

STRAIGHT CREEK PROPERTIES – DISPOSAL OF COAL
RESERVES
FINAL ENVIRONMENTAL ASSESSMENT
Bell and Harlan Counties, Kentucky

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Symbols, Acronyms, and Abbreviations

AMD	acid mine drainage
BMP	best management practice
CAH	cold water aquatic habitat
CH ₄	methane
CO ₂	carbon dioxide
DWS	domestic water supply
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FFPA	Farmland Protection Policy Act
ft	feet
ft ²	square feet
ft ³	cubic feet
GHG	Greenhouse Gases
GWP	Global Warming Potential
KPDES	Kentucky Pollutant Discharge Elimination System
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Association
NRCS	Natural Resources Conservation Service
OSMRE	Office of Surface Mining Reclamation and Enforcement
OSRW	Outstanding State Resource Water
PCR	primary contact recreation
PEM1	palustrine emergent, persistent vegetation
PEM1Fx	palustrine emergent, persistent vegetation, semi-permanently flooded, excavated
PFO1	palustrine forested, broadleaf deciduous vegetation
PFO1A	palustrine forested, broadleaf deciduous vegetation, temporarily flooded
PM _{2.5}	particulate matter less than 2.5 microns in diameter
PM ₁₀	particulate matter less than 10 microns in diameter
SCR	secondary contact recreation
SMCRA	Surface Mining Control and Reclamation Act
TVA	Tennessee Valley Authority
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAH	warm water aquatic habitat

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Proposed Action

The Tennessee Valley Authority (TVA) proposes to dispose of its mineral rights, i.e., coal reserves, underlying approximately 9,584 acres of property in Harlan and Bell Counties, Kentucky. The general location of the subject property, collectively known as the Straight Creek properties, is provided as Figure 1 below. A detailed map of the surface over these holdings and an aerial view are provided in Appendix A.

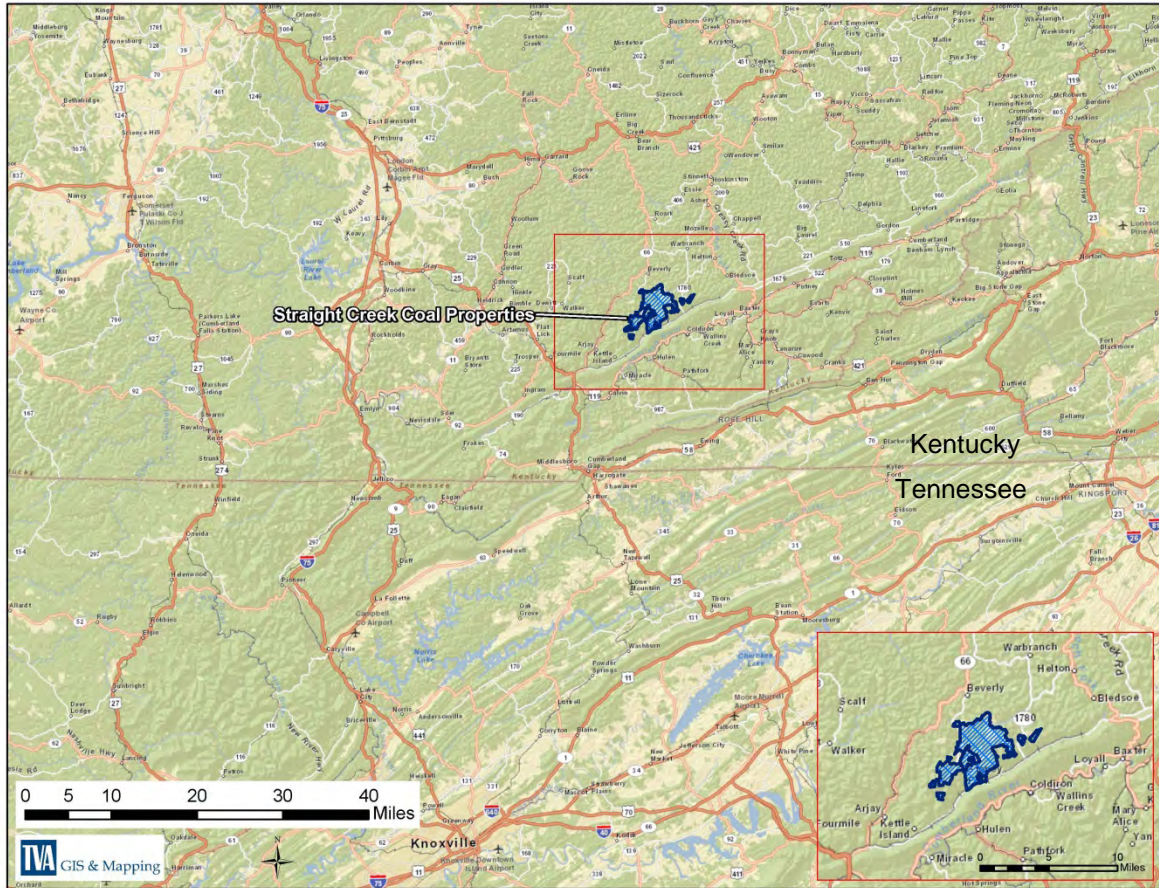


Figure 1-1. Location of TVA Straight Creek Coal Reserves, Bell and Harlan Counties, Kentucky

1.2 Purpose and Need

Since the subject coal reserves were acquired, TVA's needs for maintaining additional coal reserves to fuel its fossil plants have changed due to a variety of circumstances. Much of the coal underlying the Straight Creek property is more suitable for metallurgical purposes, such as manufacturing steel, than as steam coal. Additionally, mining of a vast portion of the coal reserves on these properties would not be economically feasible due to the thinness of the coal seam. Thus, the recognized value of the coal reserves being considered for disposal has changed. Because these reserves are no longer a strong

asset, TVA considers these reserves an unnecessary asset and proposes to declare them surplus property. Additionally, holding these coal reserves involves some associated environmental liabilities. Disposal of these coal reserves would allow TVA to recover economic value from the initial expenditure and reduce its exposure to environmental liability associated with continued ownership of coal rights underlying the properties.

1.3 Background

On behalf of the United States of America, TVA acquired rights to coal underlying approximately 8,800 acres (Tract CGCR-1) in Bell and Harlan Counties, Kentucky in 1961. As shown on the detailed topographic and aerial maps in Appendix A, Tract CGCR-1 is composed of five separate parcels (XCGCR-1 through 5); Tract CGCR-1 is the area enclosed by the yellow outline, including the dashed yellow and blue line. The purchase of Tract CGCR-1 gave TVA rights to all coal in the seam known as the Straight Creek Seam underlying the subject 8,800 acres. TVA did not acquire rights to any other coal seams or any rights to timber, oil, gas or other minerals underlying or on the subject lands. However, the deed provided certain rights to TVA, including rights of ingress, egress, and regress over the surface as are reasonably necessary for the purpose of prospecting, mining, and removing coal from the Straight Creek Seam. The deed also granted TVA the right to dispose of slate and other refuse; divert water; and erect, maintain, and remove from the surface such buildings, structures, and infrastructure as shall be reasonably necessary to mine, store, and remove coal from the Straight Creek Seam.

Also in 1961, TVA purchased certain rights to all the coal and other minerals, except gas and oil, underlying lands in Bell, Clay, Harlan, and Leslie Counties, Kentucky from the Red Bird Timber Corporation. Subsequently, these properties were known collectively as the Red Bird coal properties. Tract XEKCR-16L (composed of Parcels XEKCR-44 and 45) is included in these properties. Although TVA did not acquire any surface rights in fee, that purchase did provide TVA the right to remove coal by any mining process, to use the surface as may be necessary to conduct coal removal, to use existing roads and to construct and maintain infrastructure necessary to conduct mining operations, and to mine, remove, and transport coal underground or through surface installations on the subject land.

The original Red Bird acquisition was 40,220-acres. TVA transferred the majority of the Red Bird properties to the United States Forest Service in the year 2000, retaining only the 784-acre Tract XEKCR-16L. Tract XEKCR-16L consists of two parcels (XEKCR-44 and 45), as shown in the maps in Appendix A, outlined by the dashed blue line, including the dashed blue and yellow line. Tract XEKCR-16L abuts portions of the 8,800-acre Tract CGCR-1. The larger of the two parcels (XEKCR-44) abuts Tract CGCR-1. The smaller 48.6-acre parcel (XEKCR-45) is situated about 2.5 miles east of the larger property and adjoins an arm of the CGCR-1 main property (see Appendix A). All coal reserves that can be mined economically by surface mining techniques have been removed from Tract XEKCR-16L under previous coal leases issued by TVA.

TVA's Straight Creek properties being evaluated in this Environmental Assessment (EA) include both Tracts CGCR-1 and XEKCR-16L, a total of 9,584-acres. TVA does not own the rights to any surface-minable coal seams on Tract CGCR-1 and coal mining on Tract XEKCR-16L has occurred in the past to the extent that all of the coal that could be removed profitably by current surface mining techniques has already been mined. Thus, no additional surface mining for coal on Tracts CGCR-1 or XEKCR-16L is expected within the

foreseeable future whether or not TVA sells or retains its coal rights. Collectively, these properties (Tracts CGCR-1 and XEKCR-16L) are referred to as the “Straight Creek property” for the purposes of this EA.

Because of its depth (approximately 800 feet), the Straight Creek Seam would typically be mined by underground methods, and any removal of coal from the Straight Creek Seam under the Straight Creek property would require underground mining methods. Limited drilling indicates that the Straight Creek Seam under much of the 9,584-acre property thins to the extent that underground mining of this coal seam would be generally economically infeasible; the seam is estimated to be less than 2 feet thick. The exception to this is Parcel XCGCR-3, an approximately 122-acre property situated to the southwest of the main body of the property. TVA estimates there are approximately 192,000 recoverable tons of coal in the Straight Creek Seam under Parcel XCGCR-3.

The Straight Creek Seam is slightly thicker (estimated at less than three feet thick) under Parcel XCGCR-3 than under the rest of Tracts CGCR or XEKCR-16L. The coal under Parcel XCGCR-3 would likely be economically unattractive if it were mined independently. However, removal of the coal on Parcel XCGCR-3 could be profitable to an existing mining operation that is adjacent to or in the close vicinity of Parcel XCGCR-3, because existing mining infrastructure, such as portals, underground coal transportation systems, and air ventilation shafts could be used, thereby avoiding initial investment and start-up costs.

Thus, with the exception of the 122-acre Parcel XCGCR-3, any remaining coal cannot be currently recovered economically from beneath the 9,584-acre Straight Creek property. Therefore, TVA has determined that underground mining on virtually all of this property is unlikely for the foreseeable future. Likewise, because all surface-minable coal has been removed, no additional surface mining on the 9,584-acre TVA coal reserve holdings is expected for the foreseeable future. Underground mining of coal from the Straight Creek Seam underlying Parcel XCGCR-3 could occur if TVA disposes of the subject coal reserves.

1.4 Decision to be Made

TVA must decide whether to declare its 9,584-acre Straight Creek property surplus and dispose of those holdings under Section 31 of the TVA Act.

1.5 Scope of this Environmental Assessment

The proposed disposal (i.e., sale) of the subject coal reserves is expected to result in few, if any, immediate, direct environmental effects because the only change in current conditions would be a transfer of ownership of subsurface mineral rights.

The disposal of these coal reserves is not expected to result in additional surface mining on any of the subject TVA 9,584-acre coal reserve property. However, underground mining of coal underlying Parcel XCGCR-3 could occur in the near term. Thus, the geographic focus of the environmental review is on the potential effects associated with the possible future underground mining of the Straight Creek Seam under the 122-acre Parcel XCGCR-3.

The analysis of potential effects was focused on Parcel XCGCR-3 where underground mining could occur. No mining is anticipated on the remainder of the Straight Creek property. Thus, no changes in current conditions are anticipated on those parcels. The

following resources have the potential to be affected directly or indirectly by implementing the proposed action.

- Air quality
- Geology and groundwater
- Surface water
- Wetlands
- Floodplains and floodplain functions
- Terrestrial ecology
- Aquatic ecology
- Threatened and endangered species
- Cultural resources
- Environmental justice

The detailed analysis in this EA focuses on those resources that have the potential for significant impacts or that typically interest the public. TVA determined that there would be no impacts for the resource areas including prime farmland, natural areas, recreation, socioeconomics, noise, and aesthetics.

- Prime farmland: According to the Natural Resources Conservation Service (NRCS) online Web Soil Survey (2015) no prime farmlands are located on any of the 9,584-acre Straight Creek property, therefore no impacts to prime farmlands would occur in association with either project alternative.
- Natural Areas: There are no natural areas within the boundaries of the Straight Creek property. Daniel Boone National Forest is located 5 miles from the property boundaries, a sufficient distance that there would be no impacts with TVA's actions. Therefore, no impacts to natural areas would occur in association with either project alternative.
- Recreation: there are no organized recreational activities on the Straight Creek property or in the immediate vicinity. Informal recreation opportunities on and in the area of the subject coal properties include hunting, fishing, hiking, off-road ATV riding, and camping. None of these informal activities would be impacted by either project alternative.
- Socioeconomics: If underground mining of the Straight Creek Seam under Parcel XCGCR-3 were to occur, it would only be economically feasible for a company already engaged in coal mining in the area due to the amount of coal available and the amount of investment of resources that would be required for an outside company accessing the seam. The addition of the Straight Creek Seam to existing mining activities could extend the life of the adjacent mine by approximately 1.5

years thus resulting in a minor socioeconomic benefit to the area. No new adverse impacts to socioeconomic resources in the area would be anticipated with either project alternative.

