

U.S. Department of the Interior
Office of Surface Mining
Reclamation and Enforcement



North Cumberland Wildlife Management Area

Tennessee Lands Unsuitable for Mining
Final Petition Evaluation Document /
Environmental Impact Statement
OSM-EIS-37

Volume III

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Contents: Volume III: Appendices

| | |
|--|-----|
| Appendix A: Scoping Report: Petition Evaluation Document/Environmental Impact Statement North Cumberland Wildlife Management Area and Emory Tract Conservation Easement..... | A-1 |
| Appendix B: State of Tennessee North Cumberland Wildlife Management Area Land Unsuitable for Mining Petition | B-1 |
| Appendix C: Special-Status Species | C-1 |
| Appendix D: Acoustic Measurement and Assessment of Impacts of Surface Coal Mining in North Cumberland Wildlife Management Area and Emory River Tracts conservation Easement Area | D-1 |
| Appendix E: Water Resources | E-1 |
| Appendix F: Terrestrial Species Documented in the Evaluation Area | F-1 |
| Appendix G: Emergency Services | G-1 |
| Appendix H: Index of Biotic Integrity Assessment Data..... | H-1 |
| Appendix I: Air Emissions Methodology | I-1 |
| Appendix J: Concern Response Report | J-1 |

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Appendices



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**APPENDIX A: SCOPING REPORT: PETITION EVALUATION
DOCUMENT/ENVIRONMENTAL IMPACT STATEMENT
NORTH CUMBERLAND WILDLIFE MANAGEMENT AREA
AND EMORY TRACT CONSERVATION EASEMENT**

Appendices

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DEPARTMENT OF
INTERIOR
OFFICE OF
SURFACE MINING

SCOPING REPORT :
PETITION EVALUATION
DOCUMENT/ENVIRONMENTAL
IMPACT STATEMENT
NORTH CUMBERLAND
WILDLIFE MANAGEMENT
AREA AND EMORY TRACT
CONSERVATION EASEMENT

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SCOPING REPORT

Introduction:

The Office of Surface Mining Reclamation and Enforcement (OSM) is the regulatory authority in the State of Tennessee responsible for implementing the Surface Mining Control and Reclamation Act (SMCRA). Pursuant to § 522(c) of SMCRA, any person having an interest which is or may be adversely affected shall have the right to petition the applicable regulatory authority to have an area designated as unsuitable for surface coal mining operations. The regulatory authority is mandated to designate an area unsuitable for all or certain types of surface coal mining operations if it determines that reclamation according to the requirements of SMCRA is not technologically and economically feasible pursuant to § 522(a)(2). Under the following subsections of § 522(a)(3), a surface area may be designated unsuitable for certain types of surface coal mining operations if such operations will:

- (A) be incompatible with existing State or local land use plans or programs; or,
- (B) affect fragile or historic lands in which such operation could result in sufficient damage to important historic, cultural, scientific and esthetic values and natural systems; or,
- (C) affect renewable resource lands in which such operations could result in a substantial loss or reduction of long range productivity of water supply or of food or fiber products, and such lands to include aquifer recharge areas; or,
- (D) affect natural hazard lands in which such operations could substantially endanger life and property, such lands to include areas subject to frequent flooding and areas of unstable geology.

By letter dated September 30, 2010, the State of Tennessee filed with OSM a petition to designate certain lands in the North Cumberland Wildlife Management Area (WMA) and the Emory River Tracts Conservation Easement area in Anderson, Campbell, Morgan, and Scott Counties, hereinafter collectively referred to as “the petition area”, as unsuitable for surface coal mining operations. The State filed the petition on behalf of the Tennessee Wildlife Resources Agency (TWRA) and Tennessee Department of Environment and Conservation (TDEC) under OSM’s Federal program to regulate surface mining operations within Tennessee (30 CFR Part 942). Based on the provisions listed under A and B above, the State of Tennessee alleges that it has an interest which may be adversely affected by surface coal mining operations and the State has asked OSM to designate the petition area as unsuitable for surface coal mining operations.

OSM responded to the petitioners by letter dated October 29, 2010, with a request for additional information in order to finalize the completeness review. The petitioners responded to OSM’s

request on November 8, 2010. OSM reviewed the additional information and the petition was deemed administratively complete and accepted for processing on November 23, 2010.

OSM proceeded to process the petition by mailing notices on January 14, 2011, to the petitioners, interested State and Federal agencies, landowners and other interested parties that the petition has been accepted for processing. The parties were also notified that the action on the petition is a major Federal action and would require OSM to prepare a combined Petition Evaluation Document /Environmental Impact Statement (PED/EIS). OSM announced the acceptance of the petition to the public through legal notices in the local newspapers. In addition, the petition was made available for review at the OSM Knoxville Field Office; the Anderson County Planning and Zoning Office in Clinton, TN; the Morgan County Clerk’s Office in Wartburg, TN; the Campbell County Mayor’s Office in Jacksboro, TN; and, the Scott County Assessor of Property Office in Huntsville, TN.

The Scope of the PED/ EIS:

The North Cumberland WMA comprises the Royal Blue, Sundquist, and New River WMAs, in addition to the Emory River Tracts Conservation Easement. The total acreage for the North Cumberland WMA is approximately 167,075 acres. The petition area as submitted by the State consists of approximately 67,326 acres, which is defined by the ridgelines that lie within the North Cumberland WMA. The lands unsuitable designation would prevent surface coal mining activities within 600 feet on each side of the ridgelines; thus, creating a 1,200 foot ridge-top buffer zone for all ridge lines within the petition area. The scope of the PED/EIS proposes to evaluate the environmental impacts of each of the alternatives (see Alternatives below) on the existing environment for the entire petition area and not just the ridgelines located within the WMA boundaries. The table below represents the acreage for the four tracts that defines the petition area and the area that will be evaluated in the PED/EIS.

| Petition Area Units | Acreage¹ |
|---|----------------------------|
| Sundquist Unit | 75,000 |
| New River Unit | 23,200 |
| Royal Blue Unit | 50,000 |
| Conservation Easement on Emory River Tracts | 18,875 |
| Total Acreage: North Cumberland WMA including the Emory River Tracts Conservation Easement | 167,075 |

¹ Stan Stooksbury, Area Manager TWRA; Gina Hancock, State Director Nature Conservancy in Tennessee

Alternatives:

OSM proposed three primary alternatives in the public notice for the scoping meetings for consideration by the public as part of the evaluation for the PED/EIS. The alternatives are listed in the following table:

| Alternative # | Alternative Description |
|----------------------|--|
| 1 | Designate the entire petition area as unsuitable for surface coal mining operations. |
| 2 | Do not designate any of the area as unsuitable for surface coal mining operations. |
| 3 | Designate parts of the petition area as unsuitable for all or certain types of surface coal mining operations. |

Scoping Process:

OSM prepared a Notice of Intent in the Federal Register (76 FR 6825) to request public participation in determining the scope, alternatives and other significant issues relating to the preparation of the PED/EIS. A Federal Register was published on February 8, 2011. OSM also provided public notice in the Tennessee Administrative Register, and that announcement was published on February 3, 2011.

On February 23, 2011, OSM mailed 794 notices to the petitioners, interested State and Federal agencies, landowners, intervenors, and other interested parties to announce the date, time and place for the scoping meetings. The general public was notified via legal announcements for the receipt of public comments in accordance with 30 CFR 764.15(b)(2) of the federal regulations. The newspaper advertisements were placed once a week for two consecutive weeks in the local newspaper of the petition area. Scoping meetings were held in three of the four counties of the petition area.

Notices of the scoping meetings were advertised by other media outlets. Several special interest groups and organizations published announcements in their newsletters, websites, and through social networking services. Statewide newspapers in Nashville, Knoxville and Chattanooga provided articles related to the meetings in addition to coverage on local news, WVLT Channel 8, in Knoxville.

The following table contains information regarding the newspapers and publishing dates for the meetings:

| Newspaper | Date Published |
|-------------------------|------------------------------------|
| Clinton Courier News | February 27, 2011 March 6, 2011 |
| Lafollette News | February 24, 2011 March 3, 2011 |
| Morgan County News | February 23, 2011 March 2, 2011 |
| Scott County News | February 24, 2011 March 3, 2011 |
| Knoxville News Sentinel | February 27, 2011 March 6, 2011 |

The public meetings were held in Scott, Campbell and Anderson Counties. The meeting locations, number of attendees and speakers are listed in the following table:

| MEETING LOCATIONS | DATE | SPEAKERS | ATTENDEES |
|--------------------------|----------------|-----------------|------------------|
| Huntsville Middle School | March 8 , 2011 | 17 | 66 |
| Lafollette Middle School | March 10, 2011 | 40 | 164 |
| Oak Ridge High School | March 15, 2011 | 24 | 81 |

Many of the speakers at the meetings identified their preferred alternative and the majority expressed the need for an EIS to evaluate the petition area. In addition to the oral comments presented at the meetings, written comments were received and evaluated. Permanent records for each meeting were prepared using a court stenographer.

Public Comments Submitted:

In addition to requesting that written comments be submitted during the open comment period from February 3, 2011 to April 14, 2011, we accepted written comments at each of the scoping meetings as well as by mail and by e-mail.

A total of 25,675 comments were received from the following sources:

| Type of Comments Submitted | Number of Comments Submitted |
|-----------------------------------|-------------------------------------|
| E-mail | 25,639 |
| Mail | 27 |
| Hand Delivered | 9 |

As listed above, a large number of comments were received via e-mail at the TNLUM@osmre.gov account.

These comments were characterized as follows:

- 1) 25,116 messages submitted as a duplicate form letter;
- 2) 333 messages submitted via excel spreadsheets by the Statewide Organization for Community eMpowerment (SOCM); the spreadsheets listed each individual's comments and,
- 3) 226 messages submitted by other interested individuals and other concerned entities/organizations that appeared unique in origin.

The following procedure was used to process the comments from the public and government contributors:

- 1) All comments were tracked and logged into the administrative files.
- 2) All written and oral comments (from transcripts) were reviewed by OSM technical specialists in the Knoxville Field Office.
- 3) Comments were grouped into topical categories according to the subject matter for consideration in the analysis of the PED/EIS.
- 4) The comments within each of the topical categories were then summarized. This collective summary is included as Attachment A.

All comments will be considered in the scoping process for the preparation of the PED/EIS. All comments including a representation of duplicative comments will be filed in the administrative record for this petition.

Attachment A: Categories for Scoping Comments

| Category | Major Themes of Scoping Comments |
|---|---|
| <i>Acquired Property</i> | <ul style="list-style-type: none"> • Verify the number of acres owned by the State (127,000 acres) and, verify the number of acres given under easement rights for the conservation initiative. What is the acreage for the petition area? • The State and Federal Government should purchase the area and the coal they seek to lock up, preventing the production of energy to our country. • The Nature Conservancy (TNC) believes its current financial investment of \$10 million and its ability to raise the necessary public capital to retire the debt would be protected by implementing the State’s petition to classify the petition area as Unsuitable for Surface Mining. • OSM should consider reviewing all legal agreements made between the State and the mineral owners. |
| <i>Air Quality Including Visibility</i> | <ul style="list-style-type: none"> • Evaluate the impacts of mine dust pollutants from blasting, coal truck traffic, mining equipment, etc. • Determine the need to assess air impacts. |

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| <i>Biology</i> | <ul style="list-style-type: none">• OSM needs to do an EIS because the petition is sufficiently significant and covers a significant portion of a biologically valuable part of Tennessee. The lands subject to the State’s petition have been identified by the State of Tennessee’s Comprehensive Wildlife Strategy and TNC’s Cumberland/Southern Ridge & Valley eco-regional planning effort as a priority action area, ranking high or very high for both aquatic and terrestrial biological diversity.• The wildlife management areas are rich in biodiversity; mining would destroy this important habitat and make the protection and preservation of the area impossible.• OSM should analyze long-term benefits of intact ridge lines versus the fragmentation of habitat on biological communities.• Consider the findings of the previous Flat Fork Creek unsuitability petition regarding the impacts to a biologically important reference creek in a heavily-mined area.• There is recent evidence to suggest that biodiversity declines in aquatic animals are related to increases in specific conductivity in streams draining coal mine areas. |
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| <i>Ecology</i> | <ul style="list-style-type: none">• Evaluate the potential impacts of mining on stream biology, the biodiversity and other organisms that may exist within the wildlife management area (WMA). Evaluate ecologically significant or critical areas under Federal ownership/jurisdiction.• Review all reputable, peer-review studies, other than those funded by the coal industry, show that considerable ecological, economic and public health damage is proximately caused by coal mining activities.• The lands included in the petition area constitute an ecological treasure and ecological treasures offer great potential for tourism, which when actualized will result in substantial renewable revenues as opposed to finite revenues that are terminated when the natural resources are depleted.• If you protect the habitat of the Cerulean Warbler in the petition area, you will also protect the habitats of many other species that are ecologically important. |
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| <p><i>Economics</i></p> | <ul style="list-style-type: none"> • Mining over the years has created jobs for the local people. Unemployment in the Huntsville area is one of worst situations in the State and Nation. • Tennessee’s watersheds are becoming just as much an economic importance as energy resources to the State. • The Tennessee economy depends on a healthy water supply and water resources from surrounding watersheds for future economic growth and job creation in rural communities in the Tennessee coal fields. • It is a shame to waste or avoid using the coal energy resources in our back yard when our whole country needs energy at a reasonable cost to the consumer. • Coal provides approximately 60% of our electricity. • The coal industry has always created taxes, both for our local government and the State government. • The citizens of Morgan County believe that lack of property control by the State is one of the factors that contribute to their county’s lack of economic development and growth. • Scott County unemployment at the end of 2010 was 20.4 percent, the highest in the State. Responsible mining can reduce that rate. • Evaluate the impact to privately-held lands adjacent to any lands designated unsuitable for mining • Review the following documents “U. S. Energy Information Administration; Independent Statistic and Analysis – Domestic and Foreign Distribution of U.S. Coal by State of Origin, 2009” and “The impacts of Coal on the Tennessee State Budget.” |
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| <i>Ecosystem</i> | <ul style="list-style-type: none">• Evaluate the natural environment between the habitats, living resources, and the residents in the petition area.• Evaluate the value of mature hardwood forest in the ecosystem. |
| <i>Environmental Justice</i> | <ul style="list-style-type: none">• Environmental Justice is a NEPA requirement and must be evaluated.• Evaluate the potential impacts that surface mining will have on low income communities in the vicinity of the petition area; community and regional growth and; current population trends of the local communities. |

Esthetics and Viewsheds

- Evaluate the impacts of surface coal mining on pristine areas, breath taking vistas, and analyze long-term benefits of intact ridge lines and viewsheds including the Cumberland Mountain State Park.
- While a reclaimed mountain is certainly better than one laid bare and abandoned, a reclaimed mountain looks like an interstate median with sediment ponds and rock gullies. It's not even remotely similar to a God-made mountain.
- The petition claims that mining would distract from the recreational value of the Interstate 75 corridor described as a popular scenic drive for tourists as it bisects Royal Blue WMA. In fact, the views from I-75 depict prelaw orphan mining high walls that can be corrected if re-mining permits are continued.
- Runners in an annual organized trail race on the Cumberland Trail through the North Cumberland WMA appreciate the sense of remoteness that can't be found in many places. They prefer running through mature forests and not through clear cut areas where new highwalls can be seen. They have been thrilled to see elk and bobcat. The race couldn't be done without the nice viewsheds.
- I rarely climb all the way to Frozen Head Tower on a clear day because the views of the nearby ridges mangled by mining are depressing.

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| <i>Forestland</i> | <ul style="list-style-type: none">• Evaluate how mining encourages clear cutting and destroys forestlands and the existing diversity.• Consider placing restrictions on tree cutting.• Evaluate the negative impacts of forest fragmentation.• Evaluate the forest composition, the age classes and the succession stages of the trees in the WMA.• Deforestation and blowing off the tops of mountains is not appropriate use of the land. The process leaves behind a barren wasteland that will never be useful again.• The petitioner assumes that surface mining “destroys the forest” but, does not take into account successful efforts by OSM to address this concern through use of the forest reclamation approach.• Reclamation of mined land leaves the land in better condition than logging.• Analyze the connectivity of the forest at edges; forest composition, age classes, and successional stages; and the impacts of invasive plants and insects, particularly on mine sites.• Assess the impact on non-timber forest resources such as roots and herbs.• Consider the loss of marketable timber and high-quality timber growing on ridge tops.• Miners in Tennessee are the number one planters of hardwood forests. |
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| <p><i>Fragile Lands</i></p> | <ul style="list-style-type: none"> • Evaluate the impacts of surface coal mining on pristine areas seen from viewsheds and potential impacts to the Cumberland Trail State Park. • The petitioner lists the Cumberland Trail State Park as a fragile land, but surface coal mining operations are already prohibited in public parks by virtue of SMCRA section 522(e)(3). • The petitioner fails to demonstrate that the petition area contains fragile lands that will be significantly damaged by mining. |
| <p><i>Geology</i></p> | <ul style="list-style-type: none"> • There is need to assess the geologic data collection and analysis for acid and toxic forming materials found in the petition area. • Conduct o extensive geological studies because of numerous landslides in post-law surface mines, including Smoky Creek and Lawson Mountain, which are right along the Cumberland Trail. • From a slope stability standpoint, assess the risks and benefits of leaving ridge lines intact both in the petition area and in downstream areas. • Analyze the geologic and tenable character of soil, rocks, and minerals in the petition area, including the potential for creation of acid-mine drainage and toxic pollutants such as selenium and other known constituents of coal and the rock layers above and below the seams. • OSM must evaluate the amount of coal deposits that would be unattainable if the Petition is granted. |

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| <p><i>Historic and Cultural Resources</i></p> | <ul style="list-style-type: none">• Evaluate the long and short term impacts of mining on any monuments, archaeological sites historic site(s) and land(s) of native Americans national landmarks etc., located within the WMA, and the local community.• Located within the petition area.• There are 9 recorded archaeological sites within the proposed tracts. Seven (7) are prehistoric in nature; one (1) site has both prehistoric and historical remains. |
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Hydrology

- The need to assess the ability of surface coal mining to protect from “material damage to the hydrologic balance outside the permit area” from long and short term impacts. Section 510(b) (3) demands that the agency make an affirmative finding that the proposed mining will not cause material damage including flooding. As such more extensive baseline hydrology data should be collected for the petition area.
- Designating all of the petition area unsuitable for mining would support the Connecting the Cumberland project and help ensure that the 27,000 Tennessee residents who depend on drinking water from the New River and Emory River watersheds (Tennessee and Cumberland River basins and further downstream) will not be threatened by mining pollution by sedimentation and acid mine drainage caused by runoff from surface mine steep slope coal extraction.
- There are water bodies within the affected region identified by the State of Tennessee as being impaired and listed on the State’s 2008 303(d) list requiring that draft Total Maximum Daily Load (TMDLs) studies be developed.
- Permit applications are site specific and require considerable engineering to meet the current OSM regulations. Consider an alternative where re-mining operations can occur. Surface coal mining in compliance with all laws that used contemporary mining methods will not impact water quality but can improve waters impacted by previous mining.
- OSM needs to analyze the streams draining the petition area for the potential for acid mine drainage, discharges with selenium, elevated levels of total dissolved solids, and excessive sedimentation to be created from at surface mines. Consider the potential for water percolating through mine sites to bypass the ponds and enter the stream below the mine site.
- The EIS should address potential water quality changes with mining within the petition area and the effects on aquatic resources of the Big South Fork and Obed River.
- New River and Clear Fork along with other tributaries and the main stem Big South Fork in the National River and Recreational Area (NRRRA) are listed as Critical Habitat.
- The entire Obed WSR system has been designated as critical habitat for the spotfin chub under the endangered Species Act.

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| <i>Land Use</i> | <ul style="list-style-type: none">• Evaluate the impacts of mining on the existing conservation efforts and the future land use plans.• Evaluate the environmental impacts from oil and gas drillings, forestry operations, and road construction.• Determine if the recreational, scenic and economic values of our property would be diminished by surface mining on the surrounding tracts.• Surface mining of surrounding lands would significantly damage the conservation values of TNC's property.• The EIS should evaluate the impacts on prime farmland in the petition area. The EIS should evaluate the activities that precede or are an integral part to mining such as clear cutting, haul roads, tipples, processing plants, waste impoundments, real estate development, and industrial development. (move to land use) |
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*Mining and
Reclamation*

- Evaluate the impacts of allowing all or certain types of mining operations in the petition area and compatibility with the State's Conservation Plan including the "Connecting the Cumberlands" conservation project.
- Assess mining company's ability to reclaim.
- Evaluate the impacts of mining on prime farmland, returning lands to the original elevation and configuration, in steep slopes.
- Evaluate the number of previous and existing mining operations in the petition area and identify any significant impacts.
- Evaluate the value and impacts of roads and access to most of the WMA which are enjoyed by the public.
- Some areas should not be mined near branches and unstable areas, but banning all surface mining will not be in the best interest of the landowner.
- Mining is already occurring in the petition area, and is being carried out in accordance with SMCRA.
- Designation of lands unsuitable for mining would prevent the re-mining of abandoned mine land and the reclamation of miles of orphan high walls.
- Ninety-five percent of the coal mining in Tennessee is re-mining, which results in the reclamation of exposed abandoned highwalls, improves water quality, and provides for reforestation and vegetation for wildlife.
- The findings of OSM's 1985 EIS are still valid. Cumulative topographic impacts to the region would be largely beneficial because a large percentage of mining would occur on un-reclaimed benches that would at least partially be restored to pre-mining topography. Re-mining would result in an overall reduction in sediment discharge and acid mine drainage.
- Re-mining of abandoned mines results in reclamation of abandoned mine highwall that are safety hazards to hunters and hikers.
- Prelaw benches have increased the value of my land because hunters camp on the flat areas; I am considering constructing cabins on the benches that I would rent to hunters.

*Mining and
Reclamation
cont'd*

- Implementation of the regulations adequately protects the environment.
- Mines in Tennessee are under bonded, and as a result areas are not restored when operators walk away.
- Impacts of mining the Tennessee Valley Authority (TVA)-owned coal will not likely occur because TVA never issued an EIS on the Kopper's Deposit and because it has announced its intention to retire 4,000 megawatts of coal-fired generation.
- OSM must take into consideration that contemporary mining practice does not leave highwall, un-reclaimed surfaces and polluted water.
- OSM must consider the amount of coal in the Petition area subject to re-mining.
- Considerations should be given to the adverse impacts of the inability to re-mine.
- The elimination of mining in the Petition area will stop the post-mining land use planning currently underway in coordination with TWRA and other entities.
- Coal mining companies are the only answer for reclaiming abandoned coal mines and highwalls. The State of Tennessee does not have the funds to do so. The SMCRA abandoned mine land fund will not be adequate to reclaim these lands if we're not buying coal because AML money comes from a fee levied on mined coal.
- Analyze whether mining practices and available restoration technology are adequate to protect people and watershed ecosystems from potential short- and long-term adverse impacts.

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| <p><i>Mountaintop Mining</i></p> | <ul style="list-style-type: none"> • The residents of Tennessee do not want mountaintop removal allowed on our sensitive public lands and it is not worth the environmental degradation that will occur. • Until the time when these mined properties are all used for something beneficial, I would support to revoke permits on all mountaintop mining, cross ridge or other mines where the land is permanently destroyed. • Documented literature shows that mountaintop removal causes adverse hydrological effects to streams 1,000 times greater than the model OSM allows coal companies to use for permit applications. • Mountaintop removal mining is destructive not only to land and water but also to people living in coal communities. It destroys upper reaches of streams and causes pollution below. • Mountaintop mining is not occurring in Tennessee. • Valley fills, usually prevailing on mountaintop mining operations, are almost nonexistent here because of the stringent regulations already in place. • OSM must consider that Tennessee law already prohibits mountaintop removal mining. |
| <p><i>Noise and Ground Vibration</i></p> | <ul style="list-style-type: none"> • Evaluate the impacts of noise and vibrations from blasting; and, evaluate the noise generated from coal truck traffic, mining equipment, etc. |

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| <p><i>Public Health and Safety</i></p> | <ul style="list-style-type: none"> • Evaluate the impacts of blasting, exposed highwalls and mining equipment on public health and safety. • Evaluate the impacts of mining on public/community facilities and services available in the WMA. • The EIS must consider the imminent danger to inhabitants of the urbanized areas, cities, towns, and the communities in the petition area. • Consider all reputable, peer-review studies, other than those funded by the coal industry, show that considerable ecological economic and public health damage is proximately caused by coal mining activities. |
| <p><i>Recreation</i></p> | <ul style="list-style-type: none"> • Evaluate the impacts of mining in the petition area on recreational activities (hunting, fishing, hiking, biking, sight-seeing, camping, bird-watching, ATVs, and many other sports and activities offered in the wildlife management area.) • Evaluate the impacts of mining with the protection afforded to the Cumberland Trails State Park. • Evaluate the impacts of mining on the existing aquatic resources, commercial and recreational fishing. • Evaluate the restoration of areas used for spiritual values of our Cumberland Mountains. • The analysis must include areas outside the petition area, including the Cumberland Trail State Park, Frozenhead State Park and Recreation Area, and Big South Fork National Park and Recreation Area. • Commenter submitted the following document for review, “State-Level Economics Contribution of Active Outdoor Recreation – Technical Report and Methods of Findings.” • The Smokey Mountain Hiking Club, based in Knoxville, TN, has over 600 members. They sponsor outings in the petition area on the Cumberland Trail between Lafollette and Smokey Branch. This hiking club is one of the largest and most active outdoor recreation and conservation groups in the area. |

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| <p><i>Sedimentology</i></p> | <ul style="list-style-type: none"> • There is not a method to adequately control sediment loads into the “waters of the state.” • Mining releases both metals and sediment into watersheds. • The petition area is currently subject to heavy logging in which by itself is increasing sedimentation in streams causing loss of habitat and creating unsightly clear cuts. • Sedimentation or water quality impacts related to coal mining runoff could affect the primary elements considered important when delineating the Designated Critical Habitat for aquatic species. |
| <p><i>Socioeconomics</i></p> | <ul style="list-style-type: none"> • The EIS must consider socioeconomic items. • There is a need to address the different financial cost and environmental cost in the petition area. Consider the long and short term economic impacts that will affect the counties in Tennessee. • TN’s watersheds are becoming just as much an economic importance as energy resources to the state. • Hikers on the Cumberland Trail support businesses outside the park that would otherwise not exist. • The coal industry stimulates the economy through its employment of persons and payment of taxes. • Assess the full cost of coal and its threat on other economic activity (tourism, wildlife management, and recreation). • County residents would lose revenue from a reduction in coal severance tax. In Campbell County alone, property tax rates would have to be raised by 7 cents in order to recoup the \$4,000 that's currently paid by each coal miner. |

*Socioeconomics
cont'd*

- According to a National Park Service 2005 report, recreational activities such as hunting, camping, fishing, and enjoying nature's bounty in the area annually contribute \$10 to \$16 million to the economy. If the water and land are destroyed by mining, these revenues will be lost.
- Ecotourism plays in a sustainable future for the economy of Morgan County. That future will not happen if the designated area does not receive the protections afforded by the OSM approval of this petition.
- Tennessee's coal production accounts for about \$67 million in direct and indirect economic value.
- Consider the "externalized costs" of mining, including road repairs, carbon dioxide levels in the atmosphere, downstream clean up and restoration of streams, filtration systems for affected drinking water, oil and gas drilling, and reduced real estate values.
- Surface mining on petition ridge lines makes no economic sense when compared to the potential revenues that can be derived from preserving these lands in a pristine and unspoiled state for tourism and recreation.
- For every coal miner you put out of work, you put about 60 other people out of work when you consider supporting industries and businesses
- Assess the value of coal in the petition area and the coal severance tax that would be collected if the coal were mined.
- Campbell County can't afford to lose any more jobs; in the absence of coal severance tax revenues, county taxes would probably have to be increased.
- Outside of government, coal companies are the largest single contributors to rural school systems in east Tennessee. Without them, taxes would have to be increased.
- Banning mining in the petition area would cause coal miners to lose their jobs and would cause the nearly 20 percent unemployment rates in surrounding counties to be even higher.

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| <p><i>Socioeconomics</i> <i>cont'd</i></p> | <ul style="list-style-type: none"> • Given the recent ownership transfer of National Coal Company properties and the subsequent termination of 115 or 120 coal miner jobs, the economic impact of designating the petition area unsuitable for mining would not be all that great. • Study the impacts outside the petition boundary, particularly on those municipalities and communities that might eventually be gateway communities for a long-term recreational capability. • Study the long-term economic, social, and cultural impacts of transitioning the area, which is one of the poorest in Tennessee, from the old boom-and-bust cycles of resource extraction to a more sustainable level of economic activity that would be generated by tourism and recreation. |
| <p><i>Soil</i></p> | <ul style="list-style-type: none"> • Evaluate the need to assess soils impacts in the petition area. |
| <p><i>Streams</i></p> | <ul style="list-style-type: none"> • OSM must take into consideration that Tennessee prohibits deposition of overburden as fill in valleys and headwater streams. • The Tennessee coal mining laws already prohibits mining through streams and the removal of coal within 100 feet of a stream. • The petition area is currently subjected to heavy logging which by itself is increasing sedimentation in streams causing loss of habitat and creating unsightly clear cuts. • An environmental impact statement should be prepared that analyzes the importance of headwater streams in watersheds. |

Threatened and Endangered Species

- Assess the potential impacts of coal mining on are at least 24 animal species listed as endangered or threatened found on lands subject to the State’s petition (including the Cerulean Warbler, Gray Bat, Indiana Bat Cumberland Bean, Cumberlandian combshell, Cumberland elktoe, Oyster mussel, purple bean and tan riffleshell endangered fish (Duskytail darter, Blackside Dace, Spotfin Chub and the Cumberland Darter).
- Included within the Petition area are several other species (Cumberland Dusky Salamander, Ashy Darter, Cerulean Warbler, Golden-winged Warbler, Eastern Small-footed Bat, Northern Long-eared Bat and Rafinesque’s Big-eared Bat).and other sensitive species.
- OSM and FWS have signed a biological opinion which clearly states that surface mining operations conducted in accordance with SMCRA are not likely to result in the destruction or adverse modification of designated or proposed critical habitat.
- Mining has impacted vulnerable species in the Big South Fork, the park with the greatest number of threatened and endangered species of any park in the country.
- Investigate the effect of the petition on the integrity of the forest area because it is one of the global hot spots for biological diversity and harbors rare and declining species that are dependent on forest interior habitat.
- The Cerulean Warbler has declined about four percent per year for the past 60 years. The Cumberland Mountains are by far the best habitat for this bird on earth. A petition was filed under the Endangered Species act to list the Cerulean Warbler as threatened and endangered. This species was not listed, but it is likely that another petition will be submitted.
- The area covered by the Lands Unsuitable for Mining Petition (LUMP) potentially supports one endangered and two threatened plants (Cumberland sandwort, Cumberland rosemary, and the Virginia spiraea).
- The area covered by the LUMP potentially supports two endangered bats (Gray Bat and the Indiana Bat).

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| <p><i>Tourism</i></p> | <ul style="list-style-type: none"> • There is a need to assess how mining will impact tourism and the economy in the State of Tennessee. • The Connecting the Cumberlands project added 50,000 acres of new lands for public access. Visits to Frozen Head State Park increased by more than 20 percent during August 2009 to September 2010. • Assess impacts to recreationalists who enjoy the scenery and also hunting and fishing. • For every dollar spent in a State park, 37 are returned to the economy around the park from tourism. • Tourism will promote a sustainable economy if the vistas and waters are protected, but they might not continue if mountaintop mining occurs. • There are substantial revenue and jobs derived from tourism through the preservation of an intact landscape of the North Cumberland Plateau, including the Big South Fork, Obed Wild and Scenic River, Cumberland Trail State Park, and Frozenhead State Park and Natural Area. • In east Tennessee, the number one employer is tourism. In Campbell County, mining isn't even in the top 30. • Preserving Cerulean Warbler habitat promotes tourism. • Last year, runners from 11 States participated in an annual trail race that starts in Caryville and uses the Cumberland Trail and the North Cumberland Wildlife Management Area and economically benefit this area. |
| <p><i>Wetlands</i></p> | <ul style="list-style-type: none"> • Any impacts to wetlands or other sensitive aquatic resources should be clearly defined. |

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| <i>Wildlife Protection</i> | <ul style="list-style-type: none">• Evaluate the long and short term impacts of surface mining on wildlife habitat (including elk, fish, migratory birds and implementation of the State’s wildlife habitat plan.• The petitioner fails to recognize the opportunities that are generated through the reclamation process that result in reclaimed coal mining lands supporting elk. |
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| <p><i>Wildlife Protection</i></p> <p><i>cont'd</i></p> | <ul style="list-style-type: none">• Wildlife continues to flourish in the area and is not driven out by mining. Mining creates edge boundaries and cover for most wildlife.• Habituate for species targeted by the conservation effort requires significantly larger tracts of un-fragmented forested habitat.• The Nature Conservancy (TNC) has been engaged in a long-term habitat conservation planning efforts with the Tennessee Wildlife Resources Agency (TWRA) and local government for the Connecting the Cumberlands area.• The EIS must consider evaluating any land use listed as Wildlife Refuge Areas.• Assess impacts on vulnerable resident and migrant species, including the Cerulean Warbler whose numbers have plummeted precipitously and whose core breeding habitat is located in the petition area. The petition area supports the highest nesting density of Cerulean Warblers anywhere in its breeding range.• In the petition, there are no presentations of fact or evidence that surface coal mining in the petition area is incompatible with conservation goals of the State. By its own admission, the State does not have a wildlife plan.• Surface coal mining on Hatfield Knob created elk, turkey, and deer habitat, and people from many States enjoy viewing the elk there.• If the petition area is designated unsuitable for mining, unemployed miners will probably hunt the elk for food and eliminate them. |
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| <p><i>Width of Petition Area</i></p> | <ul style="list-style-type: none"> • Designate as unsuitable for mining an area 1,000 feet wide on each side of the ridge lines. • Designate as unsuitable for mining an area wider than the petition’s 600 feet on each side of the ridge lines. • Consider a smaller petition area such as 300 feet which is the minimum buffer zone from a National Park, or 100 feet the distance SMCRA specifies for stream buffer zones. The Petition area is not properly defined. The Petition area not only encompass what appears to be ridge lines, but also streams, valleys, and features that under any contemporary definition of “ridge” would not be included. |
| <p><i>Other</i></p> | <ul style="list-style-type: none"> • Evaluate the “The New York Times” article “My Polluted Kentucky Home.” and Article: “Death of a Mountain” Radical strip mining and the leveling of Appalachia. • Implement a plan to reclaim coal mines or previous disturbances located in the New River watershed. • The State purchased the Northern Cumberland WMA years ago, but did not purchase the mineral rights of that property. Granting the petition without proper compensation is illegal and in violation of existing contracts and must be evaluated. • Consider the physical and psychological health of communities and the spiritual value of mountains. <p>There is no such thing as “clean coal,” mining creates as much greenhouse gas.</p> |

**APPENDIX B: STATE OF TENNESSEE NORTH CUMBERLAND
WILDLIFE MANAGEMENT AREA LAND UNSUITABLE FOR
MINING PETITION**

Appendices

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Office of the Attorney General



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September 30, 2010

VIA OVERNIGHT DELIVERY

Earl Bandy, Jr.
Field Office Director
Office of Surface Mining Reclamation and Enforcement
710 Locust Street, 2nd Floor
Knoxville, Tennessee 372902

RECEIVED

OCT 01 2010

**OSM KNOXVILLE
FIELD OFFICE**

RE: Petition to Designate Certain Lands Within the North Cumberland Wildlife Management Area and the Emory River Tracts Conservation Easement, Anderson, Campbell, Morgan and Scott Counties, Tennessee as Unsuitable for Surface Coal Mining Operations

Dear Mr. Bandy:

Enclosed please find a petition with exhibit on behalf of the State of Tennessee to designate as unsuitable for surface coal mining operations the area within 600 feet of all ridge lines lying within the North Cumberland Wildlife Management Area - comprised of the Royal Blue WMA, the Sundquist WMA, and the New River WMA – and the Emory River Tracts Conservation Easement, encompassing approximately 67,326 acres in Tennessee.

Sincerely,

A handwritten signature in blue ink, appearing to read "Elizabeth P. McCarter".

Elizabeth P. McCarter
Senior Counsel
(615) 532-2582

Encls.

Reply To: Office of the Attorney General, Environmental Division
P. O. Box 20207, Nashville, Tennessee 37202
FAX: 615-741-8724

**BEFORE THE U.S. DEPARTMENT OF THE INTERIOR
OFFICE OF SURFACE MINING**

In re Designation of Certain Lands)
Within the North Cumberland)
Wildlife Management Area and the)
Emory River Tracts Conservation)
Easement, Anderson, Campbell, Morgan)
and Scott Counties, Tennessee as)
Unsuitable for Surface Coal Mining)
Operations.)

PETITION

Petitioner, the State of Tennessee , in accordance with section 522 of the Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. § 1272 (“SMCRA”), petitions the United States Department of the Interior, Office of Surface Mining (“OSM”), to designate as unsuitable for surface coal mining operations the area within 600 feet of all ridge lines lying within the North Cumberland Wildlife Management Area (“WMA”) - comprised of the Royal Blue WMA, the Sundquist WMA, and the New River WMA (also known as the Brimstone Tract Conservation Easement) – and the Emory River Tracts Conservation Easement [hereinafter referred to as the “petition area”], encompassing approximately 67,326 acres.¹

In 2007, the State of Tennessee completed an ambitious conservation project, referred to as “Connecting the Cumberlands,” which resulted in the protection of new public lands that connect to the existing public lands of the Royal Blue WMA, Sundquist WMA, and Frozen Head State Park and Natural Area. The project, located in Scott, Campbell, Anderson, and Morgan Counties, provides public access rights on approximately 127,000 acres and is the largest conservation transaction in the state since the creation of the Great Smoky Mountains National

¹ A map of the petition area is included in Exhibit A.

Park in the 1930s. In Governor Bredesen’s words, the project gave the state “a rare, once-in-a-lifetime opportunity to protect ecologically significant woodlands on a large scale and make them available for recreation [and] also help protect our air and water quality and wildlife habitat, as well as the natural beauty and cultural heritage that make our state uniquely Tennessee.”² He further described the project as an investment that will support tourism and the economies of some of the state’s most rural areas, “while at the same time ensuring this land is protected for the benefit of Tennesseans for generations into the future.”³

SMCRA was enacted, in part, to “establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations” and to “assure that the rights of surface landowners and other persons with a legal interest in the land or appurtenances thereto are fully protected from such operations.” 30 U.S.C. §1202(a), (b). Congress recognized that all surface mining operations, regardless of the permitting requirements and performance standards in place, inherently have adverse social, economic, and environmental effects.⁴ Accordingly, Congress enacted section 522, specifically recognizing that in some circumstances “coal surface mining should give [way] to competing uses of higher benefit.”⁵ As the petition shows, protecting the conservation values and recreational values of the public lands for the benefit of generations to come is a “higher benefit” that should prevail over surface coal mining.

² Press Release, Tennessee Department of Environment and Conservation, Bredesen Celebrates Historic Land Acquisition for Tennessee (Nov. 8, 2007), *available at* <http://www.state.tn.us/environment/news/release/2007/Nov/cumberlandns.shtml>.

³ *Id.*

⁴ See U.S.C. § 1201(e) (finding that effective and reasonable regulation of surface coal mining operations will merely minimize “the adverse social, economic, and environmental effects of such mining operations”).

⁵ U.S. H.R. Rep. No. 95-218, at 94 (1977); *see also* Areas Unsuitable for Surface Coal Mining, 48 Fed. Reg. 41312, 41312 (Oct. 14, 1983).

Section 522(c) of SMCRA allows any person having an interest which is or may be adversely affected by surface coal mining to petition to have an area designated as unsuitable for surface coal mining operations. 30 U.S.C. §1272(c). The SMCRA regulatory program for Tennessee is set out at 30 C.F.R. Part 942. In addition, 30 C.F.R. Parts 942.762 and 942.764 incorporate by reference OSM's criteria and procedures for considering a petition to designate non-federal lands as unsuitable. Under section 522(a)(3), OSM has the discretion to designate an area as unsuitable if such operations will:

- A) be incompatible with existing State or local land use plans or programs;
- B) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and esthetic values and natural systems;
- C) affect renewable resource lands in which such operations could result in a substantial loss or reduction of long-range productivity of water supply or of food or fiber products; or
- D) affect natural hazard lands in which such operations could substantially endanger life and property.

30 U.S.C. §1272(a)(3)(A)-(D).

Petitioner urges OSM to designate the petition area as unsuitable for surface coal mining operations based on the first two statutory criteria above because:

1) Surface mining operations in the petition area would be incompatible with the conservation goals of Tennessee's "Connecting the Cumberlands" project, as well as with various state land use plans, programs and strategies that govern and set goals for the lands within and downstream of the petition area, including Tennessee's Comprehensive Wildlife Conservation Strategy, the Management Plan for the Royal Blue WMA, the Management Plan for the Sundquist WMA, and the Tennessee State Recreation Plan. These plans have at their

core the preservation and improvement of wildlife habitat and recreational opportunities, and these goals would be seriously compromised by the inherent impacts of surface mining operations in the petition area; and

2) Surface mining operations in the petition area would significantly damage the natural systems and esthetic, recreational, cultural, and historic values of the ridge lines and their viewsheds that exist within these fragile lands, including the Cumberland Trail State Park, which traverses four counties within the petition area. The public is attracted to an intact landscape with the opportunities for hunting and wildlife viewing that such a corridor offers and surface mining in the petition area has the potential to destroy both the viewsheds and vital habitat for numerous sensitive species that exist in the petition area.

Although this petition does not otherwise discuss the criterion relating to the long-range productivity of a water supply, it is important to note that the State of Tennessee expressly recognized the protection of water quality in the New and Emory Rivers as one of the benefits of the “Connecting the Cumberlands” project. These rivers provide water for more than 27,000 Tennesseans in nine communities including Harriman, Kingston and Rockwood.⁶

Petitioner’s Contact Information

1. Tennessee Wildlife Resources Agency
Aubrey D. McKinney, Chief of Environmental Services
Ellington Agricultural Center
P. O. Box 40747
Nashville, Tennessee 37204
615-687-6577
e-mail: Dave.McKinney@tn.gov

⁶ See TDEC, North Cumberlands Acquisition; Public Benefits, *available at* <http://tennessee.gov/environment/northcumb/benefits.shtml> (last visited June 1, 2010).

2. Tennessee Department of Environment and Conservation
Paul Schmierbach
Environmental Program Manager
Knoxville Field Office
3711 Middlebrook Pike
Knoxville, Tennessee 37921
865-594-5529
e-mail: Paul.Schmierbach@tn.gov

Identification of the Petition Area

This petition seeks an unsuitability designation for all ridge lines lying within the North Cumberland WMA and the Emory River Tracts Conservation Easement (“Emory Tracts”). The North Cumberland WMA is the umbrella WMA created as a result of the 2007 “Connecting the Cumberlands” conservation project, consisting of the existing Royal Blue and Sundquist WMAs and the newly created New River WMA (also referred to as the Brimstone Tract). For clarity and ease of reference, this petition refers to the individual land units that comprise the North Cumberland WMA by their original or “unit” names—the Royal Blue WMA, the Sundquist WMA, and the New River WMA. The petition area includes approximately 600 feet on either side of the ridge lines within the North Cumberland WMA and the Emory River Tracts Conservation Easement encompassing approximately 67,326 acres in parts of four counties in Tennessee -- Anderson, Campbell, Morgan and Scott. The petition area is within the South Fork of the Cumberland, the Clear Fork of the Cumberland, and Upper Clinch watersheds, but does not include any areas where there currently is acid mine drainage to waters of the state. A Geographical Information Systems (“GIS”) map of the petition area is attached to this petition as Exhibit A.

OSM's public records reveal that since 2005, the agency has issued numerous new mining permits for surface coal mining operations in the petition area. Further, the Tennessee Valley Authority ("TVA") still has under consideration a plan for managing its coal reserves underlying the Royal Blue WMA due to the increase in market demand for high-sulfur coal.⁷ In 2003, TVA estimated that approximately 70 million tons of recoverable coal, including 28 million tons from surface mining and 42 million tons from deep mining, exist under the Royal Blue WMA.⁸ In 2008, National Coal Corporation estimated the amount of recoverable coal beneath the Sundquist WMA to be at least 30 million tons.⁹ These estimates, together with the number of surface mining permits already granted, as well as the mining infrastructure being put in place throughout the petition area, indicate ongoing and continued surface coal mining operations in the petition area for the foreseeable future.

Identification of Petitioner's Interests and Statement of How Surface Mining of the Area May Adversely Affect Those Interests

Petitioner, through the Tennessee Wildlife Resources Agency ("TWRA"), has full jurisdiction over the management, protection, propagation, and conservation of wildlife in Tennessee.¹⁰ Toward these ends, TWRA manages lands and waters suitable for game, birds, fish and fur-bearing animal restoration, propagation, and protection, including the Royal Blue and Sundquist WMAs that comprise a portion of the North Cumberland WMA. Historically, surface mining within the New River watershed has adversely affected the Royal Blue and Sundquist

⁷ Tennessee Valley Authority, Notice of Intent, Environmental Impact Statement: Koppers Coal Reserve Management Plan, 68 Fed. Reg. 26,371 (May 15, 2003).

⁸ *Id.* at 26,372.

⁹ Dave Flessner, *Legislators debate higher taxes, controls as strip mining rebounds*, Chattanooga Times Free Press (April 7, 2008), available at <http://www.timesfreepress.com/news/2008/apr/07/legislature-debates-higher-taxes-controls-strip-mi/?print>.

¹⁰ See Tenn. Code Ann. § 70-1-301.

WMAs through sediment loading, acid mine drainage and other impacts. Based upon recent trends at surface mining operations that have been fully regulated pursuant to the requirements of SMCRA, the impacts that would occur as a result of continued and renewed surface mining within the petition area can be expected to adversely affect the wildlife habitat within the New River watershed and adjacent areas through alterations of the soil and geologic structure, an elevated level of conductivity in surface water, noise, dust and vibration.

The cumulative impacts from past and current mining and, as discussed below, an expected increase in surface mining in the petition area will significantly impair wildlife habitat in the North Cumberland WMA through forest fragmentation, impacting pollution-sensitive species and the natural values of these wildlife corridors. TWRA's interests likewise would be threatened by damage to the recreational uses of the Royal Blue and Sundquist WMAs, both in terms of hunting opportunities and wildlife viewing. Consequently, surface mining in the petition area will adversely affect TWRA's management interests in protecting and propagating wildlife on these lands.

Petitioner, through the Tennessee Department of Environment and Conservation ("TDEC"), manages numerous state parks and state natural areas encompassing 175,000 acres across Tennessee. These include the Justin P. Wilson Cumberland Trail State Park ("CTSP"), the state's only linear park spanning 300 miles and traversing eleven counties in Tennessee, among them Anderson, Campbell, Morgan and Scott Counties, which are within the petition area.¹¹ TDEC, through its Division of Recreation Educational Services, is also responsible for providing assistance in the acquisition and conservation of land for recreational purposes, including the 2007 "Connecting the Cumberlands" project.

¹¹ See TDEC, Tennessee State Parks, Justin P. Wilson Cumberland Trail State Park, *available at* <http://tennessee.gov/environment/parks/CumberlandTrail>.

Surface mining within the ridge lines of the North Cumberland WMA, created as a result of the “Connecting the Cumberlands” project, can be expected to significantly impair opportunities for public access and recreation within this unbroken core of protected land, which includes nearly 130,000 acres of majestic hardwood forests, mountains and streams. Surface coal mining operations in the CTSP, or within its viewscape, and other parts of the petition area could damage important natural systems and the cultural and esthetic values of these fragile lands, including various overlooks, viewsheds and gorges, thereby adversely affecting the public’s experience of these important esthetic resources. TDEC’s interests would therefore be threatened by damage to the viewsapes and recreational uses of the ridge lines in both the Cumberland Trail State Park and the North Cumberland WMA.

Allegations of Fact and Supporting Evidence

I. THE PETITION AREA SHOULD BE DESIGNATED UNSUITABLE FOR SURFACE COAL MINING OPERATIONS BECAUSE MINING IN THE AREA WOULD BE INCOMPATIBLE WITH EXISTING STATE OR LOCAL LAND USE PLANS OR PROGRAMS WITHIN THE MEANING OF 30 U.S.C. § 1272(a)(3)(A).

A. Surface Mining in the Petition Area is Incompatible with the State’s Conservation Plan for this Area as Reflected in the 2007 “Connecting the Cumberlands” Conservation Project.

In 2007, Tennessee, in partnership with The Nature Conservancy and two conservation-oriented timber companies, acquired a mix of fee title and conservation easements to more than 127,000 acres of land.¹² Tennessee describes the acquisition as a “once-in-a-lifetime opportunity

¹² Tennessee Department of Environment and Conservation (“TDEC”), North Cumberlands Acquisition Fact Sheet, available at <http://tennessee.gov/environment/northcumb/facts.shtml> (last visited August 18, 2010). The conservation easements consist of 23,200 acres on the Brimstone tract and 18,875 acres on the Emory River tract. The State also acquired the timber rights to the Sundquist WMA’s 75,000 acres of timber. *Id.* The State appropriated

to protect majestic woodlands on the Northern Cumberland Plateau that include some of the most important forests, mountains, streams and wildlife habitat remaining in North America. . . . The ‘landscape scale’ of this acquisition will . . . help preserve the purity of streams and rivers and provide a natural corridor for wildlife”¹³ Further, “[o]ver the long term, establishing this unbroken core of protected land has the potential to enhance life in Tennessee through increased tourism, protection of unique forms of wildlife and their habitats, and opportunities for public access and recreation.”¹⁴ The Tennessee Senate recently passed a resolution extolling the virtues of the Cumberland Plateau and recognizing that its resources “represent valuable tourism assets which can, with proper stewardship, development, and management,” contribute to local economies, as well as to the quality of life in the region.¹⁵ Surface mining in the petition area is incompatible with this resolve and with Tennessee’s goals for its 2007 “Connecting the Cumberlands” land acquisition.

As the name “Connecting the Cumberlands” reflects, the acquisition connects the newly acquired lands to the existing public lands of Frozen Head State Park and Natural Area, the Royal Blue WMA, and the Sundquist WMA to create a large expanse of unfragmented habitat.¹⁶ The Cumberland Trail also traverses Frozen Head State Park and Natural Area and Royal Blue WMA, so the acquisition of this property provides an unbroken trail of approximately 90 miles through public lands that maintain “the visual esthetics for future generations of trail hikers.”¹⁷ The wildlife corridor that was created amounts to “300 square miles of protected forestland for

\$82 million out of a total estimated value of the project of \$135 million. *Id.* The State’s investment is “the largest of its kind in state history and the largest conservation appropriation by any one state in recent years.” *Id.*

¹³ TDEC, North Cumberlands Acquisition Fact Sheet, *available at* <http://tennessee.gov/environment/northcumb/facts.shtml> (last visited August 18, 2010).

¹⁴ *Id.*

¹⁵ Tennessee Senate Joint Resolution No. 980, May 5, 2010.

¹⁶ Paul Kingsbury, *Connecting the Cumberlands*, *The Tennessee Conservationist*, January/February 2009, at 20 at 19, 22.

¹⁷ Southern Cumberland Mountains: A TWRA Acquisition Priority, 2002, at 2.

black bear, elk, white-tailed deer, turkey and numerous migratory songbirds such as the cerulean warbler and the wood thrush.”¹⁸ The Nature Conservancy ranks this biologically rich area as the eighth most important place in the world.¹⁹

As the conservation easement documents indicate, one of the primary purposes of the easements is to protect the land’s “Conservation Values,” which include “native flora and fauna and the ecological processes that support them,” “threatened and endangered animal species and other animals,” “neotropical migrant songbirds,” “wetland, riparian, and other aquatic habitats,” and “biological diversity.”²⁰ All forest management activities are required to be compatible with these purposes by emphasizing sustainable forestry principles, employing best management practices, and establishing “special management” or “conservation zones.”²¹ The easements establish these special conservation areas, including approximately 5,000 acres in the Brimstone tract that are predominantly ridge lines, to protect habitats and natural communities that support rare, threatened, or sensitive plant or animal species.²² The easements also require that the grantor obtain certification of its forest management plan from the Forest Stewardship Council (FSC), or have an alternative program that meets FSC standards and that is mutually agreed upon by the grantor and the State.²³

¹⁸ Paul Kingsbury, *Connecting the Cumberlands*, *The Tennessee Conservationist*, January/February 2009, at 19.

¹⁹ TDEC North Cumberlands Acquisition; Public Benefits, *available at* <http://tennessee.gov/environment/northcumb/benefits.shtml> (last visited August 18, 2010).

²⁰ Sustainable Forestry Conservation Easement, “Brimstone Property” at 7; Conservation Easement, Emory Tract at 1-3.

²¹ Sustainable Forestry Conservation Easement, “Brimstone Property” at 19, 23 (discussing “Conservation and Economic Objectives” and “Mandatory Forest Management Provisions”); Conservation Easement, Emory Tract at 14, 20 (discussing “Compliance with Forest Management Objectives” and “Special Management Zones” or “Conservation Zones”).

²² Sustainable Forestry Conservation Easement, “Brimstone Property” at 24 (discussing “Forest Management Exclusion Zones”); Conservation Easement, Emory Tract at 6, 20 (discussing “Special Management Zones or Conservation Zones”).

²³ Sustainable Forestry Conservation Easement, “Brimstone Property” at 20-21; Conservation Easement, Emory Tract at 20-21.

Thus, the very purpose and vision of the State’s “Connecting the Cumberlands” land acquisitions are to ensure the integrity and protection of these public lands on a landscape scale and to ensure that timbering is done on a sustainable basis, lessening forest fragmentation. The Emory River tract consists of approximately 18,800 acres and is the subject of the conservation easement between The Nature Conservancy, which owns the surface rights, and the State of Tennessee. Clearly, the State’s policy for these public lands is to preserve them in large blocks in order to protect habitat and diversity and to avoid landscape fragmentation.

While the sustainable timbering practices required by the easements can be carried out consistently with the State’s wildlife conservation plans, surface mining in the petition area cannot. Surface mining, together with the clear-cutting of forest that precedes it, directly damages wildlife and wildlife habitat within, surrounding, and downstream from the mined areas. Surface mining also fragments forests, directly conflicting with one of the State’s explicit goals for the newly acquired areas. Such impacts occur even when mining is carried out in full compliance with SMCRA’s permitting requirements and performance standards.

Surface mining operations in the petition area are also inconsistent with the State’s goals of creating and enhancing recreational opportunities. The Commissioner of the Tennessee Department of Environment and Conservation (“TDEC”) stressed that the project would “increase recreational opportunities such as hunting and fishing, as well as hiking, biking, horseback riding and wildlife viewing.”²⁴ The State also repeatedly emphasized that all of the more than 127,000 acres involved in the project would be open to the public.²⁵ The acquisition

²⁴ Press Release, Bredesen Celebrates Historic Land Acquisition For Tennessee, 8 Nov. 2007, *available at* <http://tn.gov/environment/news/release/2007/Nov/cumberlands.shtml>.

²⁵ *See, e.g., id.* While the conservation easements allow for some closure in areas of active forest management where public safety would be threatened, they ensure that no more than 10% of the protected area will be closed at any time, once again indicating the importance the State places on recreation. Sustainable Forestry Conservation Easement, “Brimstone Property” at 29-30; Conservation Easement, Emory Tract at 26.

also directly advances the State’s strategy, set forth in the Tennessee State Recreation Plan and “Tennessee 2020,” a ten year plan for the future of Tennessee’s parks and landscapes, of creating a Recreation Development Corridor in the Cumberland Plateau.²⁶ Similarly, TWRA’s interests in promoting the recreational uses of the Royal Blue and Sundquist WMAs for hunting and wildlife viewing will be enhanced by this new project. Thus, the impacts of surface mining in the petition area, such as damage to scenic resources and viewsapes, noise, dust, and vibration, would all directly conflict with the State’s plans for protecting the area for public recreation.

Finally, surface mining would undermine the State’s plans for sustainable economic development. The State made clear that the “Connecting the Cumberlands” acquisition would not only preserve valuable natural lands but would also provide *long-term* support for local economies.²⁷ The keys to the State’s long-term, sustainable economic development plans are preservation of the land’s natural and ecological values that attract tourism²⁸ and management of forests for the permanent provision of valuable products and local jobs.²⁹ Unlike tourism and sustainable forestry, surface mining provides only short-term benefits, siphons the majority of profits out of the area, and leaves local communities with very few, if any, post-mining economic

²⁶ See TDEC, The Tennessee State Recreation Plan 2003-2008 at 28-31 (Feb. 2004), *available at* http://tn.gov/environment/recreation/pdf/rec_plan_final.pdf; TDEC, Tennessee 2020; Vision for Parks, People & Landscapes, at 105-06 (31 March 2010), *available at* <http://www.state.tn.us/environment/recreation/plan/>.

²⁷ Press Release, Bredesen Celebrates Historic Land Acquisition For Tennessee, November 8, 2007, *available at* <http://tn.gov/environment/news/release/2007/Nov/cumberlands.shtml> (“We were able to . . . make investment that will support tourism and the economies of some of our most rural areas, while at the same time ensuring this land is protected for the benefit of Tennesseans *for generations into the future.*”) (emphasis added).

²⁸ TDEC North Cumberlands Acquisition; Public Benefits, *available at* <http://tennessee.gov/environment/northcumb/benefits.shtml> (last visited August 18, 2010) (“the diversity of the Cumberland Mountains” is “a draw for hikers, bikers, camping and wildlife viewing”); TDEC, North Cumberlands Acquisition Fact Sheet, *available at* <http://tennessee.gov/environment/northcumb/facts.shtml> (last visited August 18, 2010) (“[E]stablishing this unbroken core of protected land has the potential to enhance life in Tennessee through increased tourism...”).

²⁹ TDEC North Cumberlands Acquisition; Public Benefits, *available at* <http://tennessee.gov/environment/northcumb/benefits.shtml> (last visited August 18, 2010) (“Working lands provide local jobs”); TDEC, North Cumberlands Acquisition Fact Sheet, *available at* <http://tennessee.gov/environment/northcumb/facts.shtml> (last visited August 18, 2010) (“Conservation easements present an opportunity to protect not only the properties themselves but also the economic benefits they generate for local communities as working forests.”).

opportunities.³⁰ Surface mining damages the natural and scenic values that attract tourism and destroys the forests that would provide a sustainable timber harvest.³¹ For all of the above reasons, surface coal mining conflicts with the State's vision and plans for the lands involved in the "Connecting the Cumberlands" project.

B. Surface Mining in the Petition Area is Incompatible with the State Management Plans for Wildlife Management Areas.

Surface mining in the petition area is incompatible with the state's plans for its Wildlife Management Areas. Under Tennessee law, a "wildlife management area" is a specific area established "for the intensive management of both habitat and wildlife species for optimum enhancement and use by both consumptive and nonconsumptive users."³² Although no comprehensive management plan has yet been developed for the new North Cumberland WMA, the Management Plan for the Royal Blue Wildlife Management Area ("Royal Blue Plan") currently provides guidance for a large portion of the WMA. As adopted in 1992, the Royal Blue Plan provides that "proper wildlife management" is the "highest priority."³³ While the Royal Blue Plan notes that mining has occurred and is envisioned to continue in the future,³⁴ it

³⁰ See, e.g., Mountain Association for Community Economic Development, *The Economics of Coal in Kentucky: Current Impacts and Future Prospects*, at 6 (25 June 2009) ("The top coal-producing counties have some of the highest poverty rates in the region. . . . So while mining employment is extremely important as a source of income for individuals in coal-producing counties, the benefits of these jobs do not translate into prosperity for the region."). A recent study in Kentucky found that the coal industry actually costs the State nearly \$115 million per year more than it brings in. Mountain Association for Community Economic Development, *The Impact of Coal on the Kentucky State Budget*, at 1 (25 June 2009), available at <http://www.maced.org/coal/>.

³¹ Recognizing the damage wrought by surface coal mining on forests, both conservation easements prevent such mining by the Grantor. Sustainable Forestry Conservation Easement, "Brimstone Property" at 31. Conservation Easement, Emory Tract at 10.

³² Tenn. Code Ann. § 70-1-101 (42).

³³ Royal Blue Plan at 32.

³⁴ *Id.* at 6, 23. Note, however, that at the time of the 1992 Plan there was only limited demand for the area's high-sulfur coal. *Id.* at 8. The development and installation of scrubbers to remove sulfur dioxide from coal-fired power plant emissions regulated under the Clean Air Act has increased the demand for such coal, meaning that mining could potentially occur at levels much higher than could have been envisioned by the Plan. See, e.g., Dave Flessner,

also makes clear that mining must be environmentally sound and compatible with the wildlife-centered uses for which the WMA was created.³⁵ The Royal Blue Plan notes that mining should be limited to situations in which it can be done so as to ensure that wildlife habitat and water quality are not adversely impacted.³⁶ For numerous reasons discussed below, mining in the North Cumberland WMA cannot meet these requirements.

Surface mining operations in the petition area will impair human recreational and wildlife-viewing opportunities in the WMA. The Royal Blue Plan's list of goals for the WMA includes providing opportunities for "wildlife enjoyment," "plant and animal restoration," "non-wildlife associated recreation" and protection and management of "threatened and endangered flora and fauna."³⁷ Similarly, the mission statement for the Sundquist Wildlife Management Area ("Sundquist Plan"), provides that TWRA has a duty to manage and operate the surface area for "Conservation and Recreation," in a way that precludes development, sustains "a natural hardwood forest through time" by prohibiting "conversion to plantations" and conserving "biological diversity," and provides public recreational opportunities.³⁸ While both the Royal Blue and Sundquist WMAs include timbering in their management plans, it should be noted that neither plan allows clear-cutting on the massive scale that occurs with surface mining. Both plans seek to protect habitat through controlled timber harvest and progressive forestry programs.³⁹

As discussed below in Part II, impacts of surface mining will have obvious adverse effects on wildlife enjoyment and wildlife viewing. Surface mining operations will degrade the

Legislators Debate Higher Taxes, Controls as Strip Mining Rebounds, Chattanooga Times Free Press (April 7, 2008).

³⁵ Royal Blue Plan at 32.

³⁶ *Id.* at 4-5.

³⁷ *Id.* at 4.

³⁸ Sundquist Plan at 4.

³⁹ See Royal Blue Plan at 13, 25; Sundquist Plan at 4-5.

scenic resources of the WMA and result in noise and dust, further lowering the area's recreational value.⁴⁰ OSM has acknowledged the adverse effects of dust and noise on recreational use and the “correlation between recreational satisfaction and high scenic quality for outdoor recreation.”⁴¹ Thus, because surface mining operations in the North Cumberland WMA will significantly damage the wildlife-and-recreation-based uses of the WMAs, such operations would be incompatible with the State's goals for the WMAs and should therefore be declared unsuitable.

C. Surface Mining in the Petition Area is Incompatible with the State Plans for the Cumberland Trail, Tennessee Greenways and Trails Plan, and the Tennessee State Park Plans.

Information since OSM’s January 13, 2006 Statement of Reasons (2006 SOR) on the petition filed by private parties further demonstrates that surface coal mining operations in the vicinity of the Smoky Mountain segment of the Cumberland Trail would conflict with the protection afforded the Cumberland Trail State Park. In 2008, the Greenways and Trails Advisory Council reiterated the national significance of the Cumberland Trail State Scenic Trail and State Park and emphasized that the continued development and eventual completion of the

⁴⁰ Flat Fork Statement of Reasons at 10 (“[S]urface coal mining operations would diminish the esthetic values of proposed overlooks.”); *Id.* at 15 (“[S]urface coal mining operations would be expected to affect the visual and noise quality of the . . . [a]rea, thus impacting the visitor's recreational experience.”); Fall Creek Falls Statement of Reasons, 65 Fed. Reg. at 39183 (acknowledging that “noise, dust, and vibration” are inherent impacts of surface mining operations in compliance with SMCRA); Fern Lake Watershed Statement of Reasons, 61 Fed. Reg. 49793, 49796 (finding that surface mining degrades visual quality even in non-pristine areas that have been subject to earlier surface mining).

⁴¹ Flat Fork Statement of Reasons at 15. *See* Fall Creek Falls Statement of Reasons, 65 Fed. Reg. at 39187 (impacts of dust and noise from surface coal mining operations in or near the Park would impair recreational use of Park land and could have a negative impact on Park visitation, affecting the economic viability of the Park and the surrounding area).

Cumberland Trail remains a priority of the Plan.⁴² Surface mining would frustrate the goals of the Tennessee Greenways and Trails Plan and conflict with the management objectives for Tennessee State Parks.

The purpose of the Greenways and Trails Plan is to create an interconnected, accessible network of greenways and trails across Tennessee, with the Cumberland Trail as the “backbone” of this system.⁴³ Tennessee law requires that the Cumberland Trail, as a state scenic trail, be located so as “to provide maximum potential for the appreciation of natural areas and for the conservation and enjoyment of the significant scenic, historic, natural, ecological, geological or cultural qualities of the areas through which such trails may pass.”⁴⁴ Because the Cumberland Trail is also a state park, Tennessee law requires that it “shall be preserved in a natural condition so far as may be consistent with its human use and safety, and all improvements shall be of such character as not to lessen its inherent recreational value.”⁴⁵ Likewise, the park must be managed consistently with the mission of Tennessee State Parks, which is “[t]o preserve and protect, in perpetuity, [the] unique examples of natural, cultural, and scenic areas,” represented by the parks.⁴⁶

As explained below, surface mining in the petition area would harm the scenic, historic, natural, ecological and cultural qualities of the areas through which the Cumberland Trail passes. Any such impacts would also be in direct conflict with the State’s mission to preserve and protect in perpetuity both the resources of the Cumberland Trail State Scenic Trail and State Park, as well as the public’s recreational uses of the North Cumberland WMA. This includes

⁴² 2008 Tennessee Greenways and Trails Plan at 30, *available at* http://www.state.tn.us/environment/recreation/plan/gt_plan2008.pdf.

⁴³ 2001 Tennessee Greenways and Trails Plan at 7-8, *available at* http://www.tennessee.gov/environment/recreation/pdf/5_Greenways_Plan.pdf.

⁴⁴ Tenn. Code Ann. § 11-11-104(1).

⁴⁵ Tenn. Code Ann. § 11-3-102.

⁴⁶ Mission Statement, Tennessee State Parks Strategic Direction: a Vision for the Future (Aug. 2005), *available at* <http://www.state.tn.us/environment/parks/pdf/StrategicDirect.pdf>.

protection of at least two rare floral species found in the North Cumberland WMA. The Canada lily (*Lilium canadense*) occurs at both Royal Blue and Sundquist WMAs and is state-listed as threatened.⁴⁷ The Ozark bunchflower (*Melanthium woodii*) occurs about 500 feet down slope of the ridge line at Royal Blue WMA within a moist ravine. That species is state-listed as endangered, and the occurrence at Royal Blue WMA represents one of only nine known occurrences in Tennessee.⁴⁸ Within the same ravine as the Ozark bunchflower, there is an occurrence record of the state-threatened leatherleaf meadowrue (*Thalictrum coriaceum*). There are eight known occurrences in Tennessee, but four are considered historical (not observed within the last 25 years).⁴⁹

Because SMCRA's permitting requirements and performance standards do not provide sufficient protection to these resources, mining in the vicinity of the Trail would be incompatible with the Tennessee Greenways and Trails Plan as well as the enabling legislation and mission statement for Tennessee State Parks.

D. Surface Mining in the Petition Area is Incompatible with Tennessee's Comprehensive Wildlife Conservation Strategy.

Mining in the petition area is incompatible with Tennessee's Comprehensive Wildlife Conservation Strategy ("CWCS"), also sometimes referred to as the State Wildlife Action Plan ("SWAP").⁵⁰ The primary goal of the CWCS is to prevent nongame wildlife within the state

⁴⁷ Tennessee Department of Environment and Conservation, Natural Heritage Program (2010), Tennessee Natural Heritage Inventory Database, Nashville, Tennessee.

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ Congress required each state to complete a Comprehensive Wildlife Conservation Strategy to ensure that state conservation programs funded under the federal "State Wildlife Grants Program" are designed to maximize benefits to nongame wildlife. TWRA, "Tennessee's State Wildlife Action Plan," available at <http://www.tennessee.gov/twra/cwcs/tncwcs2005.pdf> and <http://www.tennessee.gov/twra/cwcs/tncwcs2005app.pdf> (last visited September 16, 2010).

from declining to the point of endangerment.⁵¹ The plan proceeds through a number of steps before ultimately arriving at a set of specific “priorities for conservation action.”⁵² First, the CWCS categorizes habitat across the state based on the value of the habitat to those species deemed to have the greatest conservation need (“GCN” species). Habitat value is ranked separately for terrestrial, aquatic and subterranean species.

Second, the CWCS assesses “priority problems” for GCN species occurring within particular terrestrial, aquatic and subterranean regions within the state. Finally, after exploring the primary sources of stress impacting imperiled species in the major regions of the state, the CWCS identifies the conservation actions that are likely to be most effective in addressing the priority problems across the state. The CWCS describes some of the GCN species in the petition area that would be harmed as a result of surface mining in the petition area. The ridge lines of this petition area unite the North Cumberlands and provide a contiguous corridor for these animals.

Continued surface mining within the petition area would be incompatible with several of the CWCS's priority conservation actions, as determined by the process described above. According to the CWCS, much of the habitat within the petition area is of ‘very high’ and ‘high’ importance to the ‘first tier’ of terrestrial and aquatic GCN species, respectively.⁵³ Further, the CWCS identifies coal mining activities as a particularly problematic source of habitat destruction in the state’s Cumberland region, which encompasses the petition area.⁵⁴ The CWCS states, for

⁵¹ *Id.*

⁵² CWCS at 30.

⁵³ The CWCS categorizes habitat across the state into four classes: ‘Very High’, ‘High’, ‘Medium’ and ‘Low.’ *Id.* at 82-83, 88, 92 (Maps 7 and 11). “First tier” species are those defined as wildlife by Tennessee law, excluding federally listed and game species. *Id.* at 44.

⁵⁴ *Id.* at 118-119.

example, “construction of roads and other infrastructure necessary for access to coal mines...can be very damaging to terrestrial habitats.”⁵⁵

To combat the damaging effects of surface mining on terrestrial and aquatic habitat and GCN species, the CWCS identifies specific statewide priority conservation actions. Significantly, the top two strategies for abating the effects of incompatible mining practices are: 1) “Propose/support state legislation urging the federal Office of Surface Mining to designate critical units of aquatic, subterranean, and terrestrial habitats as ‘lands unsuitable for mining’”; and 2) “Encourage the federal Office of Surface Mining to designate critical units of aquatic, subterranean, and terrestrial habitats as ‘lands unsuitable for mining’ under current federal policy guidelines.”⁵⁶ Therefore, the CWCS finds that preventing surface mining by designating the most valuable habitats in the state – such as the petition area – as “lands unsuitable for mining” is the best action for combating mining’s serious adverse impacts on these habitats and GCN species.

It follows that allowing further surface mining in the petition area would be incompatible with the CWCS. OSM dismissed this allegation in 2006 by improperly accusing the private petitioners of misstating the CWCS’s first proposed conservation action.⁵⁷ OSM cited the abbreviated description of the proposed conservation action used in Table 65 to support this assertion. However, the petitioners’ characterization of the proposed conservation action was drawn from the “full description” contained in Appendix F, which states, “Propose/support state legislation urging the federal Office of Surface Mining to designate critical units of aquatic,

⁵⁵ *Id.* at 119.

⁵⁶ <http://www.tennessee.gov/twra/cwcs/tncwcs2005app.pdf> at Appendix F, referenced at 147-71.

⁵⁷ 2006 SOR at 28-29.

subterranean, and terrestrial habitats as ‘lands unsuitable for mining.’”⁵⁸ As such, OSM's rejection of the private petitioners' allegation was based on an incomplete reading of the CWCS.

II. OSM SHOULD DESIGNATE THE PETITION AREA AS UNSUITABLE FOR SURFACE COAL MINING OPERATIONS BECAUSE SUCH OPERATIONS WOULD AFFECT FRAGILE OR HISTORIC LANDS, RESULTING IN SIGNIFICANT DAMAGE TO IMPORTANT HISTORIC, CULTURAL, SCIENTIFIC, AND ESTHETIC VALUES AND NATURAL SYSTEMS, WITHIN THE MEANING OF §522(a)(3).

The ridge lines of the petition area are renowned for their globally significant natural resources. The petition area lies within the larger Cumberland Plateau region, which extends over 450 miles from northern Alabama to western West Virginia. Widely considered one of the most biologically rich regions on earth, the Cumberland Plateau contains the longest hardwood-forested plateau in the world.⁵⁹ According to The Nature Conservancy, the plateau is home to countless unique species “found nowhere else.”⁶⁰ The Tennessee portion of the Cumberland Plateau, in particular, is renowned for its biodiversity and expanses of unbroken forest. According to the Tennessee Department of Environment and Conservation (“TDEC”), it is the “Heart of the Cumberlands” and one of the most ecologically significant places in the world.⁶¹ Because of these and other values, the petition area fits within the “fragile lands” criterion for designation as lands unsuitable for surface mining.

The Department of the Interior’s SMCRA regulations define the term ‘fragile lands’ as:

⁵⁸ Each page of the relevant tables clearly directs the reader to Appendix F for the “full description” of the proposed conservation action. CWCS at 147-78, Tables 62-67.

⁵⁹ The Nature Conservancy, Tennessee: A Big Deal to Connect the Cumberlands, *available at* <http://www.nature.org/wherewework/northamerica/states/tennessee/features/art23012.html> (last visited June 1, 2010); The Nature Conservancy, Northern Cumberlands, *available at* <http://www.nature.org/wherewework/northamerica/states/tennessee/preserves/art10172.html> (last visited June 1, 2010).

⁶⁰ *Id.*

⁶¹ Tennessee Department of Environment and Conservation, Connecting the Cumberlands through the North Cumberlands Acquisition, *available at* <http://tennessee.gov/environment/northcumb/> (last visited August 18, 2010).

areas containing natural, ecologic, scientific, or esthetic resources that could be significantly damaged by surface coal mining operations. Examples of fragile lands include valuable habitats for fish or wildlife, critical habitats for endangered or threatened species of animals or plants, uncommon geologic formations, paleontological sites, National Natural Landmarks, areas where mining may result in flooding, environmental corridors containing a concentration of ecologic and esthetic features, and areas of recreational value due to high environmental quality.⁶²

“Fragile lands” exist within the petition area and would be significantly damaged by surface coal mining operations. The petition area contains valuable habitat for priority migratory songbirds, as well as species that Tennessee has ranked as being in the greatest need of conservation (“GNC species”). Surface mining in the petition area would result in significant harm to this habitat, and the species that depend on it, by fragmenting large tracts of contiguous forest and denuding ridgetops in the petition area.

Further, as the 2007 “Connecting the Cumberlands” conservation project recognized, the lands that constitute the petition area have exceptional value as environmental corridors containing a concentration of ecologic and esthetic features, and as areas of recreational value due to their high environmental qualities. The Cumberland Trail State Park, which bisects the petition area, and the Big South Fork NRRRA located downstream of the petition area not only provide recreational benefits but are also historically and culturally significant. For all these reasons these lands qualify as fragile lands within the meaning of §522(a)(3).

The adverse environmental effects and risks associated with surface mining in the petition area could significantly affect these fragile lands in and downstream of the petition area and result in significant damage to important historic, cultural, scientific, and esthetic values and natural systems, within the meaning of §522(a)(3). As OSM has recognized, the inherent impacts of mining include the removal of wildlife habitat within the mining area, alterations of

⁶² 30 C.F.R. § 762.5.

the soil and geologic structure, elevated levels of conductivity in surface water, and increased sedimentation to the receiving streams.⁶³

A. Surface Mining in the Petition Area Would Damage Important Environmental Corridors and Areas That Are of Recreational Value Due to High Environmental Quality.

As set forth in OSM's SMCRA regulations, 'fragile lands' also include: (1) "environmental corridors containing a concentration of ecologic and esthetic features" and (2) "areas of recreational value due to high environmental quality."⁶⁴ The ridge lines of the petition area unite the North Cumberlands and provide numerous examples of both.

As discussed more fully below, the State's 2007 "Connecting the Cumberlands" acquisition recognized that the public lands on the Cumberland Plateau, including those in the petition area, have exceptional recreational values and a concentration of ecologic and esthetic features, such as corridors of unfragmented forests, scenic vistas, and superb biological diversity.⁶⁵ For instance, the Royal Blue and Sundquist WMAs serve as a corridor of vital habitat for priority songbirds; therefore, they offer unique opportunities for bird watching and are popular destinations among birdwatchers.⁶⁶ In fact, the American Bird Conservancy has designated Royal Blue WMA as one of its Globally Important Bird Areas in Tennessee.⁶⁷ The public lands that constitute the petition area are also popular destinations for a variety of outdoor

⁶³ See, e.g., Statement of Reasons on Fall Creek Falls Petition, 65 F.R. 39178, 39183 (June 23, 2000).

⁶⁴ 30 C.F.R. § 762.5.

⁶⁵ See TDEC North Cumberlands Acquisition; Public Benefits, *available at* <http://tennessee.gov/environment/northcumb/benefits.shtml> (last visited August 18, 2010); see also Sustainable Forestry Conservation Easement, "Brimstone Property" at 7, 13.

⁶⁶ See Scott County, Sundquist WMA, *available at* <http://www.scottcounty.com/?q=node/9> (last visited September 12, 2010); Scott County, Royal Blue WMA, *available at* <http://www.scottcounty.com/?q=node/8> (last visited September 12, 2010).

⁶⁷ American Bird Conservancy, Globally Important Bird Areas in Tennessee, *available at* <http://www.abcbirds.org/abcprograms/domestic/sitebased/iba/tennessee.html> (last visited June 4, 2010).

recreational activities, including hiking, biking, fishing, camping, and wildlife viewing.⁶⁸ Because of its recreational values, the petition area is an important source of tourism-generated income for the State of Tennessee and the four counties that contain these lands.⁶⁹

Surface mining in the petition area would interfere with these recreational opportunities. It would diminish wildlife viewing opportunities by destroying the valuable habitat upon which these animals thrive. The visual and noise impacts of surface mining operations would also deplete the scenic quality of the petition area, reducing its appeal as a place for hiking, camping, wildlife viewing, and fishing. The negative impacts of surface mining on water quality of streams in the petition area could further deter hikers and campers, who use these waters for drinking water and for fishing. Surface mining operations could further conflict with these activities because public safety considerations will require that areas near surface coal mining operations be closed to recreational uses.

OSM's regulations state clearly that "[d]amage does not have to be permanent or irreparable in every instance to be significant."⁷⁰ Indeed, the D.C. District Court rejected OSM's attempt in its 1983 regulations to include an irreparable harm standard in the definition of fragile lands.⁷¹ Thus, even short- to medium-term impacts of surface mining operations on such values is a factor that warrants designation, as OSM has since recognized in other lands unsuitable designations.⁷² Accordingly, OSM cannot lawfully reject allegations of harm in the

⁶⁸ See TDEC North Cumberlands Acquisition; Public Benefits, *available at* <http://tennessee.gov/environment/northcumb/benefits.shtml> (last visited August 18, 2010).

⁶⁹ See TDEC, North Cumberlands Acquisition Fact Sheet, *available at* <http://tennessee.gov/environment/northcumb/facts.shtml> (last visited August 18, 2010) (recognizing the petition areas' recreational value for the state and local economies).

⁷⁰ 52 Fed. Reg. 18,792.

⁷¹ *In re: Permanent Surface Mining Regulation Litigation II*, No. 79-1144 (D.D.C. 1984).

⁷² See Statement of Reasons on Flat Fork LUM petition (1990) at 13 (determining that surface coal mining operations within the petition area would adversely affect the fragile lands in terms of esthetic resources, even though impacts were "short to medium term."); see also Statement of Reasons on Fall Creek Falls petition, 65 F.R. 39178, 39187 (June 23, 2000) (designating lands unsuitable because surface mining could cause "significant damage

current petition on the highly theoretical basis that reclamation may eventually alleviate that harm.

In addition, surface mining in the petition area will adversely impact the recreational value of the Smoky Mountain segment of the Cumberland Trail, which traverses lands in the vicinity of significant coal reserves. The Cumberland Trail is a 300-mile historical trail celebrating the heritage of Tennessee.⁷³ It was designated a State Scenic Trail in 1971 and a State Park in 1998. Notably, in evaluating a petition to designate lands as unsuitable, OSM is specifically required to “consider...areas adjoining...Scenic Trails designated under Tenn. Code Ann. §11-11-101.”⁷⁴ More recently, the State has recognized the Cumberland Trail as reflecting the essence and spirit of the area by designating the Cumberland Trail the official Millennium Legacy Trail for Tennessee.⁷⁵ As discussed above, in 2008, the Tennessee Greenways and Trails Advisory Council emphasized the national significance of the Cumberland Trail State Scenic Trail.⁷⁶

The Smoky Mountain segment of the Cumberland Trail begins at Cove Lake State Park and traverses the heart of the Cumberland Mountains, roughly bisecting the public lands in the petition area. The Cumberland Trail not only provides positive economic benefits to the local communities it passes through, but also provides outstanding opportunities for Tennesseans to explore and enjoy the unique natural, scenic, and cultural qualities of the Cumberland Plateau.

to the important cultural values of the Park, *including recreational, educational and religious activities*” and could cause significant damage to important esthetic values of the Park, adversely affecting recreational experience of visitors to the Park) (emphasis added).

⁷³ 2001 Tennessee Greenways and Trails Plan at 7-8, *available at* http://www.tennessee.gov/environment/recreation/pdf/5_Greenways_Plan.pdf.

⁷⁴ 30 C.F.R. § 942.762.

⁷⁵ 2001 Tennessee Greenways and Trails Plan at 10-11, *available at* http://www.tennessee.gov/environment/recreation/pdf/5_Greenways_Plan.pdf.

⁷⁶ *Id.* at 20.

The potential noise, water, and air pollution from surface mining in the petition area would significantly diminish the esthetic and recreational values of the Cumberland Trail, obscuring scenic vistas and impairing water quality within the nearby rivers and streams that are used by hikers and campers as a supply of potable water. Further, rock and debris from blasting, and potential landslides from mining sites and haul roads, could present significant hazards to recreational users.

SMCRA's normal permitting procedures, including the joint review provision of §522(e)(3) and the 300-foot buffer requirement of §522(e)(5), do not provide sufficient protection for the unique resources of the Cumberland Trail. It is worth reiterating that, in the Fall Creek Falls Statement of Reasons, OSM noted that impacts on the Fall Creek Falls State Park resulting from mining outside the park would include: "fugitive dust and noise," "visual impacts," and impacts to the "natural systems, ecologic resources, cultural resources, and esthetic values of the park."⁷⁷ In that case, OSM found that such impacts would "impair the recreational use of Park land" and "have a negative impact on Park visitation, thus affecting the economic viability of the Park and the surrounding area."⁷⁸ OSM further found that these impacts would be in "direct conflict" with the Park's mission.⁷⁹ Indeed, in considering the lands unsuitable petition, OSM specifically rejected the argument that the 300-foot buffer requirement was sufficient to protect Fall Creek Falls' recreational values from the impacts of surface coal mining.⁸⁰

⁷⁷ Statement of Reasons on Fall Creek Falls petition, 65 F.R. 39178, 39187 (June 23, 2000).

⁷⁸ *Id.*

⁷⁹ *Id.*

⁸⁰ *See id.*

OSM also saw fit to designate the Flat Fork watershed adjacent to Frozen Head State Park, in part to protect the unique resources of that public park.⁸¹ There, the Director found that surface coal mining outside the park's boundaries would lead to "alteration of water chemistry and increased sedimentation" and adverse effects on the park's designated overlooks, all of which would be incompatible with the park's mission "to protect and preserve the natural resources within the park."⁸² OSM's designation of lands outside these state parks in order to protect these public resources shows that SMCRA's safeguards were not considered sufficiently protective of park lands.⁸³

The area surrounding the Smoky Mountain segment of the Cumberland Trail contains the very same threats that led to the Fall Creek Falls and Flat Fork designations. Any one of the variety of impacts that have been shown to occur despite full compliance with SMCRA could damage the "scenic, historic, natural, ecological, geological or cultural qualities," which the designation as a state scenic trail and state park seeks to maximize.

Mining within portions of the Royal Blue WMA would also detract from the recreational value of the Interstate 75 corridor, a popular scenic drive for tourists as it bisects the Royal Blue WMA. As OSM recognized in its Statement of Reasons granting the Flat Fork lands unsuitable petition, scenic overlooks from outside and within a petition area are esthetic values that qualify as fragile lands. Further, surface coal mining operations can significantly damage such esthetic values, a factor that weighed in favor of designating the entire Flat Fork watershed as unsuitable

⁸¹ Statement of Reasons for Petition to Designate Certain Lands in the Flat Fork Watershed, Tennessee, as Unsuitable for Surface Coal Mining Operations (24 April 1990).

⁸² *Id.* at 9-10.

⁸³ Undoubtedly both the Fall Creek Falls and the Flat Fork designations were made assuming that OSM would follow its own regulations implementing §522(e).

for surface mining.⁸⁴ The views from overlooks along Interstate 75 similarly constitute fragile lands that could be significantly damaged by surface mining in the petition area.

B. Surface Mining in the Petition Area Would Damage Important Historic and Cultural Values.

As defined by the Department of the Interior, the phrase ‘historic lands’ means “areas containing historic, cultural, or scientific resources.”⁸⁵ The petition area and downstream areas contain all three, and surface mining in the petition area would damage these important resources.

In its 2006 SOR, OSM criticized the private parties’ allegation regarding the cultural and historic significance of the petition area by asserting that most of the discussion referred to the Cumberland Trail State Park and that this resource already receives sufficient protection under SMCRA.⁸⁶ For the reasons discussed in the previous section, SMCRA and its regulations are not sufficient to protect the Trail from the negative impacts of surface mining. In addition, it is important to note that since 2005, the Trail has gained national significance, as well. It is the lynchpin of the Great Eastern Trail, a new long-distance hiking trail that will run from the Alabama-Florida state line to New York, furthering the original vision of a network of trails across the entire Appalachian region.⁸⁷ The petition area’s value as a place of historic, scientific, and cultural resources is further evidenced by the proposal to federally designate the Cumberland Plateau region as a National Heritage Corridor.⁸⁸ Finally, since the prior petition, the State of Tennessee has recognized lands within the petition area as containing important historic, cultural, and scientific values, as a result of

⁸⁴ Statement of Reasons on Flat Fork LUM petition, at 13 (1990).

⁸⁵ 30 C.F.R. § 762.5.

⁸⁶ 2006 SOR at 19.

⁸⁷ See The Cumberland Trail Conference Guide to the Cumberland Trail, available at <http://www.cumberlandtrail.org/> (last visited September 20, 2010).

⁸⁸ The Alliance for the Cumberlands, *The Cumberland Plateau Heritage Corridor: Feasibility Study and Assessment of Impacts for National Heritage Corridor Designation* (2006), available at <http://www.tennessee.gov/environment/recreation/cumberlandplateau.pdf>.

Cumberlands” acquisition, the largest of its kind in Tennessee since the creation of the Great Smoky Mountains National Park.

CONCLUSION

For the reasons set forth above, the State of Tennessee respectfully requests that:

1. The petition area be designated as unsuitable for surface mining operations; and
2. No permit be issued for surface mining operations in the petition area while this

petition is pending.

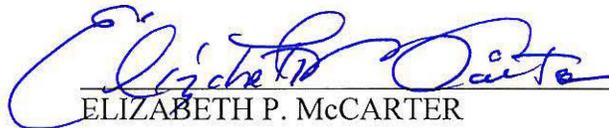
FOR THE PETITIONER THE STATE OF TENNESSEE:

Date: 9-28-10



ROBERT E. COOPER, JR.
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PHIL BREDESEN
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State of Tennessee

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APPENDIX C: SPECIAL-STATUS SPECIES

There are a number of special status species, both aquatic and terrestrial, potentially in or adjacent to the evaluation area. The following discussion identifies and describes potentially impacted special status species.

AQUATIC SPECIAL-STATUS SPECIES

Tennessee has among the highest diversity of fish fauna of any state in the United States (Carter et al. 2012). Thus, there are a number of known federal and state-listed species (i.e., mollusks, fish) that are present, or could potentially occur in the evaluation area or in the counties (Anderson, Campbell, Morgan, and Scott) associated with the evaluation area. A full description of each species is presented below.

FISHES

Seven federally listed fish species occur within the four affected Tennessee counties (USFWS 2015). Critical habitat has been designated for three of the six federally listed species. However, only one species (spotfin chub) has designated critical habitat within the evaluation area. Five additional species listed as threatened or endangered at the state level in Tennessee may also be present in or near the evaluation area (TDEC 2014). Two species, emerald darter and rosyface shiner, have been “deemed In Need of Management” at the state level in Tennessee are also known to occur within the evaluation area. These species are further discussed below.

Ashy darter (*Etheostoma cinereum*): The ashy darter, a Tennessee threatened species, is a small fish that occurs in small to medium upland rivers. It prefers areas of bedrock or gravel substrate with minimal silt deposits and is known to occur in Campbell, Morgan, and Scott Counties (TDEC 2014). It has been found in numerous streams draining the North Cumberland Wildlife Management Area (NCWMA) (Carter et al. 2003, 2012; TNHP 2009). Primary threats to this species include pollution, siltation, and habitat loss and fragmentation due to damming, agriculture practices, and land development activities (NatureServe 2014).

Blackside dace (*Chrosomus cumberlandensis*): The blackside dace is a minnow that inhabits pools of small upland tributaries to the upper Cumberland River system. This species is listed as threatened at both the federal and state level in Tennessee. It prefers areas with sand, sandstone, and shale substrates and is known to occur in Campbell and Scott Counties (TDEC 2014). This species is thought to have once been widespread in headwater streams in the upper Cumberland River system although its range has been severely reduced due to habitat degradation. In streams draining the NCWMA, it occurs primarily in the Clear Fork drainage, but in 2002 it was discovered in Straight Fork, a tributary to the New River (Carter et al. 2003, 2012; TNHP 2009). Recently, blackside dace has been discovered in four streams within the Big South Fork drainage (upper Straight Fork, Jake Branch, Cross Branch, and an unnamed tributary of Straight Fork), in Scott County Tennessee. This species was not previously known to occur in Big South Fork, and this finding suggests a possible range expansion to the south and west (Mattingly and Floyd 2013). Primary threats to this species include acid mine drainage, and siltation due to surface mining, agriculture, silviculture, and land development (NatureServe 2014).

Blue sucker (*Cycleptus elongatus*): The blue sucker, a Tennessee threatened species, is a bottom feeding fish found in large rivers and lower parts of major tributaries. This species frequently occurs in channels and flowing pools with moderate current. The blue sucker spawns in upstream riffle areas and may travel up to 100 miles to spawn (NatureServe 2014). It is known to occur in Anderson and Campbell Counties

(TDEC 2014). Primary threats to the blue sucker include water quality degradation, siltation, and dam construction (NatureServe 2014).

Cumberland arrow darter (*Etheostoma sagitta*): The Cumberland arrow darter is a federal candidate species for listing under ESA. This small fish species utilizes habitats such as rocky riffles and pools of headwaters, creeks, and small rivers. Generally this darter avoids swift currents and occurs in slow to moderate current in cool, sluggish pools or areas above and below riffles over bedrock, rubble, cobble, and pebble, often interspersed with sandy areas. It is common only in intermittently flowing first- or second-order creeks, preferring protective stones near the bank, or ledges and recesses at stream margins. Spawning peaks in April and occurs in shallow riffles often under or near rocks (NatureServe 2015). This species is known to occur in Campbell and Scott Counties within the evaluation area (TDEC 2014).

Cumberland darter (*Etheostoma susanae*): The Cumberland darter is a small fish, listed as endangered at both the federal and Tennessee state levels, which inhabits shallow water in low velocity shoals and backwater areas of moderate to low gradient stream reaches with stable sand or sandy-gravel substrates. It tends to avoid areas with large gravel or boulder substrates (IUCN 2014). This species is known to exist in Morgan and Scott Counties and has been reported in creeks in the upper Cumberland River watershed (TDEC 2014). Critical habitat was designated in 2012 and consists of 54 miles of rivers and streams, adjacent to but not within the evaluation area such as Jellico Creek and Capuchin Creek. However, these populations are found upstream of the petition area and do not receive drainage from the petition area. Primary constituent elements associated with Cumberland darter critical habitat designation include the presence of pool and run habitats, silt-free sand and bedrock substrates, adequate stream flow, and good to excellent water quality evidenced by diverse fish and macroinvertebrate communities (USFWS 2012a). Primary threats to this species include habitat loss and severe water quality degradation due to coal mining, logging, agriculture, and development within the upper Cumberland basin (NatureServe 2014).

Duskytail darter (*Etheostoma percnurum*): The duskytail darter is listed as endangered at both the federal and Tennessee state levels. The duskytail darter is a small fish that inhabits major streams ranging from larger creeks to moderately large rivers. It occurs in gently flowing pools, generally in the vicinity of riffles, among large rocks over bedrock or sand. Only four naturally occurring populations are known to exist, one of which is in the Big South Fork (USFWS 2012b). The Big South Fork population is separate taxon; the tuxedo darter (*E. lemiscatum*), which is described below. Primary threats to this species include pollution, siltation, and general habitat and water quality degradation due to mining, logging, and damming (NatureServe 2014).

Emerald darter (*Etheostoma baileyi*): The emerald darter is deemed in need of management in the State of Tennessee (TNHP 2009). This species occurs in all four counties and is known to be present within the evaluation area (TDEC 2014). Habitat includes rocky pools and runs, sometimes riffles, of creeks and small to medium rivers. This species prefers shallow habitats with low to moderate flow. Spawning peaks in May (NatureServe 2015).

Redlips darter (*Etheostoma maydeni*): The redlips darter is a relatively new species resulting from the ashy darter being split into two separate taxa. Biology and habitat preference of the redlips darter is almost identical to that of the ashy darter. The primary difference is that the ashy darter is found in the Tennessee River basin, and the redlips darter (*E. maydeni*) is found in the Cumberland system, both within Big South Fork (Powers, Kuhajda, and Ahlbrand 2012).

Rosyface shiner (*Notropis rubellus*): The rosyface shiner is deemed in need of management in the State of Tennessee (TNHP 2009). This species occurs within Campbell and Scott Counties and has been documented in the evaluation area (TDEC 2014). The rosyface shiner is typically found in large creeks

and small rivers with gravel or rubble substrates. This species frequently occurs in or around riffles and prefers clear waters with high to moderate flow (NatureServe 2015).

