



United States  
Department  
of the Interior

# Draft Environmental Assessment

## McCurtain Underground Mine Haskell County, Oklahoma



Office of Surface Mining  
Reclamation and  
Enforcement  
Mid-Continent Region

## Farrell-Cooper Mining Company Federal Coal Lease OKNM 108097 ODM Permit 4285F



October 2012

**DRAFT**

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# Chapter 1. Purpose and Need for Action

## 1.0 Document Structure

The Office of Surface Mining Reclamation and Enforcement (OSM), in cooperation with the Oklahoma Department of Mines (ODM), prepared this environmental assessment (EA). This EA is in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This document discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. This document is organized into the following five chapters:

**Chapter 1. Purpose and Need for Action:** This chapter addresses the purpose of, and the need for, Federal action to be taken on a proposed mining plan. The chapter also describes the proposed plan to recover coal from Federal lease OKNM 108097.

**Chapter 2. Alternatives Considered:** This chapter provides a more detailed description of the alternatives available to the ASLM for action. Alternatives were developed from interdisciplinary review, applicable laws and regulations, and input from government agencies. The permit application package for ODM Permit 4285F was open to public comment for a 30-day period ending March 7, 2011. The general public made no comments.

**Chapter 3. Affected Environment and Environmental Consequences:** This chapter presents the existing conditions of relevant resource components of the physical, biological, and social environments. It also provides the framework within which the environmental impacts of the action options can be assessed. Information contained here serves as a reference for evaluating and comparing alternatives for action.

**Chapter 4. Consultation and Coordination:** This chapter lists the preparers and agencies consulted during the development of the environmental assessment.

**Chapter 5. References:** This chapter lists documents used in the preparation of this environmental assessment.

## 1.1 Required Federal Action

The Federal action is a decision by the ASLM whether federally owned coal can be recovered as described in the proposed mining plan. This action is authorized in the Mineral Leasing Act of 1920, as amended

NEPA regulations apply to Federal actions that affect the quality of the human environment. The ASLM decision on the proposed mining plan for the McCurtain Underground Mine is one of those Federal actions. OSM is required, for compliance with Federal regulations at 30 CFR Part 746, to analyze and document the environmental, social, and economic impacts associated with this proposed mining plan.

The assessment will lead OSM to recommend that the ASLM choose one of the following alternatives:

- Disapprove the mining plan.
- Approve the mining plan.
- Approve the mining plan with conditions that would provide adequate protection for the environment (the preferred alternative).

## 1.2 Description of Proposed Project

In May 2010 Farrell-Cooper Mining Company (FCMC) applied to ODM for the McCurtain Underground Mine permit. The permit application is for 462.0 acres of surface support facilities to allow coal recovery from the 2,380-acre Federal Coal Lease OKNM 108097. Figure 1 shows the location of McCurtain Mine (ODM Permit 4285F). The mining operation would recover Federal coal from lease OKNM 108097 by surface and underground mining methods. Federal Coal Lease OKNM 108097 was issued on September 1, 2006, for 2,380 acres. Annual Federal coal production from McCurtain Underground Mine would range from 0.6 to 1.2 million tons. The mine will also recover privately owned coal during the 40- to 80-year proposed life of the operations.



**Figure 1.** Location of the McCurtain Mine.

The 462.0-acre permit for surface disturbance associated with underground coal recovery was approved by ODM on March 30, 2012. Surface facilities in the disturbance area include an office, maintenance and parking facilities, coal cleaning and load-out, permanent coal waste

disposal, sediment and surface water control, haulroads and, eventually, the construction of additional ventilation and miner access shafts located some distance away from the currently permitted surface disturbance.

### **1.3 General Setting and Background**

The proposed surface disturbance in support of the underground mining operation is within the 462.0-acre boundary of the ODM Federal lands Permit 4285F. Surface disturbance would be located in Sections 13, 14, and 15, Township 8 N, Range 22 E, Indian Meridian, Haskell County, Oklahoma. Federal Coal Lease OKNM 108097 covers parts of Sections 8, 9, 10 11, 14, 15, 16, and 17, also in Township 8 N, Range 22 E. The lease further identifies the S1/2 NW1/4 Section 14 as the portal (underground access area) for the mine. These surface support facilities, including the portal, would be approximately one mile north of the town of McCurtain, Oklahoma.

The McCurtain Underground Mine area is in the southeastern portion of Haskell County. Historically, Haskell County was dominated by extensive oak-hickory-pine forests of the Ouachita Physiographic Province. Rich forested land, range, minerals, and transportation were essential to the early settlement of the area. The majority of Haskell County lies within the Arkansas Valley physiographic section with some southern portions within the Ouachita Mountains section. The county is bordered to the north by the Arkansas and Canadian Rivers and the Robert S. Kerr Reservoir. The Sans Bois Mountain Range borders Haskell County to the south.

Haskell County is classified as a rural area in Oklahoma with an estimated 12,769 residents. The economy of the area is based primarily on agriculture and construction with forestry and pastureland accounting for the vast majority of the existing land uses. Several deposits of coal, limestone, and sandstone are scattered throughout the county. Western sections of the county contain deposits of high-volatile bituminous coal whereas medium-volatile bituminous coals are more prevalent in the east.

Coal mining has been occurring in the vicinity of McCurtain since the early 1900s. Underground coal mining had previously occurred near the project area. Surface disturbance for the proposed McCurtain Underground Mine would occur within 500 feet of these old works to allow for maximum coal recovery. If excavation breaks into any section of abandoned works, the permittee would backfill and seal openings with impermeable material. Any water from the underground works would be directed to a sediment pond for treatment as needed.

### **1.4 Related Environmental Documents**

The Bureau of Land Management (BLM) prepared an EA for Federal Coal Lease OKNM 107920, McCurtain Underground Tract, in June of 2004. The EA is entitled *Proposed Resource Management Plan Amendment, Environmental Assessment and Finding of No Significant Impact for Three Competitive Coal Lease Sales in Haskell, Latimer, and Haskell Counties, Oklahoma*. The BLM EA evaluated the environmental impacts of mining activities within this and other leases.

## Chapter 2. Alternatives Considered

### 2.0 Introduction

This section describes and compares a range of reasonable alternatives including the proposed action and no-action alternative. These alternatives were derived from interdisciplinary analysis, State and Federal regulations. The permit applicant, as required by ODM regulations, invited the public to comment on the proposed McCurtain Underground Mine. No comments were received. Federal agencies are required by NEPA to explore and objectively evaluate all reasonable alternatives. This includes a discussion and analysis of the proposed mining activity and its anticipated effects on the environment.

### 2.1 Alternative Analysis

#### **Alternative 1 (Recommend Disapproval):**

OSM would recommend that the ASLM disapprove the proposed mining plan. Subsequently, there would be no surface disturbance activities. This alternative provides a baseline against which we describe the environmental impacts of Alternative 2 and Alternative 3. If Alternative 1 is selected, Farrell-Cooper would not be allowed to recover Federal coal reserves accessed by surface mining disturbance within the boundary of Permit 4285F. Existing site conditions, such as vegetation composition, soil structure, hydrologic patterns, and socioeconomic settings would not be altered by coal recovery operations.

#### **Alternative 2 (Recommend Approval)**

This alternative recognizes the need for allowing coal to be recovered in compliance with SMCRA. These protections are designed to comply with the BLM coal lease stipulations for wetland protection and complement the U.S. Fish and Wildlife Service (FWS) document of September 24, 1996, entitled *Formal Biological Opinion and Conference Report on Surface Coal Mining and Reclamation Operations Under the Surface Mining Control and Reclamation Act of 1977*.

#### **Alternative 3 (Recommend Approval With Special Conditions on Mining Operations – Preferred Alternative)**

OSM would recommend that the ASLM's approval require the applicant to refrain from, or to institute, certain activities. Such requirements would be in addition to those of the approved SMCRA permit, the Resource Recovery and Protection Plan approval, the coal lease, and the seven standard conditions applied to each mining plan approval.

This alternative is based on OSM's understanding that the mine plan approved by ODM is intended to prevent surface subsidence by limiting the percent of coal extraction. Should the applicant later propose to employ longwall mining or other high-extraction mining techniques with attendant planned subsidence, such changes would likely require a modification of the proposed mine plan described for alternatives 2 and 3 of this EA. The ASLM would then have to render a decision on the mine plan modification as required by 30 CFR 746.

OSM recommends the following special condition:

1. The establishment of vegetation on all disturbed lands within the boundary of the Federal lease will be limited only to the plant species listed in Table 17 of Appendix G in ODM Permit #4285F **EXCLUDING** sericea lespedeza (*Lespedeza cuneata*) and Sudan grass (*Sorghum bicolor drummondii*). In addition, the planting of tall fescue (*Fescue arundinacea*) is limited to novel endophyte and/or endophyte free cultivars only. If any of the above mentioned excluded species become established, the applicant will undertake measures to control and eradicate these species or any other invasive species which may become established.

## **2.2 Alternative Uses of the Available Resources**

This mining operation does not involve any unresolved conflicts concerning alternative uses of the available resources. Therefore, consideration of alternatives pursuant to section 102(2)(E) of the National Environmental Policy Act of 1969, 42 U.S.C. 4332(2)(E) is not required.

# **Chapter 3. Affected Environment and Environmental Consequences**

## **3.0 Introduction**

This chapter summarizes the physical, biological and social environments of the proposed mine permit area and the much larger Federal coal lease area. It examines how implementing each alternative may affect that environment. The chapter also presents the analytical basis for the comparisons of alternatives presented above. Indirect, direct, and cumulative effects were considered in this analysis.

## **3.1 Existing Conditions and Alternative Analysis**

### **Physical Environment**

#### *(a) Topography and Land Use*

##### **(1) Existing Conditions**

The 2380-acre lease area contains less than half of the 462-acre proposed McCurtain SMCRA mine permit area. (Fig. 2) The dominant topographic feature of the area of interest (lease and permit areas) is a pair of closely spaced ridges that run diagonally northeast–southwest. Underlying geology controls topography. This part of Oklahoma is in the Arkoma geologic basin where bedrock has been folded into a series of east-trending synclines and anticlines. Erosion-resistant sandstone forms ridges while intervening valleys developed in thicker beds of more easily erodible shale (Slack, 1983). Elevations range from 500 feet to 700 feet above mean sea level.

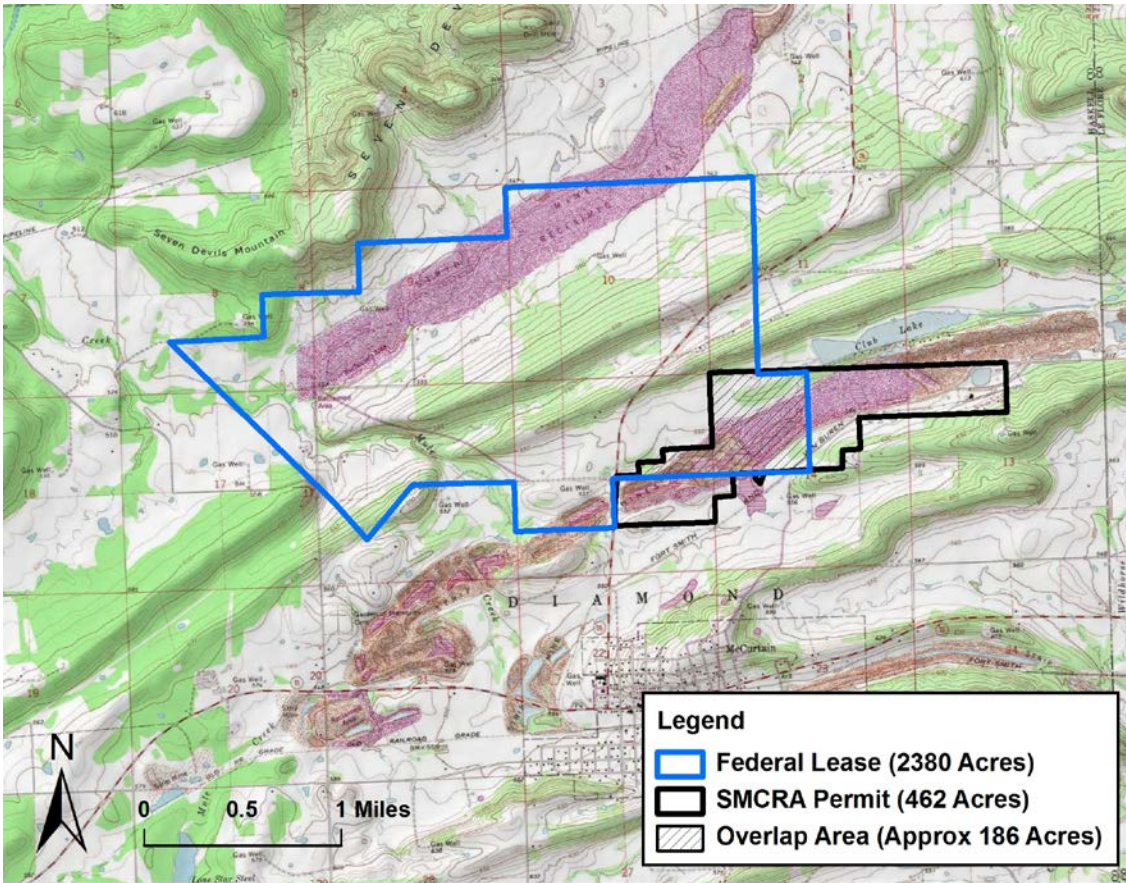
Two previously mined zones parallel the ridges cutting across the northwest and southeast borders of the area of interest. A surface mine, now reclaimed, had operated in the northern portion of the Federal lease. That mine had advanced in a northwesterly direction down the dip of the Stigler Coal. Partially reclaimed or unreclaimed spoil piles and final-cut impoundments of a second zone of mined ground is in the southern portion of the lease area. These features resulted from the recovery of the stratigraphically lower Hartshorne Coal. Here too, the mine pit advanced to the northwest down dip. Mining apparently ceased when it became uneconomical to remove ever-thickening overburden above the Hartshorne Coal. Part of this southern abandoned mine land (AML) zone is now under permit for development of the underground McCurtain Mine.

Mule Creek is the receiving stream for most, if not all, runoff from the area of interest. The creek exits the area of interest at the far western border after flowing across its southwest corner. Mule Creek cuts through the ridges in the area of interest. Unnamed tributaries to Mule Creek flow along valleys underlain by shale.

In winter, the average temperature is 63 degrees Fahrenheit. The summer average temperature is 81 degrees Fahrenheit. The total annual precipitation is 45.4 inches. Of this, 25.9 inches, or about 57 percent, usually occurs in April through September. The growing season for most crops falls within this period.

The entire surface of the area of interest is privately owned. There are 26 land owners and five residences within the boundaries of the federal coal lease area. The mine permit area contains one additional land owner (Farrell-Cooper Land Co.) and no residences. The predominant land uses of the federal leased area are undeveloped woodlands, grazing land and pastureland. The majority of the mine permitted site (296.7 acres) can be classified as undeveloped woodland due to dominant vegetation types and lack of land management practices. The permit area does not currently support any areas of managed pasture. However, 102 acres of the site are classified as grazing land by the permittee. FCMC has also classified 54.4 acres as developed water resources. This water acreage is distributed among more than a dozen separate features ranging from less than a half acre to more than 20 acres. The majority of this water supports cattle grazing; secondary use is recreation, such as fishing.





**Figure 2.** Surrounding topography and identification of permit and lease boundaries.

(2) Direct and Indirect Effects by Alternative

Alternative 1: Under this alternative, there would be no change to the existing topography or land use of the permit area.

Alternative 2 and Alternative 3 (Preferred Alternative): Under these alternatives, ODM permit performance standards require that the land disturbed by surface mining activities be restored to its approximate original contour. Mine spoil would be used to eliminate highwalls and depressions.