- **Noise:** All mining activities would occur underground in a remote area and there would be no noise impacts to individuals present on the surface with either project alternative.
- **Visual resources:** All activities under either project alternative would occur underground and no changes to visual resources would be perceptible to observers on the surface. Therefore, there would be impacts to visual resources with either project alternative.

Based on the analysis described above, TVA determined the need for further analysis of these resources is unnecessary and these resource areas were not analyzed in this EA.

This EA consists of seven chapters discussing the project alternatives, resource areas potentially impacted, and analyses of impacts. The structure of the EA is outlined below:

- **Chapter 1** describes the purpose and need for the project, the decision to be made, related environmental reviews and consultation requirements, necessary permits or licenses, and the EA overview.
- **Chapter 2** describes the Proposed Action and No Action alternatives, provides a comparison of alternatives, and discusses the Preferred Alternative.
- **Chapter 3** discusses the affected environment and the potential direct and indirect impacts on these resource areas. Mitigation measures are also proposed, as appropriate.
- **Chapter 4** discusses the cumulative impacts in relation to other ongoing or reasonably foreseeable proposed activities within the surrounding area of the project site.
- **Chapter 5** contains the List of Preparers of this EA.
- **Chapter 6** lists the agencies, organizations, and individuals who were provided a copy of this EA.
- **Chapter 7** lists the Literature Cited in preparation of this EA.

1.6 Scoping and Public Involvement

TVA released a Draft EA on October 6, 2015 for public review and comment. Copies of the Draft EA were mailed to agencies and organizations who indicated an interest in the project. TVA notified federally recognized Native American Tribes, elected officials, and other stakeholders that the Draft EA was available for review and comment for a 30-day period. An electronic version of the document was posted on the TVA website where comments could also be submitted online. A public notice was also published in the Harlan Daily Enterprise, a local newspaper, soliciting comments from other agencies, the general public, and any organizations.

The comment period closed on November 5, 2015. TVA received seven sets of comments from the USFWS, the National Resources Conservation Service, the Kentucky Clearinghouse, the Kentucky Heritage Council, a resident, and two developers. TVA carefully reviewed the comments that were received. Comments were categorized by author and summarized when appropriate for this document. The comments and TVA's responses are provided in Appendix B.

1.7 Necessary Permits or Licenses

TVA does not require any permits or licenses to dispose of the Straight Creek properties. However, the purchaser of the rights to the Straight Creek coal reserves would require certain permits to mine these coal reserves. These include the following:

- Office of Surface Mining Reclamation and Enforcement (OSMRE) mining permit in accordance with the Surface Mining Control and Reclamation Act (SMCRA)
- Kentucky Pollutant Discharge Elimination System (KPDES) permit for wastewater discharge

The purchaser that obtains the rights to the Straight Creek coal reserves would be responsible for ensuring necessary permits are obtained and implemented. If the purchaser is a company with ongoing mining operations in the area, modifications of existing permits to include the Straight Creek coal reserves may occur.

CHAPTER 2 - ALTERNATIVES

2.1 Description of Alternatives

Preliminary internal scoping by TVA determined that from the standpoint of the National Environmental Policy Act (NEPA), there are two feasible alternatives available. These are the No Action Alternative and the Proposed Action Alternative. A third alternative, i.e., leasing, was considered but is inconsistent with TVA's goal to dispose of unnecessary assets. This third alternative is described in Section 2.1.3 below.

2.1.1 The No Action Alternative

Under the No Action Alternative, at least for the foreseeable future, TVA would retain its mineral rights to the Straight Creek coal seam underlying approximately 8,800 acres in Bell and Harlan Counties, Kentucky (i.e., Tract CGCR-1 as shown in Attachments 1 and 2). TVA would also retain its coal reserves situated under the 784-acre Tract XEKCR-16L in Bell and Harlan Counties. Currently, there is no active surface mining on the subject coal properties, as all surface-minable coal has been removed. Thus, no additional surface mining is reasonably foreseeable under this alternative.

In accordance with applicable licenses, any ongoing or required reclamation efforts conducted by others are expected to continue on the Straight Creek properties. TVA would retain the right to lease or sell coal reserves underlying the Straight Creek properties. Nevertheless, because all coal that is currently able to be surface mined profitably has been mined, no additional surface mining on Tract CGCR-1 or Tract XEKCR-16L is expected. Also, because the Straight Creek Seam tends to be thin under most of the Straight Creek properties, making removal unprofitable, additional underground mining of those properties is also unlikely. However, because the Straight Creek Seam is thick enough under the 122-acre Parcel XCGCR-3, underground mining of coal underlying that parcel could occur.

2.1.2 The Proposed Action Alternative

Under the Action Alternative, TVA would dispose of, i.e., sell, its mineral rights to the Straight Creek Seam situated under the subject 8,800-acre property (Tract CGCR-1) in Bell and Harlan Counties, Kentucky. TVA would also dispose of its rights to all coal underlying the 784-acre Red Bird property (Tract XEKCR-16L) in Bell and Harlan Counties. Because all surface-minable coal reserves on these properties have been exhausted, no additional surface mining is reasonably foreseeable on these two tracts. Thus, the remaining coal reserves that would be sold would be extracted by underground mining methods. As stated above, such mining is foreseeable only on the 122-acre Parcel XCGCR-3 where TVA estimates there are approximately 192,000 recoverable tons of coal in the Straight Creek Seam.

Removal of coal from the Straight Creek Seam would require the entity conducting the mining to obtain appropriate permits and approvals, including an OSMRE mining permit in accordance with the SMCRA. That mining permit requires the installation of ventilation shafts at certain intervals to avoid the accumulation of dangerous gases. The location of any such shafts is unknown at this time, but they would typically involve less than 5 acres of surface disturbance. Air ventilation shafts are present in the surrounding area which is currently being mined and it is not anticipated that any new shafts would be required within Parcel XCGCR-3. Therefore, surface disturbances are not anticipated as a result of mining the Straight Creek Seam under Parcel XCGCR-3.

In disposing of its rights, TVA would sell its existing rights to mine and remove coal from beneath the Straight Creek properties. TVA's mineral rights include limited surface rights to conduct certain activities on the surface below which the minerals are located, such as rights of ingress, egress, and regress over the surface; the right to divert surface waters; the right to dispose of mine wastes on the surface; the right to erect, maintain, or remove buildings, structures, and mine-related infrastructure; the right to use existing roads; or the right to transport coal through surface installations on the subject land. Because all of the surface-minable coal reserves on the Straight Creek properties that could have been economically mined has already been removed, and because underground mining of Parcel XCGCR-3 could only be economically viable for an existing mining operation (and associated infrastructure) that is adjacent to or in the very close vicinity of Parcel XCGCR-3, no mining-related surface disturbances are expected to occur on any of the Straight Creek properties. Accordingly, for the purposes of this EA, it is reasonable to assume that no surface disturbances would occur under the Proposed Action Alternative. In the unlikely event that mining activities are proposed by the future holder of the mineral rights that would disturb the surface, the federal approvals needed, if any, for any such activity (e.g. OSMRE approval) would be subject to environmental reviews such as those under NEPA, Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) and the deed holder would be placed on notice to follow all applicable laws and regulations.

This sale of these coal interests would be accomplished by public auction in accordance with Section 31 of the TVA Act.

2.1.3 Alternatives Considered but Eliminated From Further Discussion

Leasing of the subject coal deposits was an option that was considered. However, under this alternative the coal reserves would remain an unnecessary asset and would not meet TVA's purpose and need to dispose of surplus coal reserves. Therefore, this alternative was dismissed for consideration in this environmental review.

It is worth noting, however, that the impact of the leasing alternative would be similar to that of the Proposed Action Alternative because leasing of coal reserves under the bulk of the 9,584 Straight Creek properties, with the exception of the 122-acre Parcel XCGCR-3, is unlikely to be financially viable to potential lessees due to the thinness of the Straight Creek seam. Thus, under this option, TVA would likely be able to lease the coal only from Parcel XCGCR-3, and impacts would be similar to the Proposed Action alternative.

2.2 Comparison of Alternatives

This EA evaluates the potential environmental effects that could result from implementing the No Action Alternative and the Proposed Action Alternative. The analysis of impacts in the EA is based on the current and potential future conditions on the property and in the surrounding region. A comparison of the impacts of the alternatives is provided in Table 2-1.

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

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Air Quality	No foreseeable change from current conditions	Greenhouse gas (methane and carbon dioxide) generation is insignificant and would be

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
		generated through use of other resources if not obtained from the Straight Creek Seam
Geology and Groundwater	No foreseeable change from current conditions	Minor direct and cumulative impacts to geology associated with the mining of the coal in the Straight Creek Seam, no impacts to groundwater
Surface Water	No foreseeable change from current conditions	No impacts anticipated
Wetlands	No foreseeable change from current conditions	No impacts anticipated
Floodplains	No foreseeable change from current conditions	No impacts anticipated
Terrestrial Ecology	No foreseeable change from current conditions	No impacts anticipated
Aquatic Ecology	No foreseeable change from current conditions	No impacts anticipated
Threatened and Endangered Species	No foreseeable change from current conditions	No impacts anticipated
Cultural Resources	No foreseeable change from current conditions	No impacts anticipated
Environmental Justice	No foreseeable change from current conditions	No impacts anticipated

2.3 Identification of Mitigation Measures

TVA has not identified any non-routine measures that would be necessary to prevent, avoid or lessen potential environmental effects. The company that obtains the mineral rights to the Straight Creek properties would obtain and comply with the requirements of an OSMRE permit and a KPDES permit. The company would also comply with all applicable local, state, and federal regulations and utilize routine mitigation measures such as best management practices for all operational activities.

2.4 The Preferred Alternative

The Proposed Action Alternative is TVA's preferred alternative.

CHAPTER 3 – AFFECTED ENVIRONMENT

Chapter 3 describes the existing conditions within the Straight Creek properties that could be potentially impacted by the project alternatives. The descriptions in this chapter establish the baseline conditions against which TVA and the public can compare the potential impacts associated with each of the alternatives under consideration.

As described in Chapter 1, the analysis in this EA focuses on the 122-acre Parcel XCGCR-3 where underground mining could occur. No mining is anticipated on the remainder of the Straight Creek properties; thus, no changes in current conditions are anticipated on those properties. Chapter 3 describes the existing conditions associated with the following resources that have the potential to be affected directly or indirectly by implementing the proposed action:

- Air quality
- Geology and groundwater
- Surface water
- Wetlands
- Floodplains and floodplain functions
- Terrestrial ecology
- Aquatic ecology
- Threatened and endangered species
- Cultural resources
- Environmental justice

3.1 Air Quality

The U. S. Environmental Protection Agency (USEPA) has established the National Ambient Air Quality Standards (NAAQS) based on six criteria air pollutants of particular concern. The criteria pollutants include particulate matter, sulfur dioxide, ozone, nitrogen dioxide, lead, and carbon monoxide. Particulate matter has two standards, i.e., particles less than 2.5 microns in diameter (PM_{2.5}) and particles less than 10 microns in size (PM₁₀). The federal Clean Air Act requires states to monitor air pollutant levels and determine areas where the NAAQS levels are exceeded. Bell and Harlan counties are currently in attainment status for all NAAQS pollutants.

Greenhouse gases (or “GHGs”) are chemical compounds in the atmosphere that trap heat, thereby affecting the earth’s energy balance. Different GHGs can have different effects. The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases relative to one ton of carbon dioxide (CO₂). According to the Intergovernmental Panel on Climate Change Fifth Assessment Report, methane (CH₄) is identified as a relatively potent GHG with a GWP of 28.

3.2 Geology and Groundwater

The Straight Creek coal properties are located in Harlan and Bell counties, Kentucky, in the Cumberland Mountain Thrust Block subregion of the greater Central Appalachians ecoregion (Griffith et al. 2009). The Southern Shale Valleys of the Ridge and Valley is characterized by high, steep ridges, hills, coves and narrow valleys, with high elevations. This region is underlain by shale, siltstone, sandstone, coal, and clay, and the soils tend to be slightly acidic (Griffith et al. 2009). Surface and underground coal mining are commonly practiced in this region. Mining, logging, farming, and other land-use activities contribute substantial amounts of sediment and suspended solids to streams in the area. Coal mining and gas well and gas line development has occurred within the Mill creek and Straight Creek watersheds which intersect the property. Currently, there is no active surface mining on the subject coal properties, as all surface-minable coal has been removed.