Slender chub (*Erimystax cahni*): The slender chub, a threatened species at the federal level and state level in Tennessee, is a small riverine minnow historically found in the Holston, Powell, and Clinch Rivers. This species is known to have been heavily impacted by habitat degradation due to coal mining throughout its range in Tennessee. Despite extensive surveys, the slender chub has not been collected since 1996 (USFWS 2014b).

Sickle darter (*Percina williamsi*): The sickle darter, a Tennessee threatened species, is a small fish found in flowing pools over rocky, sandy, or silty substrates in clear creeks or small rivers. This darter often occurs near woody debris, vegetation such as water willow, or large boulders, and it spends most of its time swimming in current in the water column. The sickle darter spawns in gravel shoals and is not tolerant to high turbidity (NatureServe 2014). This species is listed as being present in Morgan County (TDEC 2014), but is believed to be extirpated throughout much of its historic range (NatureServe 2014). Primary threats to the sickle darter include habitat and water quality degradation due to pollution and siltation, and habitat fragmentation due to dam construction (NatureServe 2014).

Silverjaw minnow (*Notropis buccatus*): The silverjaw minnow, a Tennessee threatened species, is a small fish which inhabits creeks and rivers with moderate current and sandy or gravel substrates. This species spawns in riffles with and scatters its eggs across the substrate (NatureServe 2014). The silverjaw minnow is listed as being present in Campbell County (TDEC 2014). Primary threats include habitat loss or degradation due to development in or adjacent to home range watersheds.

Spotfin chub (*Erimonax monachus*): The spotfin chub, a federally and Tennessee threatened species, is a small, slender fish which prefers clear water over gravel, boulders, and bedrock in large creeks and medium-sized rivers having moderate current. This fish is rarely seen over sand, and appears to avoid silty areas. The spotfin chub currently survives in only four tributary systems including the Emory River, and critical habitat was designated in 1977. Critical habitat includes the Emory River in Morgan County, Tennessee, which is within the evaluation area (USFWS 1977). Primary threats to this species are habitat loss and degradation including pollution and siltation due to mining runoff, logging, agriculture, and land development (USFWS 2011a).

Tuxedo darter (*Etheostoma lemiscatum*): The tuxedo darter is very similar to the duskytail darter and was only recently considered to be a separate taxon. With regard to current taxonmy, it should be noted that while the duskytail darter (*E. percnum*) is the officially listed taxon, the taxon that occurs in the evaluation area is actually the tuxedo darter (*E. lemiscatum*) (Blanton and Jenkins 2008). Biology and habitat preferences are the same as those described above for the duskytail darter, but the Tuxedo darter is only known to occur in Big South Fork. threats to this species include pollution, siltation, and general habitat and water quality degradation due to mining, logging, and damming (NatureServe 2014).

Yellowfin madtom (*Noturus flavipinnis*): The yellowfin madtom, a threatened species at the federal and Tennessee state level, is a small nocturnal catfish that inhabits warm pools and backwaters of moderate-sized streams less than one meter deep, with moderate gradient, and clean water with little silt (USFWS 2014c). Although once considered extirpated from the Clinch River, this species was reported at 8 locations in 2004. Habitat loss and degradation due to coal mining is a major contributor to the decline of yellowfin madtom. A five-year review of yellowfin madtom populations, completed by USFWS in 2012, indicated that populations currently appear to be stable, and there is no evidence to suggest that anthropogenic threats have increased since 2007 (USFWS 2012c). Critical habitat was designated by the US Fish and Wildlife Service (USFWS) in 1977 but does not include any areas within the evaluation area (USFWS 1977).

MOLLUSKS

Anthony's riversnail (*Athearnia anthonyi*): Anthony's riversnail, a freshwater snail listed as endangered at the federal and Tennessee state level, prefers medium to large river habitats with cobble/boulder substrates in the vicinity of riffles with strong current (USFWS 1997). This species is known to occur in Anderson and Campbell Counties (TDEC 2014). Overall, the greatest threat to the riversnail is habitat modification and destruction due to point and non-point source pollution (USFWS 2010). The most significant of these impacts is siltation caused by excessive releases of sediment from activities such as agriculture, resource extraction (e.g., coal mining, silviculture), road construction, and urban development (Waters 1995). The species has been successfully propagated, however, due to water and habitat quality degradation the success of potential reintroductions is uncertain (USFWS 2010). No viable populations are currently known to exist within the evaluation area (USFWS 2011b).

Alabama lampmussel (*Lampsilis virescens*): The Alabama lampmussel is listed as endangered at the federal and Tennessee state level. This freshwater mussel has a smooth, shiny outer shell, and is greenish to straw colored, sometimes with rays. It is found in sand and gravel substrates in shoal areas of small to medium sized streams (TDEC 2014). Until recently the Alabama lampmussel was believed to be extirpated from Tennessee, and known to occur only in the Paint Rock River system in northern Alabama, where the population was thought to be 50-1000 individuals. However, it was recently rediscovered in the upper Emory River (Dinkins, Faust, and Ahlstedt 2012). Very few live Alabama lampmussels had been seen in the wild (NatureServe 2014).

Birdwing pearl mussel (*Lemiox rimosus*): The birdwing pearl mussel is listed as endangered at the federal and Tennessee state level. This freshwater mussel prefers small-medium sized rivers in riffle areas with sand and gravel substrates in mod-fast currents (NatureServe 2014). Dams, channel dredging, sand and gravel mining, coal mining, sewage wastes and agricultural run-off have caused or have likely contributed to declines in populations throughout its range (Jones et al. 2009). Because of severe population declines during the twentieth century, the birdwing pearl mussel was listed as endangered by the USFWS in 1976 (Federal Register 41:24062– 24067). This species has been documented in the upper Clinch and watershed (NatureServe 2014, TDEC 2014), but is believed to be extirpated within the project area.

Cracking pearl mussel (*Hemistena lata*): The cracking pearl mussel is listed as endangered at the federal and Tennessee state level. This freshwater mussel species is critically imperiled with a total estimated population of 50-1,000 remaining individuals. Preferred habitat includes sand, gravel, and cobble substrates in swift currents or mud and sand in slower currents. It has been extirpated from much of its historic range but is still believed to be present in Clinch River in Anderson County, Tennessee (TDEC 2014), but may not occur within the evaluation area. Primary threats to the cracking pearl mussel include habitat loss and degradation due to pollution and sedimentation from coal mining, dam construction, and agriculture (NatureServe 2014).

Cumberland bean (*Villosa trabalis*): The Cumberland bean, endangered at the federal and Tennessee state level, occurs primarily in creeks and small rivers. Its shell is brown with thin wavy green rays. Several darters and a sculpin have been identified as fish hosts (Williams, Bogan, and Garner 2008). This critically imperiled species is believed to have a remaining population of 1,000-2,500 individuals and occurs in only four rivers (NatureServe 2014). It is known to occur in Morgan and Scott Counties, Tennessee (TDEC 2014). It has also been reported to occur in the Big South Fork River, but is rare (Ahlstedt et al. 2004). Primary threats to the Cumberland bean include habitat and water quality degradation including pollution and siltation due to dam construction, logging, agriculture, and acid mine runoff (NatureServe 2014).

Cumberland elktoe (*Alasmidonta atropurpurea*): The Cumberland elktoe, endangered at the federal and Tennessee state level, is a freshwater mussel with a somewhat shiny black shell with greenish rays. Its habitat ranges from small creeks to medium-sized rivers. The mussel is most common in smaller stream habitats. The preferred habitat appears to be shallow flats or pools with slow current and sand substrate with scattered cobble/boulder material, although it may be found in mud or rocky substrates and faster currents. Native host fishes, necessary for successful reproduction, include whitetail shiner (*Cyprinella galactura*), northern hog sucker (*Hypentelium nigricans*), rock bass (*Ambloplites rupestris*), longear sunfish (*Lepomis megalotis*), and rainbow darter (*Etheostoma caeruleum*) (NatureServe 2014). This mussel is restricted to tributaries of the upper Cumberland River in Kentucky and Tennessee. It has one of the most restricted ranges of any Cumberlandian species. Critical habitat for the Cumberland elktoe was designated in 2004 and includes a total of 135 miles of rivers and streams including Rock Creek, Big South Fork, and Clear Fork within the evaluation area. Primary constituent elements for this species include permanent flowing streams suitable for all life stages, geomorphically stable stream and river banks, suitable substrates with low siltation, water quality necessary for survival of mussels and fish hosts, and presence of host fish (USFWS 2004a). Habitat loss and water quality degradation due to coal mining, logging, agriculture, and dam construction are the primary threats to the Cumberland elktoe (NatureServe 2014).

Cumberlandian combshell (*Epioblasma brevidens*): The Cumberlandian combshell is endangered at the federal and Tennessee state level. This freshwater mussel occurs in shoals in large creeks and small to medium-sized rivers (NatureServe 2014). Its shell is yellowish to tawny with narrow broken green rays. This species appears to be a long-termed brooder with spawning occurring in late summer and glochidia held until late spring (NatureServe 2014). In laboratory studies, six species of perciform fish have been identified to serve as glochidial hosts for this species: *Etheostoma blennioides* (greenside darter), *Etheostoma maculatum* (spotted darter), *Etheostoma rufilineatum* (redline darter), *Etheostoma vulneratum* (wounded darter), *Etheostoma simotrem* (snubnose darter), *Percina caprodes* (logperch), *Cottus baileyi* (black sculpin), *Cottus bairdi* (mottled sculpin), and *Cottus carolinae* (banded sculpin) (USFWS 2003, 2004b; Yeager and Saylor 1995). Currently, this species has been documented in the upper and Clinch and Powell drainages of the evaluation area (NatureServe 2014). Critical habitat for the Cumberlandian combshell was designated in 2004 and includes a total of 330 miles of rivers and streams including parts of Big South Fork and the Clinch River. None of the designated critical habitat falls within the evaluation area. Primary constituent elements for this species include permanent flowing streams suitable for all life stages, geomorphically stable stream and river banks, suitable substrates with low siltation, water quality necessary for survival of mussels and fish hosts, and presence of host fish (USFWS 2004b). Primary threats to the Cumberlandian combshell include dam construction and pollution, particularly associated with coal mining (NatureServe 2014).

Dromedary pearl mussel (*Dromus dromas*): This freshwater mussel species, endangered at the federal and Tennessee state level, prefers clear, clean, fast-flowing water. It cannot tolerate excessive siltation (USFWS 1984a). This mussel is yellow-green in color with interrupted green rays on the shell. The species got its name from the distinctive hump on the shell of larger individuals (USFWS 1984a). Like other freshwater mussels, this species reproduces by releasing larvae into the water which lodge in the host fish's gills, where they develop into juvenile mussels. Fish hosts for this mussel species include black sculpin (*Cottus baileyi*), greenside darter (*Etheostoma blennioides*), fantail darter (*Etheostoma flabellare*), snubnose darter (*Etheostoma simotrem*), tangerine darter (*Percina aurantiaca*), blotchside logperch (*Percina burtoni*), logperch (*Percina caprodes*), channel darter (*Percina copelandi*), gilt darter (*Percina evides*), and Roanoke darter (*Percina roanoka*) (Jones et al. 2004). This species was historically one of the most common mussels in the Tennessee River; currently the species is documented in upper Clinch and Powell Rivers (NatureServe 2014). Primary threats to the dromedary pearl mussel include dam construction and water pollution due to coal mining activities (NatureServe 2014).

Fanshell (*Cyprogenia stegaria*): This freshwater mussel species, endangered at the federal and Tennessee state level, is rounded in shape with numerous pustules, elevated growth lines, and broken green rays. The Fanshell prefers to inhabit the river bottoms in medium to large streams (Dennis 1984). It has been found in river habitats with gravel substrates and a strong current, in both deep and shallow water (Ortmann 1919; Parmalee 1967). The mussel is reported as a long-term breeder (holds glochidia overwinter for spring release) (Ortmann 1919). Known fish hosts include the banded sculpin, (*Cyprogenia stegaria*); greenside darter, (*Etheostoma blennioides*); mottled sculpin, (*Cottus bairdi*); Tennessee snubnose darter, (*Etheostoma simoterum*); banded darter (*Etheostoma zonale*); Tengerine darter (*Percina aurantiaca*); blotchside logperch (*Percina burtoni*); logperch (*Percina caprodes*); and Roanoke darter (*Percina roanoka*) (Schulz and Marbain 1998; Jones and Neves 2001, 2002). Currently, this species has been documented in the upper and lower Clinch drainages (NatureServe 2014). However, the lower Clinch population is believed to be extirpated. Primary threats to the fanshell include dam construction and water pollution. Water quality degradation and pollution specifically associated with coal mining activities is the primary threat to this species in the Clinch River (NatureServe 2014).

Finerayed pigtoe (*Fusconaia cuneolus*): This species is a freshwater mussel, endangered at the federal and Tennessee state level, with fine green rays on a yellow to brown shell. It prefers clear, high gradient streams in firm cobble and gravel substrates (Ahlstedt 1984). In laboratory experiments by Bruenderman and Neves (1993), eight fish were identified as suitable hosts: fathead minnow (*Pimephales promelas*); river chub (*Nocomis micropogon*); stoneroller (*Camptostoma anomalum*); telescope shiner (*Notropis telescopus*); Tennessee shiner (*Notropis leuciodus*); white shiner (*Luxilus albeolus*); whitetail shiner (*Cyprinella galactura*); and the mottled sculpin (*Cottus bairdi*). In addition, several of these species were reconfirmed as hosts and other species were identified as likely hosts: mimic shiner (*Notropis volucellus*), and whitefin shiner (*Cyprinella nivea*) (Neves 1991). The finerayed pigtoe has been extirpated throughout most of its historical range and experienced an estimated 90% population decline. The only known remaining populations are found in the Clinch River and Powell River drainages. Primary threats to this species include dam construction, siltation, and pollution associated with coal mining (NatureServe 2014).

Fluted kidneyshell (*Ptychobranthus subtentum*): This federally endangered freshwater mussel species inhabits small to medium rivers in areas with swift current or riffles, although a few populations were recorded in large river shoal areas. It is often found embedded in sand, gravel, and cobble substrates (Gordon and Layzer 1989) and requires flowing, well-oxygenated waters. Shape of the shell is roughly oval elongate, and solid and greenish yellow coloring which becomes brown with age. This species is unusual in that outer portion of a brooding female's outer gills folded in a curtain-like fashion (NatureServe 2014). It is thought to have a late summer or early fall fertilization period with glochidia incubating overwinter. Glochidia are released the following spring or early summer and have an adhesive end that sticks to silt-free stones on the stream bottom. Host fishes include: barcheek darter (*Etheostoma obeyense*), redline darter (*Etheostoma rufilineatum*), fantail darter (*Etheostoma flabellare*), redline darter (*Etheostoma caeruleum*), banded sculpin (*Cottus carolinae*) (Luo and Layzer 1993; USFWS 2013). Currently, this species has been documented in the Clinch and Powell Rivers of the evaluation area, with the largest remaining population found in the upper Clinch River (NatureServe 2014). Critical habitat for the fluted kidneyshell was designated in 2013 and includes a total of 1,180 miles of rivers and streams including portions of the Clinch and Powell Rivers close to, but not within the evaluation area. Primary constituent elements for this species include Riffle habitats within large, geomorphically stable stream channels, Stable substrates of sand, gravel, and cobble with low to moderate amounts of fine sediment and containing flow refugia with low shear stress, natural flow regime adequate for feed and reproduction, suitable water quality for survival of mussels and fish hosts, and presence of host fish (USFWS 2013). Primary threats to this species include dam construction, siltation, and pollution associated with coal mining, particularly in the Clinch River (NatureServe 2014).

Littlewing pearl mussel (*Pegias fabula*): The littlewing pearl mussel, endangered at the federal and Tennessee state level, is a small mussel that occurs in creeks and small rivers. Its shell is tawny to brown, usually with variable green rays. Fish hosts reported are the black sculpin (*Cottus baileyi*), emerald darter, and greenside darter (*Etheostoma blennioides*) (Williams, Bogan, and Garner 2008). This critically imperiled species has an estimated population of 2,500-10,000 (NatureServe 2014). It has been found at several sites in the Big South Fork and the population there is considered to be the largest one remaining. This population could be used as a source for restoration of other streams (Ahlstedt et al. 2004). This species has also been documented in the upper Clinch watershed. Primary threats to the littlewing pearl mussel include water quality degradation due to dam construction, logging, agriculture, and especially coal mining activities and associated acid mine runoff (NatureServe 2014).

Orangefoot pimpleback (*Plethobasus cooperianus*): Orangefoot pimpleback, an endangered species at the federal and Tennessee state level, is a round freshwater mussel with pustules only on the posterior three-fourths of the shell and a live mussel has an orange foot. Fish hosts for orangefoot pimpleback have not been identified. This species is found in medium to large rivers in sand, gravel, and cobble substrates in riffles and shoals in deep water and steady currents as well as some shallower shoals and riffles (Gordon and Layzer 1989; Bogan and Parmalee 1983; Cummings and Mayer 1992; USFWS 1984b). This species has been documented in the Clinch, Powell, and Cumberland Rivers; however, its presence within the evaluation area is currently unknown. Primary threats to the orangefoot pimpleback include dam construction, siltation, and water pollution due to logging, agriculture, and coal mining (NatureServe 2014).

Oyster mussel (*Epioblasma capsaeformis*): The oyster mussel, an endangered species at the federal and Tennessee state level, occurs in shoals of small to large rivers in sand and gravel substrate. Its shell is yellowish green with thin green rays. Several darters and sculpins have been identified as fish hosts (Williams, Bogan, and Garner 2008). This critically imperiled species has experienced a 70–90% population decline and has an estimated remaining population of 1,000-2,500 (NatureServe 2014). This species has been documented to occur in the Big South Fork but is rare (Ahlstedt et al. 2004). It is also known to occur in the upper Clinch and Powell Rivers. Critical habitat for the oyster mussel was designated in 2004 and includes a total of 201 miles of rivers and streams including portions of Big South Fork, and parts of the Clinch and Powell Rivers, close to but not within the evaluation area. Primary constituent elements for this species include permanent flowing streams suitable for all life stages, geomorphically stable stream and river banks, suitable substrates with low siltation, water quality necessary for survival of mussels and fish hosts, and presence of host fish (USFWS 2004a). Primary threats to the oyster mussel include dam construction, siltation, and water pollution (NatureServe 2014).

Pink mucket (*Lampsilis abrupta*): This freshwater species, endangered at the federal and Tennessee state level, occurs in the bottoms streams among gravel and cobble in depths ranging from one inch to five feet in depth and swiftly moving currents and in much deeper waters with slower currents (Gordon and Layzer 1989). The pink mucket is a rounded, slightly elongate mussel with a thick, inflated, and smooth shell, which is usually yellow-brown in color. Laboratory studies have confirmed that four of nineteen fish tested are suitable hosts for the pink mucket. These include the largemouth bass (*Micropterus salmoides*), spotted bass (*Micropterus punctulatus*), smallmouth bass (*Micropterus dolomieu*), and walleye (*Stizostedion vitreum*) (Barnhart 1997). Other reported glochidial fish host species include the sauger (*Stizostedion canadense*) and the freshwater drum (*Aplodinotus grunniens*) (USFWS 1985). The pink mucket is unique in that the females possess a spotted mantle flap which may serve to mimic a fish eyespot to attract host fish (USFWS 1985). Currently, this species has been documented in the upper Clinch River, and may occur within the evaluation area. Primary threats to the pink mucket include dam construction, siltation, and water pollution associated with coal mining (NatureServe 2014).

Purple bean (*Villosa perpurpurea*): This freshwater mussel, endangered at the federal and Tennessee state level, has a dark brown to black shell with numerous closely spaced fine green rays. Its habitat is creeks to medium-sized rivers and occasionally headwaters. It is found in substrates ranging from silty-sand to boulder-sized rocks. Native host fish include sculpin (*Cottus carolinae*), greenside darter (*Etheostoma blennioides*), redline darter (*Etheostoma rufilineatum*), and fantail darter (*Etheostoma flabellare*). The purple bean is critically imperiled with an estimated remaining population of 50–1,000 individuals (NatureServe 2014). This mussel is restricted to a few tributaries of the upper Tennessee River. It was recently found in the upper Emory River, where it was thought to have been extirpated. Critical habitat for the purple bean was designated in 2004 and includes a total of 202 miles of rivers and streams including parts of the Clinch and Powell Rivers, close to but not within the evaluation area. Primary constituent elements for this species include permanent flowing streams suitable for all life stages, geomorphically stable stream and river banks, suitable substrates with low siltation, water quality necessary for survival of mussels and fish hosts, and presence of host fish (USFWS 2004b). Primary threats to the purple bean include dam construction, siltation, and water pollution associated with coal mining (NatureServe 2014).

Rough pigtoe (*Pleurobema plenum*): This freshwater mussel species, endangered at the federal and Tennessee state level, is found in medium to large rivers in sand, gravel, and cobble substrates in shoals. It is occasionally found on flats and muddy sand (Gordon and Layzer 1989; USFWS 1984c). The species is relatively large, rounded to slightly angular, or elongate, shaped like an equilateral triangle, with a brown satin-like appearance. This species is probably a short-term breeder (Ortmann 1919). Currently, this species has been documented in the upper Clinch and Cumberland rivers of the evaluation area. Primary threats to the rough pigtoe include dam construction, siltation, and water pollution associated with coal mining (NatureServe 2014).

Rough rabbitsfoot (*Quadrula cylindrica strigillata*): This freshwater mussel species, endangered at the federal and Tennessee state level, inhabits medium-sized to large rivers in swift currents but often exists in areas close to, but not in, the swiftest current. It is reported to live clean water in gravel bottoms or in riffles in shallow water (Bogan and Parmalee 1983). It is a freshwater mussel with a yellow to greenish colored shell with green rays. Adult specimens reach lengths of 5 inches (Parmalee and Bogan 1998). It is a short-term brooder with spawning occurred from May through June in water temperature 68.0 to 71.6 degrees (USFWS 2003, 2004b). Critical habitat for the rough rabbitsfoot was designated in 2004 and includes a total of 245 miles of rivers and streams including parts of the Clinch and Powell Rivers, close to but not within the evaluation area. Primary constituent elements for this species include permanent flowing streams suitable for all life stages, geomorphically stable stream and river banks, suitable substrates with low siltation, water quality necessary for survival of mussels and fish hosts, and presence of host fish (USFWS 2004b). Primary threats to the rough rabbitsfoot include dam construction, siltation, and water pollution associated with coal mining (NatureServe 2014).

Sheepnose mussel (*Plethobasus cyphus*): This federally endangered freshwater mussel is distinctive with an oval shape and flattened smooth surface except for a single row of bumps or knobs running along the ventral margin, is generally considered a large-river species (USFWS 2003). They inhabit riffles and gravel/cobble substrates but usually has been reported from deep water (>2 m) with slight to swift currents and mud, sand, or gravel bottoms (Gordon and Layzer 1989). It also appears capable of surviving in reservoirs, such as upper Chickamauga Reservoir immediately below Watts Bar Dam (Ahlstedt 1989). Sheepnose mussels are short-termed brooders with gravid females, and have been found between May and July (Gordon and Layzer 1989). Glochidia are released and mimic fish food organisms and attached to the following known fish host species blackspotted topminnow, blacktail shiner, bleeding shiner, bluntnose minnow, brassy minnow, bullhead minnow, central stoneroller, common shiner, eastern blacknose dace, fathead minnow, longnose dace, mimic shiner, Ozark minnow, pearl dace, red shiner, river shiner, silver chub, southern redbelly dace, spotfin shiner, steelcolor shiner, striped shiner,

suckermouth minnow, western mosquitofish, whitetail shiner (USFWS 2003; Guenther et al. 2009). Currently, this species has been documented in the Clinch and Powell rivers, and may occur within the evaluation area. Primary threats to the sheepsnose mussel include dam construction, siltation, and water pollution associated with coal mining (NatureServe 2014).

Shiny pigtoe (*Fusconaia cor*): This freshwater mussel species, endangered at the federal and Tennessee state level, has prominent dark green to black rays on a yellow to brown shell (USFWS 1984d). This species is known to inhabit shoals and riffles of small to medium sized clear rivers with moderate to fast current (Bogan and Parmalee 1983). A short-term brooder that spawns in late May to early June. The following fish species are known hosts of shiny pigtoe glochidia, whitetail shiner (*Cyprinella galactura*), common shiner (*Luxilus cornutus*), warpaint shiner (*Luxilus coccogenis*) and telescope shiner (*Notropis telescopus*) (Neves 1991). It is typically well burrowed in sand and cobble substrates. It does not appear tolerant of deeper water or reservoirs (USFWS 1984d). Currently, this species has been documented in the upper Clinch and Powell rivers of the evaluation area. Primary threats to the shiny pigtoe include dam construction, siltation, and water pollution associated with coal mining (NatureServe 2014).

Slabside pearlymussel (*Pleuroaia dolabelloides*): This freshwater mussel species, endangered at the federal and Tennessee state level, occurs in moderate to high gradient riffles systems in creeks to large rivers. It is generally found at depths <1 m, moderate to swift current velocities, and substrates from coarse sand to heterogeneous assemblages of larger sized particles. The slabside pearlymussel is primarily a large creek to moderately-sized river species, inhabiting sand, fine gravel, and cobble substrates in relatively shallow riffles and shoals with moderate current (Parmalee and Bogan 1998). This species requires flowing, well-oxygenated waters to thrive. This species is a short-term, summer brooder (May until August). Known fish host species include popeye shiner (*Notropis ariommus*), Tennessee shiner (*Notropis leuciodus*), silver shiner (*Notropis photogenis*), rosyface shiner (*Notropis rubellus*), saffron shiner (*Notropis rubricroceus*), telescope shiner (*Notropis telescopus*) (Neves 1991); as well as small mouth bass (*Micropterus dolomieu*) (Barnhart and Roberts 1997). Currently, this species has been documented in the upper Clinch and Powell Rivers of the evaluation area (NatureServe 2014). Critical habitat for the slabside pearlymussel was designated by the USFWS in 2013 and includes a total of 970 miles of rivers and streams including portions of the Clinch and Powell rivers, close to but not within the evaluation area. Primary constituent elements for this species include Riffle habitats within large, geomorphically stable stream channels, Stable substrates of sand, gravel, and cobble with low to moderate amounts of fine sediment and containing flow refugia with low shear stress, natural flow regime adequate for feed and reproduction, suitable water quality for survival of mussels and fish hosts, and presence of host fish (USFWS 2013). Primary threats to the slabside pearlymussel include dam construction, siltation, and water pollution associated with coal mining (NatureServe 2014).

Spectaclecase (*Cumberlandia monodonta*): This federally endangered freshwater mussel species has an elongate and compressed shell that is greenish or brownish. Spectaclecase occurs in large rivers and is a habitat-specialist, relative to other mussel species. Baird (2000) noted its occurrence on outside river bends below bluff lines. It seems to most often inhabit riverine microhabitats that are sheltered from the main force of current. It occurs in substrates from mud and sand to gravel, cobble, and boulders in relatively shallow riffles and shoals with slow to swift current (Buchanan 1980; Parmalee and Bogan 1998; Baird 2000). According to Stansbery (1967), spectaclecase is usually found in firm mud between large rocks in quiet water very near the interface with swift currents. Specimens have also been reported in tree stumps, root masses, and in beds of rooted vegetation (Stansbery 1967; Oesch 1995). The species appears to spawn twice a year during relatively short periods in the autumn (October and November) and spring (April and May). No fish hosts have yet been identified for this species. Knudsen and Hove (1997) tested five fish species and the larval tiger salamander and Barnhart and Baird (2000) laboratory tested 26 species all were negative. Currently, this species has been documented in the upper Clinch River within

the evaluation area. Primary threats to the spectaclecase include dam construction, siltation, and water quality degradation (NatureServe 2014).

Tan riffleshell (*Epioblasma florentina walkeri*): The tan riffleshell, endangered at the federal and Tennessee state level, is a subspecies of the yellow blossom (*E. florentina*) that occurs in headwater streams. Its shell is brown to yellow with green rays. Found in headwaters, riffles, and shoals in sand and gravel substrates (NatureServe 2014). The following fish species are known hosts for Tan riffleside glochidial: greenside darter (*Etheostoma blennioides*), fantail darter (*Etheostome flabellare*), redline darter (*Etheostoma rufilineatum*), and snubnose darter (*Etheostoma simoterum*) (Bogan and Parmalee 1983; Winston, M.R. and R. J. Neves 1997). Currently, this species has been documented in Big South Fork River and the upper Clinch River within the evaluation area. Primary threats to the tan riffleshell include dam construction, siltation, and water pollution (NatureServe 2014).

BENTHIC MACROINVERTEBRATES

Valley flame crayfish (*Cambarus deweesae*): The valley flame crayfish is endangered at the Tennessee state level. This aquatic crustacean is a borrowing species and is known to occur in the Clinch and Emory drainages in Anderson and Campbell Counties. This species is particularly tolerant to disturbances and has no known threats (NatureServe 2014).

TERRESTRAL SPECIAL-STATUS SPECIES

There are several known federal and state-listed (including state species Deemed in Need of Management) species (wildlife and plants) that are present (or likely to be present) in the evaluation area or in the counties (Anderson, Campbell, Morgan, and Scott) associated with the evaluation area. Below is a specific discussion of the listed birds, mammals, reptiles, amphibians, and plants.

BIRDS

Bald eagle (*Haliaeetus leucocephalus*): The bald eagle, a USFWS bird of conservation concern species and protected under the Bald and Golden Eagle Protection Act, is a large eagle with dark brown feathers, white head feathers, and yellow beak, eyes, legs, and feet (TWRA 2014a). It breeds in forested areas near large bodies of water (TWRA 2014), from central Alaska to the Texas Gulf Coast and the Florida Keys (NatureServe 2014). Bald eagles winter on reservoirs and large rivers in Tennessee (TWRA 2014). Due to the reproductive threat caused by the pesticide DDT, there were no known successful bald eagle nests in Tennessee from 1961 to 1983 (TWRA 2014). However, since that first nest in 1983 near Dover, TN, there are now more than 175 nesting pairs in Tennessee (TWRA 2014). Most of these pairs remain in Tennessee year-round. Northern migrants arrive in Tennessee in late October, which boosts the state's bald eagle populations to a peak of 300-500 individuals between late January and mid-February (TWRA 2014). Currently, this species is known to occur in all four counties associated with the evaluation area (eBird 2014). However, most of these sightings are located outside the evaluation area, with one observation near the evaluation area's southern border (eBird 2014).

Barn owl (*Tyto alba*): The barn owl, a state species deemed in Need of Management, is a pale colored medium-sized owl, with a white, heart-shaped face (TWRA 2015). In Tennessee, this species typically inhabits upland and open areas, often around human structures such as farms (TDEC 2014). This species is known to occur in Anderson County (TDEC 2014), but no observations have been recorded within the evaluation area (eBird 2014).

Bewick's wren (*Thryomanes bewickii*): The Bewick's wren, a state endangered species, is a small insectivorous songbird with a distinct slender decurved bill (NatureServe 2014). In Tennessee, this

species typically inhabits rural farms with brushy hedgerows and old buildings (TWRA 2014). Declines may be due to competition between species, habitat changes, inclement weather, and predators (NatureServe 2014). Currently, only 1-2 pairs are known to occur in Tennessee, near Rutherford County, which is not near the evaluation area (eBird 2014; TWRA 2014).

Black-billed cuckoo (*Coccyzus erythrophthalmus*): The black-billed cuckoo, a USFWS bird of conservation concern species, is a slender, medium sized bird, with grayish-brown dorsal feathers and whitish ventral feathers (TWRA 2014). This species ranges from the western Great Plains east to Virginia, and prefers forests, forest edges, and thickets, frequently associated with water (TWRA 2014). The population of this species has declined in areas where riparian habitats are degraded or eliminated by land use practices (NatureServe 2014). This species is an uncommon migrant across Tennessee and rare summer resident, especially in western Tennessee (TWRA 2014). Spring migrants can be in Tennessee between late April and early June while fall migrants can be in Tennessee from mid-August to early October (TWRA 2014). This species has been observed in Anderson and Scott counties, including one observation within the evaluation area dated May 11, 2013 (eBird 2014).

Blue-winged warbler (*Vermivora pinus*): The blue-winged warbler, a USFWS bird of conservation concern species, is a small yellow songbird with a black line through its eye, blue-gray wings and tail, and an olive-green back (TWRA 2015). In Tennessee, this species prefers shrubby, secondary growth habitats, such as abandoned farmlands and forest clearings which have scattered trees (TWRA 2015). This species has been recorded at several locations within the evaluation area (eBird 2015).

Canada warbler (*Wilsonia canadensis*): The Canada warbler, a USFWS bird of conservation concern species, is a small bird with bright yellow breast feathers with a black “necklace” (TWRA 2014). This species prefers large stands of deciduous and coniferous forests, with a dense shrubby understory from northern Georgia north to the boreal areas of Canada (TWRA 2014). Range wide, this species is declining (TWRA 2014) likely because of habitat loss on breeding and wintering grounds (NatureServe 2014). Also, this species is an uncommon migrant in Tennessee, becoming a locally common summer resident in eastern Tennessee (TWRA 2014). There are several observations of the Canada warbler around the evaluation area, including four observations within the NCWMA (2010, 2013, and 2014; eBird 2014).

Cerulean warbler (*Dendroica cerulea*): The cerulean warbler, a USFWS bird of conservation concern species and a state species deemed in Need of Management, is a small bird. Typical coloration is a bright sky-blue (males) to bluish-green (females) cap and dorsal feathers, and white (males) to cream-colored (female) ventral feathers (TWRA 2014). The cerulean warbler breeds in mature deciduous forests from northern Alabama, to southern Ontario, and west to the Great Plains (TWRA 2014). It is estimated that 80% of the global population of cerulean warblers, nest in the Appalachian Mountains, from the Cumberland Mountains north to West Virginia’s mountains (TWRA 2014). A recent (December 2014) analysis of the distribution of known Cerulean warblers was determined that 80% (292 birds) and 85% of the high-density sites occur within the petition area (Welton 2014). Nowhere else in the species range do breeding densities exceed those found in the Cumberland Mountains of Tennessee, with six to ten breeding pairs per ten acres recorded (Buehler, Welton, and Beachy 2006). The cerulean warbler habitat model (Beachy and Buehler 2005) indicates that 39% of the Cumberland Mountains (more than 80,000 ha) is currently potential breeding habitat for approximately 36,000 breeding pairs, if fully utilized. The ridgelines within the evaluation area include a large amount of cerulean warbler habitat (figure 4-X). However, this species is declining faster than any other eastern songbird, due to habitat loss caused by coal mining, development, and agriculture (TWRA 2014). Data from the Breeding Bird Survey show that this species has declined 4.1% per year between 1966 and 2007 (Murray pers. comm. 2010). There are at least 20 observations of the cerulean warblers within the evaluation area (eBird 2014).

Fox sparrow (*Passerella iliaca*): The fox sparrow, a USFWS bird of conservation concern species, is a larger sparrow that has reddish-brown and white streaks on its chest, and is gray and red on its dorsal side (TWRA 2015). This species occurs in shrubby fields and woodland edges (often in multiflora rose hedgerows) in middle and western Tennessee during migration and winter, but there are no breeding records in the state (TWRA 2015). This species has been observed immediately adjacent to the evaluation area (eBird 2015).

Golden-winged warbler (*Vermivora chrysoptera*): The golden-winged warbler, a state species deemed in Need of Management and currently under review for listing under the ESA, is a small songbird with a black (males) or gray (females) throat and face patch, and a yellow crown and wing-patch (TWRA 2015). In Tennessee, golden-winged warblers, like blue-winged warblers discussed above, prefer secondary growth areas such as abandoned pastures, which have scattered trees and shrubs (TWRA 2015). This species was in the Northern Cumberland Forest Resources Habitat Conservation Plan, but was recently removed from coverage under the habitat conservation plan since this species is associated with early successional communities, which TWRA is not taking (TWRA pers. comm. 2011). This species has been observed in several locations within and adjacent to the evaluation area (eBird 2015).

Henslow's sparrow (*Ammodramus henslowii*): The Henslow's sparrow, a USFWS bird of conservation concern species, is a small, brown sparrow that has a short tail, dorsal feathers that are dark brown streaked, a white throat and belly, and an olive-green nape (TWRA 2015). In Tennessee, Henslow's sparrows prefer overgrown fields and meadows that are typically wet, and have standing dead vegetation or scattered low shrubs or tree saplings from which to call (TWRA 2015). This species has been observed in two locations within the evaluation area (eBird 2015).

Kentucky warbler (*Geothlypis formosa*): The Kentucky warbler, a USFWS bird of conservation concern species, is a small yellow bird, with black face markings and greenish dorsal feathers (TWRA 2015). In Tennessee, Kentucky warblers prefer large forest stands with mature trees and a thick understory (TWRA 2015). This species has been observed in many locations within the evaluation area (eBird 2015).

Least bittern (*Ixobrychus exilis*): The least bittern, a USFWS bird of conservation concern species, is a small heron, with a buffy-yellow long neck and sides (TWRA 2014). This species prefers marshes with tall, emergent vegetation, such as cattails, giant cutgrass, and rushes, with areas of open water throughout the eastern United States (TWRP 2014) This secretive wetland bird probably has declined over the last century from impacted (drained, filled, degraded) wetlands (NatureServe 2014). This species has not been observed in the evaluation area, but has been observed in a few adjacent locations (eBird 2014).

Loggerhead shrike (*Lanius ludovicianus*): The USFWS bird of conservation concern species, is a robin-sized gray songbird, with a black face mask and white throat (TWRA 2015). In Tennessee, this species prefers short grasslands (including cropland, pastureland, and old fields) with isolated trees or shrubs, which have been lost to development or succession (TWRA 2015). This species has not been observed within the evaluation area, but has been observed in a few places adjacent to the evaluation area (eBird 2015).

Louisiana waterthrush (*Parkesia motacilla*): The Louisiana waterthrush, a USFWS bird of conservation concern species, is a small thrush-like species that is brown except for a distinctive white eye-stripe that extends to the neck (TWRA 2014). This species prefers forested streams in hardwood forests across most of the eastern United States (TWRA 2014). Yet this species may be declining due to habitat loss (TWRA 2014). This species has been observed approximately four times within the evaluation area, and a dozen observations adjacent to the NCWMA (eBird 2014).

Northern saw-whet owl (*Aegolius acadicus*): The northern saw-whet owl, a USFWS bird of conservation concern and state threatened species, is the smallest avian predator (8-inches), with mostly mottled brown and white feathers, a round head and yellow eyes with black pupils (TWRA 2014). This species occurs throughout forests in the western and eastern portion of United States (TWRA 2014). In Tennessee, most nesting records are from high elevations (above 5,000 feet) in spruce-fir forest. During migration they have been captured in mist nets in deciduous and mixed forests primarily in central and eastern Tennessee (TWRA 2014). However, the northern saw-whet owl is a locally rare permanent resident in the eastern Tennessee mountains, and a rare migrant and winter resident across Tennessee (TWRA 2014). This species is listed as state threatened because of its small population size (TWRA 2014). No observations have been recorded within the evaluation area (eBird 2014).

Prairie warbler (*Setophaga discolor*): The prairie warbler, a USFWS bird of conservation concern species, is a bright yellow, small songbird that has an olive green back, and black markings on its sides (TWRA 2015). In Tennessee, this species breeds in a variety of low elevation shrubby habitats, including early seral forests and open fields (TWRA 2015). This species has been observed in several locations within the evaluation area (eBird 2015).

Prothonotary Warbler (*Protonotaria citrea*): A USFWS bird of conservation concern species, is a small, golden yellow songbird, with gray wings and a black eye (TWRA 2015). In Tennessee, this species breeds in wooded swamps, flooded bottomland forests, and along slow-moving rivers (TWRA 2015). This species has not been observed within the evaluation area, though there are some recorded observations nearby (eBird 2015).

Red crossbill (*Loxia curvirostra*): A USFWS bird of conservation concern species, is a small, dull red (males) or green (females) songbird that has a bill that is crossed in fledglings and adults to extract seeds from pinecones (TWRA 2015). In Tennessee, this species prefers mature coniferous forests (TWRA 2015). This species has been observed in one location within the evaluation area and two just outside the evaluation area (eBird 2015).

Red-headed woodpecker (*Melanerpes erythrocephalus*): The red-headed woodpecker, a USFWS bird of conservation concern species, is a medium sized bird with a red head, white body and black wings (TWRA 2015). In Tennessee, this species is a year-round resident that breeds in open deciduous woodlands, river bottoms, groves of dead and dying trees, orchards and parks (TWRA 2015). This species has been observed in several locations within the evaluation area, and many locations in adjacent parcels (eBird 2015).

Rusty blackbird (*Euphagus carolinus*): The rusty blackbird, a USFWS bird of conservation concern species, is 9 inches long with males having a greenish gloss during the breeding season, and rusty-colored feather tips during the nonbreeding season (TWRA 2014). This species breeds mostly in the boreal forest of Canada and Alaska, and winters mostly in the southeast United States (TWRA 2014). In Tennessee, rusty blackbirds are uncommon winter residents that are typically observed in flooded or wet hardwood forests, beaver ponds, and pond edges (TWRA 2014). This species possibly has the most rapidly declining population in North America (TWRA 2014), likely from the degradation and reduction of wintering woodland wet habitats (NatureServe 2014). This species has been observed in Anderson, Campbell, and Morgan Counties, with two observations located on the eastern portion of the NCWMA in the evaluation area (eBird 2014).

Sharp-shinned hawk (*Accipiter striatus*): The sharp-shinned hawk, a state species deemed in Need of Management, is a small hawk with gray dorsal feathers and reddish-brown ventral feathers (TWRA 2015). This species also has a distinctive barred, long, narrow, square-tipped tail with a white terminal band (TWRA 2015). In Tennessee, this species typically inhabits large stand of deciduous, coniferous,

and mixed pine-hardwood forests, and often in towns and parks in the winter. This species has been observed in several locations within the evaluation area and many areas nearby (eBird 2015).

Short-eared owl (*Asio flammeus*): The short-eared owl, a USFWS bird of conservation concern species, is a medium-sized owl that has a large, round head, with dark patches around yellow eyes (TWRA 2015). In Tennessee, this species prefers open areas, such as brushy fields (TWRA 2015). This species has not been observed in or near the evaluation area (eBird 2015).

Swainson's warbler (*Limnothlypis swainsonii*): The Swainson's warbler, a USFWS bird of conservation concern and state species deemed in Need of Management, is a small bird with brownish-olive dorsal feathers, dull white ventral feathers, a white eye line, and a rusty cap (TWRA 2014). The breeding range of this species is from eastern Oklahoma to northern Florida (TWRA 2014). The Swainson's warbler prefers mountainous sites in eastern Tennessee with dense evergreen understories associated with moist forest ravines (TWRA 2014). This species is state-listed because of a loss of breeding habitat, especially in western Tennessee (TWRA 2014). This species was in the Northern Cumberlands Forest Resources Habitat Conservation Plan, but was recently removed from coverage under the habitat conservation plan since this species is associated with aquatic communities that TWRA was proposing to remove (TWRA pers. comm. 2011). This species has been observed in two locations in the western portion of the evaluation area, and in all four of the associated counties (eBird 2014).

Wood thrush (*Hylocichla mustelina*): The wood thrush, a USFWS bird of conservation concern species, is a medium-sized bird, with orange-brown dorsal feathers, and white ventral feathers with black spots (TWRA 2014). This species breeds in a wide variety of deciduous and mixed forests but needs a well-shaded understory, small trees with low, exposed branches, and a fairly open forest floor with leaf litter (TWRA 2014). This species has been observed in several locations within the evaluation area (eBird 2014).

Worm-eating warbler (*Helmitheros vermivorum*): The worm-eating warbler, a USFWS bird of conservation concern species, is a small buffy-olive bird with a black eye stripe and black crown stripes (TWRA 2014). This species breeding range is from southern Connecticut, to northern Alabama (TWRA 2014). In eastern and central portions of Tennessee, this species breeds in large stands of mature deciduous or mixed deciduous-coniferous forest with patches of dense understory, typically on steep slopes (TWRA 2014). Similar to several species above, this species' population is declining as breeding forests become fragmented (TWRA 2014). There are about a dozen observations of this species on the NCWMA, and many more on adjacent lands (eBird 2014).

MAMMALS

Gray bat (*Myotis grisescens*): The gray bat, a federally endangered species, is a gray to reddish-colored migratory small bat that resides in caves in forested areas (NatureServe 2014) primarily in Alabama, Arkansas, Kentucky, Missouri, and Tennessee (USFWS 2009). The species is especially vulnerable due to its loyalty to particular caves. It is very sensitive to disturbance, including the mere presence of humans with lights; disturbance may result in bats moving to less favorable roosting places. Disturbance can be minimized by the protection of buffers of undisturbed vegetation around the entrances of caves inhabited by gray bats; the protection of wooded travel corridors between roosting and foraging sites; and the carefully controlled and monitored use of herbicides and pesticides in areas adjacent to foraging and roost sites (NatureServe 2014). This species uses only eight caves in Tennessee for hibernation, which increases its risk of vulnerability to habitat destruction and white-nosed syndrome (TWRA 2014). This species has been observed in most of the eastern two-thirds of the state, but only in Anderson and Campbell Counties (Tennessee Bat Working Group 2014a). The USFWS (2014) has no records of any gray bat hibernacula

within or near the evaluation area. One of these caves is located in Hawkins County, where the population was estimated at 270,000 bats.

Indiana bat (*Myotis sodalis*): The Indiana bat, a federally endangered species, is a dull grayish chestnut small bat that is a permanent resident in Tennessee (NatureServe 2014), and ranges from western Iowa and eastern Oklahoma west to the New England states (Tennessee Bat Working Group 2014b). It hibernates in dense clusters of up to 5,000 individuals and spends summers in forests. In summer, Indiana bat habitat consists of wooded or semi-wooded areas, often along streams. Hibernacula can be affected from deforestation which can alter cave temperature, humidity, and air and water flow. Compatible forest management is most important for ensuring long-term availability of suitable summer habitat. In 2009, this species national population was estimated at 387,000 bats, which is less than half the 1967 population (USFWS 2014d). Currently this species occurs in Anderson and Campbell Counties (Tennessee Bat Working Group 2014b); however, the USFWS (2014d) has no records of any Indiana bat hibernacula within or near the evaluation area.

Northern Long-eared Bat (*Myotis septentrionalis*): The northern long-eared bat is currently (February 2015) federally listed as threatened species (USFWS 2015), though is not state-listed in Tennessee (TWRA 2014). This species, while known to occur in Tennessee, is an uncommon resident in caves, attics, under shutters or tree bark (TWRA 2014). While the northern long-eared bat has several threats to its populations such as wind farms, loss of habitats and hibernacula, the main threat is white-nosed syndrome (USFWS 2014d). This disease has spread rapidly throughout this species' population, and listing would be unlikely if it were not for this disease (USFWS 2014a). While there are no documented northern long-eared bat hibernacula records within the evaluation area, a hibernacula has been documented within a mile of the southeast corner of evaluation area, just below the Buffalo Mountain Wind Farm. Therefore, it is likely that northern long-eared bats are using terrestrial habitats, small caves or abandoned mines within portions of the evaluation area.

REPTILES AND AMPHIBIANS

Northern pinesnake (*Pituophis melanoleucus melanoleucus*): The northern pinesnake, a state threatened species, is an upland species found in pine and mixed pine and oak forest habitats, frequently along dry mountain ridges. It prefers areas with well-drained sandy soils (TDEC 2014). This large, heavy-bodied constrictor is white, yellowish, or light gray with dark brown to reddish blotches on the sides and back that are lighter toward the tail and darker near the head (TWRA 2014). This species is known to occur in Anderson and Morgan Counties and is potentially present within the evaluation area (TDEC 2014). Primary threats to the northern pinesnake include a decline in habitat quality, primarily due to fire suppression, and road mortality (TWRA 2014).

TERRESTRIAL INVERTEBRATES

No federally or state-listed terrestrial invertebrates occur within the evaluation area. For those terrestrial invertebrates listed in chapter 4 that are ranked global or state imperiled species, specific habitat information can be found on the Anderson and Campbell county species lists.

PLANTS

Cumberland rosemary (*Conradina verticillata*): Cumberland rosemary, federally and state threatened, is a low (less than 20 inches), aromatic, perennial evergreen shrub, forming clumps or mats of sprawling branches that root at the nodes. Cumberland rosemary is endemic to the upper Cumberland Plateau in north-central Tennessee and adjacent southeastern Kentucky and restricted there to floodplain habitats. Suitable habitats are full to moderate sunlit gravel bars in floodplains of the Big South Fork and its major

tributaries. Substrate can vary from dense deep sands to cobble boulders that are well drained. Populations occur on boulder/cobble/gravel bars, sand bars and islands, sandy river banks, floodplains in river gorges, and similar sunny riparian areas where seasonal flooding minimizes competition and creates new gravel-bar habitats for colonization. High quality populations are annually scoured by spring flooding to preserve and restore open conditions. Annual floods also act as a disperser through the transport of viable plant fragments downstream. Common associates include green-headed coneflower (*Rudbeckia laciniata*), along with globally rare plants such as large-flowered Barbara's-buttons (*Marshallia grandiflora*) and Virginia spiraea (NatureServe 2014).

As of 2011, there are 11 occurrences that have been observed at some point between 1989 and 2011 and 94 occurrences were believed to be extant in Tennessee (USFWS 2011c). Most occurrences are very small and isolated from others. Fewer than 4,000 total individuals were estimated at the known locations when the 1996 plan was published (USFWS 2011c). This species' abundance and distribution has probably been reduced by dam construction and by water pollution from nearby coal mining. Habitat destruction due to intensive recreational use also poses a threat (NatureServe 2014).

Virginia spiraea (*Spiraea virginiana*): Virginia spiraea, federally threatened and state endangered, is a clonal shrub often occurring in dense clumps that grow up to approximately 4 feet high. This species occurs along creek edges with margins of exposed rock and piled detritus, bars of gravel, rubble and/or boulders, and including dolomitic limestone. It occurs in alluvial silt collected within cracks in the bedrock. These sites experience a regime of periodic flooding. Elevations range from 850–1,420 feet (NatureServe 2014). Virginia spiraea is endemic to the southern Appalachians and occurs from Pennsylvania and Ohio south to Georgia and Tennessee where it occurs on streams that drain into the Ohio River and primarily within the Appalachian (Cumberland) Plateau and Blue Ridge physiographic regions. Virginian spiraea is especially vulnerable to land-use conversion and habitat fragmentation due to its limited range, small number of populations, and lack of sexual reproduction. Many sites are threatened by changes in hydrology by impoundment and by impact from recreational use, hydroelectric facilities, and run-off debris (NatureServe 2014).

Cumberland sandwort (*Minuartia cumberlandensis*): Cumberland sandwort, federally and state endangered, is a perennial herbaceous plant that grows in cool, humid, rockshelters formed through differential weathering of sandstone strata. This species grows on sandy floors of these rock houses and in similar situations such as beneath sandstone ledges. The few species that share this habitat with Cumberland sandwort include Lucy Braun's white snakeroot (*Eupatorium luciae-brauniae*) and featherbells (*Stenanthium gramineum*). Cumberland sandwort is narrowly endemic to the Cumberland Plateau of northcentral Tennessee and adjacent Kentucky. There are currently 21 to 80 occurrences known with most of them concentrated within a small portion of the overall range, in Pickett State Park in the Big South Fork National River and Recreation Area. Most of the national area's populations are located in rockshelters or lower ledges of the sandstone cliffline that rims the Big South Fork River gorge. Threats include cliffline erosion, impact associated with recreational use, and cutting of trees away from the rockhouses increasing the sunlight and evaporation thus drying out the habitat (NatureServe 2014). The officially-listed taxon is *Arenaria cumberlandensis*, but the 2013 five-year review available on the USFWS website notes the taxonomic change to *Minuartia* is accepted but not under the ESA until a technical correction to the list of endangered and threatened species is published in the Federal Register.

Pink lady's slipper (*Cypripedium acaule*): Pink lady's slipper, state commercially exploited, is a large, showy orchid that grows six to 15 inches tall. Pink lady's slipper has a wide range in eastern Canada and the United States, and is common in parts of this range. Pink lady's slipper occurs in a wide variety of habitats growing in mixed hardwood coniferous forests of pine and hemlock on rocky/mossy slopes, and in drier oak or coniferous woodlands in acidic soils. Threats include exploitation for horticultural or medicinal purposes and habitat loss and disturbance in parts of its range (NatureServe 2014).

Pale corydalis (*Corydalis sempervirens*): Pale corydalis, state endangered, is the only pink flowered corydalis and is an annual or biennial with one to several branched stems reaching up to 51 inches tall. The species is characteristic of two habitats including rocky sites on dry to dry-mesic, well-drained, often acidic soils; and recently disturbed sites, including burned areas. Pale corydalis occurs on exposed rocky areas, ledges, and cliffs from the Carolinas to Canada and Alaska and is a rock outcrop obligate in the Appalachians. Pale corydalis has a limited distribution and occurs in restricted, infrequent habitat (NatureServe 2014).

American ginseng (*Panax quinquefolius*): American ginseng, state special concern species commercially exploited, is an herbaceous, perennial plant with bright red fruits and palmate, serrated leaves. Plants occur primarily in rich, cool, moist, but not extremely wet hardwood-dominated or mixed woods, under a closed canopy, especially on slopes or ravines, and often over a limestone or marble parent material on soil with a good humus component. Plants occasionally occur in rocky woods, among swampy hardwoods, or at the edges of dense woods. Associated species include bloodroot (*Sanguinaria canadensis*), black cohosh (*Cimicifuga racemosa*), maidenhair fern (*Adiantum pedatum*), and yellow lady's slipper (*Cypripedium pubescens*). American ginseng was formerly widespread in the Appalachian and Ozark regions but due to its popularity and unique habitat requirements, the wild plant has been overharvested, as well as lost through destruction of its habitat, habitat fragmentation, and deer browsing, and is rare in most parts of the United States and Canada (NatureServe 2014).

American ginseng occurs fairly frequently in major portions of its range (Appalachia and the Ozarks) but typically have very few plants per occurrence (NatureServe 2014).

Ozark bunchflower (*Melanthium woodii*): Ozark bunchflower, state endangered, is a perennial herb forming bulbs and spreading by means of underground rhizomes. The species occurs primarily on slopes and stream terraces in moist, hardwood forests, usually over basic soils. Threats include logging and clearing of hardwood forests, overbrowsing by deer, and competition from exotic pest plants (NatureServe 2014).

Tuberclad rein-orchid (*Platanthera flava* var. *herbiola*): Tuberclad rein-orchid, state threatened, is a perennial herb that rarely blooms and chiefly reproduces vegetatively. Tuberclad rein-orchid prefers wet prairies and meadow, swales in mesic prairies, or the sandy or peaty habitats along the edges of marshes, swamps, or lakeshores. These habitats are in full sun or in the partial shade of scattered shrubs such as willows (*Salix* spp.) and dogwoods (*Cornus* spp.). This unusual orchid is relatively widespread in the northeastern United States and extreme southeastern Canada, but appears to be rare or threatened throughout most of its range. The extensive loss of prairies and wetland habitats is a serious threat to this species along with habitat fragmentation and forest management practices. Tuberclad rein-orchid is especially vulnerable to sedimentation and succession (NatureServe 2014).

Butternut (*Juglans cinerea*): Butternut, state threatened, is a large deciduous nut-bearing tree reaching nearly 100 feet in height. Butternut achieves optimal growth on well-drained soils of bottomlands and floodplains, but rarely occurs in pure stands, and seldom found on dry, compact, or infertile soils. Butternut typically grows in rich mesophytic forests, lower slopes, ravines, and various types of bottomland, including banks and terraces of creeks and streams. In Tennessee, butternut, occurs along creek bottoms in mesic forests and on lower slopes. The species is being seriously impacted by a canker fungus that is spreading rapidly through its range, and few stands remain uninfected. Butternut is an important source of mast for wildlife, especially in the northern part of its range, where black walnut does not occur (NatureServe 2014).

Goldenseal (*Hydrastis canadensis*): Goldenseal, state commercially exploited, is a perennial herb with a single, erect, hairy stem 10 to 15 inches tall that occurs in rich woods, wooded slopes and valleys on

average, medium, well-drained soil in dense shade. The species grows best in rich, mesic hardwood forest, especially those underlain by limestone or alkaline soils, but is also known from slightly acidic soils too. These forests are often second growth forests with various species composition from region to region. Areas with goldenseal tend to have a nice collection of spring wildflowers and fern diversity is likely higher than surrounding areas. Due to its use as an herbal supplement the species has been primarily wild-harvested and over-collection of the plant is a predominant threat (NatureServe 2014).

As of 2012, there were approximately 700 occurrences in the United States and Canada with 154 in Tennessee. Habitat destruction is a primary threat throughout its range. This along with the interaction and compounding intensification of over-collection it is suggested that these two threats may be increasing the rate of decline in areas of its range where these two threats are actively occurring. Invasive species is also a threat along with timber operations and all-terrain vehicle trails.

Hairy willowherb (*Epilobium ciliatum*): Hairy willowherb, state threatened, is a clumping perennial often exceeding 4.9 feet in height usually occurring in wetlands, but may be found in a great variety of habitats, including moist places, stream-sides, ditches, ponds, roadsides, and recently cleared areas and wasteland. The species is highly threatened by land-use conversion, habitat fragmentation, sedimentation, and forest management practices (NatureServe 2014).

Halberd-leaf tearthumb (*Polygonum arifolium*): Halberd-leaf tearthumb, state threatened, is a branched, sprawling annual plant with square stems and many prickles that are turned backwards. Halberd-leaf tearthumb primarily occurs in wet areas including marshes, swamps, wet ravines, and wet meadows as well as along rivers (NatureServe 2014).

Narrow-leaf ramps (*Allium burdickii*): Narrow-leaf ramps, state threatened commercially exploited, is a narrow leaf perennial herb that occurs in rich deciduous upland woods, wooded bluffs, wooded areas along rivers and streams, and cemetery prairies. The species is highly threatened by forest management practices and over-harvest, and to a lesser extent by land-use conversion and habitat fragmentation (NatureServe 2014).

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**APPENDIX D: ACOUSTIC MEASUREMENT AND
ASSESSMENT OF IMPACTS OF SURFACE COAL MINING IN
NORTH CUMBERLAND WILDLIFE MANAGEMENT AREA
AND EMORY RIVER TRACTS CONSERVATION EASEMENT
AREA**

Appendices

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Acoustic Measurement and Assessment of Impacts of Surface Coal Mining in North Cumberland Wildlife Management Area and Emory River Tracts Conservation Easement Area

Final Report

May 28, 2012

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Acoustic Measurement and Assessment of Impacts of Surface Coal Mining in North Cumberland Wildlife Management Area and Emory River Tracts Conservation Easement Area

Executive Summary

Introduction

On September 29, 2010, the State of Tennessee petitioned the Office of Surface Mining (OSM) to designate the ridgelines within North Cumberland Wildlife Management Area (NCWMA) and Emory River Tracts Conservation Easement (ERTCA) as unsuitable for surface coal mining. If approved by the Secretary of the Interior, the petition would prevent surface mining of coal for 600 feet on each side of the ridgelines in the designated area, creating a 1,200 foot ridge top corridor encompassing 67,326 acres. As part of the evaluation process of the petition, OSM will prepare an Environmental Impact Statement (EIS). One of the topics that will be evaluated is acoustic impacts of coal mining. The purpose of this study was to assess potential acoustic impacts of surface coal mining in the petition area and surrounding NCWMA and ERTCE areas, and, where data are available, assess acoustic impacts of other human-caused sounds in the NCWMA and ERTCE areas, including vehicles (including ORVs), logging, hunting, biking, hiking and other similar activities. A computer noise model (SoundPlan) was used to model the current acoustic impacts of two operational mines in the NCWMA. Land cover in the NCWMA and ERTCE areas consists primarily of deciduous forests (85%), mixed deciduous/coniferous forests (5%), grassland (5%), and several others totaling 5%. The land cover type in this area was based on the USGS National Land Cover Database; however, it should be noted that land cover is constantly changing. Logging is common in the NCWMA and ERTCE areas, and logged areas can change from mature deciduous forest to open and back to early succession deciduous forest within a few years.

Definitions

A-Weighting (dBA): A-weighting is used to account for differences in human hearing sensitivity as a function of frequency. A-weighting de-emphasizes the high (6.3 kHz and above) and low (below 1 kHz) frequencies, and emphasizes the frequencies between 1 kHz and 6.3 kHz, in an effort to simulate the relative response of human hearing.

Background Ambient Sound Level (L₉₀): L₉₀ is commonly used to indicate the residual or background sound level in the absence of most transient noise events. L₉₀ is frequently used for establishing the sound level for assessing changes to the environment.

Decibel (dB): A logarithmic measure commonly used in the measurement of sound. The decibel provides the possibility of representing a large span of signal levels in a simple manner as opposed to using the basic pressure unit Pascal. The difference between the sound pressure for silence versus a loud sound is a factor of 1,000,000:1 or more, therefore it is less cumbersome to use a small range of equivalent values: 0 to 130 decibels.

Existing Ambient Sound Level (L₅₀): The sound level of all sounds in a given area, including all natural sounds as well as all mechanical, electrical and other human-caused

sounds. The existing ambient sound level can be characterized by the L_{50} exceedence level (i.e., the median).

L_{eq} (Equivalent Sound Level): The logarithmic average (i.e., on an energy basis) of sound pressure levels over a specific time period. L_{eq} must be used carefully in quantifying background ambient sound levels because occasional loud sound levels may heavily influence (increase) the L_{eq} value, even though sound levels for that period of time are typically lower.

Results

Acoustic measurements were made at seven locations in the NCWMA units between October 29 and November 27, 2011; 1759 hours of acoustic data were collected. Measurement locations were selected to provide two data sets: existing ambient sound levels (absent coal mining sounds), and sound levels of coal mining operations (at the two operating mines in the area, Southern Coal and Triple H).

Ambient Sound Levels

Ambient sound levels absent coal mining sounds were determined for the primary land cover types in the petition area, deciduous forest and mixed forest (>90% of petition area). Metrics were computed for two ambient situations, one with flowing water sounds and one without. Flowing water, while a natural sounds, resulted in elevated (by about 10 dBA) ambient sound levels. Existing ambient (L_{50}), background ambient (L_{90}), and average sound (L_{eq} , logarithmic average) levels for three different time periods were determined for both ambient situations. Table 1 shows sound levels for two types of ambient (with and without water influence) during three time periods, full twenty four hour period (0000-2400), typical daytime hours (0700-1900, and typical nighttime hours (1900-0700).

Table 1. Background ambient (L_{90}), existing ambient (L_{50}) and energy-averaged (L_{eq}) sound levels in the NCWMA and ERTCE areas for two ambients (with and without water influence) and three time periods.

| | | Time Period | Leq | L10 | L50 | L90 |
|------------------------------|-----------|-------------|------|------|------|------|
| HHH Sites (without water) | All Hours | 0000-2400 | 32.5 | 33.2 | 30.1 | 28.3 |
| | Daytime | 0700-1900 | 37.9 | 39.0 | 32.8 | 29.4 |
| | Nighttime | 1900-0700 | 29.9 | 29.6 | 27.5 | 27.2 |
| | | Time Period | Leq | L10 | L50 | L90 |
| ROBL Sites (with water) | All Hours | 0000-2400 | 42.3 | 45.0 | 39.8 | 36.3 |
| | Daytime | 0700-1900 | 42.2 | 44.7 | 39.1 | 35.4 |
| | Nighttime | 1900-0700 | 42.3 | 45.2 | 40.3 | 36.7 |

Coal Mine Sound Levels

Two coal mines currently operate in the study area, the National Coal mine and the Triple H mine. The National Coal mine is a large mine, operating 24 hours a day, 7 days per week, while the Triple H mine is relatively small, operating during daytime hours only

and on weekdays only. Table 2 contains the results of the sound level measurements at two current coal mines during the three time periods mentioned above.

Table 2. Sound levels of two coal mines in the NCWMA area for three time periods.

| | | Time Period | Leq | L10 | L50 | L90 |
|-----------------------------|-----------|-------------|------|------|------|------|
| National Coal (@1312 ft) | All Hours | 0000-2400 | 70.1 | 68.7 | 62.6 | 56.4 |
| | Daytime | 0700-1900 | 71.4 | 69.3 | 64.2 | 56.7 |
| | Nighttime | 1900-0700 | 67.9 | 64.0 | 61.6 | 54.9 |

| | | Time Period | Leq | L10 | L50 | L90 |
|--------------------------------------|-----------|-------------|------|------|------|------|
| Triple H (@ 1066 ft, weekdays) | All Hours | 0000-2400 | 39.4 | 41.4 | 35.1 | 31.8 |
| | Daytime | 0700-1900 | 49.9 | 53.6 | 47.1 | 37.1 |
| | Nighttime | 1900-0700 | 30.7 | 31.4 | 29.7 | 28.5 |

Table 3 provides an estimate of the total acreage that would likely experience elevated sound levels due current mining operations (National Coal and Triple H) as well as modeled results of ten hypothetical mines along ridge lines in the petition area. One expects the modeled impacts of ten hypothetical mines to be greater than the National Mine because these ten mines are along the ridgelines in the petition area, they are elevated in nature and their propagated sounds are less influenced by terrain blockage.

Table 3. Areas of acoustic impact of National and Triple H coal mines (no haul truck roadways) and ten hypothetical ridgeline mines in the petition area. (values are in units of acres)

| dBA | National Coal Mine | Triple H Coal Mine | Average areas of impact from ten hypothetical ridge mines | Standard Dev. of estimate of ten hypothetical mines |
|---------|--------------------|--------------------|---|---|
| >40 dBA | 3,639 | 107 | 9,626 | 2,559 |
| >45 dBA | 1,149 | 46 | 2,841 | 1,238 |
| >50 dBA | 348 | 12 | 915 | 406 |
| >55 dBA | 141 | 6 | 240 | 63 |

Coal Haul Truck Sound Levels

Coal haul trucks were measured at the National Coal mine. A typical hour (1000-1100 on Nov. 9, 2011) revealed nine trucks with a median 77.1 dBA @ 50 ft (range 73.9-78.4 dBA), and duration of each >45 dBA averaged 1:28 minutes. In the case of a future mine location, it was not possible to model potential coal truck impact without knowing the mine location and the proposed roadway to the mine. However, it is possible to model the potential impact of coal haul trucks on a unit, per-mile basis, and future assessments can use this estimate per mile when specific locations are known. The impacts of 5 coal haul trucks per hour for a 1-mile distance on both the National Coal Mine road and the

Triple H road are shown in Table 4. As with other potential impacts, variability can be considered due to terrain differences.

Table 4. Modeled area of impacts (in acres) of 5 coal haul trucks per hour at 30 mph for a 1-mile distance on two different roads.

| dBA | National Coal Mine Road | Triple H Mine Road |
|---------|-------------------------|--------------------|
| >40 dBA | 441 | 428 |
| >45 dBA | 288 | 244 |
| >50 dBA | 170 | 121 |
| >55 dBA | 76 | 63 |

Blast Sound Levels

A single blast event was measured during the acoustic measurements at the mine sites. The blast event occurred at the Triple H mine, on October 31, 2010, at 13:39:46. The maximum sound level at 1066 ft was 75.2 dBA, and the total event duration was about 10 seconds (Table 5). Data from this blast event was used to model blast impacts at the Triple H mine. The short term area impacted by the blast event was considerably larger than the area impacted by normal mining sounds; however, the duration of this impact was less than 10 seconds. As with the ten hypothetical mines modeled, we would expect a great deal of variability in the area impacted due to terrain features.

Table 5. Leq contours and area in acres impacted by mining sounds and a single blast event at Triple H mine.

| dBA contour | Triple H Mine only | Triple H Mine and single blast event |
|-------------|--------------------|--------------------------------------|
| >40 dBA | 107 | 833 |
| >45 dBA | 46 | 303 |
| >50 dBA | 12 | 140 |
| >55 dBA | 6 | 72 |

Coal Mine Sounds Compared to Non-coal Mining Sounds

Table 6 provides a comparison of the mining operation sound levels and other sources at similar distances. Sound levels of sounds other than mining sounds were adjusted to the same distance (1312 ft) used to measure the coal mining sounds to provide a relative comparison of sound sources in the petition area (adjustment assumed point and line source propagation based on the nature of the source). It is important to note that re-computing sound levels to different distances than actually measured may introduce some error.

Table 6. Sound levels of coal mining and other human activities in and near NCWMA.

| Sound Source | Sound Level @ 50 feet | Sound Level @ 1312 feet | Source |
|-----------------------------|-----------------------|-------------------------|-------------------------------------|
| Surface Coal Mine, large | NA | 62.6 dBA | National Coal mine, this report |
| Surface Coal Mine, small | NA | 48 dBA (1066 ft.) | Triple H mine, this report |
| Logging Operation | 75.5 dBA | 47.1 dBA | CA Depart. Forestry 2006 |
| Interstate Highway (70 mph) | 76.8 dBA | 62.6 dBA | TN Depart. Transportation; FHWA TNM |
| Highway (45-55 mph) | 60.8 dBA | 46.6 dBA | TN Depart. Transportation; FHWA TNM |
| ORV (at 25 mph) | 69.7 dBA | 35.3 dBA | TN NCWMA regulations; this report |

Summary

Sound levels generated by a large contour strip mining operation are high compared to ambient baseline levels. These sound levels diminish as one gets further away from the operations. Coal mining sounds are fairly constant throughout the day when the mine is operating 24 hours/day. Under current OSM mining regulations in this region, the area of the actual mine is limited to 1500 linear feet along the contour elevation. Compared to other current human-caused sound sources in the NCWMA and ERTCE areas such as vehicles (including ORVs) and logging, a large coal mine such as National Coal, although louder than many other sources, may acoustically impact a smaller area since it is confined to a limited area.

Potential acoustic impacts of a large contour strip coal mine, based on a criterion of >55 dBA as a level of significance, could occur on approximately 240 acres (average of 10 modeled hypothetical mines; SD=63). Potential acoustic impacts based on a criterion of >45 dBA as a level of significance, could occur on approximately 2841 acres (average of 10 modeled hypothetical mines; SD=1238). The potential impacts of a large ridgeline mine were found to be generally higher than the National Mine due to the elevated nature and fewer terrain effects along the ridgeline.

Reactions to human-caused sounds by humans and wildlife are extremely variable; some individuals and species are very tolerant while others are not. It is difficult to assign a single dBA level of significance when assessing potential impacts to either humans or wildlife. The use of levels of significance of 55 dBA for humans and 45 dBA for wildlife were chosen due to several supportive references in the literature (see pages 37-39) and recommendations by agencies and organizations. If mining activity is proposed at a specific location, a more thorough review of human use and wildlife species at that location would be warranted to determine if these levels of 55 dBA and 45 dBA are appropriate.

Table of Contents

| | |
|---|----|
| Executive Summary | 2 |
| Introduction | 9 |
| Objectives | 9 |
| Study Area | 9 |
| <i>Land Cover</i> | 12 |
| Methods | 14 |
| <i>Ambient Sound Levels</i> | 14 |
| <i>Coal Mine Operation Sound Levels</i> | 15 |
| <i>Acoustic Monitors</i> | 16 |
| <i>Observer Logging</i> | 18 |
| <i>Location of Acoustic Monitors</i> | 18 |
| <i>Measurement period</i> | 19 |
| <i>Acoustic Data from Other Sound Sources</i> | 19 |
| <i>Modeling</i> | 19 |
| <i>Definition of Acoustic Terms</i> | 20 |
| <i>Decibel Basics</i> | 20 |
| Results | 22 |
| <i>Ambient Sound Levels</i> | 22 |
| <i>Sound Levels of Coal Mine Operations</i> | 23 |
| <i>Sound Levels of Coal Haul Trucks</i> | 23 |
| <i>Sound Levels of Blast Event at Triple H Mine</i> | 24 |
| <i>Sound sources and Percent Time Audible</i> | 25 |
| Discussion | 28 |
| <i>Ambient Sound Levels</i> | 28 |
| <i>Estimated Acoustic Impact from Contour Strip Mines</i> | 28 |
| <i>Estimated Acoustic Impact from Coal Haul Trucks</i> | 29 |
| <i>Estimated Acoustic Impact from Blasting at Coal Mine</i> | 30 |
| <i>Non-coal Mining Human-caused Noise Sources</i> | 31 |
| <i>Other Noise Sources, Logging</i> | 31 |
| <i>Other Noise Sources, Vehicles</i> | 31 |
| <i>Other Noise Sources, Off-Road Vehicles (ORV)</i> | 32 |
| <i>Other Noise Sources, Hiking, Mountain Biking, Hunting, Fishing, Camping</i> | 33 |
| <i>Coal Mine Sounds Compared to Non-coal Mining Sounds</i> | 33 |
| <i>Acoustic Impacts of Coal Mining Sounds to Humans</i> | 34 |
| <i>Acoustic Impacts of Coal Mining Sounds to Wildlife</i> | 35 |
| Summary | 37 |
| Acknowledgements | 37 |
| Literature Cited | 38 |
| Appendix I. Definitions of Common Acoustic Terminology | 41 |
| Appendix II. National Land Cover Database (NLCD) characterization classes. | 43 |
| Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001. | 45 |
| Appendix IV. Acoustic metrics, ELKV001 and SOCO002 (not Type 1 data) | 59 |
| Appendix V. Percent Time Audible, HHH001, HHH002, ROBL001, ROBL002. ... | 61 |

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Introduction

On September 29, 2010, the State of Tennessee petitioned the Office of Surface Mining (OSM) to designate the ridgelines within North Cumberland Wildlife Management Area (NCWMA) and Emory River Tracts Conservation Easement (ERTCA) as unsuitable for surface coal mining. The areas covered by the petition include the Royal Blue, Sundquist and New River units that comprise the North Cumberland Wildlife Management area. The petition area also includes the Emory River Tract Conservation Easement, which is managed by Frozen Head State Park for public use. A portion of the Cumberland Trail also traverses the property. Much of the property covered by the petition is part of Tennessee's 2007 "Connecting the Cumberlands" conservation initiative. Lands in this initiative are managed by the state of Tennessee for hunting, fishing, hiking, camping, wildlife viewing and other outdoor recreational activities. The petition states that surface mining would be inconsistent with such uses. Other activities that occur in the petition include mountain biking, logging, and off road vehicle use.

If approved by the Secretary of the Interior, the petition would prevent surface mining of coal for 600 feet on each side of the ridgelines in the designated area, creating a 1,200 foot ridge top corridor encompassing 67,326 acres. This area contains most of the older growth forest that exist in the area as well as a diverse array of habitats and wildlife, some of which are considered rare or threatened. The ridgelines covered in the petition include about 40 percent of the total North Cumberland Wildlife Management Area and Emory River Conservation Easement Tract.

As part of the evaluation process of the petition, OSM will prepare an Environmental Impact Statement (EIS). One of the topics that will be evaluated is esthetics; OSM has broken the esthetics topic into visual and auditory impacts. The purpose of this study was to assess potential auditory impacts.

Objectives

The objectives of this study were to determine the availability of existing acoustic data, collect additional data if necessary, and analyze the data to establish the soundscape baseline of the area identified as the study area. Where acoustic data are available for the activities listed below, provide an assessment of the impacts of surface coal mining, and other likely land use activities such as logging, off road vehicle use, and other recreation including hunting, fishing, camping, hiking (including wilderness races), mountain biking, etc., on the soundscape of the study area.

Study Area

The study area is located within the coalfields in Anderson, Campbell, Morgan and Scott Counties, Tennessee. These areas include the Royal Blue, Sundquist and New River units that comprise the North Cumberland Wildlife Management area, as well as the Emory River Tract Conservation Easement. The ridgelines covered in the petition include about 40 percent of the total North Cumberland Wildlife Management Area and Emory River Conservation Easement Tract. The location is to the west –northwest of Knoxville, TN. Figure 1 shows the location of the study area shown in relationship to Tennessee cities. Figure 2 shows a detailed breakdown of the NCWMA and Emory

River Tracts, along with the petition area. The petition primarily requests designation of 600 feet on either side of the ridgelines in the NCWMA and ERCTE areas as unsuitable for surface mining, a total of 67,326 acres. The wildlife management areas are managed for multiple uses including recreation and resource extraction. The recreational uses include hunting, fishing, off road vehicle riding, rock climbing, hiking, camping, mountain biking, wilderness racing (running/walking), and other outdoor activities. The extraction uses include logging, surface and underground coal mining, oil and gas well development. The Cumberland Trail State Park also passes through the study area more or less from southwest to northeast.

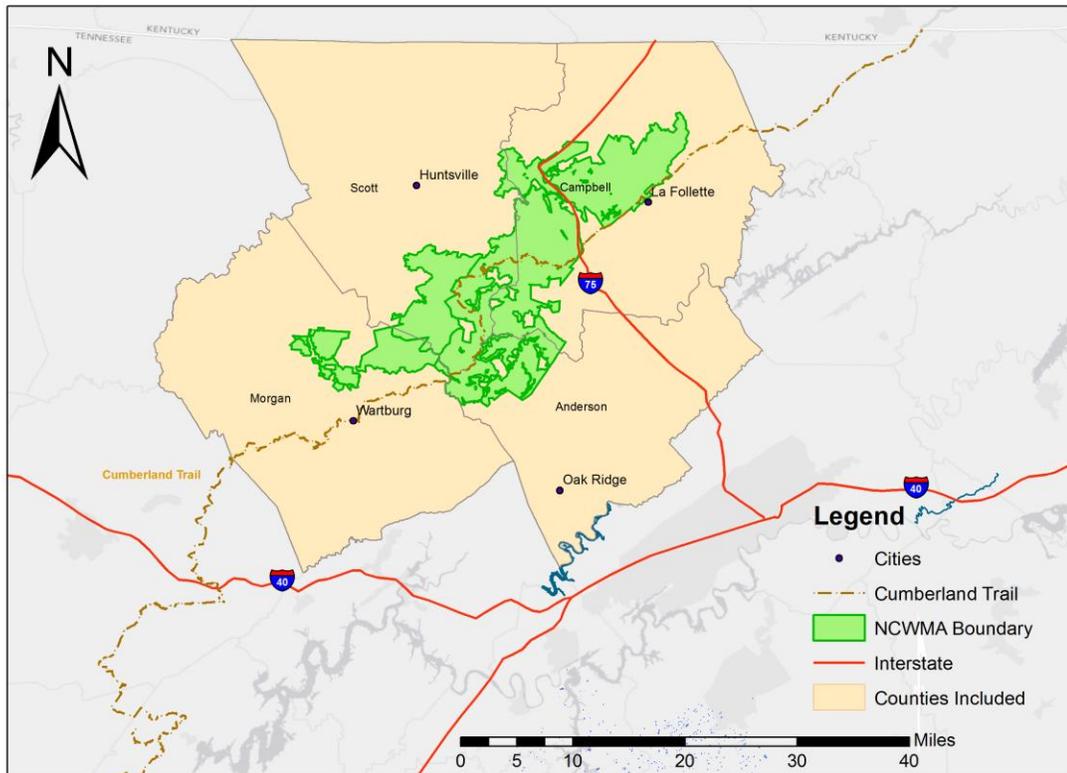


Figure 1: Location of NCWMA and ERTCE relative to Tennessee cities.

Two coal mines are currently operational in the study area (Figure 2). The National Coal mine is currently located at 36.189359N, 84.310123E, and the Triple H mine is currently located at 36.439836N, 84.113285E. Both the National Coal mine and the Triple H mine are “contour strip mines.” This method of coal mining consists of removing overburden on a hillside to expose the coal seams, mining the coal seams, and proceeding around the hillside following the contour at the coal seam level. Overburden is removed to reveal the coal seams, and is stacked along the created bench. After the coal from the seam is removed and any auger/highwall mining is completed, the overburden is replaced and the hillside re-vegetated. Coal mining by the auger/highwall method entails boring

horizontal or near-horizontal holes in an exposed face of the coal, and loading the removed coal onto trucks for transport.

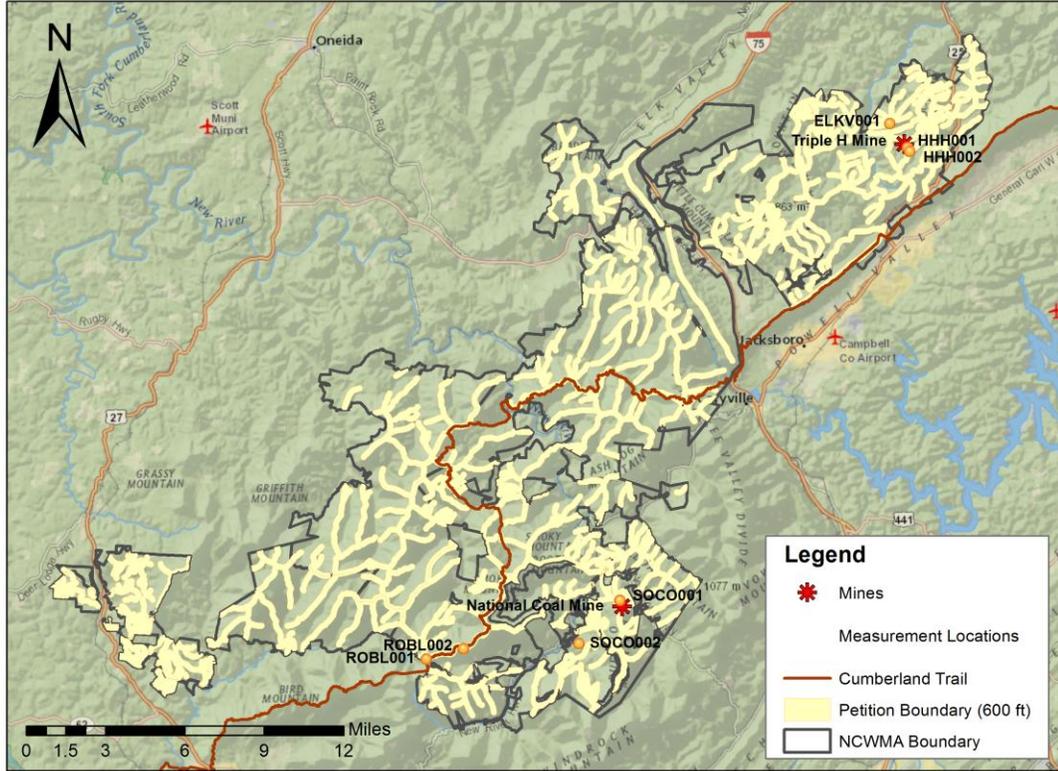


Figure 2. Area of NCWMA and ERTCE with two coal mines and monitor locations, with petition area boundary.

The Triple H mine is a relatively small operation while the National Coal mine is a large operation. Equipment used at each mine and the approximate number of daily coal trucks is shown in Table 1. Equipment used and estimates of the number of coal haul trucks per day are from coal mine personnel and OSM field inspectors.

Table 1. Equipment used at the National Coal and Triple H coal mines, November 2011.

| National Coal Mine | Triple H Mine |
|-----------------------------------|---------------------------------------|
| Maintenance Truck | Rock truck, Volvo 40 ton, 2 each |
| CAT 773B Fuel Truck | Komatsu 600 (front-end loader) |
| 275 Komatsu Dozer | Cat 330 (tracked excavator) |
| CAT 885 Loader | Gardner Denver 35 air blast drill |
| CAT 992D Loader | Coal Auger, Salem S-1500-B. (diesel) |
| CAT988F Loader | Road Grader, Caterpillar |
| Track Drill Rig DM 445 | Coal truck, MAC DM 800, 30 ton |
| 2000 KW Generator | Coal truck: MAC RD 800, 30 ton |
| Highwall Miner | Coal haul trucks per day (approx.): 2 |
| Fuel Tanker truck | |
| 980 G Loader | |
| Various Tandem Coal Trucks | |
| Track Excavator | |
| Coal trucks per day (approx.): 30 | |

Land Cover

Land cover types in the study area were determined using the National Land Cover Dataset (NLCD), a 16-class land cover classification scheme that has been applied consistently across the conterminous United States at a spatial resolution of 30 meters (Fry et al. 2011). Land cover in the study area consists primarily of deciduous forests (85.83%), mixed deciduous/coniferous forests (5.40%), and grassland (4.97%) (Table 2; Figure 3). Although the land cover type in this area was based on the most recent USGS National Land Cover Database (2006), it should be noted that land cover is constantly changing in this area. Logging is common in the NCWMA and ERTCE areas, and logged areas can change from mature deciduous forest to open and back to early succession deciduous forest within a few years. Thus, one should view these forest land cover percentages as constantly changing.

Table 2. Land cover and percent of each in study area.

| Land Cover Type | Percent of Study Area |
|-----------------------------|-----------------------|
| Open Water | 0.05% |
| Developed, Open Space | 2.50% |
| Developed, Low Intensity | 0.11% |
| Developed, Medium Intensity | 0.02% |
| Barren Land | 0.11% |
| Deciduous Forest | 85.83% |
| Evergreen Forest | 0.35% |
| Mixed Forest | 5.40% |
| Scrub/Shrub | 0.56% |
| Grassland/Herbaceous | 4.97% |
| Pasture/Hay | 0.04% |
| Woody Wetlands | 0.05% |
| | 100.00% |

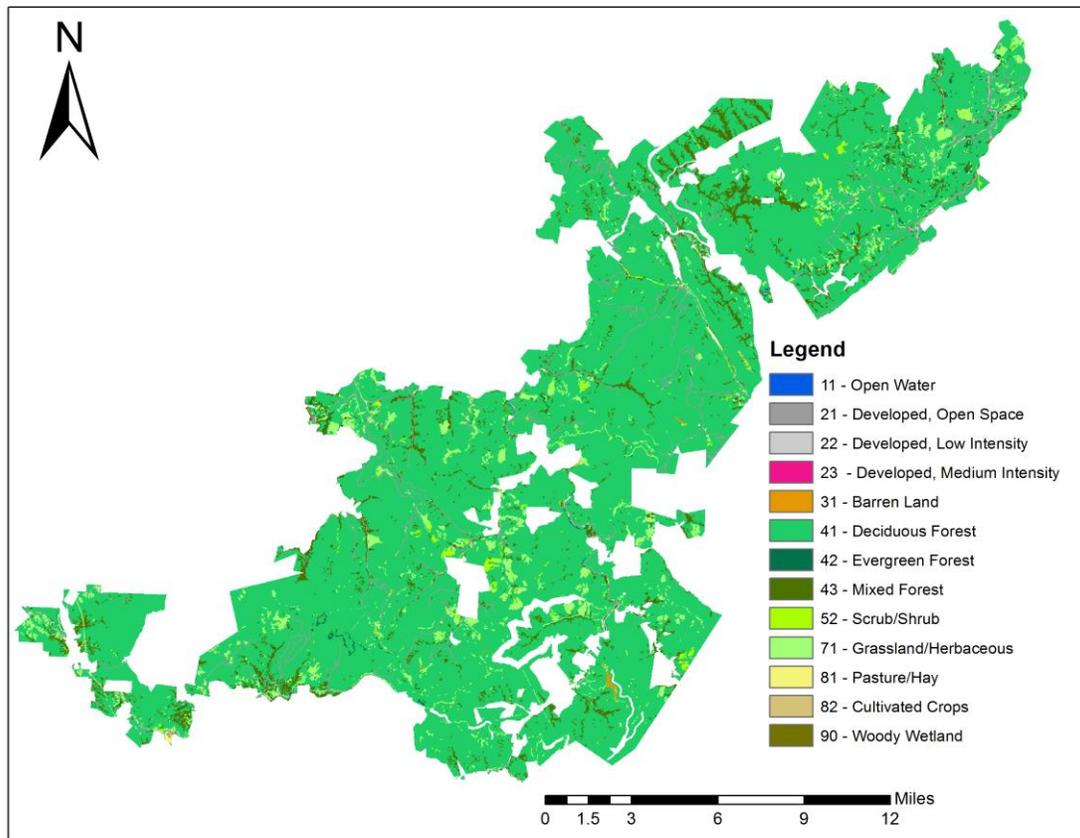


Figure 3. Land cover in the study area (see Appendix II for descriptions of each land cover type and code).

Methods

The approach of the study was to collect acoustic data in the primary land cover types of the study area in order to establish current ambient acoustic conditions of the NCWMA and ERTCE areas. Acoustic data were also collected at two operating coal mines, National Coal and Triple H. Using these two data sets, the measured current ambient sound levels and the measured sound levels of the two mines, a computer sound model was used to estimate acoustic impacts of coal mining on the soundscape of the NCWMA and ERTCE areas.

Ambient measurements consisted of long-term acoustic data collection (>25 days) in the two primary land cover types in the study area, deciduous forest (85%) and mixed deciduous/coniferous forest (5%). Ambient conditions varied according to proximity to flowing water; sound levels near flowing water were somewhat elevated compared to sound levels not near flowing water. For this reason, ambient sound levels were determined for two ambient conditions, without and with flowing water. Additionally, sound levels were determined for three daily time periods, all day (0000-2400), daytime (0700-1900), and nighttime (1900-0700). Coal mining operation measurements consisted of short-term acoustic data collection (2 to 8 days of continuous measurements) at two operating coal mines in the area, National Coal and Triple H. In addition to numerical sound level data, digital recordings were collected to identify common sound sources in the study area and the percent time each was audible. The data collected and resulting metrics are shown in Table 3.

Table 3. Acoustic data and associated metric computed.

| Data Collected: | Metric Computed: |
|---|--|
| Sound Pressure Level Data (1-second L_{eq} for 1/3 octave bands, 20-20,000 Hz; dBA) | <ul style="list-style-type: none"> • L_{eq}, L_{10}, L_{50}, L_{90}, L_{min}, and L_{max} for each hour and day of the measurement period |
| Digital Recordings | <ul style="list-style-type: none"> • Time Audible • Identification of sources of sound • Distribution of sources of sounds |

Ambient Sound Levels

Exceedence metrics are frequently used as “baseline” or “ambient” or “background” levels when assessing potential acoustic impacts of a proposed action. An exceedence metric is the sound pressure level (L), in decibels, exceeded *x* percent of the time for the specified measurement period. L_{50} is the sound pressure level exceeded 50 percent of the time (L_{50} is the same as the median). L_{90} is the sound pressure level exceeded 90 percent of the time. L_{90} is often considered the appropriate metric for establishing background ambient sound levels (Dunholter et al. 1989).

The petition area covers 67,326 acres. In order to measure and calculate ambient sound levels of this entire area requires the assumption that areas with similar land cover (and thus probably similar mammals, birds, and insects) will have similar ambient sound levels. This is not entirely true as there are local acoustic differences depending on the location, these differences include the acoustic effects of nearby running water (creeks and rivers), wind through the tree canopy, wind sounds in exposed areas, and proximity to roadways to name a few. However, this assumption has generally proven to be valid (Ambrose 2006). For this reason the approach used to quantify ambient sound levels into a single value utilized data measured in similar land cover areas and extrapolated those values to other areas with like land cover. In the NCWMA and ERTCE areas, deciduous forests (85%) and mixed forests (5%) are the primary land cover types. The remote measurement locations were in these land cover types (ROBL001 and ROBL002 HHH001 and HHH002 on weekends). Ambient sound level metrics (L_{eq} , L_{10} , L_{50} , and L_{90}) were computed for two ambient conditions (with and without flowing water) and for three time periods by calculating median values for all hours during the three time periods.

Deciduous forest and mixed forest covered over 90% of the study area, while grassland accounted for about 5% of the study area. A grassland measurement site was established as part of this work but was found in data processing to be influenced by distant traffic noise and hence was not used to establish an ambient sound level for the grassland areas. Therefore, when establishing baseline natural and existing ambient sound levels, only data collected in deciduous forest and mixed forest land cover was used for this determination.

Coal Mine Operation Sound Levels

The active mining area is an area roughly 200' by 1500' and heavy equipment operate within this limited area. The literature contains sound level reference values of various individual pieces of machinery and heavy equipment and other moving sources (truck traffic to and from the mine). This study did not attempt to establish the sound levels of the individual pieces of equipment at the mine; rather, we measured the combined sound levels of these many sources by monitoring the overall sound levels of the mine during normal operation at fixed distances from the operations. Acoustic monitors were placed at two locations 1066 feet (325 m) and 1719 feet (524 m) from Triple H, and at a location 1312 foot (400 m) from National Coal. Sound level measurements were not collected within the active mine area itself, but instead measured at these specific locations from the mine operating area. This approach allowed us to assess attenuation rates of mining sounds in the land cover and terrain type in the petition area. Eight days of acoustic data were collected at the Triple H mine, and two days of acoustic data at the National Coal mine. There was very little daily variation in sound levels at either, hence only a few days were needed to determine sound levels of normal mine operation. The Triple H mine was a smaller operation compared to the National Coal mine as evidenced in the overall measured sound levels.

Baseline mining operation sound levels were determined by calculating the logarithmic means of all hourly L_{50} values for the time periods each mine was operating.

The National Coal mine operated 24-hours per day; hence the computed baseline sound levels for National Coal were based on the time period of 0000-2400 hours. At the Triple H mine, activity at the mine and operations were during daytime hours (0700-1900), and therefore the baseline mining sound levels for Triple H were based on this time period only.

Acoustic Monitors

Four ANSI Type 1 sound level meters were used in this study. Monitors consisted of a Larson-Davis 831 Sound Level Meter (SLM), Larson-Davis PRM831 preamplifier, PCB 377B20 microphone, Larson-Davis ESP106-2 Environmental Shrouds (windscreen and bird spike), and a Roland R05 digital recorder. The recorder used the microphone output from the Larson-Davis 831 SLM. A 12-volt battery system powered the system. The equipment was stored in a weather-proof container (Figures 4 and 5).



Figure 4. Acoustic monitor at HHH001 (microphone/windscreen on one tripod, and anemometer on separate tripod).



Figure 5. Acoustic monitor at ROBL002.

All SLMs and components met ANSI Type 1 standards (IEC 804:1985, Integrating-Averaging Sound Level Meters), and were professionally calibrated annually within 12 months of deployment. A B&K 4231 acoustic calibrator that complied with Class 1 accuracy requirements of ANSI S1.40-1984, American National Standard Specification for Acoustical Calibrators (9184), or IEC 942:1988, Sound Calibrators (1988), was used to check calibration in the field. All system components were time-synchronized with GPS time at deployment, and any time off-sets observed during subsequent visits were recorded. Monitors were capable of operating extended periods of time (>25 days). All monitors collected continuous 1-second decibel data (dBA and L_{eq} for 1/3 octave bands, 20-20,000 Hz, set to “Fast” time weighting), and continuous digital audio recordings (MP3, 128 kpbs).