Of the 462 acres within the permit boundary, approximately 245 acres would be disturbed by surface mining operations. The applicant has proposed land use changes for the disturbance area. Those changes are identified in Table 1. The postmining land uses of improved pasture and water are not consistent with the undeveloped premining land use, however, the landowners have agreed to this alternative postmining land use. An approved pasture forage seed mix would be used as ground cover for the majority of the reclaimed areas. The proposed postmine land-use plan would add 208.8 acres of improved pasture while reducing the acreage of undeveloped land, grazing land, and water resources. As a result of this alternative, the

productive capacity of the land for livestock would be enhanced.

**Table 1.** Land-use accounting

Land-Use Category	Premine Acres	Postmine Acres	Difference in Acreage
Undeveloped	296.7	153.0	-143.7
Grazing Land	102.0	58.8	-43.2
Roads	5.3	3.0	-2.3
Water	54.4	38.9	-15.5
Fish and Wildlife	3.6	5.5	+1.9
Pasture Land	0.0	202.8	+202.8
Total	462.0	462.0	0

The impacts to land use would be long-term and moderate. Wildlife habitat would be reduced, but forage for livestock would increase. Cumulative impacts would be minor because private landowners in Haskell and similar rural counties cycle their property between improved pasture and undeveloped land to meet personal and income needs.

The Hartshorne coal seam is approximately 48 inches thick and will be mined to a maximum depth of 1,300 feet. This 1,300-foot thick overburden includes the McAlester Formation of the Pennsylvanian System. This formation overlies the Hartshorne coal seam and includes several thin sandstone units—the Warner, Lequire, Tahama, and Keota Sandstones in ascending order—separated by thick mudrock sections of the McCurtain Shale and other unnamed shale members. Several thin seams of coal occur as well within this section.

Initially four main entries will be driven 20 feet wide on 90-foot centers with crosscuts on 120-foot centers within the First Main. These entries from the portal face up along the highwall will be driven down the northern limb of the Milton anticline at a slope of 7 degrees. Coal production panel development will begin 515 feet from the highwall off the main entries on strike with the coal seam with 20-foot wide pillars on 60- to 70-foot centers.

Occupied dwellings and structures will be undermined. However, no secondary recovery (retreat mining) of pillars will occur under these dwellings or their associated structures within a 20 degree angle of draw. The applicant may conduct retreat mining under other areas and perform pre-subsidence surveys prior to secondary recovery. The survey reports will be forwarded to the ODM. Any pillar design changes will be submitted to the ODM for approval prior to secondary recovery operations. The applicant is also required to gain written permission from BLM’s authorizing official before subsiding any stream, wetland, or riparian zone within the lease area.

There are no schools, churches, public buildings, and public parks within the area overlying the coal seam to be mined during the initial 10-year period of the underground mining operation. However, there are several occupied dwellings, roads, transmission lines, and utility lines within this area. Prior to the opening/driving of panels from the first main; expected panel dimensions, planned pillar sizes, and surface structures will be submitted to ODM for approval. ODM will then determine any pillar size changes to be implemented and/or any pre-subsidence survey requirements. Should the crushing of pillars occur and result in surface expression, the applicant will inspect the damages and implement corrective actions approved by ODM.

Impacts to topography would be permanent and moderate. Establishment and reclamation of mine support facilities would result in moderate changes in elevation and surface drainage patterns. Mining activities would facilitate the reclamation of over 160 acres of previously disturbed abandoned mine lands. Abandoned spoil areas and pits would provide the base for a coal mine waste disposal site. The proposed reclamation activities would create a 75-acre hill

(mine waste disposal site) with 4:1 side slopes rising approximately 40 feet above the surrounding topography.

*(b) Soil and Agricultural Resources*

Existing Conditions

The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) mapped 17 soil types within the permit area. Soil types and acreage are Counts silt loam (CuA), 2.43 acres; Counts silt loam (CuB), 37.56 acres; Counts-Delta Complex (CvE), 0.28 acres; Counts-Wing complex (CwB), 3.53 acres; Enders Hector complex (EhD), 39.36 acres; Enders-Hector complex (EhE), 0.29 acres; Herctor-Linker (HIC), 0.30 acres; Kanima shaley silty clay loam (KaE), 241.68 acres; Liberal-Spiro complex (LcC), 12.37 acres; Liberal and Collinsville (LdE), 19.15 acres; Linker-Hector complex (LnD3), 2.74 acres; Naldo Fine Sandy Loam (NaC), 9.54 acres; Naldo Fine Sandy Loam (NaC2 eroded), 19.72 acres; Rexor soils (Rf), 2.62 acres; Stigler silt loam (SrA), 0.27 acres; Stigler silt loam (SrB), 11.31 acres; and Tamaha silt loam (TmB), 4.45 acres.

Of the 17 soil types, six are classified as prime soils by the NRCS. The six are CuA, CuB, NaC, SrA, SrB, and TmB. Proposed mining will disturb prime soils CuA, CuB, and NaC. Crop histories signed by landowners stated the land had not been farmed five out of the last ten years. A landowner reported the area north of the stream in Section 14 has been used for hay production four of the last ten years and cattle grazing three out of the last ten years. OSM visitors to the site during the last three years did not note any evidence of recent hay production or cattle grazing.

All natural soils disturbed in the mining process will be reclaimed by placing topsoil over graded spoil. Natural soils do not meet the "historic" crop production criterion defined in 30 CFR 701.5 and ODM Regulation 460:20-3-5 for salvage and restoration of the subsoil resource. Cropland is not a proposed postmining land use within the proposed project area.

The majority of the soils in the 245 acres to be disturbed for surface facilities have been previously affected by surface mining that included minimal reclamation. These previously mined areas are classified as Kanima shaley silty clay loam (KaE). However, 33.5 acres of the 245 acres have topsoil. For these soils, the average premine topsoil depth is 9.8 inches. The permit issued by ODM approves replacement of this topsoil resource to a depth of 5.5 inches on 55 acres.

Pasture vegetation (Bermuda grass) and native grasses are common to the various soil mapping units except Kanima shaley silty clay loam (KaE). KaE soils support primarily undesirable plant species which increase with grazing pressure.

(2) Direct and Indirect Effects by Alternative

Alternative 1: With this alternative, there would be no change in the potential for the soils to produce row, small grain, or forage crops. The topsoil and subsoil would remain undisturbed.

Alternative 2 and Alternative 3 (Preferred Alternative): Under these alternatives, the applicant would be required only to remove and replace the topsoil portion of the soil resource. All topsoil resources would be salvaged and replaced over 55 acres. The top six inches of previously disturbed KaE soils will be salvaged to be used as growth media for the remaining 190 acres. Subsoil materials would not be redistributed to support the potential land uses that were available prior to mining.

As presented in the reclamation plan, soils disturbed and reclaimed by mining activities would support the proposed postmining land use of pasture at productivity rates similar to, or higher than, those available prior to mining. This assessment is based on the loss of rooting depth (no subsoil replacement), breakdown of soil structure, and the effects of spoil compaction during soil replacement. Although impacts to soil resources and potential land use capability would be moderate and permanent, adverse impacts to the historical land use capability of the soil resources on the site would be minor and long term.

*(c) Water Resources*

(1) Existing Conditions

—*Surface Water*

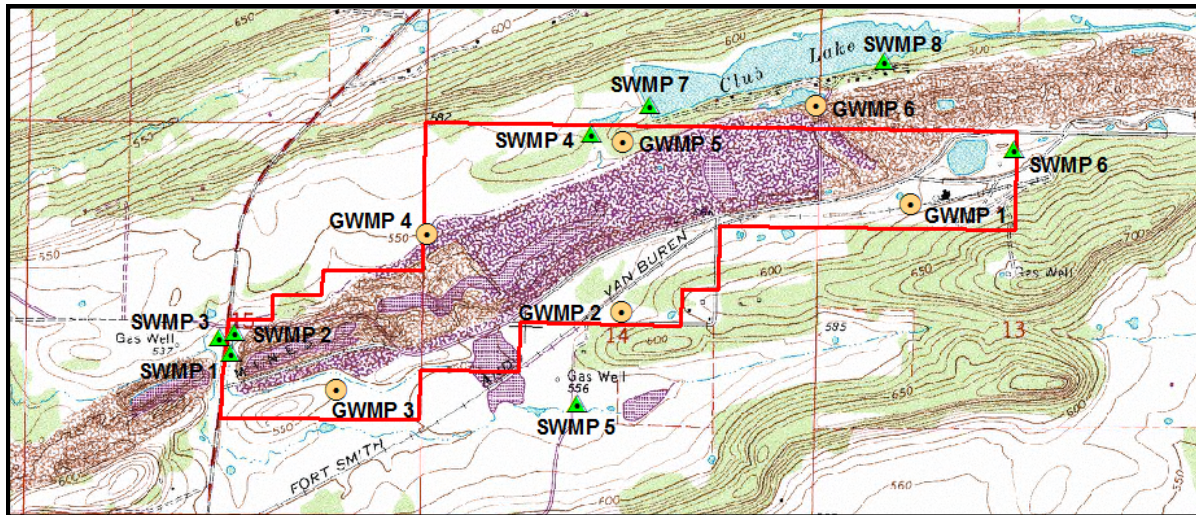
Surface-water resources of the area of interest consist of a reach of Mule Creek, a number of unnamed tributaries to Mule Creek, and impoundments created from previous coal mining operations. Streams and impoundments are used by wildlife and livestock.

Mule Creek is 0.65 stream miles from the McCurtain Mine permit boundary and has no designated beneficial uses. Another 5.3 miles down Mule Creek is Sans Bois Creek. The Oklahoma Water Resources Board has assigned the following beneficial uses to Sans Bois Creek: public and private water supply, warm water aquatic community, agriculture, industrial and municipal process and cooling water, primary body contact recreation, and aesthetics. About a 28-mile reach of Sans Bois Creek in southwestern Haskell County (well upstream from the area of interest) does not support primary body contact recreation. The Oklahoma Department of Environmental Quality had a total maximum daily load limit (TMDL) prepared in 2008 for bacteria. From the confluence with Mule Creek, Sans Bois Creek flows about 9 miles northeast before emptying into the 50,000-acre Kerr Reservoir. Kerr Reservoir is part of the McClellan-Kerr Arkansas River Navigation System. The 2010 waterbody report for Sans Bois Creek (EPA 2010) lists this 9-mile reach as impaired by low dissolved oxygen, pathogenic bacteria, and pH. Another 10.8-mile reach of Sans Bois Creek upstream from the confluence with Mule Creek is impaired by low dissolved oxygen, pathogenic bacteria, sulfate, and total dissolved solids. State TMDL development status for these two impaired reaches of Sans Bois Creek is “TMDL needed” (EPA 2010).

Within the area of interest, recent measurements of surface-water characteristics are known only for monitoring stations established to support the McCurtain Mine permit application. A U.S. Geological Survey (USGS) study from the early 1980s focused on the hydrology of abandoned mine land just northwest of the town of McCurtain but south of the lease boundary. The study area included a reach of Mule Creek and final-cut impoundments. Mule Creek water was

reported to be a sodium sulfate type with median sulfate concentrations that ranged from 26 to 260 mg/L; impounded water generally did not exceed drinking-water limits (Slack, 1983).

Total length of streams inside the permit boundary is approximately 9,800 feet. Impounded water covers about 54 acres. The largest water bodies are pits abandoned after surface coal mining operations of the 1960s and early 1970s.



**Figure 3.** Stream water monitoring stations (SWMPs) and ground-water monitoring stations (GWMPs) for the proposed McCurtain underground mine (red border encloses ODM Permit 4285F).

Four unnamed streams with a total of six monitoring stations (SWMP 1 through SWMP 6) are associated with the proposed mine (fig. 3). All flow to the west, but portions of only three of these streams are within the permit boundary. The eastern-most stream, with its monitoring station SWMP 6 at the permit boundary, is a short waterway that empties into a pond near an abandoned wash plant. The remaining streams eventually combine just west of the permit boundary to form a tributary of Mule Creek, the first named receiving stream for the proposed mining operation.

The southern-most of the four streams, with station SWMP 5 near the headwaters, will not receive runoff from ground to be disturbed under the proposed permit. Its confluence with other waterways tributary to Mule Creek is just below the furthest downstream monitoring station (SWMP 3) for the McCurtain Mine. The northern-most stream is fed in part by discharge from the 46-acre Club Lake. Station SWMP 4 is in the upper reaches of the stream, and the downstream monitoring station is SWMP 2. Approximately 6,000 feet of waterway separate these two monitoring stations. Much of the channel parallels an abandoned highwall. Another stream, 4,215 feet long with a drainage area of about 1.2 square miles, is located across the abandoned pit to the south. This watercourse is monitored at SWMP 1 just before it joins the short reach of stream between SWMP 2 to the northeast and SWMP 3 to the west.

The longest stream that passes through the permit area—the one along the north side of the abandoned final-cut pit—has a drainage area of about 0.4 square miles between SWMP 2 and the Club Lake dam. Club Lake collects runoff from 1.2 square miles. This unnamed watercourse fed by Club Lake discharge has been identified as an intermittent stream in the permit

application. During a site visit in July 2011, OSM staff noted small fish and clams in the waterway about 2700 feet downstream from the Club Lake dam. Flow was estimated to be only a few gallons per minute at that location. A portion of this stream will be reconstructed to the north so that the highwall can be cut back to expose competent rock for the mine portals. As an intermittent stream, this water body qualifies for protection by a 100-foot buffer zone along either bank. Any disturbance within the buffer zone—in this case relocating the channel—requires a variance. That variance has been granted.

A monitoring program is in place for those surface-water stations to be regularly sampled throughout the life of the mine. Baseline data are available for the six stream stations plus two more stations, SWMP7 and SWMP 8, on Club Lake (fig. 3). Water testing generally began in the spring of 2010 except that the first analyses of Club Lake samples were from October 2010. Sampling intervals tended to be irregular and the number of baseline water-quality analyses per station varied from one to eight. The permit applicant consistently measured pH, acidity, alkalinity, total dissolved solids, total iron, total manganese, and sulfate. Data for major ions—calcium, magnesium, sodium, potassium, and chloride—were not available for every baseline sampling event.

A single round of samples was also collected from seven surface-water sampling points at impoundments within the mine plan area. This was intended to be a one-time event because many of these water bodies will not exist postmining. This set of analyses did not include the full complement of major ions.

Figures and tables in Appendix A present analyses of the baseline surface-water data. Among the three categories of surface water—streams, Club Lake, and AML impoundments—Club Lake had the lowest median concentrations of iron, manganese, sulfate, and dissolved solids. The manganese concentration in lake water, however, was just over twice the EPA national secondary drinking water standard of 0.05 mg/L. Median pH, acidity, and alkalinity of Club Lake water were lower than measured in the mine plan area. AML impoundments had the poorest quality water, but that was still generally protective of aquatic life and would be suitable for consumption by wildlife and livestock.

Those water bodies for which major ions had been measured (the streams and Club Lake) produced samples of a magnesium- or calcium-bicarbonate type except that samples from station SWMP 1 were a magnesium-sulfate type. SWMP 1 stands out from the others monitoring stations on the Stiff diagrams and Durov plot in Appendix A. Runoff from previously disturbed and unreclaimed ground passes through SWMP 1.

Statistically, there was no difference at the 95 percent confidence level between values for 13 of 14 stream monitoring parameters in data sets for SWMP 4 (about 800 feet downstream from the Club Lake dam ) and SWMP 3 (the furthest downstream monitoring point on the tributary to Mule Creek). The Mann-Whitney comparison-of-medians test detected a statistically significant difference only in total dissolved solids which was higher at SWMP 3.

—*Ground Water*

As with stream water, ground-water characteristics of the area of interest are known primarily from information contained in the McCurtain Mine permit application. Older data are available from a USGS hydrology study. The USGS drilled five wells in 1980. Four wells were installed in spoil and one was drilled into nearby bedrock. Ground water, predominately a sodium sulfate type, was alkaline with median pHs that ranged from 7.2 to 7.6 and concentrations of dissolved solids, iron, manganese, and sulfate that generally exceeded drinking-water standards (Slack, 1983).