The oldest rock in Bell and Harlan counties is the Devonian black shale, found along Pine Mountain. This black shale was formed when the deep seafloor became covered with an organic black muck. The muck is now hard black shale (an oil shale), which is one of the most distinctive of all geologic formations in Kentucky. The Mississippian sandstones and siltstones are the result of a great influx of mud, silts, and sands brought in by rivers and streams from uplands many miles to the northeast and deposited as a great delta. The Mississippian limestone found in Bell and Harlan Counties was deposited in the bottom of a warm, shallow sea. At the end of the Mississippian Period, the seas receded and sediments of the Pennsylvanian Period were deposited. The warm climate of the Pennsylvanian allowed extensive forests and great coastal swamps to grow at the edges of water bodies. Marine waters advanced and receded many times, which produced many layers of sandstone, shale, and coal. Vegetation of all sorts fell into the water and was buried under blankets of sediment, which over geologic time was compressed into coal, including the Straight Creek Seam. The nonvegetative sediments such as sand, clay, and silt were compressed into sandstone and shale. Over the last million years, unconsolidated Quaternary sediments have been deposited along the larger streams and rivers (Carey and Stickney, 2002, 2005).

The project site is underlain by the Middle and Lower Breathitt Group which South consists of siltstones, sandstones, and claystones, with small amounts of coal and clay (Kilburn, et. al. 1962). The Breathitt Group underlies the valleys and forms the hills of almost all the area north of Pine Mountain.

In Bell and Harlan Counties, groundwater is obtained from the consolidated sedimentary rocks of Devonian, Mississippian, and Pennsylvanian age, and from the unconsolidated sediments of Quaternary age. The Breathitt Group yields more than 500 gallons per day to about three-quarters of the wells on valley bottoms and more than 100 gallons per day to nearly all wells on ridges. Groundwater obtained from most drilled wells contains noticeable amounts of iron and is moderately hard in most of the county, except along Pine and Cumberland Mountains where it is generally soft. The main naturally occurring contaminants that may be present in objectionable amounts in the groundwater are sulfate, common salt, iron, and manganese. Salty water commonly occurs in this region at depths between 100 and 300 feet below ground surface. In some locations old, abandoned oil and gas wells are responsible for contamination of shallow, freshwater aquifers by salt water brought up from much deeper formations. High iron and manganese levels, found in many wells, can produce objectionable taste and stain laundry and porcelain fixtures. Often, coal mining aggravates these problems by increasing the amount of fresh surface area of the

rocks exposed to oxidation, which can increase the sulfate and metals concentrations in the groundwater (Carey and Stickney, 2002, 2005).

The effects from pre-law coal mining (mining that occurred before 1977) have impacted both ground and surface waters throughout the Eastern Kentucky Coal fields. Before the enforcement of SMCRA, many coal mines were left un-reclaimed, causing erosion and water quality issues. These areas are referred to as Abandoned Mine Lands. Both Harlan and Bell Counties have ongoing Abandoned Mine Lands and ongoing reclamation projects to clean up the impacts of prelaw mining. Acid mine drainage (AMD) is polluted water that drains from areas disturbed by coal mining and frequently occurs on abandoned mine sites. AMD occurs when pyrite a mineral that occurs in coal and associated rocks, is exposed to oxygen and water during and after the mining process. AMD is characterized by low pH and high levels of metals and sulfate. AMD can impact both surface water and groundwater sources.

3.3 Surface Water

In August 2015, a total of 26 streams were identified on the Straight Creek properties via desktop review using aerial photography, topographic maps, and National Hydrography Dataset (NHD) information. The streams include: Baker Branch, Ben Howard Branch, Big Run, Birch Lick Branch, Coon Branch, Cox Branch, Dry Fork, James York Branch, Jim Branch, Knuckles Branch, Laurel Branch, Long Branch, Mill Creek, Owl Hollow, Peach Orchard Branch, Peters Branch, Rough Branch, Squirrel Hollow, Stoney Fork, Straight Creek, Wolf Pen Branch, York Branch, an unnamed tributary to Baker Branch, and three unnamed tributaries to Wolf Pen Branch. Several of these streams are visible on the topographic map in Appendix A.

Precipitation in the general area of the proposed project averages about 50.9 inches per year. The wettest month is May with an average of 5.9 inches of precipitation, and the driest month is October at 3.1 inches. Stream flow varies with rainfall and averages about 23.5 inches of runoff per year, i.e., approximately 1.73 cubic feet per second, per square mile of drainage area (USGS 2008).

The federal Clean Water Act requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The term “303(d) list” refers to the list of impaired and threatened streams and water bodies identified by the state. Tables 3.3-1 and 3.3-2 provide a listing of local streams with their state designated (Kentucky Division of Water) uses and 303(d) impairments.

Mill Creek, a tributary to Straight Creek, is on the Kentucky Division of Water Outstanding State Resource Water (OSRW) list. Existing water quality and habitat shall be maintained and protected in those waters designated as outstanding state resource waters unless it can be demonstrated that lowering water quality or habitat modification will not have a harmful effect on the water and the species the water supports.

Table 3.3-1. Uses for Streams in the Vicinity of the Proposed Action

Stream	Use Classification ¹					
	WAH	CAH	PCR	SCR	DWS	OSRW
<u>Cumberland River</u>						
Straight Creek	X		X	X	X	
Peters Branch	X		X	X	X	
Long Fork	X		X	X	X	
Widow Branch	X		X	X	X	
Salt Trace Branch	X		X	X	X	
Laurel Branch	X		X	X	X	
Big Run	X		X	X	X	
Cox Branch	X		X	X	X	
Ben Howard Branch	X		X	X	X	
Stoney Fork	X		X	X	X	
Baker Branch	X		X	X	X	
Peach Orchard Branch	X		X	X	X	
Birch Lick Branch	X		X	X	X	
James York Branch	X		X	X	X	
Knuckles Branch	X		X	X	X	
Mill Creek	X		X	X		X

¹ Codes: WAH = warm water aquatic habitat; CAH = cold water aquatic habitat; PCR = primary contact recreation; SCR = secondary contact recreation; DWS = domestic water supply; OSRW = outstanding state resource water

Table 3.3-2. Kentucky 303(d) Listed Streams in the Vicinity of the Proposed Action

Stream	303 (d) Impaired Stream		
	Use Support	Cause	Source
<u>Cumberland River</u>			
Straight Creek	Impaired	Sedimentation Siltation Specific Conductance	Upstream Hydromodifications Loss of Riparian Habitat Rural & Residential Areas Surface Minig
Peters Branch	No		
Long Fork	No		
Widow Branch	No		
Salt Trace Branch	No		
Laurel Branch	No		
Big Run	No		
Cox Branch	No		
Ben Howard Branch	No		
Stoney Fork			Coal Mining
	Impaired	Sedimentation Siltation Turbidity	Abandoned Mine Lands Loss of Riparian Habitat Streambank Modifications Surface Mining Woodlot Site Clearance
Baker Branch	No		
Peach Orchard Branch	No		
Birch Lick Branch	No		
James York Branch	No		
Knuckles Branch	No		
Mill Creek	No		

3.4 Wetlands

Wetlands are areas that are flooded or inundated by water frequently and for long enough periods to support vegetation adapted to saturated soil conditions, such as marshes, swamps, and bogs. Wetlands provide habitat for fish and wildlife, reduce flooding by retaining water, and improve water quality through its filtering capabilities. Wetlands are protected by the Clean Water Act and by Executive Order 11990 Protection of Wetlands, which requires federal agencies to minimize the destruction, loss, or degradation of wetlands.

The Straight Creek coal properties are located within the Cumberland River watershed, within the Central Appalachian ecoregion (Woods et al. 2002). According to land use/land cover data compiled by the U.S. Geological Survey, wetlands comprise 0.30 percent of the total land use within this ecoregion (Sayler 2008). Wetland habitats are uncommon in this ecoregion due to the rugged, deeply dissected terrain; wetlands are typically associated with low-lying, poorly drained areas and floodplains. Large areas of wetlands greater than one acre are rare.

Current threats to wetlands within the region include clearing and fill associated with mining activities, altered hydrology resulting in increased or reduced flooding, and increased siltation from upland clearing and development (Sayler 2008).

Analysis of wetlands on the Straight Creek coal properties was conducted using National Wetland Inventory (NWI) maps (U.S. Fish and Wildlife Service [USFWS] 2015a). Much of this area has been previously surface mined, and most wetlands and retention ponds have formed as the result of mining excavations where surface water has been retained. NWI data indicates there are 9 wetlands within the proposed project boundaries. The largest wetland is a forested wetland 2.295-acres in size that is associated with the floodplain of Stoney Fork. The remaining 8 wetlands are small emergent wetlands that have formed in previously excavated areas (Table 3.4-1). There are also numerous small ponds present within the boundaries of the proposed project area.

Table 3.4-1. Wetlands Present Within Straight Creek Coal Properties

Wetland Type ¹	Size (acres)
PFO1A	2.295
PEM1Fx	0.628
PEM1Fx	0.441
PEM1Fx	1.088
PEM1Fx	0.663
PEM1Fx	0.661
PEM1Fx	0.136
PEM1Fx	0.663
PEM1Fx	0.381
TOTAL	6.956

¹Classification codes as defined in Cowardin et al. (1979): PFO1=palustrine forested, broadleaf deciduous vegetation; PEM1 = palustrine emergent, persistent vegetation; .A=temporarily flooded; F=semi-permanently flooded; x=excavated.

3.5 Floodplains

A floodplain is the relatively level land area along a stream or river that is subjected to periodic flooding. As a federal agency, TVA is subject to the requirements of Executive Order 11988, Floodplain Management. The objective of Executive Order 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" (United States Water Resources Council, 1978). Executive Order 11988 is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. The Executive Order requires that agencies avoid the 100-year floodplain (the area subject to a one-percent chance of flooding in any given year) unless there is no practicable alternative. For certain "Critical Actions", the minimum floodplain of concern is the 500 year floodplain, which is the area subject to a 0.2-percent chance of flooding in any given year.

The mineral rights being considered for disposal underlie portions of the Straight Creek watershed, a tributary to the Cumberland River, in Bell and Harlan counties, Kentucky, from Straight Creek miles 7.9 to 17.9, right descending bank. Stoney Fork, a tributary to Straight Creek, drains most of the 8,800-acre Tract CGCR-1. Wolf Pen Branch, York Branch, Old House Branch, and Baker Branch are tributaries to Stoney Fork. Ben Howard Branch, Big Run, Laurel Branch, Mill Creek, Peters Branch, and Salt Trace Branch cross Tracts CGCR-1 and XEKCR-16L, also. A review of Flood Insurance Rate Maps for Harlan and Bell counties, Kentucky (FEMA 2015), indicated that mapped floodplains within the two tracts are designated as Approximate Zone A. Approximate Zone A floodplains are generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed there are no Base Flood Elevations or flood depths shown (FEMA, <http://www.fema.gov/zone>, accessed July 23, 2015).

3.6 Terrestrial Ecology

This section describes existing conditions of the terrestrial ecology at and in the vicinity of the Straight Creek properties including wildlife and plants (botany).

3.6.1 Wildlife

Habitat assessments for terrestrial animal species were conducted via desktop review in August 2015. The Straight Creek properties (CGCR-1 and XEKCR-16L) currently contain both forest land and areas of herbaceous vegetation. The landscape directly surrounding the project footprint is likely comprised of a combination of deciduous and coniferous forest types, wetlands, streams, early successional (pasture and agricultural) fields, roads, and residential homes. Each of the varying community types offers suitable habitat for species common to the region both seasonally and year-round.

Forested areas within in the Straight Creek Properties include both reclaimed mined land that has been replanted in hardwoods/pines and unmined areas that are in various stages of succession. Some areas have been planted with native oaks (black, blackjack, scarlet, southern, and white) and pines (pitch, shortleaf, Virginia, and white pine, see Botany Section) which would, in time, provide mature forested habitat for wildlife species. Some species found here may include but are not limited to the American tree sparrow, white-breasted nuthatch, white-eyed vireo, wood thrush, and yellow-bellied sapsucker. Hawks

that nest in woodland areas yet forage in more open areas include the Cooper's hawk, northern harrier, and sharp-shinned hawk. The hawks will also likely use the reclaimed mining areas found in reclaimed forested areas (Palmer-Ball 1996). Common mammals likely to be found here include the eastern mole, long-tail weasel, and red fox (Whitaker 1996). The eastern box turtle and northern ringneck snake are reptiles that are commonly found in these habitats (Conant and Collins 1998).

Large areas of CGCR-1 and XEKCR-16L are also dominated by herbaceous vegetation. Aerial photos suggest these habitats are associated with surface mining and are therefore likely to be dominated by non-native plants. Herbaceous areas previously disturbed by human activity are home to a large number of common species including the American robin, black vulture, Carolina chickadee, dickcissel, eastern bluebird, European starling, field sparrow, grasshopper sparrow, northern cardinal, northern mockingbird, and turkey vulture (Palmer-Ball 1996, National Geographic 2002). Mammals found in this community type include the eastern gray squirrel, northern raccoon, Virginia opossum, and white-tailed deer. Bat species likely found within this habitat include the big brown bat, eastern red bat, evening bat, silver-haired bat, and tricolored bat (Kays and Wilson 2002). Reptiles potentially present include the black rat snake, eastern garter snake, and black kingsnake (Conant and Collins 1998).