In addition to the Larson-Davis sound level meters, two high-quality digital recorders and external microphones were used to collect continuous audio recordings which were later analyzed to identify common sound sources and the percent time that each was audible. The recording packages consisted of a Roland R05 digital recorder and two Shure WL183 omni-directional microphones. Digital recordings were used primarily for sound source identification, but were also post-processed to provide dB data. MP3 recording systems were calibrated by collecting simultaneous recordings and measurements with an ANSI Type 1 sound level meter. In comparative tests, A-weighted metrics computed from the digital recordings were generally ± 1.0 dBA of A-weighted metrics computed

from the LD831 (Type 1) sound level meters. However, it should be noted that metrics computed from the digital recordings do not meet ANSI Type 1 standards.

Acoustic monitors were deployed as follows. Two of the Type 1 Larson Davis 831 systems were used to collect long-term baseline ambient data in the primary land cover types in the study area. Two of the Type 1 Larson-Davis 831 systems were used to collect coal mine operational data, and were moved between the Triple H mine and the National Coal mine during the measurement period. The digital recording systems were used at different distances from the coal mines and were used to check attenuation rates of coal mining sounds.

Observer Logging

Decibel data alone do not allow identification of sources of sounds. When conducting acoustic studies, it is important that the source of common sounds, both natural and human-caused, be identified. Further, it is important to determine the percent of time that such sounds are audible. This was accomplished by collecting continuous digital recordings, and later analyzing these recordings in the office. Listening and logging sound sources is labor intensive, thus logging is only conducted for a sub-sample of the measurement period. Office logging using the digital recordings was conducted for twelve days per season at each of the primary measurement locations, using a sample scheme of a 10 second recording every 4 minutes. In past studies, this sample scheme has proven to be very accurate, generally $\pm 5\%$ actual conditions (Ambrose 2006).

Location of Acoustic Monitors

Areas of like vegetation, land cover, topography, elevation, and climate generally possess similar acoustic characteristics, including sound sources (birds, insects, mammals), sound levels, propagation and attenuation properties. The USGS National Land Cover Database (Fry et al. 2011) was used to determine the primary land cover types. Measurement locations were selected in consultation with OSM staff after review of primary land cover types and human use patterns in the study area. Acoustic data were collected at seven locations (Table 4).

Table 4. Locations of acoustic monitors and recorders in study area, November 2011.

| Name | Latitude | Longitude | Use |
|---------|----------|-----------|--|
| ELKV001 | 36.45109 | 84.12274 | Grassland land cover measurement near Triple H |
| HHH001 | 36.43762 | 84.11097 | Coal mine operation sound levels (Triple H) |
| HHH002 | 36.43575 | 84.10972 | Coal mine operation sound levels (Triple H) |
| ROBL001 | 36.16225 | 84.44305 | Mixed forest land cover measurement |
| ROBL002 | 36.16765 | 84.41778 | Deciduous forest land cover measurement |
| SOCO001 | 36.19265 | 84.31140 | Coal mine operation sound levels (National Coal) |
| SOCO002 | 36.16936 | 84.33977 | Coal mine operation sound levels (National Coal) |

Monitors at ROBL001 and ROBL002 were deployed to collect long-term, baseline ambient data in the primary land cover types (mixed deciduous/coniferous forest and

deciduous forest cover >90% of the study area). ROBL001 was located in the western part of the Royal Blue Unit of the NCWMA, near the southeastern border with the New River Unit. This location was near the eastern border of the Emory River Tract Conservation Easement Area and the northern border of Frozen Head State Park. ROBL002 was located in the south-central part of the Royal Blue Unit. Monitors at HHH001, HHH002, and ELKV001 were in Sundquist Unit of NCWMA and were deployed to collect sound level data relative to the Triple H mine. Monitors at SOCO001 and SOCO002 were in the southern part of the Royal Blue Unit and were deployed to collect sound level data relative to the National Coal mine. Monitors HHH001, HHH002, and ELKV001 were 1066 feet, 1722 feet, and 5167 feet from the Triple H mine, respectively. SOCO001 was 1312 feet from the National Coal mine and SOCO002 was 11450 feet from the National Coal mine.

Measurement period

In most acoustic impact assessments, baseline sound levels in summer and winter are collected and assessment of potential impacts include both seasons. This assessment of potential acoustic impacts of surface mining in the NCWMA and ERTCA areas had to be completed by January 2012, thus there was a limited time period to collect and analyze acoustic data. For this study, acoustic data were collected in only one season, winter (November 2011), and modeling assessments was based on winter baseline conditions. In most areas, winter is a quieter season than summer (Ambrose 2006), thus these winter measurements provided the opportunity to assess potential impacts during the quietest time of the year. Measurement periods for determining baseline acoustic conditions (background ambient and existing ambient sound levels) need to be of sufficient duration to include periods of natural variability (such as high and low winds). Generally, a measurement period of 25 days will provide acoustic data sufficient to be within 3 dB of sound levels for the entire season (NPS 2008). Measurement periods for determining sound levels of typical human activities, such as coal mine operations, are much less variable day-to-day, thus measurement periods can be much shorter, generally from 2 to 7 days.

Acoustic Data from Other Sound Sources

Other human activities that contribute to acoustic conditions in the study area include vehicles (on both gravel roads and major highways, and also including off road vehicles), camping, hunting, fishing, mountain biking, and logging. Sound levels for these activities were obtained from published and unpublished literature.

Modeling

Computer noise models are used to estimate acoustic impact of new sources in an environment. A computer model (SoundPlan) was used to: 1) model the current impact of the two operational mines; and 2) provide a means of estimating noise impact in NCWMA and ERTCE areas that may be considered for future mine operations. The computer model used for this work is a “ray-trace” model which conceptually treats acoustic sources as points, lines or areas in which “rays” emanate from these sources that approximate the path of sound waves. The paths of the rays are stored by the computer model together with the distance that each ray travels, various model objects that a ray

encounters (barrier or terrain line) and the conditions of the media that the ray travels through (atmospheric effects). The computer model has the capability of predicting sound levels generated by point sources (generator or a material conveyor belt for example) or line sources (roadways for example) and also area sources (a large area where many sources of sound are present, both stationary and moving). The model estimates the magnitude of the sound energy produced by the sources and then predicts the attenuation of the sound as it travels through the air and reaches a point receiver (such as a residential home), or in a grid fashion to compute contours (for example, all areas >55 dBA).

The acoustic model contained standard environmental propagation features such as geometric spreading, atmospheric absorption, ground effects and terrain effects. A concentrated point source modeling approach was chosen for the mine operations themselves based on a review of the measured data in the vicinity of the active mines and field observations. The large and small mine source levels were calibrated to the nearby in-situ sound level measurements once the proper modeling elements were in place, ie terrain, atmospheric and ground cover. The difference between predicted hourly sound levels and the measured results at locations near the mines (HHH001 and SOCO001) were within 0.5 dB.

Existing and background ambient sound levels in the NCWMA were measured as part of this work, and this allows the prediction of “impact” by comparing predicted hourly sound levels ($L_{eqA_{hr}}$) from a new source to the ambient sound levels of an undisturbed area.

Using the measured current ambient sound levels and the measured sound levels of the two mines, the computer sound model was used to estimate acoustic impacts of coal mining on the soundscape of the NCWMA and ERTCE areas. The impact estimate must be based upon a sound level metric of some kind, for example “all areas that receive an hourly L_{eq} sound level above the ambient sound levels are impacted” or “all areas that receive a maximum sound level greater than 55 dBA are impacted” or some similar comparison. For this assessment of impacts, four different acoustic scenarios were modeled: all areas >40 dBA, >45 dBA, >50 dBA, and >55 dBA.

Definition of Acoustic Terms

Definitions of common acoustic terms are provided in Appendix I. Acoustic equipment and measurement procedures followed protocols outlined in “Acoustical Sampling & Analysis Guide 2008-12-02 v1.0” (NPS 2008).

Decibel Basics

The decibel is a logarithmic value used to describe the amplitude of sound pressure levels. The decibel provides the possibility of representing a large span of signal levels in a simple manner as opposed to using the basic pressure unit Pascal. The difference between the sound pressure for near silence versus a loud sound is a factor of 1:1,000,000 or more, therefore it is less cumbersome to use a small range of equivalent values, for example, 0 dB to 100 dB. Since acoustic data are logarithmic, these data cannot be summed or averaged using standard arithmetic. They must be converted back to their

original sound pressure values before being arithmetically manipulated, and then reconverted to the decibel scale. Two sound pressure levels of equal decibel level added together result in an increase of 3 dB. For example, two sounds of 40 dB added together equal 43 dB. Four sounds of the same dB level added together result in an increase of 6 dB. An increase of 6 dB is a doubling of sound pressure; hence, 50 dB is about 128 times greater than 10 dB. While an increase of 6 dB corresponds to a doubling of sound pressure level, humans perceive an increase of 10 dB as a doubling of loudness. Hence, 50 dB would be perceived as 16 times louder than 10 dB. Humans with normal hearing can hear sounds down to about 0 dB in the 1,000 Hz range. A change of 5 dB is clearly noticeable to humans. Table 5 provides some examples of common sound sources and corresponding sound levels, and Figure 6 provides some examples of frequencies of common sounds.

Table 5. Common sound sources and approximate dBA value (with measured distance).

| Source | dBA | Distance (ft) |
|---------------------------------------|-----|---------------|
| Chainsaw | 90 | 3 |
| Truck, Diesel Tractor Trailer, 65 mph | 85 | 50 |
| Truck, Diesel, Coal Haul, 25 mph | 80 | 50 |
| Automobile, 65 mph | 75 | 50 |
| ORV, 25 mph | 70 | 50 |
| Automobile, 35 mph | 65 | 50 |
| Conversation, Normal | 60 | 3 |
| Moderate Rainfall | 50 | 3 |
| Conversation, Quiet | 40 | 3 |
| Creek, Flowing Water | 30 | 100 |
| Whisper | 20 | 3 |

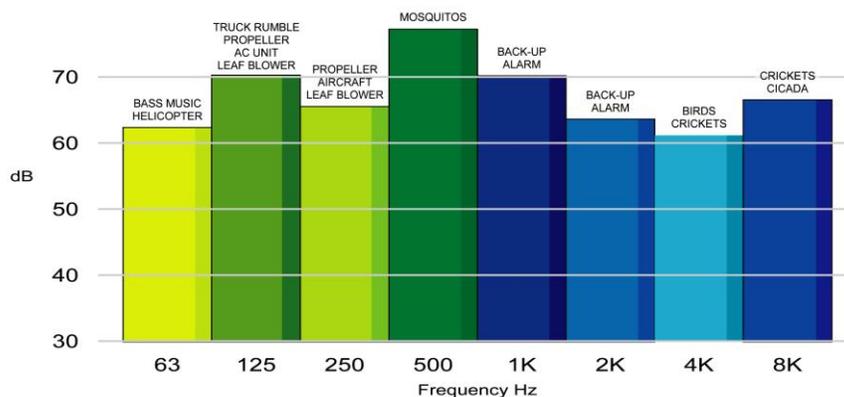


Figure 6. Frequency characteristics of common sources of environmental sound.

Results

Acoustic measurements were made at seven locations between October 29 and November 27, 2011; 1759 hours of acoustic data were collected. Measurement locations, land cover type, and dates of data collection are shown in Table 6.

Table 6. Measurement locations, data use, dates of data collection, and number of hours at each site, northern Tennessee, October-November 2011.

| Name | Land Cover, Mine | Dates | Hours |
|---------|---|----------------|-------|
| ELKV001 | Grassland, near Triple H mine | 10-31 to 11-6 | 139 |
| HHH001 | Deciduous Forest, near Triple H mine | 10-29 to 11-7 | 213 |
| HHH002 | Deciduous Forest, near Triple H mine | 10-29 to 11-6 | 196 |
| ROBL001 | Mixed Forest, Royal Blue Unit | 10-30 to 11-27 | 674 |
| ROBL002 | Deciduous Forest, Royal Blue Unit | 11-7 to 11-27 | 478 |
| SOCO001 | Deciduous Forest, near National Coal mine | 11-8 to 11-9 | 29 |
| SOCO002 | Deciduous Forest, near National Coal mine | 11-8 to 11-9 | 30 |

Ambient Sound Levels

Hourly ambient sound levels (L_{eq} , L_{10} , L_{50} , and L_{90}) were calculated from data collected at HHH001 and HHH002 (weekends only when the Triple H mine was not working) and ROBL001 and ROBL002 (all days). All monitors were within the primary land cover types in the area, deciduous forests or mixed deciduous-coniferous forests. The ROBL monitoring locations were within 1 km of flowing water, and this resulted in elevated ambient levels at the ROBL sites. For this reason, two ambient data sets were computed; one for the HHH sites without the influence of flowing water, and another for the ROBL sites, where water sounds resulted in somewhat elevated ambient sound levels. These ambient levels are the median values of all hours for the time periods shown (Table 7).

Detailed metrics for each site (hourly dBA metrics and frequency metrics) are shown in Appendices III and IV. Appendix III includes all sites where ANSI Type I sound level meters were used. Appendix IV includes two sites (ELKV001 and SOCO002) where acoustic metrics were obtained by post-processing MP3 digital recordings. MP3 recording systems were calibrated by collecting simultaneous recordings and measurements with an ANSI Type 1 sound level meter. These data do not meet ANSI Type I standards, but are generally ± 1 dBA of data collected with a Type 1 sound level meter.

Table 7. Median existing ambient sound levels (dBA) for three time periods at HHH sites (weekends only) and ROBO sites (all days), November 2011.

| | | Hour | Leq | L10 | L50 | L90 |
|-------------------------|-----------|-----------|------|------|------|------|
| HHH Sites (weekends) | All hours | 0000-2400 | 32.5 | 33.2 | 30.1 | 28.3 |
| | Daytime | 0700-1900 | 37.9 | 39.0 | 32.8 | 29.4 |
| | Nighttime | 1900-0700 | 29.9 | 29.6 | 27.5 | 27.2 |

| | | Hour | Leq | L10 | L50 | L90 |
|------------|-----------|-----------|------|------|------|------|
| | All hours | 0000-2400 | 42.3 | 45.0 | 39.8 | 36.3 |
| ROBL Sites | Daytime | 0700-1900 | 42.2 | 44.7 | 39.1 | 35.4 |
| | Nighttime | 1900-0700 | 42.3 | 45.2 | 40.3 | 36.7 |

Sound Levels of Coal Mine Operations

Coal mine operation sound levels for the National Coal mine and the Triple H mine for three time periods of the day are shown in Table 8. The Triple H mine worked daytime hours, weekdays only, therefore only data for daytime are shown.

Table 8. Sound levels of coal mine operations at National Coal mine and Triple H mine, November 2011.

| | | Time Period | Leq | L10 | L50 | L90 |
|------------------------------|-----------|-------------|------|------|------|------|
| National Coal (@ 1312 ft) | All Hours | 0000-2400 | 70.1 | 68.7 | 62.6 | 56.4 |
| | Daytime | 0700-1900 | 71.4 | 69.3 | 64.2 | 56.7 |
| | Nighttime | 1900-0700 | 67.9 | 64.0 | 61.6 | 54.9 |

| | | Time Period | Leq | L10 | L50 | L90 |
|--------------------------------------|-----------|-------------|------|------|------|------|
| Triple H (@ 1066 ft, weekdays) | All Hours | 0000-2400 | 39.4 | 41.4 | 35.1 | 31.8 |
| | Daytime | 0700-1900 | 49.9 | 53.6 | 47.1 | 37.1 |
| | Nighttime | 1900-0700 | 30.7 | 31.4 | 29.7 | 28.5 |

Sound Levels of Coal Haul Trucks

Sound levels of coal hauling trucks from the National Coal mine were measured on Nov. 9, 2011. On average, about 30-40 trips per day are made from this mine to a coal processing plant. Sound levels of nine trucks during the 1000 hour are shown in Table 9 and Figure 7. Trucks maximum dBA averaged 76.5 dBA @ 50 ft, and the time >45 dBA averaged 1:28 minutes per truck.

Table 9. Maximum dBA and duration of coal hauling trucks from National Coal mine, Nov. 9, 2011, 1000 hour.

| Time | Lmax | Duration |
|----------|------|----------|
| 10:03:35 | 78.4 | 0:02:33 |
| 10:11:03 | 73.9 | 0:00:34 |
| 10:22:59 | 77.1 | 0:01:24 |
| 10:36:06 | 76.9 | 0:01:04 |
| 10:39:46 | 77.6 | 0:03:31 |
| 10:45:09 | 77.4 | 0:00:39 |
| 10:50:34 | 74.2 | 0:00:57 |
| 10:52:09 | 75.6 | 0:00:40 |
| 10:54:04 | 77.7 | 0:01:47 |

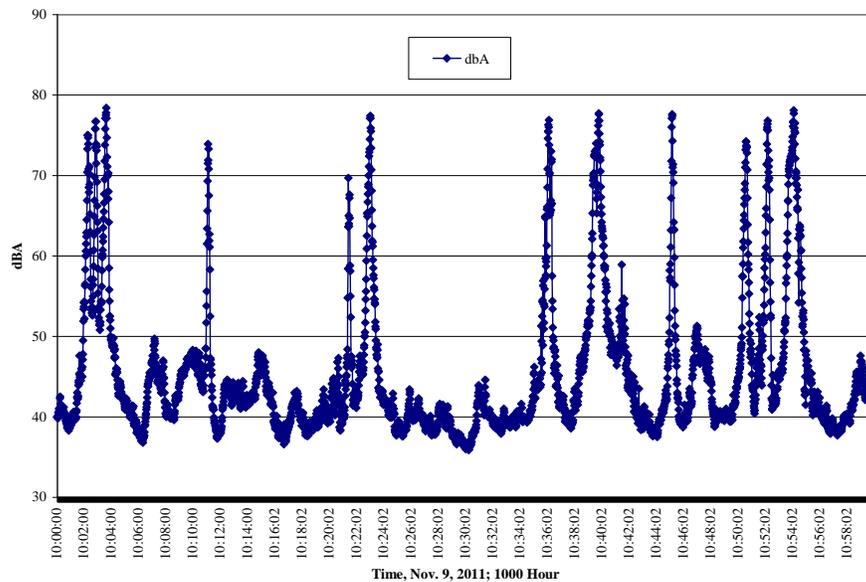


Figure 7. Coal hauling trucks from National Coal mine, Nov. 9, 2011, 1000 hour.

Sound Levels of Blast Event at Triple H Mine

Infrequent blasting operations do occur at these mining locations and a single blast event was recorded during acoustic measurements at the mine sites. A single blast occurred at the Triple H mine, on October 31, 2010, at 13:39:46. The maximum sound level at 1066 ft was 75.2 dBA, and the duration was about 10 seconds (Figure 8). Data from this blast event was used to model estimated impacted areas based on a short term time period (1-2 seconds, 75.2 dBA maximum) and an hourly time period for comparison to other model results.

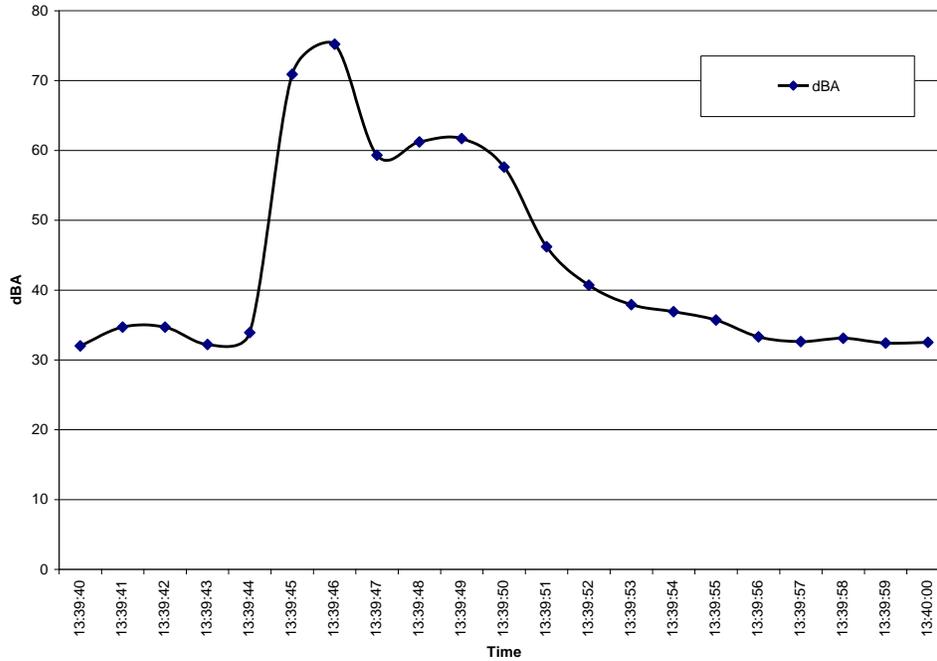


Figure 8. Blast amplitude (75.2 dBA) and duration (about 10 seconds) for a blast event at Triple H mine on October 31, 2010, at 13:39:46.

Sound sources and Percent Time Audible

The hourly percent time that human-caused sounds were audible at measurement locations in the North Cumberland Wildlife Management Area units are shown in Table 10. Data for ELKV001, HHH001, and HHH002 represent weekdays only, when the Triple H mine was operational. Common sound sources and the percent time each was audible are shown in Table 11. At four locations (ROBL001, ROBL002, HHH001 weekends and HHH002 weekends) where mine sounds were not present, audibility data are shown in Appendix IV.

Table 10. Percent time that human-caused sounds were audible at measurement locations* in North Cumberland Wildlife Management Areas, November 2011.

| Hour | ELKV001 | HHH001 | HHH002 | ROBL001 | ROBL002 | SOCO001 | SOCO002 |
|------|---------|--------|--------|---------|---------|---------|---------|
| 0 | 100.0 | 100.0 | 96.7 | 13.9 | 5.0 | 100.0 | 100.0 |
| 1 | 100.0 | 80.0 | 96.7 | 7.8 | 10.6 | 100.0 | 100.0 |
| 2 | 90.0 | 60.0 | 76.7 | 12.8 | 10.6 | 100.0 | 100.0 |
| 3 | 83.3 | 80.0 | 83.3 | 15.6 | 6.1 | 100.0 | 100.0 |
| 4 | 80.0 | 86.7 | 80.0 | 15.0 | 6.1 | 100.0 | 100.0 |
| 5 | 100.0 | 90.0 | 96.7 | 17.2 | 10.0 | 100.0 | 100.0 |
| 6 | 96.7 | 73.3 | 96.7 | 13.3 | 21.7 | 100.0 | 100.0 |
| 7 | 100.0 | 93.3 | 90.0 | 12.2 | 20.0 | 100.0 | 100.0 |
| 8 | 100.0 | 100.0 | 100.0 | 21.1 | 23.9 | 100.0 | 100.0 |
| 9 | 100.0 | 100.0 | 100.0 | 33.3 | 28.3 | 100.0 | 93.3 |
| 10 | 86.7 | 100.0 | 100.0 | 31.1 | 26.1 | 100.0 | 100.0 |
| 11 | 100.0 | 100.0 | 100.0 | 28.3 | 27.8 | 100.0 | 100.0 |
| 12 | 96.7 | 73.3 | 86.7 | 31.1 | 24.4 | 100.0 | 100.0 |
| 13 | 80.0 | 83.3 | 83.3 | 26.1 | 23.9 | 100.0 | 100.0 |
| 14 | 93.3 | 100.0 | 100.0 | 21.1 | 20.0 | 100.0 | 100.0 |
| 15 | 86.7 | 100.0 | 100.0 | 26.7 | 25.6 | 100.0 | 100.0 |
| 16 | 90.0 | 100.0 | 100.0 | 30.0 | 30.0 | 100.0 | 100.0 |
| 17 | 96.7 | 100.0 | 100.0 | 30.0 | 28.9 | 100.0 | 100.0 |
| 18 | 100.0 | 86.7 | 90.0 | 22.2 | 21.1 | 100.0 | 100.0 |
| 19 | 90.0 | 56.7 | 76.7 | 16.1 | 13.9 | 100.0 | 100.0 |
| 20 | 66.7 | 50.0 | 63.3 | 15.0 | 12.8 | 100.0 | 100.0 |
| 21 | 63.3 | 46.7 | 63.3 | 22.8 | 16.7 | 100.0 | 93.3 |
| 22 | 56.7 | 53.3 | 50.0 | 11.1 | 12.8 | 100.0 | 100.0 |
| 23 | 60.0 | 56.7 | 56.7 | 13.9 | 2.2 | 100.0 | 100.0 |

* Data for ELKV001, HHH001, and HHH002 represent weekdays only, when the Triple H mine was operational.

Table 11. Sound sources at measurement locations* and percent time audible of each, November 2011.

| Sound Source | Measurement Location | | | | | | |
|----------------------|----------------------|--------|--------|---------|---------|---------|---------|
| | ELKV001 | HHH001 | HHH002 | ROBL001 | ROBL002 | SOCO001 | SOCO002 |
| Jets | 3.8 | 2.8 | 1.7 | 6.4 | 5.5 | 0.0 | 0.8 |
| Propeller Aircraft | 2.5 | 0.8 | 0.4 | 2.3 | 1.3 | 0.0 | 1.1 |
| Helicopter | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| Vehicles | 78.8 | 85.7 | 83.1 | 11.2 | 10.8 | 83.9 | 54.4 |
| Trains | 9.3 | 9.6 | 15.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Motors | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 68.3 | 49.4 |
| People | 0.1 | 1.4 | 2.1 | 0.3 | 0.1 | 0.3 | 0.6 |
| Domestic Animals | 0.4 | 0.3 | 3.1 | 0.0 | 0.0 | 0.0 | 3.3 |
| Unknown Human Sounds | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Wind | 49.4 | 0.1 | 5.3 | 53.1 | 70.5 | 0.6 | 13.9 |
| Water | 27.9 | 76.3 | 52.8 | 100.0 | 100.0 | 2.8 | 54.4 |
| Mammal | 3.3 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Birds | 24.6 | 25.6 | 27.4 | 19.8 | 18.3 | 1.1 | 16.1 |
| Insects | 60.1 | 33.3 | 41.8 | 10.8 | 6.9 | 0.0 | 46.1 |
| Animal Sounds | 13.6 | 11.4 | 20.4 | 6.6 | 5.3 | 0.0 | 2.5 |

* Data for ELKV001, HHH001, and HHH002 represent weekdays only, when the Triple H mine was operational.

Discussion

Ambient Sound Levels

Few acoustic studies have been conducted in remote areas of eastern TN to determine existing (L_{50}) and background (L_{90}) ambient sound levels. One ongoing study involves measurements in Great Smoky Mountains National Park (GRSM) by the Federal Aviation Administration and National Park Service. Land cover in GRSM is similar to the NCWMA and ERTCE areas, with deciduous forest being the primary land cover. The existing ambient sound level in areas of NCWMA and ERTCE without flowing water for the time period 0000-2400 was 30.1 dBA, very close to levels in GRSM with like land cover type, 32.9 dBA (MacDonald, unpubl. data)(Table 12). Ambient sound levels in areas of NCWMA and ERTCE with flowing water were considerably higher, 39.8 dBA.

Table 12. Existing ambient sound level (L_{50} , 0000-2400) in the NCWMA and ERTCE areas (winter 2011) and Great Smoky Mountains National Park (winter 2005).

| Location | L_{50} | Num. Sites |
|-------------------------------------|----------|------------|
| Great Smoky Mtn. NP | 32.9 | 6 |
| NCWMA and ERTCE, non water ambient | 30.1 | 2 |
| NCWMA and ERTCE, with water ambient | 39.8 | 2 |

Estimated Acoustic Impact from Contour Strip Mines

Noise studies and assessment of potential acoustic impacts of coal mining operations in Tennessee have been conducted by OSM and Tennessee Valley Authority (TVA) prior to this study. One study concluded that surface mining equipment would generate a maximum of 98 dBA at 50 feet (unpublished TVA data). Another study listed various activities associated with mining and provided a range of sound levels as follows: earth moving, 73 dBA to 96 dBA at 50 feet; impact tools and rock drills, 76 dBA to 97 dBA at 50 feet; and blasting, estimated at 105 dBA to 110 dBA at 50 feet (Nabelek 1985).

The average sound level at the National Coal mine for all operating hours (0000-2400) was 62.6 dBA at 1312 ft. The measured sound levels summarized in this report for mining operations, haul trucks, and blast events were similar to those reported in the literature.

Four levels of acoustic impact were modeled: areas of NCWMA and ERTCE that were >40 dBA, >45 dBA, >50 dBA, and >55 dBA. It should be noted that most people will not notice a sound source until it is about 5 dB above background levels, unless it has strong tonality. Table 13 provides estimates of impact acreage for the National Coal mine based on a daytime ambient sound level of 33 dBA and night ambient sound level of 27 dBA. Both of these ambients, daytime and nighttime, were computed from data collected at sites without the influence of flowing water. Daytime and nighttime ambient sound levels were reasonably close (within 5 dBA), and there will be very little difference in the affected areas for sound levels greater than 40 dBA. The effect of the lower night time ambient sound level is in the 25-30 and 30-35 dBA contours which would be applicable

for a metric based on the concept of “increase above ambient” rather than a metric based on absolute sound levels as shown in Table 13. The lower night time ambient results in an additional 25,307 acres that have increased sound levels greater than the ambient sound level.

Table 13. Areas (in acres) acoustically impacted by the National Coal mine under two different ambient conditions (daytime 33 dBA; night hours of 27 dBA)

| dBA | National Coal Mine (night ambient of 27 dBA) | National Coal Mine (daytime ambient of 33 dBA) |
|--------------|--|--|
| 27 to 30 dBA | 15,567 | -- |
| 30 to 33 dBA | 9,739 | -- |
| 33 to 35 dBA | 4,683 | 4,683 |
| 35 to 40 dBA | 4,136 | 4,136 |
| 40 to 45 dBA | 2,491 | 2,491 |
| 45 to 50 dBA | 801 | 801 |
| 50 to 55 dBA | 207 | 207 |

Topography is the defining characteristic of sound propagation in the NWCMA and impacted area estimates are dependent on the terrain and the location of the mine operations. A test was conducted to estimate the uncertainty of the impacted area estimates. Ten hypothetical large mining operations (similar to the National Coal mine) located on or near ridgelines in the petition area were modeled as part of this work to assess the variability and range of acoustic impacts of mines in the petition areas. The ten hypothetical ridgeline mines were found to have larger impact areas than the existing mines due to the elevated nature of ridgeline mining and lack of natural shielding effects caused by terrain features. The impacted area results of these ten hypothetical ridge mines are presented in Table 14.

Table 14. Average and standard deviation of number of acres impacted at different dBA level contours for ten hypothetical ridgeline mines in the petition area.

| dBA | Average areas of impact from ten ridge mines | Standard Dev. of estimate |
|---------|--|---------------------------|
| >40 dBA | 9,626 | 2,559 |
| >45 dBA | 2,841 | 1,238 |
| >50 dBA | 915 | 406 |
| >55 dBA | 240 | 63 |

Estimated Acoustic Impact from Coal Haul Trucks

Trucks hauling coal from a mine to a processing plant have the potential to acoustically impact a large area. Factors influencing this impact include size and speed of trucks and road surface, but the primary factor is the distance from the mine to the processing plant. Because the locations of potential mines as well as locations of potential processing plants are not known, an estimated area of impact due to coal hauling trucks was determined on a unit or “per-mile” basis. If and when potential impacts from new mines are assessed, and mine locations and processing plant locations are known, impact assessment can be made by applying the estimated impact area per unit mile to the number of miles of haul truck roadway. Again topography plays a large role but the “per-mile” estimates were based on model results of the HHH and National Coal roadways that included a variety of terrain conditions. Table 15 provides the area (in acres) of impact due to coal hauling trucks for two scenarios, 5 trucks per hour at 30 mph and 10 trucks per hour at 30 miles per hour. Areas of impacts are shown for four dBA contours, >40 dBA, >45 dBA, >50 dBA, and >55 dBA.

Table 15. Areas of impacts, in acres, for a 1-mile linear distance of 5 coal haul trucks at 30 miles per hour, for different dBA contours for two roads.

| dBA | National Coal Mine Road | Triple H Mine Road |
|---------|-------------------------|--------------------|
| >40 dBA | 441 | 428 |
| >45 dBA | 288 | 244 |
| >50 dBA | 170 | 121 |
| >55 dBA | 76 | 63 |

Estimated Acoustic Impact from Blasting at Coal Mine

Blasting is common during coal mining operations; the frequency of blasting depends on the size of the mining operation and the speed of the mining operations along a ridgeline. At a large mine such as National Coal, blasting might occur every 2-3 days although this was not the case during the month-long measurement program. Blasting events have the potential to acoustically impact large areas, and although the blast event could be very loud, the impact is of a short duration and not typically associated with human annoyance but could be impactful to wildlife. A single blast event was recorded at the Triple H mine, on October 31, 2010, at 13:39:46. The maximum sound level at 1066 ft was 75.2 dBA, and the total duration of the event was about 10 seconds. Data from this blast event was used to model blast impacts at the Triple H mine. As expected, the impact area of the blast event was considerably larger than the area impacted by normal mining sounds, although the duration of each blast is about 10 seconds. As with the ten hypothetical mines modeled, a great deal of variability in the area impacted due to terrain features can be expected. Table 16 provides estimated impact areas based on mining conditions (blast and no-blast).

Table 16. Area (in acres) impacted by a mining operations and single blast event at Triple H mine, Leqhr.

| dBA contour | Triple H Mine only Leqhr | Triple H Mine and blast Leqhr |
|-------------|--------------------------|-------------------------------|
| >40 dBA | 107 | 833 |
| >45 dBA | 46 | 303 |
| >50 dBA | 12 | 140 |
| >55 dBA | 6 | 72 |

Non-coal Mining Human-caused Noise Sources

A comparison was made of mining operation sound levels to other common human-caused sounds in the study area, including vehicles (highway vehicles and ORVs) and logging operations; however, it was not possible to obtain sound levels of other human activities in the study area, such as hiking, camping, fishing, hunting, and mountain biking.

Other Noise Sources, Logging

Logging sounds include falling trees, bringing logs to a landing with tractor or cable wire line, loading logs on transport trucks, and hauling logs to processing mill or other location. Typical equipment might include chainsaws, Caterpillar D7 high-track skidder units, Caterpillar 966 loader, and semi-trucks to haul logs. A typical logging operation is similar to a small coal mine operation in the number of pieces of heavy equipment (bull dozers, loaders, and haul trucks) and the hours of operation. The mean L_{eq} sound level of a typical logging operation in CA was 75.5 dBA (range 68-83 dBA) at a distance of 50 feet (California Department of Forestry and Fire Protection 2006). The mean L_{eq} sound level of the smaller coal mine in the study area, the Triple H mine, re-calculated to 50 feet was 78.6 (range 73.6-80.6 dBA), similar to logging operations. Predicted impacts from logging operations would be comparable to impacts from a small coal mine like the Triple H mine.

Other Noise Sources, Vehicles

Sound levels of roads and highways in the study area were computed using 2010 traffic count data from the Tennessee Department of Transportation web site and Traffic Noise Model (TNM) from the Department of Transportation’s Federal Highway Administration. Average sound levels for interstate highways and non-interstate roads were computed. Traffic counts and sound levels are show in Table 17.

Table 17. Average annual daily traffic count and estimated dBA at 50 feet, calculated using the Federal Highway Administration Traffic Noise Model (TNM).

| ROAD NAME | Year of Data | Annual Average Daily Traffic Count | Average Speed (MPH) | dBA at 50 feet |
|--------------------------------|--------------|------------------------------------|---------------------|----------------|
| I-75 (north end) | 2010 | 22894 | 70 | 76.3 |
| I-75 (south end) | 2010 | 29193 | 70 | 77.3 |
| Route 63 east of I-75 | 2010 | 6445 | 55 | 67.6 |
| New River Rd (south end) | 2010 | 208 | 35 | 47.3 |
| New River Rd (middle) | 2010 | 766 | 35 | 52.7 |
| New River Rd (north end) | 2010 | 1678 | 35 | 56.5 |
| SR116 (west side) | 2010 | 359 | 45 | 52.9 |
| SR116 (east side) | 2010 | 598 | 45 | 54.6 |
| Howard Baker Hwy, New River Rd | 2010 | 6510 | 55 | 67.6 |
| Howard Baker Hwy (west side) | 2010 | 6660 | 55 | 67.7 |
| Howard Baker Hwy (east side) | 2010 | 5814 | 55 | 67.1 |
| SR 63 west of I-75 | 2010 | 6445 | 45 | 65 |
| SR 63 east of I-75 | 2010 | 21147 | 45 | 70.2 |
| SR9 | 2010 | 909 | 45 | 54.6 |

Interstate 75 is a busy highway and traffic noise is almost constant. Many of the smaller, less traveled highways have much less traffic and, as a result, vehicle sounds are intermittent in time. These smaller roadways have lower speed limits and sound levels associated with these roadways are lower. On two of the gravel roads in the Royal Blue unit of NCWMA, vehicles were audible 11.2% of the time at ROBL001 and 10.8% of the time at ROBL002. These measurement sites were about 500 m and 125 m respectively from gravel roads, and vehicle sounds were clearly audible when passing by the sites. However, because vehicles were infrequent, they did not contribute significantly to the acoustic conditions in the areas.

Other Noise Sources, Off-Road Vehicles (ORV)

In the North Cumberland Wildlife Management areas, sound levels off road vehicles must not, by regulation, exceed 86 dBA at 50 feet (Tennessee Wildlife Resource Agency 2011). Maximum sound level regulations are generally based on a standard test procedure (SAE J1287). This standard specifies measurements of ORVs at full throttle at 50 feet; however, the NCWMA regulations do not specify which measurement procedure is used. Speed limits for ORVs in the NCWMA units are 25 mph in the NCWMAs, and at 25 mph, sound levels of ORVs may be approximately 70 dBA at 50 feet, depending on the make and engine size of the recreation vehicle. It was not possible to measure ORV sound levels at 25 mph at 50 feet during the study; however, a passby test of a common ORV type was conducted after the study to obtain typical passby sound levels. A 2006 Honda Foreman four-wheel type ORV was used, with a 450 cc engine and stock factory exhaust system. The test consisted of four pass-bys at 25 mph at 50 feet on a gravel road,

similar to roads in the study area, with no wind. The median sound level of the four passbys was 70.4 dBA (range 69.1-71.9 dBA). Although this sound level is significant relative to ambient baseline levels (37 dBA – 39 dBA), the intermittent nature of ORV travel in the NCWMA units means ORV traffic at current levels do not contribute significantly to the acoustic environment.

The background sound level measurements were conducted in November 2011 which was hunting season in this part of Tennessee. The hunters that were observed on ORVs were driving less than 25 mph, and sound levels appeared to be much lower than the 70.4 dBA level (at 25 mph at 50 feet) measured during the ORV passby test. This is understandable because hunters are generally not trying to make unnecessary noise. While the sound levels of hunters on ORVs were generally low, we did not observe or measure sound levels of individuals on ORVs riding at higher speed or on ORVs with modified exhaust systems. Such traffic could raise sound levels of ORVs significantly, but it was not observed during this study.

Other Noise Sources, Hiking, Mountain Biking, Hunting, Fishing, Camping

We did not observe or measure sound levels of hiking, mountain biking, camping, or fishing during this study. We did observe hunters, but only when traveling in vehicles, including ORVs. We suspect that sounds from these activities are relatively infrequent and at relative low levels when they do occur. Such sound sources would likely have an insignificant influence on the ambient sound levels in the NCWMA and ERTCE areas.

Coal Mine Sounds Compared to Non-coal Mining Sounds

Most source-specific noise studies, such as those of vehicle sounds, are based upon measurements made 50 feet from the source, referred to as a reference distance. That was not reasonable in this study because mining operations use several types of equipment, often operating at the same time, and operating over a large area (typically 1500 linear feet along the contour). For this reason, our measurements were made at 1000-1300 feet from the areas of coal mine operations.

National Coal mine sound levels measured at 1312 feet were 62.6 dBA. The principal (and loudest) non-coal mine sound sources in the NCWMA and ERTCE areas were vehicles and logging operations. Vehicle sounds on Interstate 75 are estimated to be 77 dBA at 50 feet (using the FHWA Traffic Noise Model) and were nearly constant. At a distance of 1312 feet these levels are estimated to be 62.8 dBA which is very similar to the measured levels at National Coal. Interstate 75 is near the eastern part of the Royal Blue WMA and Sundquist WMA for about 20 miles; hence the area of impact of Interstate 75 on the NCWMA areas is large (Table 18). Sounds of vehicles on other roads were not as loud as those on I-75, and typically have far less traffic volume (Table 14). Vehicles on gravel roads in the NCWMA and ERTCE areas were at much lower speeds, generally <25 mph, were much less frequent than other major roads (we observed about 3-6 vehicles per hour), and were usually at much lower sound levels (although measured ORV sound levels at 25 mph at 50 feet were about 70 dBA, trucks and automobiles were less). The other primary sound source in the NCWMA and ERTCE areas was logging. Logging operation sound levels were similar to the I75 traffic levels,

about 76 dBA (50 ft. reference distance). However, the area of impact of a typical logging operation was much less than a major highway. Sound levels of coal mine operation are compared to other human-caused sound sources in Table 15.

Table 15. Sound levels of human activities in and near NCWMA units, including coal mining.

| Sound Source | Sound Level @ 50 feet | Sound Level @ 1312 feet | Source |
|-----------------------------|-----------------------|-------------------------|-------------------------------------|
| Surface Coal Mine, large | NA | 62.6 dBA | National Coal mine, this report |
| Surface Coal Mine, small | NA | 48 dBA (1066 ft.) | Triple H mine, this report |
| Logging Operation | 75.5 dBA | 47.1 dBA | CA Depart. Forestry 2006 |
| Interstate Highway (70 mph) | 76.8 dBA | 62.6 dBA | TN Depart. Transportation; FHWA TNM |
| Highway (45-55 mph) | 60.8 dBA | 46.6 dBA | TN Depart. Transportation; FHWA TNM |
| ORV (at 25 mph) | 69.7 dBA | 35.3 dBA | TN NCWMA regulations; this report |

Based on sound level measurements of this study (ambient and coal mine operations), and references on sound levels of other sound sources in the NCWMA and ERTCE areas, it appears that a large-scale surface mine operation such as National Coal produces sound levels similar to those generated by a large interstate such as I-75, although the area impacted would be limited to the mine and surrounding area. The sound levels and areas of impact of other human-caused sound sources in the NCWMA and ERTCE areas, including vehicles sounds (truck and ORV) and logging operation sounds, would be less than a typical large coal mine (Table 16).

Table 16. Areas of acoustic impact of different human-caused sound sources at different dBA level contours in the NCWMA and ERTCE areas.

| dBA | Sound Source and Area of Impact (in acres) | | | | |
|---------|--|---|---------------|--|-------|
| | Large Coal Mine (no roadway included) | Small Coal Mine, Logging Operation (no roadway) | Interstate 75 | Average and Stand. Dev. of 10 Hypothetical Large Coal Mines in Petition Area | |
| >40 dBA | 3,639 | 107 | 14,392 | 9,626 | 2,559 |
| >45 dBA | 1,149 | 46 | 8,450 | 2,841 | 1,238 |
| >50 dBA | 348 | 12 | 5,038 | 915 | 406 |
| >55 dBA | 141 | 6 | 2,272 | 240 | 63 |

Acoustic Impacts of Coal Mining Sounds to Humans

Impacts of noise to humans have been studied and standards established by several organizations and agencies, including the American National Standards Institute (ANSI), the National Research Council (NRC), the World Health Organization (WHO), US Environmental Protection Agency (EPA) and others. Many organizations, including ANSI, BRC, WHO, and EPA recommend a criterion of >55 DNL as a level of

significance when assessing impacts to humans (Berglund and Lindvall 1995). “DNL” is the average noise level over a 24 hour period, with sound levels of human-caused sounds between the hours 2200-0700 increased by 10 dB to take into account increased sensitivity to noise during the nighttime hours. Assessments of impact using this criterion generally deal with residential neighborhoods or individual residences. There were few residences near the areas measured for this study.

The US Environmental Protection Agency (EPA) recommends using DNL and L_{eq} as the best descriptors when assessing environmental noise impacts. The EPA recommends that in areas of outdoor activity where quiet is a basis of use, L_{eq} not exceed 55 dBA (average over 24 hour period). Sound levels above this can result in human interference and annoyance (EPA 1974).

Based on a review of available literature and recommendations by various agencies and organizations, a criteria sound level of >55 dBA was chosen as the level above which annoyance and interference with outdoor activities occurs. The area of impact >55 dBA of a large coal mine is less (268 ac) than a long, linear sound source >55 dBA, such as I-75 (2,272 ac).

Acoustic Impacts of Coal Mining Sounds to Wildlife

Barber et al. (2009; 2010) provide a summary of issues relative to human-caused sounds and animals. The potential for negative impacts to animals due to human-caused sounds is high because many animals rely on auditory clues for predator avoidance, mate attraction, obtaining nesting territories, and finding prey. Such sources include aircraft, motor boating, vehicles, machinery, and heavy equipment, including mining equipment. The study of animal response to noise is a function of many variables including characteristics of the noise and duration, life history characteristics of the species, habitat type, season and current activity of the animal, sex and age, previous exposure and whether other physical stressors are present (Manci et al. 1988). Because of the many variables involved, it is a difficult field of study.

Wildlife reaction to human-caused sounds can range from mild, such as an increase in heart rate to more damaging effects on metabolism and hormone balance. Long term exposure to noise can cause excessive stimulation to the nervous system and chronic stress that is harmful to the health of wildlife species and their reproductive fitness (Fletcher 1980; 1990). Responses vary among species of animals and among individuals of a particular species. Variations in response may be due to temperament, sex, age, and prior experience with noise. Minor responses include head-raising and body-shifting, while more overt responses include running or moving short distances; birds may fly or exhibit other alert or nervous behavior. Panic and escape behavior can result from more severe disturbances, although some species adapt to such disturbances (NPS 1995).

Behavioral and physiological responses have the potential to cause injury, energy loss (from movement away from noise source), decrease in food intake, habitat avoidance and abandonment, and reproductive losses (NPS 1995). Studies have shown that when certain bird species are flushed from nests in response to noise, eggs may be trampled or

ejected from the nest and young are exposed to injury and predators (Bunnell et al. 1981; Gladwin et al. 1987). Young mammals have been trampled as adults attempt to flee from aircraft (Miller and Broughton 1974).

One owl species that has been studied extensively is the Mexican Spotted Owl (*Strix occidentalis lucida*) in the western United States. Several noise and disturbance studies have been conducted on this species. Delaney et al. (1999) found that the number of owls flushing was negatively related to distance and positively related to noise level (the closer the distance and the louder the noise, the more the owls flushed). They found that impacts to Mexican Spotted Owls generally occur at levels >45 dBA. Spotted Owls do not occur in TN; however, Barred Owls (*Strix varia*) are a similar species and may be impacted in similar ways. Barred Owls are not a threatened or endangered species.

Impacts to birds from noise from compressors associated with oil and gas production were greatest in areas with high sound levels, >50 dBA, but were measureable in areas with moderate sound levels, 40-50 dBA (LaGory et al. 2001). Lucas et al. (2007), also studying noise impacts from compressors, found that chronic industrial noise affects ovenbirds in areas near high sound levels (specific dBA levels and distance not provided, but compressor equipment similar to that in LaGory et al. study). Blickley and Patricelli (2006) suggest that Snowy Plovers need to be >400 meters away from noise sources in order to reduce the masking effect of such noise sources on their songs and calls. Snowy Plovers do not occur in TN.

Landon et al. (2002) found that pronghorn (*Antilocapra Americana sonoriensis*) used areas with lower sound levels (<45 dB) more than expected, and used areas with higher sound levels (>55 dB) less than expected. Pronghorn do not occur in Tennessee.

It is not currently possible to know and understand how and at what levels human-caused sounds impact animals; there are too many different species and too many different scenarios of human-caused sounds to understand all the possible combinations. Overall, available literature suggests that intermittent human-caused sounds <40-45 dBA do not significantly impact wildlife species. Chronic (near continuous) noise levels >45 dBA appears to impact some species but not others.

The potential impact of noise from surface coal mines on wildlife is probably similar to the types of impacts listed above. There may be some impact when sound levels are >45 dBA, but the impacts are likely variable and impact different species differently; some species are tolerant while others are not. The area of potential impact of a large coal mine at sound levels >45 dBA is about 2,841 acres (see Table 16). The size of the impact area depends on the topography of the mined area which influences attenuation rates of mining sounds. Impacts of noise due to surface contour coal mining are normally temporary in any given area (generally less than one year).

Summary

Sound levels generated by a large contour strip mining operation are similar to what can be found near a large interstate such as I-75 (approximately 63 dBA at a distance of 400 meters). Ambient sound levels measured in the NCWMA region were approximately 33 dBA (daytime) and 27 dBA (nighttime) existing ambient (L_{50}). Coal mine related sound levels diminish as one gets further away from the operations and sound level reduction due to terrain effects can be significant. Coal mining sounds are fairly constant throughout the day when the mine is operating 24 hours/day. Under current OSM mining regulations in this region, the area of the actual mine is limited to an area about 200 by 1500 linear feet along the contour elevation. Compared to other current human-caused sound sources in the NCWMA and ERTCE areas such as vehicles (on roads and highways and including ORVs) and logging, a large coal mine such as National Coal, although louder than any other source, acoustically impacts a smaller area due to the limited operating area of the mining activity

Potential acoustic impacts of a large contour strip coal mine, based on a criterion of >55 dBA as a level of significance, could occur on approximately 240 acres (average of 10 modeled hypothetical mines; SD=63). Potential acoustic impacts based on a criterion of >45 dBA as a level of significance, could occur on approximately 2841 acres (average of 10 modeled hypothetical mines; SD=1238). The potential impacts of a large ridgeline mine were found to be generally higher than the National Mine due to the elevated nature and fewer terrain effects along the ridgeline.

Reactions to human-caused sounds by humans and wildlife are extremely variable; some individuals and species are very tolerant while others are not. It is difficult to assign a single dBA level of significance when assessing potential impacts to either humans or wildlife. The use of levels of significance of 55 dBA for humans and 45 dBA for wildlife were based on available literature and recommendations by agencies and organizations. If mining activity is proposed at a specific location, a more thorough review of human use and wildlife species at that location would be warranted to determine if these levels of 55 dBA and 45 dBA are appropriate.

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Appendix. I. Definitions of Common Acoustic Terminology.

The following are definitions of acoustic terms used in this report (NPS 2005).

Audibility: Audibility is the ability of animals with normal hearing, including humans, to hear a given sound. Audibility is affected by the hearing ability of the animal, other simultaneous interfering sounds or stimuli, and by the frequency content and amplitude of the sound.

A-Weighting (dBA): A-weighting is used to account for differences in human hearing sensitivity as a function of frequency. A-weighting de-emphasizes the high (6.3 kHz and above) and low (below 1 kHz) frequencies, and emphasizes the frequencies between 1 kHz and 6.3 kHz, in an effort to simulate the relative response of human hearing.

Background Ambient Sound Level (L_{90}): L_{90} is commonly used to indicate the residual or background sound level in the absence of most transient noise events. L_{90} is frequently used for establishing the sound level for assessing changes to the environment (Dunholter et al. 1989). The Environmental Protection Agency recommends use of L_{90} when assessing potential acoustic impacts.

Decibel (dB): A logarithmic measure commonly used in the measurement of sound. The decibel provides the possibility of representing a large span of signal levels in a simple manner as opposed to using the basic pressure unit Pascal. The difference between the sound pressure for silence versus a loud sound is a factor of 1,000,000:1 or more, therefore it is less cumbersome to use a small range of equivalent values: 0 to 130 decibels.

Existing Ambient Sound Level (L_{50}): The sound level of all sounds in a given area, including all natural sounds as well as all mechanical, electrical and other human-caused sounds. The existing ambient sound level will be characterized by the L_{50} exceedence level (i.e., the median).

Frequency: The number of times per second that the sine wave of sound repeats itself. It can be expressed in cycles per second, or Hertz (Hz). Frequency equals Speed of Sound / Wavelength.

L_{eq} (Equivalent Sound Level): The logarithmic average (i.e., on an energy basis) of sound pressure levels over a specific time period. "Energy averaged" sound levels are logarithmic values, and as such are generally much higher than arithmetic averages. L_{eq} values are typically calculated for a specific time period (1-hour and 12-hour time periods are often used). L_{eq} values are computed from all of the 1-second L_{eq} values for the specific time period. L_{eq} must be used carefully in quantifying background ambient sound levels because occasional loud sound levels may heavily influence (increase) the L_{eq} value, even though sound levels for that period of time are typically lower.

L_{max} : The maximum sound pressure level for a given period.

L_{min} : The minimum sound pressure level for a given period.

L_x (Exceedence Percentile): This metric is the sound pressure level (L), in decibels, exceeded x percent of the time for the specified measurement period. L_{50} is the sound pressure level exceeded 50 percent of the time (L_{50} is the same as the median). L_{90} is the sound pressure level exceeded 90 percent of the time. L_{90}

is often considered the appropriate metric for establishing background ambient sound levels.

Noise Free Interval (NFI): The length of the continuous period of time during which only natural sounds are audible or there is silence.

Octave: The interval between two frequencies having a ratio of 2 to 1. The *octave* is an important frequency interval relative to human hearing, and octave band analysis is a standard for acoustic analysis. The frequency resolution in octave band analysis is relatively poor; hence finer frequency resolution is often used in acoustic analysis. Generally, one-third octave band analysis is used. Three one-third octave bands are in one octave, so the resolution of such a spectrum is three times better than the octave band spectrum.

Sound: Sound can be defined as a pressure variation in air or other media that is within the hearing range of a given species. This pressure variation has two components: amplitude (sound pressure level) and frequency content. Sound pressure is a measure of the fluctuations in air pressure caused by the presence of sound waves.

Sound Level: Generally, *sound level* refers to the *weighted* sound pressure level obtained by frequency weighting, usually A- or C-weighted.

Sound Pressure: Sound pressure is the instantaneous difference between the actual pressure produced by a sound wave and the average barometric pressure at a given point in space. Not all pressure fluctuations detected by a microphone are sound (e.g., wind over the microphone). Sound pressure is measured in Pascals (Pa), Newtons per square meter, which is the metric equivalent of pounds per square inch.

Sound Pressure Level (SPL): The logarithmic form of sound pressure. Generally, *sound pressure level* refers to *unweighted* sound pressure levels of one-third octave bands.

Appendix II. National Land Cover Database (NLCD) characterization classes.

| Land Cover Class | Land Cover Subclass | Description |
|-------------------------|---|---|
| Water | 11 Open Water | All areas of open water, generally with less than 25% cover of vegetation/land cover. |
| | 12 Perennial Ice/Snow | All areas characterized by year-long surface cover of ice and/or snow. |
| Developed | 21 Low Intensity Residential | All areas with a mixture of constructed materials and vegetation. Constructed materials account for 30-80% of the cover. Vegetation may account for 20 to 70% of the cover. These areas most commonly include single-family housing units. Population densities will be lower than in high intensity residential areas. |
| | 22 High Intensity Residential | Includes highly developed areas where people reside in high numbers. Examples include apartment complexes and row houses. Vegetation accounts for less than 20% of the cover. Constructed materials account for 80 to 100% of the cover. |
| | 23 Commercial/Industrial/Transportation | Includes infrastructure (e.g. roads, railroads, etc.) and all highly developed areas not classified as High Intensity Residential. |
| Barren | 31 Bare Rock/Sand/ Clay | Perennially barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, beaches, and other accumulations of earthen material. |
| | 32 Quarries/Strip Mines/Gravel Pits | Areas of extractive mining activities with significant surface expression. |
| | 33 Transitional | Areas of sparse vegetative cover (less than 25% of cover) that are dynamically changing from one land cover to another, often because of land use activities. Examples include forest clearcuts, a transition phase between forest and agricultural land, the temporary clearing of vegetation, and changes due to natural causes (e.g. fire, flood, etc.). |
| Forested Upland | 41 Deciduous Forest | Areas dominated by trees where 75% Or more of the tree species shed foliage simultaneously in response to seasonal change. |
| | 42 Evergreen Forest | Areas dominated by trees where 75% or more of the tree species maintain their leaves all year. Canopy is never without green foliage. |
| | 43 Mixed Forest | Areas dominated by trees where neither deciduous nor evergreen species represent more than 75% of the cover present. |

Appendix II. National Land Cover Database (NLCD) characterization classes (cont.).

| | | |
|---|------------------------------------|--|
| Shrubland | 51 Shrubland | Areas dominated by shrubs; shrub canopy accounts for 25-100% of the cover. Shrub cover is generally greater than 25% when tree cover is less than 25%. Shrub cover may be less than 25% in cases when the cover of other life forms (e.g. herbaceous or tree) is less than 25% and shrubs cover exceeds the cover of the other life forms. |
| Non-Natural Woody | 61 Orchards/Vineyards/ Other | Orchards, vineyards, and other areas planted or maintained for the production of fruits, nuts, berries, or ornamentals. |
| Herbaceous Upland Natural/Semi-natural Vegetation | 71 Grasslands/ Herbaceous | Areas dominated by upland grasses and forbs. In rare cases, herbaceous cover is less than 25%, but exceeds the combined cover of the woody species present. These areas are not subject to intensive management, but they are often utilized for grazing. |
| Herbaceous Planted/Cultivated | 81 Pasture/Hay | Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops. |
| | 82 Row Crops | Areas used for the production of crops, such as corn, soybeans, vegetables, tobacco, and cotton. |
| | 83 Small Grains | Areas used for the production of graminoid crops such as wheat, barley, oats, and rice. |
| | 84 Fallow | Areas used for the production of crops that do not exhibit visible vegetation as a result of being tilled in a management practice that incorporates prescribed alternation between cropping and tillage. |
| | 85 Urban/Recreational Grasses | Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses. |
| Wetlands | 91 Woody Wetlands | Areas where forest or shrubland vegetation accounts for 25-100% of the cover and the soil or substrate is periodically saturated with or covered with water. |
| | 92 Emergent Herbaceous Wetlands | Areas where perennial herbaceous vegetation accounts for 75-100% of the cover and the soil or substrate is periodically saturated with or covered with water. |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001.

Hourly Metrics, HHH001 (weekdays), 96 hours.

| Hour | L _{min} | L _{max} | L ₁₀ | L ₅₀ | L ₉₀ | L _{eq} |
|------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0 | 25.2 | 52.3 | 34.9 | 31.6 | 29.8 | 32.9 |
| 1 | 24.9 | 55.9 | 35.5 | 32.8 | 30.7 | 33.5 |
| 2 | 24.8 | 52.6 | 35.5 | 32.0 | 29.0 | 33.6 |
| 3 | 25.3 | 57.6 | 32.4 | 30.3 | 27.1 | 31.2 |
| 4 | 24.2 | 55.3 | 27.4 | 26.1 | 25.7 | 27.1 |
| 5 | 25.3 | 51.9 | 33.8 | 28.3 | 26.8 | 31.1 |
| 6 | 25.2 | 50.7 | 32.6 | 30.1 | 29.0 | 31.8 |
| 7 | 25.7 | 66.3 | 48.6 | 35.9 | 29.0 | 45.4 |
| 8 | 26.6 | 66.2 | 53.1 | 48.4 | 43.8 | 50.2 |
| 9 | 27.4 | 66.9 | 52.6 | 48.0 | 43.2 | 50.0 |
| 10 | 33.6 | 69.4 | 56.1 | 50.0 | 43.6 | 52.5 |
| 11 | 27.3 | 66.5 | 56.3 | 52.5 | 43.2 | 53.5 |
| 12 | 26.2 | 64.6 | 51.9 | 36.2 | 31.2 | 46.9 |
| 13 | 29.5 | 75.2 | 56.5 | 51.6 | 42.2 | 53.3 |
| 14 | 28.9 | 71.4 | 55.9 | 51.3 | 46.7 | 53.0 |
| 15 | 27.5 | 69.6 | 55.8 | 50.0 | 43.9 | 52.4 |
| 16 | 28.0 | 70.3 | 56.3 | 52.5 | 47.1 | 53.9 |
| 17 | 26.4 | 66.0 | 55.8 | 49.4 | 33.7 | 51.9 |
| 18 | 26.3 | 64.7 | 52.2 | 38.5 | 31.4 | 47.7 |
| 19 | 25.6 | 51.7 | 34.5 | 32.2 | 31.3 | 33.4 |
| 20 | 25.3 | 44.2 | 34.6 | 32.1 | 31.5 | 33.3 |
| 21 | 25.1 | 52.8 | 32.7 | 31.1 | 30.1 | 31.6 |
| 22 | 24.9 | 59.4 | 34.4 | 32.8 | 31.6 | 33.4 |
| 23 | 24.9 | 54.0 | 35.1 | 33.1 | 31.5 | 33.9 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Frequency Metrics, HHH001 (0000-2400 weekdays), 96 hrs.

| Freq | L ₉₀ | L ₅₀ | L ₁₀ |
|---------|-----------------|-----------------|-----------------|
| 12.5Hz | 32.8 | 37.1 | 42.3 |
| 15.8Hz | 33.6 | 37.6 | 42.9 |
| 20Hz | 32.5 | 37.0 | 42.0 |
| 25Hz | 30.8 | 35.4 | 41.3 |
| 31.5Hz | 30.4 | 35.5 | 40.6 |
| 40Hz | 30.0 | 34.4 | 40.7 |
| 50Hz | 29.3 | 34.7 | 40.6 |
| 63Hz | 28.6 | 34.5 | 39.3 |
| 80Hz | 27.2 | 32.1 | 38.8 |
| 100Hz | 23.3 | 28.7 | 36.1 |
| 125Hz | 20.8 | 26.4 | 34.0 |
| 160Hz | 21.5 | 27.4 | 33.8 |
| 200Hz | 21.7 | 28.1 | 34.3 |
| 250Hz | 20.9 | 25.8 | 33.5 |
| 315Hz | 20.1 | 24.4 | 32.4 |
| 400Hz | 21.2 | 25.0 | 32.2 |
| 500Hz | 22.3 | 25.2 | 31.7 |
| 630Hz | 22.3 | 25.7 | 31.7 |
| 800Hz | 22.4 | 25.7 | 31.8 |
| 1000Hz | 22.8 | 25.7 | 32.1 |
| 1250Hz | 22.7 | 25.7 | 32.7 |
| 1600Hz | 22.7 | 27.5 | 33.3 |
| 2000Hz | 21.5 | 24.6 | 31.3 |
| 2500Hz | 19.1 | 22.6 | 30.0 |
| 3150Hz | 17.5 | 21.7 | 27.7 |
| 4000Hz | 15.1 | 19.2 | 25.4 |
| 5000Hz | 12.3 | 17.9 | 24.7 |
| 6300Hz | 9.6 | 15.5 | 22.9 |
| 8000Hz | 8.5 | 13.8 | 22.2 |
| 10000Hz | 6.9 | 11.6 | 19.2 |
| 12500Hz | 4.8 | 8.5 | 16.0 |
| 16000Hz | 2.2 | 5.0 | 12.0 |
| 20000Hz | -0.8 | 0.3 | 4.4 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Hourly Metrics, HHH001, weekend (84 hours).

| Hour | L _{min} | L _{max} | L ₁₀ | L ₅₀ | L ₉₀ | L _{eq} |
|------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0 | 27.0 | 40.7 | 30.9 | 30.0 | 29.5 | 30.6 |
| 1 | 27.0 | 57.7 | 30.9 | 30.6 | 29.6 | 30.7 |
| 2 | 27.1 | 43.8 | 31.7 | 30.1 | 29.5 | 31.1 |
| 3 | 27.1 | 40.9 | 30.6 | 30.4 | 30.3 | 30.4 |
| 4 | 26.9 | 42.2 | 30.4 | 30.2 | 30.0 | 30.2 |
| 5 | 27.1 | 44.8 | 30.6 | 30.2 | 30.0 | 30.3 |
| 6 | 27.1 | 43.1 | 30.9 | 30.4 | 30.1 | 30.6 |
| 7 | 27.1 | 58.5 | 36.8 | 31.0 | 30.0 | 37.3 |
| 8 | 27.2 | 64.4 | 35.8 | 31.7 | 30.3 | 37.6 |
| 9 | 27.6 | 65.6 | 40.1 | 32.7 | 31.0 | 47.7 |
| 10 | 27.3 | 69.0 | 46.1 | 34.5 | 31.6 | 43.1 |
| 11 | 26.8 | 68.8 | 48.6 | 41.7 | 34.7 | 46.1 |
| 12 | 27.8 | 67.8 | 45.5 | 36.1 | 32.3 | 43.9 |
| 13 | 28.4 | 66.3 | 44.9 | 40.5 | 34.8 | 42.0 |
| 14 | 26.9 | 66.0 | 45.4 | 40.9 | 34.8 | 43.9 |
| 15 | 26.7 | 62.1 | 45.2 | 40.0 | 30.8 | 44.3 |
| 16 | 26.2 | 60.6 | 35.4 | 30.8 | 29.4 | 33.6 |
| 17 | 25.8 | 60.5 | 34.6 | 30.2 | 28.8 | 33.6 |
| 18 | 26.0 | 66.1 | 31.5 | 28.5 | 27.9 | 35.2 |
| 19 | 26.4 | 48.4 | 30.0 | 28.4 | 28.1 | 30.2 |
| 20 | 26.4 | 50.6 | 30.0 | 28.6 | 28.2 | 31.0 |
| 21 | 26.2 | 47.7 | 29.0 | 28.3 | 28.0 | 29.5 |
| 22 | 26.6 | 43.7 | 29.7 | 28.5 | 28.1 | 29.0 |
| 23 | 26.4 | 48.4 | 29.8 | 28.4 | 28.0 | 28.9 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Frequency Metrics, HHH001, weekend, 0000-2400 (84 hours)

| Freq | L090 | L050 | L010 |
|---------|------|------|------|
| 12.5Hz | 30.6 | 34.2 | 37.7 |
| 15.8Hz | 30.9 | 34.2 | 37.7 |
| 20Hz | 29.7 | 32.9 | 36.9 |
| 25Hz | 27.9 | 31.4 | 36.1 |
| 31.5Hz | 26.5 | 30.3 | 35.1 |
| 40Hz | 25.9 | 29.5 | 34.5 |
| 50Hz | 24.3 | 28.0 | 33.7 |
| 63Hz | 22.8 | 27.2 | 33.2 |
| 80Hz | 21.4 | 25.5 | 32.8 |
| 100Hz | 18.3 | 23.3 | 30.3 |
| 125Hz | 15.8 | 19.8 | 27.7 |
| 160Hz | 14.8 | 19.0 | 26.1 |
| 200Hz | 16.4 | 19.7 | 25.1 |
| 250Hz | 16.2 | 18.9 | 23.3 |
| 315Hz | 16.6 | 18.2 | 22.9 |
| 400Hz | 18.3 | 19.5 | 22.2 |
| 500Hz | 19.4 | 20.6 | 22.0 |
| 630Hz | 19.9 | 20.9 | 22.1 |
| 800Hz | 20.1 | 21.0 | 22.0 |
| 1000Hz | 20.6 | 21.4 | 22.3 |
| 1250Hz | 20.5 | 21.2 | 22.1 |
| 1600Hz | 20.1 | 21.0 | 21.9 |
| 2000Hz | 18.6 | 19.4 | 20.4 |
| 2500Hz | 16.4 | 17.4 | 19.2 |
| 3150Hz | 14.1 | 15.4 | 19.8 |
| 4000Hz | 11.3 | 13.4 | 19.2 |
| 5000Hz | 9.1 | 10.1 | 15.7 |
| 6300Hz | 6.8 | 7.7 | 12.9 |
| 8000Hz | 5.8 | 6.9 | 12.4 |
| 10000Hz | 5.1 | 5.9 | 8.6 |
| 12500Hz | 3.7 | 4.3 | 6.4 |
| 16000Hz | 1.3 | 1.8 | 3.4 |
| 20000Hz | -1.0 | -0.8 | -0.4 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Hourly Metrics, HHH002 , weekdays (96 hours)

| Hour | L _{min} | L _{max} | L ₁₀ | L ₅₀ | L ₉₀ | L _{eq} |
|------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0 | 25.5 | 52.4 | 38.6 | 32.6 | 30.2 | 36.4 |
| 1 | 25.7 | 50.8 | 38.3 | 33.3 | 28.7 | 35.3 |
| 2 | 24.0 | 49.6 | 35.4 | 31.0 | 26.7 | 35.5 |
| 3 | 26.6 | 46.8 | 36.7 | 32.6 | 29.0 | 34.0 |
| 4 | 19.5 | 52.2 | 29.7 | 25.1 | 21.7 | 27.4 |
| 5 | 24.0 | 52.9 | 34.9 | 28.7 | 26.1 | 32.0 |
| 6 | 25.9 | 48.6 | 36.3 | 32.1 | 29.5 | 34.3 |
| 7 | 23.3 | 55.9 | 43.9 | 33.6 | 26.8 | 40.8 |
| 8 | 33.7 | 61.2 | 48.7 | 43.8 | 39.6 | 46.0 |
| 9 | 34.2 | 61.7 | 50.6 | 45.5 | 41.3 | 47.8 |
| 10 | 36.4 | 64.1 | 53.1 | 47.5 | 42.4 | 50.0 |
| 11 | 32.5 | 63.9 | 53.9 | 49.3 | 42.3 | 50.9 |
| 12 | 27.0 | 62.3 | 50.7 | 35.5 | 31.0 | 46.2 |
| 13 | 33.0 | 65.7 | 54.2 | 48.6 | 41.9 | 51.1 |
| 14 | 36.4 | 64.6 | 53.0 | 47.7 | 43.2 | 50.0 |
| 15 | 38.2 | 67.9 | 53.2 | 47.4 | 43.1 | 51.2 |
| 16 | 37.0 | 63.7 | 54.2 | 49.4 | 44.4 | 51.2 |
| 17 | 28.1 | 61.3 | 53.4 | 46.1 | 33.3 | 49.5 |
| 18 | 26.4 | 60.6 | 50.3 | 39.0 | 31.7 | 46.3 |
| 19 | 25.9 | 50.0 | 39.2 | 32.0 | 29.2 | 36.2 |
| 20 | 23.4 | 46.6 | 36.4 | 30.8 | 26.3 | 33.3 |
| 21 | 22.1 | 48.2 | 36.2 | 31.0 | 25.7 | 33.6 |
| 22 | 24.9 | 46.0 | 34.0 | 31.0 | 27.6 | 32.1 |
| 23 | 26.3 | 51.7 | 35.9 | 31.5 | 28.5 | 34.9 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Frequency Metrics, HHH002 (0000-2400 weekdays), 96 hrs.

| Freq | L ₉₀ | L ₅₀ | L ₁₀ |
|---------|-----------------|-----------------|-----------------|
| 12.5Hz | 33.4 | 37.2 | 41.4 |
| 15.8Hz | 34.6 | 38.2 | 42.6 |
| 20Hz | 34.1 | 38.0 | 42.4 |
| 25Hz | 33.7 | 38.0 | 42.4 |
| 31.5Hz | 32.9 | 37.1 | 42.8 |
| 40Hz | 31.8 | 36.5 | 41.1 |
| 50Hz | 31.3 | 35.7 | 41.2 |
| 63Hz | 31.0 | 36.2 | 41.3 |
| 80Hz | 29.3 | 34.4 | 40.5 |
| 100Hz | 26.1 | 31.7 | 39.1 |
| 125Hz | 24.8 | 29.5 | 36.7 |
| 160Hz | 22.9 | 28.1 | 34.5 |
| 200Hz | 23.6 | 29.4 | 35.9 |
| 250Hz | 24.1 | 29.9 | 37.2 |
| 315Hz | 23.6 | 29.8 | 36.5 |
| 400Hz | 22.1 | 28.5 | 35.7 |
| 500Hz | 21.2 | 27.9 | 35.0 |
| 630Hz | 21.4 | 28.1 | 34.6 |
| 800Hz | 21.0 | 27.6 | 34.5 |
| 1000Hz | 21.6 | 27.5 | 34.6 |
| 1250Hz | 21.1 | 27.3 | 34.3 |
| 1600Hz | 22.3 | 28.3 | 34.9 |
| 2000Hz | 20.8 | 26.3 | 31.7 |
| 2500Hz | 18.9 | 23.1 | 28.5 |
| 3150Hz | 18.8 | 22.5 | 29.4 |
| 4000Hz | 16.8 | 20.4 | 25.3 |
| 5000Hz | 13.8 | 18.8 | 25.0 |
| 6300Hz | 11.3 | 17.0 | 23.5 |
| 8000Hz | 10.0 | 15.4 | 22.4 |
| 10000Hz | 8.0 | 12.3 | 19.5 |
| 12500Hz | 6.5 | 9.4 | 17.1 |
| 16000Hz | 3.6 | 5.7 | 12.8 |
| 20000Hz | 0.2 | 1.2 | 5.9 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Hourly Metrics, HHH002, weekends (76 hours)

| Hour | L _{min} | L _{max} | L ₁₀ | L ₅₀ | L ₉₀ | L _{eq} |
|------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0 | 17.6 | 52.9 | 24.6 | 22.3 | 20.9 | 23.0 |
| 1 | 16.9 | 57.1 | 23.9 | 21.1 | 19.7 | 23.5 |
| 2 | 16.8 | 50.0 | 32.7 | 20.5 | 19.4 | 28.8 |
| 3 | 17.0 | 53.6 | 21.0 | 19.5 | 19.1 | 20.2 |
| 4 | 17.0 | 54.9 | 25.6 | 19.2 | 18.4 | 21.9 |
| 5 | 16.8 | 45.7 | 28.6 | 24.5 | 21.8 | 26.2 |
| 6 | 16.7 | 49.2 | 30.9 | 26.5 | 23.8 | 28.4 |
| 7 | 16.8 | 66.0 | 35.4 | 31.0 | 27.3 | 42.6 |
| 8 | 17.0 | 63.9 | 35.0 | 31.1 | 28.2 | 32.5 |
| 9 | 17.8 | 61.7 | 36.5 | 33.5 | 30.4 | 34.4 |
| 10 | 18.2 | 66.6 | 43.3 | 33.5 | 28.9 | 40.8 |
| 11 | 21.7 | 64.6 | 46.0 | 38.1 | 32.6 | 43.1 |
| 12 | 25.4 | 65.7 | 39.3 | 34.2 | 29.2 | 37.9 |
| 13 | 25.2 | 66.7 | 43.6 | 38.8 | 33.6 | 41.0 |
| 14 | 22.2 | 64.2 | 43.2 | 38.9 | 32.8 | 41.8 |
| 15 | 19.5 | 63.2 | 43.7 | 39.8 | 27.9 | 41.2 |
| 16 | 19.7 | 57.5 | 33.9 | 28.1 | 24.8 | 33.3 |
| 17 | 17.8 | 55.8 | 31.2 | 25.1 | 21.0 | 29.3 |
| 18 | 17.3 | 54.1 | 30.4 | 23.2 | 19.7 | 30.4 |
| 19 | 17.9 | 57.7 | 29.0 | 24.2 | 21.9 | 32.3 |
| 20 | 17.6 | 57.8 | 29.3 | 24.1 | 21.1 | 29.8 |
| 21 | 17.2 | 59.1 | 24.8 | 20.9 | 18.9 | 32.6 |
| 22 | 17.3 | 54.6 | 28.5 | 24.6 | 21.8 | 26.5 |
| 23 | 16.1 | 49.9 | 28.6 | 20.6 | 18.0 | 25.0 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Frequency Metrics, HHH002, weekends, 0000-2400 (76 hours)

| Freq | L ₉₀ | L ₅₀ | L ₁₀ |
|---------|-----------------|-----------------|-----------------|
| 12.5Hz | 30.4 | 34.1 | 38.0 |
| 15.8Hz | 30.6 | 34.0 | 38.1 |
| 20Hz | 29.6 | 33.0 | 38.5 |
| 25Hz | 28.9 | 32.4 | 38.8 |
| 31.5Hz | 27.8 | 31.2 | 38.0 |
| 40Hz | 27.0 | 30.2 | 37.2 |
| 50Hz | 25.2 | 28.6 | 36.7 |
| 63Hz | 24.9 | 29.0 | 36.8 |
| 80Hz | 23.2 | 27.5 | 36.6 |
| 100Hz | 19.3 | 24.4 | 33.7 |
| 125Hz | 15.9 | 21.2 | 30.8 |
| 160Hz | 12.5 | 17.5 | 28.1 |
| 200Hz | 12.9 | 17.3 | 27.3 |
| 250Hz | 12.8 | 17.2 | 25.2 |
| 315Hz | 12.7 | 16.5 | 25.3 |
| 400Hz | 11.4 | 14.9 | 23.1 |
| 500Hz | 11.3 | 15.3 | 21.6 |
| 630Hz | 11.9 | 15.2 | 21.5 |
| 800Hz | 11.4 | 15.0 | 20.1 |
| 1000Hz | 11.5 | 15.2 | 20.3 |
| 1250Hz | 11.9 | 15.2 | 19.9 |
| 1600Hz | 13.0 | 17.2 | 21.6 |
| 2000Hz | 12.4 | 15.7 | 20.5 |
| 2500Hz | 12.4 | 15.5 | 20.5 |
| 3150Hz | 12.3 | 15.9 | 20.6 |
| 4000Hz | 11.7 | 15.0 | 19.4 |
| 5000Hz | 10.6 | 13.4 | 18.4 |
| 6300Hz | 8.2 | 10.8 | 16.1 |
| 8000Hz | 7.2 | 9.5 | 15.2 |
| 10000Hz | 6.2 | 7.7 | 11.6 |
| 12500Hz | 5.1 | 6.1 | 9.3 |
| 16000Hz | 2.8 | 3.5 | 6.2 |
| 20000Hz | -0.1 | 0.2 | 1.3 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Hourly Metrics, ROBL001 (674 hours).

| Hour | L _{min} | L _{max} | L ₁₀ | L ₅₀ | L ₉₀ | L _{eq} |
|------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0 | 25.2 | 69.7 | 44.2 | 39.5 | 36.2 | 41.1 |
| 1 | 25.7 | 77.1 | 45.4 | 40.8 | 36.7 | 42.3 |
| 2 | 24.7 | 68.5 | 47.6 | 43.7 | 39.1 | 44.8 |
| 3 | 24.5 | 66.1 | 46.2 | 42.0 | 38.2 | 43.5 |
| 4 | 24.2 | 69.2 | 46.5 | 42.1 | 38.2 | 43.7 |
| 5 | 24.4 | 69.0 | 45.6 | 40.2 | 37.6 | 43.0 |
| 6 | 23.6 | 69.1 | 43.7 | 38.9 | 36.7 | 40.6 |
| 7 | 23.0 | 72.9 | 45.3 | 40.5 | 37.1 | 42.6 |
| 8 | 22.3 | 67.3 | 44.6 | 40.1 | 37.1 | 41.6 |
| 9 | 22.2 | 94.3 | 45.6 | 40.8 | 37.1 | 42.7 |
| 10 | 22.7 | 72.5 | 45.6 | 39.9 | 36.4 | 42.7 |
| 11 | 22.5 | 71.1 | 42.9 | 37.8 | 34.5 | 40.9 |
| 12 | 22.8 | 67.9 | 42.4 | 35.5 | 33.6 | 39.6 |
| 13 | 24.6 | 72.7 | 42.1 | 37.4 | 35.0 | 39.5 |
| 14 | 23.6 | 69.9 | 43.5 | 37.3 | 33.8 | 40.3 |
| 15 | 23.5 | 74.1 | 42.9 | 38.4 | 35.2 | 42.0 |
| 16 | 24.2 | 67.7 | 41.9 | 36.9 | 33.3 | 39.4 |
| 17 | 21.9 | 67.8 | 42.9 | 38.1 | 34.7 | 40.4 |
| 18 | 24.6 | 68.1 | 39.6 | 36.3 | 34.5 | 37.6 |
| 19 | 24.9 | 63.2 | 41.5 | 37.5 | 34.6 | 38.9 |
| 20 | 24.7 | 69.9 | 41.6 | 37.6 | 35.3 | 39.8 |
| 21 | 25.2 | 66.9 | 43.7 | 39.6 | 36.2 | 40.6 |
| 22 | 25.3 | 69.4 | 44.0 | 40.1 | 36.6 | 41.8 |
| 23 | 25.3 | 73.6 | 45.2 | 40.5 | 37.4 | 42.3 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Frequency Metrics, ROBL001, 0000-2400 (674 hours).

| Freq | L ₉₀ | L ₅₀ | L ₁₀ |
|---------|-----------------|-----------------|-----------------|
| 12.5Hz | 38.2 | 43.7 | 53.5 |
| 15.8Hz | 37.9 | 42.4 | 50.5 |
| 20Hz | 37.4 | 41.3 | 47.7 |
| 25Hz | 36.7 | 40.4 | 45.8 |
| 31.5Hz | 36.1 | 39.6 | 44.2 |
| 40Hz | 35.7 | 38.9 | 43.4 |
| 50Hz | 35 | 38.3 | 42.7 |
| 63Hz | 34.3 | 37.4 | 41.4 |
| 80Hz | 32.8 | 36 | 40 |
| 100Hz | 31.1 | 34.4 | 38.6 |
| 125Hz | 29.4 | 32.6 | 37.6 |
| 160Hz | 28.8 | 32.2 | 37.8 |
| 200Hz | 28.6 | 31.7 | 36.7 |
| 250Hz | 28.2 | 31.2 | 35.2 |
| 315Hz | 28.2 | 31.1 | 35.1 |
| 400Hz | 28.9 | 31.5 | 35.2 |
| 500Hz | 28.5 | 31.4 | 34.8 |
| 630Hz | 28.3 | 31.1 | 34.9 |
| 800Hz | 27.7 | 30.7 | 35.5 |
| 1000Hz | 26.7 | 29.8 | 35.4 |
| 1250Hz | 25.1 | 28.4 | 34.4 |
| 1600Hz | 23.2 | 26.5 | 32.6 |
| 2000Hz | 21.2 | 24.7 | 30.6 |
| 2500Hz | 18.7 | 22.6 | 28.6 |
| 3150Hz | 17.4 | 21.3 | 27.3 |
| 4000Hz | 17 | 20.6 | 26.4 |
| 5000Hz | 15.3 | 19.4 | 25.5 |
| 6300Hz | 13.3 | 17.9 | 24.5 |
| 8000Hz | 11.8 | 16.8 | 23.9 |
| 10000Hz | 10 | 14.6 | 21.6 |
| 12500Hz | 7.2 | 11.9 | 19 |
| 16000Hz | 4.1 | 8.2 | 15.1 |
| 20000Hz | 0.3 | 2.6 | 8.3 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Hourly Metrics, ROBL002 (478 hours)

| Hour | L _{min} | L _{max} | L ₁₀ | L ₅₀ | L ₉₀ | L _{eq} |
|------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0 | 23.4 | 74.3 | 44.6 | 39.3 | 34.7 | 41.9 |
| 1 | 21.6 | 78.8 | 48.3 | 42.7 | 38.1 | 45.1 |
| 2 | 23.4 | 75.6 | 46.9 | 42.2 | 38.5 | 43.9 |
| 3 | 22.2 | 77.7 | 47.7 | 43.6 | 38.4 | 45.2 |
| 4 | 20.3 | 75.0 | 45.3 | 40.9 | 37.1 | 42.3 |
| 5 | 18.1 | 75.7 | 44.7 | 38.8 | 34.5 | 42.1 |
| 6 | 16.6 | 74.4 | 44.5 | 39.5 | 36.0 | 41.7 |
| 7 | 16.8 | 73.2 | 45.1 | 39.7 | 35.5 | 41.8 |
| 8 | 16.8 | 84.9 | 48.6 | 43.0 | 38.0 | 45.3 |
| 9 | 18.8 | 70.1 | 47.3 | 40.4 | 36.9 | 44.2 |
| 10 | 19.4 | 96.3 | 48.8 | 39.5 | 35.3 | 48.5 |
| 11 | 20.1 | 74.3 | 47.3 | 41.3 | 36.0 | 44.5 |
| 12 | 22.9 | 79.2 | 46.8 | 40.9 | 35.3 | 44.0 |
| 13 | 24.0 | 73.0 | 49.1 | 41.8 | 35.6 | 46.0 |
| 14 | 22.4 | 97.1 | 50.0 | 43.3 | 37.6 | 46.9 |
| 15 | 22.6 | 71.4 | 48.2 | 43.3 | 36.6 | 45.0 |
| 16 | 20.7 | 64.9 | 48.4 | 40.4 | 35.3 | 43.9 |
| 17 | 23.3 | 65.4 | 45.5 | 40.7 | 36.9 | 42.7 |
| 18 | 24.7 | 67.3 | 43.3 | 39.3 | 34.9 | 40.8 |
| 19 | 23.4 | 68.6 | 43.0 | 38.3 | 36.3 | 40.2 |
| 20 | 24.0 | 72.6 | 43.3 | 39.9 | 37.0 | 42.2 |
| 21 | 22.5 | 76.1 | 46.9 | 39.6 | 37.4 | 43.7 |
| 22 | 24.9 | 71.6 | 46.1 | 41.8 | 38.8 | 43.4 |
| 23 | 25.0 | 77.1 | 46.2 | 42.1 | 36.7 | 43.6 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Frequency Metrics, ROBL002, 0000-2400 (478 hours).

| Freq | L ₉₀ | L ₅₀ | L ₁₀ |
|---------|-----------------|-----------------|-----------------|
| 12.5Hz | 39.3 | 44.3 | 51.5 |
| 15.8Hz | 39.2 | 43.5 | 49.2 |
| 20Hz | 38.7 | 42.8 | 47.8 |
| 25Hz | 38.6 | 42.4 | 47 |
| 31.5Hz | 38.4 | 42.1 | 46.6 |
| 40Hz | 37.6 | 41.4 | 45.9 |
| 50Hz | 36.5 | 40.2 | 44.8 |
| 63Hz | 34.6 | 38.5 | 43.6 |
| 80Hz | 32.9 | 37 | 42.1 |
| 100Hz | 29.6 | 34.5 | 40.6 |
| 125Hz | 28.4 | 33.4 | 40.1 |
| 160Hz | 28.6 | 33.8 | 40.3 |
| 200Hz | 29.7 | 34.5 | 40.3 |
| 250Hz | 30 | 34.4 | 40.2 |
| 315Hz | 29.3 | 33.7 | 39.2 |
| 400Hz | 28.8 | 33.1 | 38.7 |
| 500Hz | 27.8 | 32.2 | 37.4 |
| 630Hz | 26.7 | 31.3 | 36.7 |
| 800Hz | 25.9 | 30.5 | 35.7 |
| 1000Hz | 25.2 | 29.6 | 34.8 |
| 1250Hz | 24.2 | 28.6 | 34.1 |
| 1600Hz | 23.3 | 27.6 | 33.3 |
| 2000Hz | 22.8 | 26.9 | 32.7 |
| 2500Hz | 21.5 | 26 | 32.3 |
| 3150Hz | 20.7 | 25.5 | 32.1 |
| 4000Hz | 20.4 | 25.1 | 31.5 |
| 5000Hz | 19.5 | 25.1 | 31.3 |
| 6300Hz | 18.2 | 24.1 | 30.3 |
| 8000Hz | 16.8 | 22.8 | 29 |
| 10000Hz | 15.1 | 21.1 | 27.3 |
| 12500Hz | 12.5 | 18.1 | 24.5 |
| 16000Hz | 7.6 | 13.1 | 19.7 |
| 20000Hz | 1.3 | 5 | 11.1 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Hourly Metrics, SOCO001 (29 hours)

| Hour | L _{min} | L _{max} | L ₁₀ | L ₅₀ | L ₉₀ | L _{eq} |
|------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0 | 51.8 | 89.7 | 64.0 | 57.6 | 54.9 | 67.5 |
| 1 | 51.7 | 91.2 | 63.4 | 57.4 | 54.5 | 67.4 |
| 2 | 51.8 | 91.2 | 61.3 | 57.0 | 54.5 | 66.2 |
| 3 | 51.9 | 91.9 | 62.5 | 57.6 | 54.8 | 67.1 |
| 4 | 51.6 | 89.0 | 64.0 | 57.8 | 54.9 | 67.8 |
| 5 | 51.6 | 91.2 | 61.7 | 57.6 | 54.8 | 65.7 |
| 6 | 51.8 | 92.5 | 63.7 | 57.9 | 54.9 | 68.8 |
| 7 | 52.8 | 88.1 | 64.1 | 59.4 | 56.5 | 66.9 |
| 8 | 53.7 | 85.3 | 61.8 | 58.6 | 56.3 | 60.5 |
| 9 | 53.5 | 89.4 | 61.9 | 58.6 | 56.2 | 62.3 |
| 10 | 53.5 | 92.2 | 67.7 | 60.4 | 56.7 | 69.9 |
| 11 | 53.1 | 92.3 | 69.4 | 60.7 | 56.8 | 70.8 |
| 12 | 53.9 | 92.7 | 73.4 | 64.4 | 57.9 | 73.1 |
| 13 | 51.9 | 92.3 | 69.3 | 59.3 | 55.5 | 70.8 |
| 14 | 54.1 | 92.3 | 74.8 | 62.0 | 58.0 | 74.1 |
| 15 | 55.4 | 92.0 | 79.7 | 70.8 | 59.8 | 76.8 |
| 16 | 55.5 | 92.4 | 72.6 | 62.3 | 58.6 | 72.7 |
| 17 | 55.9 | 91.9 | 77.5 | 69.7 | 59.5 | 74.7 |
| 18 | 52.0 | 92.4 | 68.8 | 57.9 | 53.8 | 71.4 |
| 19 | 52.3 | 89.3 | 65.1 | 58.3 | 55.8 | 69.2 |
| 20 | 55.3 | 90.5 | 69.2 | 64.7 | 59.8 | 70.9 |
| 21 | 54.7 | 92.3 | 70.4 | 60.4 | 57.5 | 71.8 |
| 22 | 54.6 | 91.9 | 71.3 | 60.6 | 57.5 | 72.2 |
| 23 | 52.6 | 92.0 | 65.2 | 57.4 | 54.8 | 67.9 |

Appendix III. Acoustic metrics, HHH001, HHH002, ROBL001, ROBL002, SOCO001 (cont.).

Frequency Metrics, SOCO001, 0000-2400 (29 hours).

| Freq | L ₉₀ | L ₅₀ | L ₁₀ |
|---------|-----------------|-----------------|-----------------|
| 12.5Hz | 44.2 | 50.5 | 60.1 |
| 15.8Hz | 47.6 | 52.9 | 62.4 |
| 20Hz | 47.1 | 52.4 | 61.6 |
| 25Hz | 47.6 | 53.1 | 62.7 |
| 31.5Hz | 51.2 | 55.9 | 64.1 |
| 40Hz | 50.6 | 55.2 | 64.9 |
| 50Hz | 53.3 | 56.0 | 65.3 |
| 63Hz | 56.7 | 60.0 | 70.0 |
| 80Hz | 54.5 | 60.2 | 71.4 |
| 100Hz | 54.5 | 57.7 | 66.4 |
| 125Hz | 56.0 | 58.3 | 66.7 |
| 160Hz | 45.7 | 51.3 | 64.7 |
| 200Hz | 46.8 | 50.7 | 61.2 |
| 250Hz | 45.1 | 48.8 | 58.3 |
| 315Hz | 46.8 | 51.1 | 58.5 |
| 400Hz | 48.1 | 51.6 | 57.7 |
| 500Hz | 48.0 | 51.8 | 58.8 |
| 630Hz | 47.8 | 51.3 | 57.7 |
| 800Hz | 47.9 | 51.2 | 58.3 |
| 1000Hz | 46.9 | 50.8 | 59.0 |
| 1250Hz | 46.4 | 50.8 | 58.2 |
| 1600Hz | 44.8 | 49.5 | 57.9 |
| 2000Hz | 43.5 | 47.4 | 56.0 |
| 2500Hz | 41.0 | 44.1 | 52.6 |
| 3150Hz | 37.7 | 41.5 | 49.5 |
| 4000Hz | 33.2 | 36.8 | 46.6 |
| 5000Hz | 29.4 | 33.4 | 43.9 |
| 6300Hz | 23.2 | 28.7 | 41.9 |
| 8000Hz | 15.9 | 23.4 | 37.1 |
| 10000Hz | 10.7 | 19.2 | 31.9 |
| 12500Hz | 8.7 | 14.0 | 27.8 |
| 16000Hz | 7.9 | 9.5 | 19.4 |
| 20000Hz | 8.3 | 8.6 | 11.9 |

Appendix IV. Acoustic metrics, ELKV001 and SOCO002 (not Type 1 data).