Ground water is produced from monitoring wells within the proposed permit boundary for the McCurtain underground mine and from private wells adjacent to that boundary. Water-quality information is presented in Appendix B by Durov plots, Stiff diagrams, and tables.

Farrell-Cooper had six monitoring wells installed in boreholes drilled to depths that range from 40 feet to 175 feet (fig. 1). Shallow wells (GWMP 1 through GWMP 3) were completed in sandstone, interbedded sandstone and shale, or shale above the Hartshorne coal bed in the up-dip direction. The three deeper wells (GWMP 4 through GWMP 6) are screened across this northwest-dipping coal seam. Monitoring wells produced 0.002 gallon per minute to 0.05 gallons per minute.

The baseline quality of water from these six McCurtain Mine monitoring wells was generally fair. Median iron concentration and median manganese concentration both exceeded U.S. EPA national secondary drinking water standards (0.3 mg/L and 0.05 mg/L, respectively). Median total dissolved solids, at 475 mg/L was close to the national secondary standard of 500 mg/L. Ground-water samples were either of the calcium/sodium-bicarbonate type or sodium-sulfate type. Water from GWMP 6 (the deepest well for which there was only one sample) was much more concentrated in sodium and sulfate than ground water sampled elsewhere within the McCurtain Mine monitoring network. Water of that quality would be a very high salinity hazard if it were to be used for irrigation. Unlike stream water, samples from monitoring wells show a greater variation in the concentrations of major ions; this is indicated by the lack of data-point clustering in the central box of the Durov plot.

Despite the low yield of the rock strata tapped by the monitoring wells, local bedrock does provide useable quantities of water to private wells. Several residences within one-half mile of the proposed permit boundary have wells. However, only five residents gave the permit applicant information about their wells and requested that a water sample be tested. Two properties each had two wells. The permit applicant could not sample one pair of wells because these had been “closed for winter.” Among the five wells that the permit applicant sampled, two produced water for domestic purpose (presumably drinking water) and the other wells were either not used or supplied water for nondrinking use. Water types were either sodium-bicarbonate or, in one case, sodium-sulfate. Private wells range in depth from 50 feet to 65 feet, but two wells are of unknown depth. Three of the five wells are along the shore of Club Lake. Two wells of unknown depth are south of the abandoned final-cut pit within 500 feet of the proposed permit boundary.

Four of 12 median values of water-quality characteristics for private wells fell outside the 95% confidence interval for median water-quality characteristics for monitoring wells. Median pH

was below the confidence interval while total iron, sulfate, and chloride, were above the confidence interval calculated for the six monitoring wells.

## (2) Direct and Indirect Effects by Alternative

Alternative 1: Since there would be no mining or reclamation operations, there would be no change in surface- or ground-water quality or quantity under this alternative.

Alternative 2 and Alternative 3 (Preferred Alternative):

### —*Surface Water*

The quality of surface water may deteriorate during mining primarily due to increased concentration of sediments. Earth materials would be mobilized during the construction of sedimentation ponds and diversion channels and the relocation of the highwall stream. Once these features of the water-management plan are in place, all mine runoff would be routed through sediment ponds before being discharged through Mule Creek and Sans Bois Creek and on into Kerr Reservoir. Potential impacts to Mule Creek could occur during construction of water-control structures but they would be minor and temporary. No measureable effects would be expected for Sans Bois Creek or Kerr Reservoir.

Mining would relocate an approximate 2,500-foot reach of stream toward the north, away from the portal development area. The Post-Mining Land Uses and Wildlife Enhancement Plan Map (MP-7 of the permit application package) shows that other streams in the permit area would be preserved from the premine state.

Ordinarily, under a plan of recovering coal using the room-and-pillar mining method with 50% coal extraction, there would be no planned subsidence and, therefore, little if any, impact on surface-water drainage. The Resource Recovery and Protection Plan approved by BLM recognizes that retreat or secondary mining (shaving or splitting of coal pillars that support the mine roof) and/or full pillar extraction might be employed with restrictions at McCurtain Mine. This additional mining could increase the recovery to an average of 70% of the minable reserves. Such secondary extraction operations would not occur under fixed structures, occupied dwellings, and protective zones. Protective zones might include areas underlying Mule Creek, its tributaries, wetlands, and other water bodies. A patchwork pattern of collapsed mine voids could permanently affect the overlying topography. Depressions produced from mine subsidence might collect enough runoff to periodically reduce the productivity of the land. Those water bodies shielded from subsidence may lose some drainage area should land outside the protection zone eventually subside.

The permittee has not proposed to mine the Hartshorne Coal by longwall mining or other planned subsidence mining techniques. Consequently, there is no engineering or environmental analysis in the permit document for planned subsidence.

The surface area of impounded water of the permit area would decrease from 54.4 acres premine to 38.9 acres postmine (Table 1). Water in the main abandoned final-cut pit would be pumped out. That would allow the highwall to be cut back to expose competent bedrock for the mine portals. Another existing impoundment along the old highwall would also be pumped down. The



resulting low area would be filled with coal processing waste. Pumped water would pass through a sediment pond and then discharge to another abandoned final-cut pit in the southwest corner of the permit area. At the conclusion of underground mining operations, an approximate 16-acre impoundment would be established at the portal area. Another much smaller pond, about 2.5 acres, would be constructed for the mining operation and remain as a postmining feature.

Impacts to surface water resources within the permit area would be moderate and permanent due to the decrease in water resource acreage that would support the postmining land use change to improved pasture. Unlike the existing final-cut impoundments, however, the new water bodies would presumably allow easier access by cattle. Impacts to surface water resources external to the proposed surface disturbance of the project would be very minor and permanent. Postmining runoff may be somewhat greater than premine. A planned 28% decrease in impounded water surface area means less water would be loss through direct evaporation.

The permittee would be required to systematically monitor stream-water quantity (stream flow) and quality to demonstrate the successful completion of mine reclamation. This monitoring would be in addition to what would be required under the separate NPDES permit for sediment-pond effluent.

#### *—Ground Water*

Hydraulic characteristics of mine-site bedrock down to and including the Hartshorne coal bed, as measured at the monitoring wells, would suggest a hydrogeologic setting that has little capacity to store and transmit useable quantities of ground water. If this were the case, the effects of the proposed mining operation on ground-water resources would be highly localized. Nevertheless, there are a few water-supply wells in this area.

Information about the construction of the private wells is very limited, but their reported range of depth falls within that of the monitoring wells. At least some of the area adjacent to the proposed mine must be underlain by an aquifer (or aquifers). An aquifer is a saturated subsurface rock or sediment body that is sufficiently permeable to transmit economic quantities of water to wells or springs. Well tests, in particular the very low numbers reported for flow to the wells, indicated that none of the monitoring wells may have tapped an aquifer. The local aquifer (or aquifers) may be of limited areal extent but could still be affected by the proposed coal recovery and reclamation operation. Ground-water supply at private wells might decrease if the underground mine works drain an overlying aquifer.

Water quality at private wells could also be affected by the proposed mine, although probably not by the underground mining activity itself. This effect would more likely be due to pit fillings of underground development waste and especially coal processing waste. Coal processing waste is a potentially acid-forming earth material and will be produced in volumes much greater than mine development waste. Operations plan call for isolating these potentially toxic materials from the ground-water system at Disposal Site No. 1. Where it does not already exist, earth materials of low permeability when compacted will be used to line the disposal areas in the drained, abandoned mine pits. Similar earthen material will be used in the 4-foot-thick cap over the waste deposits. Final graded deposits of refuse from coal cleaning—the potentially acid-

forming substance—will be tested and treated if necessary with acid-neutralizing agricultural limestone before the cap with its root-growth medium is emplaced. Underground mine entries will have to be sealed because this will be the location of a constructed pit impoundment. The south bank of the impoundment will be spoil from the excavation of the mine face-up, some of which will be sodic. The main issue with high-sodium mine spoil is its effect on vegetation. Sodium in drinking water can be a human health issue, but more generally, it contributes to total dissolved solids.

Impacts to ground-water resources are not as easy to assess as those to surface-water resources because of the unknown lateral extent of any localized aquifers. Among the few private wells identified within a half mile of the permit boundary, two would be 600 to 900 feet from the coal refuse waste deposit. If there were to be a hydraulic connection between waste deposits and aquifers, a favorable hydraulic gradient could drive mineralized water out of the waste areas and eventually into private wells. Travel time for water from the refuse disposal area to the nearest private well could be 80-some years based on a rough calculation of average linear velocity using the highest hydraulic conductivity from the monitoring well tests ( $1.3 \times 10^{-3}$  cm/sec), a hydraulic gradient of 0.01, and an effective porosity of 0.22. The potential effect on the water-supply wells could be long term.

Wells drilled into shallow aquifers above mine works might exhibit a water-level drop should the underlying mine void collapse. Rocks may respond to tensile stress caused by roof falls into the mine void by fracturing vertically and separating along bedding planes. These responses suddenly increase aquifer porosity. Lowered water levels spread outward through the aquifer as water flows toward the zone of increased porosity. Provided fractures are not opened from the caved-in mine works to the aquifer, recovery of water levels in shallow aquifers may occur within a few months to a few years after a localized mine void collapse. Fracture-enhanced permeability within a subsidence zone may make overlying wells more productive in the long term.

The permittee would regularly test water produced from monitoring wells. Ground-water testing would continue throughout the mining and reclamation phases until the state releases the permittee from final reclamation liability and returns the bond. Monitoring parameters would include total dissolved solids. SMCRA regulations require the permittee to replace an underground or surface water source in legitimate use that has been contaminated, diminished, or interrupted by the mining operation.

#### *(d) Stream, Wetland, and Floodplain Concerns*

##### *(1) Existing Conditions*

Stream resources with the permit boundary are limited to the few small watercourses described in the preceding section. These features are channelized and lack well defined floodplains (fig. 4). The mine plan area is not within a recognized floodplain of some larger stream (Mule Creek or Sans Bois Creek) or the Kerr Reservoir.

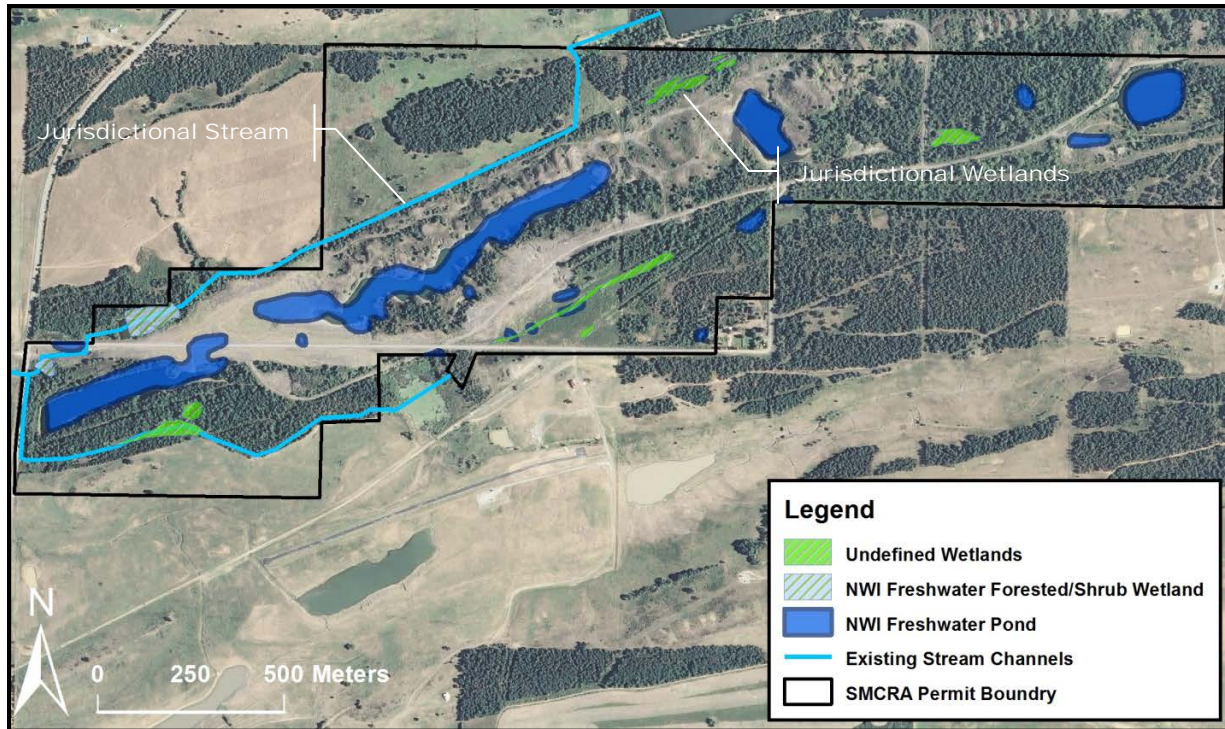


**Figure 4.** Riparian area within the proposed McCurtain permit area.

The National Wetlands Inventory (NWI) identified 18 records of features within the SMCRA permit boundary including 16 freshwater ponds (50.4 acres) and 2 forested/shrub wetlands (2.7 acres). Figures 5 and 7 shows the locations of NWI features. The NWI forested shrub wetlands are located at the northwest corner of Permit 4285F outside of the proposed disturbance area. None of the riparian zones associated with the streams within the permit area were identified as wetlands by the NWI.

Additional wetlands were identified by the COE while issuing a nationwide permit (NWP 21) for jurisdictional wetlands under the Clean Water Act (CWA). They include 2870 feet of stream channel and 0.62 acres of undefined wetlands within the proposed disturbance area. If impacted, the NWP establishes mitigation guidelines calling for the recreation of 4305 feet of stream channel and 0.84 acres of wetlands.

The permit area contains approximately 6 additional acres of undefined wetlands. The majority are isolated pockets of shrub-scrub and emergent wetlands not considered jurisdictional under the CWA. The mine permit classifies these areas as either developed water resources or fish and wildlife habitat.



**Figure 5.** National Wetlands Inventory (NWI) polygons, existing streams, and other identified wetlands within the permit boundary of the McCurtain Mine.

## (2) Direct and Indirect Effects by Alternative

**Alternative 1:** With this alternative there would be no change in the surface water values. Drainage patterns associated with the streams would not be modified. All ponds and wetlands would remain unaltered.