A total of 36 streams were identified on the Straight Creek coal properties (see Aquatic Ecology Section) which provides habitat for common amphibians, birds, and reptiles that inhabit riparian areas. The American bullfrog, northern dusky salamander, and spring peeper are common amphibians found near riparian areas in this region (Conant and Collins 1998). The Acadian flycatcher, blue heron, eastern wood-pewee, northern parula, and Louisiana waterthrush are commonly found in drainages and riparian areas in this region (Palmer-Ball 1996). The northern watersnake, rough green snake, and timber rattlesnake are common reptiles likely present within riparian habitat of this region (Conant and Collins 1996).

Review of the TVA Regional Natural Heritage database and Kentucky Natural Heritage Program records in August 2015 indicated there are no caves within three miles of the project footprint. The nearest cave record occurs approximately 12.5 miles from the project footprint. No other unique or important terrestrial habitats exist on the project site.

According to the TVA Regional and Kentucky Natural Heritage database, no aggregations of migratory birds or colonial wading bird colonies are known within three miles of the project footprint. The nearest known wading bird colony occurs approximately 35 miles from the project footprint.

3.6.2 Botany

The Straight Creek properties CGCR-1 and XEKCR-16L occur in the Dissected Appalachian Plateau Level IV ecoregion (Woods et al. 2002). Forest is the most prevalent land cover in the region, but the structure and composition of forest stands vary substantially according to factors including slope, aspect, and previous land use. The Straight Creek properties currently contain both forest land and areas of herbaceous vegetation. Forested areas include both reclaimed mined land that has been replanted in hardwoods/pines and unmined areas that are in various stages of succession. Large areas of CGCR-1 and XEKCR-16L are also dominated by herbaceous vegetation. Aerial photos suggest these habitats are associated with surface mining and are therefore likely to be dominated by non-native plants. In fact, Attachment 22.2 A of the mining application for

neighboring tracts indicates that the non-native plants clover, lespedeza, and tall fescue would be used for pastures and wildlife enhancement (Rockhampton Energy 2011). Native oaks (black, blackjack, scarlet, southern, and white) and pines (pitch, shortleaf, Virginia, and white pine) were used where forest was the target post-mining vegetation type.

3.7 Aquatic Ecology

TVA assigns appropriate streamside management zones (SMZs) and best management practices (BMPs) based on riparian condition and other considerations (such as State 303(d) listing and presence of endangered or threatened aquatic species). Appropriate application of the BMPs minimizes the potential for impacts to water quality and instream habitat for aquatic organisms. Table 3.7-1 provides a list of the SMZs identified within the Straight Creek properties, the streams they are associated with, and information on black side dace habitat within those SMZs. The blackside dace is discussed further in Section 3.8.3.

Table 3.7-1. Streams on or intersecting the Straight Creek properties

Stream ID	Stream Type	Streamside Management Zone Category	Stream Name	Notes
001	Perennial	Category B (70 ft)	Mill Creek	Blackside Dace Habitat
002	Perennial	Category B (70 ft)	Dry Fork	Potential Blackside Dace Habitat
003	Perennial	Category B (70 ft)	Mill Creek	Blackside Dace Habitat
004	Perennial	Category A (50 ft)	Wolf Pen Branch	
005	Perennial	Category A (50 ft)	Unnamed Tributary 1 to Wolf Pen Branch	
006	Perennial	Category A (50 ft)	Unnamed Tributary 2 to Wolf Pen Branch	
007	Perennial	Category A (50 ft)	Unnamed Tributary 3 to Wolf Pen Branch	
008	Perennial	Category A (50 ft)	Stoney Fork	
009	Perennial	Category B (70 ft)	Knuckles Branch	
010	Perennial	Category B (70 ft)	Stoney Fork	
011	Perennial	Category B (70 ft)	James York Branch	
012	Perennial	Category A (50 ft)	York Branch	
013	Perennial	Category B (70 ft)	Stoney Fork	Blackside Dace Habitat
014	Perennial	Category B (70 ft)	Birch Lick Branch	Blackside Dace Habitat
015	Perennial	Category B (70 ft)	Birch Lick Branch	Blackside Dace Habitat
016	Perennial	Category B (70 ft)	Peach Orchard Branch	Potential Blackside Dace Habitat
017	Perennial	Category B (70 ft)	Jim Branch	Potential Blackside Dace Habitat
018	Perennial	Category B (70 ft)	Baker Branch	Potential Blackside Dace Habitat
019	Perennial	Category B (70 ft)	Unnamed Tributary to Baker Branch	Potential Blackside Dace Habitat
020	Perennial	Category B (70 ft)	Coon Branch	Potential Blackside Dace Habitat
021	Perennial	Category B (70 ft)	Laurel Branch	Potential Blackside Dace Habitat
022	Perennial	Category A (50 ft)	Ben Howard Branch	
023	Perennial	Category A (50 ft)	Ben Howard Branch	
024	Perennial	Category A (50 ft)	Ben Howard Branch	
025	Perennial	Category A (50 ft)	Rough Branch	
026	Perennial	Category A (50 ft)	Straight Creek	

Stream ID	Stream Type	Streamside Management Zone Category	Stream Name	Notes
027	Perennial	Category A (50 ft)	Straight Creek	
028	Perennial	Category A (50 ft)	Straight Creek	
029	Perennial	Category A (50 ft)	Cox Branch	
030	Perennial	Category A (50 ft)	Big Run	
031	Perennial	Category A (50 ft)	Squirrel Hollow	
032	Perennial	Category A (50 ft)	Laurel Branch	
033	Perennial	Category A (50 ft)	Laurel Branch	
034	Perennial	Category A (50 ft)	Owl Hollow	
035	Perennial	Category B (70 ft)	Peters Branch	Potential Blackside Dace Habitat
036	Perennial	Category B (70 ft)	Long Branch	Potential Blackside Dace Habitat

3.8 Threatened and Endangered Species

The Endangered Species Act provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize federally listed species or their designated critical habitat. The policy of Congress is that federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes. The State of Kentucky provides protection for species considered threatened, endangered, or deemed in need of management within the state other than those federally listed under the Endangered Species Act. This listing is managed by the Kentucky Department of Fish and Wildlife; however, both Kentucky Natural Heritage Program and TVA maintain databases of aquatic animal species that are considered threatened, endangered, special concern, or tracked in Kentucky.

This section describes the threatened and endangered species known in the vicinity of the Straight Creek properties. The analysis includes terrestrial (both wildlife and plants) and aquatic species.

3.8.1 Terrestrial Animal Threatened and Endangered Species

A review of the TVA Regional and Kentucky Natural Heritage database in August 2015 resulted in four Kentucky state-listed terrestrial species (the eastern small-footed myotis, golden-winged warbler, Pine Mountain tigersnail, and Rafinesque's big-eared bat) and one federally listed terrestrial animal species (the northern long-eared bat) within three miles of the Straight Creek properties proposed for disposal. In addition, five federally listed or candidate for federal listing terrestrial animal species (the gray bat, Icebox Cave beetle, Indiana bat, northern long-eared bat, and red-cockaded woodpecker) have been reported from Bell and Harlan Counties, Kentucky. The federal, Kentucky state-listed, and other species of conservation concern in Bell and Harlan Counties are included in Table 3.8-1.

Table 3.8-1. Federally listed terrestrial animal species reported from Bell and Harlan Counties, Kentucky and other species of conservation concern documented within three miles of the Straight Creek Properties¹

Common Name	Scientific Name	Status ²	
		Federal	State (Rank ³)
Birds			
Golden-winged warbler	<i>Vermivora chrysoptera</i>	--	THR(S2B)
Red-cockaded woodpecker*	<i>Picoides borealis</i>	LE	X(SX)
Insects/Invertebrates			
Pine Mountain tigersnail	<i>Anguispira rugoderma</i>	--	END(S2)
Icebox Cave beetle*	<i>Pseudanophthalmus frigidus</i>	C	THR(S1)
Mammals			
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	--	SC(S3)
Gray bat**	<i>Myotis grisescens</i>	LE	THR(S2)
Eastern small-footed bat	<i>Myotis leibii</i>	--	THR(S2)
Northern long-eared bat	<i>Myotis septentrionalis</i>	LT	END(S4)
Indiana bat**	<i>Myotis sodalis</i>	LE	END(S1S2)

¹ Source: TVA Regional and Kentucky Natural Heritage Database, extracted 08/10/2015, USFWS Ecological Conservation Online System (<http://ecos.fws.gov/ecos/home.action>), and Kentucky Bat Working Group species occurrence maps (<http://biology.eku.edu/bats.htm>), accessed 08/10/2015.

² Status Codes: C = Candidate for Listing; END = Endangered; LE = Listed Endangered; LT = Listed Threatened; SC = Special Concern; THR = Threatened; X = Extirpated.

³ State Ranks: SX = Presumed Extirpated; S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S#B = Rank of a breeding population.

* Federally listed species records from Bell and/or Harlan County, Kentucky, though the exact location of the record is unknown.

** Federally listed species records from Bell and/or Harlan County, Kentucky, but not within three miles of the project footprint.

Golden-winged warblers are found in areas of patchy vegetation types that include shrubs, small trees, and dense herbaceous vegetation. These habitats are ephemeral and require periodic disturbance to maintain preferred conditions. In Kentucky, this species is known from drier slopes that have been recently cleared of forests such as those found on reclaimed mining sites (Palmer-Ball 1996). There are 14 records of this species within the proposed areas for land-rights disposal.

Red-cockaded woodpeckers in the northern portion of their historic range likely used mixed pine-hardwood forests with closed or partially open canopies, maintained by naturally occurring fires (Palmer-Ball 1996). These woodpeckers are thought to be extirpated from most of their habitat. No records are known to occur within 10 miles of the project, however according to the Kentucky State Nature Preserves Commission, red-cockaded woodpeckers were historically found in Bell and Harlan Counties. The Straight Creek property contains forested areas in both reclaimed mined lands and unmined areas in various stages of succession. While it is possible that suitable habitat for red-cockaded woodpeckers occurs within forests of the project area, the Kentucky Ecological Services

Field Office of the U.S. Fish and Wildlife Service considers the red-cockaded woodpecker extirpated from Kentucky.

Pine Mountain tigersnails are found near rotten logs, in old growth or mature second growth tulip trees (Carnegie 2014). They are only known from approximately 100 square miles in southeastern Kentucky. The closest known record of this species is approximately 0.4 miles from the property disposals. Based on desktop review, potentially suitable habitat for these species may occur within the project footprint.

The only known records of the Icebox Cave beetle are from one cave in Bell County, approximately seven miles from the project area. The Icebox Cave beetle is a candidate for federal listing under the Endangered Species Act. Species of this genus of beetles are typically found under rocks or debris in the twilight zone or dark zones of caves. They are found in areas with moist soil, often near streams or drip areas (NatureServe 2015). Icebox Cave is greater than 7.0 miles from the land disposal properties. Suitable habitat for this species does not exist on the properties slated for land rights disposal.

Rafinesque's big-eared bats roost in caves, rock shelters, mines, buildings, or hollow trees or forested areas. The eastern small-footed bat hibernates in caves and mines in winter, but roosts in crevices of rocky outcrops, talus slopes, buildings, bridges, hollow trees, exfoliating bark, dams caves, and mines in summer. Both species forage in mature forest and over permanent water bodies including rivers. Eastern small-footed bats have also been reported foraging in clearings over stripmines (Harvey 1992, NatureServe 2015). Roosting, foraging, and sources of drinking water for Rafinesque's and eastern small-footed bats likely exists on the properties slated for land rights disposal.

Gray bats are associated with caves year-round, roosting in different caves throughout the year. Bats disperse from colonies at dusk to forage along waterways (Tuttle 1976). One gray bat record exists approximately 5.7 miles from the project. There are no known cave records within the project footprint. However, any mines with surface openings remaining on the property may provide transitional roosting habitat for gray bats. Based on desktop review, suitable sources of drinking water and foraging habitat for gray bats also exist throughout the project footprint.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. Roost selection by the northern long-eared bat is similar to Indiana bat, however it is thought that northern long-eared bats are more opportunistic in roost site selection. This species has also been documented roosting in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). Suitable summer roosting habitat for the northern long-eared bat is known to exist on the proposed tracts for land rights disposal. Any mines remaining on these properties may offer additional roosting habitat for the northern long-eared bat. Based on desktop review, suitable foraging habitat and sources of drinking water for the northern long-eared bat also exist on the properties in question.

Indiana bats hibernate in caves in winter and use areas around them in fall and spring (for swarming and staging), prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead and living trees in mature forests with an open understory, often near sources of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years. This species forages over forest canopies, along forest edges, and tree lines, and occasionally over bodies of water (Pruitt and TeWinkel 2007, Kurta et al. 2002, USFWS 2015b). Several records of Indiana bat collected from mist-net surveys in maternity areas and acoustic records exist in Bell and Harlan Counties. The closest of these records is approximately 5.9 miles from the project. Based on desktop review, suitable summer roosting habitat, foraging habitat, and drinking water likely occur within the proposed land rights disposal tracts. Any mines with surface openings remaining on these properties may also offer winter roosting habitat for Indiana bat.