Hourly Metrics, ELKV001 (139 hours). Note: Not Type 1 data.

| Hour | L _{min} | L _{max} | L ₁₀ | L ₅₀ | L ₉₀ | L _{eq} |
|------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0 | 20.1 | 67.4 | 42.8 | 37.6 | 33.9 | 39.8 |
| 1 | 20.1 | 68.0 | 41.4 | 36.3 | 32.5 | 38.3 |
| 2 | 19.1 | 65.2 | 40.6 | 37.0 | 33.2 | 38.1 |
| 3 | 19.1 | 61.1 | 40.1 | 34.2 | 26.7 | 37.3 |
| 4 | 19.4 | 70.8 | 39.2 | 34.5 | 30.7 | 39.7 |
| 5 | 19.6 | 66.2 | 39.6 | 35.4 | 32.1 | 36.9 |
| 6 | 20.5 | 63.2 | 36.1 | 32.5 | 29.0 | 34.4 |
| 7 | 20.1 | 71.8 | 38.0 | 30.7 | 28.8 | 36.8 |
| 8 | 21.6 | 74.6 | 39.7 | 29.2 | 26.9 | 37.7 |
| 9 | 22.7 | 69.5 | 41.0 | 34.5 | 30.4 | 40.8 |
| 10 | 22.4 | 64.0 | 46.2 | 39.3 | 33.2 | 42.5 |
| 11 | 21.6 | 71.2 | 43.3 | 36.9 | 32.6 | 39.9 |
| 12 | 23.2 | 68.0 | 42.7 | 37.5 | 32.7 | 39.6 |
| 13 | 24.0 | 59.9 | 40.4 | 34.7 | 30.7 | 37.0 |
| 14 | 25.0 | 61.4 | 38.0 | 32.7 | 28.9 | 35.0 |
| 15 | 24.5 | 66.6 | 39.3 | 33.3 | 30.1 | 36.6 |
| 16 | 24.7 | 66.6 | 41.4 | 35.1 | 32.0 | 38.9 |
| 17 | 24.0 | 65.9 | 37.2 | 33.0 | 30.5 | 35.4 |
| 18 | 22.1 | 61.4 | 40.4 | 35.3 | 30.5 | 37.8 |
| 19 | 22.8 | 64.5 | 39.8 | 36.1 | 32.2 | 37.3 |
| 20 | 22.5 | 57.0 | 38.6 | 33.7 | 30.5 | 36.1 |
| 21 | 20.4 | 59.7 | 42.2 | 39.1 | 33.9 | 40.1 |
| 22 | 20.3 | 59.8 | 39.7 | 36.0 | 32.8 | 37.3 |
| 23 | 20.2 | 62.9 | 40.6 | 36.4 | 32.0 | 37.9 |

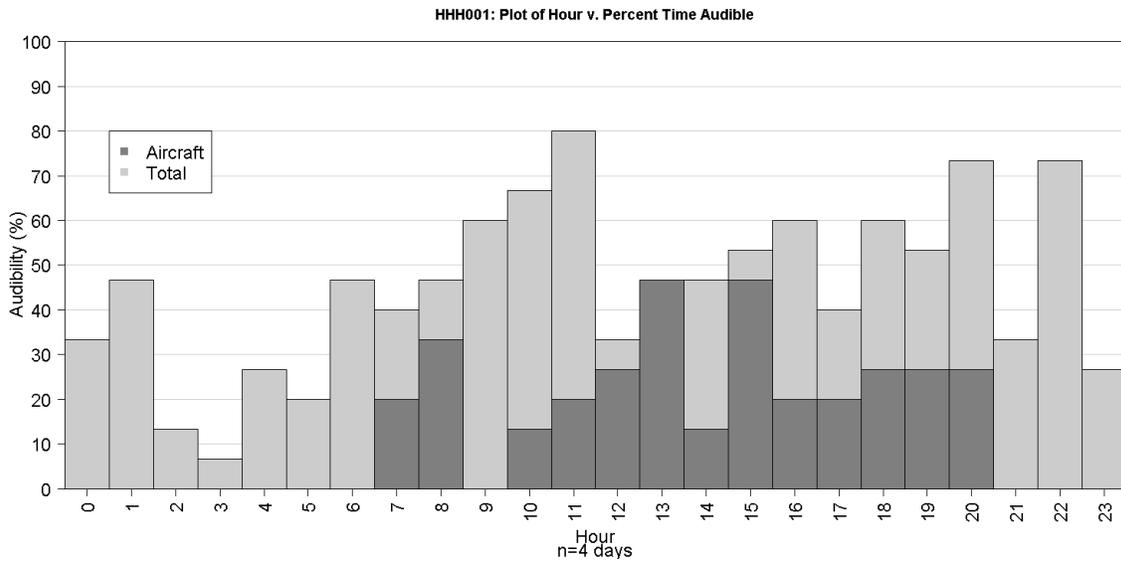
Appendix IV. Acoustic metrics, ELKV001 and SOCO002 (not Type 1 data) (cont.).

Hourly Metrics, SOCO002 (32 hours). Note: Not Type 1 data.

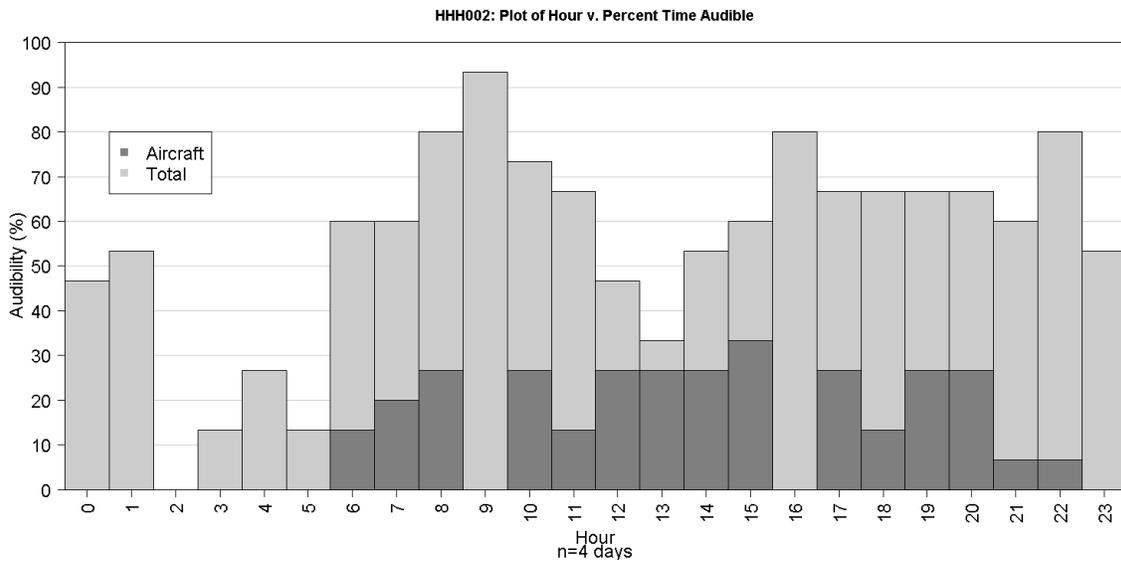
| Hour | L _{min} | L _{max} | L ₁₀ | L ₅₀ | L ₉₀ | L _{eq} |
|------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0 | 28.6 | 37.6 | 32.4 | 30.8 | 29.9 | 31.1 |
| 1 | 29.5 | 42.5 | 34.3 | 32.1 | 30.8 | 32.9 |
| 2 | 28.3 | 39.2 | 31.8 | 30.2 | 29.3 | 30.6 |
| 3 | 27.9 | 69.5 | 32.6 | 30.3 | 29.0 | 39.8 |
| 4 | 28.1 | 70.2 | 33.5 | 31.1 | 29.2 | 41.2 |
| 5 | 29.7 | 74.6 | 36.9 | 33.1 | 31.4 | 49.2 |
| 6 | 29.0 | 74.5 | 43.6 | 32.1 | 30.3 | 52.4 |
| 7 | 29.1 | 81.3 | 47.9 | 36.3 | 31.5 | 59.7 |
| 8 | 31.7 | 80.2 | 50.9 | 40.6 | 34.3 | 59.7 |
| 9 | 33.5 | 81.5 | 50.9 | 40.4 | 36.6 | 60.4 |
| 10 | 35.9 | 78.4 | 57.5 | 42.1 | 38.5 | 61.3 |
| 11 | 33.0 | 83.4 | 61.5 | 41.0 | 35.5 | 63.0 |
| 12 | 32.9 | 81.6 | 58.6 | 39.8 | 35.7 | 61.3 |
| 13 | 30.2 | 83.0 | 57.8 | 39.3 | 34.1 | 62.1 |
| 14 | 32.3 | 80.0 | 58.2 | 41.5 | 35.2 | 59.6 |
| 15 | 28.7 | 79.0 | 64.6 | 50.4 | 38.5 | 63.3 |
| 16 | 33.4 | 77.7 | 64.6 | 52.2 | 42.6 | 65.0 |
| 17 | 37.0 | 79.5 | 64.5 | 43.8 | 39.2 | 62.8 |
| 18 | 45.1 | 75.8 | 61.9 | 51.4 | 48.4 | 63.7 |
| 19 | 25.9 | 70.8 | 33.5 | 29.2 | 27.2 | 44.4 |
| 20 | 25.4 | 62.4 | 29.7 | 27.4 | 26.3 | 35.2 |
| 21 | 26.3 | 53.7 | 30.2 | 27.8 | 27.0 | 32.2 |
| 22 | 26.9 | 83.8 | 31.5 | 28.6 | 27.7 | 58.2 |
| 23 | 27.5 | 74.3 | 32.4 | 30.2 | 28.9 | 46.6 |

Appendix V. Percent Time Audible, HHH001, HHH002, ROBL001, ROBL002.

HHH001 weekend

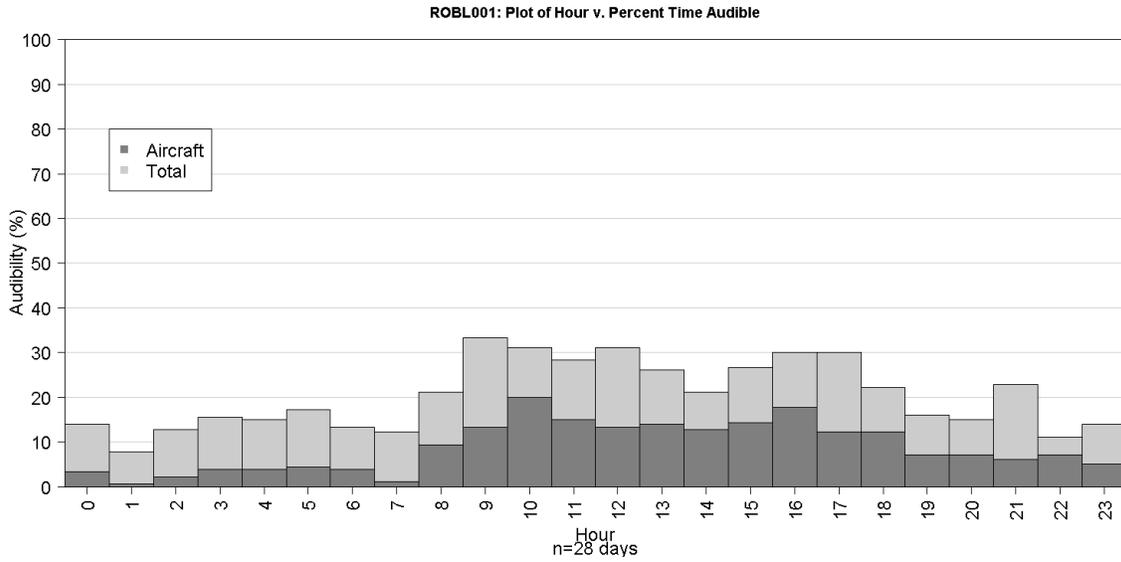


HHH002 weekend

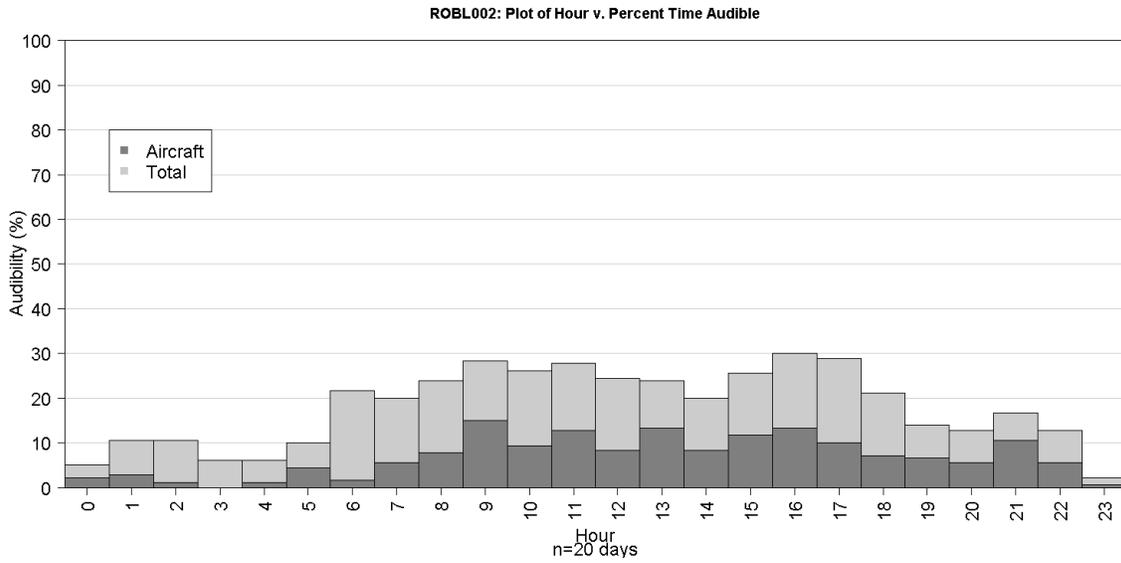


Appendix V. Hourly Percent Time Audible (cont.).

ROBL001



ROBL002



APPENDIX E: WATER RESOURCES

The following information is organized similarly to the water resources section in “Chapter 4: Affected Environment.”

SURFACE WATER

The following is a list of named streams that occur in each of the watershed in the evaluation area. Emory Watershed – Named streams of the Emory subwatershed within the study area include:

- Alex Branch
- Bobs Creek
- Cane Branch
- Convict Branch
- Dry Branch
- Edmund Branch
- Emory River
- Flat Rock Branch
- Garrett Branch
- Greasy Creek
- Grimes Branch
- Hatmaker Branch
- Laurel Branch
- Little Creek
- Little Rock Creek
- Loudon Creek
- Maden Branch
- McCoy Branch
- Middle Branch
- Mill Branch
- Phoebe Branch
- Rock Creek
- Scutcheon Creek
- Snake Den Branch
- Whiteoak Creek

Upper Cumberland Watershed – Named streams of the Upper Cumberland subwatershed within the study area include:

- Barley Creek
- Bear Branch
- Big Branch
- Big Pigeon Branch
- Broyles Branch
- Davis Creek
- Elk Fork Creek
- Hickory Creek
- Horse Creek
- Hudson Branch
- Jackson Branch
- Jennings Creek
- Jim Branch
- Johnson Branch
- Laurel Branch
- Leonard Branch
- Lick Creek
- Major Branch
- Meadow Creek
- Pryor Meredith Branch
- Rock Creek
- Sand Branch
- Sharp Branch
- Shelton Branch
- Stell Branch
- Stinking Creek
- Terry Creek
- Tram Road Branch
- Waterfall Branch

South Fork Cumberland – Named streams of the South Fork Cumberland subwatershed located within the study area include:

- Adkins Branch
- Anderson Branch
- Asher Fork
- Barley Mouth Branch
- Beech Fork
- Big Branch
- Big Bull Creek
- Bills Branch
- Blue Hole Branch
- Bowling Branch
- Brimstone Creek
- Byrges Creek
- Cage Creek
- Calvin Branch
- Carroll Branch
- Cave Branch
- Charleys Branch
- Collins Branch
- Coon Pool Branch
- Cross Branch
- Cross Creek
- Davids Creek
- Double Camp Creek
- Dry Creek
- Dry Fork
- East Prong Nicks Creek
- Eli Branch
- Flatrock Branch
- Franks Branch
- Gladey Branch
- Gordon Branch
- Gosnell Branch
- Grave Branch
- Graves Gap Branch
- Green Branch
- Greens Branch
- Grissel Branch
- Gum Branch
- Hicks Branch
- Indian Creek
- Indian Fork
- Jack Branch
- Jake Branch
- Jenney Creek
- Jerry Creek
- Joe Branch
- Joe Creek
- Laurel Fork
- Lick Branch
- Lick Creek
- Ligias Fork
- Little Brimstone Creek
- Little Bull Creek
- Little Creek
- Long Branch
- Lost Branch
- Lowe Branch
- Lower Fork
- Macs Branch
- Marlow Branch
- Mart Branch
- Martha Branch
- McCoy Branch
- McKinney Fork
- Mill Creek
- Montgomery Fork
- Neal Branch
- Negro Branch
- New River
- Nicks Creek
- North Fork Montgomery Fork
- Oldhouse Branch
- Ova Branch
- Puncheon Camp Creek
- Reynolds Branch
- Rhoda Creek
- Roach Creek
- Roaring Creek
- Rockhouse Fork
- Round Rock Creek
- Second Laurel Branch
- Shack Creek
- Shoal Creek
- Simpson Branch
- Skull Branch
- Slick Rock Branch
- Smoky Creek
- South Fork Montgomery Fork
- Spring Branch
- Spring Rockhouse Branch
- Spruce Lick Creek
- Sprucepine Branch
- Stallion Branch
- Stone Coal Branch
- Stony Fork
- Straight Fork
- Sugarcamp Branch
- Tackett Branch
- Upper Fork
- Ursery Branch
- Wells Branch
- West Prong Davids Creek
- West Prong Nicks Creek
- Wheeler Creek
- Wild Sow Branch
- Wolfpen Branch
- York Branch

Upper Clinch Watershed – Named streams of the Upper Clinch subwatershed located within the study area include:

- Adkins Branch
- Asher Branch
- Bear Branch
- Bear Wallow Branch
- Cove Creek
- Duncan Branch
- Graves Branch
- Laurel Branch
- Lowe Branch
- Mill Branch
- Ollis Creek
- Rector Branch
- Smith Cove
- Swamp Branch
- Thompson Creek
- Titus Creek
- Turley Branch
- Whetstone Branch
- Yellow Branch

SURFACE WATER QUANTITY

The following flow characteristics were estimated using the Tennessee StreamStats (USGS 2007) and the associated stand-alone program. These programs were developed using current and historical flow data and basin characteristics collected by the US Geological Survey (Ladd and Law 2007; Law and Tasker 2003; Law, Tasker, and Ladd 2009; Bingham 1986) to estimate the mean annual flows, mean summer flows, flow durations, peak storm flows, and critical low flows for ungauged streams in Tennessee. These tables (tables E-1a and E-1b) include information on the watershed size; stream slope; 7-consecutive-day, 10-year recurrent-interval low flow (7Q10); the 30-consecutive-day 5-year recurrent-interval low flow (30Q5); the mean annual flow; the mean summer flow; the various flow durations from 99.5% to 10% (q99.5 – q10, as defined in the following paragraph) and the peak discharges for the flood frequencies with a recurrence interval of 2 through 500 years (PK2 – PK500). The q99.5 can be interpreted as meaning that 99.5% of the time, stream flow discharge is anticipated to equal or exceed the calculated values. It represents the lowest average discharges anticipated for a watershed. Likewise for a q10 estimate, only 10% of the values would be expected to ever exceed this discharge rate and represent the highest average flows for a watershed. The recurrence interval is based on the probability that the given event will be equaled or exceeded in any given year.

The 7Q10 value was 0 for all watersheds with a drainage area less than 50 square miles, while the 30Q5 discharges were 0 only for the two smallest watersheds, Bruce Creek and No Business Branch. Flow duration curves and calculations are commonly used to predict the distribution of future flows for water power, water supply, and pollution studies (Searcy 1959); they describe the cumulative distribution of daily mean discharges recorded at a stream gauge and show the percentage of time each daily mean discharge was equaled or exceeded (Law, Tasker, and Ladd 2009).

Surface Water Quality: Twenty-nine Office of Surface Mining Reclamation and Enforcement (OSMRE) ambient monitoring stations (trend stations) and 14 Tennessee Department of Environment and Conservation (TDEC) ambient and ecoregion monitoring stations were compiled and evaluated against the water quality criteria established for the various stream use classifications. The following tables (tables E-2, E-3a, E-3b, E-3c, E-4, E-5a, E-5b, E-6a, and E-6b) describe the results of the monitoring data.

TABLE E-1A: CALCULATED STREAM CONDITIONS FOR CUMULATIVE IMPACT SUBAREAS AND REFERENCE WATERSHEDS IN THE NORTH CUMBERLAND WILDLIFE MANAGEMENT AREA AND ADJACENT AREAS

| Stream | Watershed Size (mi ²) | Stream Slope (ft/mi) | Stream Slope (%) | 7Q10 (cfs) | 30QS (cfs) | MAF (cfs) | MAF (cfs/mi ²) | MSF (cfs) | MSF (cfs/mi ²) | q99.5 (cfs) | q99 (cfs) | q98 (cfs) | q95 (cfs) | q90 (cfs) |
|---------------------------------|-----------------------------------|----------------------|------------------|------------|------------|-----------|----------------------------|-----------|----------------------------|-------------|-----------|-----------|-----------|-----------|
| No Business Branch ^a | 1.7 | 655 | 12.4 | 0.00 | 0.00 | 2.98 | 1.74 | 1.43 | 0.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Bruce Creek | 2.7 | 189 | 3.6 | 0.00 | 0.00 | 4.77 | 1.74 | 2.31 | 0.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.29 |
| Big Creek | 7.5 | 58 | 1.1 | 0.00 | 0.39 | 12.96 | 1.72 | 5.04 | 0.67 | 0.00 | 0.00 | 0.00 | 0.39 | 0.59 |
| Brimstone Creek ^a | 8.4 | 151 | 2.9 | 0.00 | 0.24 | 15.92 | 1.90 | 5.30 | 0.63 | 0.00 | 0.00 | 0.00 | 0.23 | 0.40 |
| Greasy Creek ^a | 8.7 | 250 | 4.7 | 0.00 | 0.41 | 15.21 | 1.74 | 5.76 | 0.66 | 0.00 | 0.00 | 0.00 | 0.41 | 0.63 |
| Stinking Creek ^a | 12.5 | 95 | 1.8 | 0.00 | 0.31 | 25.69 | 2.06 | 7.53 | 0.60 | 0.00 | 0.00 | 0.00 | 0.34 | 0.58 |
| Ollis Creek | 16.1 | 83 | 1.6 | 0.00 | 0.55 | 28.84 | 1.79 | 9.59 | 0.60 | 0.00 | 0.00 | 0.00 | 0.61 | 0.93 |
| Straight Fork | 19.2 | 44 | 0.8 | 0.00 | 0.40 | 39.77 | 2.07 | 11.64 | 0.61 | 0.00 | 0.00 | 0.00 | 0.44 | 0.78 |
| Upper Stinking Creek | 19.3 | 70 | 1.3 | 0.00 | 0.39 | 39.55 | 2.05 | 11.40 | 0.59 | 0.00 | 0.00 | 0.00 | 0.43 | 0.76 |
| New River at Braytown | 19.4 | 142 | 2.7 | 0.00 | 0.39 | 38.78 | 2.00 | 11.43 | 0.59 | 0.00 | 0.00 | 0.00 | 0.43 | 0.77 |
| Ligas Fork | 20.4 | 111 | 2.1 | 0.00 | 0.55 | 39.56 | 1.94 | 12.43 | 0.61 | 0.00 | 0.00 | 0.00 | 0.61 | 1.02 |
| Lick Fork | 20.8 | 39 | 0.7 | 0.00 | 0.69 | 40.02 | 1.93 | 13.25 | 0.64 | 0.00 | 0.00 | 0.00 | 0.77 | 1.21 |
| White Oak Creek | 21.4 | 25 | 0.5 | 0.00 | 0.79 | 38.85 | 1.81 | 13.21 | 0.62 | 0.00 | 0.00 | 0.00 | 0.87 | 1.36 |
| Montgomery Fork | 22.2 | 142 | 2.7 | 0.00 | 0.42 | 46.36 | 2.09 | 13.42 | 0.61 | 0.00 | 0.00 | 0.00 | 0.47 | 0.84 |
| Cove Creek | 24.0 | 45 | 0.8 | 0.00 | 0.58 | 47.12 | 1.96 | 14.59 | 0.61 | 0.00 | 0.00 | 0.00 | 0.65 | 1.10 |
| Upper Hickory Creek | 24.8 | 77 | 1.5 | 0.00 | 0.56 | 51.92 | 2.09 | 15.73 | 0.63 | 0.00 | 0.00 | 0.40 | 0.64 | 1.09 |
| Beech Fork | 28.0 | 113 | 2.1 | 0.00 | 0.64 | 55.35 | 1.98 | 17.40 | 0.62 | 0.00 | 0.00 | 0.45 | 0.73 | 1.27 |
| Upper Emory River | 28.1 | 84 | 1.6 | 0.00 | 0.90 | 52.43 | 1.87 | 17.26 | 0.61 | 0.00 | 0.00 | 0.66 | 1.01 | 1.69 |
| Rock Creek | 31.3 | 24 | 0.4 | 0.00 | 0.97 | 56.92 | 1.82 | 19.00 | 0.61 | 0.00 | 0.00 | 0.72 | 1.11 | 1.80 |
| Smoky Creek | 33.5 | 38 | 0.7 | 0.00 | 0.51 | 71.02 | 2.12 | 20.95 | 0.63 | 0.00 | 0.00 | 0.35 | 0.60 | 1.15 |
| Upper Brimstone Creek | 36.8 | 45 | 0.8 | 0.00 | 0.53 | 75.44 | 2.05 | 21.97 | 0.60 | 0.00 | 0.00 | 0.36 | 0.64 | 1.23 |
| Upper Elk Creek | 37.0 | 17 | 0.3 | 0.00 | 0.77 | 84.55 | 2.28 | 25.09 | 0.68 | 0.00 | 0.00 | 0.51 | 0.86 | 1.58 |

| | | | | | | | | | | | | | | |
|-----------------------------|-------|----|-----|------|------|--------|------|--------|------|------|------|------|------|-------|
| Lower Stinking Creek | 38.4 | 38 | 0.7 | 0.00 | 0.68 | 86.58 | 2.25 | 26.08 | 0.68 | 0.00 | 0.00 | 0.46 | 0.79 | 1.49 |
| Buffalo Creek | 43.6 | 12 | 0.2 | 0.00 | 0.70 | 87.89 | 2.02 | 26.78 | 0.61 | 0.00 | 0.00 | 0.47 | 0.82 | 1.57 |
| New River at Stainville | 45.4 | 37 | 0.7 | 0.00 | 0.83 | 92.78 | 2.04 | 28.89 | 0.64 | 0.00 | 0.00 | 0.55 | 0.95 | 1.83 |
| Lower Brimstone Creek | 48.8 | 32 | 0.6 | 0.00 | 0.72 | 98.07 | 2.01 | 30.18 | 0.62 | 0.00 | 0.00 | 0.48 | 0.85 | 1.66 |
| Lower Emory River | 91.7 | 20 | 0.4 | 0.83 | 2.48 | 172.09 | 1.88 | 56.53 | 0.62 | 0.48 | 1.22 | 1.79 | 2.93 | 5.04 |
| Lower Hickory Creek | 106.9 | 31 | 0.6 | 0.66 | 2.33 | 199.78 | 1.87 | 69.44 | 0.65 | 0.65 | 1.04 | 1.62 | 2.93 | 5.50 |
| New River at Smoky Junction | 111.9 | 19 | 0.4 | 0.44 | 1.85 | 212.24 | 1.90 | 72.07 | 0.64 | 0.43 | 0.73 | 1.22 | 2.38 | 4.81 |
| New River at Cordell | 198.5 | 11 | 0.2 | 0.73 | 3.21 | 362.27 | 1.83 | 137.94 | 0.69 | 0.74 | 1.29 | 2.17 | 4.31 | 8.80 |
| New River at Winona | 269.8 | 9 | 0.2 | 0.91 | 4.15 | 488.60 | 1.81 | 186.19 | 0.69 | 0.93 | 1.65 | 2.81 | 5.60 | 11.64 |
| New River at Huntsville | 306.5 | 8 | 0.2 | 0.93 | 4.40 | 559.51 | 1.83 | 212.42 | 0.69 | 0.93 | 1.68 | 2.92 | 6.00 | 12.71 |
| New River at New River | 371.5 | 7 | 0.1 | 1.31 | 5.86 | 674.81 | 1.82 | 253.52 | 0.68 | 1.28 | 2.25 | 3.89 | 7.97 | 16.43 |

Source: USGS 2007.

mi=miles; ft=feet; cfs=cubic feet per second; MAF=mean annual flow; MSF=mean summer flow.

^aReference stream.

TABLE E-1B: CALCULATED STREAM CONDITIONS FOR CUMULATIVE IMPACT SUBAREAS AND REFERENCE WATERSHEDS IN THE NORTH CUMBERLAND WILDLIFE MANAGEMENT AREA AND ADJACENT AREAS

| Stream | q80 (cfs) | q70 (cfs) | q60 (cfs) | q50 (cfs) | q40 (cfs) | q30 (cfs) | q20 (cfs) | q10 (cfs) | PK2 (cfs) | PK5 (cfs) | PK10 (cfs) | PK25 (cfs) | PK50 (cfs) | PK100 (cfs) | PK500 (cfs) |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|-------------|-------------|
| No Business Branch ^a | 0.29 | 0.48 | 0.80 | 1.27 | 1.75 | 2.35 | 3.50 | 6.50 | 430 | 719 | 933 | 1,220 | 1,440 | 1,660 | 2,190 |
| Bruce Creek | 0.47 | 0.78 | 1.27 | 2.01 | 2.78 | 3.82 | 5.55 | 10.25 | 274 | 441 | 570 | 747 | 886 | 1,040 | 1,430 |
| Big Creek | 0.98 | 1.63 | 2.69 | 4.52 | 7.09 | 10.92 | 16.34 | 29.16 | 533 | 845 | 1,080 | 1,400 | 1,650 | 1,940 | 2,630 |
| Brimstone Creek ^a | 0.77 | 1.45 | 2.68 | 4.98 | 8.21 | 13.21 | 19.16 | 34.93 | 1,210 | 1,970 | 2,530 | 3,290 | 3,880 | 4,450 | 5,890 |
| Greasy Creek ^a | 1.10 | 1.84 | 3.05 | 5.23 | 8.47 | 13.15 | 19.51 | 34.19 | 726 | 1,150 | 1,470 | 1,900 | 2,240 | 2,620 | 3,520 |
| Stinking Creek ^a | 1.12 | 2.10 | 3.75 | 7.13 | 13.13 | 21.83 | 32.74 | 59.03 | 1,540 | 2,500 | 3,200 | 4,150 | 4,890 | 5,610 | 7,430 |
| Ollis Creek | 1.71 | 2.93 | 4.84 | 8.59 | 15.28 | 24.44 | 38.14 | 67.19 | 1,020 | 1,590 | 2,030 | 2,610 | 3,070 | 3,580 | 4,810 |
| Straight Fork | 1.61 | 3.10 | 5.59 | 10.92 | 20.64 | 34.22 | 51.31 | 91.74 | 1,920 | 3,080 | 3,940 | 5,100 | 6,010 | 6,900 | 9,160 |
| Upper Stinking Creek | 1.56 | 3.01 | 5.45 | 10.65 | 20.12 | 33.46 | 51.03 | 91.91 | 2,070 | 3,340 | 4,280 | 5,530 | 6,510 | 7,470 | 9,880 |
| New River at Braytown | 1.63 | 3.10 | 5.62 | 10.98 | 20.62 | 34.04 | 51.58 | 90.73 | 2,310 | 3,750 | 4,810 | 6,220 | 7,310 | 8,380 | 11,000 |
| Ligas Fork | 2.00 | 3.61 | 6.24 | 11.65 | 21.32 | 34.52 | 52.40 | 91.98 | 2,320 | 3,750 | 4,810 | 6,210 | 7,310 | 8,380 | 11,100 |
| Lick Fork | 2.23 | 3.92 | 6.75 | 12.12 | 21.53 | 33.07 | 50.83 | 87.51 | 2,010 | 3,230 | 4,130 | 5,330 | 6,280 | 7,210 | 9,580 |
| White Oak Creek | 2.47 | 4.18 | 6.90 | 12.19 | 21.28 | 33.49 | 51.38 | 89.63 | 1,920 | 3,070 | 3,920 | 5,060 | 5,970 | 6,860 | 9,130 |
| Montgomery Fork | 1.79 | 3.51 | 6.45 | 12.65 | 23.82 | 39.51 | 59.35 | 106.85 | 2,560 | 4,150 | 5,320 | 6,870 | 8,090 | 9,260 | 12,200 |
| Cove Creek | 2.21 | 4.11 | 7.26 | 13.59 | 24.64 | 39.91 | 60.79 | 108.64 | 1,320 | 2,050 | 2,600 | 3,330 | 3,900 | 4,530 | 6,060 |
| Upper Hickory Creek | 2.22 | 4.21 | 7.68 | 14.72 | 27.32 | 43.35 | 65.71 | 115.53 | 2,560 | 4,120 | 5,280 | 6,810 | 8,010 | 9,180 | 12,100 |
| Beech Fork | 2.61 | 4.90 | 8.76 | 16.45 | 29.86 | 47.25 | 71.32 | 127.64 | 2,980 | 4,810 | 6,160 | 7,950 | 9,340 | 10,700 | 14,100 |
| Upper Emory River | 3.23 | 5.56 | 9.17 | 16.35 | 28.97 | 45.97 | 70.94 | 123.15 | 1,640 | 2,550 | 3,220 | 4,120 | 4,820 | 5,590 | 7,430 |
| Rock Creek | 3.41 | 5.93 | 9.96 | 17.69 | 30.84 | 48.56 | 75.38 | 132.04 | 1,560 | 2,410 | 3,040 | 3,880 | 4,530 | 5,250 | 6,990 |
| Smoky Creek | 2.64 | 5.45 | 10.31 | 20.35 | 38.52 | 61.02 | 91.87 | 166.70 | 2,920 | 4,660 | 5,960 | 7,690 | 9,040 | 10,400 | 13,700 |

| | | | | | | | | | | | | | | | |
|-----------------------------|-------|-------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|
| Upper Brimstone Creek | 2.91 | 6.00 | 11.26 | 21.75 | 40.93 | 64.69 | 99.38 | 180.35 | 3,210 | 5,140 | 6,570 | 8,460 | 9,950 | 11,400 | 15,100 |
| Upper Elk Creek | 3.49 | 7.01 | 12.94 | 25.11 | 47.33 | 73.10 | 107.10 | 188.25 | 2,800 | 4,450 | 5,670 | 7,310 | 8,600 | 9,880 | 13,100 |
| Lower Stinking Creek | 3.41 | 6.98 | 13.24 | 25.91 | 48.38 | 74.53 | 110.10 | 194.42 | 3,240 | 5,180 | 6,620 | 8,530 | 10,000 | 11,500 | 15,200 |
| Buffalo Creek | 3.68 | 7.45 | 13.87 | 26.25 | 47.85 | 74.86 | 115.01 | 210.44 | 2,990 | 4,730 | 6,030 | 7,770 | 9,140 | 10,500 | 14,000 |
| New River at Stainville | 4.19 | 8.32 | 15.21 | 28.45 | 51.70 | 80.01 | 122.30 | 222.89 | 3,680 | 5,870 | 7,500 | 9,650 | 11,300 | 13,000 | 17,200 |
| Lower Brimstone Creek | 4.00 | 8.22 | 15.57 | 29.59 | 53.60 | 83.37 | 128.36 | 235.31 | 3,820 | 6,080 | 7,760 | 9,990 | 11,700 | 13,500 | 17,800 |
| Lower Emory River | 10.11 | 18.10 | 31.04 | 55.21 | 96.11 | 146.80 | 225.65 | 402.60 | 3,630 | 5,520 | 6,890 | 8,700 | 10,100 | 11,600 | 15,300 |
| Lower Hickory Creek | 11.83 | 22.14 | 38.82 | 68.48 | 116.26 | 173.81 | 263.97 | 470.95 | 7,050 | 11,200 | 14,200 | 18,200 | 21,400 | 24,400 | 32,200 |
| New River at Smoky Junction | 11.13 | 21.75 | 38.96 | 70.32 | 122.25 | 183.72 | 279.48 | 502.98 | 6,780 | 10,700 | 13,600 | 17,400 | 20,400 | 23,400 | 30,900 |
| New River at Cordell | 20.86 | 42.21 | 77.97 | 132.99 | 208.59 | 303.87 | 467.19 | 847.20 | 9,750 | 15,200 | 19,300 | 24,700 | 29,000 | 33,200 | 43,900 |
| New River at Winona | 27.78 | 57.10 | 106.44 | 181.53 | 284.53 | 413.72 | 633.74 | 1149.80 | 12,200 | 19,000 | 24,100 | 30,800 | 36,000 | 41,200 | 54,400 |
| New River at Huntsville | 30.97 | 64.65 | 121.68 | 208.85 | 327.18 | 474.69 | 725.62 | 1315.72 | 13,100 | 20,400 | 25,800 | 33,000 | 38,600 | 44,100 | 58,300 |
| New River at New River | 39.29 | 80.75 | 150.48 | 257.33 | 399.85 | 579.34 | 880.77 | 1590.02 | 14,900 | 23,100 | 29,200 | 37,200 | 43,500 | 49,800 | 65,800 |

Source: USGS 2007.
 cfs=cubic feet per second.
^aReference stream.

TABLE E-2: STREAM USE CLASSIFICATIONS FOR SELECTED STREAMS WITHIN THE STUDY AREA

| Stream | Domestic Water Supply | Industrial Water Supply | Fish and Aquatic Life | Recreation | Livestock Watering and Wildlife | Irrigation | Navigation | Trout Stream | Naturally Reproducing Trout Stream |
|--|-----------------------|-------------------------|-----------------------|------------|---------------------------------|------------|------------|--------------|------------------------------------|
| Emory River Watershed | | | | | | | | | |
| Emory River | YES | YES | YES | YES | YES | YES | - | - | - |
| All other Emory River watershed surface waters | - | - | YES | YES | YES | YES | - | - | - |
| Upper Cumberland River Watershed | | | | | | | | | |
| Elk Fork Creek (Mile 1.8 (KY Line) to Origin) | YES | - | YES | YES | YES | YES | - | - | - |
| Hickory Creek | - | - | YES | YES | YES | YES | - | YES | - |
| All other Upper Cumberland River watershed surface waters | - | - | YES | YES | YES | YES | - | - | - |
| Big South Fork Cumberland Watershed | | | | | | | | | |
| Laurel Fork (Upper 4.9 miles) | - | - | YES | YES | YES | YES | - | YES | - |
| New River (Mile 15.0 to Origin) | YES | - | YES | YES | YES | YES | - | - | - |
| All other Big South Fork Cumberland watershed surface waters | - | - | YES | YES | YES | YES | - | - | - |
| Clinch River Watershed | | | | | | | | | |
| Cove Creek (Mile 16.1 to Origin) | YES | YES | YES | YES | YES | YES | - | - | - |
| Ollis Creek | YES | YES | YES | YES | YES | YES | - | - | - |
| All other Clinch River watershed surface waters | - | - | YES | YES | YES | YES | - | - | - |

Source: TDEC 2013.

TABLE E-3A: OFFICE OF SURFACE MINING AND TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION AMBIENT MONITORING DATA AND SUMMARY OF MEASURED WATER QUALITY CRITERIA THRESHOLD EXCEEDANCES AND DETECTION LIMIT ISSUES

| Stream | Station | Number of samples | pH | DO | Sulfate ^a | TDS ^a | AI (CMC/CCC) |
|-------------------------------|---------|-------------------|-----------|-----------|----------------------|------------------|----------------|
| | | | 6-9 units | >5.0 mg/L | 250 mg/L | 500 mg/L | 0.75/0.87 mg/L |
| Rock Creek near Lancing | 06-01 | 3 | 0 | 0 | 0 | 0 | 0/3 |
| Upper Emory | 06-09A | 3 | 0 | 0 | 0 | 0 | 0/3 |
| Lower Emory River | 06-09B | 3 | 0 | 0 | 0 | 0 | 0/3 |
| New River at Smoky Junction | 08-01A | 5 | 0 | 0 | 0 | 0 | 0/4 |
| New River at Stainville | 08-01B | 5 | 0 | 0 | 0 | 0 | 1/4 |
| Ligas Fork at Stainville | 08-01C | 5 | 0 | 0 | 0 | 0 | 0/3 |
| New River near Braytown | 08-01D | 4 | 0 | 0 | 0 | 0 | 0/4 |
| Beech Fork at Shea | 08-02 | 5 | 0 | 0 | 0 | 0 | 0/3 |
| Smoky Creek at Smoky Junction | 08-03A | 5 | 0 | 0 | 0 | 0 | 0/3 |
| Montgomery Fork | 08-04 | 5 | 0 | 0 | 0 | 0 | 0/5 |
| New River at Cordell | 08-05 | 5 | 0 | 0 | 0 | 0 | 0/4 |
| New River at Huntsville | 08-05B | 3 | 0 | 0 | 0 | 0 | 0/1 |
| New River at Winona | 08-06 | 3 | 0 | 0 | 0 | 0 | 0/3 |
| Buffalo Creek | 08-06A | 5 | 0 | 0 | 0 | 0 | 0/3 |
| Straight Fork | 08-06B | 5 | 0 | 1 | 0 | 0 | 0/4 |
| Lower Brimstone Creek | 08-08 | 4 | 0 | 0 | 0 | 0 | 0/3 |
| Upper Brimstone Creek | 08-08A | 4 | 0 | 0 | 0 | 0 | 0/2 |
| New River at New River | 08-09 | 3 | 0 | 0 | 0 | 0 | 1/3 |
| White Oak Creek at Hambright | 08-25 | 3 | 0 | 0 | 0 | 0 | 0/3 |
| Cove Creek at Caryville | 09-03 | 5 | 0 | 0 | 0 | 0 | 0/4 |
| Ollis Creek | 09-05 | 5 | 0 | 0 | 0 | 0 | 0/5 |
| Big Creek | 09-05A | 5 | 0 | 0 | 0 | 0 | 0/5 |
| Bruce Creek | 09-12 | 3 | 0 | 0 | 0 | 0 | 0/2 |
| Lower Stinking Creek | 10-03 | 5 | 0 | 0 | 0 | 0 | 0/5 |
| Upper Stinking Creek | 10-03A | 4 | 0 | 0 | 0 | 0 | 0/3 |
| Lick Creek | 10-04 | 5 | 0 | 0 | 0 | 0 | 0/3 |

Appendices

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|-------------------------------------|--------------|---|---|---|---|---|-----|
| Upper Hickory Creek | 10-05A | 5 | 0 | 0 | 0 | 0 | 0/5 |
| Upper Elk Creek | 10-06B | 5 | 0 | 0 | 0 | 0 | 0/5 |
| Lower Hickory Creek | 10-16 | 3 | 0 | 0 | 0 | 0 | 0/2 |
| Stinking Creek ^b | SC-Ref | 3 | 0 | 0 | 0 | 0 | 0/3 |
| Brimstone Creek ^b | BC-Ref | 3 | 0 | 0 | 0 | 0 | 0/1 |
| Greasy Creek ^b | GC-Ref | 3 | 0 | 0 | 0 | 0 | 0/1 |
| Indian Fork upstream of Joe Branch | INDIA001.0AN | 5 | 1 | 0 | 1 | 0 | 1/3 |
| New River at Stainville | NEW045.0AN | 4 | 0 | 0 | 0 | 0 | 1/0 |
| Ligas Fork at Stainville | LIGIA000.SAN | 4 | 0 | 0 | 0 | 0 | 0/2 |
| Beech Fork at Shea | BEECH000.2SC | 4 | 0 | 0 | 0 | 0 | 0/1 |
| Smoky Creek near Smoky Junction | SMOKY000.8SC | 4 | 0 | 0 | 0 | 0 | 0/2 |
| Montgomery Fork at Montgomery | MONTG000.5SC | 4 | 0 | 0 | 0 | 0 | 0/2 |
| New River at New River | NEW08.8SC | 4 | 0 | 0 | 0 | 0 | 0/2 |
| Paint Rock Creek at Newtown | PROCK001.0SC | 4 | 0 | 0 | 0 | 0 | 0/1 |
| Buffalo Creek upstream of BC Church | BUFFA004.2SC | 4 | 0 | 0 | 0 | 0 | 0/1 |
| Straight Fork at Norma Bridge | STRAI001.9SC | 4 | 0 | 0 | 0 | 0 | 0/2 |
| New River control at Fork Mtn. | FECO69D01 | 5 | 3 | 0 | 0 | 0 | 0/3 |
| Bear Branch | FECO69D03 | 2 | 2 | 0 | 0 | 0 | 0/2 |
| Unnamed Tributary to Titus Creek | FECO69E01 | 5 | 4 | 0 | 0 | 0 | 0/0 |
| Unnamed Tributary to Davis Creek | FECO69E02 | 1 | 1 | 0 | 0 | 0 | 0/0 |

Source: OSMRE n.d.

Notes: mg/L-milligrams per liter; CMC-criterion maximum concentration; CCC- criterion continuous concentration.

^aOSMRE threshold levels used for analysis of cumulative hydrologic impact assessment.

^bReference stream.

TABLE E-3B: OSMRE AND TDEC AMBIENT MONITORING DATA AND SUMMARY OF MEASURED WATER QUALITY CRITERIA THRESHOLD EXCEEDANCES AND DETECTION LIMIT ISSUES

| Stream | Fe ^a | Mn ^a | As ^b (CMC/CCC) | Hg ^b (CMC/CCC) | Se (CMC/CCC) | Cd ^c (CMC/CCC) |
|------------------------------------|-----------------|-----------------|---------------------------|---------------------------|-----------------|---------------------------|
| | 1 mg/L | 1 mg/L | 0.34/0.15 mg/L | 0.0014/0.00077 mg/L | 0.02/0.005 mg/L | HD mg/L |
| Rock Creek near Lancing | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2 |
| Upper Emory | 0 | 0 | 0/0 | 0/0 | 0/0 | 1/2 |
| Lower Emory River | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/1 |
| New River at Smoky Junction | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| New River at Stainville | 1/0 | 0 | 0/0 | 0/0 | 0/0 | 0/1 |
| Ligas Fork at Stainville | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| New River near Braytown | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Beech Fork at Shea | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2 |
| Smoky Creek at Smoky Junction | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/1 |
| Montgomery Fork | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| New River at Cordell | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/1 |
| New River at Huntsville | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| New River at Winona | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Buffalo Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Straight Fork | 1/0 | 0 | 0/0 | 0/0 | 0/0 | 0/2/1-DL |
| Lower Brimstone Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Upper Brimstone Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| New River at New River | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/1 |
| White Oak Creek at Hambright | 1/1 | 0 | 0/0 | 0/0 | 0/0 | 0/2 |
| Cove Creek at Caryville | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2/2-DL |
| Ollis Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2/2-DL |
| Big Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2 |
| Bruce Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Lower Stinking Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2 |
| Upper Stinking Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2 |
| Lick Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Upper Hickory Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Upper Elk Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Lower Hickory Creek | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/1 |
| Stinking Creek ^d | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2 |
| Brimstone Creek ^d | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2 |
| Greasy Creek ^d | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/2 |
| Indian Fork upstream of Joe Branch | 1 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| New River at Stainville | 1 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Ligas Fork at Stainville | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Beech Fork at Shea | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |

Appendices

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|-------------------------------------|---|---|-----|-----|-----|----------|
| Smoky Creek near Smoky Junction | 0 | 0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Montgomery Fork at Montgomery | 0 | 0 | 0/0 | 0/0 | 0/0 | 1-DL |
| New River at New River | 1 | 0 | 0/0 | 0 | 0/0 | 2-DL |
| Paint Rock Creek at Newtown | 0 | 0 | 0/0 | 0 | 0/0 | 4-DL |
| Buffalo Creek upstream of BC Church | 0 | 0 | 0/0 | 0 | 0/0 | 3-DL |
| Straight Fork at Norma Bridge | 0 | 0 | 0/0 | 0 | 0/0 | 1-DL |
| New River control at Fork Mtn. | 0 | 0 | 0/0 | 0 | 0/0 | 5-DL |
| Bear Branch | 0 | 0 | 0/0 | 0 | 0/0 | 0/1/1-DL |
| Unnamed Tributary to Titus Creek | 0 | 0 | 0/0 | 0 | 0/0 | 8-DL |
| Unnamed Tributary to Davis Creek | 0 | 0 | 0/0 | 0 | 0/0 | 2-DL |

Source: OSMRE n.d.

Notes: mg/L-milligrams per liter; CMC-criterion maximum concentration; CCC- criterion continuous concentration,

^aOSMRE threshold levels used for analysis of cumulative hydrologic impact assessment,

^bTDEC/EPA water quality criteria based on dissolved fraction of the sample.

^cTDEC/EPA water quality criteria based on dissolved fraction of the sample and calculated as a function of water hardness.

^dReference stream.

TABLE E-3C: OSMRE AND TDEC AMBIENT MONITORING DATA AND SUMMARY OF MEASURED WATER QUALITY CRITERIA THRESHOLD EXCEEDANCES AND DETECTION LIMIT ISSUES

| Stream | Cr ^a (CMC/CCC) | Cu ^b (CMC/CCC) | Pb ^b (CMC/CCC) | Ni ^b (CMC/CCC) | Ag ^b (CMC) | Zn ^b (CMC/CCC) |
|-------------------------------|---|---------------------------|---------------------------|---------------------------|-----------------------|---------------------------|
| | 0.016/0.011 Cr(IV) ^a HD mg/L Cr(III) ^a | HD mg/L | HD mg/L | HD mg/L | HD mg/L | HD mg/L |
| Rock Creek near Lancing | 0/0 | 1/2 | 0/1 | 0/0 | 3-DL | 1/1 |
| Upper Emory | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Lower Emory River | 0/0 | 0/2 | 0/0 | 0/0 | 1-DL | 1/1 |
| New River at Smoky Junction | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| New River at Stainville | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Ligas Fork at Stainville | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| New River near Braytown | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Beech Fork at Shea | 0/0 | 0/1 | 0/0 | 0/0 | 0/0 | 1/1 |
| Smoky Creek at Smoky Junction | 0/0 | 0/1 | 0/0 | 0/0 | 0/0 | 1/1 |
| Montgomery Fork | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| New River at Cordell | 0/0 | 0/1 | 0/0 | 0/0 | 0/0 | 1/1 |
| New River at Huntsville | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| New River at Winona | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Buffalo Creek | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 2/2 |
| Straight Fork | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Lower Brimstone Creek | 0/0 | 0/1 | 0/0 | 0/0 | 1-DL | 1/1 |
| Upper Brimstone Creek | 0/0 | 0/0 | 0/0 | 0/0 | 1-DL | 1/1 |
| New River at New River | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| White Oak Creek at Hambright | 0/0 | 2/2 | 0/1 | 0/0 | 1-DL | 1/1 |
| Cove Creek at Caryville | 0/0 | 1/1 | 0/0 | 0/0 | 3-DL | 1/1 |
| Ollis Creek | 0/0 | 0/0 | 0/1-DL | 0/0 | 1-DL | 1/1 |
| Big Creek | 0/0 | 1/1 | 0/0 | 0/0 | 0/0 | 1/1 |
| Bruce Creek | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Lower Stinking Creek | 0/0 | 0/0 | 0/0 | 0/0 | 1-DL | 1/1 |
| Upper Stinking Creek | 0/0 | 0/1 | 0/0 | 0/0 | 1-DL | 1/1 |
| Lick Creek | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |

Appendices

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|-------------------------------------|-----|------|------|-----|------|-----|
| Upper Hickory Creek | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Upper Elk Creek | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Lower Hickory Creek | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Stinking Creek ^c | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 1/1 |
| Brimstone Creek ^c | 0/0 | 1/1 | 0/0 | 0/0 | 2-DL | 1/1 |
| Greasy Creek ^c | 0/0 | 1/1 | 0/1 | 0/0 | 3-DL | 1/1 |
| Indian Fork upstream of Joe Branch | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| New River at Stainville | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Ligas Fork at Stainville | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Beech Fork at Shea | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Smoky Creek near Smoky Junction | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Montgomery Fork at Montgomery | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| New River at New River | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Paint Rock Creek at Newtown | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Buffalo Creek upstream of BC Church | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Straight Fork at Norma Bridge | 0/0 | 0/0 | 0/0 | 0/1 | 0/0 | 1/1 |
| New River control at Fork Mtn. | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Bear Branch | 0/0 | 0/0 | 0/2 | 0/0 | 0/0 | 0/0 |
| Unnamed Tributary to Titus Creek | 0/0 | 4-DL | 5-DL | 0/0 | 0/0 | 2/2 |
| Unnamed Tributary to Davis Creek | 0/0 | 2-DL | 1-DL | 0/0 | 0/0 | 0/0 |

Source: OSMRE n.d.

Notes: mg/L-milligrams per liter; CMC-criterion maximum concentration; CCC- criterion continuous concentration.

^aThese values are based on total chromium while TDEC and US Environmental Protection Agency (EPA) criteria are based on dissolved species of Cr(III) and Cr(IV) with Cr(III) criteria also being a function of hardness. As long as total chromium does not exceed either the CMC or CCC for Cr(III) or Cr(IV), no exceedances exit.

^bTDEC/EPA water quality criteria based on dissolved fraction of the sample and calculated as a function of water hardness.

^cReference stream.

TABLE E-4: SURFACE MINING DISTURBANCES IN THE OFFICE OF SURFACE MINING CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT AND REFERENCE WATERSHEDS

| Number | Trend Station | Stream Name | Acres | Miles ² | Mining Acres | Percent Mined |
|--------|---------------|---|---------|--------------------|--------------|---------------|
| 1 | 06-01 | Rock Creek near Lancing | 20,035 | 31.3 | 25 | 0.1 |
| 2 | 08-25 | White Oak Creek near Sunbright | 13,712 | 21.4 | 238 | 1.7 |
| 3 | 06-09B | Lower Emory River at Nemo | 58,693 | 91.7 | 1482 | 2.5 |
| 4 | 10-03A | Upper Stinking Creek | 12,361 | 19.3 | 344 | 2.8 |
| 5 | 09-03 | Cove Creek | 15,386 | 24.0 | 632 | 4.1 |
| 6 | 10-03 | Lower Stinking Creek | 24,582 | 38.4 | 1492 | 6.1 |
| 7 | 06-09A | Upper Emory at Elizabeth | 17,982 | 28.1 | 1171 | 6.5 |
| 8 | 08-06A | Buffalo Creek upstream of confluence with Straight Fork | 27,903 | 43.6 | 1947 | 7.0 |
| 9 | 08-08A | Brimstone Creek at Hughett | 23,525 | 36.8 | 1737 | 7.4 |
| 10 | 08-08 | Brimstone Creek at Walker Bridge | 31,225 | 48.8 | 2365 | 7.6 |
| 11 | 09-05 | Ollis Creek | 10,289 | 16.1 | 868 | 8.4 |
| 12 | 08-09 | New River at New River | 237,719 | 371.4 | 23943 | 10.1 |
| 13 | 10-06B | Upper Elk Creek | 23,682 | 37.0 | 2414 | 10.2 |
| 14 | 08-05B | New River at Huntsville | 196,134 | 306.5 | 21068 | 10.7 |
| 15 | 08-06B | Straight Fork upstream of confluence with Buffalo Creek | 12,272 | 19.2 | 1393 | 11.3 |
| 16 | 08-06 | New River at Winona | 172,682 | 269.8 | 19591 | 11.3 |
| 17 | 08-03A | Smoky Creek at Smoky Creek Junction | 21,423 | 33.5 | 2672 | 12.5 |
| 18 | 09-12 | Bruce Creek | 1,756 | 2.7 | 226 | 12.9 |
| 19 | 08-05 | New River at Cordell | 127,026 | 198.5 | 16132 | 12.7 |
| 20 | 09-05A | Big Creek | 4,817 | 7.5 | 635 | 13.2 |
| 21 | 08-01D | New River near Braytown | 12,423 | 19.4 | 1717 | 13.8 |
| 22 | 08-01C | Ligas Fork at Stainville | 13,067 | 20.4 | 1794 | 13.7 |
| 23 | 10-16 | Hickory Creek at Morley | 68,397 | 106.9 | 9638 | 14.1 |
| 24 | 08-01B | New River at Stainville | 29,078 | 45.4 | 4159 | 14.3 |

Appendices

| | | | | | | |
|----|--------|--|--------|-------|-------|------|
| 25 | 08-01A | New River upstream of Smoky Creek | 71,590 | 111.9 | 10303 | 14.4 |
| 26 | 08-04 | Montgomery Fork at Montgomery | 14,174 | 22.1 | 2128 | 15.0 |
| 27 | 08-02 | Beech Fork at Shea | 17,898 | 28.0 | 3128 | 17.5 |
| 28 | 10-05A | Hickory Creek upstream of confluence with Stinking Creek | 15,898 | 24.8 | 3175 | 20.0 |
| 29 | 10-04 | Lick Creek at Habersham | 13291 | 20.8 | 2974 | 22.4 |
| 30 | NB-Ref | No Business Creek ^a | 1,096 | 1.7 | 0 | 0.0 |
| 31 | GC-Ref | Greasy Creek ^a | 5,369 | 8.4 | 63 | 1.2 |
| 32 | BC-Ref | Brimstone Creek ^a | 5,382 | 8.4 | 110 | 2.1 |
| 33 | SC-Ref | Stinking Creek ^a | 8,269 | 12.5 | 320 | 3.9 |

Source: OSMRE n.d.

^aReference stream.

TABLE E-5A: SUMMARY OF PRIMARY AND SECONDARY MAXIMUM CONTAMINANT LEVEL THRESHOLD EXCEEDANCES FOR DOMESTIC WATER SUPPLY STREAMS

| Stream | | Upper Emory River | Lower Emory River | New River at Braytown | New River at Stainville | New River at Smoky Junction | New River at Cordell | New River at Winona | New River at Huntsville |
|----------------------------------|------------|-------------------|-------------------|-----------------------|-------------------------|-----------------------------|----------------------|---------------------|-------------------------|
| L | | 06-09A | 06-09B | 08-01D | 08-01B | 08-01A | 08-05 | 08-06 | 08-05B |
| # of Samples | | 3 | 3 | 4 | 5 | 5 | 5 | 3 | 3 |
| Parameter | MCL (mg/L) | | | | | | | | |
| pH ^a | 6.5-8.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SO ₄ | 250 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TDS | 500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fluoride | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chloride | 250 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aluminum | 0.05-0.2 | 1/0 | 1/0 | 1/1 | 3/1 | 1/0 | 3/1 | 1/0 | 0/1 |
| Iron | 0.3 | 1/0 | 0 | 1/0 | 2/0 | 0 | 2/0 | 0 | 1/0 |
| Manganese | 0.05 | 1/0 | 0 | 1/1 | 0 | 0 | 0 | 0 | 1/0 |
| Silver | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zinc | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NO ₂ +NO ₃ | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Antimony | 0.006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Arsenic | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Barium | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Beryllium | 0.004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cadmium | 0.005 | 1/0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chromium | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Copper | 1.3/1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lead | 0.015 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1/0 |
| Mercury | 0.002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nickel ^b | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Selenium | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Thallium | 0.002 | 0 | 0 | 0 | 1/1 | 1/1 | 1/1 | 0 | 1/0 |

Source: OSMRE n.d.

^apH measured in units (L=below minimum pH; H=above maximum pH).

^bNickel MCL was remanded by EPA on February 9, 1995 but is listed here for reference level.

TABLE E-5B: SUMMARY OF PRIMARY AND SECONDARY MAXIMUM CONTAMINANT LEVEL THRESHOLD EXCEEDANCES FOR DOMESTIC WATER SUPPLY STREAMS

| Stream | | New River at New River | Cove Creek | Ollis Creek | Upper Elk Creek | New River at Fork Mountain | New River at Stainville | New River at New River |
|----------------------------------|------------|------------------------|------------|-------------|-----------------|----------------------------|-------------------------|------------------------|
| Station | | 08-09 | 09-03 | 09-05 | 10-06B | FECO69D01 | NEW045.0AN | NEW08.8SC |
| # of Samples | | 3 | 5 | 5 | 5 | 4 | 4 | 4 |
| Parameter | MCL (mg/L) | | | | | | | |
| pH ^a | 6.5-8.5 | 0 | 1-H | 1-L | 0 | 3-L | 0 | 0 |
| SO ₄ | 250 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TDS | 500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fluoride | 2 | 0 | 0 | 0 | 0 | | | |
| Chloride | 250 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aluminum | 0.05-0.2 | 2/1 | 2/2 | 2/2 | 0 | 4/1 | 2/1 | 3/1 |
| Iron | 0.3 | 1/0 | 2/0 | 1/0 | 4/0 | 2 | 1 | 3 |
| Manganese | 0.05 | 1/0 | 1/0 | 4/3 | 1/0 | 0 | 0 | 0 |
| Silver | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zinc | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NO ₂ +NO ₃ | 10 | 0 | 0 | 0 | 0 | | | |
| Antimony | 0.006 | 0 | 0 | 0 | 0 | | | |
| Arsenic | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Barium | 2 | 0 | 0 | 0 | 0 | | | |
| Beryllium | 0.004 | 0 | 0 | 0 | 0 | | | |
| Cadmium | 0.005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chromium | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Copper | 1.3/1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lead | 0.015 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mercury | 0.002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nickel ^b | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Selenium | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Thallium | 0.002 | 0 | 1/0 | 1/1 | 1/1 | 0 | 0 | 0 |

Source: OSMRE n.d.

^apH measured in units (L=below minimum pH; H=above maximum pH).

^bNickel MCL was remanded by EPA on February 9, 1995 but is listed here for reference level.

TABLE E-6A: SUMMARY STATISTICS OF LOW FLOW SPECIFIC CONDUCTIVITY SITES

| Site ID | Stream | Start Date | End Date | Watershed Size (Miles ² /Acres) | Surface Mining Disturbance (Acres/%) ^a | Max (µS/cm) | Min (µS/cm) |
|---------|--|------------|------------|--|---|-------------|-------------|
| 1 | No Business Branch | 8/16/2011 | 8/29/2011 | 1.7 (1,094) | 0 (0.0) | 27.7 | 24.8 |
| 2 | Cane Branch | 9/19/2011 | 10/4/2011 | 1.2 (762) | 0 (0.0) | 55.5 | 32.9 |
| 3 | Rock Creek near Lancing and Highway 127 | 9/19/2011 | 10/4/2011 | 31.3 (20,058) | 25 (0.1) | 77.0 | 51.2 |
| 4 | Greasy Creek downstream of Mill Branch | 9/19/2011 | 10/4/2011 | 13.3 (8,480) | 64 (0.8) | 43.7 | 34.8 |
| 5 | Titus Creek just upstream of Cove Creek | 10/7/2011 | 10/21/2011 | 8.2 (5,222) | 67 (1.3) | 273.0 | 92.7 |
| 6 | White Oak Creek at Hambright Bridge | 9/19/2011 | 10/4/2011 | 21.4 (13,715) | 238 (1.7) | 115.7 | 51.9 |
| 7 | Upper Brimstone reference section | 9/19/2011 | 10/4/2011 | 8.1 (5,171) | 111 (2.1) | 144.8 | 33.0 |
| 8 | Cove Creek near Red Ash | 8/16/2011 | 8/29/2011 | 20.8 (13,318) | 462 (3.5) | 352.3 | 179.0 |
| 9 | Lower Emory River | 7/27/2011 | 8/9/2011 | 49.0 (31,386) | 1,260 (4.0) | 84.5 | 66.3 |
| 10 | Upper Stinking Creek at TWRA ATV area | 8/16/2011 | 8/29/2011 | 12.2 (7,808) | 318 (4.1) | 136.0 | 74.2 |
| 11 | Bull Creek upstream of New River | 10/25/2011 | 11/8/2011 | 10.5 (6,714) | 295 (4.4) | 100.2 | 69.1 |
| 12 | Lower Stinking Creek at National Coal haulroad | 8/16/2011 | 8/28/2011 | 33.7 (21,555) | 1,060 (4.9) | 323.1 | 196.1 |
| 13 | Upper Cove Creek | 10/7/2011 | 10/21/2011 | 4.7 (3,027) | 169 (5.6) | 247.7 | 93.9 |
| 14 | Macs Branch at Hughett | 9/19/2011 | 10/4/2011 | 2.4 (1,562) | 98 (6.3) | 155.8 | 103.5 |
| 15 | Upper Emory River at Trendstation | 7/27/2011 | 8/9/2011 | 28.1 (17,978) | 1,168 (6.5) | 109.7 | 73.5 |
| 16 | Bowling Branch upstream of Smoky Creek | 10/25/2011 | 11/8/2011 | 3.0 (1,914) | 132 (6.9) | 49.7 | 36.6 |
| 17 | Lower Buffalo Creek at Buffalo Bridge | 10/7/2011 | 10/21/2011 | 42.6 (27,232) | 1,917 (7.0) | 236.9 | 101.9 |
| 18 | Upper Straight Fork near Turley Mountain | 10/7/2011 | 10/21/2011 | 0.9 (544) | 39 (7.2) | 55.6 | 32.2 |
| 19 | Elk Fork Creek | 10/7/2011 | 10/21/2011 | 7.2 (4,627) | 341 (7.4) | 268.4 | 127.3 |
| 20 | Upper Buffalo Creek | 10/7/2011 | 10/21/2011 | 28.4 (18,182) | 1,389 (7.6) | 202.0 | 130.2 |
| 21 | New River at Fork Mountain | 6/28/2011 | 7/13/2011 | 4.2 (2,662) | 210 (7.9) | 316.2 | 52.2 |
| 22 | Paint Rock Creek at Newtown | 10/7/2011 | 10/21/2011 | 21.5 (13,766) | 1,118 (8.1) | 208.3 | 42.6 |
| 23 | Rockhouse Fork to Buffalo Creek | 10/7/2011 | 10/21/2011 | 6.3 (4,026) | 363 (9.0) | 204.7 | 101.0 |
| 24 | Mill Creek upstream at Lone Mountain | 9/19/2011 | 10/7/2011 | 10.9 (6,963) | 655 (9.4) | 199.6 | 153.1 |
| 25 | Terry Creek | 10/7/2011 | 10/21/2011 | 5.1 (3,270) | 320 (9.8) | 158.1 | 91.8 |

Appendices

| | | | | | | | |
|----|--|------------|------------|-----------------|---------------|--------|-------|
| 26 | Big Creek downstream of Ollis Creek confluence | 8/17/2011 | 8/29/2011 | 23.6 (15,130) | 1,499 (9.9) | 296.9 | 129.3 |
| 27 | Edmunds Branch tributary to Emory River | 7/27/2011 | 8/9/2011 | 1.7 (1,069) | 108 (10.1) | 93.6 | 50.6 |
| 28 | Laurel Fork upstream of low-water crossing | 6/28/2011 | 7/13/2011 | 7.2 (4,582) | 498 (10.9) | 272.4 | 110.7 |
| 29 | Emory River upstream of Edmunds Branch | 7/27/2011 | 8/9/2011 | 10.9 (7,002) | 854 (12.2) | 149.7 | 86.5 |
| 30 | Straight Fork (lower at Norma road bridge) | 10/7/2011 | 10/21/2011 | 17.0 (10,893) | 1,358 (12.5) | 415.3 | 112.2 |
| 31 | New River at Cordell | 10/25/2011 | 11/8/2011 | 198.5 (127,034) | 16,127 (12.7) | 211.3 | 158.1 |
| 32 | Cage Creek | 11/2/2011 | 11/18/2011 | 6.0 (3,808) | 509 (13.4) | 205.5 | 107.6 |
| 33 | New River downstream of Baldwin Tipple | 6/28/2011 | 7/13/2011 | 19.4 (12,422) | 1,709 (13.8) | 293.3 | 82.2 |
| 34 | Lower Ligias Fork near Stainville | 11/2/2011 | 11/22/2011 | 20.3 (12,973) | 1,790 (13.8) | 318.1 | 110.0 |
| 35 | New River at Stainville | 6/28/2011 | 7/4/2011 | 45.4 (29,082) | 4,155 (14.3) | 361.1 | 205.0 |
| 36 | Montgomery Fork upstream of Roach Creek | 10/25/2011 | 11/8/2011 | 18.5 (11,853) | 1,701 (14.4) | 173.9 | 153.2 |
| 37 | Straight Fork upstream of Neal Branch | 10/7/2011 | 10/21/2011 | 8.4 (5,395) | 800 (14.8) | 377.3 | 183.6 |
| 38 | Charleys Branch | 6/28/2011 | 7/11/2011 | 1.5 (966) | 148 (15.4) | 420.2 | 112.9 |
| 39 | Upper Ligias Fork upstream of Graves Gap Br. | 11/2/2011 | 11/22/2011 | 9.0 (5,779) | 901 (15.6) | 361.3 | 70.6 |
| 40 | Round Rock Creek at Stony Fork School | 11/2/2011 | 11/22/2011 | 15.9 (10,144) | 1,803 (17.8) | 248.6 | 114.3 |
| 41 | Hickory Creek just upstream of Rock Creek | 8/16/2011 | 8/29/2011 | 19.7 (12,595) | 2,433 (19.3) | 539.0 | 314.1 |
| 42 | Cable Branch | 11/2/2011 | 11/18/2011 | 0.4 (262) | 52 (19.8) | 545.1 | 149.1 |
| 43 | Roach Creek just upstream of Montgomery Fork | 10/25/2011 | 11/8/2011 | 3.2 (2,042) | 416 (20.4) | 171.1 | 106.2 |
| 44 | Nicks Creek | 10/25/2011 | 11/8/2011 | 4.8 (3,066) | 631 (20.6) | 154.5 | 124.0 |
| 45 | Emory River headwater | 7/27/2011 | 8/9/2011 | 2.6 (1,683) | 352 (20.9) | 302.0 | 104.4 |
| 46 | Indian Fork at Braytown | 6/28/2011 | 7/13/2011 | 4.8 (3,053) | 713 (23.4) | 591.8 | 80.8 |
| 47 | Rock Creek upstream of lower waterfall | 8/16/2011 | 8/29/2011 | 4.0 (2,579) | 648 (25.1) | 489.9 | 271.9 |
| 48 | Neal Branch | 10/7/2011 | 10/21/2011 | 1.4 (883) | 226 (25.6) | 1318.0 | 293.2 |

Source: OSMRE n.d.

µS/cm-microsiemens per centimeter.

^aThe percent of surface area that is considered to be disturbed by mining is based on surface disturbance areas and does not include underground mine areas.

TABLE E-6B: SUMMARY STATISTICS OF LOW FLOW SPECIFIC CONDUCTIVITY SITES

| Site ID | Stream | Mean (µS/cm) | Median (µS/cm) | Range (µS/cm) | Rainfall (inches) |
|---------|--|--------------|----------------|---------------|-------------------|
| 1 | No Business Branch | 26.3 | 26.2 | 2.9 | 2.47 |
| 2 | Cane Branch | 44.0 | 43.9 | 22.6 | 2.12 |
| 3 | Rock Creek near Lancing and Highway 127 | 59.5 | 59.4 | 25.8 | 2.12 |
| 4 | Greasy Creek downstream of Mill Branch | 39.9 | 39.7 | 8.9 | 2.12 |
| 5 | Titus Creek just upstream of Cove Creek | 222.0 | 242.8 | 180.3 | 6.21 |
| 6 | White Oak Creek at Hambright Bridge | 78.2 | 74.8 | 63.8 | 2.12 |
| 7 | Upper Brimstone reference section | 56.8 | 52.8 | 111.8 | 2.12 |
| 8 | Cove Creek near Red Ash | 204.8 | 201.1 | 173.3 | 2.47 |
| 9 | Lower Emory River | 77.3 | 76.7 | 18.2 | 2.5 |
| 10 | Upper Stinking Creek at TWRA ATV area | 115.5 | 115.9 | 61.8 | 2.47 |
| 11 | Bull Creek upstream of New River | 78.3 | 76.3 | 31.1 | 2.13 |
| 12 | Lower Stinking Creek at National Coal haulroad | 253.1 | 250.0 | 127.0 | 2.47 |
| 13 | Upper Cove Creek | 215.1 | 235.8 | 153.8 | 6.21 |
| 14 | Macs Branch at Hughett | 133.7 | 132.8 | 52.3 | 2.12 |
| 15 | Upper Emory River at Trendstation | 91.6 | 91.8 | 36.2 | 2.5 |
| 16 | Bowling Branch upstream of Smoky Creek | 43.3 | 43.2 | 13.1 | 2.13 |
| 17 | Lower Buffalo Creek at Buffalo Bridge | 162.9 | 166.5 | 135.0 | 6.21 |
| 18 | Upper Straight Fork near Turley Mountain | 45.2 | 46.2 | 23.4 | 6.21 |
| 19 | Elk Fork Creek | 221.0 | 231.2 | 151.1 | 6.21 |
| 20 | Upper Buffalo Creek | 179.4 | 179.0 | 71.8 | 6.21 |
| 21 | New River at Fork Mountain | 217.3 | 229.5 | 264.0 | 8.11 |
| 22 | Paint Rock Creek at Newtown | 176.8 | 188.8 | 165.7 | 6.21 |
| 23 | Rockhouse Fork to Buffalo Creek | 174.9 | 186.1 | 103.7 | 6.21 |
| 24 | Mill Creek upstream at Lone Mountain | 172.9 | 172.0 | 46.5 | 2.12 |
| 25 | Terry Creek | 126.4 | 132.4 | 66.3 | 6.21 |

Appendices

| Site ID | Stream | Mean (µS/cm) | Median (µS/cm) | Range (µS/cm) | Rainfall (inches) |
|---------|--|--------------|----------------|---------------|-------------------|
| 26 | Big Creek downstream of Ollis Creek confluence | 226.8 | 226.3 | 167.6 | 2.47 |
| 27 | Edmunds Branch tributary to Emory River | 77.2 | 77.5 | 43.0 | 2.5 |
| 28 | Laurel Fork upstream of low-water crossing | 192.6 | 197.4 | 1661.7 | 8.11 |
| 29 | Emory River upstream of Edmunds Branch | 131.5 | 128.9 | 63.2 | 2.5 |
| 30 | Straight Fork (lower at Norma Road bridge) | 323.8 | 363.9 | 303.1 | 6.21 |
| 31 | New River at Cordell | 187.6 | 189.5 | 53.2 | 2.13 |
| 32 | Cage Creek | 177.9 | 181.4 | 97.9 | 2.9 |
| 33 | New River downstream of Baldwin Tipple | 238.4 | 245.9 | 211.1 | 8.11 |
| 34 | Lower Ligias Fork near Stainville | 229.1 | 223.4 | 208.1 | 4.15 |
| 35 | New River at Stainville | 285.2 | 288.6 | 156.1 | 131 |
| 36 | Montgomery Fork upstream of Roach Creek | 162.6 | 162.2 | 20.7 | 2.13 |
| 37 | Straight Fork upstream of Neal Branch | 318.6 | 338.9 | 193.7 | 6.21 |
| 38 | Charleys Branch | 320.0 | 339.3 | 3307.3 | 6.8 |
| 39 | Upper Ligias Fork upstream of Graves Gap Br. | 245.1 | 259.5 | 290.7 | 4.15 |
| 40 | Round Rock Creek at Stony Fork School | 198.2 | 199.0 | 134.3 | 4.15 |
| 41 | Hickory Creek just upstream of Rock Creek | 471.1 | 482.8 | 224.9 | 2.47 |
| 42 | Cable Branch | 462.9 | 478.1 | 396.0 | 2.9 |
| 43 | Roach Creek just upstream of Montgomery Fork | 145.0 | 146.3 | 64.9 | 2.13 |
| 44 | Nicks Creek | 139.7 | 139.2 | 30.5 | 2.13 |
| 45 | Emory River headwater | 204.0 | 208.7 | 197.6 | 2.5 |
| 46 | Indian Fork at Braytown | 408.9 | 436.6 | 511.0 | 8.11 |
| 47 | Rock Creek upstream of lower waterfall | 429.5 | 433.5 | 217.9 | 2.47 |
| 48 | Neal Branch | 982.4 | 993.4 | 1024.8 | 6.21 |

Source: OSMRE n.d.
 µS/cm-microsiemens per centimeter.

GROUNDWATER QUANTITY

TABLE E-7: WELL STATISTICS FOR THE COUNTIES COMPRISING THE NORTH CUMBERLAND WILDLIFE MANAGEMENT AREA AND PETITION AREA

| County | Anderson | | Campbell | | Morgan | | Scott | |
|-----------------------------------|----------|-------|----------|-------|--------|-------|--------|-------|
| Total wells | 1,789 | | 1,973 | | 1,712 | | 759 | |
| Wells with known locations | 945 | | 519 | | 357 | | 147 | |
| NCWMA area wells | 17 | | 30 | | 29 | | 6 | |
| Well Statistics | County | NCWMA | County | NCWMA | County | NCWMA | County | NCWMA |
| Max. well depth (feet) | 3,458 | 250 | 1,000 | 505 | 1,647 | 775 | 900 | 106 |
| Min. well depth (feet) | 5 | 50 | 25 | 85 | 17 | 10 | 16 | 48 |
| Mean well depth (feet) | 236 | 125 | 243 | 232 | 156 | 163 | 106 | 76 |
| Median well depth (feet) | 200 | 108 | 222 | 193 | 125 | 109 | 82 | 79 |
| Max. well yield (gpm) | 1,250 | 50 | 2,200 | 300 | 150 | 50 | 350 | 12 |
| Min. well yield (gpm) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Mean well yield (gpm) | 16 | 18 | 15 | 26 | 11 | 12 | 11 | 7 |
| Median well yield (gpm) | 6 | 20 | 5 | 10 | 8 | 8 | 5 | 8 |
| Max. casing length (feet) | 910 | 63 | 346 | 105 | 718 | 69 | 147 | 25 |
| Min. casing length (feet) | 5 | 20 | 3 | 20 | 2 | 11 | 2 | 3 |
| Mean casing length (feet) | 63 | 29 | 63 | 40 | 24 | 30 | 21 | 16 |
| Median casing length (feet) | 42 | 22 | 42 | 41 | 21 | 22 | 20 | 17 |
| Max. depth to WBZ (feet) | 725 | 230 | 800 | 360 | 550 | 280 | 485 | 74 |
| Min. depth to WBZ (feet) | 3 | 34 | 6 | 10 | 4 | 38 | 6 | 33 |
| Mean depth to WBZ (feet) | 171 | 83 | 170 | 130 | 96 | 94 | 65 | 47 |
| Median depth to WBZ (feet) | 140 | 77 | 150 | 100 | 80 | 70 | 45 | 40 |

Source: Ewing pers. comm. 2012.

NCWMA-North Cumberland Wildlife Management Area; Max.-maximum; Min.-minimum; gpm-gallons per minute; WBZ-water-bearing zone.

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APPENDIX F: TERRESTRIAL SPECIES DOCUMENTED IN THE EVALUATION AREA

The following tables list those terrestrial species documented as occurring in or near the evaluation area.

TABLE F-1: BIRD SPECIES OCCURRING WITHIN THE FROZEN HEAD STATE PARK AND ROYAL BLUE WILDLIFE MANAGEMENT AREA

| Common Name | Scientific Name |
|---------------------------|----------------------------------|
| Cooper's Hawk | <i>Accipiter cooperii</i> |
| Sharp-shinned Hawk | <i>Accipiter striatus</i> |
| Wood Duck | <i>Aix sponsa</i> |
| Golden Eagle | <i>Aquila chrysaetos</i> |
| Ruby-throated Hummingbird | <i>Archilochus colubris</i> |
| Great Blue Heron | <i>Ardea herodias</i> |
| Tufted Titmouse | <i>Baeolophus bicolor</i> |
| Cedar Waxwing | <i>Bombycilla cedrorum</i> |
| Ruffed Grouse | <i>Bonasa umbellus</i> |
| American Bittern | <i>Botaurus lentiginosus</i> |
| Canada Goose | <i>Branta canadensis</i> |
| Red-tailed Hawk | <i>Buteo jamaicensis</i> |
| Red-shouldered Hawk | <i>Buteo lineatus</i> |
| Broad-winged Hawk | <i>Buteo platypterus</i> |
| Green Heron | <i>Butorides virescens</i> |
| Northern Cardinal | <i>Cardinalis cardinalis</i> |
| Turkey Vulture | <i>Cathartes aura</i> |
| Turkey Vulture | <i>Cathartes aura</i> |
| Veery Bird | <i>Catharus fuscescens</i> |
| Chimney Swift | <i>Chaetura pelagica</i> |
| Killdeer | <i>Charadrius vociferus</i> |
| Yellow-billed Cuckoo | <i>Coccyzus americanus</i> |
| Black-billed Cuckoo | <i>Coccyzus erythrophthalmus</i> |
| Northern Flicker | <i>Colaptes auratus</i> |
| Northern Bobwhite | <i>Colinus virginianus</i> |
| Rock Pigeon | <i>Columba livia</i> |
| Eastern Wood-Pewee | <i>Contopus virens</i> |
| Black Vulture | <i>Coragyps atratus</i> |
| American Crow | <i>Corvus brachyrhynchos</i> |
| Blue Jay | <i>Cyanocitta cristata</i> |

Appendices

| Common Name | Scientific Name |
|-------------------------------|--------------------------------|
| Blackburnian Warbler | <i>Dendroica fusca</i> |
| Black-throated Golden Warbler | <i>Dendroica virens</i> |
| Pileated Woodpecker | <i>Dryocopus pileatus</i> |
| Gray Catbird | <i>Dumetella carolinensis</i> |
| Least Flycatcher | <i>Empidonax minimus</i> |
| Acadian Flycatcher | <i>Empidonax virescens</i> |
| American Kestrel | <i>Falco sparverius</i> |
| Common Loon | <i>Gavia immer</i> |
| Sandhill Crane | <i>Grus canadensis</i> |
| Worm-eating Warbler | <i>Helmitheros vermivorum</i> |
| Wood Thrush | <i>Hylocichla mustelina</i> |
| Red-bellied Woodpecker | <i>Melanerpes carolinus</i> |
| Wild Turkey | <i>Meleagris gallopavo</i> |
| Black-and-white Warbler | <i>Mniotilta varia</i> |
| Brown-headed Cowbird | <i>Molothrus ater</i> |
| Great Crested Flycatcher | <i>Myiarchus crinitus</i> |
| Yellow-crowned Night-Heron | <i>Nyctanassa violacea</i> |
| Kentucky Warbler | <i>Oporornis formosus</i> |
| Louisiana Water thrush | <i>Parkesia motacilla</i> |
| Indigo Bunting | <i>Passerina cyanea</i> |
| Double-crested Cormorant | <i>Phalacrocorax auritus</i> |
| Rose-breasted Grosbeak | <i>Pheucticus ludovicianus</i> |
| Downy Woodpecker | <i>Picoides pubescens</i> |
| Hairy Woodpecker | <i>Picoides villosus</i> |
| Eastern Towhee | <i>Pipilo erythrophthalmus</i> |
| Scarlet Tanager | <i>Piranga olivacea</i> |
| Summer Tanager | <i>Piranga rubra</i> |
| Carolina Chickadee | <i>Poecile carolinensis</i> |
| Blue-gray Gnatcatcher | <i>Polioptila caerulea</i> |
| Eastern Phoebe | <i>Sayornis phoebe</i> |
| American Woodcock | <i>Scolopax minor</i> |
| Ovenbird | <i>Seiurus aurocapilla</i> |
| Black-throated Blue Warbler | <i>Setophaga caerulescens</i> |
| Cerulean Warbler | <i>Setophaga cerulea</i> |
| Yellow-throated Warbler | <i>Setophaga dominica</i> |
| Chestnut-sided Warbler | <i>Setophaga pensylvanica</i> |
| American Redstart | <i>Setophaga ruticilla</i> |

Appendix F: Terrestrial Species Documented in the Evaluation Area

| Common Name | Scientific Name |
|-------------------------|---------------------------------|
| Eastern Bluebird | <i>Sialia sialis</i> |
| White-breasted Nuthatch | <i>Sitta carolinensis</i> |
| American Goldfinch | <i>Spinus tristis</i> |
| Chipping Sparrow | <i>Spizella passerina</i> |
| Barred Owl | <i>Strix varia</i> |
| Carolina Wren | <i>Thryothorus ludovicianus</i> |
| Brown Thrasher | <i>Toxostoma rufum</i> |
| Winter Wren | <i>Troglodytes hiemalis</i> |
| American Robin | <i>Turdus migratorius</i> |
| Yellow-throated Vireo | <i>Vireo flavifrons</i> |
| Red-eyed Vireo | <i>Vireo olivaceus</i> |
| Blue-headed Vireo | <i>Vireo solitarius</i> |
| Canada Warbler | <i>Wilsonia canadensis</i> |
| Hooded Warbler | <i>Wilsonia citrina</i> |
| Mourning Dove | <i>Zenaida macroura</i> |

TABLE F-2: MAMMALS PRESENT IN THE CUMBERLAND MOUNTAIN PLATEAU

| Common Name | Scientific Name | Native/Nonnative |
|---------------------------|----------------------------------|------------------|
| Northern Long Eared Shrew | <i>Blarina brevicauda</i> | Native |
| Domestic dog | <i>Canis familiaris</i> | Nonnative |
| Coyote | <i>Canis latrans</i> | Native |
| Beaver | <i>Castor Canadensis</i> | Native |
| Elk | <i>Cervus elaphus</i> | Native |
| Eastern Big-Eared Bat | <i>Corynorhinus rafinesquii</i> | Native |
| Least Shrew | <i>Cryptotis parva</i> | Native |
| Nine-banded armadillo | <i>Dasypus novemcinctus</i> | Nonnative |
| Virginia opossum | <i>Didelphis virginiana</i> | Native |
| Northern flying squirrel | <i>Glaucomys sabrinus</i> | |
| Southern flying squirrel | <i>Glaucomys volans</i> | Native |
| Silver-haired bat | <i>Lasionycteris noctivagans</i> | Native |
| Red Bat | <i>Lasiurus borealis</i> | Native |
| Hoary Bat | <i>Lasiurus cinereus</i> | Native |
| River Otter | <i>Lontra canadensis</i> | Native |
| Bobcat | <i>Lynx rufus</i> | Native |
| Woodchuck | <i>Marmota monax</i> | Native |

Appendices

| Common Name | Scientific Name | Native/Nonnative |
|-------------------------|-------------------------------------|-------------------------|
| Striped Skunk | <i>Mephitis mephitis</i> | Native |
| Prairie Vole | <i>Microtus ochrogastor</i> | Native |
| Woodland vole | <i>Microtus pinetorum</i> | Native |
| House mouse | <i>Mus musculus</i> | Nonnative |
| Long-tailed weasel | <i>Mustela frenata</i> | |
| Mink | <i>Mustela vison</i> | |
| Little Brown Bat | <i>Myotis septentrionalis</i> | Native |
| Northern long-eared bat | <i>Myotis septentrionalis</i> | Native |
| Golden mouse | <i>Ochrotomys nuttalli</i> | Native |
| White-tailed deer | <i>Odocoileus virginianus</i> | Native |
| Muskrat | <i>Ondatra zibethicus</i> | Native |
| Hairy-tailed mole | <i>Parascalops breweri</i> | |
| Tricolored Bat | <i>Perimyotis subflavus</i> | Native |
| White-footed mouse | <i>Peromyscus leucopus</i> | Native |
| Eastern pipistrelle | <i>Pipistrellus subflavus</i> | |
| Raccoon | <i>Procyon lotor</i> | Native |
| Norway rat | <i>Rattus norvegicus norvegicus</i> | Nonnative |
| Eastern Harvest Mouse | <i>Reithrodontomys humulis</i> | Native |
| Eastern Mole | <i>Scalopus aquaticus</i> | Native |
| Eastern Grey Squirrel | <i>Sciurus carolinensis</i> | Native |
| Hispid Cotton Rat | <i>Sigmodon hispidus</i> | Native |
| Smoky Shrew | <i>Sorex fumeus</i> | Native |
| Pygmy Shrew | <i>Sorex hoyi</i> | Native |
| Eastern spotted skunk | <i>Spilogale putorius</i> | |
| Feral hog | <i>Sus Scrofa</i> | Nonnative |
| Eastern Cottontail | <i>Sylvilagus floridanus</i> | Native |
| Eastern Chipmunk | <i>Tamias striatus</i> | Native |
| Gray Fox | <i>Urocyon cinereoargenteus</i> | Native |
| Black Bear | <i>Ursus americanus</i> | Native |
| Red Fox | <i>Vulpes vulpes</i> | Native |

TABLE F-3: REPTILE SPECIES OCCURRING WITHIN THE FROZEN HEAD STATE PARK

| Common Name | Scientific Name |
|--------------------------|--|
| Northern copperhead | <i>Agkistrodon contortrix mokasen</i> |
| Eastern spiny softshell | <i>Apalone spinifera spinifera</i> |
| Eastern wormsnake | <i>Carphophis amoenus</i> |
| Snapping turtle | <i>Chelydra serpentina</i> |
| Northern black racer | <i>Coluber constrictor constrictor</i> |
| Timber rattlesnake | <i>Crotalus horridus</i> |
| Northern ring-neck snake | <i>Diadophis punctatus edwardsii</i> |
| Corn snake | <i>Elaphe guttata guttata</i> |
| Black rat snake | <i>Elaphe obsoleta obsoleta</i> |
| Five-lined skink | <i>Eumeces fasciatus</i> |
| Northern water snake | <i>Nerodia sipedon sipedon</i> |
| Rough green snake | <i>Opheodrys aestivus</i> |
| Northern fence lizard | <i>Sceloporus undulatus hyacinthinus</i> |
| Redbelly Snake | <i>Storeria occipitomaculata</i> |
| Eastern box turtle | <i>Terrapene carolina carolina</i> |
| Eastern garter snake | <i>Thamnophis sirtalis sirtalis</i> |

TABLE F-4: AMPHIBIAN SPECIES OCCURRING WITHIN THE FROZEN HEAD STATE PARK

| Common Name | Scientific Name |
|-------------------------------|----------------------------------|
| Northern Cricket Frog | <i>Acris crepitans</i> |
| American Toad | <i>Bufo americanus</i> |
| Fowler's Toad | <i>Bufo fowleri</i> |
| Southern Two-lined Salamander | <i>Eurycea cirrigera</i> |
| Four-toed Salamander | <i>Hemidactylium scutatum</i> |
| Cope's Gray Treefrog | <i>Hyla chrysoscelis</i> |
| Green Treefrog | <i>Hyla cinerea</i> |
| Gray Treefrog | <i>Hyla versicolor</i> |
| Eastern Newt | <i>Notophthalmus viridescens</i> |
| Spring Peeper | <i>Pseudacris crucifer</i> |
| Southeastern Chorus Frog | <i>Pseudacris feriarum</i> |
| Red Salamander | <i>Pseudotriton ruber</i> |
| American Bullfrog | <i>Rana catesbeiana</i> |
| Green Frog | <i>Rana clamitans</i> |
| Pickerel Frog | <i>Rana palustris</i> |
| Southern Leopard Frog | <i>Rana pipiens</i> |

TABLE F-5: TERRESTRIAL INVERTEBRATE NON-NATIVE SPECIES OCCURRING WITHIN OR NEAR THE EVALUATION AREA

| Common Name | Scientific Name |
|----------------------------|----------------------------------|
| Emerald Ash Borer | <i>Agrilus planipennis</i> |
| Partially-Africanized Bees | <i>Apis mellifera scutellata</i> |
| Camphor Shot Borer | <i>Cnestus mutilatus</i> |
| Walnut Twig Beetle | <i>Pityophthorus juglandis</i> |
| Fire Ant | <i>Solenopsis spp.</i> |

APPENDIX G: EMERGENCY SERVICES

This appendix lists the emergency services available in the four counties of the evaluation area.

Anderson County emergency services include the following:

- Lake City Fire Department
- Lake City Police Department
- Medford Volunteer Fire Department
- Briceville Volunteer Fire Department
- Marlow Volunteer Fire Department – Donovan Station
- Marlow Volunteer Fire Department – Marlow Station
- Oliver Springs Fire Department Station 2

Campbell County emergency services include the following:

- Jellico Police Department
- Jellico Fire Department
- Jellico Life Saving and Rescue Squad Incorporated
- Caryville Volunteer Fire Department
- Jacksboro Fire Department
- Lafollette Fire Department
- Ridgewood Volunteer Fire Department
- Stoney Fork Volunteer Fire Department
- Campbell County Rural Fire Service Station 1 - Headquarters
- Tennessee Department of Agriculture, Division of Forestry - Campbell County
- White Oak Volunteer Fire Department
- Cove Lake State Park Ranger Station
- Caryville Police Department
- Jacksboro Police Department
- Indiana Mountain State Park Ranger Station
- Jellico Police Department
- Norris Dam State Park Ranger Station
- Campbell County Sherriff's Department
- Cumberland Trail State Park Ranger Station

Morgan County emergency services include the following:

- Wartburg Police Department
- Wartburg Volunteer Fire Department
- Morgan County Volunteer Fire Department
- Burrville Volunteer Fire Department
- Deer Lodge Volunteer Fire Department
- Chestnut Ridge Volunteer Fire Department
- Coalfield Volunteer Fire Department
- Joyner Volunteer Fire Department
- Petros Volunteer Fire Department

Appendices

- Frozen Head State Park and Natural Area – Ranger Station
- Morgan County Sheriff’s Department

Scott County emergency services include the following:

- Scott County Sheriff Department
- Pine Hill Volunteer Fire Department
- Winfield Fire Department
- Winfield Police Department
- Paint Rock Volunteer Fire Department
- East 63 Volunteer Fire Department
- Huntsville Fire Department
- Mid-County Volunteer Fire Department
- South Scott County Volunteer Fire Department

APPENDIX H: INDEX OF BIOTIC INTEGRITY ASSESSMENT DATA

Index of Biotic Integrity assessments are a method used to assess aquatic environments using invertebrate assemblages as a proxy for overall stream health (Wittman and Mundahl 2003). Below are the results of Index of Biotic Integrity assessment surveys conducted by Tennessee Wildlife Resources Agency between 1994 and 2012 which covered streams throughout eastern Tennessee including portions of the Clinch, Powell, and Cumberland River watersheds including Big South Fork (Carter et al. 2012). These Index of Biotic Integrity assessments used multiple metrics to rate and monitor stream health over time and assigned a numerical value to each surveyed stream or segment which corresponds to a stream health category ranging from “very poor” to “excellent”. The data presented below are presented in chronological order and are limited streams within the four Tennessee counties which contain a portion of the evaluation area (Anderson, Campbell, Morgan, and Scott). All data are summarized from Carter et al. 2012 and include but are not limited to streams within the evaluation area.

| Water Body | Watershed | Year Surveyed | County | Index of Biotic Integrity Score | Benthic Biotic Integrity Score |
|------------------------|--------------------------------|----------------------|---------------|--|---------------------------------------|
| Capuchin Creek | Cumberland River | 1994 | Campbell | 44 (Fair) | 3 (Fair/Good) |
| Trammel Branch | Cumberland River | 1994 | Campbell | 36 (Poor/Fair) | 3 (Fair/Good) |
| Hatfield Creek | Cumberland River | 1994 | Campbell | 42 (Fair) | 3 (Fair/Good) |
| Baird Creek | Cumberland River | 1994 | Campbell | 38 (Poor/Fair) | 3 (Fair/Good) |
| Clear Fork (Site 1) | Cumberland River | 1994 | Campbell | 52 (Good) | 3 (Fair/Good) |
| Elk Fork Creek | Clear Fork | 1994 | Campbell | 40 (Fair) | 2 (Fair) |
| Fall Branch | Clear Fork | 1994 | Campbell | 28 (Poor) | 1 (Poor) |
| Crooked Creek | Clear Fork Cumberland River | 1994 | Campbell | 38 (Poor/Fair) | 2 (Fair) |
| Burnt Pone Creek | Clear Fork Cumberland River | 1994 | Campbell | 38 (Poor/Fair) | 2 (Fair) |
| Whistle Creek | Clear Fork Cumberland River | 1994 | Campbell | 38 (Poor/Fair) | 2 (Fair) |
| Little Elk Creek | Clear Fork Cumberland River | 1994 | Campbell | 40 (Fair) | 2 (Fair) |
| Lick Fork | Clear Fork Cumberland River | 1994 | Campbell | 38 (Poor/Fair) | 2 (Fair) |
| Terry Creek | Clear Fork Cumberland River | 1994 | Campbell | 48 (Good) | 2 (Fair) |
| Crouches Creek | Clear Fork Cumberland River | 1994 | Campbell | 28 (Poor) | 1 (Poor) |
| Hickory Creek (Site 1) | Clear Fork Cumberland River | 1994 | Campbell | 46 (Fair/Good) | 3 (Fair/Good) |
| Hickory Creek (Site 2) | Clear Fork Cumberland River | 1994 | Campbell | 48 (Good) | 2 (Fair) |
| White Oak Creek | Clear Fork Cumberland River | 1994 | Campbell | 30 (Poor) | 2 (Fair) |

Appendices

| Water Body | Watershed | Year Surveyed | County | Index of Biotic Integrity Score | Benthic Biotic Integrity Score |
|--------------------|---------------------------------|----------------------|---------------|--|---------------------------------------|
| No Business Branch | Clear Fork Cumberland River | 1994 | Campbell | 30 (Poor) | 3 (Fair/Good) |
| Laurel Fork | Clear Fork Cumberland River | 1994 | Campbell | 52 (Good) | 3 (Fair/Good) |
| Lick Creek | Clear Fork Cumberland River | 1994 | Campbell | 44 (Fair) | 3 (Fair/Good) |
| Davis Creek | Clear Fork Cumberland River | 1994 | Campbell | 38 (Poor/Fair) | 2 (Fair) |
| Rock Creek | Clear Fork Cumberland River | 1994 | Campbell | 54 (Good/Excellent) | 3 (Fair/Good) |
| Rose Creek | Clear Fork Cumberland River | 1994 | Campbell | 36 (Poor/Fair) | 2 (Fair) |
| Hinds Creek | Clinch River | 1996 | Anderson | 36 (Poor/Fair) | 3 (Fair/Good) |
| Cove Creek | Clinch River | 1996 | Campbell | 28 (Poor) | 3 (Fair/Good) |
| Titus Creek | Clinch River | 1996 | Campbell | 42 (Fair) | 3 (Fair/Good) |
| Stony Fork | Big South Fork | 1996 | Campbell | 38 (Poor/Fair) | 4 (Good) |
| Stinking Creek | Cumberland River | 2002 | Campbell | 42 (Fair) | 4.5 (Good) |
| Straight Fork | Cumberland River | 2002 | Campbell | 18 (Very Poor) | 3.0 (Fair/Good) |
| Montgomery Fork | Cumberland River | 2002 | Campbell | 48 (Good) | 3.5 (Fair/Good) |
| New River (Site 1) | Big South Fork Cumberland River | 2004 | Anderson | 30 (Poor) | 4.2 (Good) |
| New River (Site 2) | Big South Fork Cumberland River | 2004 | Campbell | 42 (Fair) | 3.5 (Fair/Good) |
| Indian Fork | Big South Fork Cumberland River | 2004 | Anderson | 41 (Fair) | 3.8 (Fair/Good-Good) |
| Poplar Creek | Clinch River | 2009 | Anderson | 30 (Poor) | 3.7 (Fair/Good-Good) |
| Titus Creek | Clinch River | 2009 | Campbell | - | 4.5 (Good) |
| Smoky Creek | New River | 2010 | Scott | 37 (Fair) | 3.5 (Fair/Good) |
| Beech Fork | New River | 2010 | Campbell | 47 (Good) | - |
| Cove Creek | Clinch river | 2012 | Campbell | 32 (Poor) | - |
| Capuchin Creek | Clear Fork Cumberland River | 2012 | Campbell | 38 (Poor/Fair) | - |
| Little Elk Creek | Clear Fork Cumberland River | 2012 | Campbell | 42 (Fair) | - |

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- 2012 Fisheries Report: Warmwater Streams and Rivers. Tennessee Wildlife Resources Agency – Region IV. Report 13-02.