**Alternative 2 and Alternative 3 (Preferred Alternative):** Under these alternatives, the applicant would mine through and replace approximately 2870 linear feet of jurisdictional perennial stream channel and adjacent riparian areas. FCMC would reconstruct the stream including a 50-foot riparian buffer zone approximately 300 feet to the north of its current location. The constructed channel is intended to mimic the characteristics of current conditions including a meandering inner-berm channel and riffle-pool complexes. FCMC will utilize boulders, tree trunks, and rootwads to provide “natural” habitat features. Detailed stream morphology design specifications within the approved SMCRA permit and 404 mitigation plans are limited. Available cross section design plans within the SMCRA permit order significant increases in both channel width and depth creating a trapezoidal cross-sectional profile with greatly reduced bank slopes. This change to the stream’s dimension will increase the channel’s capacity and in the near-term reduce flood frequency. However, the oversized channel will quite likely aggrade over time and develop a new narrower channel within. Without sufficient details in the proposed

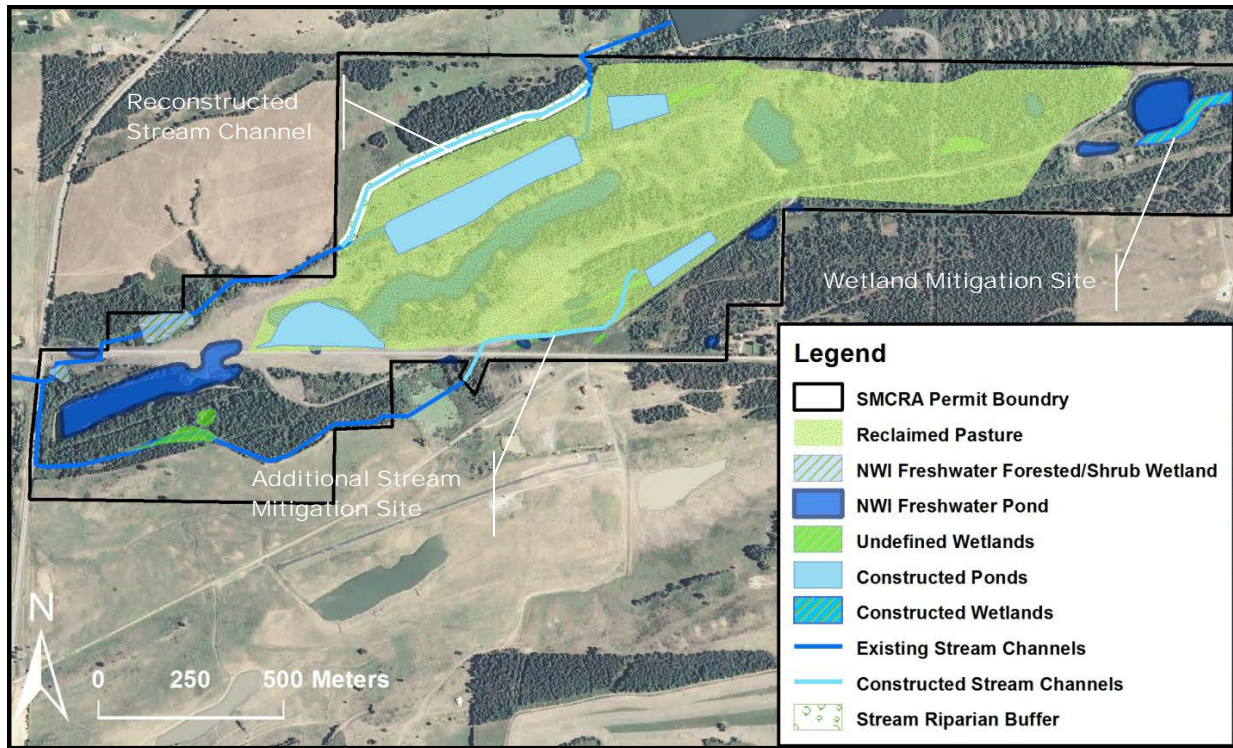
designs or baseline surveys it's difficult to precisely predict channel evolution or how these changes to the stream's current morphology will impact in-stream and downstream form and function in the near and long term.

The constructed stream will be monitored throughout the life of the mining activity. This timeframe will exceed the required 5-year requirement of the Corps. For the purpose of the Corps it will be monitored each year after construction and annual reports will be submitted to the Corps. Trees and shrubs will be counted in the third year of monitoring. If the survival rate is less than 75% of 300 trees per acre, additional trees and shrubs will be planted. Should trees meet the required 5-year survival rate and the stream is functioning as designed with morphology and aquatic life comparable to what existed before proposed mining FCMC will ask permission from the Corps to terminate the monitoring requirements.

In order to meet CWA Section 404 mitigation requirements, FCMC will receive credit for constructing 2470 feet of additional ephemeral stream channel. This stream is integrated into a berm channel intended to drain the southern edge of the permit area. The approved mitigation plan calls for incorporating natural stream design features such as riffles and pools but does not specifically require the planting or maintenance of a riparian buffer zone or establishment of any monitoring plan.

FCMC would mine through and/or fill approximately 42.26 acres of ponds and developed water resources and construct four new ponds and impoundments totaling 26.76 acres. The anticipated loss of surface water on site is 15.5 acres or 29%. This loss includes approximately 4 acres of undefined non-jurisdictional wetlands.

FCMC will avoid 0.20 acres and directly impact approximately 0.42 acres of jurisdictional wetlands. The approved NWP21 mitigation plan calls for the creation of 1.5 acre emergent wetland. FCMC intends to construct this wetland at the far eastern end of the permitted area adjacent to a large existing pond (fig. 6). The constructed wetland will be monitored quarterly (with annual monitoring reports sent to COE) and must meet an 80% ground cover rate of desirable wetland or aquatic plants species within 3 years.



**Figure 6.** Anticipated postmining configuration of streams and wetlands with the McCurtain Mine permit.

Impacts to the stream, wetland, and floodplain resources within the disturbance area would be moderate and permanent because of the decrease in developed water and wetland acreage and the change from unmanaged hydrophilic vegetation to improved pasture. Cumulative impact to the watershed of the coal recovery area would be minor because the total acreage that would be modified by the mining operation is a small percentage of the actual watershed acreage.

## Biological Environment

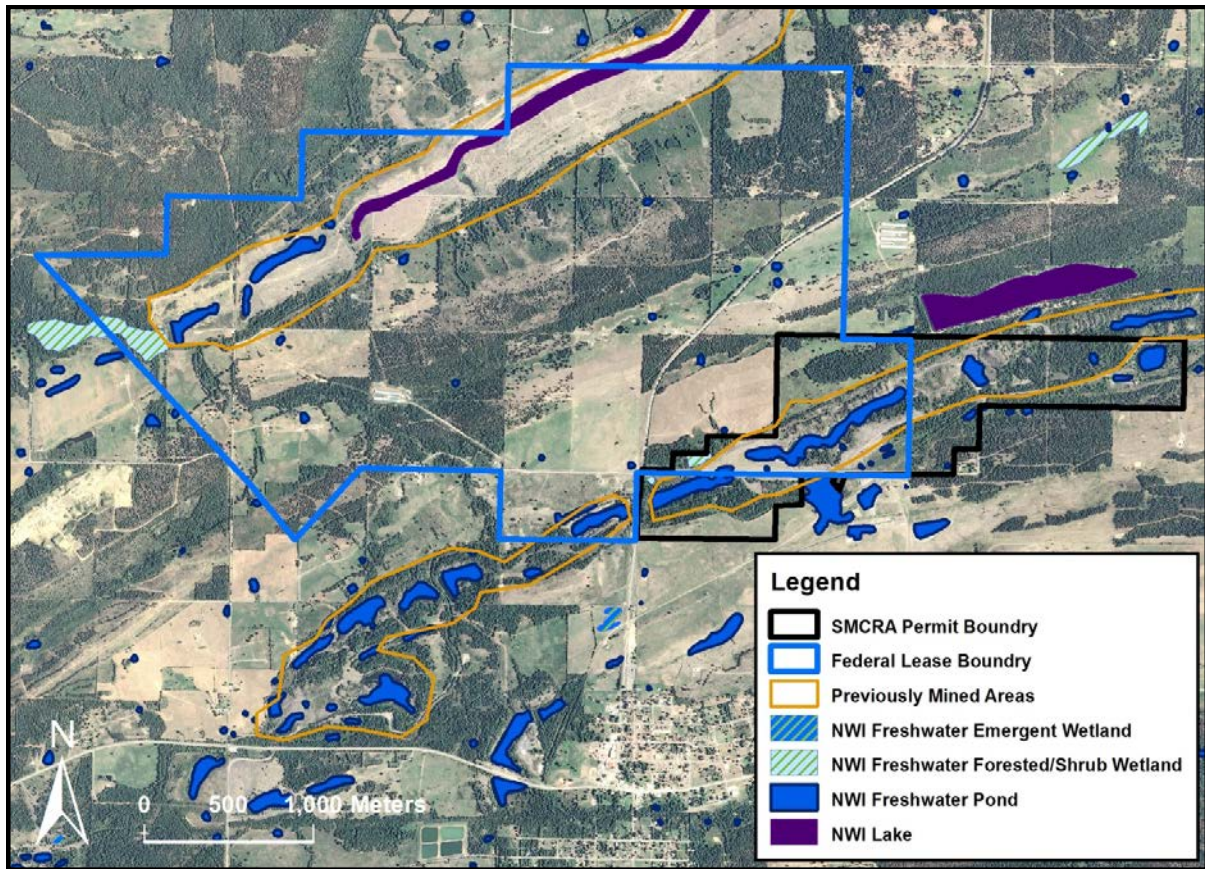
### (a) Vegetation

#### (1) Existing Conditions

The action area lies within the western most portion of Arkansas Valley Plains, a USEPA Level IV Ecoregion (37d). The Arkansas Valley Plains are located within the rain shadow of the Fourche Mountains and features a mildly undulating topography on droughty soils. Historically, large areas were subjected to routine fire which facilitated widespread prairies with scattered savanna and woodland cover types. Woodlands within the Arkansas Valley Plains are primarily dominated by oak-hickory or oak-hickory-pine forests (Anderson, 2006). Current and past land uses have converted much of the natural prairies and savannas within the ecoregion to pasture and hay land.

Historically, the action area was likely entirely forested however prior mining and tree clearing for grazing purposes has highly altered the vegetative community. Most of the permitted area

was surfaced mined in the 1960s and early 70s as was an additional section on the northwestern edge of the federal lease area (fig. 7). Areas unsuitable for grazing purposes due to steep unreclaimed spoil ridges were quickly colonized by local volunteer species. A small portion of the western side of the SMCRA permit was regraded and reclaimed to pasture in 2006 by the Oklahoma Conservation Commission’s Abandoned Mine Land Program (OCC) Four distinct vegetation types exist within the Federal Lease and SMCRA permitted boundaries of the proposed mine. The vegetation types include (A) oak-hickory woodlands, (B) grazingland with native and introduced grasses, (C) improved Bermuda grass pasture, and (D) wetlands



**Figure 7.** Premine vegetation (aerial photo: 2010 National Agriculture Imagery Program).

**A. Oak-Hickory Woodland/Forest**

The primary vegetation community of the site is a woodland complex with an oak and hickory association. The common canopy species found on the site include post oak (*Quercus stellata*), black oak (*Quercus velutina*) American elm (*Ulmus americana*), hickory (*Carya sp.*), white oak (*Quercus alba*), hackberry (*Celtis occidentalis*), and sycamore (*Platanus occidentalis*). Common understory trees for this association includes flowering dogwood (*Cornus florida*), redbud (*Cercis canadensis*), persimmon (*Diospyros uirginiana*), and eastern redcedar (*Juniperus virginiana*). Additional understory woody vegetation includes: sumacs (*Rhus spp.*), and hawthorns (*Crataegus spp.*), honeysuckle (*Lonicera spp.*), blackberries (*Rubus spp.*), greenbriers (*Smilax spp.*), and Virginia creeper (*Parthenocissus quinquefolia*). The herbaceous components

of the wooded areas within this association are dominated by grasses. Common species include switchgrass (*panicum virgatum*), Indian grass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*), and broom sedge (*Andropogon virginicus*).

The current successional stage of these woodlands varies across the action area from mid-successional to full climax. The areas cleared by mining or logging within the last 30-50 years feature reduced canopy coverage and a higher proportion of herbaceous plants as well as faster growing soft wood species. If left undisturbed, these areas will eventually develop into a well forested oak-hickory climax community. Grazing activity has also impacted the composition and natural succession of these woodlands. Over grazing limits the establishment of climax species like oaks and hickories, encourages the spread of invasive species, and reduces the coverage rates of palatable grasses and forbs. Some of the previously mined unreclaimed areas on the eastern side of the permitted area feature fairly healthy stands of mid-successional oak/hickory woodlands. The steep unreclaimed spoil ridges and valley are less suitable to cattle grazing and as a result these areas have sustained several decades of fairly undisturbed natural succession.

#### B. Grazingland with Native and Introduced Grasses

Areas on site which make up this vegetative community were likely once oak-hickory woodlands (fig. 8). Historical tree clearing coupled with routine grazing has allowed native, non-native, and introduced grasses and forbs to become dominant. Commonly encountered species include: switchgrass (*panicum virgatum*), Indian grass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), Bermuda grass (*Cynodon dactylon*), tall fescue (*Festuca arundinacea*), and sericea lespedeza (*Lespedeza cuneata*). Overgrazing in some portions has allowed for the establishment of less palatable invader species such as broomsedge bluestem (*Andropogon virginicus*), western ragweed (*Ambrosia*



**Figure 8.** Grazing area with native and introduced grasses within the proposed McCurtain permit area bordered by mid to late succession Oak-hickory woodlands.



*psilostachya*), crabgrass (*Digitaria* spp.) and foxtail (*Hordeum* spp.).

### C. Improved Bermuda Grass Pasture

The improved pasture within the action area consists primarily of Bermuda grass (*Cynodon dactylon*) and tall fescue (*Festuca arundinacea*). Tall fescue is a perennial grass with broad, coarse basal leaves. It is less palatable than many other cool season varieties but widely adapted to soil and climatic conditions in eastern Oklahoma. Tall fescue grows well on poor soils and furnishes abundant grazing during the late fall and spring. During warmer months when fescue is less productive, Bermuda grass, the primary cattle forage on the site, provides increased grazing potential and opportunities for an economical hay crop. Bermuda is a perennial, warm-season grass that spreads by extensive stolons and underground root stocks (rhizomes). Bermuda grass tolerates close, continuous grazing and, like fescue, is drought tolerant. While these exotic forages provide improved land use capability for livestock, they adversely impact vegetative biodiversity through increased competition and colonization over native plant populations.

### D. Wetlands

The action area contains a diverse array of freshwater aquatic habitats including: open water (lakes and ponds), streams, forested/shrub and emergent wetlands. The vegetative communities of the wetland areas differ significantly from the three previously discussed upland vegetation types. The majority of the aquatic habitats within the SMCRA permitted area are remnant cuts, spoil piles, and diversions channels left over from historic surface mining in the 1960s and early 70s. These features were colonized by hydrophilic volunteer plant species and naturally developed into beneficial fish and wildlife habitats.

The majority of wetlands on site include emergent and submergent vegetation, shrub scrub, and dead timber (fig. 9). Commonly encountered species include: pond lilies (*Nymphaea* sp), waterweed (*Elodea* sp), common rush (*Juncus effusus*), smartweed (*Polygonum* sp), rose mallow (*Hibiscus moscheutos*), button bush (*Cephalanthus occidentalis*), water willow (*Justicia americana*), cattail (*Typha* sp), and honey locust (*Gleditsia triacanthos*)).



**Figure 9.** Wetland area within the proposed McCurtain permit area.

## (2) Direct and Indirect Effects by Alternative

Alternative 1: With this alternative, there would be no change in the site vegetation composition other than the normal succession of the woodlands on the site. The continuance of livestock grazing within the area would impact the herbaceous and wooded plant communities. All aquatic resources (wetland, ponds, and streams) and their associated vegetative communities would remain unaltered.

Alternative 2: Impacts to vegetation resulting from Alternative 2 include the conversion of 203 acres of woodland, native grasslands, and wetlands to improved Bermuda grass pasture.

Oklahoma's Comprehensive Wildlife Conservation Strategy has identified Post Oak/Blackjack Oak Woodland as a Moderate Priority Conservation Landscape. The report cites a lack of historic fire regime and fragmentation due to land use conversion as the primary conservation issues. According to the Partner's in Flight Bird Conservation Plan for the Ozark Ouachitas (Physiographic Area 19), 50% of Haskell County is forested. The expected loss due to mining activity is less than 0.1% of the total forested area in LeFlore County.

The applicant has proposed seeding the reclaimed pasture land with a forage/legume mix. The exact seed selection and rates are unknown. The SMCRA permit allows FCMC to choose a minimum of two permanent and temporary cover species from an approved list included in the permit's appendix. However, the permit does not hold the applicant to the approved list because it states that, "*At the time of planting, other species may be more suitable for planting as determined by the applicant.*" This language provides the applicant with nearly unlimited flexibility with regards to species selection and seeding rates and considerably hinders informed analysis of any potential impacts to the resource. The approved permit specifically authorizes the establishment of three potentially invasive and/or noxious plant species: sericea lespedeza, Sudan grass, and tall fescue.

Sericea lespedeza also known as Chinese bushclover (*Lespedeza cuneata*) is a perennial legume native to Asia. Though listed as a noxious weed in neighboring Kansas, sericea is not currently on the USDA-NRCS noxious weed list for Oklahoma. However, it is commonly recognized as a highly invasive species undesirable for cattle due to its high concentration of tannins. The Oklahoma Invasive Plant Council includes sericea lespedeza in its list of the 12 most problematic invasive species in the state. Cattle will often avoid grazing sericea in favor of more palatable grasses and forbs further accelerating its spread. Sericea lespedeza was once commonly utilized on reclaimed mine land due to the plant's ability to fix nitrogen and tolerance to acidic and droughty soils. Unfortunately, without proper management sericea displaces native vegetation, alters habitats, and can dramatically increase land management costs.