3.8.2 Botanical Threatened and Endangered Species

Data provided by the Kentucky State Nature Preserves Commission indicates that five state and no federally listed plant species have been previously reported within a one-mile vicinity of the Straight Creek properties (Table 3.8-2). No federally listed plant species have been previously reported from Bell or Harlan County, Kentucky. No designated critical habitat for plants occurs on the tracts proposed for landrights disposal. Substantial portions of CGCR-1 and XECCR-16L have been surfaced mined and, due to the wholesale disturbance on those portions of the tract, it is highly unlikely that state-listed plant species occur there. It is possible that one or more populations of state-listed plant species occur within portions of CGCR-1 and XECCR-16L that were not mined and are currently forested.

Table 3.8-2. Species of conservation concern known from within one mile of the Straight Creek Properties

Common Name	Scientific Name	Federal Status	KY State Status (Rank)
American Golden-saxifrage	<i>Chrysosplenium americanum</i>	-	THR(S2?)
Rock Harlequin	<i>Corydalis sempervirens</i>	-	SPCO(S3?)
Nodding Mandarin	<i>Prosartes maculata</i>	-	SPCO(S3?)
Ovate Catchfly	<i>Silene ovata</i>	-	END(S1)
Roan Mountain Goldenrod	<i>Solidago roanensis</i>	-	THR(S1S2)

Status codes: **END** = Endangered; **SPCO** = Special Concern; **THR** = Threatened.

Rank Codes: S1 = Extremely rare and critically imperiled in the state with 5 or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extirpation; S2 = Very rare and imperiled within the state, 6 to 20 occurrences; S3 = Rare or uncommon with 21 to 100 occurrences; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2); ? = Denotes uncertainty in exact rarity of the element.

3.8.3 Aquatic Threatened and Endangered Species

A query of the Kentucky State Nature Preserves Commission database indicated that one federally-listed endangered, one federally-listed threatened, one candidate for federal listing, and four additional state-listed aquatic animals are currently known from Harlan and Bell counties, Kentucky (Table 3.8-3).

Table 3.8-3. Records of Federal and State-listed Aquatic Animal Species within Harlan and Bell counties, Kentucky¹

Common Name	Scientific Name	Element Rank ²	Status ³	
			Federal	State (Rank) ⁴
Crayfish				
Longclaw Crayfish	<i>Cambarus buntingi</i>	E		SPCO (S3S4)
Mountain Midget Crayfish	<i>Cambarus parvoculus</i>	E		THR (S2)
Fishes				
Blackside Dace	<i>Phoxinus cumberlandensis</i>	E	LT	THR (S2)
Kentucky Arrow Darter	<i>Etheostoma spilotum</i>	E	C	THR (S3)
Mussels				
Cumberland Elktoe	<i>Alasmidonta atropurpurea</i>	E	LE	END (S1)
Cumberland Papershell	<i>Anodontoides denigratus</i>	E		END (S1)
Pocketbook	<i>Lampsilis ovata</i>	E		END (S1)

¹Source: Kentucky State Nature Preserves Commission (KSNPC), queried 7/29/15; and KSNPC County Species Lists

²Element Rank: E = Extant

³Status Codes: LE or END = Listed Endangered; LT or THR = Threatened; C = Candidate for Federal Protection; SPCO = Species of Special Concern

⁴State Rank: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Tracked

The federally threatened blackside dace (USFWS 1987) is an inhabitant of small upland tributaries of the upper Cumberland River drainage in Kentucky and Tennessee, the upper Kentucky River drainage in Kentucky, and the Powell and Clinch River drainages in Virginia. It is typically found in streams with substrates comprised primarily of sand, sandstone, and shale, with adequate canopy cover including hemlock, mountain laurel and other deciduous species which help in-stream temperatures remain cool year-round. This species is relatively secretive and tends to dwell in pools near undercut banks with vegetative cover (Etnier and Starnes 1993). The blackside dace has experienced considerable decline across its former range due to habitat degradation associated with a variety of human-related activities including resource extraction, land development, road construction, and agricultural practices. Within the Straight Creek drainage, it previously occurred in seven streams in addition to Straight Creek, but is now restricted to three tributaries of Straight Creek: Mill Creek, Caney Creek, and Howard Branch (USFWS 2015c).

The Kentucky arrow darter is currently proposed as a threatened species under the Endangered Species Act (USFWS 2015d). It inhabits pools or transitional areas between pools and riffles in moderate to high-gradient streams with rocky substrates, and is often found near various types of cover including boulders, rock ledges, and woody debris (Etnier and Starnes 1993, USFWS 2015d). This species is also known to utilize riffle habitats with moderate flow during spawning. The Kentucky arrow darter formerly occurred in at least 74 streams in the upper Kentucky River drainage of eastern Kentucky, but habitat and water

quality degradation have reduced its current range to 47 streams in the upper Kentucky River drainage (USFWS 2015d). This species is not expected to be found within the project area.

The federally endangered Cumberland elktoe (USFWS 1997) is endemic to the Cumberland River drainage in Kentucky and Tennessee. Its former distribution included the main stem Cumberland River and its tributaries entering from the south between the Big South Fork Cumberland River upstream to Cumberland Falls, in addition to Marsh Creek above Cumberland Falls. It has been observed in areas of slow current with sand, mud, and cobble substrates, generally at depths of one to two feet (Parmalee and Bogan 1998). This species has declined significantly due to factors such as coal-mining and the completion of Wolf Creek Dam. It is currently known to persist in only three populations: Rock Creek, McCreary County, Kentucky; the upper Big South Fork Cumberland River drainage in McCreary County, Kentucky, and Scott, Fentress, and Morgan counties, Tennessee; and in Marsh Creek, McCreary County, Kentucky (USFWS 1997).

The Draft EA recorded a second candidate for federal listing, the Cumberland arrow darter (*Etheostoma sagitta*). On October 8, 2015, the USFWS determined that federal listing of the Cumberland arrow darter was not warranted. Therefore, this species is no longer a candidate for federal listing.

3.9 Cultural Resources

TVA is coordinating its NEPA review of the Straight Creek Properties Disposal of Landrights Project with a Section 106 review of the proposed actions. Under Section 106 of the National Historic Preservation Act (NHPA), agencies must consider the possible effects of their actions on historic properties, and must provide the Advisory Council on Historic Properties an opportunity to comment. Regulations implementing NHPA Section 106 define an undertaking as “a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval,” (36 CFR Part 800.16(y)). TVA determined that the proposed action is an undertaking for purposes of Section 106 compliance. Further, 36 CFR Part 800.3(a) requires agencies to consider whether the proposed undertaking is a type of activity that has the potential to cause effects on historic properties. If the undertaking is such an activity, then the agency must follow steps outlined in 36 CFR Part 800.4 through 800.13. These steps include consultation with federally-recognized Indian tribes and the appropriate state historic preservation officer(s) and other consulting parties, defining the area of potential effects, identifying historic properties, evaluating project effects on historic properties, and resolving adverse effects. Historic property is defined as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior,” (36 CFR Part 800.16(l)).

TVA's action consists of selling mineral rights to the property. The subject coal reserve properties consist of Tract CGCR-1 and Tract XECCR-16L. Data available to TVA from the Kentucky Heritage Council concerning the locations of previously recorded archaeological sites do not indicate the presence of any archaeological sites within the Straight Creek properties. Examination of the current USGS Balkan, Kentucky 7.5-minute topographic quadrangle shows that Tract CGCR-1 includes the communities of Stoney Fork, with

approximately 33 mapped structures (mostly houses) and a cemetery, and Camp Ritter, with approximately 12 houses. These communities are located along Highway 221, which parallels the southern boundary of the tract. In addition, a small number of scattered structures are shown on Route 2011. The 1954 and 1974 editions of this topographic map also show those communities, with approximately the same number of structures. No houses or cemeteries are shown in Parcel XCGCR-3 on any of these editions of the Barren, Kentucky quadrangle. The 1891 Cumberland Gap KY-VA-TENN 30-minute topographic quadrangle does not show Highway 221 or Route 2011, and shows no structures or cemeteries in Tract CGCR-1 or XEKCR-16L. Based on these maps, existing highways were built and the communities of Stoney Fork and Camp Ritter were established sometime during the first half of the twentieth century. Large areas within Tract CGCR-1 have been affected by surface mining, and these communities were very likely related to the development of coal mines in the area.

3.10 Environmental Justice

Both Bell and Harlan are rural counties with relatively small populations. Pertinent low-income and minority statistics for each, as well as for the State of Kentucky, are provided in Table 3.10-1. As shown in the table, economic conditions in both counties are well below the state level. Additionally, whites form a very large proportion of the population, while blacks or African American and other minorities comprise only about 5 percent of the population in each of the two counties.

Table 3.10-3. Low-Income and Minority Populations in Bell and Harlan Counties, Kentucky

Characteristic	Bell County	Harlan County	Kentucky
2014 Population	27,778	28,163	4,413,457
White alone	95.4 %	96 %	88.5
Black or African American alone	2.4 %	2.2 %	8.2 %
Hispanic or Latino	0.9 %	0.8 %	3.3 %
White (not Hispanic or Latino)	94.6 %	95.3 %	85.6 %
Per capita income (2009-2013)	\$15,091	\$16,257	\$23,462
Persons below poverty level (2009-2013)	33.5 %	31.3 %	18.8 %

Source: U.S. Census Bureau (2015)

CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

Chapter 4 discusses the potential effects to the Straight Creek properties and surrounding area associated with the implementation of either of the project alternatives. This section evaluates the impacts associated with No Action and Proposed Action Alternatives for the resource areas described in Chapter 3. This analysis is based on the assumption described previously that there would be no surface disturbances under either the No Action Alternative or the Proposed Action Alternative. In the event the need for surface disturbances was identified in the future, those activities would be subject to environmental reviews at that time.

4.1 Air Quality

Under both the No Action and Proposed Action, the Straight Creek Seam under the 122-acre Parcel XCGCR-3 could be mined which could result in the release of the GHGs methane and carbon dioxide.

In general terms, based on rank, coal can be classified as either “thermal” coal or “metallurgical” coal. The coal from the Straight Creek Seam is a high-quality “coking coal” typically used for metallurgical purposes. No plants within the United States currently coke coal, therefore the coal mined from the Straight Creek Seam would most likely be exported and it is not possible to determine the ultimate destination where the coal would be utilized. To determine the potential for air quality impacts associated with the use of this coal, TVA estimated approximately 192,000 tons of coal would be available for mining under Parcel XCGCR-3. Additionally, TVA estimated the metric tons of methane and CO₂ equivalent tons that could be produced from its use (Table 4.1-1).

Table 4.1-1. Estimated emissions of Methane and CO₂ equivalents from the Straight Creek Seam in Parcel XCGCR-3

	Approximate tons of coal	Cuft of methane (CH ₄)	Metric tons of CH ₄	CO ₂ equivalent metric tons	CO ₂ equivalent US tons
1 ac-ft	1,800	115,740	2.2	51.4	56.6
XCGCR-3	~192,000	12,345,600	238.3	5,480.2	6,039.2

Assumptions and constants:

recovery rate of mining = 0.5 (50%)	Weight of methane	0.7168 gallons per litre
yield rate (tons/acre ft)(Univ KY) = 1800	1 Litre	0.03531467 ft ³
1 ac-ft = 43560 ft ³	Weight of methane	20.2975138 gallons per ft ³
1 ac-ft yields 1,800 tons of coal	Conversion	1,000,000 gallons per metric ton
1 ac-ft of coal yields 115,740 ft ³ of methane	1 ft ³ methane	0.0000203 metric tons
1 ton of coal yields 64.3 ft ³ of methane		
US ton = metric ton*1.102		
metric tons = ft ³ of methane*.000193		
metric ton CO ₂ equivalent = tons of methane *23		
metric ton CO ₂ equivalent = cubic feet of methane * 0.000479389 (EPA 2015)		
1 lb of coal yields 9.31*10 ⁻⁴ metric tons of CO ₂ from combustion (EPA 2015)		

Facilities that process coal for metallurgical purposes typically make coke, an ingredient in steelmaking. The emissions associated with the coal from the 122-acre Parcel XCGCR-3 Straight Creek Seam do not constitute a significant increase above normal operational levels for such facilities. In fact, if the coal from the Straight Creek Seam were not available, the facilities using such coal would still operate and would utilize an equivalent amount of coal from another resource. Impacts associated with the use of the Straight Creek Seam therefore would be minor.

4.1.1 No Action Alternative

Under the No Action Alternative, TVA would retain its mineral rights to the Straight Creek properties. Ongoing reclamation activities on the Straight Creek properties would continue, but no additional surface or underground mining would be expected to occur on Tract CGCR-1 or Tract XEKCR-16L. There would be no direct or indirect impacts to air quality.

4.1.2 Proposed Action Alternative

Under the Proposed Action, the purchaser of the Straight Creek property mineral rights is likely to mine the Straight Creek Seam underlying the 122-acre Parcel XCGCR-3. If this coal were mined it would be expected to produce the estimated amounts of methane and carbon dioxide described above. As discussed, these amounts of methane and carbon dioxide do not constitute a significant contribution to the typical emissions from coal coking facilities and therefore, direct or indirect impacts to air quality associated with the Proposed Action would be minor.