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Appendices

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APPENDIX I: AIR EMISSIONS METHODOLOGY

This appendix documents the methods, models and assumptions used to develop the surface coal mining PM_{2.5} and PM₁₀ emission estimates presented in chapter 6.

FUGITIVE DUST

The fugitive dust emission factors for coal mining operations was obtained from the US Environmental Protection Agency (EPA) 2011 National Emissions Inventory, specifically the technical documentation for the source Mining and Quarrying (2325000000) (EPA 2015). EPA National Emissions Inventory emission factor is in turn based on AP-42 equations developed for western surface coal mines (which are substantially larger than the coal mines in the project area). No useable Tennessee or Appalachia-specific emission factor sources were located. The western surface coal mining-based emissions factors are considered to provide a conservative basis for evaluating emissions given that the arid conditions of the west would be expected to result in higher fugitive dust generation than in the evaluation area.

The National Emissions Inventory particulate matter fugitive dust emissions factors for coal mining include overburden removal, drilling and blasting, loading and unloading and overburden replacement activities (EPA 2015). The amount of overburden material handled is assumed to equal ten times the quantity of coal mined and coal unloading is assumed to be split evenly between end-dump and bottom-dump operations. The National Emissions Inventory emission factor does not include transfer and conveyance operations, crushing and screening operations, and storage since the dust emissions from these activities are assumed to be well controlled. The PM₁₀ emissions factor equation for coal mining is (EPA 2015):

$$EF_c = (10 \times (EF_{to} + EF_{or} + EF_{dt})) + EF_v + EF_r + EF_a + (0.5 \times (EF_e + EF_i))$$

where, EF_c = coal mining fugitive dust emissions factor (lbs/ton)

EF_{to} = PM₁₀ emission factor for truck loading overburden at western surface coal mining operations (lbs/ton of overburden)

EF_{or} = PM₁₀ emission factor for overburden replacement at western surface coal mining operations (lbs/ton of overburden)

EF_{dt} = PM₁₀ emission factors for truck unloading: bottom dump-overburden at western surface coal mining operations (lbs per ton of overburden)

EF_v = PM₁₀ open pit overburden removal emission factor at western surface coal mining operations (lbs per ton)

EF_r = PM₁₀ drilling/blasting emission factor at western surface coal mining operations (lbs per ton)

EF_a = PM₁₀ loading emission factor at western surface coal mining operations (lbs per ton)

EF_e = PM₁₀ truck unloading: end dump-coal emission factor at western surface coal mining operations (lbs per ton)

$EF_t = \text{PM}_{10}$ truck unloading: bottom dump-coal emission factor at western surface coal mining operations (lbs per ton).

Applying the PM_{10} emissions factors developed for western surface coal mining operations yields the following coal mining fugitive dust emissions factor (EPA 1998):

$$EF_c = (10 \times (0.015 + 0.001 + 0.006)) + 0.225 + 0.00005 + 0.05 + (0.5 \times (0.0035 + 0.033)) = 0.513 \text{ lbs/ton}$$

In 2006, the EPA adopted new $\text{PM}_{2.5}$ and PM_{10} ratios for several fugitive dust categories and concluded that the $\text{PM}_{2.5}$ and PM_{10} ratios for fugitive dust categories should be in the range of 0.1 to 0.15 (Midwest Research Institute (2006). Consequently, a ratio of 0.125 was applied to the PM_{10} emissions factors to estimate $\text{PM}_{2.5}$ emissions factors (EPA 2015).

The resulting National Emissions Inventory coal mining fugitive dust emission factors are as follows:

- 0.513 lbs PM_{10} per ton of coal produced
- 0.064 lbs $\text{PM}_{2.5}$ per ton of coal produced.

OFF-ROAD EQUIPMENT EMISSIONS MODELING

The off-road equipment sources were based on the typical mining scenario discussed above, and include excavators, off-highway trucks, a drill rig, grader and dozer. Equipment is not assumed to be operating in any particular location, but is of sufficient quantity to achieve the maximum possible production in the evaluation area. The following inputs were used in modeling off-road equipment through MOVES2014:

Model Selection: Nonroad.

Domain/Scale: National (the only option for nonroad modeling).

Calculation Type: Inventory.

Analysis Year: 2024 (to match on-road analysis).

Month: January.

Day: Weekdays.

Geographic Bounds: Anderson County, Tennessee (single county used to represent the four counties in the evaluation area).

Nonroad Equipment Selection: Diesel construction equipment.

Pollutants And Processes: $\text{PM}_{2.5}$ (running exhaust), PM_{10} (running exhaust).

Output Units: Mass- grams, energy- joules, distance- miles.

EPA default values were used for all other nonroad modeling inputs. The resulting output database was post-processed using an EPA-developed Mysql script that converts the calculated emissions quantities to emissions factors by equipment horsepower in units of grams per horse-power hour. Table I-1 summarizes the resulting emissions factors.

TABLE I-1: NON-ROAD EQUIPMENT ASSUMPTIONS AND EMISSION FACTORS

| | Number | HP | Total Operating Hours Per Day | PM ₁₀ Emission Factor (grams/HP-hr) | PM _{2.5} Emission Factor (grams/HP-hr) |
|--------------------|--------|-----|-------------------------------|--|---|
| Excavators | 3 | 600 | 30 | 16.31 | 15.82 |
| Off-Highway Trucks | 3 | 600 | 30 | 7.45 | 7.23 |
| Drill Rig | 1 | 400 | 10 | 41.42 | 40.18 |
| Dozer | 1 | 500 | 10 | 12.84 | 12.45 |
| Grader | 1 | 300 | 10 | 2.99 | 2.90 |

ON-ROAD SOURCES

The on-road analysis addresses emissions associated with the transportation of coal from the mine to a rail line or other distribution point and employee commutes to/from the mine site. The analysis was conducted using EPA's mobile source emissions model, MOVES2014.

For coal haul trucks, it was assumed 5-axle coal haul tractor trailers with a capacity of 40 tons would be utilized. Based on the range in annual coal production in the evaluation area, this results in 1,350 to 6,000 truck trips per year. A travel distance of 50 miles (roundtrip) was assumed, leading to an estimate of 67,500 to 300,000 vehicle miles traveled per year for haul trucks. For emissions modeling, the diesel combination long-haul truck source type was used.

For employee commutes, a range of 20 to 50 mining employees was assumed depending on the level coal production. The analysis assumed a roundtrip travel distance of 50 miles and 270 workdays per year. This resulted in 270,000 to 675,000 vehicle miles traveled for employee commutes. For emissions modeling, this travel was assumed to all be from gasoline-powered passenger trucks.

The MOVES2014 input assumptions are detailed below.

Model: On-road.

Domain/Scale: Project-level.

Calculation Type: Emission rates (e.g., grams/vehicle mile traveled).

Year: 2024 (to coincide with an analysis year used by the Knoxville MPO transportation conformity determination).

Month: January.

Days: Weekdays.

Hour: 7 a.m. to 8 a.m.

Geographic Bounds: Anderson County, Tennessee (used to represent all counties in evaluation area).

On-Road Equipment: Diesel combination long-haul truck (e.g., tractor trailer) and gasoline passenger trucks.

Road Type: Rural unrestricted access (for running emissions) and off-network (for start emissions).

Pollutants and Processes: PM_{2.5} and PM₁₀, including tirewear and brakewear processes. Emissions associated with extended idle mode (e.g., long haul truck “hoteling”) or auxiliary power units were not included.

Output Units: Mass- grams, energy- joules, distance- miles.

Output Emissions Detail: All default options, plus disaggregate by source use type.

Project Data Manager:

- Age distribution, meteorology, fuels: obtained from Knoxville Regional Transportation Planning Organization to match inputs to regional MOVES modeling for the Long Range Mobility Plan Amendments
- Source type distribution- 100% long-haul trucks (in one MOVES run) and 100% passenger trucks (in a separate MOVES run)
- Average Speed- 45 mph
- Average grade- 0%
- Link length- 1 mile (the link length is not relevant because the model was set to calculate emission rates rather than quantities).

The resulting emissions factors are shown in table I-2.

TABLE I-2: HAUL TRUCK AND PASSENGER 2024 EMISSION FACTORS

| Pollutant | Haul Truck | | Passenger Truck | |
|-------------------|---------------------------------------|--|---------------------------------------|--|
| | Start Emissions (grams/vehicle-start) | Running Emissions (grams per vehicle-mile) | Start Emissions (grams/vehicle-start) | Running Emissions (grams per vehicle-mile) |
| PM _{2.5} | 0.0093 | 0.0960 | 0.1218 | 0.0148 |
| PM ₁₀ | 0.0102 | 0.2187 | 0.1377 | 0.0454 |

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2006 *Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors*, MRI Project No. 110397, November 2006, available at <http://www.epa.gov/ttnchie1/ap42/ch13/bgdocs/b13s02.pdf> (Accessed December 2011).

US Environmental Protection Agency (EPA)

1998 AP-42, Fifth Edition, Volume 1, Chapter 11: Mineral Products Industry, Section 11.9: Western Surface Coal Mining. October 1998. Available online at: <http://www.epa.gov/ttn/chie1/ap42/ch11/final/c11s09.pdf>.

2015 The 2011 National Emissions Inventory. Accessed online July 17, 2015 at: <http://www.epa.gov/ttnchie1/net/2011inventory.html>.

APPENDIX J: CONCERN RESPONSE REPORT

Office of Surface Mining Reclamation and Enforcement
North Cumberland Wildlife Management Area Lands Unsuitable for Mining
North Cumberland Wildlife Management Area Tennessee Lands Unsuitable for Mining Draft
Petition Evaluation Document / Environmental Impact Statement
Concern Response Report

GENERAL NEPA COMMENTS

CONCERN STATEMENT: (Concern ID: 56958) Commenters suggested that the draft Petition Evaluation Document / Environmental Impact Statement (PED/EIS) does not fulfill the National Environmental Policy Act (NEPA) requirements to consider the impacts from the proposed petition, the impacts from previous mining activities, or the impacts from previous “unanticipated events.”

RESPONSE: The Office of Surface Mining Reclamation and Enforcement (OSMRE) began its NEPA process on February 8, 2011 with publication of the Notice of Intent in the Federal Register (76 FR 6826), and formed an interdisciplinary team to evaluate all impacts to the human environment, including impacts from previous mining and impacts from previous “unanticipated events.” OSMRE developed a reasonable range of alternatives to assist in evaluating the proposed action, and OSMRE held meetings with the public and non-federal agencies to receive and consider their comments and concerns. OSMRE also considered relevant new information over the course of its review.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496749 **Organization Type:** Unaffiliated Individual

Representative Quote: The intent of NEPA review within the draft EIS-37 calls for a "hard look" of the petitioners claims for protection. The draft EIS-37 is no more than a narrow scope of current SMCRA regulations to provide these protections. For OSMRE draft EIS-37 to limit itself to this narrow scope of the highly sensitive North Cumberlands areas being protected by SMCRA regulations omits the NEPA required consideration of factors association with past Cross Ridge mining sites that had these same regulations but still resulting in impacts to the hydrologic balance anyway. The historic evidence of Zeb Mountain is a clear example of this. Historically we know from each county history book that all four counties shares unique roads and stagecoach and waterways routes that can only be found in Southern Appalachia and experience over the Cumberland Trail footpaths from the Cumberland Gap to Chattanooga. The old historical trail and river routes were used by early settlers into the Tennessee Territory.

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496799 **Organization Type:** Unaffiliated Individual

Representative Quote: Under the assessment found in the draft EIS-37 no data appears showing the number of "Unanticipated Events" that have occurred at Cross Ridge Mining sites 1984 to 2016. (Attachment #10) Pursuant to SMCRA's permit requirements that state "that any person who proposes to conduct surface coal mining operations must first demonstrate that the potential environmental impacts of the proposed operation have been thoroughly investigated and effective measures to prevent adverse impacts have been incorporated into the mining plan. Given the number of NOV's issued by the Knoxville

field office since 1984 serious concerns are still surrounding weather a person proposing surface mining operations using cross ridge mining can fully address or demonstrate the ability to investigate and develop effective measure or best management practices related to "Unanticipated Events" catalog still 1884 per "Cross Ridge Mining" techniques pursuant to carryout SMCRA for North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE). This further relates to obtaining a permit, where the applicant must effectively demonstrate, inter alia, that a thorough determination of the probable hydrologic consequences (PHC) of the mining and reclamation operations (both on and off the mine site) for North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE) from "Unanticipated Events" and NOV files as catalog in OSMRE Knoxville Field since 1984. Prior Cross Ridge Mining PHC studies only addresses known anticipated mining activities in the relevant area (known as a Cumulative Hydrologic Impact Assessment or CHIA); but leaves the State of Tennessee's North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE) to the mercy of "Unanticipated Events".

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496782 **Organization Type:** Unaffiliated Individual

Representative Quote: Pursuant to [48 FR 41350, Sept. 14, 1983, as amended at 52 FR 18795, May 19, 1987; 53 FR

26584, July 13, 1988] the draft EIS-37 team should have made a "good faith" effort to seek any missing sufficient information. As stated, "Congress passed SMCRA in 1977 to "establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations" (SMCRA 102(a), 30 USC§ 1202(a)). SMCRA balances this goal with the goal of "assur[ing] that the coal supply [meets] the Nation's energy requirements" (30 USC§ 1202(f)). Section 522(c) of SMCRA allows "any person having an interest which is or may be adversely affected ... to petition the regulatory authority to have an area designated as unsuitable for surface coal mining operations, or to have such a designation terminated" (30 USC § 1254(c)). The petition process is the chief process by which the OSMRE reviews lands to assess whether there are areas unsuitable for all or certain types of surface coal mining operations under section 522(b) of the Act. The intent of SMCRA section 522 is to provide a higher degree of protection to specific public and environmental values from surface coal mining operations where it is determined that the significance of these values could be compromised. As stated in the PURPOSE AND NEED section, "The purpose of the agency action is to process the petition in accordance with SMCRA and other applicable federal laws. The proposed action is necessary because it is the responsibility of OSMRE to evaluate the merits of the petitioner's allegations and determine whether the petition area is entirely or partially eligible for designation as unsuitable for surface coal mining operations based on the criteria in section 522(a)(3) of SMCRA. This action is also needed to accommodate the mission of OSMRE as the regulatory authority for surface coal mining operations in Tennessee." This follows the same outline evaluation of merits of prior LUMP petitions by OSMRE. The petitioner's serious land use allegations and the process to determine whether the petition area is entirely or partially eligible for designation as unsuitable. OSMRE has outlined this process in the three volume set of its determination. The draft EIS-37 covers the basic review process but omits the detail NEPA "hard look" of each petitioner's allegations and a good faith effort to communicated with the petitioners for addition or "missing" fact finding information needed during an almost five period. This short-change assessment does not meet the intent of SMCRA or the criteria set forth in NEPA review requirement.

Corr. ID: 3619 **Organization:** *Not Specified* **Comment ID:** 496839 **Organization Type:** Unaffiliated Individual

Representative Quote: - Will the proposed alternatives have special emphasis on the persistence and permanence of the effects in the draft EIS-37?

- Will the proposed alternatives addressed the contributing direct and indirect significant degradation considered individually or collectively in the draft EIS-37?
- How does the proposed alternatives addressed significantly adverse effects of surface coal mining on human health or welfare, including but not limited to effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites in the draft EIS-37?
- How does the proposed alternatives addressed significantly adverse effects of surface coal mining on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes in the draft EIS-37?
- How does the proposed alternatives addressed significantly adverse effects of surface coal mining on aquatic ecosystem diversity, productivity, and stability. Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy in the draft EIS-37?
- How does the proposed alternatives addressed significantly adverse effects of surface coal mining on recreational, aesthetic, and economic values in the draft EIS-37?

The amount of time to achieve an ecologically sound land use compatible to the surrounding region from the proposed alternatives is a much larger question. Even with current performance standards (515(b) regulations the petition area will still impact the planning and management by the state of Tennessee. This is the overall assertion with the state of Tennessee's petition. Surface coal mining is incompatible with existing State or local land use plans and programs and will affect fragile or historic lands, resulting in significant damage. The most underlining question is the ability to meet post mining land use. Can the proposed alternatives meet returning the land to an equal or better economic or public use of the affected land compared with the pre-mining use? Can the proposed alternatives improve or make better the lands unsuitable petition area? Can the proposed alternatives achieve increasing the economic recreational value of the petition area? As well; as the economic impact on tourist's dollars (Attachment #13). Honestly, nobody knows.

CONCERN STATEMENT: (Concern ID: 56959) One commenter noted that there may still be impacts to the petition area as a result of the proposed alternatives, even under the Surface Mining Control and Reclamation Act of 1977(SMCRA) regulations.

RESPONSE: OSMRE agrees that impacts may still occur as a result of mining activity within the petition area, despite the permit and performance standards required under SMCRA. Designating the area unsuitable for all mining that is not remining will ultimately produce the most environmentally beneficial result. Many of the previously mined areas within the permit area contain health and safety hazards (such as highwalls, unstable spoil piles, and pits) and discharge water with high levels of contaminants. These hazards are unlikely to be resolved without intervention. By allowing remining, many of these areas will be reclaimed, reducing health and safety concerns and improving water quality. Admittedly, there will be short-term detrimental impacts at these sites because of mining. However, in the long-term, we are confident that the approach we are taking will result in a healthier ecosystem and will complement the Tennessee State Wildlife Action Plan and more fully implement section 102(h) of SMCRA, 30 USC § 1202(h), which encourages the reclamation of pre-SMCRA abandoned mine sites.

Representative Quote(s):

Corr. ID: 3619 **Organization:** *Not Specified* **Comment ID:** 496836 **Organization Type:** Unaffiliated Individual

Representative Quote: The draft EIS-37 leaves readers to believe that SMCRA's regulations will protect the petition area within the proposed alternatives in draft EIS-37. Yet, what are risks factors even with SMCRA regulations found in Sections: 101, 508(a), 515(b) 761.5, 780.16(b), 780.18(b), 800.13(a))(l), 810.2, 816.22, 816.4189f)(l), 816.35, 816.71(a). 816.100, 816.111, 816.113, 816.114, 816.116, and 816.200 exist?

CONCERN STATEMENT: (Concern ID: 56960) Commenters suggested that there are no recorded violations of SMCRA or any associated long-term damage that would necessitate the prohibition of surface mining within the petition area.

RESPONSE: The existence of a SMCRA violation, citizen complaint, or unanticipated long-term acid mine drainage issue, is unrelated to the evaluation of a petition to designate lands unsuitable for mining. Section 522(a)(3), 30 USC §1272(a)(3), identifies the criteria for designating an area as unsuitable for all or certain types of surface coal mining operations. In adopting these criteria, Congress recognized that, even with perfect compliance with all requirements under SMCRA, certain types of land uses, or certain cultural, scientific, esthetic, or environmental resources, are simply incompatible with coal mining activities. This PED/EIS addresses whether the petition area meets one or more of the criteria alleged by the petitioner.

Representative Quote(s):

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492233 **Organization Type:** Non-Governmental

Representative Quote: The petition notes that several mining permits have been issued in the petition area, yet there is no demonstration by the petitioner that such operations have violated SMCRA standards, caused long term acid mine drainage, or any other problems that result in "significant damage" as to warrant prohibition of all future surface coal mining operations in the area.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492235 **Organization Type:** Non-Governmental

Representative Quote: As you is aware, unlike most other states, coal mines in Tennessee are not regulated by a state SMCRA program but instead are directly regulated and permitted by OSM. In its most recent annual evaluation report, OSM stated that the entire mining program in that state generated only four citizen complaints in review year 2014 and all were responded to within 10 days of receipt. See Office of Surface Mining Reclamation and Enforcement Annual Evaluation Report for the Regulatory Program Administered by the Knoxville Field Office for the States of Tennessee and Georgia, Fiscal Year 2014 at p. 7. The same report reveals that 94 percent of all inspected sites were free of any off-site impacts.

Corr. ID: 3835 **Organization:** *Not Specified* **Comment ID:** 496294 **Organization Type:** Unaffiliated Individual

Representative Quote: Those are great questions. Taking sweeping policy actions that are insufficiently supported by real risks only serves to validate unsupported rationale and decision- making, reinforcing a

mantra or belief system that implies that such "protective" action is a "major step in protecting the environment". The proponents assert that the designation would protect the area from an OSMRE that "can't be trusted to protect the environment." Melding those beliefs into a policy would constitute a lie, a lie that we would propagate upon our youth as a truth.

Just as we each have a moral obligation to protect the environment, we have a moral obligation to be honest in our logic and policy-making. The movement in this case for an unsuitable-for-mining designation is primarily to establish a symbolic and political legacy in the form of a "landmark" step to "protect" the environment of East Tennessee.

Respectfully, one must acknowledge that the feeling- -the desire for a major "environmental victory"- -is very real amongst the proponents of the designation. The intent, their cause, is worthwhile and to be admired by all. There is tremendous political pressure from the "environmental camps" to make protective policy decisions. But in human nature, decisions are most often based on emotion- -on perception. . . and it is much easier to manipulate perception than to make real, tangible change.

Whether the topic is the economy, social justice, health-care, global hunger, fluoride in public water supplies, genetically modified organisms, and my favorite, so-called "sustainable" farming practices (which are not in any sense of the word truly sustainable), we will all benefit if our policy decisions are based on true, bona fide science and real need, not on the feel-good effect of a policy change that has little or no real benefit.

In summary, the law and rules are clear: There must be some objective, tangible basis for granting the "unsuitable" designation- -some basis beyond a political-environmental ideology. OSMRE's current authority and practices, combined with the technical and economic realities of this specific coal resource, already provide sufficient environmental protection. There is no compelling need for the designation, thus it cannot be supported by lawful agency process.

PETITION EVALUATION

CONCERN STATEMENT: (Concern ID: 56972) Two commenters asserted that this petition is nearly identical to a previous petition that OSMRE rejected on January 13, 2006, because it was incomplete, lacked merit, and did not meet the minimum legal requirements for consideration. The previous petition area was 443.5 square miles, while, according to the commenter, this petition covers 505 square miles. One commenter asserted that the large size of the petition area means that it is unlikely that the evidence presented can relate to criteria for designation throughout the entire petition area. This commenter also claimed that the petitioners failed to identify the area to which each allegation applies within the larger area or provide adequate evidence to support the allegation for the entire area. A second commenter claimed that the earlier petition, like this petition, made broad allegations covering a large tract of land, did not offer factual support for its allegations, did not address all lands within the area, and did not take current mining regulations into consideration, all of which are minimum requirements under federal law for such a petition to be deemed complete.

RESPONSE: The comment inaccurately characterizes the acreage at issue in this petition and the scope of our analysis in the draft PED/EIS. It is true that the North Cumberland Wildlife Management Area consists of approximately 172,000 acres (or 269 square miles). But the actual petition area is much smaller: 67,326 acres (or about 105 square miles). This area is much smaller than the 443.5 square miles at issue in the previous petition that OSMRE rejected. Furthermore, OSMRE's determination with respect to this petition is based on the unique allegations and facts that are before the agency in this petition. In the PED/EIS, OSMRE has done a thorough analysis of these allegations and has determined that the

petition adequately covers the entire petition area, offers factual information for the analysis presented, and takes into account current mining regulations.

Representative Quote(s):

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492443 **Organization Type:** Unaffiliated Individual

Representative Quote: This Petition is nearly identical to a previous Petition that OSMRE rejected as incomplete and lacking merit, on January 13, 2006. That Petition was 443.5 square miles as opposed to this Petition's 505 square miles. In evaluating that Petition OSMs stated: the large size of the selected area means that it is unlikely that the evidence presented can relate to criteria for designation throughout the entire petition area the petitioners have failed to identify the area to which each allegation applies within the larger area or provide adequate evidence to support the allegation for the entire area. Further, petitioners didn't provide evidence that supported the specific allegations for the entire 444 square mile region or discrete and specific areas within the petition area.

Similarly, the instant Petition does not justify declaring the entire Petitioned area as unsuitable.

Corr. ID: 3852 **Organization:** *Not Specified* **Comment ID:** 500180 **Organization Type:** Unaffiliated Individual

Representative Quote: In 2006, OSM determined that a similar type LUM that comprised 283,834 acres did not meet the minimum legal requirements to go forward. That it made broad allegations covering a large tract of land, didn't offer factual support for its allegations, didn't address all lands within the area and didn't take current mining regulations into consideration, all of which are minimum requirements set by federal law for such a petition to be deemed complete. I find this LUM to be very similar.

LAND USE PLANS/PROGRAMS INCOMPATIBILITY

CONCERN STATEMENT: (Concern ID: 57025) Multiple commenters expressed concern about OSMRE's analysis of compatibility of mining with the 2015 State Wildlife Action Plan and associated Comprehensive Wildlife Conservation strategy to support the designation. One commenter suggested the determination was inconsistent with the holding in *Utah International, Inc. v. Department of Interior*. Specifically, several commenters asserted that the State Wildlife Action Plan should not be considered for several reasons:

1. The State Wildlife Action Plan was drafted in 2015 and the petition was filed in 2010. Land use plans that were developed years after the petition was filed should not be considered in the justification of issuing the petition. Decision makers should not be able to consider developments that occurred after the time the petition was filed.
2. The State Wildlife Action Plan does not comply with Tennessee law that requires that it be promulgated as a rule subject to public review and comment, and is therefore void for the purposes of the designation. The plan is not a plan for the purposes of Section 522 of SMCRA.
3. No representatives from the mining industry were involved in the development of the State Wildlife Action Plan and the public comment solicitation was not done in a manner that interested parties would have known the impact of the plan.
4. Despite the plan's status, the land at issue was clearly meant to support multiple uses.

RESPONSE: Commenters have mischaracterized and selectively quoted the decision in *Utah International, Inc. v. Department of Interior*, 553 F. Supp. § 872, 885 (D. Utah 1982). Commenters quote the case as stating that “if a determination of unsuitability is made under 30 USC § 1272(a)(3)(B), there must be a finding that affected lands are fragile or historic and that surface mining operations would significantly damage the historical or fragile aspects of the land.” However, this quote is incomplete. The preceding language states, “A surface area may be designated unsuitable for certain types of surface coal mining operations if such operations will — be incompatible with existing State or local land use plans or programs” (citing 30 USC § 1272(a)(3)(A)). The full quote summarizes the relevant statutory criteria for this proposed action.

Furthermore, it is appropriate for OSMRE to consider the 2015 State Wildlife Action Plan for the following reasons:

1. It is proper for OSMRE to consider all available information that is pertinent to the petition, including information that did not exist when the petition was filed. Nothing in the statute or OSMRE regulations prevents OSMRE from accepting additional information, including information on new land use plans or programs, from the petitioner.
2. OSMRE is unaware of state rulemaking requirements. Neither SMCRA nor its implementing regulations require that state land use plans undergo a formal process before they can be considered for purposes of the lands unsuitable for mining (LUM) designation. OSMRE further notes that the State Wildlife Action Plan became a final plan upon approval by the US Fish and Wildlife Service (USFWS) on June 10, 2016.
3. OSMRE is unaware of what, if any, public process was implemented in the development of the draft State Wildlife Action Plan.
4. OSMRE agrees that the area supports multiple-use that the state deems is compatible with its wildlife management goals. However, the state has determined that surface coal mining operations are not compatible with these goals, as described in the 2015 State Wildlife Action Plan.

Representative Quote(s):

Corr. ID: 3852 **Organization:** *Not Specified* **Comment ID:** 500171 **Organization Type:** Unaffiliated Individual

Representative Quote: OSMRE's determine of fragile lands is improper

If a determination of unsuitability is made under 30 U.S.C. § 1272(a)(3)(B), there must be a finding that affected lands are fragile or historic and that surface mining operations would significantly damage the historical or fragile aspects of the land. *Utah International, Inc. v. Department of Interior*, 553 F. Supp. 872, 885, 1982 U.S. Dist. LEXIS 18167, *34, 13 ELR 20409, 19 ERC (BNA) 1305 (D. Utah 1982). Much of the draft decision on "fragile lands" is based upon the 2005 Conservation plan which identifies species of wildlife present in the area.

See Page 2-29. However, as noted, it is incorrect for OSMRE to rely on the TWRA plan because it was not properly promulgated and is not binding.

Corr. ID: 3852 **Organization:** *Not Specified* **Comment ID:** 500170 **Organization Type:** Unaffiliated Individual

Representative Quote: Tenn. Code Ann. § 4-5-102(1 2) states:

(12) "Rule" means each agency statement of general applicability that implements or prescribes law or policy or describes the procedures or practice requirements of any agency. "Rule" includes the amendment or repeal of a prior rule, but does not include:

(A) Statements concerning only the internal management of state government and not affecting private rights, privileges or procedures available to the public; (B) Declaratory orders issued pursuant to § 4-5-223;(C) Intra-agency memoranda; (D) General policy statements that are substantially repetitious of existing law.

Accordingly, the application of TWRA's plans constitute a "rule" under state law and because they were never promulgated as a rule as required by the statute are void and of no effect as a matter of law. Therefore any reliance by OSMRE on the cited conservation plans by TWRA are invalid and OSMRE cannot base its decision on such plans.

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492411 **Organization Type:** Unaffiliated Individual

Representative Quote: In addition to the bias of the SWAP and the process, the SWAP should have been promulgated as a rule within the meaning of Tenn. Code Ann. 4-5-102(12)

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492399 **Organization Type:** Unaffiliated Individual

Representative Quote: The 2015 State Wildlife Action Plan cannot be used as a basis for a determination related to compatibility with "existing" state land use plans or programs since it is neither in existence nor has been appropriately promulgated.

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492408 **Organization Type:** Unaffiliated Individual

Representative Quote: The SWAP was never placed on notice in the Tennessee Administrative Register for the public to review and comment. TWRA partnered with numerous entities and persons in developing the report, but not one entity or person representing the mining industry was even consulted much less involved. While public comment was solicited, it was not done so in a manner where TMA as an intervenor or other interested parties would have known the impact to the LUM PED/EIS. The SWAP is voluminous in and of itself, and additional time is needed to fully evaluate the SWAP and its relationship to the PED/EIS.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492256 **Organization Type:** Non-Governmental

Representative Quote: Because the SWAP is being relied upon to support a designation which will be used by OSM to substantially affect the rights of persons having coal interests, it must meet the definition of a "rule" under Tennessee law. It does not. TWRA is familiar with the necessary procedures for promulgating rules through the Tennessee Administrative Register and it elected not to. As a result, the SWAP is void for purposes of Section 522 of SMCRA. To hold otherwise would be arbitrary and capricious action by OSM.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492269 **Organization Type:** Non-Governmental

Representative Quote: Additionally, references to species in the SWAP cannot be relied upon to meet the terms of Section 522(a)(3)(B) due to the existing biological opinion and the aforementioned inadequacies with both the substance of the SWAP and the process by which it was developed.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492246 **Organization Type:** Non-Governmental

Representative Quote: The SWAP was never placed on notice in the Tennessee Administrative Register for the public to review and comment. While the SWAP was made publicly available, it did not undergo the formal notice and comment procedures under Tennessee state or municipal law that would render it a state or local plan or program. Additionally, the level of public notice provided for the SWAP did not inform interested parties of the impact to the LUM PED/EIS. Moreover, TWRA partnered with numerous entities and persons in developing the report, but not one entity or person representing the mining industry was even consulted much less involved. Rather, the "Core Planning Team" responsible for development of the SWAP on which the designation now relies, included nongovernmental groups charged with forming the SWAP in a leadership capacity. Such an effort, led in part by unelected interest groups, cannot be characterized as a state or local plan or program.

All of the land use plans in existence at the time the petition was filed in 2010 acknowledge mining's existence within the wildlife management areas, anticipate its continuance and outline its compatibility with wildlife management goals. Land use plans that were developed FIVE YEARS AFTER the petition was filed should not be considered in the justification of issuing the petition.

The state has shown no scientific evidence or provided any facts that lead to a change in position other than that they want the petition to be issued.

Corr. ID: 3452 **Organization:** Alden Resources **Comment ID:** 495511 **Organization Type:** Business

Representative Quote: Property Rights and land Use Plans. Property transaction to the State Of Tennessee was undertaken in about 2002. This transaction was clearly predicated to be a multiple use land use with severed property rights transferred separately to mineral, logging, and oil/gas interests. Included in this transaction was a limit on the maximum surface area that could be surface mined on the property respective to the mineral owner's rights. In 2005 the State of Tennessee (TWRA) formulates the Tennessee State Wildlife Action Plan (SWAP) and the Comprehensive Wildlife Conservation Strategy. Even as late as 2015 OSM was considering revisions that had been formulated by the State to the Management Plans. These "Plans" were not existing when the property was taken by the State of TN. Furthermore, these plans were in direct contradiction of the provisions that the State agreed to when they took the surface rights of the property. Noteworthy to the (SWAP) plan is the fact that petitioning OSM to declare the land unsuitable for mining was one of the Priorities listed as action items. This disingenuous process by the state equates to buying a house in a subdivision where a long list of restrictions are agreed to and then totally ignoring those restrictions and developing your own without regard to other property owners rights. OSM validates this approach by considering the petition at all!!!

Corr. ID: 3753 **Organization:** *Not Specified* **Comment ID:** 495448 **Organization Type:** Unaffiliated Individual

Representative Quote: Well, I feel like I'm in an alternative universe listening to these previous speakers, but I'm a consulting engineer. I make my living working for coal companies. And I'm also the founder of a non-profit watershed group, the Coal Creek Watershed Foundation, and we work with coal

companies, you know, not for people that come from other places and come in and like to hike but for the people that actually live in these mining communities. And, I'm sorry, but I smell a rat. I got the first whiff in the findings where it says that OSM has concluded that surface coal mining operations would be incompatible with the 2015 State plan and the 2005 conservation strategy. Well, at the time the petition was filed, there was only the 2005 plan, and it includes every known activity of man that there is and as a potential for stress, and it acknowledges that mining's existence, anticipates its continuance, and outlines its compatibility with wildlife management plans. But shazam, in the 2015 plan, it specifically spells out a plan for dealing with all these other activities of man except for - - and by allowing those activities, except for mining, and its plan for mining is to encourage OSM to designate prior habitats as mines unsuitable. It seems like an awful lot of coincidence to me.

Corr. ID: 3754 **Organization:** *Not Specified* **Comment ID:** 495493 **Organization Type:** Unaffiliated Individual

Representative Quote: The wildlife plan they're talking about, there again, was drafted in 2015. I personally have prepared many permit applications in the State of Tennessee. I send letters to the Tennessee Wildlife Resource Agency every time I prepare a permit and request comments. I have never received a comment letter back saying that the buying plans are not compatible with the proposed mine land use or any land use plan. So I think that that statement was generated just to support the petition, and there is no basis for it.

Corr. ID: 3782 **Organization:** *Not Specified* **Comment ID:** 495953 **Organization Type:** Unaffiliated Individual

Representative Quote: Next, the petition states that the - - excuse me - - the assertion that the land use is not compatible, we prepare a permit application, submit letters to the State of Tennessee requesting comments. And of all the permits we've done in the State of Tennessee to-date, I cannot recall one time that they've ever commented back that mining is not compatible with their plans. The 2015 plan that was prepared, for some reason was prepared five years after the petition was filed. And even after the petition was filed, the State of Tennessee was negotiating with the minerals with ways to recover their coal.

Corr. ID: 3851 **Organization:** Mark V Mining and Engineering **Comment ID:** 500161 **Organization Type:** Business

Representative Quote: The accusation that the land is not suitable for mining because it is incompatible with existing state or local land use plans or programs is false. The 2015 land use plan referenced in the draft PED/EIS was not in place at the time the petition was filed in 2010. The State of Tennessee has publicly stated that surface mining and reclamation creates excellent habitat for grouse, turkey, deer, and elk. Surface coal mining and reclamation is what allowed the opportunity for Elk to be reestablished here in Tennessee.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492244 **Organization Type:** Non-Governmental

Representative Quote: The Proposed Designation is not Supported by a State Plan or Program At the time the petition was filed, the petitioner admitted that "no comprehensive management plan has yet been developed for the new North Cumberland WMA..." and the Management Plan for the Royal Blue Wildlife Management Area "notes that mining has occurred and is envisioned to continue in the future." See petition at p. 13. These admissions by the petition demonstrate that nothing in Tennessee state or local land use plans supported the filing.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492271 **Organization Type:** Non-Governmental

Representative Quote: Mining in this area is not inconsistent with existing State and local plans, because no plan exists; the TWRA's 2015 SWAP is not a plan for purposes of Section 522 of SMCRA.

CONCERN STATEMENT: (Concern ID: 57027) One commenter stated that the State of Tennessee is seeking protection for its state land use as well as land use by individual counties, which if approved, would provide protection of capital investment resources for planning and programs for land use, economic growth, small recreational business growth, and long-term jobs.

RESPONSE: OSMRE has evaluated this petition based on the available information and the criteria at 30 USC § 1272. The motivations the commenter alleges are not reflected in the statutory criteria for a LUM designation. Thus, OSMRE's approval of the state's petition is not based on these purported motivations.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496785 **Organization Type:** Unaffiliated Individual

Representative Quote: The State of Tennessee has the right to seek protection of its land use planning and programs capital investments and its water pollutant laws. I find that not only is the State of Tennessee seeking protection of its land use but Tennessee is seeking protection for its individual county's land use as well. If approved the designation provides the state of Tennessee and these individual counties needed protection of its capital investment resources for planning and programs for its land use, economic growth, small recreational business growth and long term jobs.

CONCERN STATEMENT: (Concern ID: 57028) One commenter voiced disagreement with the OSMRE conclusion that the draft plans for the Royal Blue Wildlife Management Area and the Sundquist Wildlife Management Area, as well as the Brimstone and Emory River Tracts Conservation Easement (ERTCE), are not existing state or local land use plans for the purposes of 30 CFR § 762.11(b)(1). Another commenter suggested that OSMRE relied on the Sundquist and Royal Blue plans to determine whether fragile lands exist.

RESPONSE: OSMRE disagrees with the conclusion made by the commenters. In determining what constituted an "existing state or local land use plan or program," OSMRE relied on guidance from the Council on Environmental Quality suggesting that "proposed [land use] plans should . . . be addressed if they have been formally proposed by the appropriate government body in a written form, and are being actively pursued by officials of the jurisdiction" (46 Fed. Reg. 18026 (March 23, 1981)). This approach was reasonable. The draft plans for the Royal Blue and Sundquist wildlife management areas have not been officially adopted, nor are they being actively considered for official adoption. They have also been in draft form for many years. Instead of finalizing these draft plans, the state has pursued its State Wildlife Action Plan and a Habitat Conservation Plan for the management of the North Cumberland Wildlife Management Area NCWMA and ERTCE. Based on these efforts, it is appropriate to determine that the draft plans for the individual wildlife management areas do not qualify as existing state or local land use plans under NEPA guidance. Furthermore, although OSMRE did not rely on information in the Sundquist and Royal Blue plans to inform its fragile lands analysis, even if it had, it was not improper as the fragile lands analysis is separate from the land use plan analysis.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496762 **Organization Type:** Unaffiliated Individual

Representative Quote: The draft EIS-37 states that OSMRE concludes that the draft plans for the Royal Blue Wildlife Management Area and the Sundquist Wildlife Management Area, as well as the Brimstone and ERTCE, are not existing state or local land use plans for the purposes of 30 CFR § 762.11(b)(1). This I disagree with, 762.11(b)(1) says "Be incompatible with existing state or local land use plans or programs", all known surface coal mining technology CAN NOT put a ridgeline back the way it was or populated the ridgeline with its original wildlife habitats and animals. They are gone until the Lord back. And, every engineer at OSMRE knows this.

Corr. ID: 3852 **Organization:** *Not Specified* **Comment ID:** 500171 **Organization Type:** Unaffiliated Individual

Representative Quote: OSMRE's determine of fragile lands is improper

In addition, OSMRE relies heavily on management plans for the Sundquist and the Royal Blue areas which it admitted did not qualify as a land use plan. See generally pages 2-29 and 30. It is inconsistent to conclude that no formal plan exists for those areas and then use them to determine fragile lands exist and may be impacted. Such overreliance on these unenforceable plans creates a significant problem with OSMRE's analysis.

CONCERN STATEMENT: (Concern ID: 57029) One commenter disagreed with the conclusion that surface coal mining is not inherently inconsistent with statewide plans such as the "Connecting the Cumberlands" project, Tennessee 2020, and the 2008 Tennessee Greenways and Trails Plan because mining would negatively impact these plans. Another commenter concurred with the state's management objectives for the NCWMA.

RESPONSE: As noted in the draft PED/EIS, the petitioner did not provide specific evidence to support its assertion that surface mining is incompatible with goals and priorities outlined in Tennessee 2020, and OSMRE could not independently find such evidence in the Tennessee 2020 Plan. Also, for reasons explained in the draft PED/EIS, OSMRE found that mining is not incompatible with the Cumberland Trail, the Tennessee Greenways and Trails Plan, and the Tennessee State Park Plans. SMCRA establishes mining exclusion zones, which include the provision that mining is not allowed within 300 feet of a public park (30 CFR § 761.11). Therefore, no surface coal mining would be permitted within a distance of 300 feet on either side of a trail's right-of-way. While recreational users of the trail could experience some noise and visual impacts as a result of nearby surface coal mining operations, these impacts would be localized and would diminish with distance from the mining area.

Representative Quote(s):

Corr. ID: 3222 **Organization:** TN Department of Environment and Conservation **Comment ID:** 491991 **Organization Type:** State Government

Representative Quote: However, TDEC notes that it disagrees with OSMRE's conclusion that surface coal mining is not inherently inconsistent with other statewide plans, including the "Connecting the Cumberlands" project, Tennessee 2020, and the 2008 Tennessee Greenways and Trails Plan. Surface coal

mining does negatively impact all of these plans as was indicated in the State's original petition, and we continue to believe this today.

Corr. ID: 2754 **Organization:** The Nature Conservancy **Comment ID:** 490890 **Organization Type:** Unaffiliated Individual

Representative Quote: With respect to the State's management objectives for the North Cumberland Wildlife Management Area, we concur with the State's position on achieving its resource management objectives based on the original 2005 SWAP (see petition section I.D, beginning page 17). We also concur with the approach to managing natural resource values in the area outlined in the 2015 SWAP, Chapter 4, pages 133-4

CONCERN STATEMENT: (Concern ID: 57029b) Some commenters disagreed with the conclusion presented in the draft PED/EIS that surface mining is incompatible with the State Wildlife Action Plan and wildlife management goals in the NCWMA, because wildlife management areas have expanded in areas where mining has occurred, mining has helped to restore native habitat and aided elk reintroduction, and mining has not had significant impacts on uses set forth in the State Wildlife Action Plan. One of these commenters asserted that granting of the petition would actually be contrary to the goals in the State Wildlife Action Plan.

RESPONSE: Although we recognize that mining reclamation can result in restoration of native species and promote wildlife goals for certain species, OSMRE does not agree that granting the petition is contrary to the goals of the State Wildlife Action Plan. As noted in the draft PED/EIS, the State Wildlife Action Plan includes an explicit statement that “new contour, cross-ridge, or mountain top removal coal mining is incompatible with agency management and restoration goals for the NCWMA,” Based on this and supporting maps and appendices, OSMRE found that new surface mining operations in the NCWMA would be inconsistent with the 2015 State Wildlife Action Plan. Also, as mentioned in the draft PED/EIS, mining is only peripherally discussed in the habitat conservation plan for the wildlife management areas. However, the inability to clearcut areas necessary for surface coal mining operations, specifically in forest and woodland reserves, would suggest that the activities and operations necessary to conduct surface coal mining, especially at altitudes above 1,800 feet, would be incompatible with the draft habitat conservation plan.

Representative Quote(s):

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492405 **Organization Type:** Unaffiliated Individual

Representative Quote: From 2005 to the 2010 TWRA worked to obtain surface rights and other easement rights for management purposes. In so doing, reclamation plans were developed in collaboration with the TWRA that would allow restoration of native habitat following the mining activity that could not have been otherwise achieved. In fact, TWRA intentionally expanded into wildlife management areas knowing that active surface coal mining was occurring or would in the future. Rather than the plan being incompatible with surface mining, in actual practice the mining activities have helped restore native hardwoods and grasses, as well as increased habitat for the reintroduction of the American elk. Thus, the SWAP is internally inconsistent with TWRA's own actions

Corr. ID: 3791 **Organization:** *Not Specified* **Comment ID:** 496023 **Organization Type:** Unaffiliated Individual

Representative Quote: And, also, there's a statement in here that, "Surface mining in the petition area is incompatible with State management plans for wildlife management areas." That is untrue. That's absolutely an untrue statement. Because we've seen wildlife management area properties expand in areas where mining activities are ongoing, and people that work or live here know that.

What, if anything, has changed, to support a lands-unsuitable-for-mining designation? The State issued a new comprehensive land use plan in 2015. It is difficult to imagine that the proposed future use of the land is vastly different from the actual use of the land over the past 20 years. Based on the large number of citizen comments, it appears that the petition to declare the area "unsuitable" is driven purely as a "feel good" political proposal. The push to declare this area- -to declare an area, any area in the State of Tennessee "unsuitable for mining"- -is conspicuously a move intended to appeal to a specific political sentiment. The message is, "We don't like the use of coal, and we don't like coal mining." The designation would in actuality provide little protection, as there is little real risk to this area from mining practices and thus no real impact from an unsuitable-to-mine designation in this case. Under the law and OSMRE rules, a "good feeling" is not enough reason to advance an unsuitable to mine designation

Corr. ID: 3835 **Organization:** *Not Specified* **Comment ID:** 496285 **Organization Type:** Unaffiliated Individual

Representative Quote: a) The areas have historically been used for mining. Under the proposed designation, mining will (potentially) continue in the general area. The recreation and conservation activities set forth in the State's 2015 plan are already in play; they have been for quite a number of years now. The current and recent mining activities have not been conclusively shown by the current decision process to have significant impact on the uses set forth in the State's 2015 plan.

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492430 **Organization Type:** Unaffiliated Individual

Representative Quote: Statements from key TWRA personnel demonstrate that surface coal mining is not incompatible with wildlife management goals in the North Cumberland Wildlife Management Area.

On January 20, 2016, TWRA Special Assistant to the Director for Policy and Legislation, Chris Richardson testified in the Senate Energy, Agriculture and Natural Resources Committee to the positive effects of surface mining for the states wildlife. Mr. Richardson stated numerous times that mining had been conducive to TWRAs elk program, specifically. He went on to say, I know that there's been some cooperation between the mining companies, as far as the elk management, and putting the land back in ways that are more conducive for the elk. Through those cooperative agreements with the mining companies, we've also been able to better management those animals up there.

Clearly these statements acknowledge the compatibility of reclamation activities associated with surface coal mining and TWRAs wildlife management goals. Thus, the granting of the Petition would actually be contrary to the goals in the SWAP.

CONCERN STATEMENT: (Concern ID: 57032) Commenters asserted that the fact that mining in the petition area would be incompatible with Tennessee's State Wildlife Plan makes these areas fragile lands.

RESPONSE: Under SMCRA and its implementing regulations, lands that are part of a wildlife plan do not necessarily constitute fragile lands. In order to qualify as fragile lands, lands must meet the requirements of regulations at 30 CFR §762.5, which define fragile lands as those "areas containing natural, ecologic, scientific, or esthetic resources that could be significantly damaged by surface coal

mining operations.” *Id.* “Examples of fragile lands include valuable habitats for fish or wildlife, critical habitats for endangered or threatened species of animals or plants, uncommon geologic formations, paleontological sites, national natural landmarks, areas where mining may result in flooding, environmental corridors containing a concentration of ecologic and esthetic features, and areas of recreational value due to high environmental quality.”

A determination that coal mining in a particular area is incompatible with a land use plan does not necessarily equate to a determination that the area contains fragile lands. OSMRE has determined that portions of the petition area meet the definition of fragile lands. Although we have declined to find that the whole petition area constitutes fragile lands, we have determined that coal mining operations will be incompatible with the 2015 Tennessee State Wildlife Action Plan and the associated Comprehensive Wildlife Conservation Strategy. Therefore, we rely on both 30 CFR §§ 762.11(b)(1) and (b)(2) in our determination that the lands unsuitable designation is necessary. The entire area may be designated under the incompatibility criterion, and parts of the area also qualify for designation under the fragile lands criterion.

Representative Quote(s):

Corr. ID: 3801 **Organization:** *Not Specified* **Comment ID:** 495573 **Organization Type:** Unaffiliated Individual

Representative Quote: To my mind, after having read the EIS, the fact that the petition area that mining would be incompatible with Tennessee's state wildlife plan de facto makes these areas fragile lands.

CONCERN STATEMENT: (Concern ID: 57034) Multiple commenters expressed concern about the narrow focus on what constitutes a land use plan. One stated that the narrow focus on officially adopted or formally proposed draft plans unreasonably restricts consideration of other programs described by the state in their petition. One commenter stated that OSMRE’s narrow definition of what constitutes a land use plan has led to the rejection of these plans as not qualifying for consideration.

RESPONSE: OSMRE disagrees that we designed a restrictive definition for “existing state or local land use plans or programs” which is inconsistent with SMCRA’s legislative history. The commenter selectively quotes a legislative history report (available at: http://www.osmre.gov/resources/coalex/docs/coalex_085.pdf) on the origins of the phrase “state or local land use plans or programs.” The full paragraph from which the commenter quotes reads, “[T]here appears to be no clear reason why Congress chose the words it did or why the exact language of the section changed so frequently over the evolution of the various bills. It may be only a matter of semantics as to why the various modifiers were used. It does appear, however, the language was intended to mean almost any governmental land use policy be considered in the area to be reviewed for unsuitability for surface coal mining.”

The conclusion cited by the commenter appears to concern the meaning of the phrase “local land use plans or programs” and not the meaning of the modifier “existing” as used in the enacted version of SMCRA. The report does briefly discuss the meaning of “existing” by noting that in S. Rep. No. 492, 93rd Cong., 1st Sess. 18 (1973), the House Committee on Interior and Insular Affairs defined “existing land use plans and programs” as “plans and programs in existence at the time the review takes place.”

In this context, OSMRE’s consideration of existing state or local land use plans or programs was reasonable. OSMRE broadly considered state or local guidance documents which describe allowable uses, set future goals, and project present and future use of a particular area. Furthermore, in accordance with

guidance from the Council on Environmental Quality, OSMRE did not consider draft plans which were not being actively considered for official adoption by officials of the jurisdiction. This approach is consistent with the statutory language of SMCRA 522(a)(3)(A) and gives full effect to the term “existing.”

Representative Quote(s):

Corr. ID: 3171 **Organization:** Southern Alliance for Clean Energy **Comment ID:** 494270 **Organization Type:** Unaffiliated Individual

Representative Quote: On page 2-13 of the PED/EIS, OSM notes that "neither SMCRA nor its implementing regulations define 'existing state or local land use plans or programs'" and then proceeds to design a restrictive definition for the terms that is inconsistent with the legislative history of SMCRA found on OSM's own web page (appended) which concludes that "almost any governmental land use policy (should) be considered in the area to be reviewed for unsuitability for surface coal mining." Accordingly, we believe that OSM's narrow focus on "officially adopted or formally proposed draft" plans unreasonably restricts consideration of the other State programs described by the State in their petition.

Corr. ID: 3236 **Organization:** Tennessee Chapter Sierra Club **Comment ID:** 494296 **Organization Type:** Conservation/Preservation

Representative Quote: On pages 2-13/2-14 OSMRE quotes, in part, the Council on Environmental Quality:

"The term 'land use plans,' includes all types of formally adopted documents for land use planning, zoning and related regulatory requirements. Local general plans are included, even though they are subject to future change. Proposed plans should also be addressed if they have been formally proposed by the appropriate government body in a written form, and are being actively pursued by officials of the jurisdiction."

OSMRE then makes reference to several state plans that it evaluated as land use plans or programs. These include the 2007 North Cumberlands Conservation Acquisition, 2008 Tennessee Greenways and Trails Plan, Tennessee 2020, Tennessee's Comprehensive Wildlife Conservation Strategy (TWRA 2005), and the Tennessee State Wildlife Action Plan (TWRA 2015c). OSMRE rejects these plans as not qualifying for consideration because they do not fit into its narrow definition of what constitutes a land use plan, even though OSMRE's definition is not supported by the documentation OSMRE references. Confusingly, OSMRE goes on to state on page 2-22 that: "OSMRE finds that new surface mining operations in the NCWMA would be inconsistent with the 2015 State Wildlife Action Plan.", and on page 2-23 additionally states: "Surface coal mining is also incompatible with the 2014 Northern Cumberlands Forest Resources Habitat Conservation Plan."

CONCERN STATEMENT: (Concern ID: 56970) One commenter noted that the decision to grant the petition was based on the 2015 State Wildlife Action Plan and, as such, it was up to the petitioners to offer up proof of standing.

RESPONSE: OSMRE does not understand what the commenter means by “proof of standing.” However, we note that under our regulations, “[a]ny person having an interest which is or may be adversely affected” by surface coal mining may submit a petition to designate lands unsuitable for mining (30 CFR § 764.13(a)). The State, which manages the lands covering the petition area, clearly has such an interest.

Representative Quote(s):

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492389 **Organization Type:** Unaffiliated Individual

Representative Quote: In addition, OSMRE based its decision to grant the Petition in part based upon a recent (2015) State Wildlife Action Plan ("SWAP") developed by Tennessee Wildlife Resources Agency ("TWRA"). Petitioner based its "interest" or "standing" on impacts to either TWRA or the Tennessee Department of Environment and Conservation. As a result it was essential for Petitioners to offer up proof of standing. In placing the language related to surface mining, it was able to buttress its claim by creating an issue that would be inconsistent with the plan.

FRAGILE OR HISTORIC LANDS

CONCERN STATEMENT: (Concern ID: 56974) Multiple commenters expressed concern over the alleged vagueness of the OSMRE support of the petitioner's allegation that the petition area qualified as fragile lands. Two commenters recommended text revisions to the PED/EIS to more closely reflect OSMRE's findings as written in the detailed analysis in chapter 2 of the EIS and as presented in the PowerPoint presented at the public hearings. Another commenter asked for clarification in the summary section on whether the area is considered fragile or not. Another commenter voiced concern that many statements in the draft PED/EIS contradict support of the area as fragile lands.

RESPONSE: OSMRE agrees that the draft PED/EIS may have included confusing language concerning the overall determination that the petition area included fragile lands as defined under SMCRA. Portions of the area qualify as fragile lands. OSMRE has included revised language to better reflect its overall conclusion as described in chapter 2 of the final PED/EIS.

Representative Quote(s):

Corr. ID: 166 **Organization:** Not Specified **Comment ID:** 487798 **Organization Type:** Unaffiliated Individual

Representative Quote: Comment 2: I attended two of the local public hearings on the TNLUM petition and it was apparent that the majority of attendees did not realize, in spite of the Powerpoint introduction, that OSMRE supported the petitioners' allegation that the petition area qualified as "fragile lands". I believe this misunderstanding is primarily due to the "Conclusion" section of the draft EIS in Volume 1, pg. v and Volume 1, pg. 2-40. I would respectfully suggest that the Conclusion section (excerpted below from EIS) be re-written, as follows, to more closely reflect OSMRE's findings as written in their detailed analyses in Chapter 2 and as presented in the Powerpoint introduction at the public hearings.

- 1) Remove the last sentence [bracketed] below. (30CFR762.10 is also a typo..it's 762.11)
- 2) Add the additional critical habitats portion of the 30 CFR § 762.5 "fragile lands" definition (ADDED AND CAPITALIZED below).
- 3) Change the [[double-bracketed]] portion of the second sentence to read "Thus, the petition area meets the definition of fragile lands as described by 30 CFR § 762.5."

CONCLUSION (found in Vol. 1, pg. 2-40 and Vol. 1, page v)

After reviewing all information available relevant to primary allegation (2), the OSMRE has determined that the record supports a conclusion that the petition area or areas adjacent to it contain valuable fish and wildlife habitat, AND CRITICAL HABITATS FOR ENDANGERED OR THREATENED SPECIES OF

ANIMALS OR PLANTS, that could be significantly damaged by surface coal mining operations in the petition area, specifically as it relates to forest-dependent birds such as the cerulean warbler and plants such as the Ozark bunchflower and pale corydalis. [[Thus, portions of the area meet the definition of fragile lands as described by 30 CFR § 762.5]]. The OSMRE has also determined that the elk viewing tower is fragile land because it provides recreational value due to high environmental quality and could be significantly damaged as a result of surface coal mining operations.

However, the OSMRE rejects the assertion that surface coal mining could significantly damage the Cumberland State Trail, as SMCRA protections are already in place and intended to afford parks sufficient protection from surface coal mining operations. Finally, the OSMRE rejects the assertion that there are historic resources in the NCWMA or ERTCE and the petition area that could be significantly damaged as a result of surface coal mining operations. The OSMRE finds that this assertion lacks merit because these resources, though present, would be adequately protected by current regulations. [Therefore, the area does not qualify as either historic or fragile lands as defined by 30 CFR § 762.10.]

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493249 **Organization Type:** Unaffiliated Individual

Representative Quote: Summary, p. v, Primary allegation (2) - The 5th sentence states Thus, portions of area meet the definition of fragile lands; The last sentence states Therefore, the area does not qualify as either historic or fragile lands; Please explain this contradictory conclusion. An area can be determined unsuitable under 30 CFR 762.11b(2) by being either historic or fragile, rather than both historic and fragile as concluded for Primary allegation (2).

Corr. ID: 3171 **Organization:** Southern Alliance for Clean Energy **Comment ID:** 494271 **Organization Type:** Unaffiliated Individual

Representative Quote: The Petition Area Qualifies As Fragile Lands

Second, OSM needs to clarify and confirm that the State of Tennessee has established that the petition area qualifies as "fragile lands" that could be significantly damaged by surface mining under 30 C.F.R. §§ 762.5, 762.11(b)(2). The PED/EIS provides:

"Given the record related to the cerulean warbler, Ozark bunchflower, and pale corydalis, the OSMRE has concluded that the petition area provides valuable habitat for fish and wildlife. In addition, this habitat could be significantly damaged by surface coal mining operations, thus qualifying it as fragile lands." PED/EIS, Vol. 1, Chapter 2, page 2-33.

Other statements in the document could be viewed as inconsistent with that conclusion, however, as some commenters noted during the public hearing process. Consequently, the PED/EIS should clearly state, as was clarified by OSM personnel during the public hearings, that OSM's overall conclusion is that the petition area does qualify as fragile lands that could be significantly damaged by surface coal mining operations. In particular, the final sentence of Chapter 2 should likely be removed or substantively clarified and further, it would be helpful for the final document to include a heading entitled "Conclusion" where the statement above at 2-33 could be reiterated.

CONCERN STATEMENT: (Concern ID: 56975) Multiple commenters argued that the conclusion that the entire area is fragile for certain flora and fauna without identifying the proper range of lands that are impacted is arbitrary and overestimates the impact of surface coal mining in that area. Numerous commenters noted that based on the immense biological diversity of Tennessee, the logic of evaluating such a large petition area in terms of fragile lands is questionable.

RESPONSE: Language has been added to the final PED/EIS to clarify that only a subset of the entire petition area was determined to be fragile lands. This finding is based on the presence of valuable fish and wildlife habitat and critical habitat for endangered or threatened species of animals or plants that could be significantly damaged by surface coal mining in the areas, specifically the presence of forest-dependent birds such as the cerulean warbler and plants such as the Ozark bunchflower and pale corydalis. Of the lands determined to be fragile under 30 CFR § 762.5, the elk viewing tower qualified because the tower promotes recreational and environmental values and could be significantly damaged as a result of surface coal mining operations. OSMRE determined that the Cumberland State Trail was not fragile because sufficient SMCRA protections are already in place to afford the park protection from surface coal mining operations. Similarly, OSMRE determined that the historic resources in the NCWMA or ERTCE would also be adequately protected by current regulations. Therefore, neither area qualified as either historic or fragile lands as defined by 30 CFR § 762.5. However, OSMRE has determined that the entire area may be designated as unsuitable for mining because mining is inconsistent with state or local land use plans. Thus, the designation is not limited to areas that constitute fragile lands.

Representative Quote(s):

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492258 **Organization Type:** Non-Governmental

Representative Quote: The second basis upon which OSM relies in proposed the designation of lands unsuitable is that mining will affect fragile and historic lands, resulting in significant damage to important historic, cultural, scientific, and esthetic values and natural systems. The petition upon which the proposed designation relied has failed to make this showing. The petition states that "fragile lands" exist within the petition area, but it does not say that the entire petition area contains such lands. Petitioners list the Cumberland Trail State Park as a fragile land, but surface coal mining operations are already prohibited in public parks by virtue of SMCRA § 522(e)(3). Petitioners site the Big Fork NRRRA as an example of fragile lands, but negate this assertion by admitting that the Big Fork NRRRA is located downstream from the petition area. See Petition at p. 21. The petition also cites several vast areas, lengthy features, and even roads that it believes qualify as fragile lands, including the 450 mile Cumberland Plateau, the 300 mile long Cumberland Trail, Interstate 75, and the Great Eastern Trail that stretches from Alabama to New York. Such arguments are inconsistent with SMCRA's requirements for an unsuitability finding. A complete petition must include allegations of fact and supportive evidence covering all lands in the petition area which tend to establish that the area is unsuitable...pursuant to specific criteria in sections 522(a)(2) and (3). See 30 C.F.R. § 764.13(b)(1)(v). Petitioners fail to explain how such vast features relate to the areas under consideration of the petition. By the petitioner's logic, no mining should be allowed anywhere near the 300 mile Cumberland Trail, the 450-mile Cumberland Plateau, the Great Eastern Trail, or Interstate 75. Clearly this is not supportable, and designation of these lands as unsuitable for mining on such a basis would set an untenable precedent, paving the way for future designations based on petitions so broad in scope and vague in description that they cannot be evaluated.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492273 **Organization Type:** Non-Governmental

Representative Quote: In addition, petitioners fail to demonstrate that the petition area contains fragile lands that will be significantly damaged by mining. To the contrary, petitioners cite examples of lands already protected under SMCRA, or outside of the petition area, or features that are so large and broad that they cannot supply a reasonable connection that is limited to the petitioned area.

Corr. ID: 3851 **Organization:** Mark V Mining and Engineering **Comment ID:** 500162 **Organization Type:** Business

Representative Quote: OSMRE has failed to properly identify fragile lands and grossly over calculates the impact of mining activities within the Petition area.

Corr. ID: 3852 **Organization:** *Not Specified* **Comment ID:** 500172 **Organization Type:** Unaffiliated Individual

Representative Quote: Tennessee is one of the most biologically diverse states in the United States, with over 300 species of fish, at least 80 mammal species, 60 reptile species, approximately 70 amphibian taxa, over 340 species of birds, over 225 land snail taxa, 100 aquatic snail species, at least 120 mussel species, 70 crayfish species, and thousands of insect taxa. See. Page 2-29

Assuming the above is true, then the logic of evaluating such a large Petitioned area in terms of fragile lands is misleading and not reliable. Taken to the logical progression, the entire state of Tennessee could be considered "fragile lands" because some of it may be. Even if some of the area within the petitioned area might contain fragile lands, OSMRE must make a finding as to what specific areas are impacted as fragile land, and only those areas are subject to the evaluation. OSMRE has improperly aggregated the entire Petitioned area and concluded that the entire area is fragile for certain flora and fauna without properly identifying the range. While Alternative 5 appears to establish an affected area, the draft PED/EIS does not properly find that the entire area should be subject to restrictions on surface coal mining.

As a result even if the area contains some fragile lands, OSMRE has not properly identified the impact of surface coal mining on the entire petitioned area. It is therefore, arbitrary and capricious, and will not be upheld by a court.

CONCERN STATEMENT: (Concern ID: 56976) One commenter voiced concern that the draft PED/EIS implies that the area does not qualify as historic or fragile lands because current regulations are adequate to protect historic resources. The commenter noted that the history of lawsuits brings into question the ability of surface coal mining operators to adequately protect resources under current regulations.

RESPONSE: As described in chapter 2 of the PED/EIS, OSMRE concluded that the resources in the petition area do not qualify as historic resources that could be significantly impacted by surface mining. Historic lands are those "areas containing historic, cultural, or scientific resources. Examples of historic lands include archeological sites, properties listed on or eligible for listing on a state register or the National Register of Historic Places, national historic landmarks, properties having religious or cultural significance to Native Americans or religious groups, and properties for which historic designation is pending" (30 CFR § 762.5).

Prior to permit authorization for surface coal mining, the OSMRE must comply with section 106 of the National Historic Preservation Act of 1966 (NHPA). The NHPA requires federal agencies to take into account the effects of their undertakings on historic properties, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment (36 CFR § 800.1(a)). SMCRA also requires the identification of cultural resources and the preparation of a plan to prevent or minimize adverse effects to resources that are listed or eligible for listing in the National Register before the mining permit can be approved under 30 CFR § 780.31(a) or § 784.17(a) (30 CFR § 779.12(b) and § 783.12(b)). If a plan cannot be agreed upon by both the SMCRA regulatory authority and the agency with jurisdiction for the historic site, then a mining permit is denied. The commenter does not explain why this process is inadequate. Without specific evidence, OSMRE concluded that this process adequately protects historic resources from being significantly affected by surface mining activities.

Although the commenter cites cases in support of its assertion that historic resources are not adequately protected, these cases do not appear to be relevant to the protection of historic resources. Rather, they appear to concern water quality.

Representative Quote(s):

Corr. ID: 3619 **Organization:** *Not Specified* **Comment ID:** 496871 **Organization Type:** Unaffiliated Individual

Representative Quote: Finally, the OSMRE rejects the assertion that there are historic resources in the NCWMA or ERTCE and the petition area that could be significantly damaged as a result of surface coal mining operations. The OSMRE finds that this assertion lacks merit because these resources, though present, would be adequately protected by current regulations. Therefore, the area does not qualify as either historic or fragile lands as defined by 30 CFR § 762.10. The key wording here is "would be adequately protected by current regulations". OSMRE's past history of lawsuits brings questions of surface coal mining operators' ability to adequately protected water quality using current regulations. Each year OSMRE Knoxville Field Office issues an annual report noting lawsuits. These concerns are brought forward in the 2008 paper by the SOCM Stripmine Issues Committee (now known as the E3 Committee) entitled, Heads Up on Headwaters: How surface coal mining threatens small Streams, Creeks, Springs and Seeps", (Attachment #14) because "water" is becoming more of an economic "commodity" in the upper East Tennessee region and Appalachia. The draft EIS-37 comes short in the assessments of these important concerns.

CONCERN STATEMENT: (Concern ID: 56977) Commenters stated that OSMRE should have made additional efforts to communicate with appropriate agencies and sought out other resources including libraries to obtain additional references to aid in the fragile land designation determination. One commenter stated that OSMRE failed to communicate with the state and seek additional evidence. One commenter noted the need to seek additional references and resources pursuant to historic lands within the petition area and provided recommended resources.

RESPONSE: The Tennessee Division of Archaeology, Tennessee Historical Commission, and the National Register of Historic Places were consulted to identify all known archaeological and architectural resources located within the petition area. These resources and their eligibility for the National Register of Historic Places are detailed in chapter 4 of the PED/EIS. In addition, the Absentee Shawnee Tribe of Oklahoma, Cherokee Nation, Chickasaw Nation, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Shawnee Tribe, and United Keetoowah Band of Cherokee Indians in Oklahoma were contacted to identify potential properties of religious or cultural significance within the petition area. This consultation was reasonable in light of the evidence presented in the petition.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496779 **Organization Type:** Unaffiliated Individual

Representative Quote: Pursuant to "Historic lands" containing historic, cultural, or scientific resources within the petition area can be found in any county history book at the University of Tennessee Library. Examples of historic lands include archeological sites, properties listed on or eligible for listing on a State or National Register of Historic Places, National Historic Landmarks, properties having religious or cultural significance to Native Americans or religious groups, and properties for which historic designation is pending. The lands of Native American of the North Cumberland Mountains are available

on any woodland Indian map at UT Library. Any state of Tennessee map at the Division of Geology shows important archeological sites and geological sites within the petition area. Did the draft EIS-37 review team actually seek this information? To say it was not "our job" to seek such data is not meeting SMCRA and Congress intent to protect the citizens of the United States.

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496810 **Organization Type:** Unaffiliated Individual

Representative Quote: Comments of concern on OSMRE draft EIS-37 lack of a NEPA require /1 hard look" at direct and indirect impacts to NCWMA or ERTCE: OSMRE rejects the assertion that there are historic resources in the NCWMA or ERTCE and the petition area that could be significantly damaged as a result of surface coal mining operations. I question if OSMRE actually ask by letter to the State of Tennessee to provide needed missing sufficient information to prove its so-stated assertion. Pursuant to 762.5 Historic lands means areas containing historic, cultural, or scientific resources. Examples of historic lands include archeological sites, properties listed on or eligible for listing on a State or National Register of Historic Places, National Historic Landmarks, properties having religious or cultural significance to Native Americans or religious groups, and properties for which historic designation is pending. If the lands in question are not part of Tennessee, culture, landmarks and my old cabin home then every Tennessean needs to move back to Europe. OSMRE states that through its own analysis in the draft EIS-37 that OSMRE finds the assertion lacks merit as these resources, although present, would be adequately protected by current regulations. Really, common sense tells you that with a state song of "Rocky Top" OSMRE Knoxville have all the sufficient information that mountains are historic resources. Hunting and fishing in these mountains is "way of life" that any federal or state government agency in Tennessee should understand. Maybe everyone at OSMRE has forgotten their homes of their grandfathers. IU would think even Earl Bandy sings "My Old Kentucky Home" every once in a while. OSMRE has not in "good faith" and NEPA /1 Hard Good" requirements sought expert to address this assessment within the draft EIS-37 evaluation to determine if these lands do not qualify as either historic or fragile lands, defined by 30 CFR § 762.10. The University of Tennessee is just a few blocks from the OSMRE office. To be acting in "good faith" OSMRE Knoxville should have sought-out these resources. Any Tennesseans knows that these mountains have caves, Indian artifacts and small private family cemeteries. They may not be on the National Register but to the families living in these mountain communities OSMRE Knoxville draft EIS-37 owes them the "good faith" effort to fully seek out resources to address this portion of a draft EIS-37 review. It is disappointing that OSMRE choose not to. The intent of SMCRA section 522 is to provide a higher degree of protection to specific public and environmental values from surface coal mining operations where it is determined that the significance of these values could be compromised. How many small family cemeteries are found within the petition area? These small cemeteries may be on the National Register but they are in the hearts of ridgeline families in the petition area. In regards to this section of the draft EIS-37, I am disappointed that the state of Tennessee did provide the information and OSMRE never asked for it. The simple fact of having a state's song that says "My home sweet home ... "is enough reason to protect one of the last unique wilderness areas in Tennessee. What are some of the rich cultural history of these ridgelines? The earliest white settlers of what is today Anderson, Campbell, Morgan and Scott Counties, Tennessee moved into the region in the latter part of the 18th Century. They settled along the New River, in what was at the time part of North Carolina. They established farms and worked the land around the rivers and its tributaries, these petition ridgelines are Historic treasures in capturing Tennessee's past and future. And, the homelands of woodland Indians of Southern Appalachia.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496825 **Organization Type:** Unaffiliated Individual

Representative Quote: The draft EIS-37 determined that these cited references were not sufficient evidence to support "Fragile land" designation. Pursuant " historic, cultural, scientific, and esthetic values

and natural systems, within the meaning of §522(a)(3)", NEPA requires OSMRE to take a "hard look" during the EIS review process. If additional "sufficient evidence" was needed then OSMRE should have made a "good faith" effort to communicate with the office of Governor of the State of Tennessee seeking additional evidence. It appears that the state of Tennessee only submitted references to "sufficient evidence" in the petition footnotes. Commenter assumes this was to safe paper. The underlining fact is that the state of Tennessee (petitioners) reference already "standing" citations in prior OSMRE LUMP designated in Tennessee (Rock Creek, Flat Rock, Fern Lake and Fall Creek Falls) to justify their claims of "fragile lands". The benchmark within (Rock Creek, Flat Rock, Fern Lake and Fall Creek Falls) of "fragile lands" should apply to The North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE) ridgelines petition areas. I assume that the petitioners avoided lengthy hard copy to save time and paper.

CONCERN STATEMENT: (Concern ID: 56978) Multiple commenters suggested that the Cumberland Trail State Park, the Big South Fork National River and Recreation Area, numerous watersheds, wildlife management areas, and other lands noted in the 2007 Connecting the Cumberlands project should be designated as fragile lands based on the flora and fauna in the area and the outstanding natural and cultural resources of these lands. The commenters stated that the area contains high value habitat, recreational and aesthetic resources, and high quality streams. Numerous commenters noted the presence of the cerulean warbler, the golden-winged warbler, and other plant sensitive species, as well as wildlife habitat as justification for designation. One commenter noted that the flora and fauna surrounding the elk viewing tower should serve as an example of the reason this area should be designated, and another mentioned the potential hydrologic consequences of mining in the area.

RESPONSE: OSMRE considered whether the petition area or areas nearby contained fragile lands that could be significantly affected by surface coal mining. The petition area was approximately 67,000 acres. However, the OSMRE evaluation area was approximately 172,000 acres, roughly the entire size of the NCWMA and ERTCE. OSMRE determined that this area was adequate for determining whether fragile lands existed in or near the petition area. In order to assess water quality impacts to nearby areas, OSMRE examined areas 6.2 miles downstream from potential surface mine and remaining locations. The 6.2-mile metric was used as a gross level analysis for determining where significant impacts might be expected to occur, especially since no mine applications are currently proposed. For more information, see the response to Concern Statement 56886. OSMRE is not making a determination regarding whether Big South Fork National River and Recreation Area or other areas noted in the 2007 Connecting the Cumberlands project are fragile lands because they are not within the area of expected impact and OSMRE has no specific evidence or analysis before it showing that there would be significant impacts to such areas should mining occur within the petition area. OSMRE did find that the petition area contained fragile lands for several resources including the cerulean warbler, pale corydalis, and Ozark bunchflower, as well as the area around the elk viewing tower. The analysis in chapter 2 of the PED/EIS noted that the loss of cerulean warbler habitat (mature hardwood stands) could not be restored in a biologically relevant period to conserve the warbler. However, given the current regulatory protections in place such as the Clean Water Act, SMCRA, the Endangered Species Act, and Tennessee Responsible Miners Act, OSMRE did not find that aquatic habitat in the petition area was fragile.

Representative Quote(s):

Corr. ID: 3236 **Organization:** Tennessee Chapter Sierra Club **Comment ID:** 494296b **Organization Type:** Conservation/Preservation

Representative Quote: We reject OSMRE's reasoning in concluding this, and strongly recommend that the NCWMA be designated as "fragile lands" and confirm that the State of Tennessee has established that the petition area qualifies as "fragile lands" that could be significantly damaged by surface mining under 30 C.F.R. §§ 762.5, 762.11(b)(2).

Corr. ID: 269 **Organization:** Tennessee Parks and Greenways Foundation **Comment ID:** 488050
Organization Type: Unaffiliated Individual

Representative Quote: Additionally, the petition area should be designated as "fragile lands." The Cumberland Mountains are renowned for phenomenal forests, rich aquatic life and outstanding outdoor recreation. The streams contain extremely high concentrations of endangered species. In fact the Cumberland aquatic regions contain the highest number of fish, mussel and crayfish species, and the highest number of endemic freshwater fauna in North America. Most of these ridgelines are in the headwaters of the Big South Fork, an area of very special concern to TennGreen. Ridgetop and headwater conservation would benefit the park's waters and wildlife and its biodiversity.

Corr. ID: 2522 **Organization:** Tennessee Ornithological Society **Comment ID:** 490052 **Organization Type:** Unaffiliated Individual

Representative Quote: I also believe the area under consideration should qualify as "fragile lands" due to the importance of this habitat to several species of breeding birds in need of management concern, for example, Cerulean and Golden-winged Warblers.

Corr. ID: 3025 **Organization:** BirdWorks Consulting **Comment ID:** 493232 **Organization Type:** Unaffiliated Individual

Representative Quote: I find the two justifications used by the State; 1) that surface mining would be in conflict with plans and programs of the State, and 2) that fragile wildlife habitat would be significantly damaged by surface coal mining, are both valid. The Draft Environmental Impact Statement (DEIS) correctly presents evidence that mining operations would be incompatible with the management objectives in the State Wildlife Action Plan and 2015 Tennessee State Wildlife Action Plan and correctly presents evidence that habitat for the Cerulean Warbler is too fragile to be mined for coal. The Cerulean Warbler requires large tracks of mature hardwood forest and shares this habitat with several other forest-dependent species. Since normal permitting requirements and modern reclamation methods cannot replace this habitat, by definition, it is fragile and, by definition, it is unsuitable for surface mining.

Corr. ID: 3171 **Organization:** Southern Alliance for Clean Energy **Comment ID:** 494272 **Organization Type:** Unaffiliated Individual

Representative Quote: In addition, we disagree with the conclusion that the Cumberland Trail State Park would not be significantly damaged from coal surface mining, and thus does not qualify as "fragile" or "historic" lands. OSM finds, in the analysis of Alternative 5, that the trail and the Hatfield Knob elk viewing tower area are, in fact, sensitive resources that warrant additional protection as fragile lands.

Corr. ID: 3749 **Organization:** *Not Specified* **Comment ID:** 495443 **Organization Type:** Unaffiliated Individual

Representative Quote: And I was surprised that one of the justifications that the State made for declaring this area unsuitable for mining, that this area contains fragile resources that would be significantly damaged by surface mining. The draft EIS found that that lacks merit, and I contend that taking down a mature hardwood forest would go into the category of being fragile. Even if you use all the current

regulations, you do everything exactly right, you use the modern reclamation methods, you can't restore a hardwood forest, at least not for decades and decades. And if you can't do that in a biologically reasonable amount of time, I would consider that a fragile habitat.

Corr. ID: 211 **Organization:** *Not Specified* **Comment ID:** 487883 **Organization Type:** Unaffiliated Individual

Representative Quote: For over 30 years, I have traveled with family, friends, and boy scouts to the area to experience the incredible outdoor recreational opportunities that the Big South Fork area offers. Ridgeline mining would destroy the vistas experienced traveling to and in the area, and would adversely affect the water quality in the area. These areas should be designated as "fragile lands."

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496732 **Organization Type:** Unaffiliated Individual

Representative Quote: Is surface coal mining an unacceptable risk to the cited petition area? Is allowable "remining" an acceptable risk? The three-volume draft EIS-37 does not fully answer the petitioner's questions. Instead the draft EIS-37 submits an alternative that still puts the petition area to unacceptable risk(s) from surface coal mining. To the heart of petitioner's concerns is that no probable hydrologic consequences determination (PHC) can fully protect its valuable land and water resources within the petition area. Surface coal mining can have a predictive estimate of potential impacts of the proposed mining and reclamation operation within draft EIS-37 petition area. But, is the protection that the petitioners are seeking. The hydrologic balance of the petition area is the heart of everyone's concerns. It is the sum of the effects upon area's hydrologic balance that petitioners claim that all surface coal mining and treatment practices are still an unacceptable risk to local land use plans or programs and the affect fragile or historic lands in which such operations could result in significant damage to the hydrologic balance and important historic, cultural, scientific, or esthetic values and natural systems ... " (30 USC § 1272(a)(3)(A)(B) within the entire petition area. SMCRA recognizes that technologies do not exist that readily allow an applicant to evaluate quantitatively all factors that must be addressed in the PHC determination. In fact surface coal mining and even the preferred alternative in the draft EIS-37 places the petition area at risks to these potential PHC adverse impacts. Thus, this position meets the petitioner's claim of "fragile lands".

CONCERN STATEMENT: (Concern ID: 56893) Commenters asserted that coal mining will adversely impact the Big South Fork National River and Recreation Area, which is located downstream of the designation area, and one commenter claimed that the impacts to the Big South Fork National River and Recreation Area are underestimated in the draft PED/EIS.

RESPONSE: OSMRE agrees that past human activities, including coal mining, have impacted the Big South Fork of the Cumberland River (BSFR). The New River and Clear Fork join at the southern terminus of the Big South Fork National River and Recreation Area (BSFNRRRA) to create the BSFR. Clear Fork enters from the west and experiences minimal impact from mining activity. Those coal mining impacts in the area date from 1978, and there has been no recent activity in the watershed since 1999. New River enters from the southeast through the heart of the NCWMA LUM and has been significantly impacted from prior mining. See chapter 6 of the final PED/EIS.

OSMRE analyzed the amount of annual mine disturbance in the NCWMA and found that the average disturbance is 112 acres per year. Most of the mining impacts in the New River watershed occurred before the passage of SMCRA, and many acres have been reclaimed through remining.

The PED/EIS does consider the impacts of the designation on the BSFNRRRA in the water quality section of chapter 6. OSMRE has determined that mining in the NCWMA is not likely to significantly impact the BSFNRRRA. This is due to the annual rate of mining, re-mining, and the expected downstream area where significant impacts could occur. In determining this area, OSMRE examined the literature and chose a single metric (6.2 miles) to better predict where significant impacts might be expected to occur. BSFNRRRA is not within this area of potential for significant impact. Furthermore, OSMRE is not aware of specific evidence indicating that mining would have a significant impact on the BSFNRRRA. For additional discussion, see the responses to Concern Statements 56886 and 57040. It is important to note that OSMRE used the 6.2-mile metric only to assist in estimating general impacts for the purposes of this designation. The potential impacts on BSFNRRRA of any future re-mining proposals within the petition area will be assessed at a site-specific level using more site-specific metrics. Furthermore, OSMRE will engage the NPS and the State in such an analysis in order to ensure compliance with SMCRA 522(e)(3).

Representative Quote(s):

Corr. ID: 2828 **Organization:** Coalition to Protect America's National Parks **Comment ID:** 490685
Organization Type: Unaffiliated Individual

Representative Quote: The Analysis Significantly Underestimates Potential impacts to Big South Fork National River and Recreation Area (BISO)

A primary concern for the Coalition is the protection and preservation of the resources that led to the establishment of BISO. However, when Congress created BISO it included only lands at the lower end of the watershed. The boundaries of BISO contain only 14% of the lands within Big South Fork watershed, so activities upstream and outside park boundaries, such as in the petition area, greatly impact the water quality in the park. The streams in this watershed are important headwaters to BISO and support unique and ecologically valuable species of insects, fish, and salamanders, and are also critical to downstream functions and values. These headwater areas are crucial to preserve biological diversity and contribute directly to the water quality of the Big South Fork.

For the purposes of the analysis and comparison of alternatives, the draft PED/EIS estimated that surface runoff from mining operations would extend only 100 feet overland and that downstream effects would be diminished from any particular mine area within 6.2 miles downstream from the operation. The draft PED/EIS notes that the selection of these distances from potential mineable resources does not mean that there would definitely be impacts within that distance or that there would never be impacts outside of that distance. While the draft PED/EIS casts these distances as conservative, we believe that the distance (100 feet overland and 6.2 miles downstream), which the draft PED/EIS refers to as the buffer area used to analyze alternatives, is too restrictive and does not sufficiently acknowledge the potential of downstream impacts in BISO. Also, the draft PED/EIS appears to not account for the impact of haul roads and associated surface disturbances, which can be a major source of runoff contributing to sediments and turbidity, thus further underestimating the downstream effects of new mining or re-mining.

In the past, surface mining in the New River watershed has adversely affected BISO and the Big South Fork River through sediment loading, acid mine drainage, and associated impacts. The Coalition is concerned that any new surface mining (or re-mining) in the petition area, combined with the impacts from past and existing mining, could further impair the water quality in the New River and the Big South Fork, harming pollution-sensitive aquatic species and the natural and aesthetic values of BISO.

Corr. ID: 3035 **Organization:** *Not Specified* **Comment ID:** 493242 **Organization Type:** Unaffiliated Individual

Representative Quote: The rivers and canyons of BISO, located downstream of the NCWMA, are a rare asset for East Tennessee and deserve full protection as wilderness. BISO falls outside the evaluation area used in the DEIS. This evaluation area is a logical and satisfactory analytical tool, but it cannot take into account the effects of prospective remining in all relevant cases. As the DEIS correctly notes, “pollutants in surface waters can be transported a long distance downstream from their source thereby degrading waters outside the evaluation area”(DEIS, 6-72).

CONCERN STATEMENT: (Concern ID: 57040) Several commenters claimed that dismissing BSFNRRRA as fragile lands based on its downstream distance from the petition area was not sound rationale and that BSFNRRRA could be, and has been, significantly damaged by surface coal mining operations. One commenter stated that mining within the watershed portion of the petition area is incompatible with the authorizing legislation for BSFNRRRA and with the 2005 BSFNRRRA General Management Plan.

RESPONSE: As previously discussed in our response to Concern Statement 56893, OSMRE has determined that mining in the NCWMA is not likely to significantly impact the BSFNRRRA. However, OSMRE does not have before it any specific facts or information to support a conclusion that mining permitted under the petition or designation areas would significantly affect lands in BSFNRRRA and, thus, support a determination that the park is a fragile land. OSMRE agrees that park resources have been impacted by mining in the past. However, there is no specific evidence or analysis before OSMRE that SMCRA-regulated surface coal mining occurring within the petition area would result in significant impacts to park resources such that a fragile lands determination is warranted in this PED/EIS. As a result, in this analysis, OSMRE is not making a determination regarding whether BSFNRRRA constitutes fragile lands as it is not within the area analyzed where significant impacts might be expected to occur. The enabling legislation for the BSFNRRRA (16 USC § 460ee) does not specifically address surface coal mining in areas outside the boundaries of the BSFNRRRA. However, the enabling statute for BSFNRRRA specifically states that the Secretary of the Interior shall consult and cooperate with other departments and agencies of the United States and the States of Tennessee and Kentucky in the development of measures and programs to protect and enhance water quality within the BSFNRRRA and to ensure that such programs for the protection and enhancement of water quality do not diminish other values (16 USC 460ee(i)).

SMCRA 522(e)(3) also prohibits mining that would adversely affect a public park, unless it is approved jointly by the regulatory authority and the federal, state, or local agency with jurisdiction over the park. OSMRE will consult with the NPS to ensure compliance with this provision in SMCRA.

The General Management Plan for the BSFNRRRA acknowledges the statutory requirement that NPS must protect and enhance water quality in cooperation with other agencies, and notes that water resources are a priority management issue in the BSFNRRRA. The General Management Plan also discusses a number of other federal and state laws aimed at protecting water quality that apply to lands within the BSFNRRRA.

Representative Quote(s):

Corr. ID: 2828 **Organization:** Coalition to Protect America's National Parks **Comment ID:** 490689
Organization Type: Unaffiliated Individual

Representative Quote: It is abundantly clear that mining within the watershed portion of the petition area is incompatible with the authorizing legislation for BISO, and with the 2005 BISO General Management Plan (GMP). The GMP makes clear that the recreational and economic values for which the Big South Fork is protected are tied to a broader area than contained within BISOs boundaries. The GMP

emphasizes the goal of managing BISO to provide healthful outdoor recreation for the enjoyment of the public and for the benefit of the regional economy. The recreational uses of BISO and the attendant economic benefits to the region are dependent upon high water quality of the Big South Fork, and would be undermined by renewed surface coal mining operations in the petition area.

Corr. ID: 2828 **Organization:** Coalition to Protect America's National Parks **Comment ID:** 490691
Organization Type: Unaffiliated Individual

Representative Quote: Big South Fork National River and Recreation Area Should be Designated as Fragile Lands

Given the uniqueness, significance, and high quality of natural resources at BISO, we disagree with OSMRE's decision in the draft PED/EIS not to designate BISO as fragile lands. OSMRE's rationale for this decision, apparently, is simply because the park is approximately 20 river miles away from the petition area and a study in West Virginia documented that impacts from mining diminished as the distance to upstream mining activities increased (Petty et al. 2010).(p. 2-36). A careful reading of this study reveals that it reported variable findings depending on not only distance from mining (which is the part cited by OSMRE), but also depending on the underlying coal geology. That study included findings that streams draining watersheds with Freeport coal geology had significantly poorer water quality and ecological condition than streams draining watersheds with similar mining intensity but with Kittanning coal geology. http://www.uky.edu/~tmute2/geography_methods/readingPDFs/pettyetal_landscape-indicators-stream-eco-impair-appalachia2010.pdf

Mine-related pollutants affecting BISO are known to travel greater distances than those evaluated in Petty et al, so the blanket dismissal of BISO from fragile lands consideration based merely on its distance downstream is not defensible. Further supporting the assertion that BISO should be designated as fragile lands, is the special status given to protection of the parks resources under a variety of statutory authorities. These include:

" SMCRA Section 522(e)(1), which protects all lands within the boundaries of the National Park System, and the National System of Trails, the Wild and Scenic Rivers System and National Recreation Areas designated by Congress (30 USC 1272(e)(1)).

"The NPS Organic Act of 1916 established the fundamental purpose of units of the National Park System, which is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations (54 USC 100101(a)). Courts have consistently interpreted the Organic Act as giving conservation priority over use such that when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant (NPS Management Policies 2006 1.4.3).

"Section 108 of the Water Resources Act of 1974 (Public Law 93-251), the parks enabling legislation, established BISO for the purposes of conserving and interpreting an area containing unique cultural, historic, geologic, fish and wildlife, archeologic, scenic, and recreational values, preserving as a natural, free-flowing stream the Big South Fork of the Cumberland River, major portions of its Clear Fork and New River stems, and portions of their various tributaries for the benefit and enjoyment of present and future generations, the preservation of the natural integrity of the scenic gorges and valleys, and the development of the areas potential for healthful outdoor recreation. In essence, BISO was created to protect specific rare or unique recreational or esthetic resources, which supports the conclusion that BISO should be identified as fragile lands in the draft PED/EIS.

In conclusion, consistent with the higher degree of protection afforded to the unique and high quality resources of BISO, we believe that OSMRE should reconsider its dismissal of BISO for fragile lands status and should conduct an appropriate analysis resulting in an understandable and defensible determination.

Corr. ID: 3171 **Organization:** Southern Alliance for Clean Energy **Comment ID:** 494273 **Organization Type:** Unaffiliated Individual

Representative Quote: Finally, we also believe that the Big South Fork National River and Recreation Area ("BISO") qualifies as a fragile land within the meaning of SMCRA § 522(a)(3)(B) and 30 C.F.R. § 762.11(b)(2). With respect to BISO, OSM states that it "will not make a determination on whether the park unit is fragile land within the meaning of SMCRA section 522(a)(3) or 30 CFR § 762.11(b)(2)." PED/EIS at 2-36. OSM recognized that "the fragile lands sought to be protected" do not need to be within the petition area, and that the "regulations only require that surface mining operations are within the petition area and affect fragile lands, regardless of whether those fragile lands are within the petition area." Id. However, based solely on a 2010 study by Petty et al., OSM concluded that, because the boundary of BISO is approximately 20 river miles from the petition area, "mining in the petition area would not likely significantly damage resources within Big South Fork National River and Recreation Area." Id.

CONCERN STATEMENT: (Concern ID: 58019) Some commenters asserted that BSFNRRRA should qualify as fragile lands by definition, because of the special status given to parks under various statutes and because BSFNRRRA was created to protect specific rare or unique recreational or esthetic resources.