Sudan grass (*Sorghum bicolor drummondii* formerly *Sorghum vulgare sudanese*), also known as shatter cane, is an annual grass native to eastern Africa and commonly cultivated throughout the world for forage or as a cover crop. This plant species contains varying amounts of cyanogenic glucosides which within the rumen of cattle covert to prussic acid. Prussic acid interferes with respiratory function and can be lethal to cattle in high concentrations. Horses fed Sudan grass are known to develop cystitis syndrome, a condition similar to colic, which can also be fatal. Toxicity issues are highest with younger plants and when more mature plants are stressed from

droughts and overnight frosts (Vogel, et al., 1987). Sudan grass is listed as a noxious weed in six states though not in Oklahoma. Sudan grass is known for its rapid and aggressive growth which can quickly out compete native plants and crops.

Tall fescue (*Fescue arundinacea*) is a cool season perennial grass native to Europe. Fescue forms dense, low growing mats, which inhibit the establishment of other plant populations (both woody and herbaceous). Tall fescue is also allelopathic. An allelopath releases toxic substances that suppress the growth of surrounding plants. Tall fescue may become invasive in some habitats and displace desirable vegetation if not properly managed. Tall fescue's drought tolerance is enhanced by the presence of an endophytic fungus, *Neotyphodium coenophalium*, which produces alkaloids toxic to wildlife and livestock (Bates, 1997). Most fescue pastures in the United States are dominated by a tall fescue variety known as Kentucky 31. These pastures are highly endophyte infected. Fescue toxicity can cause several different ailments to cattle and horses including fat necrosis, gangrenous extremities, loss of milk production, foaling problems and death (Puntum, et al., 1990). Varieties of endophyte-free and novel endophyte tall fescue are now readily available throughout the country. Novel endophyte varieties of tall fescue contain special strains of the fungus which are non-toxic but still provide the benefits of drought tolerance and pest resistance.

Permit 4285F lacks an unambiguous, detailed revegetation plan. Farrell-Cooper has used the following seed mix for pasture cover on similar sites in the area: Bermuda grass (30 bushels of sprigs/5 pounds of seed per acre), tall fescue (40 pounds of seed per acre), subterranean clover (2-3 pounds of seed per acre), and perennial ryegrass (5-20 pounds of seed per acre). Temporary or cover crop species in the mix include annual ryegrass, (*Lolium multiflorum*) at 10-20 pounds per acre, winter rye (*Secale cereale*) at 10-20 pounds per acre, and Sudangrass (*Sorghum sudanense*) at 40 pounds per acre.

Reclamation to improved pasture would increase available forage crops for livestock and hay production. However, the indirect and long-term effects resulting from exclusive pasture reclamation include the loss of native plant populations and a decrease in the wildlife diversity that they support. Under this alternative, forage availability for cattle would increase at the expense of losing native plant communities well into the foreseeable future. Impacts to the existing vegetation resources would be moderate and permanent within the disturbance boundary. More than 140 acres of land with an undeveloped land use (unmanaged woodland habitat) would be converted to improved pasture. This change is consistent with the desire of the surface owners to place their property in production for support of increased livestock operations. The cumulative impact to vegetation in the local area becomes very minor because the acreage is a very small percentage of the total forested and woodland acreage available to support wildlife resources.

Alternative 3 (Preferred Alternative): Executive Order 13112 requires all federal agencies “to the extent possible and permitted by law,” to “not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or anywhere else.” Under this alternative, the establishment of vegetation on all disturbed lands within the boundary of the Federal lease will be limited strictly to the plant species listed in the SMCRA permit excluding sericea lespedeza (*Lespedeza cuneata*) and Sudan grass (*Sorghum bicolor drummondii*). The planting of tall fescue (*Fescue arundinacea*) will be

limited to novel endophyte and/or endophyte free cultivars. The use of the variety known as Kentucky 31 Tall Fescue will not be allowed. If sericea or Sudan grass becomes established, the applicant will undertake measures to control and eradicate these species or any other invasive species which may become established. Restricting the use of these species will reduce some of the negative impacts associated with the land use conversion and increase the capability of the land as pasture. Limiting the applicant's species selection to an approved list will remove much of the uncertainty associated with the approved revegetation plan.

*(b) Fish and Wildlife Resources*

(1) Existing Conditions

Overall wildlife resources are directly related to the habitat types occurring on the site. Existing wildlife habitat within the McCurtain site includes: mid-successional oak-hickory woodlands, grazingland with native and introduced grasses, improved Bermuda grass pasture, and aquatic resources including wetlands, ponds, and streams. State and Federal fish and wildlife agencies have not identified any sensitive habitat required for migratory birds of high Federal interest within the proposed project area. The USFWS and the Oklahoma Natural Heritage Inventory (ONHI) list the American burying beetle as an endangered species that may be found within the proposed project boundary.

Common forest species of southeast Oklahoma are expected to occupy most of the project area and include up to 48 mammal species in addition to a wide variety passerine birds, reptiles, and amphibians. A few black bears may be present. The more open early-successional woodlands and unmanaged pasture areas provide habitat for eastern cottontail rabbits, coyotes, raccoons, beaver, striped skunk, opossum, and red fox.

Wildlife diversity on the permit area is enhanced by the small streams, shallow herbaceous and forested wetlands, and large and small ponds. These landscape features provide a drinking water source for larger mammals, larval habitat for a variety of amphibians, habitat for reptiles associated with water, succulent herbaceous browse in the form of hydrophytic vegetation, and foraging areas for insectivorous bats and birds.

White-tailed deer and game bird species such as the eastern wild turkey and northern bobwhite are the most important game species in the action area. Northern bobwhite populations within the vicinity of the permit area have been substantially reduced by the conversion of native grasslands to coastal Bermuda grass and tall fescue. Small populations of mourning doves may inhabit open land during the annual migrations. Important small game mammals in the area include eastern fox squirrel, eastern gray squirrel, and eastern cottontail rabbit.

A diversity of nongame wildlife species (i.e. passerines, raptors, amphibians, and reptiles) are associated with habitats of the action area. The dominant habitats found within the area—oak-hickory woodlands—support a variety of resident and seasonal nongame species. Passerines are numerous and use the entire range of the site.

FCCM conducted a bird survey of the site in September of 2011. FCCM's survey identified 13 species of migratory birds (as defined by USFS's official migratory bird list) within or in close proximity to the permit area. The migratory birds found during the survey include the following

species: great blue heron, turkey vulture, eastern meadowlark, field sparrow, red winged blackbird, American crow, great roadrunner, red-bellied woodpecker, red shoulder hawk, mourning dove, hairy woodpecker, and tufted titmouse. Species lists from a nearby breeding bird survey route (Pocola) were reviewed to identify additional species common to the area that would be expected to occupy the premining habitats on the permit area. Common migratory bird species expected to use the woodlands of the site are yellow-billed cuckoo, downy woodpecker, eastern wood-pewee, great crested flycatcher, eastern kingbird, summer tanager, chipping sparrow, and Baltimore oriole. Common migratory bird species expected to be utilizing the early-successional woodlands and scrub habitats on the site include Bell's vireo, northern mockingbird, common yellowthroat, yellow breasted chat, field sparrow, northern cardinal, blue grosbeak, indigo bunting, and painted bunting. Full listing of all bird species found in the past ten years at the nearby Pocola Breeding Bird Survey route is provided in Appendix 2.

## (2) Direct and Indirect Effects by Alternative

Alternative 1: Under this alternative, no changes would occur to the wildlife habitat characteristics, and, therefore, site conditions would likely remain the same. No temporary impacts such as removal of existing soil and vegetation from the proposed mining area would occur. Existing resident and migrant wildlife species and habitats would remain undisturbed.

Alternative 2 and Alternative 3 (Preferred Alternative): The loss of habitat and the land use conversion would have direct and predictable effect on the wildlife populations within the permit area. Land that has been reclaimed to improved pasture would support a different wildlife community—one that is expected to be less diverse and abundant than what is there now.

Wildlife species preferring open, early-successional (recently disturbed) habitats would initially benefit from the effects of mining activities as woodlands and forest are cleared and weedy vegetation invades portions of the mine site. Animals expected to benefit from an increase in early-successional habitats include bobwhite quail, dickcissel, horned lark, field sparrow, meadowlarks, American goldfinch, a wide variety of wintering sparrows (white-throated, white-crowned, Leconte's, field, etc), coyote, deer mouse, white-tailed deer, hispid cotton rat, and cottontail rabbit. Due to recent population declines, the bobwhite and field sparrow are listed as a priority species for the Partners in Flight Ozark-Ouachita physiographic area.

As disturbed areas are regraded and converted to improved pasture, wildlife diversity and abundance would decrease. Not only do pasture grasses have limited browse and seed value for species such as white-tailed deer, cottontail rabbits, bobwhite quail, and wild turkey, but the sod-forming nature and invasive characteristics of the forage crops would displace other plants beneficial to wildlife. Plant species proposed for the improved pasture have been examined for their value to wildlife, and their overall value is low. The wildlife habitat value of the established pastures would be dependent on management practices by the landowners following bond release. These practices would ultimately determine the structural diversity and species diversity of the reclaimed areas. A lack of cover on closely grazed or hayed pastures would contribute to a further decreased wildlife habitat value for this land use category.

Four temporary and permanent impoundments are included in the reclamation plan and would be constructed as a result of mining activities. These impoundments range from 2.1 acres to 16.2

acres. They are proposed for various locations throughout the area and would replace some of the open water aquatic habitat lost as well as provide a perennial water source for wildlife species. The constructed 1.5 acre wetland would help mitigate some of the wetlands lost during mining and provide valuable habitat for fish and wildlife.

As with the game and non-game wildlife species described above, numerous species subject to the Migratory Bird Treaty Act would suffer a permanent loss of habitat in the postmine landscape due to the land use conversion. A large number of nesting migratory birds would be disrupted by the clearing of the forests and woodlands during the nesting season. To minimize the impacts to migratory bird species during their nesting season, the clearing of undeveloped woodland would be conducted as much as possible during the months of August through March as recommended by the USFS. If clearing is required within the nesting period, a migratory bird nest survey will be conducted to determine presence of migratory birds and any active nests located will be left in place until the eggs have hatched and the young have fledged. As a relatively large block of woodland is converted to pasture, the impacts of the land use would extend into habitats outside of the disturbance. Increased fragmentation could impact forest and woodland migratory bird species that are area sensitive—species preferring large blocks of continuous habitats. Forest fragmentation would also have a predictable negative effect on songbird species nesting adjacent to the disturbance area. These are species that are susceptible to nest parasitism by brown-headed cowbirds.

Migratory birds favoring early-successional habitats would see a dramatic increase in available habitat as land clearing and mining proceed. This consequence would likely continue until reclamation is complete and the perennial dominated improved pastures are fully established. Following pasture establishment, a few species capable of utilizing grazed or hayed pastures for foraging or nesting (scissor-tailed flycatcher, eastern meadowlarks, eastern bluebird, northern rough-winged swallow, barn swallow, killdeer, red-winged blackbirds, and brown-headed cowbirds) would see an increase in available habitat as a result of the land-use conversion. The new ponds would create open-water habitat with shallower open shorelines more favorable to Canada geese, migrating ducks, and wading birds during the spring and fall migrations.

The cumulative impact due to the conversion of migratory bird habitat and potential loss of nest or young during land clearing would be confined to the permit area and is not expected to have any impact on the range-wide status of the species involved.

*(c) Threatened and Endangered Species*

(1) Existing Conditions

The USFWS listed the following threatened or endangered species as occurring in Haskell County: American burying beetle (ABB), interior least tern, and the piping plover. The Oklahoma Natural Heritage Inventory list 5 species of concern occurring in Haskell County (Table 2).

**Table 2.** Oklahoma species of conservation concern known to occur in Haskell County.

	Federal Status	State Status	Scientific Name	Common Name
Fish		T	<i>Percina maculata</i>	Blackside Darter

Reptiles		CS SS2	<i>Macrochelys temminckii</i>	Alligator Snapping Turtle
Insects	E	E	<i>Nicrophorus americanus</i>	American Burying Beetle
Birds	T	E	<i>Haliaeetus leucocephalus</i>	Bald Eagle
Mammals		SS2	<i>Mustela frenata</i>	Long-Tailed Weasel

T = threatened E = endangered CS = Statewide Closed Season SS2 = Species of Special Concern

The interior least tern and piping plover utilize sand and gravel bars associated with large river systems. The blackside darter is represented by natural heritage data within the Robert S. Kerr Reservoir eight-digit HUC watershed but considered extirpated/possibly extirpated within Haskell County (NatureServe, 2009). This fish prefers cool clear streams with moderate current, gravel substrate and deep pools. The long-tailed weasel and alligator snapping turtle are assigned a State rank of “SS2” in Oklahoma. These are species identified by technical experts as possibly threatened or extirpated but for which additional information is needed. The weasel is a wide-ranging habitat generalist and activities on the project area are not expected to influence the range-wide status of the species. The alligator snapping turtle is the largest freshwater turtle in the world. Leaving the water only to lay eggs, the turtle’s habitat includes primarily large rivers and their backwaters. Hunting is the primary reason for the alligator snapping turtles decline in Oklahoma.

The ABB occurs in Haskell County and is known to utilize the type of habitat found at the project area. This insect is a large, black-and-orange carrion beetle once found in 32 states and Canada but now known only in Rhode Island, Massachusetts, South Dakota, Nebraska, Kansas, Arkansas, Texas, and Oklahoma. The ABB was designated in August 1989 as a Federal endangered species. Before 1990, the Oklahoma ABB population was known from the capture of ten specimens. During the summer of 1990, the Oklahoma Natural Heritage Inventory (ONHI) reported the capture of four specimens in Latimer County. Since then, captures have been made in Latimer and surrounding counties. In eastern Oklahoma, the presence of the ABB has been documented as of mid-1996 in Tulsa, Cherokee, Muskogee, Sequoyah, Haskell, Pittsburg, Latimer, LeFlore, and Bryan Counties.

Reasons for the decline of this species are not well understood, but habitat fragmentation and pesticides are possible contributing factors. This insect buries carcasses of small vertebrates for its own food and for that of its hatching larvae. Like other carrion beetles, burying beetles play an important role in ecosystems by recycling dead materials. Predators and other scavengers such as American crow, raccoon, fox, opossum, and skunk compete with the ABB for carrion. The ABB are known to particularly utilize grass/forb/shrub seral stages of pine-oak or oak-dominated open- and closed-canopy forests, mesic hardwood forests, dry-mesic oak woodlands, and dry oak woodland habitats within its range. At this time, no critical ABB habitat has been designated by the USFWS or Oklahoma Department of Wildlife Conservation (ODWC).

An August 2010 survey failed to capture any ABB on the permit area. In 2009 the USFWS concluded from this survey that ABB removal is not required within the permit area, and impacts

are not likely to occur to this species. However, based on the annual cyclic nature of ABB populations, survey results are only valid for one year from the last date of the survey. Additional ABB surveys and the ongoing reporting of survey results to the USFWS would be required for this site.

## (2) Direct and Indirect Effects by Alternative

Alternative 1: Under this alternative, mining activities would not take place. Therefore, site conditions and habitat would remain the same as it currently relates to the ABB.

Alternative 2 and Alternative 3 (Preferred Alternative): As determined in the SMCRA permit findings and in this EA, no adverse impacts are expected to occur to any species protected under the Endangered Species Act as a result of these alternatives. A completed survey did not capture any ABB on the permit area. Consequently, the USFWS determined that impacts to the ABB are not likely. However, survey results are valid for one year from the conclusion of the survey; additional surveys would be required for the permit area.