4.2 Geology and Groundwater

4.2.1 No Action Alternative

Under the No Action Alternative, disposal of the mineral rights would not occur. Ongoing reclamation activities on the Straight Creek properties would continue, however these are unrelated to the TVA action. No underground mining would occur. There would be no direct or indirect impacts to geology or groundwater.

4.2.2 Proposed Action Alternative

Under the Proposed Action, the purchaser of the mineral rights to the Straight Creek properties is likely to mine the approximately 192,000 recoverable tons of coal underlying Parcel XCGCR-3. Mining would allow oxygen and moisture to reach the coal and surrounding rock. Additionally, mining would result in the removal of portions of the Straight Creek Seam, resulting in a permanent impact to geology. This removal would not, however, affect any of the surrounding geological units. Underground mining from Parcel XCGCR-3 would occur only with the appropriate permits and approvals, (including a mining permit from the OSMRE in accordance with the SMCRA). Regulations implementing SMCRA govern the design, operation, and environmental impact of mines. Mining and reclamation sites are inspected on a regular basis by state inspectors under these regulations. Federal inspectors also conduct random oversight inspections. Additionally, the seam would be mined by the deep mine method which allows for the maximum recovery of coal in the mine area with minimal surface disturbance (this would make the risks associated with subsidence negligible). Therefore, the impacts to geology and groundwater from the removal of the coal would be minor.

4.3 Surface Water

4.3.1 No Action Alternative

Under the No Action Alternative, no active surface mining would be anticipated on the subject coal properties, as all surface-minable coal has been removed. Additionally, no underground mining would be anticipated under the No Action Alternative. Any ongoing or required reclamation efforts conducted by others are expected to continue on the Straight Creek properties and could generate soil disturbances with the potential to impact surface water. The reclamation activities and effects of those activities are unrelated to the TVA action. No impacts to surface water would be anticipated as a result of the No Action Alternative.

4.3.2 Proposed Action Alternative

Under the Proposed Action, no active surface mining on the subject coal properties would be anticipated as all surface-minable coal has been removed. Any ongoing or required reclamation efforts conducted by others are expected to continue on the Straight Creek properties and could generate soil disturbances with the potential to impact surface water. As described above for the No Action Alternative, under the Proposed Action these impacts to surface water would be minor and temporary.

Underground mining of Parcel XCGCR-3 would be anticipated under the Proposed Action. Design, construction, and maintenance of any underground mining would be subject to federal and state guidelines for BMPs, and to permitting requirements prior to any direct discharge to the Waters of the US. With the implementation of permit requirements and BMPs, no direct or indirect impacts to surface waters are anticipated in association with underground mining of Parcel XCGCR-3.

4.4 Wetlands

4.4.1 No Action Alternative

Adoption of the No Action Alternative would not result in substantial changes to wetlands at or in the vicinity of the Straight Creek properties. All reclamation and surface activities would continue and changes to wetlands associated with these activities would not be the result of any TVA action.

4.4.2 Proposed Action Alternative

Under the Proposed Action, as described previously, all reclamation activities, including revegetation of disturbed areas, would continue on the Straight Creek properties. Wetland impacts would continue to occur, but the impacts would not be a result of adopting the Proposed Action Alternative.

Any new underground mining of coal on Parcel XCGCR-3 would be anticipated to have no direct or indirect impacts to wetlands as NWI maps indicate no wetlands are present on this tract and because the mining would all occur underground.

4.5 Floodplains

4.5.1 No Action Alternative

Under the No Action Alternative, disposal of the mineral rights would not occur. Ongoing reclamation activities on the Straight Creek properties would continue regardless of the TVA action. Therefore, there would be no direct or indirect impacts to floodplains because there would be no physical changes to the current conditions found within the local floodplains associated with the TVA action.

4.5.2 Proposed Action Alternative

For Tracts CGCR-1 and XEKCR-16L, no surface mining is expected or foreseeable, because all of the coal that could be extracted economically has already been mined; therefore, there would be no impacts to floodplains or floodplain resources associated with the disposal of mineral rights. Any ongoing reclamation efforts on the Straight Creek properties would continue, though any floodplain impacts from those activities would not be associated with TVA's action and, therefore, no impacts would occur.

No surface disturbances are expected on Parcel XCGCR-3, though underground mining would be anticipated. Underground mining would be conducted in accordance with all federal and state regulations. Additionally, as there would be no associated surface disturbances, no direct or indirect impacts to floodplains would be anticipated.

4.6 Terrestrial Ecology

This section describes the potential impacts to terrestrial ecology (both wildlife and plants) at and in the vicinity of the Straight Creek properties.

4.6.1 No Action Alternative

4.6.1.1 Wildlife

Under No Action Alternative, any ongoing or required reclamation efforts conducted by others are expected to continue on the Straight Creek properties. No additional surface mining on Tracts CGCR-1 or XEKCR-16L is expected. Impacts to wildlife habitat would be limited to locations where reclamation efforts would continue. Any wildlife (primarily common, habituated species) currently using these heavily disturbed areas may be displaced by increased levels of disturbance during actions, but it is expected that they would return to the project area upon completion of actions. Attachment 22.2A of the mining application for this property indicates that the non-native plants clover, lespedeza, and tall fescue would be used for pastures and wildlife enhancement during reclamations (Rockhampton Energy 2011). Thus it is expected that the common wildlife populations would increase as vegetation grows and habitat improves in reclaimed areas.

4.6.1.2 Botany

Adoption of the No Action Alternative would not result in appreciable changes to the terrestrial ecology of the region. Plant communities present on CGCR-1 or XEKCR-16L are heavily disturbed in many areas and likely contain substantial cover of non-native invasive plants, but some portion of the tracts likely contain mature forest. No additional mining is expected to occur on CGCR-1 or XEKCR-16L and TVA does not own the surface rights. All reclamation activities, including revegetation of disturbed areas, would continue regardless of TVA's decision. Changes to local plant communities would continue to occur, but the changes would not be a result of any TVA action.

4.6.2 Proposed Action Alternative

Under the Proposed Action alternative, no surface disturbance would be anticipated beyond that already occurring on the Straight Creek properties. As described for the No Action Alternative, no impacts to terrestrial ecology (wildlife and botany) would be anticipated as a result of ongoing surface reclamation activities. Underground mining would occur on Parcel XCGCR-3. New underground mining of coal on Parcel XCGCR-3 would not be expected to result in impacts to the terrestrial surface; therefore, direct or indirect impacts to terrestrial ecology (plant or wildlife) are not anticipated under the Proposed Action Alternative.

4.7 Aquatic Ecology

4.7.1 No Action Alternative

Under the No Action Alternative, any ongoing or required reclamation efforts conducted by others are expected to continue on the Straight Creek properties in accordance with applicable requirements for that reclamation. Such reclamation efforts are independent of the TVA action. The No Action Alternative, therefore, would not be anticipated to have impacts to aquatic ecology.

4.7.2 Proposed Action Alternative

Under the Proposed Action, no surface mining would occur as all surface-minable coal has been removed. As described above for the No Action Alternative, surface reclamation surface reclamation activities would continue regardless of the Proposed Action and would not be anticipated to have impacts to aquatic ecology.

There would be no measurable direct or indirect impacts to streams intersecting the Straight Creek property as a result of underground mining of Parcel XCGCR-3; however, changes to aquatic ecology in streams within the watershed would likely occur over the long term due to factors such as the continuation of anthropogenic activities such as population growth. Such changes would not be the result of TVA's action.

4.8 Threatened and Endangered Species

This section describes the potential environmental impacts to terrestrial (wildlife and plants) and aquatic threatened and endangered species associated with the project alternatives.

4.8.1 No Action Alternative

4.8.1.1 Terrestrial Animal Threatened and Endangered Species

Four Kentucky state-listed terrestrial species and five federally listed or candidate for federal listing terrestrial animal species were assessed based on either documented presence within Bell and Harlan Counties, Kentucky, or on the potential for the species to occur in the project footprint. Habitat for Icebox Cave beetle does not exist within the action area. Red-cockaded woodpecker is extirpated from Bell and Harlan Counties, Kentucky. Neither Icebox Cave beetle nor Red-cockaded woodpecker would be impacted by the proposed actions. Impacts to the other state-listed terrestrial species and federally listed or candidate for federal listing terrestrial animal species are analyzed below.

Habitat for golden-winged warbler, Pine Mountain tigersnail, Rafinesque's big-eared bat, eastern small-footed bat, gray bat, Indiana bat, and northern long-eared bat exists in the

Straight Creek properties. Actions that may result in effects to these species would occur only in areas of disturbance associated with any ongoing or required reclamation efforts conducted by others that would be expected to continue. No additional surface mining on Tract CGCR-1 or Tract XECCR-16L is expected. Impacts to these species would be limited to locations where reclamation efforts would continue. As these areas were previously heavily disturbed by surface mining activities, restoration and reclamation of these areas would potentially be beneficial for these species through the potential creation of new habitat.

4.8.1.2 Botanical Threatened and Endangered Species

Adoption of the No Action Alternative would have no impact on federally listed plant species or designated critical habitat because neither occurs within Tracts CGCR-1 or XECCR-16L. State-listed plants may occur on portions of these parcels, but they would not be impacted by adoption of the No Action alternative because land use on the parcels would not change as a result of the decision. No additional mining is expected to occur on CGCR-1 or XECCR-16L. Land use changes controlled by the landowner or some other entity could affect state-listed plants if they are present, but any potential negative impact would not be the result of any TVA action.

4.8.1.3 Aquatic Threatened and Endangered Species

The federally-listed endangered Cumberland Pigtoe and the candidates for federal listing, the Cumberland arrow darter and the Kentucky arrow darter; as well as the state-listed longclaw crayfish, mountain darter, Cumberland papershell, and pocketbook, are all known from Bell and Harlan counties, but outside the Straight Creek property boundaries. Stony Fork and Mill Creek within the Straight Creek watershed are known to support populations of the federally-listed threatened blackside dace.

As described previously, in accordance with applicable licenses, any ongoing or required reclamation activities conducted by others are expected to continue on the Straight Creek properties under the No Action Alternative. Reclamation activities have the potential to generate soil disturbances that impact surface water and thus aquatic habitats. As described in Section 4.2.1, soil erosion and sedimentation, removal of the tree canopy, and improper use of herbicides can impact streams and therefore threaten aquatic life including threatened and endangered species if they are present. However, such reclamation activities would continue to occur regardless of TVA's action. Use of BMPs would limit these impacts.

Therefore, no direct or indirect impacts to sensitive aquatic species are anticipated as a result of the No Action Alternative. Additionally, since there is no designated critical habitat for aquatic species within the Straight Creek property boundaries, no impacts to sensitive aquatic habitats are expected to occur with selection of this alternative.

4.8.2 Proposed Action Alternative

Under the Proposed Action, no surface mining would occur as all surface-minable coal has been removed. Impacts to terrestrial and aquatic threatened and endangered species associated with the ongoing reclamation activities on the surface would be unrelated to the Proposed Action and would occur regardless of TVA's action.

Underground mining of Parcel XCGCR-3 would occur but would not be anticipated to require any new surface disturbances. Impacts to both terrestrial and aquatic threatened and endangered species would be similar to those described above for the No Action

Alternative. No direct or indirect impacts to threatened and endangered species or their habitats would be anticipated under the Proposed Action.

There would be no measurable direct or indirect impacts to streams intersecting the Straight Creek property as a result of underground mining of Parcel XCGCR-3; however, changes to aquatic ecology in streams within the watershed would likely occur over the long term due to factors such as the continuation of anthropogenic activities such as population growth. Such changes could impact threatened and endangered species but would not be associated with the TVA's action.

4.9 Cultural Resources

4.9.1 No Action Alternative

Under the No Action Alternative, disposal of the mineral rights would not occur. Ongoing reclamation activities on the Straight Creek properties would continue, however these are unrelated to the TVA action. There would be no direct or indirect impacts to cultural resources because there would be no physical changes to the surface associated with TVA's action.

4.9.2 Proposed Action Alternative

Although some subsurface changes could occur in Parcel XCGCR-3 as a result of future mining activity, such changes do not have the potential to affect historic properties, which are located on or near the surface of the ground. Moreover, the depth of the coal reserves and the modest width of the coal seam makes this mining project unsusceptible to subsidence. Therefore TVA finds that although the proposed actions meet the definition of "undertaking" as defined at 36 CFR Part 800.16(y), this undertaking is not the type of activity that has the potential to affect historic properties. No further review is therefore necessary under Section 106 of the NHPA for this proposed action.

4.10 Environmental Justice

Various actions can affect the socioeconomic status of an area. Some activities create new job opportunities or improve public amenities. Other actions can affect the local job market or change the desirability of an area as a place to live or work. Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) directs federal agencies to identify and address the disproportionate effects of their actions on minority and low-income populations. Although TVA is not subject to this EO, its policy is to consider environmental justice in its environmental reviews.