RESPONSE: Fragile lands are defined at 30 CFR § 762.5 as "areas containing natural, ecologic, scientific, or aesthetic resources that *could be significantly damaged by surface coal mining operations*" (emphasis added). OSMRE recognizes the value and unique characteristics of BSFNRRRA. However, as explained above in the response to Concern Statement 56893, OSMRE has determined that it does not have the facts or information to conclude that the park is significantly affected by mining in the petition area, which is needed for a fragile lands determination. Because of this lack of facts or information, OSMRE has not made a fragile lands determination relative to BSFNRRRA.

Corr. ID: 3171 **Organization:** Southern Alliance for Clean Energy **Comment ID:** 494275 **Organization Type:** Unaffiliated Individual

Representative Quote: PL 93-251. Accordingly, almost by definition, the national park qualifies as fragile lands, absent the misapplication of the 2010 Petty study. Further, existing and readily-available evidence clearly shows that BISO could and, indeed, has been, significantly damaged by surface coal mining operations. The Final PED/EIS should also acknowledge that potential effects of any future proposed mining upstream of the park can only be determined by detailed, case-specific analyses and cannot rely on this misapplication of this study's findings.

CONCERN STATEMENT: (Concern ID: 58020) One commenter noted that impacts from past surface coal mining companies in Tennessee and the creation of trust funds for reclamation or clean-up clearly demonstrate the potentially long-term damage to these areas from surface mining. This commenter stated that this damage shows that the petition area qualifies as fragile lands.

RESPONSE: Fragile lands are defined at 30 CFR § 762.5 as “areas containing natural, ecologic, scientific, or aesthetic resources that *could be significantly damaged by surface coal mining operations.*” Past damage alone is not enough to qualify an area as a fragile land.

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496813 **Organization Type:** Unaffiliated Individual

Representative Quote: The natural and ecologic resources of the petition area include the following: North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE) petition area provides valuable habitat for threatened and endangered species of fish and wildlife. It has numerous occurrences of stream dependent threatened and endangered species and esthetic resources of high scenic value, forming an environmental corridor within the petition area which has a concentration of ecologic and esthetic features. North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE)) has valuable habitats for rare floral species. The esthetic resources of North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE) includes various number of old Indian trails, ridgeline viewsheds and gorges throughout North Cumberland Wildlife Management Area (NCWMA)comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)and the Emory River Tracts Conservation Easement (ERTCE)). North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE) has areas of high recreational and cultural value due to high environmental quality, and is used for recreational, educational and religious activities. Fragile lands in the petition area outside the Park. North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE) certain watersheds in and outside the petition area that are fragile lands because of the existence of natural systems within these watersheds consisting of streams with high water quality and water quantity. Surface coal mining operations in North Cumberland Wildlife Management Area (NCWMA)comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)and the Emory River Tracts Conservation Easement (ERTCE) in certain watersheds outside the petition area would affect the fragile lands of the petition area, because of the inherent historic environmental impacts of surface coal mining operations. The fact of past surface coal mining companies in Tennessee that are no longer in business and the "clean up" or "reclamation" are in "Trust Funds" clearly points out the potentially long term damage to the petition areas. These impacts could potentially damage natural systems and cultural and esthetic values within and outside the petition area during the mining and reclamation phases of surface coal mining operations.

CONCERN STATEMENT: (Concern ID: 56979) Multiple commenters noted the impacts of coal mining on the water quality of the region and the subsequent impacts downstream to public health and safety and

the natural environment. Because of this, the commenters believe that the entire petition area should be designated as fragile lands.

RESPONSE: As stated in our response to Concern Statement 58020, past damage alone is not enough to qualify an area as a fragile land under 30 CFR § 762.5.

Representative Quote(s):

Corr. ID: 209 **Organization:** *Not Specified* **Comment ID:** 487879 **Organization Type:** Unaffiliated Individual

Representative Quote: The petition area should be designated as "fragile lands." Headwater sources are essential to healthy downstream water. Coal mining was the primary cause of decline for 33 of the 34 aquatic special-status species known to occur in the evaluation area.

Corr. ID: 224 **Organization:** LightWave Solar **Comment ID:** 487902 **Organization Type:** Unaffiliated Individual

Representative Quote: The majority of the ridgeline to be designated are in the headwaters of the Big South Fork, an area of special concern to me. Their protection would benefit the park's water resources. Additionally, the North Cumberland Mountains contain natural treasures such as a 40' tall waterfalls, mountain tops over 3,000', and headwater streams. The petition area should be designated as "fragile lands." Headwater sources are essential to downstream viability.

Corr. ID: 3414 **Organization:** Tennessee Citizens for Wilderness Planning (TCWP) **Comment ID:** 493214 **Organization Type:** Conservation/Preservation

Representative Quote: Ridgeline mining, being in the headwaters of streams, affects water quality and quantity downstream. It is known to impact the survival of aquatic organisms, including special-status species. For this reason (and others), the petition area should be designated as "fragile lands." Additionally, since the effect of re-mining is contrary to the intent of designating a protected area, the criteria for establishing its appropriateness should be carefully examined.

Corr. ID: 3780 **Organization:** *Not Specified* **Comment ID:** 495930 **Organization Type:** Unaffiliated Individual

Representative Quote: It's not suitable for mining in this fragile land because the clouds touch the treetops and the water condenses and drops to the earth here and creating our watershed and it joins the creeks that join the Cumberland River and flows into Norris Lake there. The roofs of trees hold the mountainside together and force topsoil accumulates one inch in 900 years lies there; it cannot be replaced in our lifetime, nor our children's lifetime, nor our grandchildren's lifetime. It is not suitable for mining this fragile land. Because the rains move downstream of this area rely on water wells and springs for drinking water and blasting stops the flow of springs, and water contamination forever poisons afterwards, it is not suitable for mining this fragile land.

Corr. ID: 3809 **Organization:** *Not Specified* **Comment ID:** 495809 **Organization Type:** Unaffiliated Individual

Representative Quote: All coal mining, especially ridgeline mining, impacts the water quality of the region. This is an issue of concern for all of us in Tennessee, especially those downstream. And I want to emphasize what a serious issue of public health that is, but there's not enough time for that this evening.

We need to account for the impact on all species, including humans living downstream of this petition area. Because of this, the entire petition area should be designated as fragile lands.

CONCERN STATEMENT: (Concern ID: 56916) One commenter claimed that the draft PED/EIS does not fully assess the potential harm to the Cumberland Trail State Park, and that the draft PED/EIS was incorrect in suggesting that SMCRA regulations will mitigate impacts. The commenter cited coal mining impacts along the Trail of Tears and cited other LUM petitions for the proposition that state park land should be protected.

RESPONSE: SMCRA prohibits surface coal mining within 300 feet of any public park (30 USC § 1272 (e)(5)). In addition, ridges that contain certain sections of the Cumberland Trail identified by the state in its petition would be designated. OSMRE declines to make a blanket determination that all park land qualifies as fragile land. The determinations made in previous LUM designations are based on unique facts and circumstances and have no bearing on our evaluation of the petition at hand.

While OSMRE recognizes that views along the trail could be impacted in the short term by remaining until reclamation occurs and post-mining uses are implemented, we have determined that these impacts would not be significant under 30 CFR § 762.5. We have, however, added additional discussion of the potential for long-term visual impacts to the discussion of aesthetics in chapter 6.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496768 **Organization Type:** Unaffiliated Individual

Representative Quote: Draft EIS-37 states that OSMRE rejects the assertion that surface coal mining could significantly damage the Cumberland State Trail, as SMCRA protections are already in place and intended to afford parks sufficient protection from surface coal mining operations. This I disagree with, the same said "sufficient protection" was part of the Skyline Coal Company SMCRA permit along the "Trail of Tears" route across the Cumberland Plateau, (attachment #9) not only was the route viewshed damaged; after 23 years OSMRE is still trying to "put things back the way it was". This is NOT an assertion; the Cumberland Trial State Park should be allowed the same protection as Rock Creek, Flat Rock, Fern Lake and Fall Creek Falls had with their LUMP designations. The petitioners are seeking the "equal protection" found in 762.5. The Cumberland Trail State Park pathways and viewsheds should not be put to such risks.

Corr. ID: 3619 **Organization:** *Not Specified* **Comment ID:** 496832 **Organization Type:** Unaffiliated Individual

Representative Quote: The draft EIS-37 has not fully assessment the potential harm to this section of the Cumberland Trail State Park and the benefits it provides to the public and tourists to have a "one-of-a-kind" experience in Upper East Tennessee. OSMRE is dismissing its assessment by stating SMCRA regulations will protected from significant harm is foolish. No one can put back these value ecosystems once they are harm; an almost-like approach repair by OSMRE regulations is not the intent of SMCRA. This nearby area makes up a part of the future planning and management goals of the North Cumberlands petitioners.

CONCERN STATEMENT: (Concern ID: 56980) One commenter noted that the draft PED/EIS failed to take a "hard look" at potential impacts to natural resources as required by NEPA.

RESPONSE: OSMRE evaluated the petition and associated evidence as required by SMCRA and, pursuant to NEPA, evaluated the environmental impacts of a reasonable range of alternatives. Since the scale of the designation at the landscape level would not have any site-specific impacts, the analysis is general in nature, although still robust and exhaustive. OSMRE has thus met all of its obligations under NEPA.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496778 **Organization Type:** Unaffiliated Individual

Representative Quote: At the same time, OSMRE fails to meet 30 CFR 762.4 responsibilities for "good faith" and NEPA "hard look" evaluations of the petitioners request for designation. The draft EIS-37 assessment and evaluation review should have had a "hard look" to meet 30 CFR 762.5 in determining the "full scope" of the petitioner's claims that: The petition area has "Fragile lands" to meet 30 CFR 762.5 areas containing natural, ecologic, scientific, or esthetic resources that could be significantly damaged by surface coal mining operations. Examples of fragile lands include valuable habitats for fish or wildlife, critical habitats for endangered or threatened species of animals or plants, uncommon geologic formations, paleontological sites, National Natural Landmarks, areas where mining may result in flooding, environmental corridors containing a concentration of ecologic and esthetic features, and areas of recreational value due to high environmental quality. These set EIS review requirement have not been meet by the draft OSMRE EIS-37.

CONCERN STATEMENT: (Concern ID: 58021) One commenter alleged that an underlying indirect impact is the "fracturing" of habitats and that in his opinion, fragile lands are those that can be easily damaged or destroyed by the fragmentation of rare state species habitats and feeding ranges.

RESPONSE: Fragile lands are defined at 30 CFR § 762.5 as "areas containing natural, ecologic, scientific, or aesthetic resources that could be significantly damaged by surface coal mining operations." There is nothing specific in the definition relating to the presence of lands that can be easily damaged by habitat fragmentation, although OSMRE has determined that lands which could be significantly damaged by mining are fragile lands. These include areas of forest that serve as important habitat for wildlife, including the cerulean warbler, and could be fragmented by mining operations.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496759 **Organization Type:** Unaffiliated Individual

Representative Quote: Under SMCRA SECTION 762.5 - DEFINITIONS of "FRAGILE LANDS" means areas containing natural, ecologic, scientific, or esthetic resources that could be significantly damaged by surface coal mining operations. Examples of fragile lands include valuable habitats for fish or wildlife, critical habitats for endangered or threatened species of animals or plants, uncommon geologic formations, paleontological sites, National Natural Landmarks, areas where mining may result in flooding, environmental corridors containing a concentration of ecologic and esthetic features, and areas of recreational value due to high environmental quality. Under SMCRA SECTION 762.5 - DEFINITIONS "HISTORIC LANDS" means areas containing historic, cultural, or scientific resources. Examples of historic lands include archeological sites, properties listed on or eligible for listing on a State or National Register of Historic Places, National Historic Landmarks, properties having religious or cultural significance to Native Americans or religious groups, and properties for which historic

designation is pending. My opinion of fragile lands is "easily broken, damaged, or destroyed of rare state species' habitats and feeding ranges. (Supported by Attachment #5, #6, #7 and #8) Can ridgeline be used for agriculture, forestry, wildlife habitation, and state recreational used after surface coal mining? Old timers will tell you that honey bees or a bobcat habitats and feeding ranges can be easily broken, damaged, or destroyed from surface coal mining. This simple point meets the OSMRE definition of 762.5. Surface coal mining can lead to the degradation or disturbance of forests, mountaintops and streams of headwaters surface and ground waters, soils, local land use, native vegetation, and wildlife population. An underline indirect impact is "fracture lands" from surface coal mining that are aboard-line definitions of meeting OSMRE 762.5 fragile lands definition. It is my opinion of SMCRA regulations leaving ridgelines in "fracture" conditions resulting in headwaters in almost broken conditions, almost damage unrepairable condition, and almost completely destroyed. The draft EIS-37 is no more than a fracture EIS that does not protect the unique ridgelines headwaters of East Tennessee within the protection area.

CONCERN STATEMENT: (Concern ID: 56981) Commenters noted that multiple locations and tourist sites within the petition area are on reclaimed mines and asserted that mining can and should be allowed within the wildlife management area. Multiple commenters noted that the Hatfield Knob elk viewing tower is consistent with surface coal mining and exists as a result of coal mining. One commenter noted that impacts to the area around the elk viewing tower would be temporary and that the area should not qualify as fragile land, and, even if it were to qualify, the relatively small area impacted (approximately 1,327 acres) is not sufficient to declare the entire petition area as unsuitable for mining.

RESPONSE: Fragile lands include areas of recreational value due to high environmental quality (30 CFR § 762.5). OSMRE found that the elk viewing tower provides such recreation, as the post-mining use that has been implemented has created a recreational opportunity to view elk. Although surface mining had occurred there, it was the post-mine land use and management that created the fragile land. Surface mining adjacent to the elk viewing tower could significantly affect the recreational value of the area. See chapter 2 of the PED/EIS for the complete evaluation of fragile lands.

Moreover, as stated previously, not all of the petition area qualifies as fragile land. OSMRE's determination that the area is unsuitable for surface mining is also based on the incompatibility criterion in SMCRA section 522(a)(3)(A).

Representative Quote(s):

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492464 **Organization Type:** Unaffiliated Individual

Representative Quote: The Hatfield Knob Elk Viewing Tower is consistent with surface coal mining.

OSMRE found that the Hatfield Knob Elk Viewing Tower area qualified as a fragile land because the dust, noise and water quality impacts could significantly damage the recreational value which could occur near Hatfield Knob Elk Viewing Tower. However, it should be pointed out that the viewing tower exists only because of past surface coal mining as it is located on a mountaintop removal site, which was mined prior to the introduction of SMCRA. Some of the success of the reintroduction of the elk was in part due to habitat restoration from reclaimed mining operations, as demonstrated by TWRAs legislative testimony on Jan. 20, 2016.

In addition, any impact to the area of the Viewing Tower will be temporary and not long term. The PED/EIS appears to conclude that the impact is permanent. Even if it were, it affects only approximately 1,327 acres which is not sufficient to declare the entire Petitioned area as unsuitable for mining.

Corr. ID: 3782 **Organization:** *Not Specified* **Comment ID:** 495956 **Organization Type:** Unaffiliated Individual

Representative Quote: The fragile lands they refer to, one they refer to is the Elk Viewing Tower. Elk Viewing Tower is on a reclaimed mine bench. We find elk on reclaimed mines consistently. They seem to like reclaimed mine bench for some reason. Your tourism dollars you talk about, they come to ride the trails that are on the mine benches. These benches were created by mining. Mining can exist in the Wildlife Management Area and it should exist.

CONCERN STATEMENT: (Concern ID: 56982) One commenter noted that previous mining had to adhere to permitting requirements and that annual reports conducted and released by the OSMRE have noted a reduction in environmental effects caused by mining in the area. Therefore, according to this commenter, the area is not so fragile as to be significantly affected by coal mining at its historic rates in the area.

RESPONSE: Fragile lands are defined at 30 CFR § 762.5 as “areas containing natural, ecological, scientific, or aesthetic resources that could be significantly damaged by surface coal mining operations.” These regulations state, “[e]xamples of fragile lands include valuable habitats for fish and wildlife, critical habitats for endangered or threatened species of animals or plants, uncommon geologic formations, paleontological sites, national natural landmarks, areas where mining may result in flooding, environmental corridors containing a concentration of ecologic and aesthetic features, and areas of recreational value due to high environmental quality.” Even if past mining practices have been improved and resulted in improvements in environmental effects, some lands in the petition area still remain at risk for damage based on their inherent qualities and therefore qualify as fragile lands.

Representative Quote(s):

Corr. ID: 3452 **Organization:** Alden Resources **Comment ID:** 495517 **Organization Type:** Business

Representative Quote: Allegation 2 - Fragile Lands. These so called fragile lands have been mined for about 100 years at a very moderate production rate according to the OSM findings. For the past 37 years that mining has been conducted under regulations based on the surface mining act (SMCRA). These regulations were entirely aimed at protecting the environment from significant impacts. If a mining area could not demonstrate that impacts would be minimal, A PERMIT COULD NOT BE OBTAINED. In each of OSM's annual reports they tout their administration of SMCRA and how its implementation has progressed toward its intended goal. The petition area has been mined within strict guidelines since 1984 and pre-law mining has been remediated during all of that time through SMCRA guidelines. Miraculously, only now OSM finds that continued mining this area will yield significant impacts in every conceivable way. If the petition area is scenic, or picturesque, or a natural treasure, it has developed into that state while coal mining was present all along! Let's be clear the area is not so fragile as to be significantly affected by coal mining at its historic rates in this area, it is just government controlled!!!

CONCERN STATEMENT: (Concern ID: 56984) One commenter stated that the draft PED/EIS is misleading regarding the amount of mining to that will occur at one time. The commenter further noted

that based on the small areas to be impacted at any given time, overall impacts would not harm fragile lands, and the basis for designating the entire area as unsuitable for mining is not valid.

RESPONSE: OSMRE disagrees with the commenter's contention that the PED/EIS is misleading. The draft PED/EIS is clear that the average disturbance rate of mining over the past 30 years is approximately 112 acres per year. That mining rate is expected to continue over the next 30 years regardless of whether a designation is made. At the same time, portions of the petition area are considered fragile as "areas containing natural, ecologic, scientific, or aesthetic resources that could be significantly damaged by surface coal mining operations" (30 CFR § 762.5). It is not their size or extent that makes them fragile; it is their vulnerability to mining.

Representative Quote(s):

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492467 **Organization Type:** Unaffiliated Individual

Representative Quote: The rate of surface coal mining anticipated in the next 30 years will not adversely affect the cerulean warbler habitat or the Ozark bunchflower and pale corydalis.

Unless OSMRE decided to approve 30 years of mining permits at once, which is not practical or possible, the incremental impact to the habitat of the cerulean warbler or the flowers is not a concern. As noted by OSMRE, mining anticipated in the area is approximately 112 acres per year. Over a 30 year period a total of 3,360 acres will be disturbed, but most will be in advanced stages of reclamation by that time.

The analysis ignores that OSMRE assumed 112 acres per year would be mined- -not the entire petitioned area, and also ignores that mining activities are contemporaneously reclaimed. It leaves the reader with the perception that the entire Petitioned area would be one swath of bare de-forested land with no reintroduction of native grasses or other plant species. This is inconsistent with the earlier part of the PED/EIS that specifically discusses how mining would be conducted. In short, it seems clear that wiping out the entire petitioned area at one time harms fragile land. Such a scenario will not happen and the basis for declaring the entire area as unsuitable is not valid.

CONCERN STATEMENT: (Concern ID: 56985) One commenter asserted that the petition fails to meet the required legal or regulatory level of completeness and should have been dismissed.

RESPONSE: On November 23, 2010, OSMRE made an initial determination that the petition was complete pursuant to 30 CFR § 764.15(a)(21). As explained in chapter 2 of the PED/EIS, OSMRE has determined that the State has submitted adequate supporting evidence to support its allegations that mining is incompatible with existing State or local land use plans and would affect fragile lands.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492242 **Organization Type:** Non-Governmental

Representative Quote: The Proposed Designation Fails to Satisfy Required Criteria Under SMCRA The petitioners base their arguments on two discretionary criteria contained in SMCRA: (1) that mining in this area will be incompatible with existing State or local land use plans or programs; and (2) that mining will affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and esthetic values and natural systems. The petition fails to meet either of the statutory criteria.

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492360 **Organization Type:** Unaffiliated Individual

Representative Quote: The Petition did not and cannot meet the well-established criteria for such designations. One of the most egregious action by OSMRE is that the Petition never rose to the legal or regulatory level of completeness and should be dismissed in its entirety.

CONCERN STATEMENT: (Concern ID: 58022) One commenter alleged that the petitioner has not met its burden of proving that mining will result in significant damage to natural and cultural resources and failed to consider factors that mitigate mining impacts (e.g., reforestation).

RESPONSE: The allegations of the petition must be supported by evidence that “tend[s] to establish that the area is unsuitable for all or certain types of surface coal mining . . . assuming that contemporary mining practices required under applicable regulatory programs would be followed if the area were to be mined” (30 CFR § 764.13(b)(1)(iv)).

The State did submit such evidence. As explained in chapter 2 of the draft PED/EIS, both the 2005 Comprehensive Wildlife Conservation Strategy and the 2015 State Wildlife Action Plan extensively document the impact that mining, including mining performed in compliance with SMCRA requirements has had and, in the absence of a designation, will continue to have on sensitive species and habitat in the NCWMA (see chapter 2, page 2-20). OSMRE has relied on the petitioner’s conclusion that surface mining, even when performed in compliance with SMCRA and other federal laws, is still incompatible with their existing land use plan. In addition, there is evidence that fragile lands are present in the petition and could be affected by surface mining. For more information see chapter 2.

OSMRE has determined that these plans adequately support the State’s contention that the area is unsuitable for surface coal mining.

Representative Quote(s):

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492265 **Organization Type:** Non-Governmental

The petition also fails to consider many factors that mitigate specific allegations in the petition about the impacts of mining. For example, the petition assumes that surface mining "destroys the forests," but does not take into account successful efforts by OSM to address this concern through use of the forestry reclamation approach as part of the agency's Appalachian Regional Reforestation Initiative. In 2010, 273,000 trees were planted on reclaimed mine sites in Tennessee, and 86% of those trees were planted using the highly successful forestry reclamation approach. Reclamation also provides opportunities to restore important former tree species, such as the American chestnut. See Restoration of the American chestnut on Mined Land in Tennessee, Barry Thacker, and P.E. (October 27, 2010). A comprehensive programmatic environmental impact statement (EIS), endorsed by several federal agencies (including OSM, the Environmental Protection Agency, and the Fish and Wildlife Service (FWS)) found that "surface mining is a temporary use of the land, and with proper mining and reclamation techniques, the land is not irretrievable for a variety of future land uses." See Mountaintop Mining/Valley Fills in Appalachia, Draft Programmatic EIS (2003) at p. IV F1.

ALTERNATIVES

CONCERN STATEMENT: (Concern ID: 56935) Commenters suggested that the petition to ban mining in this area is unnecessary, since most of the coal in the area has been mined and it is unlikely that companies would spend the money to mine these lands in the future.

RESPONSE: Based on our evaluation of coal resources, available in chapter 5 of the PED/EIS, we do not agree with the commenter's contention that most of the coal has already been mined and that it is unlikely that companies will attempt to continue to mine in the area. We have determined that there are approximately 343 million tons of surface mineable coal in the NCWMA and ERTCE and the PED/EIS anticipates that mining will continue to occur at a rate of 112 acres per year.

Representative Quote(s):

Corr. ID: 3835 **Organization:** *Not Specified* **Comment ID:** 496286 **Organization Type:** Unaffiliated Individual

Representative Quote: b) Many of the citizens who spoke in favor of the proposed mining exclusions cited the "decline" of coal as a "reason" for the exclusion zones to be granted and/or expanded. This was one of the most common themes amongst the supporters of the exclusion zone. It is in fact a very strong factor showing that Alternative 1 is sufficient. The widespread agreement that the demand for the particular type of coal in the subject area is in decline and will continue to decline makes it continually less likely that the areas in question will ever be subject to mining. That is in fact happening now. The coal that has been most economical to mine has already been mined. The coal reserves in the areas in question are difficult and expensive to mine- -difficult and expensive to mine and reclaim in accordance with current OSMRE laws and regulations. There are no signs of wildly-accelerated plans for large-scale mining of the areas in question. The petition seeks to ban a practice that is less likely than ever to occur. Thus a ban is unnecessary- -and some necessity is required by law to support an unsuitable-for- mining designation.

Corr. ID: 3835 **Organization:** *Not Specified* **Comment ID:** 496289 **Organization Type:** Unaffiliated Individual

Representative Quote: Supporters of the designation primarily state a general opposition to coal use, coal mining, and to any other use other than recreation and tourism- -despite the fact that the coal (mineral rights) have been long established, well-prior to the state's acquisition of the surface rights. The ridgetops have not suddenly become "unsuitable" for mining. The character of the ridgetops have not changed, nor has the environmental risk increased.

As cited numerous times by proponents of the designation, the mining and use of coal is in an apparent real and continual decline, for reasons other than opposition to mining at the local and regional level. The economics of coal and coal mining continue to change, making it less likely that the areas in question will be mined- -and much less likely that the area will be suddenly mined on any mass scale. It's just not going to happen. Thus there is little environmental risk.

OSMRE's analysis showed that just over 100 acres of the subject area have been subject to mining in any given period (year?). At that rate, if the entire proposed exclusion zone was eventually mined, it would take 670 years. Given that the highest ridgelines are more difficult to mine, it would likely take longer than that. At that rate, environmental devastation, even in the form of widespread destruction of the viewscape, is simply not going to occur. In that time frame, only a small percentage of the area would be

affected, with ample time for reclaimed areas to mature, with a natural succession from the monoculture of the reclamation to a more diverse flora and fauna. The small number of acres that would be mined at any one time would pose little or no risk to the watershed. These factors indicate less environmental risk than ever before.

CONCERN STATEMENT: (Concern ID: 56936) One commenter supported alternative 1 because the environmental risks of mining are less than ever before due to engineering and enforcement effectiveness.

RESPONSE: OSMRE agrees with the commenter that technological advances and enforcement practices have helped reduce the environmental impacts and consequences from surface coal mining operations. However, we have determined that, even with these advances, certain types of mining are not suitable in this area.

Representative Quote(s):

Corr. ID: 3835 **Organization:** *Not Specified* **Comment ID:** 496288 **Organization Type:** Unaffiliated Individual

Representative Quote: No change in risk. The technical suitability of the area in question for mining has not changed. The environmental risks are not projected to be greater than before. In fact, through OSMRE's engineering and enforcement effectiveness, the environmental impacts of potential future mining activities are less than ever before.

CONCERN STATEMENT: (Concern ID: 56937) Commenters suggested that the LUM petition would deprive private mineral rights owners of their mineral rights and prevent them from recovering their coal resources.

RESPONSE: The tenor of this concern is that the proposed designation would have takings implications under the Fifth Amendment of the United States Constitution. In this regard, Executive Order 12630, "Governmental actions and interference with constitutionally protected property rights," requires federal agencies to consider the takings implications of their regulatory actions. The Attorney General promulgated general guidelines for all agencies and supplemental guidelines for the Department of the Interior to use in implementing this executive order. OSMRE will fully comply with Executive Order 12630 and the Attorney General's guidelines in evaluating the takings implications of the proposed designation. Whether the proposed action would constitute a taking of the private property of specific mineral rights owners is outside the scope of this PED/EIS.

Representative Quote(s):

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492237 **Organization Type:** Non-Governmental

Representative Quote: The petition notes that vast coal reserves are held by just two entities (the Tennessee Valley Authority and National Coal Corporation) within the petition area, totaling over 100 million tons of recoverable reserves. That means that at current prices in Tennessee, which in 2013 averaged over \$73/ton according to Energy Information Administration data, OSM is being asked to risk up to \$7.3 billion for the federal government if it grants this petition and is successfully sued for a takings claim of these coal reserves. See petition at p. 6.

Representative Quote: This LUM calls for 600' buffers on either side of ridges. On our property which is adjacent to Emory River, this would basically cut out the mountains on our property. Our ridges are about 2400' and the flatter areas are 1500-1800'. I assume the rest of the mountains are similar so this would take a significant portion of property and resources away from the owners.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492275 **Organization Type:** Non-Governmental

Representative Quote: Finally, designating these lands unsuitable for mining may result in significant takings claims against OSM and the federal government in the billions of dollars.

Corr. ID: 3797 **Organization:** *Not Specified* **Comment ID:** 495553 **Organization Type:** Unaffiliated Individual

Representative Quote: I'll limit my comments to one topic that I don't think has been addressed or at least not presented, and it's a question of how the owners of the current mineral rights may be compensated. In private conversations, a question comes up that this prohibition against mining in these areas is perhaps an unlawful taking, and I do think, based on my conversations here, is that there may be a mechanism that the owners of the mineral rights may be compensated. I don't think that that topic has been - - I don't think it's been discussed openly.

Corr. ID: 3806 **Organization:** *Not Specified* **Comment ID:** 496135 **Organization Type:** Unaffiliated Individual

Representative Quote: Prominently most of our money comes from the coal mining industry. And what I want to try and stress to everybody - - and I'm going to go through a couple notes here - - this is eminent domain, the power of the government to take private property and convert it into public use. That's what this is, eminent domain.

The Fifth Amendment provides that the government may only exercise this power if they provide just compensations to the property owners. Eminent domain is what has happened here. If you notice in their presentation, they put up the numbers, and I think it was close to a billion dollars that they would have to pay out to the mineral owners. Where is that money going to come from? You and I. The only reason these people are here are because of you and I. Taxes give these people their jobs. That money comes out of our wallet. It doesn't matter if we're talking about five jobs or 500. I have three children I've got to raise. They are seven, eight and ten years old, and what you are trying to do is take something away from me that you have nothing to do with. Eminent domain. You're letting the government take something from me that they have no power to do, but yet there's people here trying to pull to get rid of the coal mining industry.

Corr. ID: 3815 **Organization:** *Not Specified* **Comment ID:** 495931 **Organization Type:** Unaffiliated Individual

Representative Quote: My main concern is private property rights, and I will say up front, I have zero interest or ownership, anything in any of these mineral reserves, but I am a homeowner, and I own a three-bedroom house, and if the Federal Government or local government came in and told me that I now cannot use one of the bedrooms in my house for public benefit, I should be compensated for that, because it is for public benefit, but what I have seen in this plan so far does not compensate the owners of this mineral asset that the plan is attempting to regulate or significantly reduce the amount of mining or potential mining, I should say. There are owners that own this. It is an asset, just like your home, just like your car, just like the watch that you are wearing tonight. If the government tries to take your home, your

car or your watch, you should be compensated for that. It isn't just about hiking in the mountains, scenic vistas or things like that.

So based on the financial aspect of this, of not compensating the mineral owners, I am in support of Alternative 1.

CONCERN STATEMENT: (Concern ID: 56939) One commenter suggested that the OSMRE should not have been negotiating with the petitioners regarding additional provisions.

RESPONSE: As explained on pages 1-3 and 1-4, the petitioner sent a series of letters to OSMRE with the intent to clarify certain statements in the petition, adding additional statements intended to justify the allegations of the petition and amending the petition by submitting various documents referenced in the petition. These additional materials submitted by the petitioner became part of the administrative record and have been considered along with all other information submitted by interested parties. OSMRE considered this information because nothing in our regulations prevents us from accepting additional information or communicating with the petitioner or other interested parties after a completeness review. Furthermore, all parties, including the general public, have had ample opportunity to review OSMRE's proposed decision and submit comments.

Representative Quote(s):

Corr. ID: 3770 **Organization:** Not Specified **Comment ID:** 495732 **Organization Type:** Unaffiliated Individual

Representative Quote: The petition was originally filed, as the slideshow told us, in late September of 2011. Shortly thereafter, on November 5th, the Lands Unsuitable petition was deemed complete. While this was an obligation of OSM to deem this application complete, there were certain minimum requirements that they were supposed to look at in this two-month period that they did. What we found out is, we read their findings, were that negotiations and interaction between the petitioners were going on during at least June 26, 2012. What this tells us is that the petition was never complete, it was not viable and it was not complete, and there should not have been negotiating with the petitioners for additional provisions.

CONCERN STATEMENT: (Concern ID: 56940) One commenter suggested that the State Wildlife Action Plan did not contain sufficient evidence that mining is incompatible with management of the area.

RESPONSE: The allegations of the petition must be supported by evidence that “tend to establish the validity of the allegations . . . assuming that contemporary mining practices required under applicable regulatory programs would be followed if the area were to be mined” (30 CFR § 764.13(b)(1)(iv)). The state, as the manager of the NCWMA, explicitly stated in its State Wildlife Action Plan that surface coal mining is incompatible with its management of the area. OSMRE determined that this met the requirements of 30 CFR § 764.13(b)(1)(iv).

Representative Quote(s):

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492458 **Organization Type:** Unaffiliated Individual

Representative Quote: The Petition did not include evidence of impacts that were not preventable under SMCRA.

Similar to our comments with regard to the 1996 biological opinion, the Petition makes unfounded conclusions that impacts would occur if mining was conducted following all SMCRA requirements and the Tennessee Responsible Mining Act. Much of the analysis from the SWAP and other information does not take into proper consideration restrictions on mountaintop removal mining methods and the state restriction on mining or placing overburden within 100 feet of a stream. The SWAP is devoid of any such analysis. The steep slopes within the petition area are not unique from other areas throughout Appalachia that have been mined and successfully reclaimed during the 28 years since the enactment of SMCRA.

CONCERN STATEMENT: (Concern ID: 58023) One commenter suggested that the OSMRE clarify whether the alternative 2 remaining coal resource volume as presented in chapter 5 text excludes the “second cut” resource for a total remaining coal resource excluded volume of 14.7 million tons, not the stated 8.5 million.

RESPONSE: The 8.5 million tons referenced on page 5-43 is the total amount of coal tonnage that is excluded from being mined within the petition area and the non-petition patch areas in alternative 2 (this includes the second cut resource). Please see the Grand Total line on Table 5-24 for those two classifications (3,260,000 + 4,370,000 + 360,000 + 480,000 = 8,470,000 tons).

Representative Quote(s):

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492063 **Organization Type:** Federal Government

Representative Quote: The EPA recommends that the OSMRE clarify whether Alternative 2 re-mining coal resource volume as presented in the Chapter 5 text, excludes the "second cut" resource for a total re-mining coal resource excluded volume of 14.7 million tons not the stated 8.5 million. In Chapter 5, the DEIS states Alternative 2 excludes all NCVMA and ERTCE areas within the designated petition area from any and all mining-related activities. This includes any access roads and face-up areas for underground mining. Within the same chapter, the DEIS states that Alternative 2 excludes approximately 8.5 million tons of the re-mining coal resource in the NCWMA and ERTCE. However, Table 5-24 indicates 8.5 million tons is the auger resource and that the total "reining coal resource" is the "second cut" (6.3 million tons) plus the "auger" (8.5 million tons) resource volumes, or 14.7 million tons.

CONCERN STATEMENT: (Concern ID: 56963) Commenters voiced concern about the overwhelming size of the petition area, claiming that the large size of the petition area should have disqualified the area from the onset. One commenter noted higher levels of cost to taxpayers as a result of the size of the area. Another commenter noted that based on the size of the area, the burden of proof for designation falls to the petitioners, and the petition has failed to meet that burden. One commenter also suggested that if OSMRE is interested in protecting the cerulean warbler, then its permitting requirements could be made to focus on habitat conservation and restoration and that impacts to the small area involved with the elk viewing tower are temporary and do not justify a lifetime ban of mining.

RESPONSE: The petitioner has a burden of submitting evidence in support of the allegations of the petition, but OSMRE is required by law to evaluate the allegations. OSMRE has done so in chapter 2. Although the petition area is large, SMCRA does not contain any restrictions for a land unsuitable for mining designation based on size. Instead, SMCRA requires the analysis to focus on four criteria. The

two criteria assessed were whether surface coal mining would: (1) be incompatible with existing state or local land use plans or programs (30 CFR § 762.11(b)(1)); or (2) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and aesthetic values and natural systems (30 CFR § 762.11 (b)(2)). OSMRE determined that the surface mining in the petition area as a whole would meet the first criterion based on the evidence supplied by the petitioner. OSMRE also determined that a portion of the petition area, including habitat for the cerulean warbler and the elk viewing tower, would meet the second criterion. This criterion is met when mining could result in significant damage to fragile lands. There is no limitation based on the size of the area at issue, nor is there a limitation based on the temporal nature of the effect.

While OSMRE recognizes that there may be other ways to accomplish the goals of this designation, the agency is not prohibited from pursuing the designation merely because it has other options. As long as the relevant criteria have been met, OSMRE may designate lands unsuitable for mining.

Representative Quote(s):

Corr. ID: 47 Organization: Alden Resources, LLC. **Comment ID: 488057 Organization Type:** Unaffiliated Individual

Representative Quote: Furthermore, the size of this LUM petition (over 60,000 acres) should have qualified the whole thing as a frivolous request from the beginning. Did the petitioners meet the SMCRA qualified minimum criteria for such a preposterous request? I think not given the overwhelming size of the target area. How much work would be required by OSM to conduct the findings and necessary research for an area of over 60,000 acres and at what cost to the taxpayer?!!! By supposing to have conducted the necessary findings work on this area and supposing to seriously consider the petition, OSM has now provided radical groups that are anti mining a perfect vehicle to petition for entire states to be declared as lands unsuitable for mining. The premise is the same for an entire state as it was for this massive "taking" in Tennessee. At the very least, OSM has inherently obligated themselves to entertain and review such ridiculous efforts all over the coal fields in the United States. The cost all borne by the unsuspecting tax payers!!!!

Corr. ID: 3178 Organization: Tennessee Mining Association **Comment ID: 492356 Organization Type:** Unaffiliated Individual

Representative Quote: TMA maintains its argument that the Petition is a gross misuse of the lands unsuitable process due to its sheer size, vagueness and overly broad geographic scope.

Corr. ID: 3178 Organization: Tennessee Mining Association **Comment ID: 492442 Organization Type:** Unaffiliated Individual

Representative Quote: The Area covered by the Petition is too large to make determinations on the impact to fragile lands or any state land use plans.

Despite the large scope of the Petitioned area, OSMRE's estimation of some 12,331 acres identified in Option 5 is the extent of the actual purported impact, which is less than 20% of the Petitioned area. While TMA does not agree with any designation of unsuitability these observations alone show that the breadth of the Petitioned area is far too large. It begs the questions as to whether the entire Central Appalachians could be designated unsuitable to eliminate individual permitting decisions that need to be made. If OSMRE were interested in protecting the cerulean warbler, then its permitting requirements could be made to focus on habitat conservation and restoration rather than a complete ban. Impacts to the acreage

impacted by the small area involved in the Elk Viewing Tower are temporary at best and do not justify a lifetime ban of mining.

Corr. ID: 3389 **Organization:** Innovative Reclamation Technologies & Engineering Co **Comment ID:** 494788 **Organization Type:** Business

Representative Quote: The petition is overly broad in scope and it does not provide the required factual allegations and supporting evidence for the designated area. The large size of the selected area means that it is unlikely that the evidence presented can relate to criteria for designation throughout the petition area. The petitioners didn't provide evidence that supported the specific allegations for the entire region.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492229 **Organization Type:** Non-Governmental

Representative Quote: The petition also covers a vast area of 67,326 acres, or over 505 square miles. In seeking to prohibit mining in such a broad area, the petitioners have the burden of justifying its immense scope, and the petition has failed to do so.

CONCERN STATEMENT: (Concern ID: 56964) One commenter cited 30 CFR § 731.14(g) and stated that the draft PED/EIS fails to fully assess impacts to land use.

RESPONSE: The commenter cites regulations governing content requirements for program submissions when a state is seeking to establish a regulatory program under SMCRA. The state is not seeking to establish such a program through this petition process. Thus, these regulations are inapplicable.

Representative Quote(s):

Corr. ID: 3619 **Organization:** *Not Specified* **Comment ID:** 496859 **Organization Type:** Unaffiliated Individual

Representative Quote: The draft EIS-37 fails to meet 731.14(g) 17 requirements to meet a determination of full assessment of § 761.5 Definitions. Toward the 761.5 part- Cemetery means any area of land where human bodies are interred. Community or institutional building means any structure, other than a public building or an occupied dwelling, which is used primarily for meetings, gatherings or functions of local civic organizations or other community groups; functions as an educational, cultural, historic, religious, scientific, correctional, mental-health or physical health care facility; or is used for public services, including, but not limited to, water supply, power generation or sewage treatment. Specifically toward evidence in the draft EIS-37 addressing land designation impacts assessment to determine does in impact:

-Occupied dwelling means any building that is currently being used on a regular or temporary basis for human habitation.

-Public building means any structure that is owned or leased, and principally used by a governmental agency for public business or meetings.

-Public park means an area or portion of an area dedicated or designated by any Federal, State, or local agency primarily for public recreational use, whether or not such use is limited to certain times or days, including any land leased, reserved, or held open to the public because of that use.

-Public road means a road (a) which has been designated as a public road pursuant to the laws of the jurisdiction in which it is located; (b) which is maintained with public funds in a manner similar to other public roads of the same classification within the jurisdiction; (c) for which there is substantial (more than

incidental) public use; and (d) which meets road construction standards for other public roads of the same classification in the local jurisdiction.

-Publicly-owned park means a public park that is owned by a Federal, State or local governmental entity.

-Significant forest cover means an existing plant community consisting predominantly of trees and other woody vegetation. The Secretary of Agriculture shall decide on a case-by- case basis whether the forest cover is significant within those national forests west of the 100th meridian.

-Significant recreational, timber, economic, or other values incompatible with surface coal mining operations means those values to be evaluated for their significance which could be damaged by, and are not capable of existing together with, surface coal mining operations because of the undesirable effects mining would have on those values, either on the area included in the permit application or on other affected areas.

CONCERN STATEMENT: (Concern ID: 56965) One commenter recommended that the PED/EIS should consider “natural hazard lands” adjoining geographic areas in which natural conditions pose a threat or, as a result of surface coal mining operations, could pose a threat to health and safety. The commenter also noted impacts to visual resources at the elk viewing tower.

RESPONSE: The commenter appears to be referring to the criterion in SMCRA section 522(a)(3)(D), which allows for a designation based on the presence of “natural hazard lands.” However, the petition does not allege that such lands exist and would be affected by surface mining. OSMRE is limited to evaluating the unsuitability criteria alleged in the petition. Therefore, it did not consider whether this criterion had been met.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496767 **Organization Type:** Unaffiliated Individual

Representative Quote: The OSMRE has also determined that the elk viewing tower provides recreational value due to high environmental quality that could be significantly damaged as a result of surface coal mining operations. Viewing towers are no good without actual elk to see. Without question the outline areas of tower on put at risk and become Natural hazard lands, thus the draft EIS-37 should consider the adjoining geographic areas in which natural conditions exist which pose or, as a result of surface coal mining operations, may pose a threat to the health, safety or welfare of people, property or the environment, including areas subject to landslides, cave-ins, large or encroaching sand dunes, severe wind or soil erosion, frequent flooding, avalanches and areas of unstable geology to the elk population within the petition area.

CONCERN STATEMENT: (Concern ID: 56966) Commenters noted that the petition area needs to include ridgeline headwaters extending to and connecting with downslope stream corridors in order to ensure that the petition area is continuous and that resources are protected.

RESPONSE: The ridges in alternative 3 extend to the base stream level. The additional areas identified by OSMRE in alternative 4 were developed using a different scientific analysis and only extend down to within 500 feet of the stream elevation. In addition, the Tennessee Responsible Miners Act would protect the stream corridor within 100 feet of the stream throughout the evaluation area.

Representative Quote(s):

Corr. ID: 90 Organization: Armstrong State University (Prof Emer) **Comment ID:** 488326
Organization Type: Unaffiliated Individual

Representative Quote: But in neither alternative is it made sufficiently clear that ridgeline protection must be extended downslope to the lowest elevation, which would be at the level of streams. This would ensure wildlife migration corridors through the whole local range of elevation, with associated changes in climate and vegetation.

Corr. ID: 92 Organization: *Not Specified* **Comment ID:** 488330 **Organization Type:** Unaffiliated Individual

Representative Quote: I support the request to designate the ridge lines in the North Cumberland Wildlife Management Area unsuitable for mining. This should cover all ridge lines extending to and connecting with streams.

Corr. ID: 3417 Organization: *Not Specified* **Comment ID:** 493219 **Organization Type:** Unaffiliated Individual

Representative Quote: I very strongly support the State of Tennessee's request and intent to designate ALL ridgelines in the North Cumberland Wildlife Management Area as unsuitable for surface mining. That designation should cover all ridgelines extending to and connecting with stream corridors.

Corr. ID: 3809 Organization: *Not Specified* **Comment ID:** 495812 **Organization Type:** Unaffiliated Individual

Representative Quote: The lands unsuitable designation area should cover all the ridgelines extending to and connecting with stream corridors to best protect the water and air quality.

Corr. ID: 3827 Organization: *Not Specified* **Comment ID:** 496237 **Organization Type:** Unaffiliated Individual

Representative Quote: Quite frankly, the area needs to be sure that the ridgetop headwaters are protected with - - through the lower stropes(sic) - - slopes on the descending ridgelines so that the repair in stream corridors are protected. The whole point is to have an area that's continuous, contiguous for wildlife and for the protection of water. It's crazy to say let's protect the top where the water starts, and then part way down the mountain, let's let anything happen to it that pollutes it.

CONCERN STATEMENT: (Concern ID: 56968) One commenter suggested that OSMRE include an overlay map in the PED/EIS depicting the petition area in conjunction with physical features. The commenter stated that the map should delineate public and private property.

RESPONSE: The PED/EIS includes several maps, which show physical features and public and private property. For example, figure 4-12 shows administrative units; figure 4-17 shows recreational resources including publically owned lands; and many other figures throughout chapter 4 show the various physical and natural features of the area. OSMRE used overlay analysis to assess impacts. However, given the large scale of the area and the limitations of what can be depicted and seen on maps of an appropriate size, readable overlay maps of the scale suggested by the commenter could not be provided.

Representative Quote(s):

Corr. ID: 3759 **Organization:** *Not Specified* **Comment ID:** 495585 **Organization Type:** Unaffiliated Individual

Representative Quote: Also, please do an overlay map that shows this over physical features so you can tell where the lands are at. And please designate which ones are public property and which ones are private property so that people can get an idea - - a lot of this property is probably owned by huge conglomerates who could give a - - I don't know what for the rest of us.

CONCERN STATEMENT: (Concern ID: 56969) Commenters expressed concern about OSMRE's explanation and description of ridgelines within the petition area. The commenters noted that in many instances, the ridgelines extend down into valleys and stated that the PED/EIS description of ridgelines is thus misleading. One commenter suggested using the best available technology to identify petition areas. Another commenter recommended the use of Lidar to determine ridgeline areas. One commenter noted that clarification is needed with respect to whether the buffer on all ridgelines applies vertically or horizontally.

RESPONSE: In several areas the petition area does extend down to the base stream elevation (valley). OSMRE relied on the state's geographic description of ridgelines in the petition for alternatives 2, 3, 5, and 6. OSMRE developed alternative 4 using a different scientific analysis of ridgelines and under that alternative, the additional ridgelines only extend down to within 500 feet of the stream elevation (see the response to Concern Statement 56966). In response to the commenter's concern about the buffer direction, OSMRE proposes to measure the distance of any designated area horizontally (along the ground surface).

Representative Quote(s):

Corr. ID: 53 **Organization:** *Not Specified* **Comment ID:** 488078 **Organization Type:** Unaffiliated Individual

Representative Quote: The Office of Surface Mining should use the best possible science and technology to identify all the ridgelines in the petition area.

Corr. ID: 3133 **Organization:** Mark V Mining and Engineering, Inc. **Comment ID:** 493531
Organization Type: Unaffiliated Individual

Representative Quote: The petition area includes approximately 500 miles of ridges in an area of slightly over 67,000 acres in four counties. A ridge is defined as a long, narrow elevation of land; a chain of hills or mountains. The map provided with the petition extends down into the valleys below and does not accurately reflect a ridgeline.

Corr. ID: 3184 **Organization:** *Not Specified* **Comment ID:** 494162 **Organization Type:** Unaffiliated Individual

Representative Quote: My second problem with the Lands Unsuitable for Mining Petition is how the areas designated as ridges has been annotated. By definition a ridge is: "a long, narrow elevation of land; a chain of hills or mountains." It appears that you have included quite a lot of areas running down off the ridge lines almost into the streams along the hollow or valley. If the ridge is the top of a chain of mountains of hills, how can your depiction run all the way to the hollow or valley. Although this may

seem like a minor point of contention, it will make a huge difference to the miners attempting to extract their minerals. The most expensive part of contour mining is the initial cut. The manner in which your ridge lines run, an initial cut will have to be made every time the miners skip these areas. It appears to me that what you have proposed is no different than saying "No new mining can occur across any of the lands controlled by the state. Both would have the same effect.

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492227 **Organization Type:** Non-Governmental

Representative Quote: There are several fundamental problems with how the petition area itself is defined which bar any designation with the petition as its basis. The petition states that it "seeks to designate as unsuitable for surface coal mining operations the area within 600 feet of all ridge lines..." However, the petition fails to explain what this means. For example, it is unclear whether such distance is measured horizontally or vertically. Moreover, the petition fails to explain why the area near the ridgeline is more deserving of protection than other areas.

Corr. ID: 3783 **Organization:** *Not Specified* **Comment ID:** 495960 **Organization Type:** Unaffiliated Individual

Representative Quote: I heard a new word tonight, Lidar. Evidently there is a way with radar and light and lasers to see where ridgelines are. So it sounds like that that's the best technology to use that, that science for determining where ridgelines are and to have them include the corridors of streams which are important to be protected.

CONCERN STATEMENT: (Concern ID: 56956) One commenter suggested that the sensitive resources identified under alternative 5 are already protected by SMCRA or the Clean Water Act and do not require any further protection.

RESPONSE: OSMRE disagrees with the commenter. Not all the sensitive resources identified in alternative 5 (or any action alternative) would be protected under SMCRA or the Clean Water Act. In fact, the state-listed plants and the cerulean warbler lack the federal protection from either law cited, which is why OSMRE found them to be fragile lands. In addition, the elk viewing tower, which qualifies as a fragile land due to its high recreational value, is not protected at the federal level. Moreover, even areas that are already protected by federal law may be designated unsuitable for surface mining as long as the alleged criteria for unsuitability in have been met (see SMCRA section 522(a)(3)).

Representative Quote(s):

Corr. ID: 3852 **Organization:** *Not Specified* **Comment ID:** 500178 **Organization Type:** Unaffiliated Individual

Representative Quote: Alternative 5 designates 12,331 acres of public access lands within the NCWMA as unsuitable for surface coal mining operations. This alternative focuses on designating lands based on the presence of sensitive resources within the ridgelines proposed in the State petition. The sensitive resources identified under this alternative are already protected by SMCRA or the Clean Water Act and do not require any further protection. The Hatfield Knob elk viewing tower is constructed on a reclaimed mine site with an active surface mine on the Blue Gem coal seam below. The elk are consistently found grazing on the reclaimed mine site and seem to prefer the open lands created by the surface mining. The Tennessee Wildlife Resources Agency has repeatedly stated that surface mining and reclamation played

an integral part in the elk reintroduction program and continue to offer necessary habitat for continued success.

CONCERN STATEMENT: (Concern ID: 56957) One commenter suggested that the proposed 300-foot buffer under alternative 6 would still fragment the mineral owner’s coal reserves to the extent that an economical or viable mine plan could not be developed, and as a result, alternative 6 would essentially prevent surface coal mining and reclamation within the entire NCWMA.

RESPONSE: OSMRE extensively evaluated the impacts of all of the alternatives on coal reserves in chapter 5 of the PED/EIS. For more information, see table 5-41 in the final PED/EIS. The analysis included consideration of “patch” areas, which OSMRE defined as areas that would not be designated, but could not be accessed because access would require the development of roads across designated areas. Alternative 6 would exclude around 37% of mineable and augerable resources and 31% of remaining resources. The analysis suggests that between 60–70% of the coal resource would still be available if OSMRE made the designation. Whether or not an applicant can develop an economical mine plan is subject to the applicant’s determination of a number of factors, including the price of coal, the location of the resource and ability to access it.

Representative Quote(s):

Corr. ID: 3852 **Organization:** *Not Specified* **Comment ID:** 500179 **Organization Type:** Unaffiliated Individual

Representative Quote: Alternative 6 designating 505 miles of so-called ridgeline with a 600 foot buffer zone, 300 feet on either side. The reduced buffer zone would still fragment the mineral owner's coal reserves to the point that an economical or viable mine plan could not be developed. It is not feasible to repeatedly cease mining and haul material around each buffer zone. This alternative would essentially prevent surface coal mining and reclamation within the entire NCWMA. As stated previously, outlawing mining within the NCWMA would severely hinder or prevent the reclamation of the hundreds of miles of orphan mine land within the NCWMA. The mining companies, either by remining or by generating AML monies are responsible for the majority of the reclamation of abandoned mined lands.

NEW ALTERNATIVES OR ELEMENTS

CONCERN STATEMENT: (Concern ID: 57041) Two commenters supported a corridor along the ridgelines that is wider than 1,200 feet. One commenter recommended 2,000 feet. One commenter noted that the petition area should be increased far beyond the 76,000 acres that is proposed under alternative 4.

RESPONSE: As required by NEPA, OSMRE considered a range of reasonable alternatives based on the petition provided by the State of Tennessee. The petition identified habitat corridors along specific ridgelines as lands unsuitable for mining. OSMRE used these parameters to develop reasonable alternatives for the PED/EIS. OSMRE relied on the petitioner to propose the width of the corridor that would be necessary for meeting its land management goals. In considering alternatives, OSMRE looked at both a larger area than proposed (alternative 4) and smaller areas than proposed (alternatives 5 and 6). Under NEPA, OSMRE must consider a range of alternatives and fully evaluate all reasonable alternatives. However, “[a]n agency is under no obligation to consider every possible alternative to a proposed action. . . .” *Seattle Audubon Soc’y v. Moseley*, 80 F.3d §§1401, 1404 (9th Cir. Wash. 1996). In addition, the commenters have not provided any rationale as to why a wider corridor would better meet the state’s goals as stated in the petition.

Representative Quote(s):

Corr. ID: 3775 **Organization:** *Not Specified* **Comment ID:** 495875 **Organization Type:** Unaffiliated Individual

Representative Quote: This part of the country, this opportunity to preserve for your children and your grandchildren and great-grandchildren and for many, many generations the beauty of this land by denying the mining on the ridge tops should be as extensive as possible, far beyond the 76,000 acres that are proposed or allowed under the fourth alternative, and should be strictly enforced with absolutely no mining or access to those areas by heavy equipment except if there's no alternative. The state and the federal government should have the options to determine that.

Corr. ID: 164 **Organization:** *Not Specified* **Comment ID:** 487781 **Organization Type:** Unaffiliated Individual

Representative Quote: In 2010, the State of Tennessee petitioned the office of Surface Mining to designate a 1200 foot wide corridor extending along the ridgelines of the North Cumberland Wildlife Management Area as unsuitable for surface mining. While I strongly support this initiative, the proposed corridor is too narrow to afford the necessary protection sought and which is necessary to protect important headwaters, geologic features, scenic vistas and to provide the necessary wildlife transit corridor.

Corr. ID: 3771 **Organization:** *Not Specified* **Comment ID:** 495744 **Organization Type:** Unaffiliated Individual

Representative Quote: Good evening. My name is Paul Baxter. I'm a native, born and raised here in LaFollette, Tennessee. Let me start off by saying I'm not against coal. I like coal. Coal is a part of this county, part of this culture always has been, I hope it continues to be, a part of our culture in spite of what the current Administration in Washington would have us to do about coal.

But, now, I got to tell you this, I'm against strip mining. I do love the rural area they call Russell Fork, which is a suburb of Dove. We had a mission here at LaFollette, we rode back and forth every day so our - - and I'd look at the mountains and, you know, I really appreciate the mountains, I love the mountains, especially those that hadn't been stripped.

And here comes strip mining, just tore the heck out of them. Well, I went away to school, went to Ohio, worked for 30-some-odd years. When I came down to visit my folks on the weekends, I could see more strip mining along 25, and that just tore me up. I hate it. I hate that strip mining. And I'm glad that the State has finally taken a position to try to put a stop to some of this stuff. I don't think they're going far enough. Six hundred foot on each side? How about 2,000 foot on each side.

Hey, again, I am all for coal. I think deep mining is the way to go. But let's quit tearing up the mountains. And let's do one more thing, let's cut out the clear cutting. I think the clear cutting is the final solution for Campbell County. That's all I got to say. Thank you very much.

CONCERN STATEMENT: (Concern ID: 57045) Multiple commenters stated that a better preferred alternative would be to designate the area proposed by the state, while allowing only abandoned mine land reclamation projects and road access. One commenter added that land reclamation projects should only be allowed for abandoned mine lands Category 1, 2, and 3 sites and road access to these sites.

RESPONSE: Technically, abandoned mine lands projects would not be restricted under any of the proposed Alternatives. Therefore, the alternative suggested by these commenters is the same as alternative 2 under which OSMRE would grant the petition and declare the area unsuitable for all mining, including remining. Therefore, OSMRE has adequately analyzed this proposed alternative and no changes are necessary in the PED/EIS.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496707 **Organization Type:** Unaffiliated Individual

Representative Quote: A better preferred alternative would be to "grant the state petition designation for a total of 569 miles of ridgelines and 76,133 acres while allowing only land Reclamation projects for AML Category 1, 2, and 3 and road access to sites."

CONCERN STATEMENT: (Concern ID: 57049) One commenter stated support for alternative 4 with a modification to limit remining and water extraction for water privatization and private corporate profit.

RESPONSE: OSMRE has identified alternative 4 as its preferred alternative. However, SMCRA does not regulate the extraction of water. The addition of that component into our alternatives analysis, therefore, is not within the scope of reasonable alternatives and we have not addressed it in the PED/EIS. With respect to remining, as discussed in our response to Concern Statement 56943a, OSMRE will ensure that any remining activity is consistent with applicable regulations and with the reasons for any unsuitability designation.

Representative Quote(s):

Corr. ID: 808 **Organization:** *Not Specified* **Comment ID:** 488579 **Organization Type:** Unaffiliated Individual

Representative Quote: I support Alternative 4 with one critical modification: limiting re-mining and water extraction for water privatization and private corporate profit. We must protect the watersheds and the pristine nature of these precious bioregions.

CONCERN STATEMENT: (Concern ID: 57051) One commenter voiced support for protecting the area as a wilderness or a national park.

RESPONSE: SMCRA does not provide OSMRE the authority to designate wilderness areas or convey national park status. Therefore, we have not incorporated this comment into the PED/EIS.

Representative Quote(s):

Corr. ID: 2743 **Organization:** *Not Specified* **Comment ID:** 490994 **Organization Type:** Unaffiliated Individual

Representative Quote: If it were an option, I personally would greatly prefer to see that this area were protected either as a wilderness area or even as a national park with wilderness protection embedded in it.

CONCERN STATEMENT: (Concern ID: 56973) One commenter alleged that the vagueness associated with the description of mining activities in the draft PED/EIS could lead to the complete ban on mining within the petition area under any action alternative.

RESPONSE: OSMRE disagrees that the action alternatives would result in a total ban on mining within the NCWMA. Chapter 5 of the PED/EIS provides an analysis of the remining and underground coal resources that would be available for extraction under alternative 4, which is the preferred alternative. Based on this analysis, approximately 45% of the coal resource would be available for extraction under alternative 4.

Representative Quote(s):

Corr. ID: 3851 **Organization:** Mark V Mining and Engineering **Comment ID:** 500163 **Organization Type:** Business

Representative Quote: Furthermore, the Alternative actions offered by OSMRE are weak and fail to consider the realities of modern mining activities. For all intense and purposes, each Action Alternative would equate to a complete ban on mining with the Petition area because of the vagueness of definition and impracticalities of operations.

GENERAL REMINING

CONCERN STATEMENT: (Concern ID: 56943a) Multiple commenters asserted that remining should only be done if strict limitations or requirements are imposed and met and only when it would reduce risk to human health and/or safety. Commenters suggested that the final PED/EIS should provide a definition of remining and identify what activities would be allowed. Another commenter asserted that amount of adjacent area that could be disturbed should be defined. One commenter voiced support for placing strict parameters on remining activity.

RESPONSE: Many commenters expressed concern over how OSMRE defines remining and how remining may impact the petition area if it is allowed to continue. Remining is a mining technique that allows an operator to re-disturb an area that was mined but left unreclaimed before the passage of SMCRA in 1977. Remining can eliminate existing highwalls, reestablish stream channels disturbed by previous mining activities, improve water quality, and remove safety concerns (47 Fed. Reg. §§ 27734, 27735 (June 25, 1982)). The remining of abandoned mine lands can also reduce demands on the use of the Abandoned Mine Land Reclamation Fund established under Title IV of SMCRA (30 USC § 1201 et seq.).

Remining usually involves re-disturbing an unreclaimed area and making a cut of undisturbed land behind or on either side of the previously mined area. Full reclamation of the area is achieved through the distribution of spoil generated by the mining activity. The size of the operation and the exact combination of previously disturbed and undisturbed acreage is largely governed by the economics of how much coal remains in the area, as well as the costs of removing additional overburden and reclaiming the highwall. After the overburden is removed, the operator is required to use all reasonably available spoil material to eliminate highwalls to the maximum extent possible (30 CFR § 816.106 (b)). The operator is also required to revegetate the site (30 CFR § 816.111). Operators are also required to return the site to its approximate original contour (30 CFR § 816.102 (a)(1)). Often, the additional mining cut adjacent to the previously mined areas is necessary to generate enough spoil to fully reclaim previously mined areas. Otherwise, portions of the old highwall will be left behind.

In Tennessee alone, remining has resulted in the reclamation of many miles of abandoned highwall, abated significant stream sediment sources, improved water quality, and eliminated public and wildlife safety hazard. The beneficial effect of remining on receiving water bodies has been documented. For example, the Tennessee Department of Environment & Conservation (TDEC) compared the water quality in the New River in the 1970s with water quality in the mid-2000s and found significantly improved water quality. The water quality improvements have been attributed to SMCRA requirements for new mines and the reclamation of pre-SMCRA abandoned mines (TDEC, pers. comm. Nov. 4, 2013). The US Environmental Protection Agency (EPA) and Pennsylvania Department of Environmental Protection have found similar water quality and safety benefits from remining abandoned mine lands (USEPA 2001).

For these reasons, the preferred alternative would allow remining on a case-by-case basis. However, OSMRE would, in making decisions on any remining proposal in the NCWMA, ensure that any approved activity complies with current regulations and is consistent with the reasons for any unsuitability designation. OSMRE will provide further guidance and explanation about how it would evaluate remining proposals for consistency with an unsuitability designation in the record of decision for any such designation.

Representative Quote(s):

Corr. ID: 3222 Organization: TN Department of Environment and Conservation Comment ID: 491995 Organization Type: State Government

Representative Quote: DWR recommends that the OSMRE clarify the definition of remining and specific activities that would be allowed under remining to clearly identify the limits of this kind of disturbance in the Final PED/EIS.

Corr. ID: 3222 Organization: TN Department of Environment and Conservation Comment ID: 491996 Organization Type: State Government

Representative Quote: DWR notes that it is common practice in remining to extend the disturbance slightly beyond the ends of old highwalls. In some cases, the original mining disturbance may leave small, untouched areas that a remining operation may propose to include. DWR recommends that the OSMRE clarify whether and/or how much of this kind of incidental new surface disturbance beyond old highwalls or existing cuts would be allowed under the alternatives incorporating remining in the Final PED/EIS.

Corr. ID: 3852 Organization: Not Specified Comment ID: 500175 Organization Type: Unaffiliated Individual

Representative Quote: Remining allows removal of coal adjacent to pre-SMCRA mining in order to generate the material necessary to reclaim the abandoned mine lands. The amount of adjacent mine area allowed under remining in Alternative 3 needs to be spelled out to prevent differing interpretations now or in the future.

Corr. ID: 3225 Organization: Tennessee Wildlife Resources Agency Comment ID: 494286 Organization Type: State Government

Representative Quote: III. Alternate III: Remining Under Alternative 3 and Alternative 4 TWRA has no objection to consideration of remining within the petition area to resolve significant environmental, slope stability, and/or public safety issues. However, as OSMRE has identified significant potential remining within the petition area, blanket exception for remining could easily defeat the protective intent of the

petition. OSMRE concludes that 183.7 miles of high wall within the petition area could be subject to re-mining (p. 3-8). TWRA recommends that the Record of Decision (ROD) for the Final EIS specify a carefully crafted process for consideration of re-mining proposals. The consideration process should include the following elements.

- Approach all re-mining proposals from the presumption that the petition area is Lands Unsuitable for Mining (LUM).
- Utilize the "Local Interagency Working Agreement for Coal Mine Permitting, Compliance and Enforcement Actions in Tennessee Under the Clean Water Act and the Endangered Species Act," as entered into in 2010.
- Prepare a thorough "current conditions" site assessment to benchmark existing habitat, wildlife and aquatic resources, and water quality, on and adjacent to proposed re-mining. This information should then be used in a risk vs. benefit assessment of proposed re-mining.

Corr. ID: 3455 Organization: Sierra Club Comment ID: 493225 Organization Type: Conservation/Preservation

Representative Quote: I encourage OSM to apply strict criteria for any re-mining allowed in the protected area. At most, it should be allowed only when the State of Tennessee and OSM agree that there are significant environmental or human health and safety problems that can only be fixed by re-mining and when the benefits of re-mining clearly outweigh the environmental harm. In no case should undisturbed land be mined under the rubric of 're-mining'.

Corr. ID: 3826 Organization: Not Specified Comment ID: 496229 Organization Type: Unaffiliated Individual

Representative Quote: So I understand that there's an expanded area under alternative four that allows more of the ridgelines to be saved. And we think that's important. If - - and that would be probably my preferred alternative. However, I think that if any re-mining is allowed, it needs to be under very strict parameters and needs to be permitted. There needs to be a permitting process that allows public input for the permitting decisions on any re-mining. If you look at the coal resource extractions, the amount of coal to be allowed by re-mining is really very minimal. So I hope that won't happen.

Corr. ID: 68 Organization: Not Specified Comment ID: 488245 Organization Type: Unaffiliated Individual

Representative Quote: While re-mining of old pre-law scars can be beneficial in limited situations, that approach certainly should be the exception rather than the rule. Re-mining should only be allowed where genuine terminal problems exist and can be remedied.

Corr. ID: 269 Organization: Tennessee Parks and Greenways Foundation Comment ID: 488051 Organization Type: Unaffiliated Individual

Representative Quote: Re-mining should only be allowed where genuine environmental problems exist and can be corrected. Public hearings should be required prior to re-mining to ensure no harm would be caused to fragile habitat or scenic destinations.

Corr. ID: 278 Organization: Not Specified Comment ID: 487968 Organization Type: Unaffiliated Individual

Representative Quote: Re-mining should ONLY occur when environmental damages from previous mining MUST be corrected. The State and OSMRE would have to agree on the need to permit re-mining.

Corr. ID: 2362 Organization: Ms. Comment ID: 489888 Organization Type: Unaffiliated Individual

Representative Quote: Any re-mining of old sites in the area should be approved ONLY in those limited cases where the State of Tennessee and OSMRE agree that the safety and/or environmental benefits of re-mining outweigh the damage caused by re-mining.

Corr. ID: 3183 Organization: Statewide Organizing for Community eMpowerment (SOCM) Comment ID: 494160a Organization Type: Unaffiliated Individual

Representative Quote: Re-mining must be strictly limited and allowed only under specific conditions. The burden to demonstrate the necessity for re-mining and that the proposed mining meets the criteria under which re-mining may be allowed should be on the applicant.

We recommend a separate pre-permit process which would allow an entity proposing to re-mine to define and describe the proposal under guidelines prepared by OSMRE in consultation with the State as Petitioner and other concerned stakeholders.

Corr. ID: 3183 Organization: Statewide Organizing for Community eMpowerment (SOCM) Comment ID: 494160c Organization Type: Unaffiliated Individual

Representative Quote: Re-mining should only be allowed when a clear and substantial risk to human health or safety is documented. The criteria for Abandoned Mine Land Priority One sites should be considered in drafting this requirement.

Alternatively, re-mining may be allowed when a clearly documented ongoing and significant environmental injury must be remedied. Current violations of Water Quality Standards not remediable without re-mining might be one indicator of such an environmental injury.

Any re-mining should be permitted only for the smallest feasible footprint to allow correction of the averred cause for re-mining.

Corr. ID: 3756 Organization: Not Specified Comment ID: 495567 Organization Type: Unaffiliated Individual

Representative Quote: However, I also urge OSM to adopt rigorous standards that govern where re-mining is permitted. The Office already reviews abandoned mine land sites, rates them on the threat that they propose to human health and safety. I think that OSM should limit re-mining to sites that are designated as priority one or two, meaning that they do pose a real threat to human health and safety. And they should try to find abandoned mine land fund money to reclaim those sites without the need for re-mining.

Corr. ID: 3178 Organization: Tennessee Mining Association Comment ID: 492438 Organization Type: Unaffiliated Individual

Representative Quote: If re-mining is allowed for pre-law highwalls, then highwall mining should be allowed in adjacent virgin areas that would support the reclamation of the pre-law sites.

The proposed area is 67,326 acres (66,311 acres of unpermitted area) of which 505 miles are ridgeline. Approximately 183.7 miles of ridgeline are eligible for re-mining of the 201.6 miles of highwall in Option 3. However, the re-mining is subject to a case-by-case unspecified analysis of the extent to which the re-mining affects the pre-law sites. While OSMRE states in Alternative 3, that an undisturbed area may be deemed suitable for surface mining activities if this area is necessary to facilitate reclamation that alleviates the actual or potential environmental and safety problems related to the proposed re-mining of previously mined areas, it is not clear what criteria will be used to make this determination.

CONCERN STATEMENT: (Concern ID: 56943b) Multiple commenters expressed concern about the effect of re-mining on lands that have already recovered or stabilized or are returning to a natural state and asserted that these areas should not be re-mined. Commenters asserted that re-mining these sites could further damage the natural environment at these sites. Another commenter noted that where mine sites are returning to a natural state, water quality has vastly improved. Two commenters discussed that in the event that re-mining does occur in these areas, coal companies should be financially responsible for reclamation costs.

RESPONSE: Based on commenters' concerns about this issue, OSMRE has revised the PED/EIS to include language that emphasizes that re-mining would not be done without conducting an assessment of adverse effects on areas that have naturally revegetated over the years. The goal of re-mining is to restore areas that were mined and left unreclaimed before the passage of SMCRA. Re-mining can eliminate existing highwalls, reestablish stream channels disturbed by previous mining activities, improve water quality, and remove safety concerns (47 Fed. Reg. §§ 27734, 27735 (June 25, 1982)). The re-mining of abandoned mine lands can also reduce demands on the use of the Abandoned Mine Land Reclamation Fund established under Title IV of SMCRA. *Id.* Nonetheless, OSMRE recognizes that disturbance of areas that have already stabilized may not result in the same environmental gains as would occur in places where there are dangerous highwalls, mine drainage, sedimentation, or other adverse impacts to water quality.

As explained in the response Concern Statement 56943a, OSMRE would, in making decisions on any re-mining proposal in the NCWMA, ensure that any approved activity complies with current regulations and is consistent with the reasons for any unsuitability designation. The objective of SMCRA regulations is to ensure that "all surface mining activities [including re-mining] are conducted in a manner which preserves and enhances environmental and other values . . ." (30 CFR § 817.2). The existing regulations provide for a thorough examination of re-mining proposals before they are approved, including an identification and review of any potential environmental and safety problems that are reasonably anticipated to occur (refer to 30 CFR §§ 785.25 and parts 779 and 780). OSMRE has also revised the PED/EIS to emphasize that re-mining would not be done without conducting an assessment of adverse impacts on areas that have naturally revegetated over the years. We have added a discussion of these factors to chapter 3 in the discussion of re-mining. OSMRE will provide further guidance and explanation about how it would evaluate re-mining proposals for consistency with an unsuitability designation in the record of decision for any such designation.

Representative Quote(s):

Corr. ID: 146 Organization: Not Specified Comment ID: 488410 Organization Type: Unaffiliated Individual

Representative Quote: I am concerned about the provisions to allow coal companies to re-mine areas that could supposedly be improved by re-mining and reclamation. Many of these areas could be left as is because they are already in a process of returning to a natural state. Others could be better repaired by

trained specialists whose primary interest is the environmental reparation rather than the profit motive. Coal companies are shutting down in record numbers and the owners are struggling to extract every last dollar from a dyeing technology. One of my biggest concerns is that the re-mining would occur and the profits taken. Then it would be in the corporation's best interest to file for bankruptcy leaving the tax payers on the hook for the reclamation costs. If any re-mining is to occur the mining operation should be on an up-front payment schedule and the money held in escrow for the future reclamation project. This money could then be used by properly trained crews to restore the native vegetation rather than create a sterile grassy area or possibly introducing invasive non-native species.

Corr. ID: 3062 Organization: Not Specified Comment ID: 493302 Organization Type: Unaffiliated Individual

Representative Quote: Thirdly, the clause justifying the exemption for re-mining that states only in those cases where there is a significant risk to safety or where water pollution is occurring from other causes such as sedimentation and that they would expect any such exceptions to be scrutinized carefully reminds me of the kind of loopholes that were included in SMCRA that Ken Heckler described as big enough to dive a coal truck through and that led him to denounce SMCRA with the statement you can put lipstick on a corpse, but in the end, you still have a corpse. Most of the old highwalls are relatively stable and not generating significant sediment and other pollutants any more. Re-mining will result in further hydrologic alterations and generate additional sediment and other water pollutants. Areas on the old benches that are unstable are very limited in extent. On the other hand, there are extensive areas of mines reclaimed back to AOC per SMCRA requirements that are unstable and have started sliding. However, the solution to these problem sites is not to apply the same remedy that created the original problem. The solution is to recognize that the original mining of these sites, even those sites reclaimed per SMCRA requirements, destabilized them, and now they are going to have to reestablish equilibrium gradually over a long period of time.

Corr. ID: 3744 Organization: Tennessee Environmental Council Comment ID: 495440 Organization Type: Conservation/Preservation

Representative Quote: Most of the damage that would be the subject of a mining request is from pre-SMCRA mining. Over these past more than thirty years, the water quality in most of the streams so affected has vastly improved. Areas with what might have been dangerous high walls have largely now been reforested. Disturbing these areas by allowing "re-mining" under the guise of environmental benefit by reclamation would in fact incur new damage to the fragile areas and set back what is an improving environmental landscape. There is very little acid mine drainage in this area.

Corr. ID: 2777 Organization: Smoky Mountains Hiking Club Comment ID: 490591 Organization Type: Unaffiliated Individual

Representative Quote: The club feels that OSMRE's Alternative 3, the preferred alternative in the Petition Evaluation Document/Environmental Impact Statement (PED/EIS) document is flawed in that re-mining of coal seams would be allowed on too many of the ridgelines in the petition area. We recognize that reclamation after re-mining is a viable method of correcting existing environmental hazards. However, Alternative C does not distinguish between mined areas that are hazards and mined areas that have been stabilized or reclaimed and thus should not be further disturbed. According to the PED/EIS 183 to 219 miles of ridgeline would be exempt under re-mining. Since existing permitted mining operations cannot be designated unsuitable, allowing any re-mining and its associated access and haul roads, simply leaves too much of the Cumberlands at risk for future mining.

**Corr. ID: 3233 Organization: Environmental Protection Agency Comment ID: 492039
Organization Type: Federal Government**

Representative Quote: However, best technology currently available and enhancement where practicable does not demonstrate or guarantee the reclamation will improve impacts associated with pre-SMCRA mining where these effects have been naturally attenuated.

**Corr. ID: 2828 Organization: Coalition to Protect America's National Parks Comment ID: 490693
Organization Type: Unaffiliated Individual**

Representative Quote: The Extent of Proposed Remining Needs to be Better Defined and Limited

The draft PED/EIS contains several alternatives that would allow remining of lands within the petition area, noting that remining pre-SMCRA operations and site restoration have the potential to reduce or eliminate water impacts including sediment and pollutant loads from the previously mined areas and restore surface drainage patterns. The primary shortcoming of any/all of the remining alternatives is that the extent of remining that could be allowed, and hence the resulting adverse impacts, is not well quantified and thus appears to be open-ended. As a result, without further description to place practical limits on the circumstances under which remining decisions would be made, the extent of remining is a major shortcoming of these alternatives.

While we agree that remining in certain circumstances can have long-term benefits if done the right way, we believe it is important to address potential remining on a site specific basis. As the DEIS notes, remining has the potential to disturb surface runoff, pollute waters, and alter surface water and groundwater connections, resulting in adverse impacts on water resources until restoration. Experience in other NPS areas, including New River Gorge National River in West Virginia, has shown that often these previously mined areas have naturally reclaimed over time; lands have revegetated and slopes and drainages have stabilized naturally, eliminating most off-site impacts. Remining these types of sites would likely create new environmental impacts and exacerbate adverse environmental effects, particularly as new access and haul roads would need to be built or former roads would need to be reopened. Access and haul road construction removes vegetation, disturbs soils, and increases the potential for erosion and runoff to adjacent water bodies. Runoff from access roads can be a significant source of sediment loading to streams, especially if not reclaimed after the mining operation.

Corr. ID: 2778 Organization: Not Specified Comment ID: 490593 Organization Type: Unaffiliated Individual

Representative Quote: I feel that OSMRE's Alternative 3, the preferred alternative in the Petition Evaluation Document/Environmental Impact Statement (PED/EIS) document is flawed in that remining of coal seams would be allowed on too many of the ridgelines in the petition area. We recognize that reclamation after remining is a viable method of correcting existing environmental hazards. However, Alternative C does not distinguish between mined areas that are hazards and mined areas that have been stabilized or reclaimed and thus should not be further disturbed. According to the PED/EIS 183 to 219 miles of ridgeline would be exempt under remining. Since existing permitted mining operations cannot be designated unsuitable, allowing any remining and its associated access and haul roads, simply leaves too much of the Cumberlands at risk for future mining.

Corr. ID: 3018 Organization: Not Specified Comment ID: 493281b Organization Type: Unaffiliated Individual

Representative Quote: Another important factor is that several previously mined areas within the evaluation area that would be eligible for remining have become reclaimed through natural processes and/or intentional efforts to the point where they have a maturing, diverse forest cover, support diverse wildlife populations, and cause minimal, if any, downstream water quality impacts. Remining these areas would adversely affect their forest community for the decades it would take for reforestation. Several of these areas do have remnant highwalls, but many of these present little safety risk to anyone except a person hiking off-road or off-trail and not exercising proper diligence (as do the numerous naturally occurring bluff-like rock outcrops in the evaluation area).

CONCERN STATEMENT: (Concern ID: 56943c) We received many comments about the potential for remining to improve water quality. Multiple commenters claimed that remining can adversely affect water resources and that there is not enough evidence that remining improves water quality. Multiple commenters stated that the draft PED/EIS does not sufficiently analyze the impacts of remining on water quality and does not demonstrate a sufficient understanding of impacts and benefits of previous remining efforts on water quality. One commenter questioned whether remining is beneficial, citing low background contaminant levels being low, which the commenter stated indicate that natural reclamation has occurred on these abandoned (pre-SMCRA) mine lands. Another commenter stated that the remining and reclamation of pre-SMCRA mined sites, has actually improved water quality. One commenter alleged that the current petition leaves the fragile waters in the petition area at risk, and that water resources are not adequately discussed in the draft PED/EIS. The commenter stated that the draft PED/EIS incorrectly insinuates that remining is the only method for improving impaired waters in Tennessee and, thus, does not take a hard look at remining.

RESPONSE: OSMRE has included additional information on remining in chapters 3 and 6 of the final PED/EIS to address these issues. Remining has been studied in a number of states.¹ However, the most comprehensive study was completed by the Pennsylvania Department of Environmental Protection in 2002. The study evaluated water quality on 112 remined sites with 233 pre-existing discharges in Pennsylvania. They evaluated loading from acidity, iron, manganese, aluminum, sulfate, and flow. They found at least 40% of all sites experienced eliminating or reducing the load. Another 50% experienced no change in water quality loading as a result of remining. Depending on the parameter, only 1% to 10% experienced worse post-mining loading conditions.

Based on these studies, OSMRE has concluded that remining could help resolve existing water quality issues in Tennessee. The changes OSMRE has made ensure that OSMRE has fully considered the impact of remining on water quality.

¹ Hawkins, J.W. 1995. Characterization and effectiveness of remining abandoned coal mines in Pennsylvania. U.S. DOI, Dept. of Mines. RI 9562; Smith, M.W., K.B.C. Brady, and J.W. Hawkins. 2002. Effectiveness of Pennsylvania's remining program in abating abandoned mine drainage: water quality impacts. Society for Mining, Metallurgy, and Exploration, Inc. Transactions. Vol. 312; Smith, M.W. 2004. The development of a national program to abate acid mine drainage through remining abandoned mine lands. Proceedings America Society of Mining and Reclamation; and Mauger, N. S., R. Baker, T. Butalia, and W. Wolfe. 2011. Impacts of reclamation and remining on watersheds of pre-law legacy coal mines. World of Coal Ash Conference. May 9–12, 2011. Denver, CO.

Representative Quote(s):

Corr. ID: 277 Organization: Not Specified Comment ID: 487967 Organization Type: Unaffiliated Individual

Representative Quote: Re-mining will disturb the protection of natural areas and the delicate environments. It could pollute water. And the loss of natural areas that attract visitors to Tennessee, and well as benefit the citizens of Tennessee, will produce potential tax and revenue loss.

Corr. ID: 2648 Organization: Not Specified Comment ID: 490157 Organization Type: Unaffiliated Individual

Representative Quote: Remining is just as bad as mining. Having tested overburden and seen first-hand mining companies not treat overburden as recommended, mining should be discouraged. There are NEVER enough volunteers to maintain the liming stations to keep water safe for fish and other water life. Please do not allow remining in the North Cumberland Wildlife Management Area. The watershed will be critically damaged.

Corr. ID: 3617 Organization: Not Specified Comment ID: 496789 Organization Type: Unaffiliated Individual

Representative Quote: Comments of concern on Remining to improve water quality: The draft EIS-37 lacks proven evidence that "remining" results in sufficient improvements to water quality. The proven known evidence of improving water quality comes from Tennessee Land Reclamation program than from OSMRE Tennessee database of former coal industry "remining" sites. In fact, "mother nature" does a better job to improving water quality over time. The final EIS-37 should provide evidence that "remining" in Tennessee's coal fields have resulted in high percentages of water quality improvements. The high numbers of former surface coal mining sites that are still being monitor each year in Tennessee by the Tennessee Mining Section of TDEC is clear evidence that "remining" does not produce sufficient water quality improvements to damage streams. Saying "remining" improves water is not valid then the improvements are just a few percentages, if any, of the water quality. The study of the Sewanee coal seam has proven this to be true. Again, land reclamation is far better than "remining". If the Alternative 3, OSMRE's preferred alternative is chosen then the final EIS should provide proven evidence that "remining" results in sufficient water quality improvements as claim. A better preferred alternative would be to "grant the state petition designation while allowing only Land Reclamation projects and road access."

Corr. ID: 3222 Organization: TN Department of Environment and Conservation Comment ID: 491994 Organization Type: State Government

Representative Quote: DWR supports allowing remining and reclamation of previously mined areas. Historical data has shown that remining and reclamation of pre-SMCRA mined sites has actually improved water quality in heavily mined watershed by eliminating pits and cast over spoil, thus reducing the possibility of acid mine drainage and also restoring natural drainage patterns

Corr. ID: 3233 Organization: Environmental Protection Agency Comment ID: 492036 Organization Type: Federal Government

Representative Quote: The OSMRE has selected its preferred alternative based upon their opinion that re-mining is valuable for its reclamation potential. However, if background contaminant levels are low indicating natural reclamation for these abandoned (pre-SMCRA) mine lands, then re-mining may be of

questionable benefit. Table 4-8 of the DEIS indicates most of the measured water-quality parameters are below the threshold levels and reportedly many of the sampling stations are located in headwater streams close to these pre-SMCRA mines. The DEIS also states that the most vulnerable wetlands are those near existing coal reserves and those located near past mining sites because of re-mining impacts.

**Corr. ID: 3233 Organization: Environmental Protection Agency Comment ID: 492038
Organization Type: Federal Government**

Representative Quote: According to the OSMRE, a survey of 30 headwater streams indicates historical and current coal mining impacts remain a source of subtle effects to water quality and macroinvertebrate community impairment throughout the region. If current (SMCRA-permitted) mining is having an impact, then permitted re-mining can be expected to also have an impact, potentially more than subtle. The DEIS does not explain how re-mining impacts to water quality, aquatic ecosystems, and wetlands will be reclaimed under SMCRA to a higher level than what is currently being documented. Additionally, the DEIS does not provide an anticipated duration of impairment associated with re-mining and any subsequent reclamation activities.

Corr. ID: 3617 Organization: Not Specified Comment ID: 496750 Organization Type: Unaffiliated Individual

Representative Quote: Does the draft EIS-37 present a "solid" scientific assessment argument to allow "remining" or the Preferred Alternative #3 within the petition area? OSMRE believes that the normal permitting process would address detailed hydrologic and geologic information (Attachment #2) for all proposed "remining" or "Alternative #3 proposal" within the petition area for all surface coal mining and determine the probable hydrologic consequences (PHC) of any such operations into the receiving streams, ground-water systems, and the draft EIS-37 petition area. Addition to this is a hydrologic reclamation plan (HRP) addressing all hydrologic conditions, 30 CFR 780.21(h), 784.14(g), within the petition area. What is re-mining? SMCRA re-mining permits are those proposed surface coal mining operations in pre-law locations in Tennessee under the AML program of OSMRE, category 1, 2, and 3 sites. Over the past 30 year OSM Knoxville Field Office has issued "remining" SMCRA permits approval for water quality improvements. But, does the water quality data gathered at these "remining" surface coal operations sites support the claim that water quality improvements have occurred over the past 30 years? Does data support a solid argument that "before re-mining" data and "after re-mining" data of water quality improvement at a higher level? If OSMRE proposes draft EIS-37 Preferred Alternative #3 or any alternative is approved where is the proof that any alternative including allowing "remining" will improve water quality at a higher percentage. NEPA require a "hard look" at any proposed alternative by OSMRE. The draft EIS-37 does not contain sufficient scientific evidence that allowable "remining" surface coal operations will improve the water quality within the petition area. Then, how can OSMRE's draft EIS-37 proposed any alternative that places undue risks upon the petition area and the petitioner's valuable capital investment? How can OSMRE and TDEC pursuant to 30 CFR 761.11(c), and present Memorandum of Understanding (MOU) work? The record demonstrates that surface coal mining, even re-mining (example Zeb Mountain), that areas outside of the petition area are fragile lands because their waters (streams) that enter into the draft EIS-37 petition area's watersheds.

CONCERN STATEMENT: (Concern ID: 56943d) One commenter alleged that the benefits of re-mining are aesthetic and not ecological in nature. The commenter also asserted that the scale of future re-mining could be larger than pre-SMCRA mines and that re-mining could thus result in impacts greater than those currently thought to occur from the pre-SMCRA mines.

RESPONSE: OSMRE does not agree with the commenter that re-mining has no ecological benefit. OSMRE has found that “[r]emining . . . will almost always result in improvement of environmental conditions . . . (47 Fed. Reg. §§ 27734, 27735 (June 25, 1982)). Moreover, as previously discussed, re-mining has been scientifically shown to improve water quality (see response to Concern Statement 56943c). In response to this comment, OSMRE notes that it would evaluate applications for re-mining in accordance with its regulations at 30 CFR §§ 779 and 780. OSMRE will also continue to use the established process for allowing other state and federal agencies to evaluate mining proposals.

Representative Quote(s):

Corr. ID: 3062 Organization: Not Specified Comment ID: 493300 Organization Type: Unaffiliated Individual

Representative Quote: My reasons for opposing the exceptions for re-mining follow:

First, I wish to point out that re-mining to reclaim unreclaimed highwalls is unnecessary and counterproductive. Any unreclaimed highwalls date from pre-SMCRA mining, and therefore are at least 30 years old. While these mines generated a lot of ecological damage from siltation and altered hydrology when they were first mined, they have largely stabilized at this point. I have walked and RV’ed some of these old benches and most of them have grown up in new forest or developed wetlands on the horizontal benches. In many places untrained persons might not even recognize they were on a former coal mine other than the oddly level terrace following the elevation contour around the mountain. Further, the scale of the mines in the pre-SMCRA era were much smaller than any new mine would be. Any re-mining would inevitably involve mining on a much larger scale than occurred previously. This is actually self-evident since the coal from the preexisting mine footprint has already been removed. Thus the only economic justification for re-mining would require digging deeper into the mountainside (or mountaintop removal) in order to extract additional coal to provide a profit to the re-mining. This re-mined area would have to be reclaimed as per SMCRA; however, this will not prevent the adverse environmental impacts associated with strip mining. It will allow restoration of Approximate Original Contour (AOC), but this is an aesthetic, not an ecologic, improvement. In fact, because of the smaller scale of these old mine benches compared to the larger footprint of the new mines coupled to the fact that the old mines have largely reforested whereas backfilled mines tend not to reforest, it is debatable that re-mined areas would even be an aesthetic improvement. It also must be borne in mind that reclamation does not equate to restoration. If these areas are re-mined to reclaim them, then this will result in a new round of watershed disturbance and stream impairment, perhaps not as severe as resulted from the original mining, but impairment none-the-less.

CONCERN STATEMENT: (Concern ID: 56943e) Commenters stated that clarification is needed on whether an unmined (undisturbed) area can be designated as LUM once a permit has expired after the LUM designation and recommended that LUM consideration be given to unmined (undisturbed) areas associated with active permits set to expire after the official LUM designation.

RESPONSE: Pursuant to 30 CFR § 762.13, lands covered by a current SMCRA permit are exempt from designation as unsuitable for surface coal mining. Thus, OSMRE cannot consider lands covered by a current permit for designation, as the commenter suggests. The designation of additional lands would require another petition process for designation.

Representative Quote(s):

Corr. ID: 3233 Organization: Environmental Protection Agency Comment ID: 492045
Organization Type: Federal Government

Representative Quote: The EPA recommends that the OSMRE refine its preferred alternative to consider in its LUM designation all undisturbed acreage associated with active permits set to expire after the official LUM designation.

Corr. ID: 3233 Organization: Environmental Protection Agency Comment ID: 492046
Organization Type: Federal Government

Representative Quote: The EPA recommends that the OSMRE clarify whether an unmined (undisturbed) area can be designated as LUM once a permit has expired after the LUM designation. The DEIS indicates under the preferred Alternative there are 1,015 acres subject to an active permits which reduces the designated LUM area to 66,311 acres. According to the DEIS as of March 15, 2012, the OSMRE records indicated 12 permitted areas that were at least partly within the petition boundary. These included four surface mines, eight underground mines, one refuse area, and two haul roads. Additionally, six permits were identified which as of the close of 2014 had not expired and still had portions of the proposed disturbance that had not yet been disturbed. Moreover, Table 5-45 indicates an active permit does not always indicate active mining. The DEIS does not specify whether active mining is ongoing under these permits nor when they are expected to expire. Consequently, the EPA recommends that the OSMRE include a provision in its LUM designation to include all undisturbed acreage associated with permits active at the time of LUM designation that later expire within the designated LUM area.

Corr. ID: 3233 Organization: Environmental Protection Agency Comment ID: 492048
Organization Type: Federal Government

Representative Quote: The EPA recommends that the OSMRE avoid approving permits received after and inconsistent with the State's 2010 Petition or the DEIS's identified preferred alternative. For example, the DEIS states: "[n]o currently permitted operations were identified within the NCWMA and ERTCE but are being proposed under the Clear Energy Corporation, Brimstone Surface A line No; I permit application (OS. .Y RE application number 3247). " Similarly, the DEIS indicates that for the Rich Mountain Coal seam the Triple H Coal, LLC, has recently submitted a permit application to continue mining within the NCWMA and ERTCE area.

CONCERN STATEMENT: (Concern ID: 56943f) Multiple commenters requested additional analysis regarding the impacts of construction of roads associated with remining and requested that construction of new roads be limited.

RESPONSE: Private roads constructed or used to facilitate surface coal mining operations are subject to the permitting process and not all proposed new roads would necessarily be permitted. Any new roads are inspected and must be constructed and maintained pursuant to the regulatory requirements. Existing roads are used wherever possible in order to minimize adverse environmental impacts.

Representative Quote(s):

Corr. ID: 3222 Organization: TN Department of Environment and Conservation Comment ID: 491992 Organization Type: State Government

Representative Quote: DWR recommends that the OSMRE provide additional, specific details, to the extent possible, regarding the development and use of haul roads to facilitate re-mining under Alternatives 3 and 4 and their associated environmental and other impacts in the Final PED/EIS

Corr. ID: 3841 Organization: Not Specified Comment ID: 495196 Organization Type: Unaffiliated Individual

Representative Quote: Most of my comments went away, but my only comment now is, I prefer Alternative 4 to Alternative 3, because apparently it was just a matter of surveying techniques to define the areas, and a ridgetop is a ridgetop no matter who or when it was designated, so I think that that extra area is useful and good to protect. The only other significant comment that I have is, the way that the alternatives are written, I understand that it will allow new roads to be constructed in addition to maintenance of the existing roads to the existing highwalls. I would request that you limit additional roads to the maximum possible extent; if at all possible, eliminate new roads altogether.

Corr. ID: 1544 Organization: Not Specified Comment ID: 489175 Organization Type: Unaffiliated Individual

Representative Quote: Include a requirement in all permits issued for re-mining that existing roads to existing high walls can be maintained, but no new roads are permitted.

Corr. ID: 3232 Organization: Not Specified Comment ID: 494293 Organization Type: Unaffiliated Individual

Representative Quote: The only other significant comment that I have is, the way that the alternatives are written, I understand that it will allow new roads to be constructed in addition to maintenance of the existing roads to the existing highwalls. I would request that you limit additional roads to the maximum possible extent; if at all possible, eliminate new roads altogether.

CONCERN STATEMENT: (Concern ID: 56943g) Multiple commenters voiced support for alternative 4 with re-mining allowed only in instances where there is consultation and consensus, including a public hearing process, in order to ensure that the benefits of re-mining outweigh its potential damages. Multiple commenters expressed support for a modified alternative 4 without re-mining, with one commenter voicing support as long as permitting is focused on reclamation purposes more than the extraction of coal.