## Social Environment

### (a) *Recreation Resources*

#### (1) Existing Conditions

There are no national, state, county, or municipal parks in the proposed permit area. Designated wilderness, trails, wild and scenic rivers, or lands with other special environmental or recreational classifications do not exist within the project area. No public lands would be affected by the proposed action.

The primary recreational use of the proposed permit area is seasonal hunting. However, the land is under private ownership and hunting is limited to only those individuals granted access. Potential game species found on the site include whitetail deer, wild turkey, eastern cottontail, mourning dove, bobwhite quail, squirrel, and raccoon.

#### (2) Direct and Indirect Effects by Alternative

Alternative 1: Under this alternative, there would be no change to the existing recreational resources in the permit area.

Alternative 2 and Alternative 3 (Preferred Alternative): Impacts to the recreational resource values of the mined area would be minor and temporary—limited to the life of the mining and reclamation plus the time necessary for wildlife populations to become reestablished. New open-water impoundments would provide habitat for fish, wetland species, and wildlife. Some game species should return to the area as cover and food sources are reestablished. Surface mining activities may change the movement patterns and the habitats of the game associated with seasonal hunting in this area. Hunters and fishermen would be restricted from the project area during the life of the mining and reclamation operations.



*(b) Visual Resources*

(1) Existing Conditions

The proposed mine site is located in a rural setting in eastern Haskell County. County landscape is moderately to strongly sloping wooded hills with stream corridors and interspaced agricultural fields. The leased area lies below the Seven Devils and Campground Spring Mountains. The majority of the permitted area was historically mined and then abandoned. The visual resources within the permit boundary are highly disturbed and unnatural in comparison to the surrounding landscape. Access to potential overlooks is limited by private ownership of the land and the lack of well traveled roads.

(2) Direct and Indirect Effects by Alternative

Alternative 1: Under this alternative, there would be no change to the existing visual resources in the permit area.

Alternative 2 and Alternative 3 (Preferred Alternative): Impacts to the visual resource values would be minor and temporary. The visual resource values of the proposed permit area are typical of the region. There are no unique values identified on the proposed mine unit and the area is not visible from any known sensitive observation point. The mine site cannot be seen from any major highway or scenic travel route.

*(c) Parks, Historical, and Cultural Resources*

(1) Existing Conditions

In December 2010, Farrell-Cooper's consulting archaeologist investigated the archaeological, historical, cultural, and paleontological resources of the proposed permit area. The consultant found a historic homestead, a site containing prehistoric materials, and evidence of historic coal mining. The Oklahoma Historical Society (OHS), Oklahoma Archeological Survey (OAS), and Choctaw Nation of Oklahoma had an opportunity to examine the survey report during the permit application review process.

In a letter dated April 27, 2012, the Deputy State Historic Preservation Officer (SHPO) of OHS declared no sites were eligible for listing on the National Register of Historic Places within the ODM permitted area. The OAS gave clearance for the project in April 2012 while in January 2011 the Choctaw Nation of Oklahoma had given clearance for the project to proceed. As a result of the Section 106 process, no historic properties were determined to occur in the project area. This determination was made in the SMCRA permit findings document.

No State or Federal parks or recreation areas exist within or adjacent to the proposed project area.

(2) Direct and Indirect Effects by Alternative

Alternative 1: There would be no change in the condition of the proposed permit area, so there would be no adverse effects to heritage resources as a result of this alternative.

Alternative 2 and Alternative 3 (Preferred Alternative): There would be no adverse impacts to heritage resources as a result of these alternatives because no historic or cultural properties would be affected by the proposed action and no parks are within or adjacent to the permit area. Standard conditions found in the ODM permit and ASLM mining plan approval document for the McCurtain operation would protect any future discoveries of heritage resources from mining impact by requiring timely notification of such discoveries be made to both ODM and OSM.

*(d) Environmental Justice*

(1) Existing Conditions

Executive Order No. 12898 requires Federal agencies to respond to the issue of environmental justice by “identifying and addressing disproportionately high adverse human health and environmental effects of its programs, policies, and activities on minority and low income populations.” Haskell County, Oklahoma encompasses the analysis area. According to the 2010 U.S. Census data, there are approximately 12,769 people who reside within the county. Within this population demographic, 72.5% are persons of White/Caucasian descent, 16.2% are Native American, 3.6% are persons of Hispanic or Latino origin, 0.7% are persons of black or African American descent, and 0.6 % are of Asian origin. The other 6.4% of the population reported as being some other race or combination of races.

As reported by the U.S. Census, the median household income for Haskell County in 2006-2010 was \$37,474 and the poverty rate was at 12.3%. In comparison, the 1999 Census demographics for the state of Oklahoma demonstrated a median household income of \$42,979 and a poverty rate of 16.2%. These data indicate that Haskell County is marginally above the Oklahoma state poverty average and below mean household income levels. In addition, the demographic data indicate that few minorities reside within the county.

(2) Direct and Indirect Effects by Alternative

Alternative 1: This alternative neither adds to nor diminishes the local economy or employment opportunities. Likewise, there would be no adverse environmental impacts on minority populations as a result of this alternative.

Alternative 2 and Alternative 3 (Preferred Alternative): These alternatives would add to the local economy and employment opportunities for the skilled and unskilled labor workforce through (1) continued employment of mining and contracted personnel from existing permits, (2) potential creation of new employment opportunities to accommodate for on-going mining operations, and (3) strengthening the local economy and tax base by the addition of local revenue through workforce development.

Due to the rural location of the proposed action and nominal level of minority individuals and families residing in LeFlore County, there would be minimal adverse environmental consequences on these populations as a result of Alternative 2 or Alternative 3.

*(e) Socioeconomics*

(1) Existing Conditions

As stated in the environmental justice analysis in this chapter, the census data demonstrates that Haskell County is marginally above the Oklahoma state poverty average and below mean household income levels. There is a potential for impacts on the population and economic base of the local area as a result of the proposed action and action alternatives. Approximately 50 individuals would be employed at the McCurtain Mine at an annual income higher than the county average. Secondary employment is estimated at 75 persons and mine life is projected to be 40 to 80 years.

(2) Direct and Indirect Effects by Alternative

Alternative 1: If this alternative is selected, there would be no immediate change in the existing opportunities for employment or in the economic base of the area. However, increased economic stimulus from mining, coal sales, and support enterprises would be lost under this alternative.

Alternative 2 and Alternative 3 (Preferred Alternative): Under these alternatives, coal mining operations would proceed. The results could be an increase in economic stimulus through employment opportunities and support services for the mine. Active mining would occur over a 40- to 80- year period with production of about 7.5 million tons of Federal coal from the site. Final reclamation activities and reclamation bond liability would continue for a number of years after the last coal is recovered. Local economic stimulus would likely increase or remain the same as a result of this alternative. The proposed action balances coal production while protecting sensitive environmental resources within the McCurtain mine area.

*(f) Noise and Transportation*

(1) Existing Conditions

Primary travel routes which overlap the McCurtain lease area include several improved county roadways (E1265, E1270, E1275, D1275, N4510, N4515, N4520, N45 and N4550) and a primary paved highway (US 26). These roads currently carry local light vehicle and heavy truck traffic. Highway 26 bisects the Federal lease area but lies outside and to the west of the ODM permitted area. Existing noise impacts include highway and county road traffic.

(2) Direct and Indirect Effects by Alternative

Alternative 1: Under this alternative, there would be no change to the current background noise of the area. Transportation routes would remain unaltered and not be subjected to any additional traffic.

Alternative 2 and Alternative 3 (Preferred Alternative): Mining activities at the proposed mine would contribute to an increased level of noise above the natural background of a sparsely populated rural area. Sources of noise pollution from coal mine development activities include

blasting and operation of bulldozers, haul trucks, and other heavy equipment. Once the mine begins normal operations, sources of noise pollution will be heavy equipment or conveyors moving coal, ventilation fans, and a coal processing plant. During mining operations this noise pollution should be attenuated because it will occur in a depression created for access to the coal seam. Noise impacts, affecting people living within a few miles of the mine, would be minor and long term. The noise pollution would no longer exist after mining operations cease.

Noise from blasting and equipment operations, including mine ventilation fans, might also affect wildlife populations and nesting behavior. Noise could result in the displacement of numerous animal and bird species in the area, although this impact would be minor and cease after the close of mining operations.

There would be minor and temporary impacts to the highway and county roads near the proposed permit area. In some areas, CR E1275, CR D1275, and CR N45 are within 100 feet of the proposed disturbance boundary. Farrell-Cooper has received a variance from the LeFlore County Commission to mine within 100 feet of these public roads. County Road (CR) E1275 runs along the southern edge of the permit and is expected to serve as the primary access and haul road transporting mined coal off the site and onto HWY 26. Heavy- and light-truck traffic on CR E1275 and HWY 26 would increase under these alternatives. Coal trucks and employee personal vehicles would utilize these transportation routes frequently, increasing impacts to these roads.

CR N45 bisects an area proposed for a coal mine waste disposal site. CR N45 serves as the sole access road to several small residences along the banks of Club Lake. Construction of the mine waste site will require the temporary closer and/or detour of CR N45.

During blasting operations, traffic on CR E1270, CR E1275, CR D1275, and CR N45 may be blocked to prevent vehicles and personnel from entering the blasting area. Farrell-Cooper would do this to minimize the chance of people being injured by falling blast debris. These impacts would be temporary and would no longer exist after mining operations cease.

### *(g) Air Quality*

#### (1) Existing Conditions

The U.S. Environmental Protection Agency established National Ambient Air Quality Standards in 1971. The Oklahoma Department of Environmental Quality has adopted similar standards for statewide air quality protection. This legislation required air quality planning that classifies an area as “attainment” or “nonattainment.” Nonattainment refers to those areas that do not presently meet the national air quality standards. Haskell County is considered an attainment area. The proposed mine site is located in a rural area dominated by pasture and other agricultural land uses. There are currently no substantial impacts to air quality, industrial or otherwise, in the area of the proposed mine.

#### (2) Direct and Indirect Effects by Alternative

Alternative 1: Under this alternative, there would be no change to the air quality in the local area.

Alternative 2 and Alternative 3 (Preferred Alternative): Under these alternatives, air quality impacts typical of mining operations would affect the local area. Local air quality deterioration would result from increased dust levels and emissions from blasting, mining equipment, and over-the-road coal trucks. Typically, the periodic watering of roads and other traffic areas would be accomplished to reduce dust formation. The air quality impacts to the few local residents living near the proposed permit boundary would be minor and temporary. National and State air quality standards are not predicted to be exceeded under this alternative. Air quality changes would be limited primarily to the coal-recovery phase of the McCurtain Mine.

### 3.2 Cumulative Impact Consideration

Alternative 1: Under this alternative, temporary and long-term environmental impacts would occur that are consistent with the reclamation requirements of the BLM approved exploration plan. Additional proposed coal leases adjacent to and reliant upon the McCurtain mine's approval would likely be delayed or withdrawn. Socioeconomic advantages such as employment opportunities and increased revenue generated by the proposed project would not be realized as a result of this alternative.

Alternative 2 and Alternative 3 (Preferred Alternative): Both positive and negative cumulative impacts are anticipated under the proposed action. Under the preferred alternative, cumulative impacts would primarily result from proposed land use and vegetation changes, as well potential subsidence impacts. The conversion of mixed oak-hickory woodlands and wetlands to improved pasture would reduce wildlife habitat. The introduction of exotic plants including Bermuda grass in once-forested areas would decrease vegetative biodiversity within the project area but increase land-use capability for livestock operations.

The scope of the cumulative effects on the physical and biological environments within the permit boundary would be minor because of pre-existing surface disturbances resulting from abandoned mining activities. Many of the soil resources in the disturbance area have been lost during the previous mining activities, so there will be limited topsoil to place on the disturbed areas. Because of the increase in the amount of pasture postmining land use with the associated reclamation of abandoned mine land, we anticipate minor and long-term cumulative effects relating to soil resources.

BLM published a notice of Notice of Intent (NOI) in the Federal Register on June 24<sup>th</sup>, 2011 to amend its Resource Management Plan (RMP) for Oklahoma. The proposed RMP amendment includes a proposed lease for the McCurtain No. 2 Mine. The McCurtain No. 2 Mine is a 1,300 acre proposed coal lease which expands the underground shadow area of the McCurtain Mine approximately 2.5 miles to the east. This proposed lease will have a cumulative positive effect on socioeconomic resources of the area. Employment opportunities and local revenue will increase in both scale and duration. Negative impacts associated with the underground shadow area of the McCurtain mine such as the potential for subsidence would increase in spatial and temporal scale. Surface impacts such as land use changes and loss of wildlife habitat would increase should additional entry portals and/or coal mine waste disposal areas be required.

Much of the permitted area was strip mined and abandoned prior to 1977 and the implementation of SMCRA. As such, several public safety and environmental issues exist on the unreclaimed

site. 170 acres within and around the permit have or will be reclaimed by the Oklahoma Conservation Commission's (OCC) AML Program as part of approved AML plan. FCMC has asked OCC to remove 20 acres from this plan in order to conduct surface and underground mining operations. If the mine plan is approved FCMC will be responsible for reclaiming the 20-acre portion, saving the public approximately \$240,000 in AML program costs and result in a minor positive impact to socioeconomic and environmental resources.

Considering the scale and potential longevity of the proposed mining operation the overall cumulative impact of surface and underground activities associated with Alternative 2 and Alternative 3 (Preferred Alternative) would be moderate and long term.

### 3.3 Federal, State, Regional and Local Land Use Plans and Policies

There are no Federal, State, or local land use plans or policies that can be impacted by this mine

## Chapter 4. Consultation and Coordination

Preparers

<b>OSM</b>		
<b>NAME</b>	<b>TITLE</b>	<b>RESPONSIBILITY</b>
Larry Emmons	Soil Scientist	Mining Plan Decision Document
Brian Hicks	Hydrologist	Water Resources
Nick Grant	Natural Resource Specialist	Biological Resources
Bill Joseph	Program Support Division Chief	NEPA Deciding Official
<b>ODM</b>		
Darrell Shults	Geologist	NEPA Consultation
Doug Cross	Ecologist	NEPA Consultation
Tek Tsegay	Hydrologist	NEPA Consultation

### Agencies Contacted During Development and Review

U.S. Army Corps of Engineers, Tulsa District  
 U.S. Department of the Interior, Fish and Wildlife Service, Tulsa Field Office  
 U.S. Department of the Interior, Bureau of Land Management  
 Choctaw Nation of Oklahoma  
 Oklahoma Department of Wildlife Conservation  
 Oklahoma Archeological Survey  
 Oklahoma Historical Society, State Historic Preservation Office

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## APPENDIX A Surface Water

**Table A-1.** Summary statistics for baseline data from six stream water monitoring stations of the mine plan area.

(mg/L, milligram per liter; N, number of samples; cfs, cubic feet per second)

Constituent	Units	N	Minimum	Mean	Median	Maximum
pH	standard units	29	6.1	7.5	7.5	8.8
Acidity	mg/L as CaCO <sub>3</sub>	26	2	17	16	60
Alkalinity	mg/L as CaCO <sub>3</sub>	26	10	117	120	200
Total iron	mg/L	29	0.13	2.55	0.74	13.30
Total manganese	mg/L	29	0.03	1.70	0.37	19.40
Sulfate	mg/L	29	7	111	83	290
Chloride	mg/L	16	1.0	8.0	10.0	15.0
Calcium	mg/L	16	8.0	26.6	23.2	72.0
Magnesium	mg/L	16	2.1	19.0	17.5	46.0
Sodium	mg/L	16	6.8	19.5	19.5	36.0
Potassium	mg/L	16	1.4	2.4	2.0	7.0
Total dissolved solids	mg/L	29	44	289	256	841
Flow	cfs	47	0	0.1	0.1	0.7

**Table A-2.** Summary statistics for baseline data from two water monitoring stations on Club Lake.

(mg/L, milligram per liter; N, number of samples)