4.10.1 No Action Alternative

Under the No Action Alternative, disposal of the mineral rights would not occur. Ongoing reclamation activities on the Straight Creek properties would continue; however, these reclamation activities are unrelated to the TVA action. Because there would be no new activities with the potential to effect low-income or minority populations in the area, there would be no potential for impacts to low income or minority populations.

4.10.2 Proposed Action Alternative

Under the Proposed Action, coal mining could occur under Parcel XCGCR-3. For this coal to be economically feasible to mine, the coal would need to be removed by a company with mining operations already ongoing in the immediate area. Thus, removal of this coal is not expected to affect the local economy to a noticeable extent and no new mining jobs are expected to be created. Additionally, no disproportionate environmental effects are expected to occur to any minority or economically disadvantaged populations.

4.11 Cumulative Impacts

Cumulative impacts are defined in the Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (Council on Environmental Quality 1987) as follows:

“Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

This section discusses those resources and receptors that could result in perceivable, but insignificant, cumulative impacts from TVA’s alternative actions. For proposed alternatives, no substantive cumulative impacts are expected for air quality (including GHGs), geology and groundwater, surface water, wetlands, floodplains, terrestrial ecology (wildlife and plants), aquatic ecology, threatened and endangered species, cultural resources, and environmental justice as described in the following sections.

4.11.1 Air Quality

Mining of the Straight Creek Seam underlying Parcel XCGCR-3 could result in the release of both methane and carbon dioxide. This release would contribute cumulatively to increasing levels of these GHGs in the Earth’s atmosphere. As described in Section 4.1, the emissions associated with the metallurgical grade coal from the Straight Creek Seam underlying Parcel XCGCR-3 do not constitute a significant increase above normal operational levels for facilities that process this type of coal. In fact, if the coal from the Straight Creek Seam were not available, the facilities using such coal would still operate and would utilize an equivalent amount of coal from another resource. Therefore, cumulative impacts associated with the use of the Straight Creek Seam would be minor.

4.11.2 Geology and Groundwater

Removal of the coal from the Straight Creek Seam would constitute a minor cumulative impact in conjunction with removal of coal that is currently ongoing and has occurred in the past in the vicinity of the Straight Creek properties. The removal of the coal would occur only with an OSMRE permit and would be conducted in accordance with all requirements for that permit. Therefore, this cumulative impact would be considered minor.

4.11.3 Surface Water

As there would be no surface disturbances associated with either the No Action or Proposed Action Alternatives, cumulative impacts to surface waters would not be anticipated within the Straight Creek properties area.

4.11.4 Wetlands

As there would be no surface disturbances associated with either the No Action or Proposed Action Alternatives, cumulative impacts to wetlands would not be anticipated within the Straight Creek properties area.

4.11.5 Floodplains

No surface disturbances would be anticipated under either the No Action or Proposed Action Alternatives that would result in cumulative impacts to floodplains of the area. Therefore, cumulative impacts to floodplains are not anticipated.

4.11.6 Terrestrial Ecology

Most of the project area has previously been heavily impacted by mining and majority of the actions associated with this project are only associated with mineral rights transfers and would not impact the surface. Cumulative effects of the project on common wildlife species are, therefore, not anticipated.

4.11.7 Aquatic Ecology

Most of the project area has previously been heavily impacted by mining and majority of the actions associated with this project are only associated with mineral rights transfers. Surface impacts that would affect surface waters and therefore aquatic species are not expected and, therefore, no cumulative impacts to aquatic species in the area are anticipated.

4.11.8 Threatened and Endangered Species

Coal mining activities underlying Parcel XCGCR-3 would be unlikely to contribute to cumulative impacts to threatened and endangered species in the area. No new surface disturbances are anticipated that would anticipate any terrestrial or aquatic threatened and endangered species in the area.

4.11.9 Cultural Resources

Because neither the No Action nor the Proposed Action Alternatives would be anticipated to impact the surface where cultural resources would be present, no cumulative impacts to cultural resources would be anticipated.

4.11.10 Environmental Justice

Coal mining activities are ongoing in the area surrounding the Straight Creek property. The size of the Straight Creek Seam underlying Parcel XCGCR-3 makes it uneconomical for mining except by a company with operations already active in the area. Therefore, mining of the Straight Creek Seam underlying Parcel XCGCR-3 is unlikely to have a cumulative impact on low-income or minority populations in the area as it is unlikely to contribute to new jobs or economic changes in the region. Additionally, no cumulative environmental effects are anticipated to have a cumulative impact on minority or economically disadvantaged populations in the area.

4.12 Unavoidable Adverse Environmental Impacts

The proposed activities could cause some unavoidable adverse environmental effects. Specifically, mining the coal from the Straight Creek Seam would generate add a small release of methane and carbon dioxide to the environment. However, these effects would be minor.

4.13 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 uses of water resources. Long-term productivity is the capability of the land to provide resources, both market and nonmarket, for future generations. In this context, long-term impacts to site productivity would be those that last beyond the life of the project.

The project would not affect short-term of the Straight Creek properties. The project would affect long-term productivity by removing the minable coal from the Straight Creek Seam underlying Parcel XCGCR-3.

4.14 Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources would occur when resources would be consumed, committed, or lost because of the project. The commitment of resources would be irreversible if the project started a process (chemical, biological, or physical) that could not be stopped. Similarly, commitment of a resource would be considered irretrievable when the project would directly eliminate the resource, its productivity, or its utility for the life of the project and possibly beyond.

The extraction of and loss of the coal from the Straight Creek Seam is an irreversible and irretrievable commitment of resources. Likewise, the use of fuel and electric energy to power mining equipment represents another irreversible and irretrievable use of resources.

CHAPTER 5 – LIST OF PREPARERS

5.1 NEPA Project Management

Carol Butler Freeman, PG

Position: Contract NEPA Specialist
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 Experience: 7 years in NEPA Compliance
 Involvement: NEPA Compliance, Document Preparation, and Document Compilation

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Position: NEPA Specialist III
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 Involvement: NEPA Compliance and Document Preparation

David W. Robinson

Position: Program Manager Environmental Support
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 Experience: 34 years in Environmental Permitting; 27 years in NEPA Compliance
 Involvement: Project Management; Document Review

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Position: Contract Senior NEPA Specialist
 Education: Ph.D., Fisheries and Wildlife Sciences; M.S., Wildlife Ecology; B.S., General Science/Zoology
 Experience: 10 years in Forest Management, Inventory, and Software Development; 24 years in NEPA Compliance
 Involvement: Document Compilation and Preparation

5.2 Other Contributors

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 Involvement: Surface Water

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Position: Senior Environmental Scientist
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 Experience: 22 years in Environmental Analyses, Surface Water Quality, and Groundwater Hydrology Evaluations
 Involvement: Groundwater

Adam J. Dattilo

Position: Botanist
Education: M.S., Forestry; B.S., Natural Resource Conservation Management
Experience: 15 years in Ecological restoration and Plant Ecology; 8 years in Botany
Involvement: Terrestrial Ecology (botany); Threatened and Endangered Species (botany)

Patricia Bernard Ezzell

Position: Specialist, Native American Liaison
Education: M.A., History with an emphasis in Historic Preservation; B.A., Honors History
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Involvement: Tribal Liaison

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Andrew Henderson

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Education: M.S., Fisheries Biology (Conservation); B.S., Fisheries Biology
Experience: 10 years in aquatic monitoring, rare aquatic species surveys
Involvement: Aquatic Ecology; Threatened and Endangered Species (aquatic)

Kim Pilarski-Hall

Position: Senior Wetlands Biologist
Education: M.S., Geography, Minor Ecology
Experience: 20 years in Wetlands Assessment and Delineation
Involvement: Wetlands; Natural Areas

Matthew Reed

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Education: MS, Wildlife and Fisheries Science, Minors in Environmental Policy and Watershed Management
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Involvement: Aquatic Ecological Resources (Aquatic Ecology)

Karen Utt

Position: Senior Program Manager, Climate Policy
Education: BA, Biology, JD
Experience: 23 years in environmental compliance, corporate carbon risk management, and climate change adaptation planning
Involvement: Air Quality and Greenhouse Gas

Edward W. Wells III

Position: Archaeologist
Education: M.A., Anthropology; B.S., Anthropology
Experience: 13 years Cultural Resource Management
Involvement: Cultural Resources

Carrie C. Williamson, PE, CFM

Position: Civil Engineer, Water Resources
Education: M.S., Civil Engineering; B.S., Civil Engineering; Professional Engineer
Experience: 2 years in Floodplains and Flood Risk; 3 years in River Forecasting; 11 years in Compliance Monitoring
Involvement: Floodplains

CHAPTER 6 – ENVIRONMENTAL ASSESSMENT RECIPIENTS

6.1 Federal Agencies

National Park Service
Office of Surface Mining Reclamation and Enforcement, U.S. Department of the Interior
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service

6.2 Federally Recognized Tribes

The following federally recognized Tribes were contacted regarding the availability of this EA:

Absentee Shawnee Tribe of Oklahoma
Cherokee Nation
Eastern Band of Cherokee Indians
Eastern Shawnee Tribe of Oklahoma
Shawnee Tribe
United Keetoowah Band of Cherokee Indians in Oklahoma

6.3 State Agencies

Bell County Mayor's Office
Harlan County Mayor's Office
Kentucky Department for Environmental Protection
Kentucky Department of Fish & Wildlife
Office of U.S. Representative Hal Rogers
Office of U.S. Senator Mitch McConnell
Office of U.S. Senator Rand Paul
State Representative Rick Nelson
State Representative Fitz Steele
State Senator Brandon Smith
State Senator Johnny Ray Turner