RESPONSE: OSMRE has revised its preferred alternative from that identified in the draft and has now identified alternative 4 as its preferred alternative because it is environmentally preferable. With respect to re-mining, as noted in Comment Response 56943b, existing regulations provide for a thorough examination of re-mining proposals before they are approved, including an identification and review of any potential environmental and safety problems that are reasonably anticipated to occur (refer to 30 CFR § 785.25 and parts 779 and 780). OSMRE already has a process in place for coordination between state and federal agencies in permitting decision-making, including decisions about re-mining (see also response to Concern Statement 56992). In addition, OSMRE's regulations provide for robust citizen participation in the permitting process (refer to 30 CFR §773.6). However, OSMRE cannot give its

authority for making permitting decisions to any outside party (see also response to Concern Statement 56991).

As discussed in the response to Concern Statement 56943a, OSMRE would also, in making decisions on any remaining proposal in the NCWMA, ensure that any approved activity complies with current regulations and is consistent with the reasons for any unsuitability designation. OSMRE will provide further guidance and explanation about how it would evaluate remaining proposals for consistency with an unsuitability designation in the record of decision for any such designation.

Representative Quote(s):

**Corr. ID: 2828 Organization: Coalition to Protect America's National Parks Comment ID: 490693a
Organization Type: Unaffiliated Individual**

Representative Quote:

Specifically, we recommend that remaining be limited to only those circumstances in which there is state and federal agency consensus that the long-term benefits of a remaining proposal would significantly exceed the potential short- and long-term adverse impacts. OSMRE should initiate an inter-agency, consensus-based process by which such future site-specific decisions about remaining proposals would be made.

**Corr. ID: 2828 Organization: Coalition to Protect America's National Parks Comment ID: 490695
Organization Type: Unaffiliated Individual**

Representative Quote: We Support Alternative 4 if Modified to Limit Remaining

Contingent on the condition that a consensus-based decision making process, similar to what is suggested above, is incorporated into future decisions about remaining, the Coalition strongly supports Alternative 4, as it would most effectively ensure the preservation and best uses of the evaluation area. With such limitation of remaining, Alternative 4 would also clearly become the (only) environmentally preferred alternative as it would provide the most effective protection of the affected resources. Given the clear ecological, recreational, and economic benefits of a strong conservation-based decision, we also believe that a modified Alternative 4 would best meet the Purpose and Need for the project and therefore should appropriately become OSMRE's preferred alternative (and eventual selected action).

**Corr. ID: 3171 Organization: Southern Alliance for Clean Energy Comment ID: 494276b
Organization Type: Unaffiliated Individual**

Representative Quote: Intervenors believe that the entire 74,968 non-permitted acres defined by Alternative 4 should be designated unsuitable for surface mining and that any proposed exclusion from that designation for the purposes of remaining should be considered only in rare cases where an applicant has demonstrated, through a robust interagency examination by all appropriate state and federal agencies with concerns, including a thorough public participation process, that the environmental benefits of the proposed operation justify consideration of a case-specific exclusion. Such an exceptional situation should be approved only through a process of consensus by all state and federal agencies with jurisdictions or concerns within the affected area and any such consensus process should be set forth in detail as part of the Record of Decision for this designation. In the absence of such exceptional scrutiny, Intervenors would recommend the designation of Alternative 4 without any provision for remaining.

**Corr. ID: 3225 Organization: Tennessee Wildlife Resources Agency Comment ID: 494286b
Organization Type: State Government**

Representative Quote: □ Proceed with the permitting process where there is consensus that re-mining is appropriate to solve a significant environmental and/or public safety problem, that re-mining will result in a minimal disturbance of virgin territory, and that re-mining will result in an optimal mine land reclamation. The process for evaluating proposals from re-mining should apply to all aspects of permitting, including development of haul and access roads.

Corr. ID: 262 Organization: Not Specified Comment ID: 488044 Organization Type: Unaffiliated Individual

Representative Quote: Further, the Department of the Interior should include a provision that re-mining should be permitted only if, through an interagency process, there is consensus between the state and the federal agencies that the benefits of the proposed operation are worth the destruction of additional undisturbed mountainside in an area that has been determined to be fragile.

**Corr. ID: 3183 Organization: Statewide Organizing for Community eMpowerment (SOCM)
Comment ID: 494160b Organization Type: Unaffiliated Individual**

Representative Quote: This process should include public notice and comment before the OSMRE agrees that a re-mining proposal will move to the SMCRA permit stage.

Representative Quote(s):

Corr. ID: 185 Organization: Not Specified Comment ID: 487841 Organization Type: Unaffiliated Individual

Representative Quote: The modification to Alternative 4 should state that re-mining is limited to sites at which, by consensus between the State and OSMRE, safety and/or environmental benefits of re-mining outweigh the damages inflicted by the procedure. The ecological impact of ridgetop surface mining on the subject fragile environment is calamitous. The effects are long-lasting and essentially irreversible.

Corr. ID: 2354 Organization: Not Specified Comment ID: 489839 Organization Type: Unaffiliated Individual

Representative Quote: I support Alternative 4 with the modification that Alternative 4 should states that re-mining is limited to sites at which, by consensus between the State And OSMRE, it is determined that safety and/or environmental benefits outweigh the damages inflicted by the procedure. This position most closely accomplishes the State's intent to designate this area as unsuitable for surface mining.

Corr. ID: 2759 Organization: Not Specified Comment ID: 490246 Organization Type: Unaffiliated Individual

Representative Quote: I want to voice my support for "Alternative 4," as long as it is modified to permit re-mining of old mining areas only if the State of Tennessee and OSMRE can agree that the re-mining won't cause more damage to the area's environment, or jeopardize the safety of the humans and other animals that use the site and the areas downstream.

Corr. ID: 3018 Organization: Not Specified Comment ID: 493282 Organization Type: Unaffiliated Individual

Representative Quote: Therefore the modified version of Alternative 4 should require that any application for remining within the designated ridgeline include a rigorous evaluation of the current environmental quality of the mine area. This evaluation should emphasize the resources of concern identified in the LUM petition. In addition to OSMRE's standard factors, approval of the application should be based on:

- 1) clear evidence of net overall post-reclamation improvement of environmental quality;
- 2) reclamation to forest rather than the more common wildlife reclamation to a mix of grasses, forbs, and shrubs (and frequently including non-native species);
- 3) limitation of the previously unmined area to the minimal acreage required to remine the previously mined area, rather than a larger area to maximize financial benefits; and
- 4) agreement by the State of Tennessee (in particular the Department of Environment and Conservation and Tennessee Wildlife Resources Agency) that the remining will result in a net improvement of environmental quality.

Modifying the existing Alternative 4 in the manner described above or adding a new alternative that includes the provisions described above will not require the preparation and circulation of a supplemental draft EIS. The proposed modified/new alternative and its anticipated environmental consequences are fully within the range encompassed by the current Alternatives 2 through 5 and particularly those of Alternatives 2 and 4. The environmental consequences would be less than those of the current Alternative 4 and no new impacts not already addressed in the draft EIS would be introduced. There is also nothing in the regulations for implementing the National Environmental Policy Act issued by the Council of Environmental Quality (36 CFR 1500-1508) or by the Department of Interior (43 CFR Part 46) requiring a supplemental draft EIS for such a modified or new alternative. Applicable NEPA case law also does not require a supplemental draft EIS for this change.

Corr. ID: 3018 Organization: Not Specified Comment ID: 493281 Organization Type: Unaffiliated Individual

Representative Quote: Preferred Alternative - based on the analyses presented, I urge OSMRE to create, evaluate, select and implement a modified version of Alternative 4 - Expanded Corridor Designation with Remining and Road Access. Although I do not fully understand the methodology used to increase the Alternative 4 ridgeline area over that presented in Alternatives 2 and 3, the increased ridgeline area aligns with the intent of the State of Tennessee in the LUM petition and provides increased protection for the numerous resources of concern. Allowing access roads through the designated ridgeline area will minimize adverse effects on potential future coal mining in non-ridgeline areas. Allowing remining will, as OSMRE states, allow remediation of unreclaimed mines. Alternative 4 does not, however, include adequate criteria for the permitting of remining within the ridgeline areas. While 219.5 miles of ridgeline are identified as subject to future remining, the ridgeline area affected by this remining could be much greater since the definition of remining in OSMRE regulations includes no limits on the area of previously unmined land that can be mined as part of a remining operation. I have seen remining operations, as well as permit applications for remining operations, where the previously mined area made up a small proportion of the total mine area.

Corr. ID: 3025 Organization: BirdWorks Consulting Comment ID: 493234 Organization Type: Unaffiliated Individual

Representative Quote: I want to express my support for Alternative 4 as the preferred alternative with an important modification. With the use of OSMRE's more accurate LIDAR technology, the 569 miles of ridgelines and 76,133 acres of the petition area in Alternative 4 more closely reflect the State's original intent of designating lands as unsuitable for surface coal mining. The critical improvement to Alternative 4 is that re-mining in the protected area should be allowed ONLY after a robust interagency examination and consensus that the environmental benefits of a proposed re-mining project outweigh the environmental damage that would be caused by the project.

Corr. ID: 3035 Organization: Not Specified Comment ID: 493241 Organization Type: Unaffiliated Individual

Representative Quote: I am in favor of Alternative 4 in the DEIS, but with the caveat that re-mining should be permitted only when the long-term environmental benefits are significant and the short-term negative environmental impacts are minimal. The decision regarding a re-mining permit should (a)not be driven simply by compliance with SMCRA regulations, (b)be reached jointly by OSMRE and the State of Tennessee, and (c)include consultation with the Superintendent of the Big South Fork National River Recreation Area (BISO).

Corr. ID: 3099 Organization: Southeastern Avian Research Comment ID: 493491 Organization Type: Unaffiliated Individual

Representative Quote: As President of Southeastern Avian Research I am writing to speak out in favor of Alternative 4 with one significant modification as it relates to Lands Unsuitable for Mining in the North Cumberland Mountains in TN. I would further recommend that the modification be that mining would be highly restricted and rarely if at all take place in the already protected areas. I would also recommend that there be a strict application screening process and in order for the application to be approved that the mining project must outweigh the impact that it will have to the affected area.

Corr. ID: 3171 Organization: Southern Alliance for Clean Energy Comment ID: 494276 Organization Type: Unaffiliated Individual

Representative Quote: Alternative 4 is More Consistent with the Intent of the Petition Than the "Preferred" Alternative

Third, with one significant modification discussed below, Intervenor support Alternative 4 rather than the preferred alternative (Alternative 3) as more consistent with the State's intent to protect all the ridgeline corridors in the NCWMA. In correspondence between the State and OSM, OSM indicated that in reviewing the petition area map, it used several technical approaches, including LIDAR, to identify the ridgelines. The State agreed to the use of the LIDAR technology because it produced more accurate information than the GIS mapping it had used. Alternative 3, however, defines the petition area based on the less accurate GIS mapping, contrary to the State's express wish. By contrast, through the use of OSM's more accurate technology, Alternative 4 identified an additional 64 miles of ridgelines within the petition area. We believe that Alternative 4 thus most closely fulfills the State of Tennessee's petition that "all ridge lines" be declared unsuitable for surface coal mining operations. However, Alternative 4 should be modified to greatly restrict the amount of land that could be potentially subject to re-mining. Intervenor are very skeptical about the alleged benefits of most re-mining proposals and some of the Intervenor organizations will submit separate comments on this point. As currently drafted, Alternative 4 would allow re-mining on hundreds of miles of land that had been mined previously. The State of Tennessee has made clear that any proposed re-mining within the designated area should be limited.

Corr. ID: 3196 Organization: Not Specified Comment ID: 494226 Organization Type: Unaffiliated Individual

Representative Quote: I support Alternative 4 (the preferred plan), which designates 569 miles of ridgeline as unsuitable for surface coal mining operations, with one crucial improvement- -that re-mining of old sites in the protected area should be approved only in those limited cases where the State of Tennessee and OSMRE agree the safety and/or environmental benefits of re-mining outweigh the damage caused by the process. With this improvement, Alternative 4 provides the highest level of protection for the headwaters of the Big South Fork National River and Recreation Area.

Corr. ID: 3763 Organization: Not Specified Comment ID: 495661 Organization Type: Unaffiliated Individual

Representative Quote: These fragile lands, they need to be protected. I'm for, I believe a modification of alternative four. As Adam said earlier, I think that if there has to be re-mining, you have to use significant environmental and safety problems as your lens when you're looking at this and meet with TWRA, TDEC, the State before you make the decision to go in and remine.

Corr. ID: 1204 Organization: Ms. Comment ID: 488513 Organization Type: Unaffiliated Individual

Representative Quote: I support Alternative 4 with one critical modification, no re-mining.

Corr. ID: 1964 Organization: Not Specified Comment ID: 489169 Organization Type: Unaffiliated Individual

Representative Quote: I Support alternative 4 which designates 569 miles of ridge as unsuitable for surface mining operations. Visitors spend over \$170 Million a year in these 4 counties because of their pristine nature, so I support alternative 4 with the modification of not allowing re-mining.

Corr. ID: 3004 Organization: Not Specified Comment ID: 491792 Organization Type: Unaffiliated Individual

Representative Quote: I support for Alternative 4 (the preferred plan), which designates 569 miles of ridgeline as unsuitable for surface coal mining operations, with one crucial improvement- -that re-mining of old sites in the protected area should NOT be approved in any circumstances

Corr. ID: 3786 Organization: Not Specified Comment ID: 495200 Organization Type: Unaffiliated Individual

Representative Quote: I totally support this petition, particularly I like the fourth alternative the best. But I also want to echo the concerns that people have about the re-mining with alternative four. I also lived in (unintelligible) Rock Ridge which was where Willie was talking about earlier which was sold as a re-mining job. So I just want to - - the only thing I want to add is perhaps OSM should consider if you are going to permit sites within that permit area, probably only do it in such a way that they're permitted but they're mostly done for reclamation purposes and not so much for the extraction of coal.

Corr. ID: 3744 Organization: Tennessee Environmental Council Comment ID: 495439 Organization Type: Conservation/Preservation

Representative Quote: The Council supports the State of Tennessee's request and intent to designate all ridgeline corridors in the North Cumberland Wildlife Management Area as unsuitable for surface coal mining. We believe Alternative 4 will provide the best protection for the land and water quality; however we have grave concerns about allowing re-mining. There should be a presumption against re-mining. An

exception for "remining" could create a giant loophole that could render much of the protection meaningless.

Corr. ID: 3776 Organization: Not Specified Comment ID: 495903 Organization Type: Unaffiliated Individual

Representative Quote: I want to speak in support of the petition, specifically support of alternative four, although I am concerned about the permit for allowance for any remining. There was a 1,200 acre strip mining permit proposed on one of the mountains up above me that was framed locally as remining.

Corr. ID: 2754 Organization: The Nature Conservancy Comment ID: 490890 Organization Type: Unaffiliated Individual

Representative Quote: Mining activities in the State's ridgeline petition area are not compatible with the State's resource management objectives for the NCWMA. Protecting the ridgelines constitutes a reasonable compromise which allows access to mineral extraction while protecting all other resource values for the public. We agree that re-mining of areas affected by coal extraction prior to the 1977 Surface Mining Control and Reclamation Act (SMCRA), when done properly and prioritized by those causing environmental hazard, are not incompatible with the protection of ecological values. All potential re-mining activities do not necessarily resolve environmental hazards, and each re-mine activity should be evaluated accordingly.

CONCERN STATEMENT: (Concern ID: 56952) Multiple commenters voiced their support for alternative 4 under the condition that the petition area include all of the ridgeline corridors in the petition area, extending to and connecting with stream corridors in the NCWMA and ERTCE. Some stated that a modified alternative 4 will provide the best protection for the land, wildlife, and water quality and will protect the people by providing the opportunity for a more sustainable recreation and tourism-based economy in the future.

RESPONSE: In response to these comments, OSMRE has identified alternative 4 as its preferred alternative because it provides extended protection for ridgelines and allows remining on a case-by-case basis in order to improve environmental and public health and safety hazards. We have not modified alternative 4 as the commenter suggests; however, due to the Clean Water Act and Tennessee Responsible Miners Act, stream corridors would be protected under alternative 4.

Representative Quote(s):

Corr. ID: 198 Organization: Tennessee Greenways and Trails Program Comment ID: 487856 Organization Type: Unaffiliated Individual

Representative Quote: I recommend that the National Park Service follow Alternative 4 with a modification most closely accomplishes the State's intent to designate as unsuitable for surface mining all of the ridgeline corridors in the petition area, extending to and connecting with stream corridors in the North Cumberland WMA and the Emory River Tract Conservation Easement.

I recommend the modification to Alternative 4 should be that re-mining of older coal mines is limited to sites at which, by consensus between the State and OSMRE, safety and/or environmental benefits of re-mining outweigh the damages inflicted by the procedure.

Corr. ID: 249 **Organization:** *Not Specified* **Comment ID:** 488011 **Organization Type:** Unaffiliated Individual

Representative Quote: I am aware that there is a petition circulating that pertains to some specifications that will help us to manage the surface mining of our coal resources in a responsible manner. I am no expert on these specifications, but those who are recommend as follows: "Our recommendation: Alternative 4 with a modification most closely accomplishes the State's intent to designate as unsuitable for surface mining all of the ridgeline corridors in the petition area, extending to and connecting with stream corridors in the North Cumberland WMA and the Emory River Tract Conservation Easement. The modification to Alternative 4 should state that re-mining is limited to sites at which, by consensus between the State and OSMRE, safety and/or environmental benefits of re-mining outweigh the damages inflicted by the procedure."

Corr. ID: 3163 **Organization:** Tennessee Conservation Voters **Comment ID:** 494097 **Organization Type:** Unaffiliated Individual

Representative Quote: Alternative 4 with a modification most closely accomplishes the State's intent to designate as unsuitable for surface mining all of the ridgeline corridors in the petition area, extending to and connecting with stream corridors in the North Cumberland WMA and the Emory River Tract Conservation Easement. The modification to Alternative 4 should state that re-mining is limited to sites at which, by consensus between the State and OSMRE, safety and/or environmental benefits of re-mining outweigh the damages inflicted by the procedure.

Corr. ID: 3749 **Organization:** *Not Specified* **Comment ID:** 495444 **Organization Type:** Unaffiliated Individual

Representative Quote: I support alternative for - - I like OSM's use of LIDAR for better defining the petition area, but I think that the State's request should be adhered to that the ridge lines go from the ridge tops to the valley floor, but I would also like there to be consensus between the State and OSM as to where re-mining should be allowed so that the environmental advantages would not - - would outweigh the environmental damage.

CONCERN STATEMENT: (Concern ID: 56995) One commenter recommended that the OSMRE clarify potential re-mining impacts to any ridgeline previously unaffected by pre-SMCRA mining. The commenter stated that the draft PED/EIS is unclear about how many acres of identified highwalls underlie ridgelines unaffected by prior mining that would be impacted by re-mining. The commenter stated that the draft PED/EIS is similarly unclear on whether permitted mining occurring outside the proposed 1,200-foot corridor will have any impact to the ridgelines that are the subject of the state's petition.

RESPONSE: Under alternatives 3 and 4, any areas within the petition area with existing highwalls would be eligible for re-mining. The goal of that re-mining would be to eliminate existing highwalls and reestablish natural stream channels. At this time we do not know where potential re-mining might be proposed, although previously augered areas would likely not be re-mined. OSMRE would evaluate any re-mining proposals under the established processes and provide state and federal agencies and the public an opportunity to be heard. OSMRE's action would not place additional restrictions on surface mining outside the designation area. Thus, the impacts of such mining are outside the scope of the PED/EIS.

The highwall calculations presented in the PED/EIS were performed using geographic information system (GIS) data and account for each abandoned mine land highwall present in the entire NCWMA and ERTCE footprint (evaluation area). This data was then sorted by alternative to provide the estimated

number of miles of highwalls by alternative. For example, for the evaluation area there are approximately 390 miles of abandoned min land highwall. Approximately 219 miles of those highwalls are in the designation area for alternative 4. As described above, not all of these miles would be subject to re-mining, as some portion of them were previously augered.

Representative Quote(s):

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492070 **Organization Type:** Federal Government

Representative Quote: The EPA recommends that the OSMRE clarify potential re-mining impacts to any ridgeline previously unaffected by pre-SMCRA mining. The State's petition's includes ridgeline within Tennessee's 2007 'Connecting the Cumberland's conservation initiative. This area contains most of the remaining older forest and an array of habitats and wildlife, including rare or threatened species. These lands are also managed by the state of Tennessee for outdoor recreational activities including hunting, hiking, and wildlife viewing. According to the OSMRE, 201.6 miles of pre-SMCRA highwalls exist within the petition area, of which the OSMRE estimates 183.7 miles (26,720 acres) are potentially surface mineable highwalls. Of this total, it is unclear how many miles (acres) of the identified highwalls underlie ridgeline, and associated forest and habitats, unaffected by prior mining, which will be impacted by re-mining inconsistent with the petition's purpose. Additionally, it is unclear whether permitted mining occurring outside the proposed 1200-foot corridor will have any impact to the ridgelines that are the subject of the State's petition.

CONCERN STATEMENT: (Concern ID: 56991) One commenter alleged that the analysis of impacts of re-mining in the draft PED/EIS is inconsistent and does not agree with the adverse impacts noted in the draft PED/EIS, considering the size of the area affected.

RESPONSE: OSMRE disagrees that the PED/EIS analysis is inconsistent. We have, however, reviewed the relevant sections and clarified the analysis related to re-mining to include both adverse and beneficial impacts. OSMRE agrees that there are short-term adverse impacts associated with re-mining activities. These impacts are similar in nature to other mining activities, and we have clarified the discussion of short-term impacts in chapter 6 of the PED/EIS. The long-term benefits of re-mining are two-fold. Re-mining eliminates ongoing environmental harm and reduces public safety concerns associated with highwalls.

Representative Quote(s):

Corr. ID: 3389 **Organization:** Innovative Reclamation Technologies & Engineering Co **Comment ID:** 494796 **Organization Type:** Business

Representative Quote: A reclaimed surface coal mine is the only site that meets the criteria of "high environmental quality", yet the state and OSM claim that the environmental quality of the petition area will be ruined if mining is allowed and reclamation performed. It is queer that the "fragile area" discussed is the elk viewing tower area-which just happens to be a reclaimed surface coal mine! In 2000, when the elk were going to be re-introduced, areas of old mines were to play a key role (see accompanying article). This fact seems inconsistent with the petitioners' claims, especially since a lot of these 'old mines' were pre-SMCRA. The old restoration zone consisted of 670,000 acres in Campbell, Scott, Morgan, Claiborne and Anderson Counties. Out of the 670,000 acres, surface mines accounted for only 1.5% of the open space. That amount of disturbance took over a half century. It is hard to imagine that in the 67,000 acre

petition area that mining will have the negative effects depicted. Yet the state and OSM claim that the environmental quality of the petition area will be ruined if mining is allowed and reclamation performed.

CONCERN STATEMENT: (Concern ID: 56992) One commenter requested that the Record of Decision should specify the process for consideration of remining proposals. The commenter stated that this process should include the preparation of a current conditions site assessment and a risk versus benefit analysis. According to the commenter, remining should only proceed if there is consensus between applicable parties on the need for remining. The commenter suggested that all remining proposals should recognize that the petition area is designated as unsuitable for mining and follow applicable requirements of the Clean Water Act and Endangered Species Act.

RESPONSE: As stated in the response to Concern Statement 56943a, OSMRE would, in making decisions on any remining proposal in the NCWMA, ensure that any approved activity complies with current regulations and is consistent with the reasons for any unsuitability designation. OSMRE will provide further guidance and explanation about how it would evaluate remining proposals for consistency with an unsuitability designation in the record of decision for any such designation.

Current regulations require permit applicants to gather and include in their application information on fish and wildlife resources in the permit area and adjacent area (30 CFR § 780.16). Applicants must include a description of how, to the extent possible using the best technology currently available, the operator will minimize disturbances and adverse impacts on fish and wildlife and related environmental values and enhance these resources where practicable. *Id.* Applicants must also include information about the baseline hydrologic condition of the area and make a determination on the probable hydrologic consequences of the proposed operation (30 CFR § 780.21). The applicant must also submit plans for hydrologic reclamation and water monitoring. *Id.* Before approving a permit, the regulatory authority must assess the probable cumulative hydrologic impacts of the proposed operation to make a determination that the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. *Id.* If not contained elsewhere in the application, remining permit applicants must also identify potential environmental and safety problems related to the mining that are reasonably anticipated to occur (30 CFR § 785.25). Finally, permit applicants are required to submit a reclamation plan assessing the condition, capability, and productivity of the land within the proposed permit area and describing the proposed use of the land following reclamation (30 CFR § 780.23). Disturbed area must be restored to the use they were capable of supporting before any mining or higher or better uses (30 CFR § 816.133).

OSMRE works in collaboration with the Tennessee Department of Environment and Conservation, the Nashville District of the Corps of Engineers, the USFWS Cookeville Field Office, and Region 4 of the EPA under the Local Interagency Working Agreement to review all mining permit applications. This process is designed to improve interagency communication and coordination during the coal mine permitting process. The Local Interagency Working Agreement process also assists the respective state and federal permitting, enforcement, and compliance agencies in conducting reviews required by the Clean Water Act, SMCRA, and the Endangered Species Act. OSMRE will continue to coordinate with those agencies and other interested parties in making decisions about remining proposals in the designated area. OSMRE will also invite the Tennessee Wildlife Resources Agency (TWRA) to the Local Interagency Working Agreement team for the purposes of an early assessment on any proposed remining operation within the NCWMA.

Representative Quote(s):

Corr. ID: 3063 **Organization:** Tennessee Wildlife Resources Agency **Comment ID:** 493328
Organization Type: Unaffiliated Individual

Representative Quote: TWRA has no objection to consideration of remining within the petition area to resolve significant environmental, slope stability, and/or public safety issues. However, as OSMRE has identified significant potential remining within the petition area, blanket exception for remining could easily defeat the protective intent of the petition. OSMRE concludes that 183.7 miles of high wall within the petition area could be subject to remining (p. 3-8).

TWRA recommends that the Record of Decision (ROD) for the Final EIS specify a carefully crafted process for consideration of remining proposals. The consideration process should include the following elements.

- Approach all remining proposals from the presumption that the petition area is Lands Unsuitable for Mining (LUM).
- Utilize the "Local Interagency Working Agreement for Coal Mine Permitting, Compliance and Enforcement Actions in Tennessee Under the Clean Water Act and the Endangered Species Act, " as entered into in 2010.
- Prepare a thorough "current conditions" site assessment to benchmark existing habitat, wildlife and aquatic resources, and water quality, on and adjacent to proposed remining. This information should then be used in a risk vs. benefit assessment of proposed remining.
- Proceed with the permitting process where there is consensus that remining is appropriate to solve a significant environmental and/or public safety problem, that remining will result in a minimal disturbance of virgin territory, and that remining will result in an optimal mine land reclamation. The process for evaluating proposals from remining should apply to all aspects of permitting, including development of haul and access roads.

CONCERN STATEMENT: (Concern ID: 56993) Multiple commenters discussed the abandoned mine reclamation fund and its applicability to the petition area. One commenter stated that the abandoned mine lands fund is the appropriate solution to the problem of localized pollution. Multiple commenters noted that the amount of fees collected from mining companies for acid mine runoff that needs mitigation has been relatively small and has not been substantial enough to cover reclamation needs. While the fees collected are not enough to cover all the reclamation needs, the commenters recommend the continued use of the abandoned mine reclamation fund to support the reclamation of troubled spots. One commenter noted that the abandoned mining lands priority list should be considered first when determining areas to be off-limits for remining.

RESPONSE: Congress determines the amount of abandoned mine lands fees collected (per ton mined by specific mining methods) and distribution rates to the various states. Additionally, SMCRA establishes a priority rating system for abating pre-law impacts. This petition would not influence those provisions. There are insufficient funds to abate all existing impacts from pre-law mining operations. Remining would offer an additional opportunity to reclaim these sites and fix environmental problems and safety hazards.

Representative Quote(s):

Corr. ID: 3062 **Organization:** Not Specified **Comment ID:** 493301 **Organization Type:** Unaffiliated Individual

Representative Quote: Secondly, I am certain that it will be argued that some of these old mine benches will be sources of acid runoff that needs mitigation. This will be true in some localized areas, but acid mine drainage in this region is rare and mostly emanates from auger mines. Remining to correct these hotspots is like killing a gnat with a sledge hammer. The OSM has been collecting fees from mining companies for decades expressly for the purpose of reclaiming such areas. It may be that not enough fees was collected to cover all the reclamation needs, but this abandoned mine reclamation fund is the appropriate solution to the problem of localized pollution hotspots. Mining companies are not going to submit mine applications to address local problems. They are going to submit mine applications that will cover extensive areas of the mountains that will just happen to include a few of the local trouble spots. In defense of the mining companies, it would not be economically justifiable to do anything else. Thus, a remining exception is not really a mitigation rationale, but instead, a mining rationale.

Corr. ID: 3410 **Organization:** SOCM **Comment ID:** 493212 **Organization Type:** Unaffiliated Individual

Representative Quote: If remining is allowed:

- The AML Priority I list should be considered first for areas to be off-limits for remining.
- A finite timeline could be applied as a parameter for applicants who wish to mine an area and reclaim the area.
- The AML funding for Tennessee is inadequate and needs to be revised to accomplish its intended function.

Corr. ID: 3824 **Organization:** *Not Specified* **Comment ID:** 496193 **Organization Type:** Unaffiliated Individual

Representative Quote: I don't understand what is the economic feasibilities of people who would want to come and do the remining of these meager little seams. I just can't see that really happening. I don't think we're going to have any takers. So I'm curious that if one of these alternatives are presented where they could come in and remine, what does that do - - what's the timeline on that? How long is that open-ended timeline? Do they have forever to come in and say, oh, I would like to reclaim that? So I think if that should happen, there should be some time limits on this.

And also, I'm curious about what sort of interference does that give for the highwalls that are eligible for the AML reclamation. And, yes, there's not enough money in the AML funds for Tennessee. And that's something else that needs to be addressed. I think that sun sets in 2012. Am I - - I mean, 2021. Dyslexia. So that's a concern that those funds are going to be terminated possibly. And we certainly need to put in our voices to have that extended and have it to cover Tennessee in a better form than it does presently. So Elizabeth says that about two hundred miles of that highwall - - and that's a rough figure, we're going to hone that down - - are eligible for AML funding to be for reclamation. So those are my - - my two main concerns, is the time limitation. If it is - - if remining is allowed, is it going to be an open-ended time frame, and is that going to interfere with the reclaiming of the AML eligible mine?

CONCERN STATEMENT: (Concern ID: 56996) One commenter recommended that the OSMRE provide examples of how remining has benefited the Pine Creek watershed's headwaters to support its determination that remining is valuable for its reclamation potential of ridgelines.

RESPONSE: Remining has been part of many, if not most, of the surface mining operations in Tennessee in recent history. Remining helps restore drainage patterns to natural channels, reduces sediment loading, eliminates dangerous and unstable highwalls, and commonly improves downstream

water quality (see also response to Concern Statement 56943). OSMRE is unaware of any re-mining taking place in the Pine Creek watershed in Scott County, Tennessee, and therefore cannot comment on its effectiveness. However, the following discussion provides two examples where re-mining has had beneficial impacts elsewhere. For instance, the Premium Coal Company, Inc. Mine 3 (OSMRE Permit No. 3233) specifically states in the March 10, 2016, National Pollutant Discharge Elimination System permit rationale, that Wolfpen Branch and Charley's Branch were mined through and discharged through drainage windows from pre-law mine pits. Premium Coal Company's re-mining eliminated mine pits and directed surface drainage to natural drainage conveyances. These actions have improved water quality for the unnamed tributaries and named tributaries which receive drainage for the entire mining permit area. TDEC attributes the improved water quality to re-connection of the natural drainage patterns and the stabilization of old pre-law spoil zones.

Likewise, re-mining associated with the Kopper Glo Mining, LLC Area 4 using the forestry reclamation approach has actually shown decreases in conductivity and sulfates in the Davis Creek watershed according to biological surveys and water quality monitoring. This information is also included in the January 12, 2016, National Pollutant Discharge Elimination System renewal rationale for OSMRE Permit No. 3244.

Representative Quote(s):

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492044 **Organization Type:** Federal Government

Representative Quote: The EPA recommends that the OSMRE provide examples of how re-mining has benefited the Pine Creek watershed's headwaters to support its opinion that re-mining is valuable for its reclamation potential of the ridgelines proposed for LIJM designation.

CONCERN STATEMENT: (Concern ID: 56997) One commenter requested that in areas where re-mining does not produce a sufficient volume of backfill to match natural contour lines, permits should require the import of backfill to meet this goal.

RESPONSE: Current regulations require operators to disclose how the proposed re-mining operation will improve health and safety concerns and environmental quality (30 CFR § 785.25). If a permit is approved, OSMRE will require permittees to use all reasonably available spoil (30 CFR § 816.106) to reclaim the maximum amount of highwall possible. Additionally, as discussed in the response to Concern Statement 56943a, OSMRE will, in making decisions on any re-mining proposal in the NCWMA, ensure that any approved activity is consistent with current regulations and with the reasons for any unsuitability designation. OSMRE will provide further guidance on how it will evaluate re-mining proposals for consistency with an unsuitability designation in the record of decision for any such designation.

Representative Quote(s):

Corr. ID: 1544 **Organization:** *Not Specified* **Comment ID:** 489177 **Organization Type:** Unaffiliated Individual

Representative Quote: RECLAMATION: Where re-mining does not produce a sufficient volume of fill material to restore natural-looking contours, permits should require import of back-fill to meet that goal, including placing a layer of topsoil of an adequate thickness to support growth of native vegetation.

CONCERN STATEMENT: (Concern ID: 56998) Multiple commenters sought clarification on the bonding process for reclamation. One commenter asked if the state could force reclamation with a performance bond prior to remining based on the current economic conditions. Another commenter stated that companies should be required to participate in a bankruptcy risk study prior to remining and that all bonds should require full funds to cover the reclamation.

RESPONSE: SMCRA requires a permit applicant to obtain a bond that is sufficient to assure the completion of the reclamation plan if the work has to be performed by OSMRE (30 USC § 1259(a)). Therefore, the concerns expressed by these commenters are already adequately addressed by SMCRA and OSMRE's implementing regulations.

Representative Quote(s):

Corr. ID: 3820 **Organization:** *Not Specified* **Comment ID:** 496146 **Organization Type:** Unaffiliated Individual

Representative Quote: I would like to make two requests that I think should be included in the final permit. I think that any company that is allowed to do any sort of risk mining has to be able to pass a bankruptcy risk study looking at the entire course of the period that they will be mining, and I think that the bonding process should require full funds to cover the cost of reclamation in the event of a bankruptcy.

EARTH RESOURCES

CONCERN STATEMENT: (Concern ID: 56881) One commenter suggested that the final PED/EIS use geologic ages as defined by the International Commission on Stratigraphy.

RESPONSE: OSMRE has updated the PED/EIS and incorporated the suggested geologic ages into the Earth Resources section of the EIS.

Representative Quote(s):

Corr. ID: 3222 **Organization:** TN Department of Environment and Conservation **Comment ID:** 492002 **Organization Type:** State Government

Representative Quote: DEC's Tennessee Geological Survey (TGS) has reviewed the Draft EA and comments that the International Commission on Stratigraphy has the geologic age for the Mississippian period between 358.9-323.2 million years ago and the Pennsylvanian period between 323.2-298.9 million years ago. TGS recommends that the OSMRE use these geologic ages for these periods in the Final PED/EIS.

CONCERN STATEMENT: (Concern ID: 56882) One commenter asked for clarification on the different descriptions of identified geological structural features in the draft PED/EIS.

RESPONSE: OSMRE believes that chapter 5 adequately describes the relationship between the structural formations with the following language found on page 5-4: "The stratigraphic sequences of the NCWMA and ERTCE follow two distinctly different nomenclatures. The stratigraphy of the North Cumberland Plateau/Wartburg Basin follows the nomenclature developed by the Tennessee Geological Survey (Wilson, Jewell, and Luther 1956) while the Cumberland Block follows the current nomenclature

used by the US Geological Survey (McDowell, Rice, and Newell 1985). The North Cumberland Plateau/Wartburg Basin section of the NCWMA and ERTCE represents nearly all of the Pennsylvanian-age strata preserved in Tennessee while the Cumberland Block has been subjected to nearly 500 feet of vertical displacement and has been subjected to more erosion of the younger Pennsylvanian strata.” Chapter 4 has been revised to delete the reference to the three structural features and bring the chapter more in line with the descriptions provided in chapter 5.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493250 **Organization Type:** Unaffiliated Individual

Representative Quote: Summary, p. vii, and p. 4-2 - Earth Resources/Geology - This section states there are three predominant geologic structural features in the area, the North Cumberland Plateau, Wartburg Basin, and the Cumberland Block. The next sentence then changes the context of the geologic structural features by merging two of these features into the North Cumberland Plateau/Wartburg Basin. This classification becomes more confusing in Chapter 5 - Evaluation of Coal Resources which addresses the Cumberland Plateau and Cumberland Block. The relationship between these different areas and/or classification schemes should be clarified.

AIR QUALITY AND GREENHOUSE GASES

CONCERN STATEMENT: (Concern ID: 56885) One commenter suggested incorporating emissions data from the four counties in the evaluation area found at an EPA weblink.

RESPONSE: OSMRE has incorporated the suggested data into the final PED/EIS. The last sentence under “Greenhouse Gas Emission” in chapter 4 has been revised as follows: “While there are baseline greenhouse gas inventories for Chattanooga and Nashville, there is no available comprehensive emissions inventory data for the four counties within the evaluation area. EPA greenhouse gas reporting data for large facilities includes two facilities in Anderson County: the Bull Run power plant in Clinton, Tennessee (2.9 million metric tons carbon dioxide equivalent in 2014) and the U.S. Department of Energy National Security Complex in Oak Ridge (58,509 metric tons carbon dioxide equivalent in 2014). No facility-specific greenhouse gas emission data is available for the other three counties in the evaluation area.” In addition, the appropriate reference has been added.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493251 **Organization Type:** Unaffiliated Individual

Representative Quote: Summary, p. ix, 2nd paragraph, and p. 4-17, 1st paragraph - These sections state While there are baseline greenhouse gas inventories for Chattanooga and Nashville, there is no available emissions data for the four counties in the evaluation areas. The USEPA, at <http://www.epa.gov/ghgreporting/greenhouse-gas-reporting-program-and-us-inventory-greenhouse-gas-emissions-and-sinks#browse>, provides facility-specific GHG emissions data for the four counties.

CONCERN STATEMENT: (Concern ID: 56902) One commenter (EPA) suggested that the loss of forested land will adversely impact the carbon sequestration potential of the area and contribute to climate change and that these impacts cannot be compared among alternatives. This commenter stated that neither

SMCRA nor the implementing regulations require reforestation of previously forested mine sites and suggested that, as a result, there would be a net loss of forested area. The commenter also stated that further greenhouse gas emissions could result from the burning of forest/tree cover prior to surface mining.

RESPONSE: The PED/EIS describes the impacts of carbon sequestration for the no-action alternative as well as the action alternatives. Under alternatives 2, 5, and 6 there would be no impacts to carbon sequestration as no surface coal mining would be allowed. However, under alternatives 3 and 4, re-mining that is consistent with the designation criteria would be allowed, which could have implications for carbon sequestration. The impacts associated with these two alternatives and re-mining would depend on several factors, including whether or not trees and other more mature vegetation would be cleared from re-mining sites, and in what amounts. OSMRE is unable to predict the level of clearing that might be associated with any particular application for re-mining that could occur under alternatives 3 and 4, though it would likely be less than the amount currently occurring under the no action alternative. EPA is also correct that SMCRA does not dictate post-mining land use, and does not require the site to be replanted to forest. However, OSMRE relies on the surface owner, in this case TWRA, to prescribe the ultimate reclamation condition for the site. TWRA may seek to manage the sites to benefit species that prefer forest habitat or those that prefer early successional habitat. The PED/EIS does not authorize any specific mining application, which would be necessary in determining the amount of land clearing that may be required. This level of analysis would be conducted during the permitting process and site-specific new review would occur once an application is received.

Representative Quote(s):

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492071 **Organization Type:** Federal Government

Representative Quote: The DEIS addresses this impact only for Alternative I. Consequently, the impact to the carbon sequestration potential cannot be compared among the six alternatives. According to the DEIS, because mining reclamation under the no-action alternative only requires the establishment of vegetative cover, not reforestation, mined areas will experience a net loss of forestland. As stated in the DEIS, this reduction in forested landscapes reduces the level of carbon removed from the atmosphere. Moreover, because neither SMCRA nor the implementing regulations require reforestation of previously forested mine sites, coal-mining regions experience a net loss of forested area. This reduction in forested acreage also can result in the emission of GHGs associated with burning of forest/tree cover prior to surface mining.

CONCERN STATEMENT: (Concern ID: 56883) One commenter suggested that the air quality analysis should reflect the large variance in possible extraction levels.

RESPONSE: The PED/EIS air quality analysis appropriately explained the range in potential mining related emissions based on the potential maximum and minimum coal extraction levels. Table 6-3 in the draft PED/EIS showed a range of PM_{2.5} emissions of 65.9 to 200.2 tons/year. OSMRE agrees with the commenter that this is a substantial range of potential impacts. However, OSMRE used actual coal production numbers from 2006 through 2013 to determine the emissions estimates. The economic and regulatory factors driving the variation in the potential levels of coal extraction are discussed in chapter 5.

Representative Quote(s):

Corr. ID: 3222 **Organization:** TN Department of Environment and Conservation **Comment ID:** 492001
Organization Type: State Government

Representative Quote: APC notes that the emission estimation techniques for mining related particulate impacts appears reasonable as outlined in the Draft PED/EIS, but recommends that the OSMRE address that there are significant differences in the maximum and minimum extraction levels possible, which will in turn drive the likely particulate impacts observed in the Final PED/EIS and throughout potential implementation of proposed actions.

CONCERN STATEMENT: (Concern ID: 56884) Commenters suggested that the PED/EIS should reflect the additional impacts to air quality and climate change, including the impact from coal mining and impacts associated with the removal of carbon sinks along forested ridgelines, as well as the unique impacts of burning the low-quality coal from the Tennessee area.

RESPONSE: Impacts on air quality and greenhouse gas emissions from surface coal mining were discussed in detail in chapter 6 of the PED/EIS. The relationship of coal mining and combustion to climate change is also addressed in the PED/EIS (starting on page 6-444). The potential for loss of carbon sequestration provided existing forests is addressed on page 6-45 (third full paragraph).

Representative Quote(s):

Corr. ID: 3258 **Organization:** Sierra Club **Comment ID:** 494300 **Organization Type:** Conservation/Preservation

Representative Quote: Third is the decline in air quality that results from burning the coal- -particularly the high-sulfur, low quality coal from around here. It is not just the carbon dioxide, either; it is the particulates, acid rain, mercury, etc. This is the air we breathe and it contributes to TN having some of the worst health issues in the nation.

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496786 **Organization Type:** Unaffiliated Individual

Representative Quote: Comments of concern on Man-made climate impacts to North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTC): Does the draft EIS-37 address effects upon ridgelines from man-made climate changes? Because the Surface Mining and Reclamation Act of 1977 does not require coal companies to reforest the land as part their post-mining reclamation work, the ridgelines are damage from providing important weather protection to the terrain and replaced by flat fields of non-native grasses. Traditionally, East Tennessee forest has been a "wind buffer" from wind storms and its impacts in communities. Strong spring and fall rain storms and high winds have been slowdown by the protection provided by Cumberland Mountains forest ridgelines. Not only does ridgeline provide environmental protection but serves as a first line of defense to communities and farmlands. The ridgeline forest is a filler of bad air and sunlight as well. The steady disappearance of a forest system that naturally captures and holds carbon dioxide, one of the greenhouse gases responsible for climate change. So, the state of Tennessee is addressing the need to balance coal industry production and its direct and indirect impacts to Tennessee's climate. This biodiversity of the Cumberland Mountains is one of the many added-value of drawing tourists to

Tennessee and public health to the citizens that live in these communities. Coal production and biodiversity and Climate Change must be address in the final EIS. The final EIS need to address even if OSMRE wishes to omit the words "man-made" or "climate change".

WATER RESOURCES

CONCERN STATEMENT: (Concern ID: 56898) One commenter suggested that OSMRE should attempt to gather data from other water monitoring agencies, and that the Tennessee Rivers Assessment should be included in the analysis.

RESPONSE: In response to comments, OSMRE examined the Emory River Watershed water quality management plan from 2002, which referenced the Tennessee Rivers Assessment Project, however, the link to the document was no longer live and OSMRE could not find the referenced document. However, OSMRE used more recent data (2014) in assessing both the affected environment and environmental consequences on water quality. Neither older documents nor additional stream monitoring data would provide useful insight into either cumulative impacts or baseline conditions.

Furthermore, OSMRE has conducted a gross level analysis using sufficient information to provide the public and the decision-makers the necessary information for considering the environmental impacts associated with the proposed federal action. This approach was necessary because the proposed action does not identify any specific mining application for consideration. Thus, it would be impossible at this point to assess impacts on a waterbody-specific basis. It is also unclear what additional information could be provided if OSMRE assessed each of the 180 named streams in the petition area. In the event that a remaining application is received, OSMRE would conduct a multi-criteria hydrologic analysis to understand the potential for water quality impacts prior to making a decision on the application.

Representative Quote(s):

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492058 **Organization Type:** Federal Government

Representative Quote: The EPA recommends that the OSMRE include the Tennessee Rivers Assessment project in its affected environment and environmental impacts analysis. For example, in the Emory River Watershed, this State project identifies Bobs and Greasy Creeks as having Regional Significance for its Natural and Scenic Qualities. Additionally, it identifies Rock Creek as having Local Significance in its Natural and Scenic Qualities and Regional Significance for its Recreational Fishery. For the Clear Fork of the Cumberland River Watershed, this State assessment project identifies Stinking Creek as an Excellent Fishery. For the South Fork Cumberland River Watershed, this State assessment project identifies Brimstone Creek as having Statewide or greater Significance for its Natural and Scenic Qualities.⁵ Beech Fork, Puncheon Camp, Rockhouse Fork, and Smokey Creeks are identified as having Regional Significance for their Natural and Scenic Qualities.

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492060 **Organization Type:** Federal Government

Representative Quote: The EPA suggests that the OSMRE indicate whether any additional water quality monitoring stations are available to supplement its limited water quality data for the affected water resources within the study area. The OSMRE indicates it compiled and evaluated water-quality data from 29 OSMRE ambient monitoring stations and Tennessee Department of Conservation (TDEC) ambient and ecoregion monitoring stations. These 43 water-quality sampling sites are being used to represent and

evaluate a 172,000 acre (269 square mile) area, crossed by 180 named streams for approximately 643 stream miles within a complex mountainous area. In TDEC's water quality management plans for each of the 8-digit HUC watersheds overlapping the study area, it has identified other agency water-quality monitoring sites, i.e., the Corps of Engineers, the Tennessee Valley Authority, the United States Geological Survey, the National Park Service, etc. Consequently, the EPA recommends that the OSMRE determine whether any of these agency water monitoring sites could help OSMRE expand its limited water-quality data used in its analysis.

The EPA also recommends that the OSMRE identify those water bodies that have not been assessed within the study area. For example, in its Emory River Watershed Water Quality Management Plan, the TDEC reports only 47-percent of the streams have been assessed to determine their attainment with designated uses. In its Clear Fork of the Cumberland River Watershed, where the Royal Blue Management Area is located, the IDEC reports only 47-percent of the streams have been assessed to determine their attainment with designated uses. The Royal Blue WMA appears to overlap two 10-digit HUC sub-watersheds: Hickory Creek (0513010106) and Clear Fork Creek (0513010105), of the Clear Fork of the Cumberland River Watershed.

CONCERN STATEMENT: (Concern ID: 56896) One commenter stated that it should be made clear that mining is the primary cause of impairment in 303(d)-listed streams.

RESPONSE: While abandoned mine sites are the primary cause of impairment in some 303(d)-listed streams, they are not always the primary cause of such impairment. Table 4-7 provides the source of impairment for 303(d)-listed streams in the petition area, including those listed as a result of impairment due to abandoned mines.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493252 **Organization Type:** Unaffiliated Individual

Representative Quote: Summary, p. ix, 4th par. - This paragraph should clearly state that surface mining is a primary cause of impairment of the 303(d)-listed streams.

CONCERN STATEMENT: (Concern ID: 56897) One commenter suggested using the mode instead of average or median to describe contaminant levels.

RESPONSE: OSMRE agrees with the commenter that the use of the "mode" could provide additional descriptive information about the contaminant levels. However, the data used was already processed and was only provided in terms of the mean and median. The raw data was not available.

Representative Quote(s):

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492062 **Organization Type:** Federal Government

Representative Quote: The EPA suggests that the OSMRE consider using the "mode" to describe the contaminant levels that occur most often in its Table 4-8 to better illustrate the background conditions within existing mined areas. Table 4-8 of the DEIS provides the mean (average) and the median (middle value) for the various

water quality constituents for which water quality data was available. It is unclear what the average and median values represent in the context of contaminant levels associated with past mining activities. The mode may better indicate the intensity of contamination within the study area. Moreover, defining the mode as a range of contaminant values may be more informative than a single mode contaminant value.

CONCERN STATEMENT: (Concern ID: 56886) Commenters stated that the use of only one parameter (distance to nearest upstream mine feature) is not adequate to assess impacts to water resources. These commenters stated that the reference material used, Petty et al. (2010), was misapplied in the draft PED/EIS.

RESPONSE: In order to assess the impacts of a federal action under NEPA, OSMRE had to focus the impact analysis on the area where significant impacts might be expected to occur. The lack of site-specific information about where mining could occur added additional complexity to this task. In order to conduct a general analysis of water quality and downstream impacts outside the petition area, OSMRE relied on Petty et al. (2010) to select a 6.2-mile metric for measuring the downstream impacts of surface mining. OSMRE then determined the location of coal seams where mining could occur and placed a 6.2-mile radius around those areas in order to determine the area where significant impacts might be expected to occur. OSMRE recognizes that a multi-criteria approach to assessing hydrologic impacts is appropriate when considering a site-specific application for surface mining because at that point, the amount and intensity of mining is known. However, OSMRE determined that it was reasonable and appropriate to use a single criterion to measure the general impacts of this designation. OSMRE examined the literature on downstream effects from coal mining and decided that the use of Petty et al. (2010) as a gross metric was reasonable. In addition, TDEC has analyzed water quality in the New River and has documented improving water quality. Since we know that mining has occurred within the watershed, TDEC data lends general support to the use of Petty et al. (2010) and the 6.2-mile metric.

In the event that a mining application is submitted to OSMRE for review and permitting, OSMRE will conduct a thorough analysis of the potential impacts on water quality and coordinate with TDEC on Clean Water Act compliance.

Representative Quote(s):

Corr. ID: 256 **Organization:** Self **Comment ID:** 488029 **Organization Type:** Unaffiliated Individual

Representative Quote: A precautionary approach to the statement of findings in the draft PED/EIS is thus warranted in the preparation of the final PED/EIS. From the above analysis, it is apparent that adverse stream water chemistry and biota response can occur for some distance downstream and that the exact downstream distance limit of adverse stream response cannot be prescribed for all times and all events [such as 50- or 100-year rainfall events, which were not monitored by the Petty et al (2010) study]. As a consequence, it cannot be stated with certainty that "mining in the petition area would not likely significantly damage resources within Big South Fork National River and Recreation Area" (quote from p. 6-71 of the draft PED/EIS) merely because the Park is located approximately 20 river miles from the Petition Area.

To re-state, while utilizing the findings of Petty et al (2010) along with other valid information to estimate buffer areas for comparative analysis of alternatives is a reasonable approach, consideration of the "distance to the nearest upstream mine feature" (DNMF) parameter in isolation from other valid and more predictive indicators of stream impairment is not a technically valid reason for rejecting out of hand the Big South Fork National River and Recreation Area as fragile lands merely because the Park is located approximately 20 river miles from the Petition Area.

Corr. ID: 256 Organization: Self Comment ID: 488024 Organization Type: Unaffiliated Individual

Representative Quote: Further, the scope of the Petty et al (2010) study did not include examination of upstream mining effects on other biota such as mussels, fish, frogs, turtles or any number of animal species dependent upon good water quality. In short, while the "distance to the nearest upstream mine feature" (DMMF) parameter is useful, it has only limited utility and is NOT a key predictor of the cumulative effects of coal mining on downstream freshwater aquatic resources.

By itself, the "distance to the nearest upstream mine feature" (DNMF) parameter as evaluated by Petty et al (2010) could be reasonably used to state that, under the conditions and duration (2002-2003) of the macroinvertebrate study of one river watershed in West Virginia, certain macroinvertebrate biota can be adversely affected for at least (but not limited to) approximately 10 km downstream from the nearest mining feature. Petty et al (2010) do not state that other significant and adverse effects such as water chemistry degradation are predicted by the same distance parameter; instead, the analysis of covariance presented in Petty et al (2010) indicates that the best and most powerful predictors of stream impairment as measured by the study are (1) the multifactorial mining intensity index (which incorporates coal geology and mining data, watershed area land cover including extent and area of abandoned and actively mined areas for both surface and underground mines, surface elevation, dominant surface geology, coal seam and type, and coal outcrop characteristics such as length and dip angle) and (2) the combinatorial model incorporating coal geology plus mining intensity plus distance to nearest mine feature. Petty et al (2010) found that the strongest single predictive factor of stream impairment was that of the multifactorial mining intensity index first documented in the Petty et al (2010) study; NOT "distance to the nearest upstream mine feature" (DNMF).

Corr. ID: 256 Organization: Self Comment ID: 488025 Organization Type: Unaffiliated Individual

Representative Quote: Further, Petty et al (2010) do not address many other important measures of stream impairment such as populations of mussels, fish, frogs, and other important animals and plants dependent upon healthy water bodies. This is not a criticism of Petty et al (2010) but merely realistic acknowledgement of funding and time limitations for such studies; as a consequence, it is important to not stretch the Petty study findings beyond the technical boundaries of the reported research. To do otherwise is a misapplication of the Petty et al (2010) research.

Thus, while I find that that the use of Petty et al. (2010) "distance to the nearest upstream mine feature" (DNMF) parameter as a "buffer area used to analyze alternatives" by OSMRE to be a useful concept when combined with other critical parameters, DNMF is not the only parameter that is predictive of adverse downstream effects from mining in watersheds of the Eastern deciduous forest. Other variables such as conductance, acidity, SO₄, Fe, as well as dissolved metal concentrations of Mn, Al, Cr, Ni, mining intensity and coal geology are more significant in predicting where potential impacts on water quality and quantity could occur.

Corr. ID: 256 Organization: Self Comment ID: 488023 Organization Type: Unaffiliated Individual

Representative Quote: I will confine my technical comments to consideration of OSMRE's definition of a "buffer area used to analyze alternatives," defined within the 3 Volumes of the draft PED/EIS as the "average reach used in the analysis to provide a rough estimate of where potential impacts on water quality and quantity could occur" (p. 6-60). OSMRE analyses of alternatives presented in the PED/EIS relies heavily on application of this single parameter. I present evidence that use of this parameter has been misapplied in the PED/EIS assessment such that a number of the PED/EIS findings warrant re-consideration.

The source for the OSMRE "buffer area used to analyze alternatives" is the "distance to the nearest upstream mine feature" (DNMF) parameter plucked from the 2010 study of Petty et al. ("Landscape indicators and thresholds of stream ecological impairment in an intensively mined Appalachian watershed") performed over a period of years in the Cheat River watershed of north-central West Virginia and southwestern Pennsylvania by staff of West Virginia University. This single parameter of "distance to the nearest upstream mine feature" is only one of approximately 15 landscape parameters investigated by Petty et al (2010) to fulfill the authors' stated objective of constructing an index of mining intensity (MI) for application and comparison with other in-stream parameters so as to best determine which measures were the best predictors of downstream mining impacts.

Close reading of this study reveals that the "distance to the nearest upstream mine feature" (DNMF) parameter is predictive of only a few of the Petty et al (2010) measures of stream response (macroinvertebrate family richness, macroinvertebrate abundance, and the West Virginia Stream Condition Index of biotic integrity), and is not predictive of water chemistry parameters such as conductance, acidity, sulfate, and dissolved toxic metal concentrations of iron, manganese, nickel, zinc, chromium, copper, etc. Multiple linear regression relating numerous landscape attributes (including the mine position parameter DNMF) to benthic macroinvertebrate community structure determined that reliance on the "distance to the nearest upstream mine feature" (DNMF) parameter alone gave very poor congruence (R^2 of 0.03 to 0.06; an excellent fit would be to achieve an R^2 of approximately 1.0) between the observed and predicted values for several benthic macroinvertebrate metrics (total benthic macroinvertebrate family richness, Ephemeroptera/Plecoptera/Trichoptera family richness, total abundance and West Virginia Stream Condition Index). Reliance on the spatial multi-parameter index of mining intensity (MI) developed by Petty et al (2010) provided a good fit (R^2 of 0.64 to 0.71) for these same measures of biological response in the Freeport coal geology.

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493284 **Organization Type:** Unaffiliated Individual

Representative Quote: Chapter 2, p. 2-36 and Chapter 6, p. 6-71 and elsewhere - the reliance on Petty et al. 2010 to conclude adverse effects on water quality would not extend, on average, beyond 10 km downstream of mines and therefore not harm the Big South Fork NRR is inappropriate. No comparison of differences in geological, hydrological, baseline macroinvertebrate community composition, mine history or other factors between the Petty et al. West Virginia study area and the evaluation area is given, nor is a discussion of how these differences could affect predicted aquatic impacts. The number of sampling sites farther downstream than 10 km is not given by Petty et al. and therefore the robustness of a 10-km threshold is questionable. Table 5 in Petty et al. shows that, compared to other factors, distance downstream is a fairly weak predictor of downstream aquatic impacts.

Corr. ID: 3063 **Organization:** Tennessee Wildlife Resources Agency **Comment ID:** 493327
Organization Type: Unaffiliated Individual

Representative Quote: Assessment of the impact of Alternatives on surface streams and aquatic ecology OSMRE incorporates a study from West Virginia entitled "Landscape indicators and thresholds of stream ecological impairment in an intensively mined Appalachia watershed" by Petty et al. (2010) into consideration of the extent of adverse aquatic ecological impact from current and future mining in the NCWMA and ERTCE. Applications of Petty et al. (2010) are found in DEIS sections related to the impact of road construction on aquatic species (p. 2-30), potential impacts on the Big South Fork National River and Recreation Area (p. 2-36), and Impacts of Alternatives on Surface Water - Assumptions and Methodology (pp. 6-59, 6-60, 6-71 and 6-73).

Petty et al. (2010) integrate water quality data, aquatic habitat assessment, and aquatic species biological information into an impact boundary determination. Petty et al. (2010) conclude that adverse impact to aquatic ecological function diminishes as the distance from coal mining approaches 6.2 miles. This finding is specific to the West Virginia study site and likewise specific to the Kittanning and Freeport coal formations. The Final EIS should clarify that the findings of Petty et al. (2010) are useful only in suggesting that a boundary for adverse impact to aquatic ecology in an intensively mined watershed could be developed utilizing thorough integration of ample water quality, aquatic habitat, and biological information. While TWRA has no objection to the general conclusions of the assessment of impacts of the alternatives on aquatic ecology and surface streams, future misapplication of Petty et al. (2010) should be avoided.

Corr. ID: 3225 **Organization:** Tennessee Wildlife Resources Agency **Comment ID:** 494285
Organization Type: State Government

Representative Quote: II. Assessment of the impact of Alternatives on surface streams and aquatic ecology OSMRE incorporates a study from West Virginia entitled "Landscape indicators and thresholds of stream ecological impairment in an intensively mined Appalachia watershed" by Petty et al. (2010) into consideration of the extent of adverse aquatic ecological impact from current and future mining in the NCWMA and ERTCE. Applications of Petty et al. (2010) are found in DEIS sections related to the impact of road construction on aquatic species (p. 2-30), potential impacts on the Big South Fork National River and Recreation Area (p. 2-36), and Impacts of Alternatives on Surface Water - Assumptions and Methodology (pp. 6-59, 6-60, 6-71 and 6-73).

Petty et al. (2010) integrate water quality data, aquatic habitat assessment, and aquatic species biological information into an impact boundary determination. Petty et al. (2010) conclude that adverse impact to aquatic ecological function diminishes as the distance from coal mining approaches 6.2 miles. This finding is specific to the West Virginia study site and likewise specific to the Kittanning and Freeport coal formations. The Final EIS should clarify that the findings of Petty et al. (2010) are useful only in suggesting that a boundary for adverse impact to aquatic ecology in an intensively mined watershed could be developed utilizing thorough integration of ample water quality, aquatic habitat, and biological information. While TWRA has no objection to the general conclusions of the assessment of impacts of the alternatives on aquatic ecology and surface streams, future misapplication of Petty et al. (2010) should be avoided.

CONCERN STATEMENT: (Concern ID: 56887) One commenter expressed concern about the effects that acid mine drainage would have on the watersheds in the petition area and surrounding ecosystems if the impacts are not properly mitigated.

RESPONSE: OSMRE acknowledges the concerns related to acid mine drainage. However, SMCRA does not allow the issuance of a permit, whether remining or not, that is projected to result in acid mine drainage or any other permanent adverse effects to water quality (30 CFR § 816.42). Where the water quality issue cannot be resolved, OSMRE requires the operator to develop a funding mechanism to treat the water quality problem for as long as it persists (30 CFR §§ 800.14, 800.15). OSMRE discussed acid mine drainage in chapter 4 (page 4-29) and impacts to water resources from surface coal mining, including cross-ridge mining and acid mine drainage in chapter 6 (Water Resources) of the draft PED/EIS.

Representative Quote(s):

Corr. ID: 3415 **Organization:** *Not Specified* **Comment ID:** 493218 **Organization Type:** Unaffiliated Individual

Representative Quote: Cleanup of acid mine drainage to waters should be include with this petition.

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496725 **Organization Type:** Unaffiliated Individual

Representative Quote: The draft EIS-37 brings forth the much larger overview that the connecting impacts to the Tennessee water supply and water resources of the Tennessee River eastern drainage basin. Yes these concerns are beyond the scope of the petition; but still equally just as important to county, regional districts and state lawmakers of the petition area. Not only are there environmental concerns, but state of Tennessee planners and managers of the state's water supply and water resources have deep concerns of the water quality and quantity for future resource planning. Recognizing that this is not within SMCRA LUMP assessment, but it does not omit lawmakers growing concerns. The final EIS-37 must address these concerns. The state of Tennessee economic future depends upon water supply and water resources downstream from East Tennessee for it citizens and industrial recruitment; even those communities that draw from these water resources downstream. Surface coal mining impacts brings direct and indirect to the towns and cities downstream that need water supply and resources. While the world moves forward into the alternative energy age Tennessee and the United States are still living in the old fossil fuel world, we are slowing turning into a third world nation. I bet this will surprise OSMRE on how important their role is for the future of Tennesseans and the United States.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496821 **Organization Type:** Unaffiliated Individual

Representative Quote: Cross Ridge surface coal mining operations in the petition area watersheds, and the lower watersheds, could potentially impact the water quality and/or quantity of these streams which are essential to the continued existence of the unique waters and water formed features fund in the Cumberland Mountains.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496822 **Organization Type:** Unaffiliated Individual

Representative Quote: The fragile lands of the petition area would be a risk by an Cross Ridge surface coal mining operator failure to mitigate unanticipated acid or toxic mine drainage from a surface coal mining operation within the petition area. While these may be relatively unlikely occurrence, due to the preventive and mitigative requirements of SMCRA, it is an unacceptable risk because of the potential impact that untreated acid or toxic mine drainage potentially have on the important natural systems of the petition area. I agree that the degree of damage would depend on the character, intensity, and duration of the untreated acid or toxic mine drainage. In addition, the limited drill hole data available to OSM and the variability in the occurrence of acid/toxic-forming material in the watersheds increases the risk that a permitted Cross Ridge surface coal mining operation might produce significant amounts of acid/toxic material. But, even with state-of-the-art-predictive and preventive techniques, a permittee may misapply the mining operations or reclamation plan, and create AMO or chemical changes or pollutant to the watershed. These unforeseen impacts could result is long term damage the important natural systems and cultural and esthetic values of the petition area.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496816 **Organization Type:** Unaffiliated Individual

Representative Quote: -Cross Ridge surface coal mining could result in water quality alterations in parts of the petition area that do not have acid or toxic materials. Alterations can include significant increases in alkalinity, total dissolved solids, pH, resuspension of iron from previously weathered overburdens or spoils, and generation of manganese. These alterations are associated with largescale disruptions of strata interacting with ground and Cross Ridge surface waters.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496817 **Organization Type:** Unaffiliated Individual

Representative Quote: Cross Ridge surface coal mining toxic material handling plan (TMHP) associated with remining even with successful implementation of several steps, including: (1) Adequate sampling of the overburden, (2) accurate analysis of the overburden materials, (3) adequate design for handling the acid- or toxic material, and (4) effective implementation of the TMHP still have resulting in damages to the waters at discharge points. At any point in these steps, operator error can occur and potentially result in the formation toxic materials which could significantly impact the water resources of the receiving stream.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496815 **Organization Type:** Unaffiliated Individual

Representative Quote: The risks and uncertainties associated with Cross Ridge surface coal mining operations could result in adverse impacts causing damage to the fragile lands of the petition area and those watersheds. When evaluating the risk of damage to the petition area from a surface coal mining operation, OSMRE draft EIS-37 should considered the probability that a surface coal mining operation will cause damage and the impacts that could result. The record demonstrates that there are a number of uncertainties in evaluating the impacts of surface coal mining operations in such a large petition area.

CONCERN STATEMENT: (Concern ID: 56889) One commenter stated that the impacts to renewable resource lands were not adequately evaluated in the draft PED/EIS.

RESPONSE: This comment refers to the unsuitability criterion in SMCRA section 522(a)(3)(C). However, the State did not allege that the NCWMA met this criterion. Thus, the PED/EIS did not evaluate whether it was met.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496781 **Organization Type:** Unaffiliated Individual

Representative Quote: Renewable resource lands with geographic areas which contribute significantly to the long-range productivity of water supply or of food or fiber products, such lands to include aquifers and aquifer recharge areas was lightly review in the draft EIS-37.

CONCERN STATEMENT: (Concern ID: 56892) One commenter stated that reclamation of surface coal mines does not maintain the chemical, physical, and biological integrity of water resources in their original state. In addition, draft PED/EIS fails to adequately address the key points of the petitioner's

request, namely the incompatibility of surface coal mining with the restoration of the chemical, physical, and biological integrity of water resources. Furthermore, the commenter noted that individual ridgelines are unique and noted two examples of operations with reclamation problems in spite of approved reclamation plans.

RESPONSE: The commenter inaccurately characterizes the criteria evaluated to make a designation determination. The petition alleges that surface coal mining would: (1) be incompatible with existing state or local land use plans or programs (30 CFR § 762.11(b)(1)); or (2) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and aesthetic values and natural systems (30 CFR §762.11 (b)(2)). OSMRE has determined that surface coal mining in the petition area would meet both of these criteria.

OSMRE has determined that re-mining can help restore once impacted waters, a goal that is consistent with the Clean Water Act. OSMRE has also found that responsible coal mining does maintain the “chemical, physical, and biological integrity of the Nation’s waters.” Coal mine permits are not issued if OSMRE believes the site would cause material damage to the hydrologic balance outside of the permitted area (30 CFR § 816.41(a)). The PED/EIS does not permit any specific mining application, but rather considers the designation of the petition area as unsuitable for mining. OSMRE would conduct site-specific analyses, including hydrologic assessments, for any mining application it receives. We agree that each ridgeline is unique and can require ridgeline-specific reclamation plans. When or if unanticipated events occur, OSMRE will take steps to ensure that mining and reclamation will not cause material damage to the hydrologic balance outside of the permitted area.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496719 **Organization Type:** Unaffiliated Individual

Representative Quote: When you first review the Draft EIS-37 we are reminded that the Clean Water Act (CWA) is the basic federal statute for protecting surface water quality of the petition area. It calls for mining operators "to restore and maintain the chemical, physical and biological integrity of the Nation's waters" 33 USC 1251(a). Within SMCRA regulatory authority and guidelines the petitioners request protection from adverse hydrologic effects upon the petition area. Within cumulative hydrologic impact assessment (CHIA) usually provides safeguards from existing and anticipating mining activities on both the quality and quantity of ground and surface waters. With this comes SMCRA regulation of "approximate original contour" (AOC) to put ridgelines back to AOC. Petitioners claim that even with AOC the resulting configuration destroys the plan and programs and management intended for the unique "one-of-a-kind" hydrologic regime petition area. The draft EIS-37 determination fails to address the key points of the petitioners request for designation; being that surface coal mining is incompatible in terms of reclaim ability to restore and maintain the chemical, physical and biological integrity to meet protection from adverse hydrologic effects to the State of Tennessee's plans and programs and management of the petition area. Each ridgeline is unique with many different hydrologic features that offset normal reclamation plans. Examples are Zeb Mountain surface coal mining operation and the Skyline Coal Company surface coal mining operation. Each set in very different locations but still having "red flags" reclamation problems even with an approved reclamation plan. So, how do we protect the draft EIS-37 petition area?

CONCERN STATEMENT: (Concern ID: 56900) One commenter suggested designating waters within the petition area as Exceptional Tennessee Waters.

RESPONSE: The TDEC Division of Water Pollution Control, and not OSMRE, has the responsibility and jurisdiction for identification of Exceptional Tennessee Waters and Outstanding National Resource Waters within the state of Tennessee.

Representative Quote(s):

Corr. ID: 3222 **Organization:** TN Department of Environment and Conservation **Comment ID:** 491997
Organization Type: State Government

Representative Quote: According to TDEC Rule 0400-40-03.06(4)(a)(4), waters within areas designated as lands unsuitable for mining (LUM) shall be deemed Exceptional Tennessee Waters where such designation is based in whole or in part on impacts to water resource values. Since water resource values, and particularly fish habitat, are in part corollary to primary allegation (2), DWR recommends that the OSMRE state in the Final PED/EIS that streams inside the area designated as unsuitable for mining may become Exceptional Tennessee Waters.

CONCERN STATEMENT: (Concern ID: 56901) One commenter stated that minor spills can have long-term impacts on groundwater and soil.

RESPONSE: The OSMRE discusses impacts to water resources and water quality from surface coal mining in detail in chapter 6 of the PED/EIS. This discussion also includes the use of mitigation measures to comply with water quality standards and regulations. Additionally as stated in chapter 6, “it is assumed that impacts to water resources would occur but that adherence to performance standards and implementation of mitigation measures would minimize or prevent exceedances of applicable water quality criteria.” In making a determination on a lands unsuitable petition, OSMRE must assume that any permitted operation would be in compliance with the regulatory requirements (30 CFR § 764.13(b)(1) (V)). As such, permit conditions would require mitigation and contingency plans aimed at reducing the likelihood of spills and requiring clean-up if spills were to occur (30 CFR § 816.41). The PED/EIS is focused on the consideration of the petition for a lands unsuitable for mining determination. The PED/EIS does not authorize mining, and any site-specific mining application would go through a separate permitting process. As part of that process, applicants would be required to identify the potential for mining-related impacts and specify mitigation measures to eliminate, avoid, or reduce those impacts.

Representative Quote(s):

Corr. ID: 1701 **Organization:** *Not Specified* **Comment ID:** 488916 **Organization Type:** Unaffiliated Individual

Representative Quote: Even "minor" spills or contamination can contaminate ground water and soil for years to come.

FISH AND WILDLIFE AND SPECIAL STATUS SPECIES

CONCERN STATEMENT: (Concern ID: 56904) Commenters stated the PED/EIS does not adequately assess impacts to wildlife in the area, specifically bobcats and black bears.

RESPONSE: OSRME agrees with the commenter that the analysis did not include a discussion of the black bear and bobcat. Additional information and analysis has been provided in the EIS to better describe the projected impacts to more forest-dependent mammals such as the bobcat and black bear.

Representative Quote(s):

Corr. ID: 2919 **Organization:** *Not Specified* **Comment ID:** 490756 **Organization Type:** Unaffiliated Individual

Representative Quote: There is no viable reason to subject the North Cumberland Wildlife Management Area Tennessee Lands to Mining. These lands are to be managed to support the wildlife in that area and any mining will ruin the habitat for the very animals this Management Area was set up to protect.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496826 **Organization Type:** Unaffiliated Individual

Representative Quote: Comments of concern on draft EIS-37 lack of "hard look" on impacts to North Cumberland Black bears population: TWRA map. The draft EIS -37 fails to shows the impacts on the Black bear (*Ursus americanus*) population in the North Cumberlands from Cross Ridge surface mining. Black bears are one of Tennessee's states treasures mostly inhabiting Blount, Carter, Cocke, Greene, Jefferson, Johnson, Monroe, Polk, Sevier, Sullivan, Unicoi, and Washington counties along the eastern border of the state. In recent years the population has shown sufficient changes in it migration and feeding ranges into the petition area. This is illustrated by the above TWRA map above. Sightings of Black bear have recorded in the four county petition areas. The highest densities of bears reside in the Cherokee National Forest (CNF) and the Great Smokey National Park (GSMNP) are now migrating into such areas as the petition area. Since the 1970's, the number of bears has significantly increased in Tennessee. For Example, prior to 1980, the annual harvest in the state was usually less than 20 bears. Today the picture could not be more astounding. Since 2004, Tennessee's annual bear harvest has exceeded 300 animals! In 2009, a harvest of 571 bears in Tennessee set a new state record.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496828 **Organization Type:** Unaffiliated Individual

Representative Quote: Cross Ridge surface coal mining in the petition has the potential of resulting in more budgeting of state funds to address the direct and indirect impacts the Black bear population in the petition area. This directly impacts Tennessee ability to monitor Black bears migration patterns and protect tourists. The EIS-37 should add evaluation and determination assessment on this subject.

Representative Quote: Comments of concern on draft EIS-37 lack of "hard look" on impacts to North Cumberland Bobcat population: The removal of Bobcat's habitat and feeding range is not address within the draft EIS-37. SMCRA regulations allow these locations to be put at risk within the petition area without any safeguards.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496822 **Organization Type:** Unaffiliated Individual

Representative Quote: The fragile lands of the petition area would be a risk by an Cross Ridge surface coal mining operator failure to mitigate unanticipated acid or toxic mine drainage from a surface coal mining operation within the petition area. While these may be relatively unlikely occurrence, due to the preventive and mitigative requirements of SMCRA, it is an unacceptable risk because of the potential impact that untreated acid or toxic mine drainage potentially have on the important natural systems of the petition area. I agree that the degree of damage would depend on the character, intensity, and duration of the untreated acid or toxic mine drainage. In addition, the limited drill hole data available to OSM and the variability in the occurrence of acid/toxic-forming material in the watersheds increases the risk that a

permitted Cross Ridge surface coal mining operation might produce significant amounts of acid/toxic material. But, even with state-of-the-art-predictive and preventive techniques, a permittee may misapply the mining operations or reclamation plan, and create AMO or chemical changes or pollutant to the watershed. These unforeseen impacts could result in long term damage to the important natural systems and cultural and esthetic values of the petition area.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496816 **Organization Type:** Unaffiliated Individual

Representative Quote: -Cross Ridge surface coal mining could result in water quality alterations in parts of the petition area that do not have acid or toxic materials. Alterations can include significant increases in alkalinity, total dissolved solids, pH, and resuspension of iron from previously weathered overburdens or spoils, and generation of manganese. These alterations are associated with largescale disruptions of strata interacting with ground and Cross Ridge surface waters.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496817 **Organization Type:** Unaffiliated Individual

Representative Quote: Cross Ridge surface coal mining toxic material handling plan (TMHP) associated with remaining even with successful implementation of several steps, including: (1) Adequate sampling of the overburden, (2) accurate analysis of the overburden materials, (3) adequate design for handling the acid- or toxic material, and (4) effective implementation of the TMHP still have resulting in damages to the waters at discharge points. At any point in these steps, operator error can occur and potentially result in the formation toxic materials which could significantly impact the water resources of the receiving stream.

CONCERN STATEMENT: (Concern ID: 56912) One commenter suggested removing the black-capped chickadee from analysis due to lack of evidence that it is found in the area.

RESPONSE: OSMRE agrees with the commenter and has removed the reference from the document.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493275 **Organization Type:** Unaffiliated Individual

Representative Quote: p. C-11 - delete the paragraph on the Black-capped Chickadee. There are no valid records of this species outside the Blue Ridge Mountains along the Tennessee-North Carolina border and it is extremely unlikely it will be recorded in or near the evaluation area.

CONCERN STATEMENT: (Concern ID: 56913) One commenter stated that there are limitations in the eBird database used to describe species in the draft PED/EIS and suggested that these limitations should be noted. The commenter specifically suggested that OSMRE use records published in *The Migrant*, a journal of the Tennessee Ornithological Society.

RESPONSE: OSMRE used the eBird database to provide a list of birds that may be present in the petition area. We agree that it is not without its limitations, and have noted so in the PED/EIS. The commenter did not cite or reference a particular journal article from *The Migrant*. Furthermore, the commenter states that inclusion of the records is unnecessary for the analysis. The relevant appendix

represents birds that are currently documented as recently occurring in the petition area. This is adequate for the purposes of assessing impacts.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493274 **Organization Type:** Unaffiliated Individual

Representative Quote: Appendix C, p. C-10. Regarding the birds listed in the Terrestrial Special-Status Species section, it is important to note that the limitations of records in the eBird database, which, with some exceptions, include few records that are more than 5-10 years old. A more comprehensive list of birds reported in the evaluation area and adjacent areas would include records published in *The Migrant*, the journal of the Tennessee Ornithological Society, and elsewhere. The inclusion of these additional records, however, would not invalidate the descriptions of the general status of the birds in the subject area and is unnecessary for this analysis. The limitations of the eBird database should, however, be noted.

CONCERN STATEMENT: (Concern ID: 56907) Multiple commenters asserted that coal mining adversely impacts downstream water resources, which contributes to the decline of aquatic special-status species in the area. One commenter asserted that mining will impact downstream species and that coal mining is a primary cause of the decline of 33 species populations in the petition area. Another expressed concern about downstream impacts to the Big South Fork National River and Recreation Area.

RESPONSE: OSMRE assessed general impacts to downstream species and determined that downstream aquatic resources are adequately protected from surface mining within the petition area as a result of the Tennessee Responsible Mining Act, the Clean Water Act, and the Endangered Species Act. OSMRE agrees that a number of aquatic species have declined as a result of mining, as well as logging, agriculture, and development in the area. This decline is discussed by species in appendix C of the PED/EIS. To assess water-quality impacts, OSMRE considered a larger evaluation area encompassing water resources 6.2 miles downstream from areas where mining could occur. For a discussion on the use of this metric see response to Concern Statement 56886. However, it should also be noted that neither the petition nor any of the action alternatives considered in the PED/EIS authorizes any specific mining application. Future application-specific NEPA analysis would be required to ensure that the impacts are adequately analyzed and mitigated to avoid adverse impacts, including impact to downstream aquatic resources.

Representative Quote(s):

Corr. ID: 198 **Organization:** Tennessee Greenways and Trails Program **Comment ID:** 487860
Organization Type: Unaffiliated Individual

Representative Quote: Headwater sources are essential to downstream viability. Coal mining was the primary cause of decline for 33 of the 34 aquatic special-status species known to occur in the evaluation area.

Corr. ID: 2828 **Organization:** Coalition to Protect America's National Parks **Comment ID:** 490686
Organization Type: Unaffiliated Individual

Representative Quote: The impact of surface mining in the petition area on water quality downstream in BISO waters is of particular concern due to the presence of federally threatened and endangered mussel species in the New River and the Big South Fork. The Big South Fork provides habitat for seven mussel

species that are federally listed as endangered, one species that is a federal candidate for listing, and one endangered state-listed species. In addition, the U.S. Fish and Wildlife Service (FWS) has designated twenty-seven miles of the main stem of the Big South Fork and nine miles of the New River downstream from the petition area as critical habitat for three mussel species that now exist in only a few small, isolated populations. When designating critical habitat for the endangered mussel species, the FWS identified mining as an activity that could adversely modify critical habitat in a manner likely to result in jeopardy to the species through the addition of sediment and acid-mine drainage to the watershed, leading to the degradation of water quality. BISO has more federally endangered fish and imperiled mussel species than any other unit (park) in the National Park System.

Corr. ID: 3146 **Organization:** Center for Biological Diversity **Comment ID:** 493645 **Organization Type:** Unaffiliated Individual

Representative Quote: Scientific and policy literature are rife with data on the downstream consequences of surface coal mining. The harmful effects to downstream water quality and aquatic species that result from surface coal mining are increasingly well documented in the scientific literature (eg. Hitt, N.P. and D.B. Chambers. 2014. Temporal changes in taxonomic and functional diversity of fish assemblages downstream from mountaintop mining. *Freshwater Science* 33(3): 915-926; Muncy, B.L. et al. 2014. Mountaintop removal mining reduces stream salamander occupancy and richness in southeastern Kentucky (USA). *Biological Conservation* 180: 115-121; U.S. Environmental Protection Agency. 2011. *The Effects of Mountaintop Mines and Valley Fills on Aquatic Ecosystems of the Central Appalachian Coalfields*. EPA/600/R-09/138F March 2011; Pond, G.J. 2010. Patterns of Ephemeroptera taxa loss in Appalachian headwater streams (Kentucky, USA). *Hydrobiologia* 641:185-201; Gratwicke, B (ed). 2008. *Proceedings of the Appalachian Salamander Conservation Workshop*. IUCN/SSC Conservation Breeding Specialist Group: Apple Valley, MN; Black, T. R., Jones, B. K., and; Mattingly, H. T. (2013). Development and validation of habitat models for the threatened Blackside Dace, *Chrosomus cumberlandensis*, at two spatial scales. *Southeastern Naturalist*, 12(4), 27-48; Zipper, C. E., et al. (2014). Freshwater mussel population status and habitat quality in the Clinch River, Virginia and Tennessee, USA: A featured collection. *JAWRA Journal of the American Water Resources Association*, 50(4), 807-819; Johnson, B. R., Haas, A., and; Fritz, K. M. (2010). Use of spatially explicit physicochemical data to measure downstream impacts of headwater stream disturbance. *Water Resources Research*, 46(9)).

These waters are an area of unparalleled and irreplaceable biological diversity. But cumulative downstream water pollution from coal mining is contributing to the decline of freshwater mussels, fishes, crayfishes, and other species. Silt, sediment, and pollutants can be carried downstream for miles, and it is arbitrary and capricious to assume that the cumulative pollutants will stop being transported at a certain mileage from a mine. These lands should be designated as unsuitable for mining and as fragile lands to protect the sensitive species that live downstream from the negative impacts of cumulative water pollution.

Corr. ID: 3567 **Organization:** Sierra Club **Comment ID:** 495068 **Organization Type:** Conservation/Preservation

Representative Quote: I have also search for hellbender habitat in these areas.

Corr. ID: 3800 **Organization:** *Not Specified* **Comment ID:** 495562 **Organization Type:** Unaffiliated Individual

Representative Quote: In fact, the Cumberland aquatic regions contain the highest number of fish, mussel and crayfish species and the highest number of endemic fresh water fauna in North America.

CONCERN STATEMENT: (Concern ID: 56908) One commenter stated that climate change exacerbates adverse impacts of habitat loss to the green salamander and special status species.

RESPONSE: OSMRE agrees that climate change could exacerbate changes in species diversity, as discussed in the PED/EIS. The climate change analysis provided in the PED/EIS did not focus on individual species and the projected changes to their distribution unless there was recent supporting scientific literature concerning those impacts. The PED/EIS recognized that adverse impacts to habitat could disproportionately impact amphibians, which would include the green salamander. Nonetheless, OSMRE will update its analysis to include the studies on the green salamander. It should be noted, however, that none of the alternatives analyzed in the PED/EIS would authorize any specific application for mining in the petition area and that the project mining rate of the area of approximately 112 acres per year would likely continue. As the PED/EIS explains, the contribution of local surface coal mining to greenhouse gas emissions is small. Thus, the preferred alternative would have no significant impact on climate change.

Representative Quote(s):

Corr. ID: 3146 **Organization:** Center for Biological Diversity **Comment ID:** 493651 **Organization Type:** Unaffiliated Individual

Representative Quote: Climate change is predicted to lead to the extirpation of numerous species within the next 100 years. To survive a changing climate, corridors for dispersal must be present to give species the greatest chance of adaptation. Both the ridge tops and their connecting riparian corridors are of crucial importance for climate adaptation.

For example, climate change is an emerging, dire, and primary threat to the green salamander. In a study to identify the amphibians most vulnerable to climate change in the southeastern United States, Barrett et al. (2014) report that the green salamander was the most frequently identified species of concern for climate change impacts by state agency biologists (p. 286) (Barrett, K., N.P. Nibbelink, and J.C. Maerz. 2014. Identifying priority species and conservation opportunities under future climate scenarios: Amphibians in a biodiversity hotspot. *Journal of Fish and Wildlife Management* 5.2 (2014): 282-297).

Salamanders are particularly susceptible to climate change because of their restrictive physiological requirements and low vagility (Sutton et al. 2014; Sutton, W.B., et al. 2014 .Predicted Changes in Climatic Niche and Climate Refugia of Conservation Priority Salamander Species in the Northeastern United States. *Forests* 6.1 (2014): 1-26).

Sutton et al. (2014) evaluated species-specific vulnerabilities to projected climate change by the year 2050 and found that all analyzed salamander species were projected to lose a portion of their climatic niche, defined as the collective climatic patterns that regulate an organism's distribution (p. 2, 3). For the green salamander, the authors found that it likely lose 49 percent of its climatic niche by 2050 (p. 14).

Other researchers have predicted an even greater loss of habitat for the green salamander due to climate change. Barrett et al. (2014) predict that 93 percent of the green salamander's range will become climatically unsuitable by 2050 (p. 287).

Corr. ID: 3146 **Organization:** Center for Biological Diversity **Comment ID:** 493652 **Organization Type:** Unaffiliated Individual

Representative Quote: Climate change also exacerbates the negative effects of other threats to the green salamander, such as habitat degradation due to logging, mining, pipelines, or fracking. Mantyka-Pringle et

al. (2011) examined how climate change affects the negative impacts of other threat factors such as habitat loss. They found that the "most important determinant of habitat loss and fragmentation effects, averaged across species and geographic regions, was current maximum temperature, with mean precipitation change over the last 100 years of secondary importance" (p. 2). They highlight the rapid population decline of green salamanders in fragmented habitats in the southern Appalachians as an example of the synergistic effects between habitat degradation and climate change (Mantyka-Pringle et al. 2011, p. 2; Mantyka-Pringle, C. S., T.G. Martin, and J.R. Rhodes. 2011. Interactions between climate and habitat loss effects on biodiversity: a systematic review and meta-analysis. *Global Change Biology* 18(4): 1239-1252).

Researchers believe that climate change is already harming green salamanders. Corser (2001) identifies climate change and increasing summer temperatures and more variable winter temperatures specifically as a primary factor in the population crash of green salamanders in the Blue Ridge Mountains (p. 122). He also identifies a population lost to drought that contributed to total reproductive failure (p. 122; Corser, J. D. 2001. Decline of disjunct green salamander (*Aneides aeneus*) populations in the southern Appalachians. *Biological Conservation* 97:119-126). Because green salamander females only brood every other year and do not become sexual mature until age three, the number of times a female can reproduce in her lifetime is limited, which will exacerbate the negative effects of climate change on failed broods.

The threat posed to the green salamander and other species by climate change highlights the importance of protecting the ridgetops and their riparian corridors to give these special Tennessee species the best possible chance of survival into the future in the face of a changing climate.

CONCERN STATEMENT: (Concern ID: 56909) Commenters stated that this area contains sensitive habitat for special-status species, and reclamation and mitigation cannot restore this habitat to original ecological conditions. Commenters also stated that the area contains important archaeological sites which are important to Native American and pioneer history.

RESPONSE: OSMRE agrees that the petition area contains sensitive species and environments (see generally, appendix C of the PED/EIS). OSMRE also agrees that some sensitive species and environments may not be capable of being restored in meaningful timeframes. For that reason, a thorough technical review during each permit application review should be conducted with participation from several state and federal agencies to determine whether and how an operation may proceed. SMCRA and the Endangered Species Act and their implementing regulations require an assessment of critical habitat for endangered species. The Endangered Species Act also prohibits destruction of critical habitat and activities that may jeopardize the continued existence of threatened or endangered species. If a mining operation cannot avoid destroying critical habitat or may cause jeopardy to a threatened and endangered species, a permit cannot be granted. The NHPA similarly protects archaeological and cultural resources. OSMRE has consulted with the State Historic Preservation Officer to determine whether cultural resources are likely to be present within the evaluation area. The area may contain archeological resources, though no documented sites were identified during consultation with the State Historic Preservation Officer. Instead, OSMRE and the State Historic Preservation Officer agreed that consultation would occur on an application-by-application basis when specific proposed remaining footprints are identified.

Representative Quote(s):

Corr. ID: 2300 **Organization:** Not Specified **Comment ID:** 489796 **Organization Type:** Unaffiliated Individual

Representative Quote: They also harbor numerous important archaeological sites important to our understanding of Native American and pioneer history in the region, and they shelter significant ecological communities including rare and endangered species, and they are non-renewable resources that should be preserved.

Corr. ID: 2608 **Organization:** American Bird Conservancy **Comment ID:** 490130 **Organization Type:** Unaffiliated Individual

Representative Quote: American Bird Conservancy strongly supports the petitioner and supporting intervenors statements about the importance of this area for many species of birds, and the likely negative impacts coal development would have on species of conservation concern and habitats.

Corr. ID: 3146 **Organization:** Center for Biological Diversity **Comment ID:** 493640 **Organization Type:** Unaffiliated Individual

Representative Quote: Reclamation and mitigation activities cannot restore the original ecological conditions and habitat needs of sensitive species. For example, Petty et al. (2013) did not find green salamanders in reclaimed forested areas following mining mitigation activities (p. 48; Petty, J. T., et al. 2013. Ecological function of constructed perennial stream channels on reclaimed surface coal mines. *Hydrobiologia* 720.1 (2013): 39-53).

CONCERN STATEMENT: (Concern ID: 56911) Commenters stated that further loss of cerulean warbler habitat will contribute to a decline in the population, which is of particular concern due to their preference for nesting on ridgelines. One commenter stated that reclamation activities cannot replace cerulean warbler habitat (mature forest) within a biologically relevant period.

RESPONSE: OSMRE agrees with the commenters and has determined that cerulean warbler habitat located in the petition area meets the definition of fragile lands under SMCRA.

Representative Quote(s):

Corr. ID: 2213 **Organization:** American Bird Conservancy **Comment ID:** 490209 **Organization Type:** Unaffiliated Individual

Representative Quote: The cerulean warbler was proposed for listing as threatened under the Endangered Species Act. However, the USFWS determined that the listing was not warranted (USFWS 2007a). As part of the review of the species status, the USFWS identified four primary mechanisms contributing to the species decline. Each of these contributors is caused by habitat loss. 1. Reduction in available nesting sites and suitable breeding territory characteristics because of loss or degradation of habitat. 2. Reduction in foraging success resulting from decreased prey abundance, primarily on the wintering grounds in South America. 3. Increased predation throughout the species annual range and nest parasitism of cerulean warblers in their breeding grounds, resulting from habitat fragmentation. 4. Loss of migration habitat (USFWS 2007a). In Tennessee, the cerulean warbler requires large tracts of mature deciduous forests (Robbins, Fitzpatrick, and Hamel 1989).

In addition, in Tennessee these warblers are more apt to occur higher up slopes along ridgelines rather than in bottomlands (Wood, Bosworth, and Dettmers 2006) and on north- to east-facing slopes. Buehler and others (2006) found when comparing five breeding areas that three out of five areas were population sinks-areas that contain no or low populations with little increase due to poor quality habitat. In this study, the petition area was found to be one of two areas in the Cumberland Mountains capable of sustaining a

stable population in good years (Buehler et al. 2006). The authors suggested that in order to allow for a stable population, habitat loss should be minimized. (DEIS 2 - 31)

Edge effect and forest fragmentation limit cerulean warbler abundance and distribution (Wood, Bosworth, and Dettmers 2006). In a review of the literature, Wood and others (2006) found that cerulean warblers were tolerant of forest gaps such as roads, trails, and minimal silvicultural treatments, whereas they were negatively affected by extensive hard edge of reclaimed mines. The presence of a forest edge can result in increased predation, brood parasitism, and species competitions and the effect can extend up to 150 feet into the forest (Wood, Bosworth, and Dettmers 2006). In 2005, Wood and others documented lower cerulean warbler territory density adjacent to reclaimed mine edges (Wood, Bosworth, and Dettmers 2006). Wood, Bosworth, and Dettmers (2006) found that the edge effect of reclaimed mines extended over 1,000 feet into the forest.

The USFWS made a similar conclusion, stating that the introduction of hard edges may result in greater local population declines and that the continued degradation or removal of suitable mature and old-growth hardwood forestland will result in reductions in nesting opportunities, and that accumulation of habitat losses is likely to result in overall species decline (USFWS 2007a). USFWS cautioned that [e]ffects in a relatively small portion of the species range; could contribute disproportionately to the population decline (USFWS 2007a). The USFWS stated that large-scale habitat losses in the Kentucky and West Virginia from surface coal mining was predicted to occur through 2012 resulting in a 10-20% loss of the warbler population occurring in that part of its core area.

Corr. ID: 2213 **Organization:** American Bird Conservancy **Comment ID:** 490210 **Organization Type:** Unaffiliated Individual

Representative Quote: Although reclamation of surface coal mining operations is required for SMCRA-permitted sites, Welton (2014) suggests that the methods would be insufficient to replace [the] habitat in a biologically relevant timeframe. Threats to cerulean warbler habitat include forest timber activities and land clearing for other activities. The TWRA has been developing a habitat conservation plan that establishes reserves of core breeding and foraging habitat and sets management strategies above elevations of 1,800 feet, such as no harvesting more than 10% of the habitat above 2,100 feet (Welton 2014). In 2005, Buehler, Welton, and Beach (2006) estimated that the Cumberland Mountains in Tennessee provide over 80,000 hectares of potential cerulean warbler habitat.

Buehler and others studied potential warbler habitat for the Royal Blue Unit Wildlife Management Area and Sundquist Unit Wildlife Management Area, and predicted that 59% of the Royal Blue Unit was suitable habitat and that the unit could support approximately 1/3 of the Cumberland Mountains cerulean warbler populations (approximately 13,000 breeding pairs). Similarly, the study found that 50.5% of the Sundquist Unit was suitable cerulean warbler habitat that could support approximately 3,500 breeding pairs (Buehler, Welton, and Beach 2006). The study also found that the coal reserves on the Royal Blue Unit generally overlap the same area as warbler habitat. A recent study documented that of 365 cerulean warblers detected in the NCWMA, 91% of the birds and 95% of the high-density sites were located in the petition area or within 100 feet of the petition area boundary (Welton 2014). Buehler, Welton, and Beach (2006) found that the 2005 Cumberland Mountain population may compose 20% of the range-wide population. Buehler and others predict that surface coal mining could displace upwards of 8,000 breeding pairs in the NCWMA or roughly 4% of the overall species population.