Constituent	Units	N	Minimum	Mean	Median	Maximum
pH	standard units	7	6.8	7.7	7.45	8.8
Acidity	mg/L as CaCO <sub>3</sub>	7	2	13	10	40
Alkalinity	mg/L as CaCO <sub>3</sub>	7	52	116	80	220
Total iron	mg/L	7	0.16	0.34	0.27	0.91
Total manganese	mg/L	7	0.01	0.08	0.11	0.12
Sulfate	mg/L	7	12	62	66	95
Total dissolved solids	mg/L	7	20	138	148	148

**Table A-3.** Summary statistics for baseline data from seven impoundments in the mine plan area.

(mg/L, milligram per liter; N, number of samples)

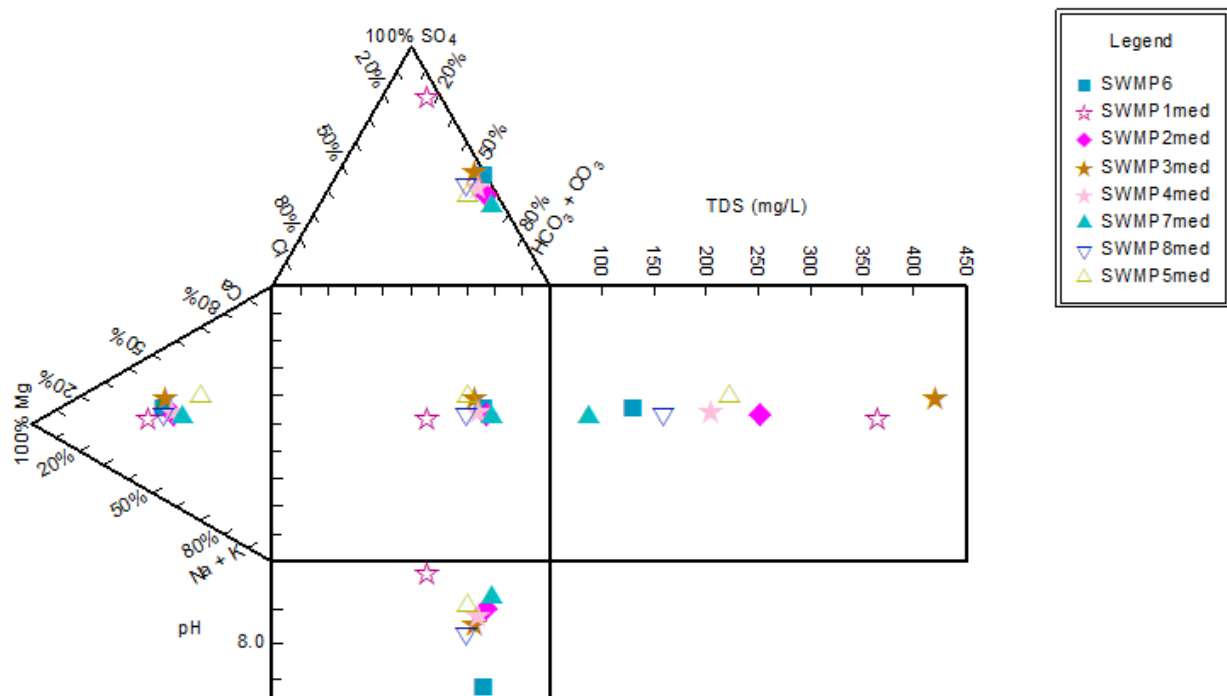
Constituent	Units	N	Minimum	Mean	Median	Maximum
pH	standard units	7	7.3	7.9	7.8	9.4
Acidity	mg/L as CaCO <sub>3</sub>	7	2	25	20	40
Alkalinity	mg/L as CaCO <sub>3</sub>	7	60	117	116	200
Total iron	mg/L	7	0.31	7.76	2.61	21.60
Total manganese	mg/L	7	0.06	1.07	1.24	1.91
Sulfate	mg/L	7	43	287	200	850
Total dissolved solids	mg/L	7	93	434	335	939

## APPENDIX A Continued

**Table A-4.** Mann-Whitney comparison of medians (baseline record)—upstream station (SWMP 4) of the highwall stream versus the furthest downstream station (SWMP 3) for all combined drainage from the mine plan area.

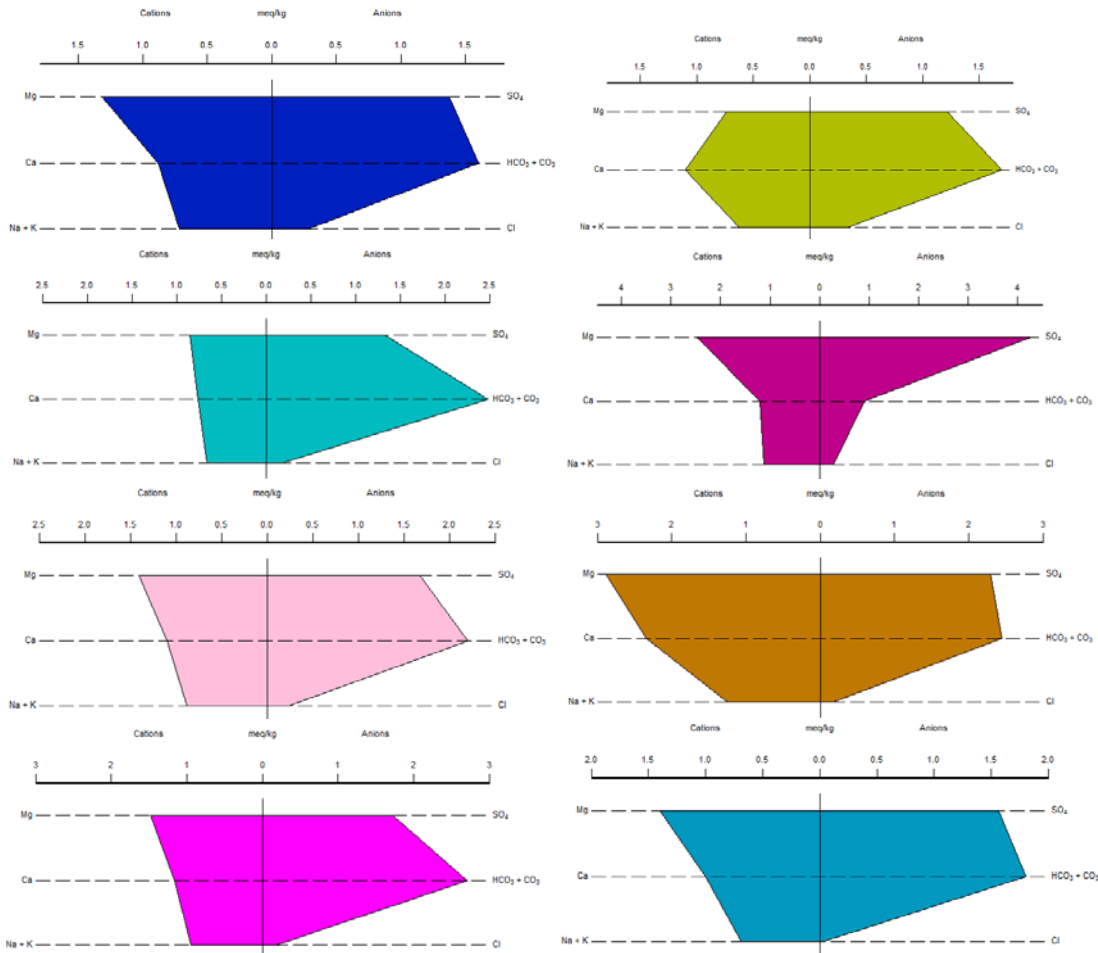
(mg/L, milligram per liter; N, number of samples; cfs, cubic feet per second)

Constituent	Units	SWMP3		SWMP4		Medians are different at 95% confidence level
		N	Median	N	Median	
pH	standard units	6	7.74	8	7.61	NO
Acidity	mg/L as CaCO <sub>3</sub>	6	23.0	8	15.0	NO
Alkalinity	mg/L as CaCO <sub>3</sub>	6	122.0	8	110	NO
Total iron	mg/L	6	1.10	8	0.61	NO
Total manganese	mg/L	6	0.36	8	0.20	NO
Sulfate	mg/L	6	110.0	8	70.5	NO
Chloride	mg/L	2	6.25	4	8.5	NO
Calcium	mg/L	2	46.8	4	22.0	NO
Magnesium	mg/L	2	35.0	4	17.0	NO
Sodium	mg/L	2	27.5	4	19.0	NO
Potassium	mg/L	2	1.95	4	1.85	NO
Total suspended solids	mg/L	6	7.0	8	6.5	NO
Total dissolved solids	mg/L	6	420.5	8	204.5	YES
Flow	cfs	6	0.3	8	0.2	NO



**Figure A-1.** Major-ion composition, pH, and total dissolved solids (TDS) of water sampled from surface water monitoring stations of the proposed McCurtain underground mine. Unlike the other stations which display median values, SWMP 6 shows an analysis of a single sample.

APPENDIX A Continued



**Figure A-2.** Major-ion composition (median values) of water from surface water monitoring stations at the proposed McCurtain underground mine. Left column from the top: SWMP 8 and SWMP 7 (both Club Lake stations), stream stations SWMP 4 and SWMP 2 below Club Lake; right column from the top: SWMP 5, SWMP 1, water from all stations passes through SWMP 3 except that SWMP 6 (for which there was only one sampling event ) is in a different watershed.

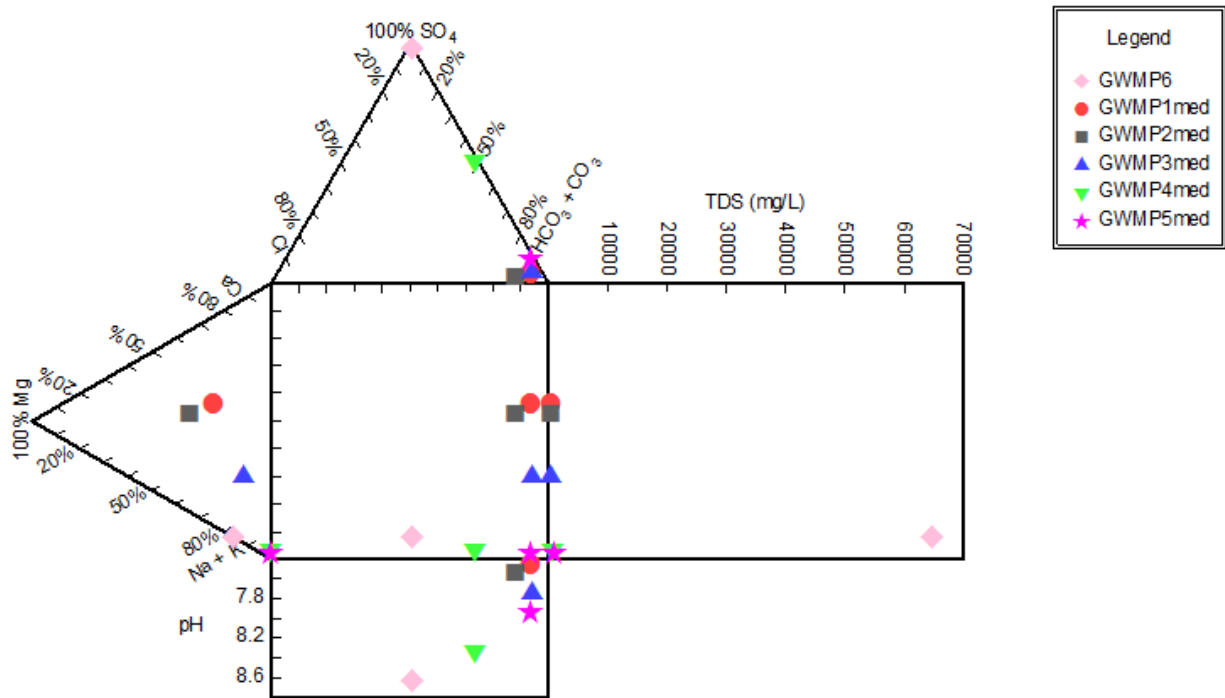
## APPENDIX B Ground Water

**Table B-1.** Summary baseline ground-water data for three residential wells and six monitoring wells.

(mg/L, milligram per liter; N, number of samples; TDS, total dissolved solids)

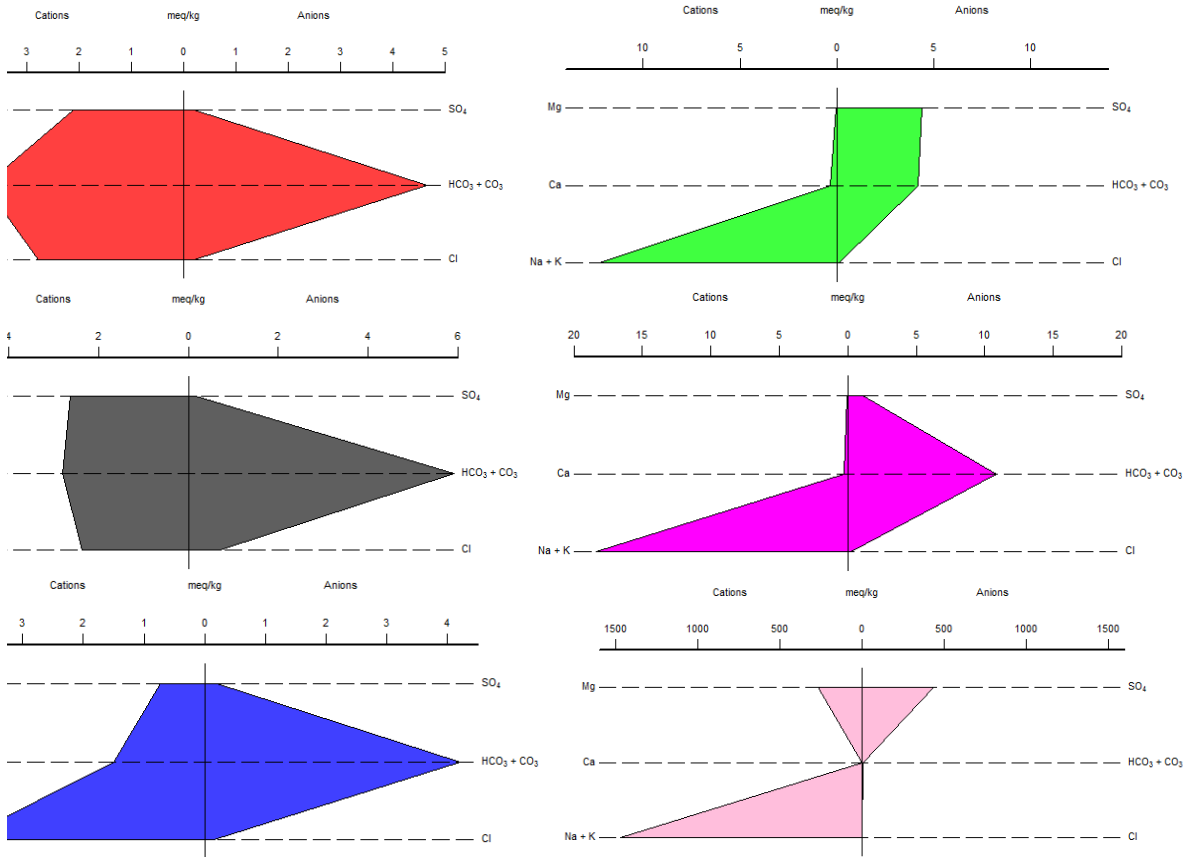
Constituent	Units	Residential well water			Monitoring well water			95% confidence interval for median*
		N	Range	Median	N	Range	Median	
pH	standard units	5	6.3–7.6	7.3	31	6.4–9.1	7.7	7.6–7.9
Acidity	mg/L as CaCO <sub>3</sub>	5	<2–60	<2	31	<2–80	6	2.0–30.0
Alkalinity	mg/L as CaCO <sub>3</sub>	5	60–360	200	31	30–620	280	220–380
Total iron	mg/L	5	1.08–6.13	2.52	31	0.199–183.6	0.943	0.443–1.08
Total manganese	mg/L	5	0.093–1.35	0.22	31	<0.01–5.35	0.225	0.115–0.435
Sulfate	mg/L	5	18–260	90	31	2–22,000	30	10.0–53.0
Chloride	mg/L	5	10.0–15.0	15.0	21	2.5–42.5	7.0	5.0–11.5
Calcium	mg/L	5	17.6–56.0	24.0	21	4.0–80.0	28.0	8.0–48.0
Magnesium	mg/L	5	8.4–37.0	12.0	21	0.4–3400	9.1	1.3–26.0
Sodium	mg/L	5	32.0–210.0	120.0	21	42.0–31,000	93.0	66.0–280.0
Potassium	mg/L	5	1.0–5.5	1.2	21	1.0–7200	1.4	1.2–1.8
TDS	mg/L	5	220–797	460	31	270–65,000	475	405–622