6.4 Individuals and Organizations

Harlan Daily Enterprise

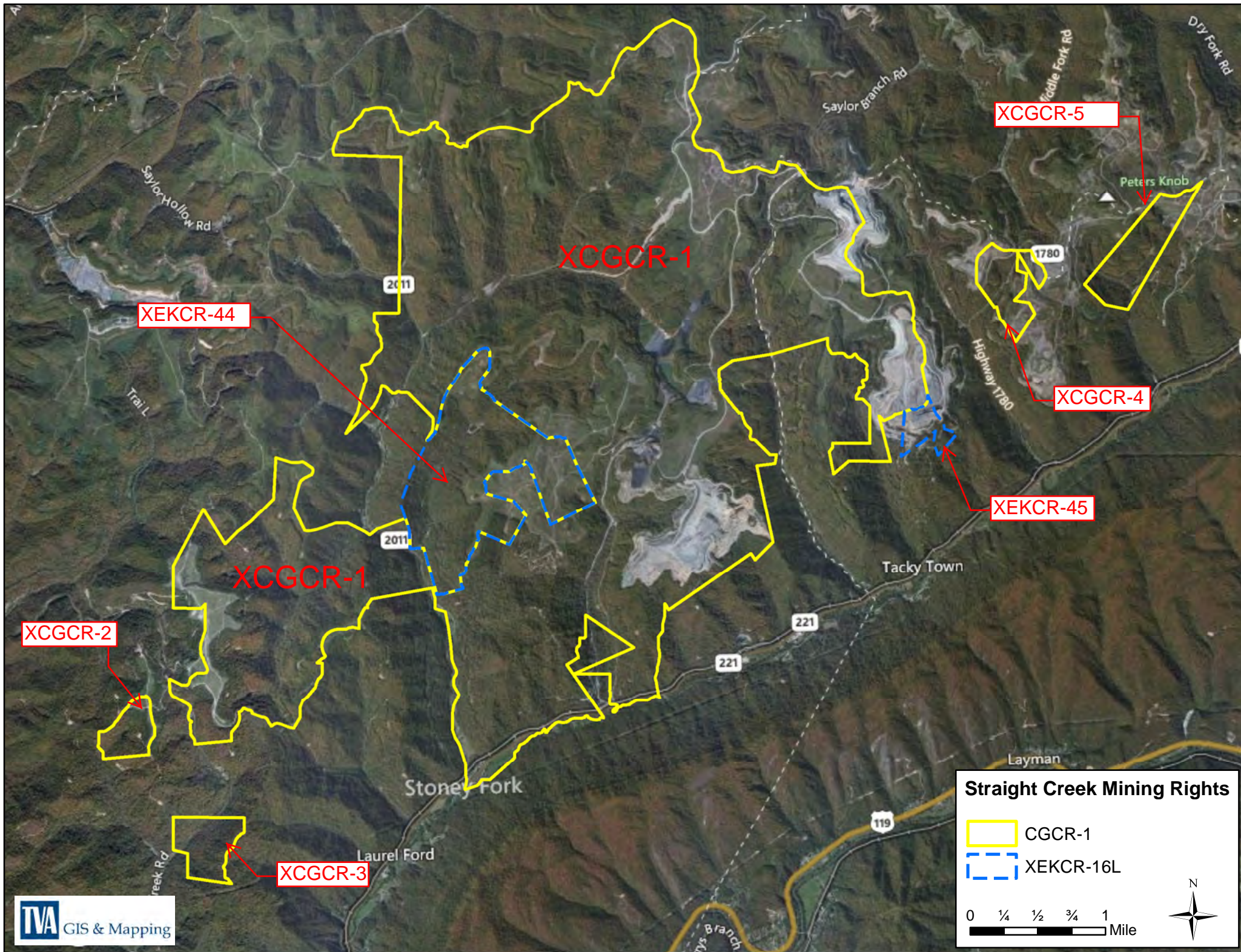
CHAPTER 7 – LITERATURE CITED

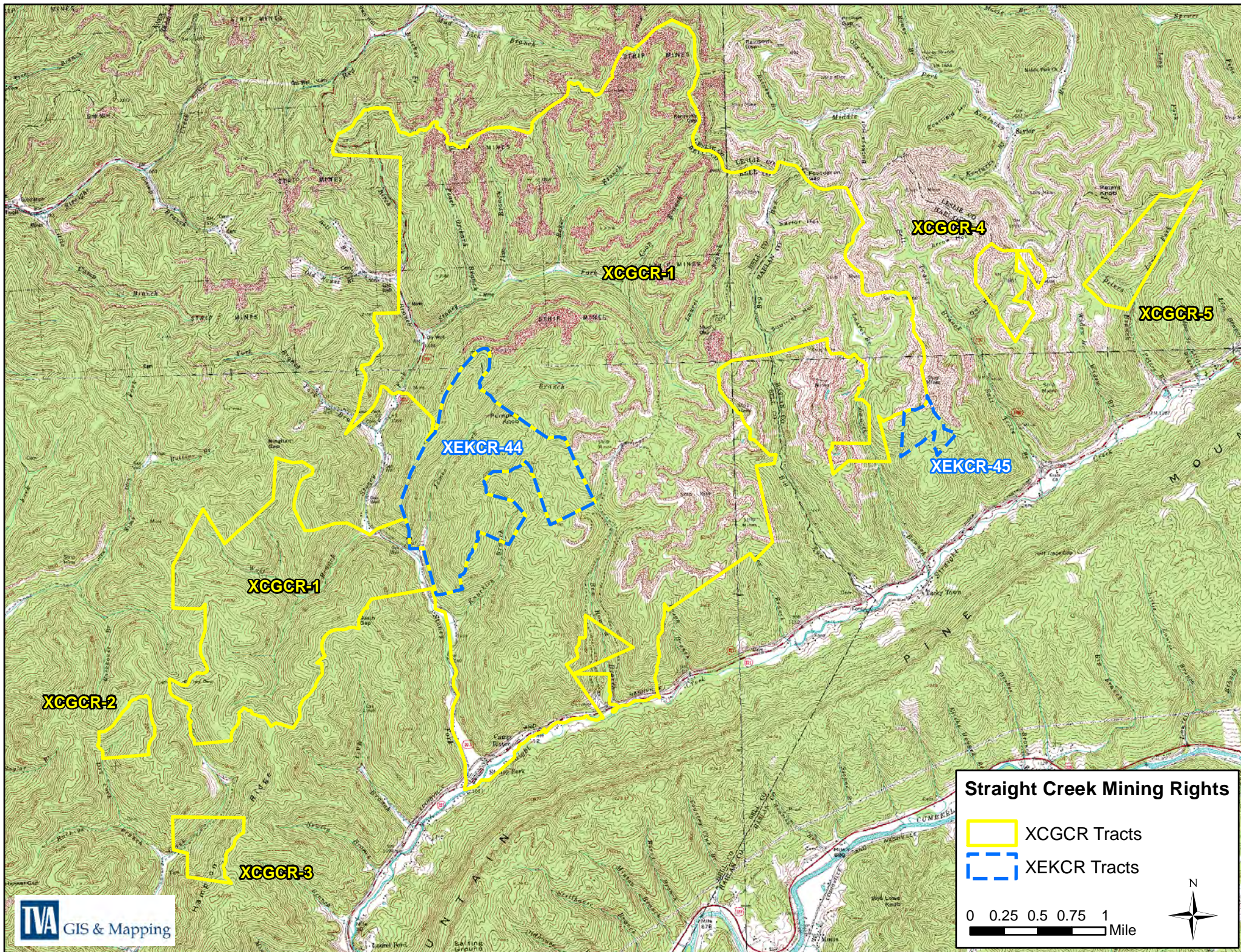
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Appendix A – Map and Aerial Photograph






Straight Creek Mining Rights

 XCGCR Tracts

 XEKCR Tracts

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Appendix B – Response to Public Comments

A Draft Environmental Assessment (EA) was released for comment on October 6, 2015. The comment period closed on November 5, 2015. The Draft EA was transmitted to state, federal, and local agencies and federally recognized tribes. It was also posted on TVA's public NEPA review website. A notice of availability including a request for comments for the Draft EA was published in the Harlan Daily Enterprise. Comments were also accepted through November 5, 2014, via TVA's website, mail, and e-mail.

TVA received seven sets of comments from the USFWS, the National Resources Conservation Service, the Kentucky Clearinghouse, the Kentucky Heritage Council, a resident, and two commercial developers. TVA carefully reviewed the comments and grouped them based on topic and commenter. Comments were summarized when appropriate for this document. The following sections summarize the comments received and provide TVA's responses. The original comments are provided at the end of this appendix.

Federally Listed Species (*Commenter: Kentucky Ecological Services Field Office of the USFWS*)

1. *Plant Species*: The Draft EA determined that there are no federally-listed plant species in Bell or Harlan County. The Kentucky Ecological Services Field Office (KFO) of the USFWS agrees with this determination.

Response: Comment noted.

2. *Terrestrial Species*: The DEA identified four federally-listed terrestrial species and one candidate species for federal listing that are known to occur or have historically been documented in Bell and Harlan Counties. These included the federally endangered red-cockaded woodpecker (RCW) (*Picoides borealis*), the federally endangered gray bat (*Myotis grisescens*), the federally endangered Indiana bat (*Myotis sodalis*), the federally threatened Northern long-eared bat (NLEB) (*Myotis septentrionalis*), and Icebox Cave beetle, which is a candidate for federal listing. With the exception of the RCW, the KFO agrees that the species that could occur in the area and the associated species/habitat descriptions are appropriate. The KFO considers the RCW extirpated from Kentucky and does not believe it needs to be considered in the final EA. Further, because the icebox cave beetle is only found in one cave in Bell County, approximately seven miles from the action area, we would not expect this species to be present within the action area.

Response: TVA acknowledges that the KFO considers the RCW extirpated in Kentucky. To conservatively ensure all potential impacts are analyzed, TVA has elected to retain the discussion of this species in the Final EA. TVA has added the KFO's description of the RCW species status and the potential for the Icebox Cave beetle to occur in the area to Subsection 3.8.1.

3. *Aquatic Species*: The DEA recognizes the federally-threatened blackside dace (*Phoxinus cumberlandensis*) and the federally endangered Cumberland elktoe (*Alasmodonta atropurpurea*) as having the potential to occur within the project area. While the KFO agrees that these species could be present within the action area, we recommend that the final EA include additional information for each species, similar to the information that was provided for the terrestrial species Section 3.8.1.

The DEA also identified the Kentucky arrow darter (*Etheostoma spilotum*) as a federal candidate species. As of October 8, 2015, this species is proposed as a threatened species under the Endangered Species Act (<http://www.gpo.gov/fdsys/pkg/FR-2015-10-08/pdf/2015-25278.pdf>). Further, this species is endemic to the Kentucky River Basin and is not expected to be found in the area of impact, which is limited to the Cumberland River watershed. Therefore, the KFO does not believe this species should be included in the final EA.

The DEA also identified the Cumberland arrow darter (*Etheostoma sagitta*) as a federal candidate species. On October 8, 2015, the USFWS determined that federal listing of the Cumberland arrow darter was not warranted (<http://www.gpo.gov/fdsys/pkg/FR-2015-10-08/pdf/2015-25058.pdf>). Therefore, the species is no longer a candidate for federal listing. We recommend the DEA be updated to reflect this recent decision.

Response: Species descriptions for the blackside dace, Cumberland elktoe, and Kentucky arrow darter have been added to Subsection 3.8.3. TVA elected to include the Kentucky arrow darter in the Final EA to conservatively ensure all potential impacts are considered. The Cumberland arrow darter has been removed and text clarifying this species federal status has been added to Subsection 3.8.3.

Prime Farmlands and Wetlands (Commenter: Kentucky Natural Resources Conservation Service)

4. Based upon the information provided, the Kentucky Natural Resources Conservation Service (NRCS) does not anticipate the proposed action will negatively affect Wetland Reserve Program easements, Grassland Reserve Program easements, or PL-566 watershed structures. If federal dollars are to be used to convert wetlands or convert important prime farmlands from agricultural uses to non-agricultural uses, a Form AD-1006 must be submitted to the local NRCS office.

Response: As no surface disturbances are anticipated as a result of the proposed action, no wetlands or prime farmlands would be converted. Accordingly, a Form AD-1006 was not deemed necessary.

Cultural Resource Impacts (Commenter: Kentucky State Clearinghouse/Kentucky Heritage Council)

5. Currently, you have not provided enough information to determine this project's potential to impact sites listed or eligible for listing on the National Register of Historic Places.

Per the Section 106 regulations, it is expected that the applicant or responsible agency provide appropriate base information to our office to facilitate a review – including previously identified cultural resources that may be impacted by the proposed undertaking. You may not be aware, but effective July 8, 2013 we instituted a new Section 106 submission process to assist applicants and agencies in providing us the appropriate level of information to make our comments. Please refer to the following

website <http://www.heritage.ky.gov/siteprotect/> where you will find three separate documents to assist you in submitting additional information to our office for review.

Response: See response to Comment 6.

6. Upon review we are concerned that all of the previously identified resources have not been included in the consideration of potential impacts to historic properties. We are unsure of what data source was queried as the Kentucky Historical Commission (pg 24) is not an entity. Assuming that you are referring to the Kentucky Heritage Council, we are concerned that only previously identified above-ground historic sites have been captured by your background research.

At least two previously identified archaeological sites that have not been assessed for NRHOP eligibility appear to fall within or close to the parcels. This data would have been gathered by consulting with the Kentucky Office of State Archaeology (OSA). We recommend contacting Christina Pappas at the Kentucky SA to acquire site location information that pertains to your proposed undertaking. If you have already consulted with them, please include the project registration number in the Draft EA that discusses the results of that query

Response: As described in Subsection 4.1.18, although some subsurface changes could occur under the proposed project as a result of future mining activity in Parcel XCGCR-3, the proposed actions would include no boreholes, vent shafts, or other new mining facilities and would involve no significant ground disturbance. Moreover, the depth of the coal reserves, the modest width of the coal seam, and the methods that would be utilized to mine it (as described in Subsection 4.2.2) make this project unsusceptible to subsidence. Consequently, the proposed actions do not have the potential to affect historic properties. Therefore TVA finds that although the proposed actions meet the definition of “undertaking” as defined at 36 CFR Part 800.16(y), this undertaking is not the type of activity that has the potential to affect any historic properties that may be present in the affected area. Pursuant to 36 CFR § 800.3(a)(1), TVA has no further obligations under NHPA Section 106 and no further cultural resources review is necessary under Section 106 of the NHPA for this proposed action.

The reference to the Kentucky Historical Commission has been corrected to the Kentucky Heritage Council.

Cease Coal Mining (*Commenter: Eric Caldwell*)

7. Coal mining has had a negative impact on the forests of and around the Bledsoe, KY area. Our hunting lands have been almost completely demolished and our flocks of grouse, turkey, and herds of deer have suffered tremendous negative impact. Although I believe that we should use our natural resources, the impact already seen is more than enough damage to justify no further strip mining. It is also important to preserve the beauty of the mountains for our current and future generations. I think it is time to move forward and away from this destructive method.

Response: TVA considers the Straight Creek coal reserves an unnecessary asset and proposes to declare them surplus property. TVA will not be mining the Straight Creek coal seam. Additionally, TVA has determined that underground mining on virtually all of this property is unlikely for the foreseeable future. Likewise, because all surface-minable coal has been removed, no additional surface mining on the 9,584-acre TVA coal reserve holdings is expected for the foreseeable future, including strip mining. Underground mining of coal from the Straight Creek Seam underlying Parcel XCGCR-3 could occur if TVA disposes of the subject coal reserves. If underground mining occurs on XCGCR-3, it will likely be conducted by adjacent property owners without the need for any further surface disturbance.

Interest in the Purchase or Lease of the Straight Creek coal leases

8. TVA received several expressions of interest for purchasing and/or leasing the rights to the Straight Creek coal seam.

Response: TVA project managers contacted these commenters to provide information about the sale of the Straight Creek coal seam rights. The sale of these coal interests would be accomplished by public auction in accordance with Section 31 of the TVA Act.

Kentucky Resources (*Commenter: Kentucky State Clearinghouse*)

9. Cumberland Valley Area Development District: No negative comments.

Response: Comment noted.

10. Kentucky State Fish & Wildlife: No comments.

Response: Comment noted.

11. Kentucky Department for Natural Resources: No major concerns from the review of the proposed project as presented other than those stated as conditions of comments.

Response: Comment noted.

12. Kentucky Department of Transportation: Contact KYTC District 11 permits prior to any work on or near KYTC right of way.

Response: Comment noted.

13. Kentucky Housing, Building, Construction: No comments.

Response: Comment noted.