The presence of this species and the importance of this particular area (breeding habitat) to the life cycle of the species in part prompted the state to identify in its draft habitat conservation plan an area of approximately 6,300 acres within the NCWMA as a high elevation conservation area, intended to reduce or prevent the adverse impacts associated with logging from adversely affecting species of concern to the

state including the cerulean warbler (Welton et al. 2012). The state also designated forest and woodland reserves encompassing almost 12,000 acres. Management in these reserves and conservation areas would be limited to invasive plant and animal control; disease, parasite and pathogen control; fire management; or other forest health concerns. The OSMRE has determined that approximately 2,800 acres of the 1,200-foot petition boundary corridors would fall within the forest high elevation conservation area. (DEIS 2 - 31, 2-32)

Corr. ID: 2213 **Organization:** American Bird Conservancy **Comment ID:** 490206 **Organization Type:** Unaffiliated Individual

Representative Quote: Relevant to the intervenors concern about important songbird habitat, the intervenors identify the presence of numerous songbird species in this area of the Northern Cumberland Plateau that are designated by Partners in Flight as priority species for conservation. Discussion of these species of concern is largely limited to information on the cerulean warbler. The intervenors contend that designation of the ridgelines in the Petition Area is essential to protect the habitat of the cerulean warbler. The intervenors cite data and a number of studies that they contend confirm the imperiled status of this bird and that directly or indirectly demonstrate the importance of the petition area in protecting this species. The intervenors conclude by stating that the Surface Mining Control and Reclamation Act regulations do not require reforestation and the [approximate original contour] provision cannot and does not recreate the ridges, steep slopes, and mature forest habitat that existed prior to mining, the serious long-term impacts of coal mining on the large blocks of mountain forests that Cerulean warblers and other wildlife require for survival are not addressed and mining in the Petition Area would be devastating for the Cerulean warbler and other vulnerable bird species; Intervenors suggest 80% of the cerulean warblers in the NCWMA fall within the State petition area and 85% of the high-density areas occur within the petition area. When this area is expanded by a 100-foot buffer, those numbers increase to 91% a 95%, respectively. (DEIS - 2-25)

Corr. ID: 3025 **Organization:** BirdWorks Consulting **Comment ID:** 493233 **Organization Type:** Unaffiliated Individual

Representative Quote: The Cerulean Warbler is the forest bird of the highest conservation concern in Tennessee and the OSMRE correctly presents evidence for why this bird deserves its special status. Tennessee Wildlife Resources Agency (TWRA) is aware of the particular responsibility it has to protect Cerulean Warbler habitat. The NCWMA and ERCA provide habitat for a significant proportion of the breeding population (Buehler et al. 2006), and within the petition area it reaches its highest breeding densities and highest breeding success found anywhere in this species' range (Welton 2014, Boves 2011). Since TWRA has management control over both of these areas, it controls the best and largest amount of Cerulean Warbler habitat of any single entity.

The continuity of forested ridges in the petition area may play an important role in the early spring. Cerulean Warblers, returning from their 2,000-mile migration from the Andes of South America, occupy the lower slopes before the emergence of leaves at higher elevations (Welton 2015). As spring advances the birds slowly move up-slope to breeding areas. Since Cerulean Warblers disproportionately nest on ridgelines (Buehler et al. 2006), it is reasonable to suspect they also use ascending ridgeline corridors in the spring. Disrupting the continuity of these ridgelines by coal mining would make some petition areas unsuitable as early spring habitat. The continuity of riparian corridors is also important as breeding habitat for Cerulean Warblers. While the majority of birds nest on higher elevation forested ridgelines, Cerulean Warblers also nest along streams in the petition area (Buehler et al. 2013, Robbins et al. 2009, Welton pers. obs.).

Corr. ID: 3105 **Organization:** Appalachian Mountains Joint Venture **Comment ID:** 493497
Organization Type: Unaffiliated Individual

Representative Quote: As noted in the OSMRE Draft EIS for this petition, research has shown that this region is a critical population center for the Cerulean Warbler, one of the AMJVs highest priority species. The core of the Cerulean Warbler range occurs within the central and southern Appalachian Mountains, and research estimates that the Cumberland Mountain population may compose 20% of the range-wide population of this species. Cerulean Warblers have continued to decline since being petitioned but found not warranted for listing in 2006 as threatened under the Endangered Species Act. Without proactive steps to address this decline, the Cerulean Warbler will likely be listed in the future, and this will have major economic and management ramifications throughout the Appalachians. The U.S. Fish and Wildlife Service lists permanent loss or degradation of mature forest breeding habitat, such as results from surface mining, as one of the primary causes of the decline of Cerulean Warbler populations. As noted in the Draft EIS, while practices to successfully reforest surface mines do exist, they are implemented at the landowners discretion, and the forest stands at these reforested sites take decades to mature into a stand suitable to support breeding Cerulean Warblers. Therefore, the breeding habitat is ecologically lost for a significant amount of time, resulting in a long-term displacement of local Cerulean Warbler populations, potentially expediting population declines.

CONCERN STATEMENT: (Concern ID: 56910) One commenter expressed support for a new biological opinion because the current one is outdated and new species have been listed since 1996.

RESPONSE: The 1996 Biological Opinion was based on a proposed action to approve and conduct surface coal mining and reclamation operations under state and federal regulatory programs pursuant to SMCRA. The scope of the current action is a determination that certain lands are unsuitable for surface coal mining. Therefore, OSMRE has not relied on the 1996 Biological Opinion in this lands unsuitable petition process. OSMRE has engaged in a separate consultation under the Endangered Species Act with the USFWS and developed an independent biological assessment for this petition action.

Representative Quote(s):

Corr. ID: 3146 **Organization:** Center for Biological Diversity **Comment ID:** 493636 **Organization Type:** Unaffiliated Individual

Representative Quote: The 1996 biological opinion that states that surface mining operations conducted in accordance with SMCRA are not likely to harm protected species or result in the destruction or adverse modification of designated or proposed critical habitat is a bogus, outdated, overly broad and illegal document, and consultation must be re-initiated. It is evident that the BiOp is not adequately protecting species because of the numerous Appalachian coalfield species that have needed to be listed or proposed for listing since the BiOp was issued including the diamond darter, Kentucky arrow darter, Big Sandy crayfish, sheepnose, spectaclecase, snuffbox, Cumberland darter, Laurel dace, Cumberland elktoe, oyster mussel, Cumberlandian combshell, purple bean, and rough rabbitsfoot.

LAND USE AND RECREATION

CONCERN STATEMENT: (Concern ID: 56931) One commenter suggested that 14 million acres of timberland were not harvested in 2012, as stated in the draft PED/EIS.

RESPONSE: The use of the word “harvested” was a typographical error. In 2012, approximately 14 million acres (or 53% of the state’s land area), was forested. This forested acreage yielded a timber harvest of 412 million cubic feet. The error has been corrected in the PED/EIS.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493259 **Organization Type:** Unaffiliated Individual

Representative Quote: 5th paragraph - The 4th sentence states that 14 million acres of timberland, 53% of the state land area, were harvested in 2012. This is factually incorrect, as only a fraction of the states timberland was harvested in 2012 (or any other single year). The same error occurs in on page 4-125.

CONCERN STATEMENT: (Concern ID: 56917) One commenter stated that the draft PED/EIS fails to assess all of the impacts to land use and recreation, including those from the rain shadow effect.

RESPONSE: Rain shadow effects result in reduced precipitation on the leeward sides of mountains. It is unclear what level of topographic change would be required to affect a rain shadow. Since mountain top removal mining is prohibited in Tennessee, and since the likely amount of surface disturbance in the petition area (approximately 112 acres per year) it is not anticipated to change under any of the alternatives analyzed, the topography of the area would not be impacted over the long-term. Reclamation of surface mining would require returning the area to the approximate original contour (30 CFR § 816.102 (a)(1)). The PED/EIS did not assess potential impacts to ridges acting as rain shadow, as the potential effects would be speculative, especially without site-specific information about where mining would occur.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496788 **Organization Type:** Unaffiliated Individual

Representative Quote: Comment of concern on the draft EIS-37 addressing Rain Shadow: Much of airborne moisture falls as rain on the windward side of ridgelines. This often means that the land on the other side of the mountain (the leeward side) gets far less rain-an effect called a "rain shadow". It is not address addressed in Cross Ridge Mining. It often produces a desert. The higher the mountain, the more pronounced the rain shadow effect is and the less likely rain will fall on the leeward side. It has a potential in impacting state of Tennessee management plans and programs of the North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTC).

CONCERN STATEMENT: (Concern ID: 56918) Commenters noted that recreation and tourism are important in this area and asserted that people might not come to the area if it is impacted by strip mining. One commenter stated that the coal mining developments have contributed to recreational opportunities in the area. Another commenter stated that many people who choose to recreate in the area do not notice mining activity.

RESPONSE: As noted in chapter 6 of the PED/EIS under the discussion of impacts to socioeconomics, across the four-county study area, non-local visitors spent approximately \$177.4 million, approximately

65% of which was in Anderson County. Together, the four counties in the study area account for approximately 1% of the non-local visitor spending in the state. In total, travel and tourism-related expenditures support 1,420 jobs in the study area, as well as \$10.4 million in state tax receipts and \$6.0 million in local tax receipts (see table 4-42 in chapter 4 of the PED/EIS). The current level of mining disturbance has coincided with 230,000 recreational visitor days in the evaluation area. The level of recreational activity in the evaluation area is anticipated to continue because the level of mining activity is expected to continue at current rates. However site-specific impacts to recreation and visitation could occur. To the extent that visitors would be discouraged from coming to the region because of continued or increased disturbance from mining activity or decreased wildlife viewing opportunities, there would be adverse impacts to recreation and tourism spending. However, because there are ample recreational opportunities in the region and because adverse impacts would be highly dependent on the location of an individual mining operation and its proximity to and visibility from areas important for recreation, the intensity of any adverse impacts of decreased visitor spending from continued mining would be uncertain.

Representative Quote(s):

Corr. ID: 2843 **Organization:** *Not Specified* **Comment ID:** 490710 **Organization Type:** Unaffiliated Individual

Representative Quote: Furthermore, the Upper Cumberland mountains are situated within a ~5 hour drive from many high population centers such as Cincinnati, Atlanta, Lexington, Louisville, Memphis, Nashville, Chattanooga etc. providing wonderful scenic country for these tourists to enjoy. If marred by strip mining I doubt many people will come and spend their tourist dollars in the area.

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496783 **Organization Type:** Unaffiliated Individual

Representative Quote: As found in the Abstract Section of the draft EIS-37, On September 30, 2010, pursuant to the Surface Mining Control and Reclamation Act (SMCRA), 30 USC§ 1272(c), the State of Tennessee filed a petition with the Office of Surface Mining and Reclamation and Enforcement (OSMRE) to designate certain lands in the State as unsuitable for surface coal mining operations. OSMRE has established its "standing" in the prior four LUMP designations in Tennessee of protecting state of Tennessee environmental resources. The state of Tennessee is not only seeking environmental protection of its natural resources, but its capital investments in the North Cumberland Wildlife Management Area (NCWMA)-comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE). The designation does not impact any current surface coal mining operations in Tennessee and its capital investment in promoting tourism in Tennessee.

Corr. ID: 3331 **Organization:** Anderson County **Comment ID:** 494364 **Organization Type:** County Government

Representative Quote: Coal mining has also positively contributed to some of Anderson County's most frequented tourism sites, specifically the Coal Creek Company's WindRock Park Trails. The 72,000 acres of trails host hundreds of ATV, motorcycles, bike and other off-road vehicle riders every weekend. Many of these trails appear on reclaimed surface mines and the development was made economically feasible by the access and haul roads built by the mining companies. Examples like WindRock prove that coal mining and tourism can work together to bring economic prosperity to rural areas of Tennessee both in the short and long term.

Corr. ID: 3791 **Organization:** *Not Specified* **Comment ID:** 496010 **Organization Type:** Unaffiliated Individual

Representative Quote: The vast majority of tourists come here for ATV riding and hunting and those kinds of sports. And I don't have an ATV. I like to hike. I prefer to hike. I like going to hiking trails; that's where I get my exercise. And, believe me, the trail heads around here, around LaFollette, Caryville, the Campbell County area, and the trail heads always have parking, they're never crowded. In fact, I was just at a trail head before I came here. I was the only one here. And when I'm out on a trail, I rarely see anybody out here.

So the vast majority of money coming from this area from tourists are not coming from bird watchers and hikers. That's just a fact. And, also, these people that are talking about some of these beautiful communities that they've been in recently, these communities that they're referring to have coal mining operations ongoing right adjacent to them, they don't even know it, they don't see them. A lot of times they're up at a higher elevation and they're not being seen. And down low elevation you see the pristine-looking areas that are adjacent to coal mining activities.

CONCERN STATEMENT: (Concern ID: 56919) One commenter voiced support for historical non-mining family homesteads and requested that individuals not lose their homes or farms.

RESPONSE: Individual homes and farms are not part of the evaluation of this petition because the petition only applies to lands that are owned or controlled by the State.

Representative Quote(s):

Corr. ID: 2370 **Organization:** Ms. **Comment ID:** 490030 **Organization Type:** Unaffiliated Individual

Representative Quote: I also support historical non-mining family homesteads in these mountains. People should not lose their homes or farms when they can be incorporated into preserving the land, wildlife and water quality.

CONCERN STATEMENT: (Concern ID: 56921) One commenter requested clarification on the type of material harvested from land within the evaluation area and on the amount of forest coverage in the area.

RESPONSE: As noted in the discussion of Socioeconomics in chapter 4 of the PED/EIS and in table 4-13 under the discussion of Land Use and Recreation, 91.05% of the of the land area within the evaluation area consists of deciduous forest, mixed forest, and evergreen forest types. The reference to 94% was a typographical error and has been corrected.

In the discussion on vegetation in chapter 4 of this EIS, we note that forest communities within the study area consist primarily of the following forest types: sugar maple-yellow poplar-basswood-buckeye, sugar maple-northern red oak-yellow poplar-black locust, and chestnut oak-black locust. Oak and yellow poplar are valuable commercial timber species in Tennessee, along with other species known to occur within the study area such as cherry and black walnut (Mercker 2007). Based on this, it is reasonable to assume that the material commercially harvested from the study area would consist predominantly of these species.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493256 **Organization Type:** Unaffiliated Individual

Representative Quote: Summary, p. x - 3rd paragraph - the second sentence states Forests alone cover more than 94% of the land area. The last paragraph on p. xi states Forests alone comprise more than 91% of the land cover. Please explain these differences.

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493257 **Organization Type:** Unaffiliated Individual

Representative Quote: Summary, p. xii - 1st paragraph, line 10 states. The annual average amount of land harvested within the evaluation area from 1968-2002 was 505 acres annually. The material harvested is not stated.

AESTHETICS

CONCERN STATEMENT: (Concern ID: 56922) Two commenters suggested that the PED/EIS acknowledge the long-term impacts to visual resources from scars on the landscape, with one commenter stating that scarred mountains would shape a negative public perception of Tennessee wilderness.

RESPONSE: OSMRE agrees that the PED/EIS should discuss the potential for long-term impacts to visual resources, and we have added this discussion to the final PED/EIS. Visual impacts vary based on whether a pre-SMCRA mine site or a reclaimed site is being viewed. However, the aesthetic impacts of surface coal mining operations are typically short-term in nature, since reclamation is required for all new mines. While some remaining may continue under the preferred alternative and cause temporary aesthetic impacts, the reclamation of abandoned highwalls throughout the petition area will provide the best opportunity to eliminate the appearance of past mining operations. Under SMCRA, each mine site is subject to post-mining land use requirements so that the site will be able to support pre-mining activities once mining has ceased (see the response to Concern Statement 56923).

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493258 **Organization Type:** Unaffiliated Individual

Representative Quote: Summary, p. xiii, 2nd paragraph - Visible, long-term scars from post-SMCRA surface mining occur in and adjacent to the evaluation area. The PDED/EIS cover photo illustrates these scars. Revise the 4th sentence to acknowledge this. The related discussion on page 4-101 should also acknowledge this.

Corr. ID: 3258 **Organization:** Sierra Club **Comment ID:** 494298 **Organization Type:** Conservation/Preservation

Representative Quote: First, there is just the esthetic issue. When I drive up I-75 headed north out of Knoxville, it is sad to see the mountains that have already been scarred- -even from a distance of several miles away. This damages the public perception of Tennessee's pristine wilderness beauty that attracts so many tourists to our state. More destruction would contribute to a public perception that Tennessee is a plundered, poverty-ridden state that should be avoided.

CONCERN STATEMENT: (Concern ID: 56923) One commenter stated that SMCRA regulations do not include provisions to adequately protect viewsheds or to assess impacts on vistas. The commenter further stated that the method of mitigating impacts to viewsheds through forest blinds is not effective for the entire year.

RESPONSE: OSMRE agrees that SMCRA does not directly require impacts to viewsheds to be considered in the evaluation of individual SMCRA permits. In general, surface coal mining operations are a temporary land use and, as such, viewsheds are not significantly adversely affected in the long term after reclamation has occurred. The post-mining use of the land, as regulated under 30 CFR § 715.13, is critical to mitigating long-term impacts. These regulations require that “all disturbed areas shall be restored in a timely manner: (1) to conditions that are capable of supporting the uses which they were capable of supporting before any mining, or (2) to higher or better uses ...” (30 CFR § 715.13(a)). The landowner or land management agency is consulted concerning post-mining uses and the post-mining land use must be compatible with adjacent land use and, where applicable, with existing local, state or federal land use policies and plans (30 CFR § 715.13(d)(1)). TWRA, as the land management agency, would have the ability to prescribe post-mining uses and restoration activities including mitigation such as forest blinds or other attempts to screen mining impacts from view. Mitigation and post-mining land use is decided on a permit-by-permit basis and is site-specific in nature. As the commenter points out, the use of forest blinds is only seasonally effective at reducing visual impacts, depending on the species used. Additional discussion has been added to chapter 6 of the PED/EIS to better describe visual impacts. For additional discussion see the response to Concern Statement 56922.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496809 **Organization Type:** Unaffiliated Individual

Representative Quote: Comments of concern on OSMRE protection of the Cumberland Trail State Park: Part of the park is its "viewshed". I do not know of any SMCRA regulations that provides full protection of ridgeline viewsheds. It is a well-known fact and not an assertion that surface coal mining could significantly damage the management plans and programs of the Cumberland State Trail's viewshed, and there are no SMCRA protections that are already in place and intended to afford parks sufficient protection from surface coal mining operations to cover this damage. Usually when such damage occurs it is written up as an "unanticipated event" and takes almost forever to be resolved by OSMRE. The NOV file at OSRME Knoxville is filled with such data per "unanticipated events" status. These viewsheds draw thousands of tourists each year to Tennessee. Within the viewsheds are unique wilderness areas for potential movie industry as well that would be harm. The value of these viewsheds is clearly illustrated in the movies "Jungle Book" and "King Kong" at Fall Creek Falls State Park and any future movie at the Civil War, Andrew Jackson, Appalachia families and Tennessee history of early settlers. The petition area is have areas almost or similar to the early 1800s.

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496757 **Organization Type:** Unaffiliated Individual

Representative Quote: Future land use is for the petition area and the Cumberland Trail so that hikers have access to areas being preserved for their natural or scenic beauty that cannot be otherwise accessed. The very remote scenic trail follows numerous sparsely populated ridge lines where the trail designers have strategically routed the trail to spectacular overlooks and scarce drinking water sources and wildlife and unique plants along the these trails. The very rugged and very scenic trail dips into remote and spectacular gorges where hikers enjoy scenic waterfalls and beautiful swimming holes. Key to this land use planning is the networking with the petition area for creating future jobs in the four county petition

areas for the recreational industry in these four counties. These concerns were not fully given a "hard look" or analyses in the draft EIS-37. The most common way OSMRE and mine operators address "viewshed vesta impacts" area by "forest blinds" (to hide the view of surface coal mining) from tourists. It is only seasonal during spring and summer because of forage. During fall and winter tourist still see nearby surface coal mining operations. So, the question of vista impacts is not fully address in the draft EIS-37. Any site visit to Cross Ridge mining operations tells you that these footpaths, old roads and stagecoach routes and wildlife and plants are lost forever. Petitioners are seeking the protection of these remaining historical fragile lands for future generations to experience. The Draft EIS-37 fails to recognize this need for protection.

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496808 **Organization Type:** Unaffiliated Individual

Representative Quote: Comments of concern on Primary allegation (2) fragile lands as described by 30 CFR § 762.5. OSMRE states it rejects the assertion that surface coal mining could significantly damage the Cumberland State Trail, as SMCRA protections are already in place and intended to afford parks sufficient protection from surface coal mining operations. This statement fails to state the assumption by OSMRE that the impacts to the surrounding "Viewsheds" of the Cumberland Trail will on be impacted. The Cumberland Trail's viewsheds are part of the ongoing planning by the Tennessee State Park System. ANY viewshed damage would impact tourism and youth educational programs and future movie industry plans to film in these areas by the Tennessee State Park System and Department of Tourism. Long Range Planning for these viewsheds must be assessed by OSMRE to meet EIS and NEPA requirements within SMCRA.

CONCERN STATEMENT: (Concern ID: 56925) One commenter suggested that noise pollution should be minimized by developing permit requirements and by monitoring noise from blasting, construction, and transportation activities.

RESPONSE: Although SMCRA or the implementing regulations have no noise criteria for operational noise levels, 30 CFR §§ 816.61 through 816.68 govern blasting and set a limit for both frequency and decibels at 30 CFR § 816.67. Maximum ground vibration limits from blasting are set in 30 CFR § 816.67 and are based on distance between the structure and the blast.

Regulations at 30 CFR § 816.62 require residential structures within ½ mile of the potential blast to be monitored 30 days before a scheduled blast. OSMRE also has its own seismographs and has performed quality assurance / quality control checks of individual blasting events.

Representative Quote(s):

Corr. ID: 1544 **Organization:** *Not Specified* **Comment ID:** 489176 **Organization Type:** Unaffiliated Individual

Representative Quote: NOISE POLLUTION: Because the state's petition area and nearby areas are widely used for recreation, and wildlife can also be adversely impacted, Noise Pollution should be minimized by developing and enforcing appropriate permit requirements. Some examples are provided below.

~ BLASTING: Within a "Soundshed" (defined below), blasting should be limited to once per day. (I believe that once a day is appropriate because, as a recreational user in the area, I would be surprised by a single blast, but I would be offended, and may avoid recreational use of the area with more frequent

blasting.) A "soundshed" for blasting would be determined by evaluating where the noise resulting from blasting decreases to a negligible decibel level (designated by the State). For example, if the noise level is acceptable at a distance of 5 miles in all directions (the "Soundshed"), then the nearest blast allowed on the same day should be 10 miles away. The actual size of the soundshed would depend on the size of the blast, topography, presence of vegetation, and other factors. Available research may support predicting the distance sound travels. Monitoring of noise levels at various distances and in various directions during the first few blasts should be implemented to confirm the size of the soundshed. Areas not typically visited by recreational users could be used to increase the area of the soundshed in certain directions.

~ CONSTRUCTION AND TRANSPORTATION: The noise from heavy equipment used to drill, excavate, load, and transport coal is continuous, and therefore much more objectionable to recreational users. The acceptable decibel level used to determine the extent of the soundshed for the equipment and vehicles should be much lower than the level used for intermittent blasting. The entire length of the transportation corridors should be considered. As described for blasting above, monitoring should be required to confirm the extent of the soundshed, and the distance to recreational use areas may be considered.

SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

CONCERN STATEMENT: (Concern ID: 56930) One commenter requested clarification regarding severance tax receipts generated by mining in the project area, and another commenter requested clarification on total money spent by visitors from outside the local area.

RESPONSE: The cited severance tax receipts and coal tonnage are provided as annual ranges from 2008 through 2014. As the "Fiscal Resources" section under Socioeconomics and Environmental Justice in chapter 4 states: "current and recent coal production (since 2008) from the evaluation area has ranged from 54,000 to 240,000 tons of coal with severance tax receipts ranging from \$54,400 to \$240,000 (see "Chapter 5: Evaluation of Coal Resources"). Anderson and Campbell counties have accounted for 200,000 to 1.2 million tons of coal since 2008." Similarly, for the severance tax receipts, the presented data is quoted as being from fiscal year 2014, so it is the total for that particular year (July 2013–2014).

To provide a better perspective on the proportion of severance tax receipts generated within the evaluation area, fiscal year 2014 severance tax receipts generated by mining in the state were \$ 6,764,757.

In terms of understanding visitor money spent in the area, the PED/EIS discussion on Recreation and Visitor Spending in chapter 4 refers to growth in visitation and visitor spending in Tennessee since 2009. This section discusses tourism and travel spending in the four-county area. Visitors from outside the local area spent \$117.4 million in 2012 according to Table 4-42

OSMRE has revised the relevant text in chapter 4 to provide clarity about these figures.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493264 **Organization Type:** Unaffiliated Individual

Representative Quote: Chapter 4, Fiscal Resources, p. 4-119, 3rd par. - Clarify whether the cited severance tax receipts and coal tonnage are annual amounts or the total since 2009. 4th par. - To gain a better perspective of the proportion of severance tax receipts generated within the evaluation area, quantify the FY2014 severance tax receipts generated by mining in the evaluation area.

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493260 **Organization Type:** Unaffiliated Individual

CONCERN STATEMENT: (Concern ID: 56927) Commenters suggested that the protection of lands as unsuitable for mining would generate more economic benefits than mining those same lands, particularly due to tourism and renewable energy jobs.

RESPONSE: Current economic conditions related to tourism are described in the PED/EIS, as are the economic benefits of coal production within the evaluation area. OSMRE used a University of Tennessee study (English et al. 2012) to provide this analysis. The analysis in the PED/EIS describes the impacts of the proposed action alternatives on tourism. While alternative 1 would contribute to mining employment and earnings in the region, possibly adversely affecting visitation and tourism in the area, there would be long-term beneficial impacts to recreation and tourism spending under alternative 4 because visitation would be encouraged and, although some disruptions and nuisances would occur outside the petition area, the recreational experience be enhanced due to the reclamation of pre-SMCRA mine sites. However, the PED/EIS states that the intensity of beneficial impacts due to increased visitor spending would be uncertain. Impacts to jobs within the renewable energy sector are not specifically discussed in the PED/EIS, but they are included within the analysis of impacts on employment in general.

Representative Quote(s):

Corr. ID: 86 **Organization:** National Parks Conservation Association **Comment ID:** 488314
Organization Type: Unaffiliated Individual

Representative Quote: The forests, ridges, and valleys of the Cumberland Plateau are far more important to the visual, ecological, and recreational value of these lands than any economic gain mining may offer. While there may be a short-term (a few years) increase in local mining employment, these gains will likely be offset by losses in tourist and recreation revenue, as well as jobs from these sectors. The economic effects are limited to a relatively small portion of the local population over a short period, but the scars will last essentially forever.

Corr. ID: 152 **Organization:** *Not Specified* **Comment ID:** 487764 **Organization Type:** Unaffiliated Individual

Representative Quote: The benefit of minerals and less than 200 jobs is meager and temporary compared to the natural beauty and the 1400 jobs supported by the tourism to see that beauty.

Corr. ID: 157 **Organization:** *Not Specified* **Comment ID:** 487771 **Organization Type:** Unaffiliated Individual

Representative Quote: Also, tourism will be utterly destroyed when the unique Cumberland forests, mountains, streams and landscape are displaced. The economy of East Tennessee relies on tourism. The loss of tourism will have an irrevocable economic hit to thousands of people.

Corr. ID: 164 **Organization:** *Not Specified* **Comment ID:** 487780 **Organization Type:** Unaffiliated Individual

Representative Quote: A much higher and more economically beneficial purpose will result from the petition: enhanced tourism in the area. The Wildlife Management Area and the Cumberland Trail provide

great and valuable tourist attractions, including multiple uses such as hiking, hunting and fishing. These features provide significant economic values which mining greatly diminishes.

Rather than opening the old mines, these sites should be carefully and completely reclaimed and protected. Doing so will enhance the current and future value and economic contribution of these lands thru tourism.

Corr. ID: 2823 **Organization:** *Not Specified* **Comment ID:** 490676 **Organization Type:** Unaffiliated Individual

Representative Quote: Recreation and tourism are a higher and better use of this area for the economic future of the region. Travel and tourism-related expenditures in the four-county area in a recent year supported 1,420 jobs as well as \$10.4 M and \$6.0 M, respectively, in state and local tax receipts. By contrast, there were 135 people employed in surface mining in the entire State of Tennessee in 2013.

Corr. ID: 2828 **Organization:** Coalition to Protect America's National Parks **Comment ID:** 490684 **Organization Type:** Unaffiliated Individual

Representative Quote: Conservation and Recreation Are the Highest and Best Uses of the Petition Area

The Coalition strongly supports the States petition and believes, in general, that it offers the most sustainable environmental and economic future for the four-county area that will be most affected by the proposed action. Numerous academic studies and land management case studies from around the United States have demonstrated that a healthy and aesthetically pleasing environment is a fundamental component of a prosperous tourism-based economy. In contrast, the adverse environmental impacts of surface mining are well known and described in detail throughout the draft PED/EIS.

The draft PED/EIS clearly documents that recreation and tourism are significantly more important than coal mining to the economy of the four-county area. Coal mining employment in Tennessee has declined sharply since 2009 (Figure 4-23). According to the Energy Information Administration, coal mining employment in Tennessee totaled 297 employees in 2013, only 135 of whom worked in surface mining (p. 4-122). English et al. 2012 estimated that if the petition were denied (as in Alternative A), between \$5 million and \$25 million would be generated in sales from coal production, which would support between 30 and 133 jobs in the four-county region (p. 6-392). On the other hand, since 2009 there has been growth in recreational visitation and visitor spending in Tennessee (p. 4-126). The four-county area draws hundreds of thousands of visitors to the region through its parks, wilderness areas, hiking, bike, horse, and off-highway vehicle trails, and other recreation resources. Visitors coming from outside of the local area spend approximately \$177.4 million annually within the four-county area. (Table 4-42, p. 4-127)

In other words, the economic value of conservation and recreation in the petition area is \$177.4 million annually, while the economic value of continued coal mining is estimated to be \$5-25 million per year. Further, the draft PED/EIS notes that surface mining would shift over time from sites within the petition area to other sites in the evaluation area without affecting the level of production. Thus, the impact of an unsuitability designation would have no long-term effect on regional economic conditions (pp. 6-397, 6-400, 6-402, 6-405, and 6-407). Given the inevitable and substantial adverse impacts of continued coal mining versus the significant and sustained economic benefits of conservation and recreation, we believe that protecting the land and rivers and streams in the area, to the extent practicable, and ensuring the continuance of the diverse outdoor recreational opportunities offered in the area should be the top priorities and fundamental drivers of the OSMRE decision-making process.

Corr. ID: 3258 **Organization:** Sierra Club **Comment ID:** 494301 **Organization Type:** Conservation/Preservation

Representative Quote: Fourth, the coal companies argue that coal brings jobs, but this claim is exaggerated because coal companies have done everything possible to lower their costs and get the coal with the fewest people possible. I read recently that nationwide, there are more jobs in the solar industry than in coal; Tennessee could have more clean jobs that are high-paying than coal jobs if we adopted sensible strategies.

Corr. ID: 3743 **Organization:** *Not Specified* **Comment ID:** 495436 **Organization Type:** Unaffiliated Individual

Representative Quote: We believe tourism to be a far more sustainable industry than mining, and believe the State of Tennessee is right to try and protect the area that brings the state \$177.4 Million per year, while providing more than 1,400 jobs.

Corr. ID: 3847 **Organization:** Pigeon Forge Department of Tourism **Comment ID:** 500158
Organization Type: Unaffiliated Individual

Representative Quote: As an organization dedicated to advancing the economic vitality of our communities through tourism and outdoor recreation, we offer our support for the State of Tennessee's petition to designate the ridgelines of the North Cumberland Wildlife Management Area unsuitable for surface mining, with an exemption for the re-mining of old sites in order to provide reclamation of dangerous and polluted abandoned mines. We feel strongly that protecting the Cumberland Plateau's mountaintops from the harmful effects of high-elevation surface mining will ensure the beauty of the ridgetops will remain for future generations and encourage sustainable economic development.

CONCERN STATEMENT: (Concern ID: 56928) Commenters suggested that the jobs created from mining in the area would be minimal.

RESPONSE: The PED/EIS acknowledges that continued surface coal mining operations outside the petition area and re-mining within the petition area would result in the same level of mining jobs as current conditions. This is based on the projection that mining would likely continue on as much as 112 acres per year.

Representative Quote(s):

Corr. ID: 7 **Organization:** *Not Specified* **Comment ID:** 487784 **Organization Type:** Unaffiliated Individual

Representative Quote: The small number of jobs that surface mining on these lands would apparently provide are not worth the devastation brought on by this practice.

Corr. ID: 164 **Organization:** *Not Specified* **Comment ID:** 487779 **Organization Type:** Unaffiliated Individual

Representative Quote: The proposed alternatives all include provision to reopen the orphan mined areas. This is justified to provide jobs and to support the area's economy. This is an invalid and misleading conclusion. In fact, the US coal industry in general is in serious decline as coal is replaced by other lower cost and renewable energy sources. This is especially true in TN where the cost of regulating the mining

industry now exceeds the state revenue it generates. Therefore, these orphaned mine areas should be reclaimed as required and no further mining activity allowed on them.

Corr. ID: 3763 **Organization:** *Not Specified* **Comment ID:** 495660 **Organization Type:** Unaffiliated Individual

Representative Quote: I believe in 2014 there was a total of two - - no, seven hundred and forty-one thousand tons of coal mined in Tennessee. You all can correct me, I believe 2013 it was a little over a million tons of coal. So we see that going down. Last year in the State of Tennessee sixteen billion dollars were generated by tourism. We see a move, there's a trend here. These areas, as many people have spoken, deserve a better economy than the mono-economy that has fed so many people with coal, but it hasn't fed everybody and it's declining. So we need to diversify, to get better economies here.

CONCERN STATEMENT: (Concern ID: 56929) Multiple commenters suggested that granting the lands unsuitable for mining petition would prevent mining on more than 7,700 acres within Anderson County, thus reducing economic benefits to that county.

RESPONSE: A shift in mining from areas within the petition area to other areas outside the petition area but within the evaluation area would result in a level of production (approximately 112 acres per year) that is anticipated to be the same as under the no-action alternative. As a consequence, the total tax receipts to the four counties would be the same as that described under the no action alternative. There would be a shift in surface mining from within the petition area to other areas within the evaluation area. Remining could also occur within the designation area under two of the proposed alternatives, including the preferred alternative. Therefore, the impacts to regional economic conditions are anticipated to be the same for the action alternatives as those described for the no-action alternative.

Representative Quote(s):

Corr. ID: 3331 **Organization:** Anderson County **Comment ID:** 494363 **Organization Type:** County Government

Representative Quote: Like our history suggests, our community has long supported all-of-the-above energy policy. This position includes and embraces coal. However, granting the Lands Unsuitable for Mining Petition as proposed by the Office of Surface Mining Reclamation and Enforcement (OSMRE) would inhibit our ability to conduct mining on more than 7,700 acres within our county. This acreage not only encompasses a large amount of coal reserves but also represents hundreds of jobs and tens of thousands of dollars of severance taxes. According to the Comprehensive Annual Financial Report from the Tennessee Comptroller of the Treasury, Anderson County has collected more than \$780,000 in taxes since 2010. These collections go to support our county school and highway systems and are an important part of our budget.

Corr. ID: 3797 **Organization:** *Not Specified* **Comment ID:** 495554 **Organization Type:** Unaffiliated Individual

Representative Quote: Another point related to that is that the reduction of long-term mining in the area may actually have an impact on the county. Does the county receive some tax money from some of the activities related to that? So there is an economic impact to restricting mining, and I don't know what that is, and I'm not certain that that's been fully explored or disclosed here.

CONCERN STATEMENT: (Concern ID: 56932) One commenter suggested that surface coal mining will not negatively impact tourism, as stated in the petition.

RESPONSE: The PED/EIS describes the potential impacts of mining on recreation if mining were to continue at its current rate into the future (refer to “Impacts of the Alternatives on Socioeconomics,” “Alternative 1: No-Action Alternative”). This analysis is based on the historic rate of mining in the petition area. The PED/EIS concludes that impacts to tourism under the no action alternatives are not likely to be because of the historic mining rate, which would not change under the action alternatives. However, the PED/EIS acknowledges that there could be locally significant impacts to recreational resources that are in close proximity to mining operations.

Representative Quote(s):

Corr. ID: 3745 **Organization:** National Mining Association **Comment ID:** 492270 **Organization Type:** Non-Governmental

Representative Quote: Finally, the petition suggests that surface coal mining operations will jeopardize tourism in the region. The petition provides no evidence of this and fails to recognize the opportunities that are generated through the reclamation process following surface coal mining operations.

CONCERN STATEMENT: (Concern ID: 56933) Two commenters suggested that mining on these lands would occur in rural areas with high poverty rates, which would negatively impact those communities. Another commenter suggested that text in the draft PED/EIS regarding low-income residents is misleading.

RESPONSE: Text revisions have been made to the Summary and the affected environment in order to provide clarity to the description of communities located within the study area. There are concentrations of low-income populations within the evaluation area. In fact, as the data shows, the entire evaluation area could be considered as low-income since the evaluation area generally exhibits a poverty rate above 20% with portions of counties within the evaluation area reflecting higher rates of poverty. Census tracts 9507, 9506, and 9753 have concentrated areas of low-income residents (ranging from 29.4 to 42%).

The analysis acknowledges that coal reserves are located in rural areas that have high rates of poverty. Specific details regarding the study area’s demographics, employment/income, and tax revenue profile are included in chapter 4 in the section “Socioeconomics and Environmental Justice” and, more precisely, in tables 4-33 through 4-37. Throughout the analysis of socioeconomic impacts contained in chapter 6, the PED/EIS acknowledges the potential impacts of continued mining on environmental justice communities. The commenter’s assertion that all tax revenues generated from the mining of coal would not be provided to the very counties that need the revenue the most is inaccurate. A shift in mining from areas within the petition area to other areas outside the petition area and within the evaluation area would result in a level of production that is anticipated to be the same as under the no-action alternative. As a consequence, the total tax receipts to the four counties would be the same as that described under no action. Remining could also occur within the designation area. Therefore, the impacts to regional economic conditions are anticipated to be the same for the action alternatives as those described for the no-action alternative.

Representative Quote(s):

Corr. ID: 25 **Organization:** Alabama A & M University **Comment ID:** 487837 **Organization Type:** Unaffiliated Individual

Representative Quote: We do the residents of these impoverished mining regions no service by reopening the mines. They need new kinds of jobs and education. Are we smart and dedicated enough to help them in this direction?

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493261 **Organization Type:** Unaffiliated Individual

Representative Quote: Summary, p. xiii, last paragraph and 1st paragraph on p. xiv - The statement There are no known concentrations of low income populations among the evaluation area is misleading. The whole area has a high poverty rate and the 1st paragraph on p. xiv suggests low income residents are concentrated in three census tracts.

Corr. ID: 3452 **Organization:** Alden Resources **Comment ID:** 495514 **Organization Type:** Business

Representative Quote: Allegation 1- Land use Plans. OSM's conclusion that the sterilization of "between 43 and 190 million tons of coal reserves is an insignificant percentage" defies - - anyone's imagination who works outside of the FEDERAL GOVERNMENT! OSM asserts in their findings that additional coal production can be developed elsewhere in the Appalachian region. This assertion is not supportable for the region where this petition is filed! The Daniel Boone National Forest is located to the north, The Fall Creek Falls Lands Unsuitable Area is located to the south, the Fern Lake Lands unsuitable area is located to the northeast, and several other areas located in the region are all off limits to coal mining either by existing laws or implicit government policy. Furthermore, given the state of the coal industry nationwide in the last 3 years, the same rationale could be applied to any coal reserve in the continental United States. Coal demand and prices are down without dispute, but the value of that natural resource must be evaluated on a longer term basis. Coal is used for many things other than power generation. Future technology may well create a demand for the very resource that OSM proposes to sterilize. When a Federal agency evaluates private property rights in view of the input of 7-9 other federal and state agencies, there is one sure loser in the outcome and that is the taxpayer.

These coal reserves are located in rural areas that have high rates of poverty. The approval of the LUM will doom these people to perpetual reliance on other lower paying jobs (if any are available at all) that cannot offer the same salary and benefits as do coal mining jobs. Additionally, all tax revenues generated from the mining of coal will be lost to the very counties that need the revenue the most. Lands Unsuitable petitions seem like a good idea to people who work in government agencies whose jobs and incomes are perpetuated by such pursuits, but they are certain economic losers to the people who live and work in the coal fields!!!

CULTURAL RESOURCES

CONCERN STATEMENT: (Concern ID: 56934) One commenter noted that there are several historic saltpeter caves in the proposed project area and that these caves were not fully evaluated in the draft PED/EIS.

RESPONSE: OSMRE consulted the Tennessee State Historic Preservation Officer to identify all previously documented cultural resources (archaeological sites and historic structures) within the petition area and none of the resources listed in the comment were identified as resources. There are likely additional resources, some of which may be these caves, which have yet to be documented due to the minimal survey of the area. Surveys for these resources would be conducted during the permitting process for any mining proposal and appropriate protective measures would be required before any mining could occur.

Representative Quote(s):

Corr. ID: 3619 **Organization:** *Not Specified* **Comment ID:** 496833 **Organization Type:** Unaffiliated Individual

Representative Quote: Comments of concern on draft EIS-37 lack of "hard look" on impacts to historic saltpeter caves: The Draft EIS-37 Chapter 6 list Indiana bats within the petition area. We assume that they are other bat populations within the petition area. Thus, how many saltpeter caves are within the petition ridgelines? It appears that the draft EIS-37 omitted any assessment dealing with historic saltpeter caves. These sites are important Civil War history sites. If bat population caves are with the petition area then it is consider a saltpeter cave. Some known saltpeter caves are: The United States Saltpeter Cave Survey, 2006, By Douglas Plemons, Reprinted with permission from the Journal of Spelean History, Vol. 41, No. 2, Issue 132 (July-December, 2007) shows:

Anderson County

Anderson Fritz Saltpeter Cave D Lake City

Anderson Sinking Spring Saltpeter Cave D Norris

Anderson Springhill Saltpeter Cave NOT Powell

Anderson Wallace Cave U Norris

Campbell County

Campbell Meredith Cave U Demory War of 1812

Campbell Murrayville Cave U Demory

Campbell New Mammoth Cave U Ivydell

Campbell Preachers (Saltpeter) Cave U Jacksboro

Morgan County

Morgan Obey Saltpeter Cave U Honey Creek

Scott County

Scott Indian Rockhouse #2 D Honey Creek

Scott Indian Rockhouse #4 D Honey Creek

I did not see anything in the Draft EIS-37 to address these "historic lands" concern within the petition assessment or effort to seek locations of other saltpeter caves within the petition area.

PUBLIC HEALTH AND SAFETY

CONCERN STATEMENT: (Concern ID: 56878) One commenter requested clarification on the use of permitted haul roads and the extent of mining related traffic on these roads.

RESPONSE: The 24.7 miles of haul roads identified in the PED/EIS reflect only active haul road permits and do not include historically permitted haul roads. Mining-related traffic anywhere in the petition or evaluation areas is currently minimal because there is very little active mining occurring in petition area. Mining traffic is expected to increase if any of the existing permits begin to produce coal or if future operations are permitted.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493263 **Organization Type:** Unaffiliated Individual

Representative Quote: Chapter 4, Public Health and Safety, p. 4-143, 1st par. - Please clarify whether approximately 24.7 miles of permitted haul roads are currently or historically permitted. Also clarify

whether, given the few operating mines in the area, there is currently mining -related traffic on these roads.

CONCERN STATEMENT: (Concern ID: 56879) One commenter voiced concern over natural hazards and the threat to public health and safety, property, the environment, and the extent to which this threat was discussed in the draft PED/EIS.

RESPONSE: OSMRE has already conducted a robust public health and safety analysis as provided in chapter 6 of the PED/EIS. However, in response to the comment, we are providing additional information on natural and mining-induced land hazards and adding a cross reference to the Earth Resources/Geology section in chapter 6 where we discuss land movement in greater detail.

Representative Quote(s):

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496780 **Organization Type:** Unaffiliated Individual

Representative Quote: natural hazard lands with geographic areas in which natural conditions exist which pose or, as a result of surface coal mining operations, may pose a threat to the health, safety or welfare of people, property or the environment, including areas subject to landslides, cave-ins, large or encroaching sand dunes, severe wind or soil erosion, frequent flooding, avalanches and areas of unstable geology was lightly review in the draft EIS-37.

COAL RESOURCES ANALYSIS

CONCERN STATEMENT: (Concern ID: 57011) One commenter stated that economic viability is impacted by the high sulfur and ash content of Tennessee coal, which makes it less likely for facilities that use coal to be able to meet Clean Air Act combustion emissions limits.

RESPONSE: OSMRE agrees with the commenter. In fact, chapter 5 of the PED/EIS states that Appalachian coal production is expected to continue in decline as existing economically recoverable reserves are depleted and as the demand for cheaper and more accessible coal from the interior and lower sulfur western coals increases.

Representative Quote(s):

Corr. ID: 86 **Organization:** National Parks Conservation Association **Comment ID:** 488313
Organization Type: Unaffiliated Individual

Representative Quote: The coals mined in Tennessee are typically high in sulfur and ash content, and are therefore less desirable for use as fuel due to the increased difficulty for users to meet current and likely future Clean Air Act combustion emissions limits. This impacts the economic viability of these coals, especially when considered against the continuing reduction in the use of coal as a fuel for industrial and electric generation facilities.

CONCERN STATEMENT: (Concern ID: 57012) One commenter voiced concern about permitting any additional surface mining in the NCWMA. The commenter stated that because of the decline in demand for coal, operators will delay remediation as long as possible, leaving tracts of polluted land.

RESPONSE: SMCRA and the implementing regulations at 30 CFR § 816.101 contain timelines for reclamation. Operators are prevented from opening a mine cut greater than 1,500 feet in length inclusive of the clearing and grubbing operation. The same regulations also require an operator to perform rough backfill and grading of the exposed cut within 60 days of contour mining and 180 days of area mining. Therefore, a coal mining operation can only create a limited amount of disturbance over both spatial and temporal scales. In addition, active operations are inspected a minimum of once per month. OSMRE inspectors are very diligent in enforcing the time and distance requirements of 30 CFR § 816.101. Finally, before any coal mining permit can be issued, an applicant must obtain a bond that is sufficient to assure the completion of the reclamation plan if the work has to be performed by OSMRE (30 USC § 1259(a)). Therefore, SMCRA provides both a mechanism to ensure that coal mining operations conduct contemporaneous reclamation, regardless of the coal market, as well as a mechanism to ensure that reclamation costs do not fall on the public in the event that an operator is not able to complete reclamation.

Representative Quote(s):

Corr. ID: 3098 **Organization:** TerraShares **Comment ID:** 493490 **Organization Type:** Unaffiliated Individual

Representative Quote: As documented by EIA, the precipitous decline in demand for coal is real and appears to be long term, if not permanent, due to world response to climate change, air and water pollution and permanent destruction of irreplaceable natural areas. In the US, this decline is occurring even without new pollution regulations that are pending and can be expected to accelerate the decline in use of coal by US utilities, many of which are rapidly closing coal fired plants, plan to close amor or all, and are replacing them with entirely new plants that use less polluting fuels and will be unsuitable for burning coal.

The trend away from coal is certain to accelerate with the virtual price parity of renewable energy. Based on technology, not extraction, RE costs will continue to decrease at a rapid rate, similar to the cost decline of computers. On the other hand, coal costs, based on extraction, acquisition of land and rights, labor costs, and increasingly difficult extractive challenges, are certain to increase.

The negative effect on coal company profits has already been dramatic, with a very large number of coal companies having already declared bankruptcy. More can be expected in the future, while those left are likely to respond by accelerating their operations to "get theirs" before the market collapses. Plenty of history in fossil fuels supports this prediction. All of which forebodes that panicked coal operators will fund extraction first and delay remediation as long as possible, if ever. Again there is plenty of history of failing industries leaving vast polluted tracts for the public to clean up. For surface extraction operators, this also would mean leaving blighted lands and habitats, in addition to toxic residues.

I urge you to not permit surface mining in the North Cumberland Wildlife Management Area.

CONCERN STATEMENT: (Concern ID: 57013) One commenter suggested that the first paragraph on page 5-79 of the draft PED/EIS should be revised to note that the Mercury and Air Toxics Standards went into effect in April of 2015, and remained in effect after the June 2015 *Utility Air Regulatory Group v. EPA* Supreme Court ruling. The commenter also noted that the discussion regarding the Mercury and

Air Toxics Standards compliance options should state that some utilities, such as the Tennessee Valley Authority (TVA), are choosing to retire certain coal units and replace them with gas generation. The commenter also suggested that the paragraph be updated to state that the final Coal Combustion Residuals rule went into effect October 19, 2015.

RESPONSE: OSMRE agrees with the suggested update and will include this additional information in chapter 5 of the final PED/EIS.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493273 **Organization Type:** Unaffiliated Individual

Representative Quote: p. 5-79, first par. - revise to note that the Mercury and Air Toxics Standards went into effect in April, 2015 and remains in effect after the June 2015 Utility Air Regulatory Group v. EPA Supreme Court ruling. Regarding the MATS compliance options, the discussion should also note that some utilities, such as TVA, are choosing to retire certain coal units and replace them with gas generation. Last bullet item - update to state that the final CCR rule went into effect October 19, 2015.

CONCERN STATEMENT: (Concern ID: 57014) One commenter stated that table 5-52 of the draft PED/EIS should give units of measurement for production and reserves, and that periods should be changed to commas to separate thousands for the Kentucky coal reserves.

RESPONSE: OSMRE does not agree with the commenter. The units of the table are stated in the table name, "Table 5-52: Regional Coal Production and Demonstrated Reserves in Million Short Tons". All other periods and commas are appropriate for the numbers being illustrated.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493272 **Organization Type:** Unaffiliated Individual

Representative Quote: Table 5-52 - give units of measurement for production and reserves. Also, it appears that periods are mistakenly used instead of commas to separate thousands for the Kentucky coal reserves.

CONCERN STATEMENT: (Concern ID: 57015) One commenter stated that there are conflicting statements about the percentage of coal produced and consumed in Tennessee in the first paragraph of page 5-72, and on page 5-69 of the draft PED/EIS.

RESPONSE: OSMRE agrees that there is an inconsistency in the numbers reported and has updated them in the final PED/EIS. Specifically the number on page 5-72 will be changed to the rounded up value of 0.03.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493271 **Organization Type:** Unaffiliated Individual

Representative Quote: p. 5-72, first par. - The statement 0.0025% of coal produced in Tennessee was consumed in Tennessee conflicts with p. 5-69, which gives this value as 0.03%.

CONCERN STATEMENT: (Concern ID: 57016) One commenter suggested that figure 5-7 on page 5-28 of the draft PED/EIS would be improved by including only actual ridgeline areas.

RESPONSE: This figure is presented to illustrate what a patch area is. The area referenced by the commenter is a ridgeline area, though not one that is part of the designation area. For specific areas proposed for designation, see figure 3-3 in chapter 3 of the PED/EIS.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493270 **Organization Type:** Unaffiliated Individual

Representative Quote: p. 5-28, Figure 5-7 - While I understand the point of this figure, the figure itself could be greatly improved if all of the (presumably) ridgeline petition areas were actually located on ridgelines. The petition area overlaid by the words Private Property, for example, is not on a ridgeline.

CONCERN STATEMENT: (Concern ID: 57017) One commenter suggested that the descriptions of mining of individual coal seams on page 5-13 of the draft PED/EIS would be improved by consistently stating whether historical and current areas were mined via underground mining, surface mining, or both techniques.

RESPONSE: OSMRE agrees with the commenter and added the word “surface” to the descriptions.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493269 **Organization Type:** Unaffiliated Individual

Representative Quote: p. 5-13 - The descriptions of the mining of the individual coal seams in this section would be improved by consistently stating whether both historical and current mining were underground, surface, or by both techniques.

CONCERN STATEMENT: (Concern ID: 57018) One commenter recommended moving the explanation on page 5-18 of the draft PED/EIS forward so that it immediately precedes table 5-1, which currently lacks context, units of measurement, and explanations of the rank codes.

RESPONSE: OSMRE agrees with the commenter. In the final PED/EIS, table 5-1 has been moved to page 5-18 and it now includes units of measurement. This table was renumbered as table 5-2 because it is now the second table in the chapter.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493268 **Organization Type:** Unaffiliated Individual

Representative Quote: Table 5-1, pp. 5-9 - 5-10 - As currently presented, this table lacks context, units of measurement, and explanations of the Rank codes. I recommend moving the explanation on p. 5-18 forward so that it immediately precedes Table 5-1.

CONCERN STATEMENT: (Concern ID: 57019) One commenter questioned whether the legend entry on page 5-71, figure 5-19 of the draft PED/EIS should be changed to ERTCE Total. The legend entry Petition Total appears to be erroneous, as the sum of NCWMA and ERTCE coal production should be equal to or greater than the values shown for NCWMA production.

RESPONSE: OSMRE agrees with the commenter. In the legend for figure 5-19 the phrase “NCWMA and ERTCE” was changed to “NCWMA/ERTCE” in the final PED/EIS.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493267 **Organization Type:** Unaffiliated Individual

Representative Quote: p. 5-71, Figure 5-19 - the legend entry Petition Total appears to be erroneous as the sum of NCWA and ERTCE coal production should be equal to or greater than the values shown for NCWA production. Should the legend entry be changed to ERTCE Total?

CONCERN STATEMENT: (Concern ID: 57020) One commenter asked for clarification of confusing text on page 5-70, 2nd paragraph of the draft PED/EIS, which includes percentages in the last sentence that do not agree with the percentages in the first two sentences.

RESPONSE: After reviewing the text on page 5-70, OSMRE has determined that discrepancy between the different percentages was an error in the draft PED/EIS. OSMRE has corrected this error in the final PED/EIS.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493266 **Organization Type:** Unaffiliated Individual

Representative Quote: p. 5-70, 2nd par. - This is confusing. The first sentence states that 4.5% of Tennessee coal was produced in the petition area in 2013. The second sentence states that 46% (% NA 21% ECE) of Tennessee coal was produced in the petition area in 2008. Then the last sentence states that between 2006 and 2013, 13 to 16% of Tennessee coal was produced in the petition area. The percentages in this last sentence do not agree with the percentages in the first two sentences.

CONCERN STATEMENT: (Concern ID: 57021) One commenter suggested a revision to the last paragraph of on page 5-70 of the draft PED/EIS to note that TVA has not burned coal mined in Tennessee for several years (reference provided). The commenter stated that the University of Tennessee, Knoxville, has recently retired its coal plant and is thus an unlikely future consumer of petition area or other coal.

RESPONSE: OSMRE has revised the paragraph to better reflect the trend in coal use as suggested by the commenter and eliminate any confusion.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493265 **Organization Type:** Unaffiliated Individual

Representative Quote: Chapter 5, Evaluation of Coal Resource, p. 5-70, last par. - Revise to note that TVA has not burned coal mined in Tennessee for several years. Its consumption of Appalachian coal has also been declining for several years. Citation: TVA 2015 Integrated Resource Plan Final Supplemental Environmental Impact Statement, Section 3.3. Available at <https://www.tva.gov/Environment/Environmental-Stewardship/Integrated-Resource-Plan>. Also note that the University of Tennessee, Knoxville, has recently retired its coal plant (as described in Knoxville-area media) and is thus an unlikely future consumer of petition area or other coal.

CONCERN STATEMENT: (Concern ID: 57023) One commenter indicated support for preventing virgin surface cuts in the petition area because it would be difficult to obtain a National Pollutant Discharge Elimination System permit for these sites.

RESPONSE: OSMRE supports limitations on disturbing virgin land within the designated petition area. Note that in addition to obtaining a SMCRA permit, an operator must also obtain a National Pollutant Discharge Elimination System permit under the Clean Water Act, which is implemented by TDEC. If TDEC indicates that a National Pollutant Discharge Elimination System permit may be difficult to obtain based on the Tennessee Antidegradation Statement, then the mining operation would likely not be permitted.

Representative Quote(s):

Corr. ID: 3222 **Organization:** TN Department of Environment and Conservation **Comment ID:** 491993 **Organization Type:** State Government

Representative Quote: DWR supports preventing virgin surface cuts in the petition area. These sites would be difficult for DWR to permit in compliance with the Tennessee Antidegradation Statement and the Tennessee Responsible Miners Act of 2009 (Public Acts 289), which prohibits the removal of coal or placement of any mine spoil or fill within 100 feet of the high water level of a stream.

CONCERN STATEMENT: (Concern ID: 57024) One commenter noted that coal production in the region is declining and the remaining coal is barely economically feasible to extract. These and other factors reduce the opportunity costs of not mining these areas.

RESPONSE: The analysis provided in chapter 5 of the PED/EIS is consistent with this comment. OSMRE has not revised the final PED/EIS in response to this comment.

Representative Quote(s):

Corr. ID: 87 **Organization:** *Not Specified* **Comment ID:** 488317 **Organization Type:** Unaffiliated Individual

Representative Quote: coal production in the Appalachian region is in secular decline. After centuries of mining, the easy to access coal is severely depleted. What remains is costly to extract and capital intensive. These resources are already barely economically feasible to extract. With the shift to electricity

production from natural gas and renewable resources coal is the clear loser. As old coal fired plants are taken offline the demand for coal will steadily drop around the world. This reduces the opportunity costs of not mining these areas.

CONCERN STATEMENT: (Concern ID: 57008) One commenter voiced concerns about cross ridge mining and achieving water quality objectives. This commenter identified multiple impacts from cross ridge mining but stated that the draft PED/EIS does not fully assess the inherent impacts that may occur from a cross ridge surface coal mining operation. The commenter expressed concern about surface coal mining operations causing significant long-term damage to affected watersheds, waters and features, and dependent ecologic resources.

RESPONSE: OSMRE agrees that cross ridge mining may cause adverse impacts to the watershed in which it occurs but notes that it is difficult to assess the level of these impacts without site-specific information. We do not know where remaining would occur under the preferred alternative. However, once a remaining application is submitted, its location, type of mining and reclamation, and other site-specific detail will be known. A thorough technical review of the application would occur with input from TDEC, Mine Safety and Health Administration, USFWS, NPS, and other pertinent state and federal agencies. The mine plan would be designed and/or modified to minimize adverse impacts within the footprint of the mine and prevent material damage to the hydrologic balance outside the permitted area.

Representative Quote(s):

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496814 **Organization Type:** Unaffiliated Individual

Representative Quote: Comments of concerns with Cross Ridge Mining to achieve water quality: I found that the draft EIS-37 does not fully assess the inherent impacts which may occur in a cross ridge surface coal mining operation in compliance with SMCRA per allowable remaining 30 CFR 701.5:

- Cross Ridge surface coal mining operations will cause removal of wildlife habitat within the mining area.
- Cross Ridge surface coal mining operations results in alterations of the soil and geologic structure.
- Cross Ridge surface coal mining operations does elevated levels of total dissolved solids in surface and ground water.
- Cross Ridge surface coal mining operations will increase sedimentation to the receiving stream from construction of drainage control structures and roads.
- Cross Ridge surface coal mining operations in the petition area and certain other parts of the petition area could have other impacts on fragile lands.
- Cross Ridge surface coal mining operations in the petition and in certain watersheds of the petition area would affect these fragile lands and could result in significant damage to the important natural systems, cultural values and esthetic values of these fragile lands.
- Cross Ridge surface coal mining operations in the petition area could cause significant damage to important natural systems of the petition area, including:
 - Cross Ridge surface mining could impact the environmental corridor inside the petition area, and its ecological and esthetic features.
 - Cross Ridge surface coal mining operations in the petition area in and outside the petition area could result in significant damage to the important esthetic values of the North Cumberland Wildlife Management Area (NCWMA)- comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone

Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE) esthetic resources; and including various overlooks, viewsheds, and gorges.

- Cross Ridge surface coal mining operations has the potential risk to significant damage important esthetic resources resulting in adversely affects to the tourist's experience and impact Tennessee economic tourism development. - Cross Ridge surface coal mining operations in the petition area could potentially cause significant damage to the important cultural values of the petition area, including recreational, educational and religious activities. - Cross Ridge surface coal mining operations potentially result in damages to important natural systems outside the petition area. - Cross Ridge surface coal mining operations potentially result in streams of certain watersheds in and outside North Cumberland Wildlife Management Area (NCWMA) comprised of the Royal Blue Wildlife Management Area, the Sundquist Wildlife Management Area, and the New River Wildlife Management Area (also known as the Brimstone Tract Conservation Easement)-and the Emory River Tracts Conservation Easement (ERTCE) petition area being damage. These watersheds, and the lower reaches of the watershed that are important natural systems because they are the primary water sources for the unique waters and water-formed features of the petition area and its stream-dependent ecologic resources. Surface coal mining operations in these watersheds could cause significant long term damage to these waters and features and dependent ecologic resources.

CONCERN STATEMENT: (Concern ID: 57010) One commenter stated the rate at which mining would occur will not result in adverse impacts to fragile lands, and suggested that OSMRE's decision should be based upon a historical rate of impacts of 112 acres per year, which would take 588 years to reach the 65,830.8 potential surface mineable acres. The commenter stated this rate would have minimal and almost unappreciable impacts. One commenter stated that the draft PED/EIS is misleading regarding the amount of mining that will occur at one time. The commenter further argued that, based on the small areas to be impacted at any given time, overall impacts would not harm fragile lands, and thus alleged that the basis for designating the entire area as unsuitable for mining is not valid.

RESPONSE: The overall rate of mining is a factor that OSMRE took into consideration when assessing the potential environmental impacts of mining within the petition area, as required by NEPA. OSMRE determined that only a portion of the petition area qualifies as fragile lands. OSMRE disagrees with the commenter's assumption that the PED/EIS is misleading. The draft PED/EIS is clear that the average disturbance rate of mining over the past 30 years is approximately 112 acres per year. That mining rate is expected to continue over the next 30 years regardless of whether or not a designation is made. OSMRE assessed the two criteria for unsuitability alleged in the petition—that surface coal mining operations — (1) are incompatible with existing state or local land use plans or programs (30 CFR § 762.11(b)(1)); and (2) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and aesthetic values and natural systems (30 CFR § 762.11 (b)(2)). These criteria are independent of one another. This means that OSMRE can make independent determinations that the petition met one or both of the criteria. In this petition, OSMRE has concluded that the entire petition area met criteria 1, while certain areas met criteria 2. As OSMRE has explained in the PED/EIS, even a small amount of mining could result in significant damage to fragile lands.

Representative Quote(s):

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492431 **Organization Type:** Unaffiliated Individual

Representative Quote: The rate at which mining would occur in the Petitioned area will not result in adverse impacts to fragile lands.

The PED/EIS evaluated six alternatives. Alternative one is the impact of not granting the Petition. OSMRE determined that based upon historical data that surface coal mining historically impacts approximately 112 acres per year within the petition area. OSMRE recognized that permitting is subject to stringent permit review and evaluation. The report at page 3-3 states that of the total petition area, there are 65,830.3 potential surface mineable acres. OSMRE did not consider the minimal and almost unappreciable impact of mining 112 acres per year in an area; rather its conclusions are directed to impact to the entire area at any given time. To mine the entire area at the historic rate of 112 acres per year would take 588 years. OSMRE's decision should be based upon impacts to 112 acres per year.

Representative Quote: The rate of surface coal mining anticipated in the next 30 years will not adversely affect the cerulean warbler habitat or the Ozark bunchflower and pale corydalis.

Unless OSMRE decided to approve 30 years of mining permits at once, which is not practical or possible, the incremental impact to the habitat of the cerulean warbler or the flowers is not a concern. As noted by OSMRE, mining anticipated in the area is approximately 112 acres per year. Over a 30 year period a total of 3,360 acres will be disturbed, but most will be in advanced stages of reclamation by that time.

The analysis ignores that OSMRE assumed 112 acres per year would be mined- -not the entire petitioned area, and also ignores that mining activities are contemporaneously reclaimed. It leaves the reader with the perception that the entire Petitioned area would be one swath of bare de-forested land with no reintroduction of native grasses or other plant species. This is inconsistent with the earlier part of the PED/EIS that specifically discusses how mining would be conducted. In short, it seems clear that wiping out the entire petitioned area at one time harms fragile land. Such a scenario will not happen and the basis for declaring the entire area as unsuitable is not valid.

CONCERN STATEMENT: (Concern ID: 56989) One commenter disagreed with the analysis of remining in chapter 6, asserting that the analysis does not focus on the petitioners' original request, and instead works solely to justify remining. The commenter stated that the analysis fails to discuss reclamation mining, fails to compare or discuss reclamation mining data versus remining data, and fails to determine if remining is economically or technically feasible.

RESPONSE: OSMRE assumes that reclamation mining is restoration of abandoned mine lands. Remining is similar except that it provides coal to offset costs in order to make reclamation economically feasible. Remining has the potential to achieve exactly what the petitioner requested by: (1) eliminating existing highwalls, and (2) reestablishing natural water flow channels. If an operation is not technically or economically feasible, or if the proposed remining operation is not compatible with the land use plan, a permit will not be issued. In making this determination, as stated above and in the final PED/EIS, OSMRE will coordinate with the state and others as appropriate. It is not necessary to compare federal trust fund reclamation data against remining data in this petition evaluation because they are separate approaches with varied objectives. Furthermore, the state indicated that it supports remining in a letter dated October 5, 2010.

Representative Quote(s):

Corr. ID: 3619 **Organization:** *Not Specified* **Comment ID:** 496835 **Organization Type:** Unaffiliated Individual

Representative Quote: The draft EIS-37 Chapter 6, Environmental Consequences, is no more than structure wording to allow surface coal mining within the petition under the assumption that "facelift" (remining) improves pre-law sites and all over has minor direct and indirect impacts. The Knoxville Field

Office's files of NOV's tell different stories of re-mining sites. Draft EIS-37, Chapter 6 omits any discussion that reclamation mining is far better than any "facelift mining" at site operations. Most surface coal mining re-mining operations expand the mining site, thus, opening the potential of "unanticipated events" at re-mining operations. The only argument against reclamation mining is that the coal industry cannot make it economically feasible and Tennessee does not get large amount of AML funding. The Chapter 6 gets away from petitioner's original request and goes off in a completely different direction of justifying re-mining. The draft EIS-37 Chapter 6 never discusses or compares Federal trust fund reclamation data against re-mining data. The one important point under SMCRA section 508(a), 515(c), 515(d) and 30 CFR 780.18 is that re-mining is more quest work to determine if re-mining will be technologically and economically feasible, under 522.(a)(2) and (5), thus petitioners were seeking lands unsuitable designation. A wider scope of ridgelines impacts in the United States draw even more concerns that we can compare data such as "A study of Ridgeline and Steep Slope Regulations in Mountain Communities Throughout the United States", by Richard Houck, June 2005. (Attachment #11)

CONCERN STATEMENT: (Concern ID: 56926) One commenter requested that an environmental study should be conducted to evaluate the ecosystem services provided by the NCWMA before any decision on the future use of the ecosystem is made.

RESPONSE: Ecosystem services can be described as benefits that society receives from the environment, such as clean water and clean air. Through its analysis in the PED/EIS on air quality, groundwater, surface water, and fish and wildlife, OSMRE has adequately studied the ecosystem and assessed the impacts of the alternatives on these resources. Thus it does not need to supplement the analysis with an ecosystem services-specific analysis, as the commenter suggests.

Representative Quote(s):

Corr. ID: 2185 **Organization:** *Not Specified* **Comment ID:** 490159 **Organization Type:** Unaffiliated Individual

Representative Quote: An environmental study must be done to evaluate the ecosystem services provided by the North Cumberland Wildlife Management Area Tennessee Lands before releasing this ecosystem to exploitation. Without knowing what we do, we run the risk of irreparable damages that the citizens of Tennessee must endure and be asked to make right later on.

CONSULTATION AND COORDINATION

CONCERN STATEMENT: (Concern ID: 57001) Multiple commenters expressed concern about the length of time allowed for review of the draft PED/EIS, stating that OSMRE did not allow sufficient time for a thorough review given the size of the document and the amount of time it took to develop.

RESPONSE: Pursuant to the National Environmental Policy Act, OSMRE is required to publish the draft PED/EIS for public comment for a period of 45 days (40 CFR § 1506.10 (c)). The initial public comment period began on December 11, 2015, and ran for 45 days. In response to public comment, the agency extended the comment period until February 26, 2016. This is sufficient time for public review of the document, as indicated by the fact that we received more than 22,000 comments.

Representative Quote(s):

Corr. ID: 76 **Organization:** *Not Specified* **Comment ID:** 488270 **Organization Type:** Unaffiliated Individual

Representative Quote: First, I would very much like to see the comment period extended. Something that has taken this long to draft and is this voluminous will need additional time to be digested.

Corr. ID: 2141 **Organization:** Plateau Properties **Comment ID:** 490021 **Organization Type:** Unaffiliated Individual

Representative Quote: The time for the public to digest this document is way too short. It's about a 5" thick document full of technical information that took 5 years to generate. The public comment period started right around the holidays at the end of 2015 with 30 days to react. That is not enough time for a good thoughtful process from all parties involved. Given the complexity, the stakeholders, time and space, I suggest this decision process be given about a year.

Corr. ID: 2540 **Organization:** Kopper Glo Mining **Comment ID:** 490065 **Organization Type:** Unaffiliated Individual

Representative Quote: I would kindly ask you to consider extending the comment period for another 180 days on the Unsuitable Lands Petition.

Corr. ID: 3133 **Organization:** Mark V Mining and Engineering, Inc. **Comment ID:** 493526 **Organization Type:** Unaffiliated Individual

Representative Quote: I would like to request that the comment period be extended for 180 days to allow adequate time to review the Draft Petition Evaluation Document/Environmental Impact Statement (PED/EIS). It took OSM over five (5) years to review the 28 page petition submitted by the State of Tennessee and generate this 1000± page PED/EIS. Forty five days is not a reasonable time frame to review such a massive document. It should also be noted that the PED/EIS document came out 10 days prior to the Christmas Holiday, when many people are off of work spending time with family and have limited time to review such a document

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492377 **Organization Type:** Unaffiliated Individual

Representative Quote: OSMRE should extend the comment period 180 days to allow time for proper evaluation and comment on the PED/EIS.

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492379 **Organization Type:** Unaffiliated Individual

Representative Quote: Despite the exceptional length of time OSMRE spent developing its PED/EIS, OSMRE is offering TMA, an Intervenor and the public a mere 45 day period to review and comment on a monumental proposal consisting of more than 1,000 pages. The timing is as ill-conceived as the proposal.

Corr. ID: 3389 **Organization:** Innovative Reclamation Technologies & Engineering Co **Comment ID:** 494800 **Organization Type:** Business

Representative Quote: OSM took over five years to reach this stage in the process, held all public meetings concerning the draft petition document and EIS in one week, and provided a mere 45 days comment period. OSM should grant at least 180 days for full evaluation of the documents and to provide complete comments concerning the ramifications of this petition.

Corr. ID: 3452 **Organization:** Alden Resources **Comment ID:** 495519 **Organization Type:** Business

Representative Quote: Finally I would request that an appropriate amount of time be allocated to allow adequate review of the findings that OSM has published. 30 days is certainly not enough time to read and review a document that exceeds 1200 pages!! OSM's review of a 500 page permit application affecting 100 acres has historically taken 1-4 years.

Corr. ID: 3754 **Organization:** *Not Specified* **Comment ID:** 495488 **Organization Type:** Unaffiliated Individual

Representative Quote: My first request is that you extend the comment period on this petition. OSM received the petition in 2010, I think it's about twenty-six pages long. They created a nine hundred page document, and they want us to review it in forty-five days. That's not realistic, and I don't think it's reasonable, and I would like to at least see another six months. That's just my request, and I think it's a reasonable request. If it takes you five years to generate it, I think you need to give us at least six months to look it over.

CONCERN STATEMENT: (Concern ID: 57002) One commenter expressed concern about the communication process, stating that communication from the petitioner and others was received and reviewed by OSMRE without proper notification to intervenors.

RESPONSE: The lands unsuitable process is an informal administrative process, during which it is proper to receive and consider all information submitted to OSMRE. Throughout this petition process, OSMRE has maintained a record consisting of all documents relating to the petition, including correspondence from the petitioners, at its Knoxville Field Office. That record is available to the public, including intervenors, for inspection, free of charge. OSMRE is under no obligation to supply intervenors a notification of every communication from the petitioner. Also, the draft PED/EIS acknowledges the September 2015 letter from Tennessee in the "Petition Background" section. All formal communications were summarized in chapter 1 of the draft PED/EIS. Additional information on the administrative record is provided in chapter 1 of the PED/EIS. Moreover, intervenors have had ample opportunity to review documents and provide comments to OSMRE through the public comment process.

Representative Quote(s):

Corr. ID: 3178 **Organization:** Tennessee Mining Association **Comment ID:** 492460 **Organization Type:** Unaffiliated Individual

Representative Quote: OSMRE reviewed and received communication from Petitioner and others without proper notification to Intervenors, including TMA. The report notes a number of communications with Petitioner that were not provided to the intervenors including TMA. There was apparently no request for input from intervenors about the practical impacts of mining limited to just re-mining areas. OSMRE relied on the 2015 SWAP without asking for Intervenor's comments. While some general stakeholder meetings were held, the process is not defensible when proper communication is not provided.

REFERENCES

CONCERN STATEMENT: (Concern ID: 56961) Commenters provided references which they suggested should be considered in this planning process, both in favor of and in opposition to the proposed petition. One commenter suggested the use of a 2010 Petty study titled "Landscape Indicators and Thresholds of Stream Ecological Impairment in an Intensively Mined Appalachian Watershed."

RESPONSE: OSMRE appreciates the additional resources and has considered them in the development of the final PED/EIS.

Representative Quote(s):

Corr. ID: 256 **Organization:** Self **Comment ID:** 488032 **Organization Type:** Unaffiliated Individual

Representative Quote: Jackson D.R. and A. P. Watson, 1977. "Disruption of nutrient pools and transport of heavy metals in a forested watershed near a lead smelter," J. Envir. Qual. 6(4): 331-338.

O'Neill, R.V., B.S. Ausmus, D.R. Jackson, R.I. Van Hook, P. Van Voris, C. Washburn and A. P. Watson, 1977. "Monitoring terrestrial ecosystems by analysis of nutrient export." Water, Air and Soil Pollution 8: 271-277.

Petty, J.T., J.B. Fulton, M.P. Strager, G.T. Merovich Jr., J.M. Stiles, and P. F. Ziemkiewicz, 2010. "Landscape indicators and thresholds of stream ecological impairment in an intensively mined Appalachian watershed." J. N. Amer. Benthol. Soc. 29 (4): 1292-1309.

Munro, J.K., R.J. Luxmoore, C.C. Begovich, K.R. Dixon, A.P. Watson, M.R. Patterson and D.R. Jackson, 1977. "Transport model to predict the movement of Pb, Cd, Zn, Cu and S through a forested watershed." pp. 45-58 in Disposal of Residues on Land: Proceedings of the National Conference on Disposal of Residues on Land. Information Transfer, Inc., Rockville, MD, 216 pp.

Corr. ID: 352 **Organization:** Mr. **Comment ID:** 489462 **Organization Type:** Unaffiliated Individual

Representative Quote: We have seen mountain top mining, rivers destroyed:
<http://www.livescience.com/51820-colorado-mine-spill-river-photos.html>

Corr. ID: 3171 **Organization:** Southern Alliance for Clean Energy **Comment ID:** 494274 **Organization Type:** Unaffiliated Individual

Representative Quote: Intervenors believe that the 2010 Petty study is an important contribution to the scientific literature on the impacts of mining on water quality and macroinvertebrates. Likewise, its use by OSM, along with other research and literature cited, to help define a "buffer area used to analyze alternatives" is appropriate. However, the Petty study cannot be read to preclude a conclusion that mining in the petition area could significantly damage the resources within BISO. The Petty study made clear that the specific stream impacts examined are dependent in part on the coal geology of the area and that field validation is essential. Petty et al., Landscape indicators and thresholds of stream ecological impairment in an intensively mined Appalachian watershed, J. North American Benthological Society, 29(4):1292-1309, at 1305-1306 (2010). In the case of BISO, there is ample evidence of the impacts of surface coal mining on the national park. See Appalachian Highlands Network Resource Brief, Water Quality Monitoring (BISO), January 2015, available at <http://science.nature.nps.gov/im/units/aphn/>. As specified in its enabling legislation, the explicit purpose for the establishment of BISO is:

"[C]onserving and interpreting an area containing unique cultural, historic, geologic, fish and wildlife, archaeological, scenic and recreational values, preserving as a natural free-flowing stream the Big South Fork of the Cumberland River, major portions of its Clear Fork and New River stems, and portions of their various tributaries for the benefit and enjoyment of present and future generations, the preservation of the natural integrity of the scenic gorges and valleys and the development of the area's potential for healthful outdoor recreation."

Corr. ID: 3617 **Organization:** *Not Specified* **Comment ID:** 496721 **Organization Type:** Unaffiliated Individual

Representative Quote: The study of contour surface coal mining goes as far back as 1975, we find in Tung, HongShoung, "Impacts of Contour Coal Mining on Stream/low, a Case Study of the New River Watershed, Tennessee." PhD, diss., University of Tennessee, 1975. (http://trace.tennessee.edu/Utk_graddiss/2530 (Attachment #1) the study of New River watershed. Tung's study provides us with potential impacts to the hydrological balance in New River before SMCRA.

Corr. ID: 3618 **Organization:** *Not Specified* **Comment ID:** 496824 **Organization Type:** Unaffiliated Individual

Representative Quote: To support the claims the state of Tennessee provided the following references: See, e.g., Statement of Reasons on Fall Creek Falls Petition, 65 F.R. 39178, 39183 (June 23, 2000).

See TDEC North Cumberlands Acquisition; Public Benefits, available at <http://tennessee.gov/environment/northcumb/benefits.shtml> (last visited August 18, 2010); see also Sustainable Forestry Conservation Easement, "Brimstone Property" at 7, 13.

See Scott County, Sundquist WMA, available at <http://www.scottcounty.com/?g=node/9> (last visited September 12, 2010); Scott County, Royal Blue WMA, available at <http://www.scottcountv.com/?g=node/8> (last visited September 12, 2010).

American Bird Conservancy, Globally Important Bird Areas in Tennessee, available at <http://www.abcbirds.org/abcprograms/domestic/sitebased/iba/tennessee.html> (last visited June 4, 2010).

See TDEC North Cumberlands Acquisition; Public Benefits, available at <http://tennessee.gov/environment/northcumb/benefits.shtml> (last visited August 18, 2010).

See TDEC, North Cumberlands Acquisition Fact Sheet, available at <http://tennessee.gov/environment/northcumb/facts.shtml> (last visited August 18, 2010) (recognizing the petition areas' recreational value for the state and local economies). 52 Fed. Reg. 18, 792.

In re. Permanent Surface Mining Regulation Litigation II, No. 79-1144 (D.D.C. 1984). See Statement of Reasons on Flat Fork LUM petition (1990) at 13 (determining that surface coal mining operations within the petition area would adversely affect the fragile lands in terms of esthetic resources, even though impacts were "short to medium term."); see also Statement of Reasons on Fall Creek Falls petition, 65 F.R. 39178, 39187 (June 23, 2000) (designating lands unsuitable because surface mining could cause "significant damage

2001 Tennessee Greenways and Trails Plan at 7-8, available at [http://www.tennessee.gov/environment/recreation/pdf/5 Greenways Plan.pdf](http://www.tennessee.gov/environment/recreation/pdf/5%20Greenways%20Plan.pdf). 30 C.F.R. § 942.762.

2001 Tennessee Green ways and Trails Plan at I 0-11, available at

http://www.tennessee.gov/environment/recreation/pdf/5_Greenways_Plan.pdf

Id. At 20.

Statement of Reasons on Fall Creek Falls petition, 65 F.R. 39 17;, 39187 (June 23, 2000).

Id.

Id.

see Id.

Statement of Reasons for Petition to Designate Certain Lands in the Flat Fork Watershed, Tennessee, as Unsuitable for Surface Coal Mining Operations (24 April 1990).

Id. at 9-10.

Undoubtedly both the Fall Creek Falls and the Flat Fork designations were made assuming that OSM would follow its own regulations implementing §522(e).

Statement of Reasons on Flat Fork LUM petition, at 13 (1990).

30 C.F.R. § 762.5.

2006 SOR at 19.

See The Cumberland Trail Conference Guide to the Cumberland Trail, available at <http://www.cumberlandtrail.org/> (last visited September 20, 2010).

The Alliance for the Cumberlands, The Cumberland Plateau Heritage Corridor: Feasibility Study and Assessment of Impacts for National Heritage Corridor Designation (2006), available at

<http://www.tennessee.gov/environment/recreation/cumberlandplateau.pdf>.

Corr. ID: 3675 **Organization:** Center for Biological Diversity **Comment ID:** 495133 **Organization Type:** Conservation/Preservation

Representative Quote: References:

www.globalchange.gov/usimpacts, cosponsored by US Dept of State

Elizabeth Kolbert, /The 6th Extinction: An Unnatural History/ (NY: Henry Holt, 2014)

Corr. ID: 3755 **Organization:** *Not Specified* **Comment ID:** 495497 **Organization Type:** Unaffiliated Individual

Representative Quote: If you would go to ilovemountains.org, you will find websites that tract coal and the kind of health statistics that go with coal mining communities.

Corr. ID: 3834 **Organization:** *Not Specified* **Comment ID:** 496281 **Organization Type:** Unaffiliated Individual

Representative Quote: I would like to provide technical comments in consideration of OSMRE's definition of a buffer area used to analyze alternatives, as defined within the three volumes of the draft EIS, as the, quote, average reach used in the analysis to provide a rough estimate of where potential impacts on water quality and quantity could occur. That's defined on page 660. OSM analysis of alternatives presented in EIS relies heavily on application of this single parameter. I present evidence that use of this parameter has been misapplied in the PED/EIS assessment such that a number of the PED/EIS findings warrant reconsideration.

The source for the OSM buffer area used to analyze alternatives is the distance to the nearest upstream mine feature parameter that's been plucked from the 2010 study of Petty et al. The title of that is, landscape indicators and thresholds of stream ecological impairment in an intensively mined Appalachian

watershed. This study was performed over a period of years in the Cheat River watershed of north central West Virginia and southwestern Pennsylvania by staff of the West Virginia University. This single parameter, of distance nearest upstream mine feature, is only one of approximately fifteen landscape parameters investigated by Petty to fulfill the author's state objective of constructing an index of mining intensity for application and comparison with other in-stream parameters so as to best determine which measures were the best predictors of downstream mining impacts

Close reading of this well-conducted study, reveals that the distance to the nearest upstream mine feature parameter is predictive of only a few of the Petty measures of stream response, regarding primarily macroinvertebrate biota population in the stream. That parameter is not predictive of water chemistry parameters, such as conductance, acidity, sulfates and dissolved toxic metal concentrations of iron, manganese, nickel, zinc, chromium, copper and others. Further, the scope of the Petty study did not include examination of upstream mining effects on other biota, such as mussels, fish, frogs, turtles or any number of animal species dependent upon good water quality.

Corr. ID: 256 **Organization:** Self **Comment ID:** 488032 **Organization Type:** Unaffiliated Individual

Representative Quote: Jackson D.R. and A. P. Watson, 1977. "Disruption of nutrient pools and transport of heavy metals in a forested watershed near a lead smelter," J. Envir. Qual. 6(4): 331-338.

O'Neill, R.V., B.S. Ausmus, D.R. Jackson, R.I. Van Hook, P. Van Voris, C. Washburn and A. P. Watson, 1977. "Monitoring terrestrial ecosystems by analysis of nutrient export." Water, Air and Soil Pollution 8: 271-277.

Petty, J.T., J.B. Fulton, M.P. Strager, G.T. Merovich Jr., J.M. Stiles, and P. F. Ziemkiewicz, 2010. "Landscape indicators and thresholds of stream ecological impairment in an intensively mined Appalachian watershed." J. N. Amer. Benthol. Soc. 29 (4): 1292-1309.

Munro, J.K., R.J. Luxmoore, C.C. Begovich, K.R. Dixon, A.P. Watson, M.R. Patterson and D.R. Jackson, 1977. "Transport model to predict the movement of Pb, Cd, Zn, Cu and S through a forested watershed." pp. 45-58 in Disposal of Residues on Land: Proceedings of the National Conference on Disposal of Residues on Land. Information Transfer, Inc., Rockville, MD, 216 pp.

Corr. ID: 3675 **Organization:** Center for Biological Diversity **Comment ID:** 495133 **Organization Type:** Conservation/Preservation

EDITORIAL

CONCERN STATEMENT: (Concern ID: 57003) Multiple commenters stated that clarification is needed as to whether or not OSMRE is rejecting the state's fragile lands allegation. One commenter suggested an edit to the Conclusion section of chapter 2 to clarify the misunderstanding and to clearly indicate that the petition area meets the definition of fragile lands. One commenter stated that OSMRE references 30 CFR § 762.10, but the commenter was unable to find the regulatory section at 30 CFR § 762.10.

RESPONSE: OSMRE reviewed the various sections identified by the commenters. OSMRE agrees that the PED/EIS was unclear on this point. After reevaluating the record, OSMRE confirmed that certain portions of the petition area meet the regulatory definition of "fragile lands." The remaining lands within the petition area do not meet the regulatory definition of "fragile lands." We have revised the language in the PED/EIS in chapter 2 to better reflect this overall conclusion. Additionally, the reference to 30 CFR § 762.10 was a typographical error. The correct citation is 30 CFR § 762.5.

Representative Quote(s):

Corr. ID: 2996 **Organization:** League of Women Voters of Tennessee **Comment ID:** 490885
Organization Type: Unaffiliated Individual

Representative Quote: Finally, OSMRE's analysis of the petition's claim that the proposed area contains "fragile lands" seems very confusing because in the Conclusion OSMRE seems to be saying that it does not agree that the proposed area is "fragile lands", yet in another part of the DEIS, specifically p. 2-33, OSMRE does agree that the proposed area qualifies for the designation of "fragile lands". The League urges OSMRE to correct this error in the FEIS and conclude that the petition area does contain valuable habitat for fish and wildlife and that further mining could cause significant damage to that habitat thus qualifying the area as "fragile lands".

Corr. ID: 3229 **Organization:** *Not Specified* **Comment ID:** 494289 **Organization Type:** Unaffiliated Individual

Representative Quote: As you recommended, I reviewed the details of your analyses of the state's allegations (Vol. 1, Chapter 2) and, I am glad to say, I think I finally understand OSMRE's positions. As I mentioned to you and several other OSMRE staff and/or contractors, a majority of the people participating in the public meetings apparently thought OSMRE was rejecting the petitioners' "fragile lands" allegation. I believe this misunderstanding is primarily due to the last sentence, underlined and bracketed below, in the "Conclusion" section of the document. Incidentally, removing the last sentence will also remove the typographical citation error 30 CFR § 762.10.

I respectfully suggest that the following changes to the "Conclusion" sections would clarify the apparent misunderstandings:

- 1) Remove the last sentence (underlined and bracketed below).
- 2) Add the additional critical habitats portion of the 30 CFR § 762.5 "fragile lands" definition (underlined below).
- 3) Change the underlined portion of the second sentence to read "Thus, the petition area meets the definition of fragile lands as described by 30 CFR § 762.5."

Corr. ID: 3230 **Organization:** *Not Specified* **Comment ID:** 494290 **Organization Type:** Unaffiliated Individual

Representative Quote: The OSMRE rejects the state's claim that the petition area qualifies as "fragile lands" and references 30 CFR 762.10 as the basis for their rejection of the state's claim. I cannot find a section 10 in the current (?) version of Title 30, Part 762 ????. Could you please direct me, preferably with a link, to the version of Part 762 that includes a section 762.10?

I attended the first public hearing in our area and spoke with several of the OSM staff about both the reference and the apparent contradiction in their Analysis Conclusions section regarding the "fragile lands" designation. It is still not really clear whether or not OSM is rejecting the state's "fragile lands" position or not. They have asked me to point that out in my comments, which I will do.

CONCERN STATEMENT: (Concern ID: 57004) One commenter suggested adding Volume indicators to the Table of Contents and adding a Table of Contents to Volumes II and III.

RESPONSE: OSMRE will add volume indicators and Tables of Contents to Volumes II and III.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493280 **Organization Type:** Unaffiliated Individual

Representative Quote: Table of Contents - To make the document more reader-friendly, add Volume indicators to the Table of Contents. Also add Tables of Contents to Volumes II and III.

CONCERN STATEMENT: (Concern ID: 57005) One commenter noted that table 3-4 and table ES-4 lack information to facilitate comparison between the alternatives.

RESPONSE: The two tables referenced by the commenter are meant for summary comparison only and should not be relied on to provide the levels of detail necessary to compare the different alternatives. We suggest that the reader review chapter 6 and associated appendices, which provide much greater detail, as required by NEPA, on the various alternatives.

Representative Quote(s):

Corr. ID: 3018 **Organization:** *Not Specified* **Comment ID:** 493276 **Organization Type:** Unaffiliated Individual

Representative Quote: Chapter 3, Table 3-4 (and the identical Table ES-4)

- Many of the resource x alternative cell entries lack information necessary to make comparisons among the alternatives. Such information could include quantitative information (already used for some resources such as Fish and Wildlife) or, lacking quantitative information, a more subjective ranking of the alternatives.

CONCERN STATEMENT: (Concern ID: 57006) One commenter suggested corrections to the apparent inconsistencies in acreage excluded from surface mining provided in chapters 5 and 6 for alternatives 2–6; the available remaining acres provided in chapters 3 and 6 for alternatives 2–6; the miles of highwalls provided in chapters 3, 4, and 6 for alternatives 1, 3, and 4; and the surface mining acres protected under alternatives 2, 3, 4, 5, and 6.

RESPONSE: OSMRE reviewed all of the acreage calculations and updated them, as appropriate, in the final PED/EIS. However, some of the suggested inconsistencies are based on measuring different things. In terms of highwalls, the different numbers reflect the total miles of highwall in the evaluation area compared to the total number of highwalls within the different alternatives. It is further delineated by the miles of highwall that could then be expected to be reclaimed, as they possess suitable coal resources, for alternatives that allow remaining and reclamation. OSMRE added some clarifying text; however, the numbers are correct as reported. In addition, OSMRE has confirmed the numbers reported concerning mining exclusions and the difference between chapters. In most cases the numbers are measuring different things. For example, remaining areas projected in table 3-2 represent the maximum potential acreage available for surface mining and remaining; whereas the remaining estimates cited in chapter 6 focus on those remaining areas that fall within tier 1 priority habitat. In another example, table 5-23 referenced in the comment reflects the total mineable and augerable coal resources excluded by both the petition area and patch areas for alternative 2 as 54,797 acres. Whereas chapter 6 states that approximately 22,122 acres of surface mineable and augerable coal resources would be designated in the petition area under that alternative, this number does not include acreage associated with patch areas outside the petition area described in chapter 5.

Representative Quote(s):

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492064 **Organization Type:** Federal Government

Representative Quote: The EPA recommends that the OSMRE address the apparent inconsistencies in miles of highwalls provided in Chapters 3, 4, and 6 for three of the alternatives. For Alternative 1, the linear extent of highwalls has been characterized as 183.7, 201.6 miles, and 390 miles. For Alternative 3, the linear extent of highwalls has been characterized as 102 miles and 201.6 miles. And for Alternative 4, the linear extent of highwalls has been characterized as 102 miles, 112 miles, and 219.5 miles.

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492065 **Organization Type:** Federal Government

Representative Quote: The EPA recommends that the OSMRE address the apparent inconsistencies in available re mining acres provided in Chapters 3 and 6 for Alternatives 2 - 6. For Alternative 2, Chapter 3 seems to indicate 8,147 acres while Chapter 6 indicates 8,345. For Alternative 3, Chapter 3 seems to indicate 16,925 acres while Chapter 6 indicates 8,346. .For Alternative 4, Chapter 3 seems to indicate 16,925 acres while Chapter 6 indicates 9,094. For Alternative 5, Chapter 3 seems to indicate 15,400 acres while Chapter 6 indicates 1,422. For Alternative 6, Chapter 3 seems to indicate 12,075 acres-while Chapter 6 indicates 4,909.

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492049 **Organization Type:** Federal Government

Representative Quote: The EPA recommends that the OSMRE address the appearance of conflicting acreage information regarding the surface mining acres protected under five of the alternatives. For Alternative 2, Table 5-23 seems to indicate 54,797 acres will be excluded (protected) while the text in Chapter 6 seems to indicate only 22,122 acres will be protected. For Alternative 3, Table 5-23 seems to indicate 47,405 acres will be excluded (protected) while the text in Chapter 6 seems to indicate only 34,094 acres will be protected. For Alternative 4, Table 5-23 seems to indicate 51,483 acres will be excluded (protected) while the text in Chapter 6 seems to indicate only 37,367 acres will be protected. For Alternative 5, Table 5-23 seems to indicate 12,277 acres will be excluded (protected) while the text in Chapter 6 seems to indicate only 8,876 acres will be protected. Similarly for Alternative 6, Table 5-23 seems to indicate 34,260 acres will be excluded (protected) while the text in Chapter 6 seems to indicate only 19,166 acres will be protected.

Corr. ID: 3233 **Organization:** Environmental Protection Agency **Comment ID:** 492066 **Organization Type:** Federal Government

Representative Quote: The EPA suggests that the OSMRE address the apparent inconsistencies in acreage excluded from surface mining provided in Chapters 5 and 6 for Alternatives 2- 6. For Alternative 2, Chapter 5 seems to indicate 54,797 acres while Chapter 6 indicates 22,122. For Alternative 3, Chapter 5 seems to indicate 47,405 acres while Chapter 6 indicates 34,094. For Alternative 4, Chapter 5 seems to indicate 51,483 acres while Chapter 6 indicates 37,367. For Alternative 5, Chapter 5 seems to indicate 12,277 acres while Chapter 6 indicates 8,876. For Alternative 6, Chapter 5 seems to indicate 34,260 acres while Chapter 6 indicates 19,166.

Appendices

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U.S. Department of the Interior
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