\*Bootstrap intervals for monitoring well water constituents—500 subsamples (3-19-12)



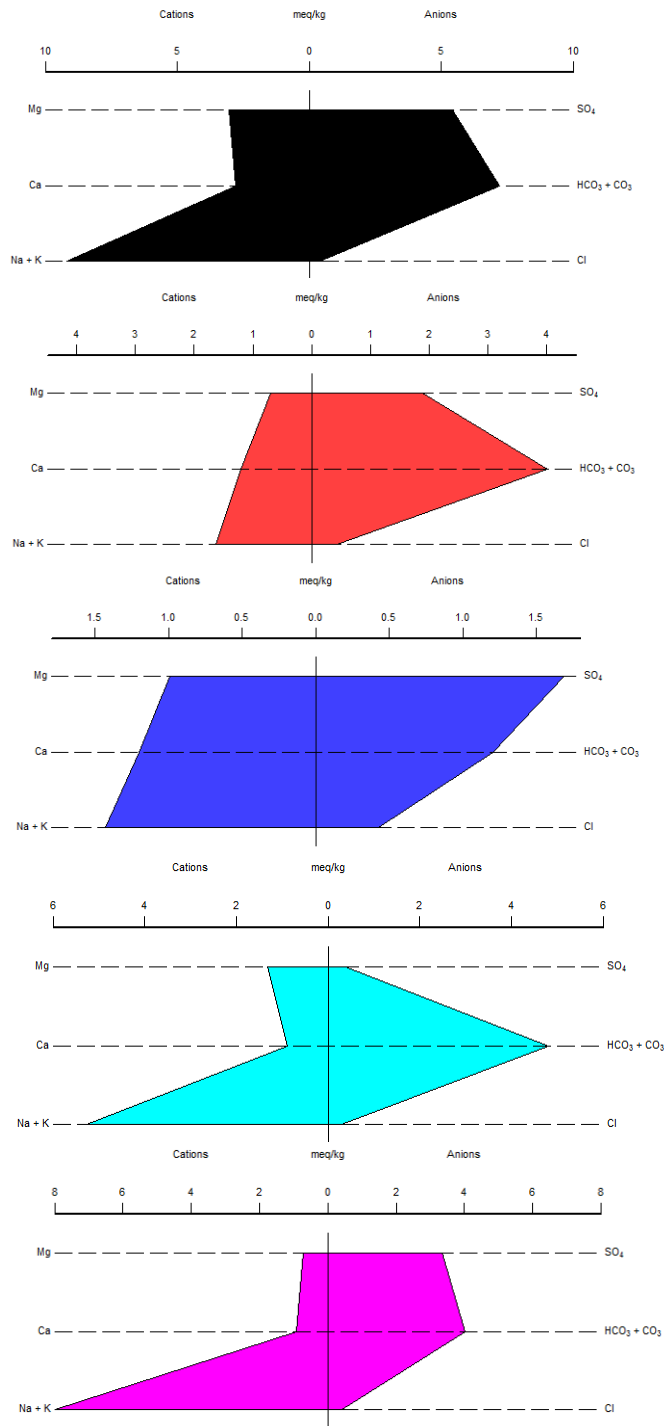
**Figure B-1.** Major-ion composition, pH, and total dissolved solids (TDS) of water produced from monitoring wells of the proposed McCartney underground mine. All wells are completed in bedrock, either above (GWMPs 1, 2, and 3) or within (GWMPs 4, 5, and 6) the Hartshorne Coal. Unlike the other wells which display median values, GWMP 6 shows an analysis of a single sample.

APPENDIX B Continued



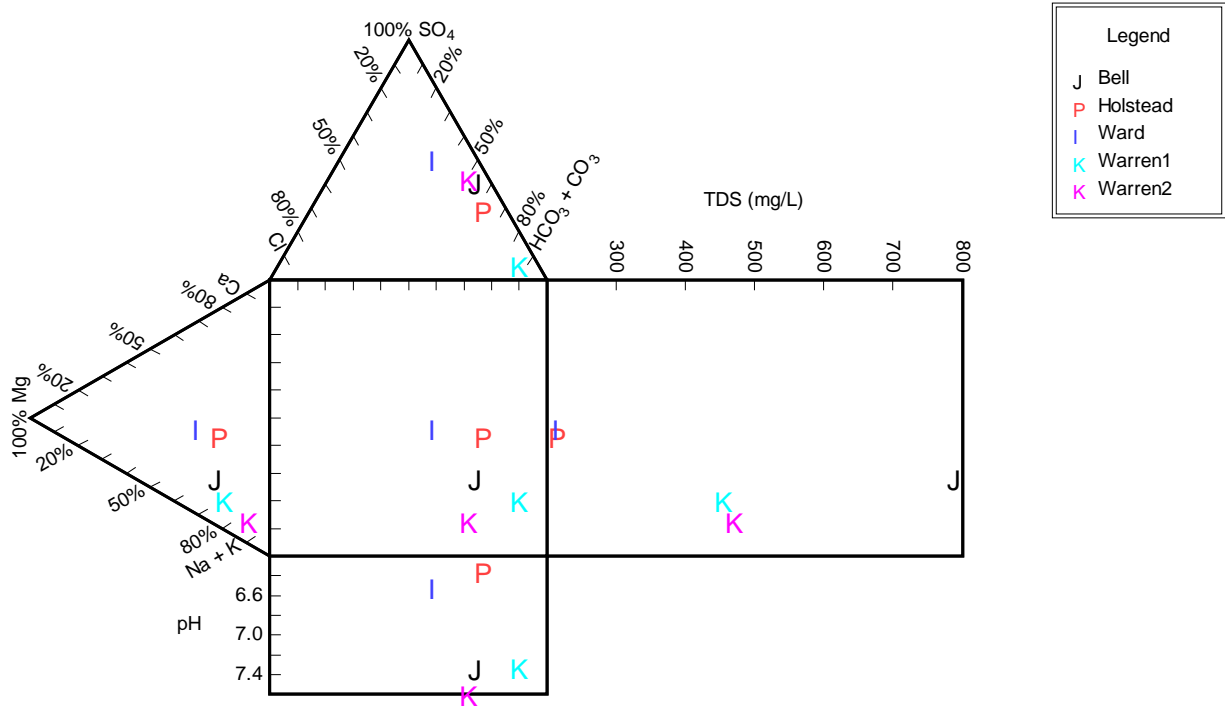
**Figure B-2.** Major-ion composition (median values) of water from monitoring wells of the proposed McCurtain underground mine. Left column from the top: GWMP 1, GWMP 2, and GWMP 3; right column from the top: GWMP 4, GWMP 5, and GWMP 6 (a single sampling event).

APPENDIX B Continued



**Figure B-3.** Major-ion composition of water from private wells near the McCurtain proposed underground mine. From top to bottom, the wells are: Bell, Holstead, Ward, Warren 1, and Warren 2.

APPENDIX B Continued



**Figure B-4.** Major-ion composition, pH, and total dissolved solids (TDS) of water produced from private wells in the area of the proposed McCurtain underground mine. All wells are completed in bedrock, either above the Hartshorne Coal (Bell, Holstead, and Ward) or below this coal bed (Warren 1 and Warren 2).

**APPENDIX C** All historical records of breeding bird species detected at sample locations along BBS Route 67057 (Pocola, Okla.), query date 06/26/2012

Species List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
(Yellow-shafted Flicker) Northern Flicker	0	2	0	0	-	0	0	0	0	-	-
Acadian Flycatcher	22	0	0	0	-	4	0	1	0	-	-
American Crow	38	43	35	49	-	42	26	18	45	-	-
American Goldfinch	4	4	6	1	-	3	6	5	2	-	-
American Robin	39	33	31	39	-	18	25	20	24	-	-
Bald Eagle	0	0	0	0	-	2	0	0	0	-	-
Baltimore Oriole	3	1	0	2	-	2	3	4	1	-	-
Barn Swallow	30	41	30	30	-	48	52	37	27	-	-
Barred Owl	1	1	0	0	-	0	0	0	0	-	-
Bell's Vireo	23	5	9	4	-	3	9	6	5	-	-
Belted Kingfisher	1	0	0	0	-	0	0	0	1	-	-
Bewick's Wren	4	3	4	1	-	2	0	3	0	-	-
Black Vulture	0	5	0	0	-	0	0	0	0	-	-
Black-and-white Warbler	2	2	0	1	-	0	3	0	1	-	-
Blue Grosbeak	16	16	21	22	-	24	20	14	14	-	-
Blue Jay	9	7	12	5	-	13	12	17	14	-	-
Blue-gray Gnatcatcher	21	16	12	15	-	19	21	11	15	-	-
Broad-winged Hawk	0	1	0	0	-	0	0	0	0	-	-
Brown Thrasher	2	5	8	6	-	5	3	5	7	-	-
Brown-headed Cowbird	38	42	30	30	-	46	39	28	40	-	-
Canada Goose	0	0	0	0	-	0	3	0	0	-	-
Carolina Chickadee	10	9	12	23	-	10	6	13	9	-	-
Carolina Wren	3	7	7	6	-	1	10	9	4	-	-
Cattle Egret	32	0	1	61	-	0	15	0	0	-	-
Chimney Swift	3	6	3	4	-	3	3	5	3	-	-
Chipping Sparrow	5	6	4	9	-	0	4	3	8	-	-
Chuck-will's-widow	1	2	0	0	-	0	0	0	0	-	-
Common Grackle	14	13	28	17	-	21	9	10	8	-	-
Common Nighthawk	1	0	0	0	-	0	0	0	0	-	-
Common Yellowthroat	1	5	5	1	-	7	0	5	1	-	-
Cooper's Hawk	0	0	0	0	-	1	0	0	1	-	-
Dickcissel	75	100	114	86	-	72	33	57	52	-	-
Downy Woodpecker	2	8	11	13	-	10	5	9	9	-	-
Eastern Bluebird	19	28	21	25	-	24	48	17	16	-	-
Eastern Kingbird	11	9	9	13	-	24	31	11	13	-	-
Eastern Meadowlark	101	114	113	162	-	118	77	82	96	-	-
Eastern Phoebe	10	4	11	9	-	7	7	9	8	-	-
Eastern Wood-Pewee	22	13	10	19	-	19	14	10	11	-	-
Eurasian Collared-Dove	0	0	0	0	-	1	1	5	2	-	-
European Starling	32	64	66	82	-	74	56	37	58	-	-
Field Sparrow	14	21	18	14	-	22	25	8	9	-	-
Fish Crow	10	5	3	6	-	0	6	5	6	-	-
Grasshopper Sparrow	0	3	0	2	-	0	0	0	0	-	-
Gray Catbird	1	1	2	3	-	11	0	1	1	-	-
Great Blue Heron	2	1	1	3	-	6	4	2	0	-	-
Great Crested Flycatcher	14	4	4	7	-	9	5	4	4	-	-



Great Egret	0	0	1	0	-	4	1	0	2	-	-
Great Horned Owl	0	1	1	2	-	0	0	0	0	-	-
Great-tailed Grackle	0	1	0	0	-	4	0	0	2	-	-
Greater Roadrunner	0	0	0	1	-	0	0	1	0	-	-
Green Heron	1	3	1	2	-	3	2	6	2	-	-
Hairy Woodpecker	0	0	0	0	-	2	0	1	0	-	-
House Finch	3	1	3	2	-	19	2	6	0	-	-
House Sparrow	65	95	103	103	-	26	39	22	49	-	-
Indigo Bunting	26	26	20	17	-	32	41	34	47	-	-
Kentucky Warbler	1	2	5	1	-	9	1	1	2	-	-
Killdeer	7	9	6	15	-	13	13	11	13	-	-
Lark Sparrow	4	8	3	6	-	6	9	3	3	-	-
Little Blue Heron	0	0	0	0	-	5	0	0	0	-	-
Loggerhead Shrike	3	2	1	1	-	1	3	3	1	-	-
Mourning Dove	23	32	49	57	-	37	25	37	36	-	-
Northern Bobwhite	20	26	30	41	-	16	15	12	13	-	-
Northern Cardinal	53	68	65	68	-	59	73	59	67	-	-
Northern Mockingbird	113	125	125	137	-	105	120	99	102	-	-
Northern Parula	4	3	2	3	-	5	1	0	4	-	-
Northern Rough-winged Swallow	5	2	4	3	-	9	7	5	1	-	-
Orchard Oriole	1	1	1	2	-	1	1	1	1	-	-
Painted Bunting	34	21	34	15	-	26	26	25	24	-	-
Pileated Woodpecker	0	2	1	2	-	2	2	1	2	-	-
Pine Warbler	0	0	0	0	-	0	0	1	0	-	-
Prothonotary Warbler	1	1	0	0	-	1	1	2	0	-	-
Purple Martin	2	11	6	1	-	4	1	5	6	-	-
Red-bellied Woodpecker	13	16	19	20	-	15	12	13	19	-	-
Red-eyed Vireo	1	2	4	0	-	2	3	1	2	-	-
Red-headed Woodpecker	0	2	3	1	-	1	1	1	0	-	-
Red-shouldered Hawk	1	2	2	2	-	0	0	0	0	-	-
Red-tailed Hawk	1	2	2	0	-	5	1	4	2	-	-
Red-winged Blackbird	20	38	28	33	-	24	14	17	32	-	-
Rock Pigeon	0	0	0	0	-	4	0	0	0	-	-
Ruby-throated Hummingbird	5	4	1	3	-	4	3	2	4	-	-
Scissor-tailed Flycatcher	13	19	21	25	-	33	16	13	18	-	-
Snowy Egret	0	0	0	2	-	0	0	0	0	-	-
Summer Tanager	1	2	2	1	-	4	4	3	1	-	-
Tufted Titmouse	25	43	21	30	-	28	14	18	31	-	-
Turkey Vulture	2	1	1	4	-	10	6	6	4	-	-
Warbling Vireo	3	2	0	0	-	0	0	0	0	-	-
Western Kingbird	0	1	0	0	-	0	0	0	0	-	-
White-breasted Nuthatch	2	1	0	1	-	0	2	0	2	-	-
White-eyed Vireo	2	3	0	2	-	4	2	1	2	-	-
White-winged Dove	0	0	0	0	-	0	0	1	0	-	-
Wood Thrush	0	0	0	0	-	22	0	0	0	-	-
Yellow-billed Cuckoo	15	19	12	12	-	15	14	8	3	-	-
Yellow-breasted Chat	3	1	0	0	-	1	4	1	1	-	-
Yellow-crowned Night-Heron	0	3	0	0	-	0	1	0	0	-	-
Yellow-throated Vireo	0	0	0	0	-	1	0	1	0	-	-
<b>Total Species</b>	<b>71</b>	<b>77</b>	<b>63</b>	<b>67</b>	<b>0</b>	<b>72</b>	<b>67</b>	<b>69</b>	<b>65</b>	<b>0</b>	<b>0</b>
<b>Total individuals</b>	<b>1088</b>	<b>1251</b>	<b>1218</b>	<b>1385</b>	<b>0</b>	<b>1233</b>	<b>1061</b>	<b>896</b>	<b>1013</b>	<b>0</b>	<b>0</b>

