



# STATE OF ALABAMA SURFACE MINING COMMISSION

Page 1 of 26

Permit Number:P- 3998

License Number:L- 861

## PERMIT TO ENGAGE IN SURFACE COAL MINING OPERATIONS

Pursuant to **The Alabama Surface Mining Control and Reclamation Act of 1981**, as amended, ALA. Code Section 9-16-70 et. seq. (1975) a permit to engage in Surface Coal Mining Operations in the State of Alabama is hereby granted to:

Signal Resources, LLC  
240 Oxmoor Circle  
Suite 111  
Birmingham, AL 35209

Such operations are restricted to 75 acres as defined on the permit map and located in:

This permit is subject to suspension or revocation upon violation of any of the following conditions:

1. The permittee shall conduct Surface Coal Mining and Reclamation Operations in accordance with the plans, provisions and schedules in the permit application.
2. The permittee shall conduct operations in a manner to prevent damage or harm to the environment and public health and safety and shall notify ASMC ~~and the public in accordance with ASMC Rule 880-X-8K-16~~ of any condition which threatens the environment or public health and safety.

SEE ATTACHMENT

**LEGAL DESCRIPTION**  
**P-3998-64-24-S**

**SW/SW of Section 15, NW/SE, NE/SE, SE/SE, SW/SE and SE/SW of Section 16, NE/NW, NW/NE, NE/NE, and SE/NE of Section 21, and NW/NW of Section 22, all in Township 14 South, Range 8 West, Walker County, Alabama.**

## CONDITIONS TO BE PLACED ON PERMIT P-3998-64-24-S PAGE #1

3. Surface coal mining operations are restricted to those areas for which sufficient bond has been posted with ASMC. On the date of issuance of this permit, bond was posted only for increment(s) 1 consisting of 27 acres as defined on the permit map.
4. No mining disturbance is to occur on any part of the permit on which legal "right of entry" has not been obtained. When such rights are "pending" the applicant shall submit acceptable evidence, to the Director, that such rights have been obtained according to ASMC Regulation 880-X-8D-.07.
5. No disturbance is to occur on any properties on which land use comments from legal owners of record are "pending" prior to the applicant providing acceptable comments.
6. No disturbance is to occur in the 300' setback area to any occupied dwelling prior to the applicant providing acceptable evidence to ASMC of its having secured a waiver of each subject area signed by the owner of the dwelling.
7. No mining disturbance shall occur within the 100' setback of any public road or the relocation of any public road prior to the applicant providing acceptable evidence, to the Director, of its having secured approval for a waiver from the appropriate jurisdictional authority and specific written waiver from ASMC.
8. The permittee shall notify the ASMC and seek consultation with the US Fish and Wildlife Service if:
  - a. The permit is modified in any way that causes an effect on species or Critical Habitat listed under the Endangered Species Act of 1973.
  - b. New information reveals the operation may affect Federally protected species or designated Critical Habitat in a manner or extent not previously considered or
  - c. A new species is listed or Critical Habitat is designated under the Endangered Species Act that may be affected by the operation
9. The permittee shall contact the ASMC and consult with the Alabama Historic Preservation Officer if the permit is modified or if previously unknown archaeological or historic resources are discovered on the permit area. Upon discovery of previously unknown artifacts or archaeological features the permittee shall cease operations until the Alabama Historic Preservation Officer approves resumption of operations.
10. No blasting is allowed on this permit until a signed blasting plan is submitted to the ASMC.
11. The permittee must conduct all tree removal activities between October 15 and March 31 within the bat potential summer roosting habitat area.

**CONDITIONS TO BE PLACED ON PERMIT P-3998-64-24-S PAGE #2**

12. All bat potential summer roosting habitat occurring within the permit area must be flagged in a flagging color different than that of the permit boundary prior to conducting mining activities. Potential summer roosting habitat is identified in yellow on the BAT POTENTIAL SUMMER ROOSTING HABITAT MAP dated 02/13/2019 in the Spaulding habitat survey dated 13 February 2019.

*Sum 11/6/2019*  
**DATE ISSUED: November 6, 2019**

**EFFECTIVE DATE: November 6, 2019**

**EXPIRATION DATE: November 5, 2024**

  
**Kathy H. Love, Director**

**FINDINGS TO BE PLACED ON PERMIT NO.: P-3998-64-24-S PAGE #1**

The ASMC, acting by and through its Director, hereby finds, on the basis of Information set forth in the application or from information otherwise available, that --

1. The permit application is complete and accurate and the applicant has complied with all requirements of the Act and the regulatory program.
2. The applicant has demonstrated that reclamation as required by the Act and the regulatory program can be accomplished under the reclamation plan contained in the permit application.
3. The proposed permit area is:
  - (a) Not within an area under study or administrative proceedings under a petition, filed pursuant to Chapter 880-X-7 to have an area designated as unsuitable for surface coal mining operations;
  - (b) Not within an area designated as unsuitable for mining pursuant to Chapter 880-X-7 or subject to the prohibitions or limitations of Section 880-X-7B-.06 and Section 880-X-7B-.07 of this chapter; or
4. For mining operations where the private mineral estate to be mined has been severed from the private surface estate, the applicant has submitted to the Regulatory Authority the documentation required under Section 880-X-8D.07 and Section 880-X-8G-.07 of this chapter.
5. The Regulatory Authority has made an assessment of the probable cumulative impacts of all anticipated coal mining on the hydrologic balance in the cumulative impact area and has determined that the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area.
6. The applicant has demonstrated that any existing structure will comply with Section 880-X-2B-.01, and the applicable performance standards of Chapter 3 or 10.
7. The applicant has paid all reclamation fees from previous and existing operations as required by 30 C.F.R., Subchapter R.
8. The applicant has satisfied the applicable requirements of Subchapter 880-X-8J.

**FINDING TO BE PLACED ON PERMIT NO.: P-3998-64-24-S PAGE #2**

9. The applicant has, if applicable, satisfied the requirements for approval of a long-term, intensive agricultural, post-mining land use, in accordance with the requirements of 880-X-10C-.58(4) and 880-X-10D-.52(4).
10. The operation will not affect the continued existence of endangered or threatened species, or result in destruction or adverse modification of their critical habitats, as determined under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.).
11. The Regulatory Authority has taken into account the effect of the proposed permitting action on properties listed or eligible for listing on the National Register of Historic Places. This finding is supported in part by inclusion of appropriate permit conditions or changes in the operation plan protecting historic resources, or a documented decision that the Regulatory Authority has determined that no additional protection measures are necessary.
12. For a proposed remining operation where the applicant intends to reclaim in accordance with the requirements of Section 880-X-10C-.56 or 880-X-10D-.49, the site of the operation is a previously mined area as defined in Section 880-X-2A-.06.
13. Surface coal mining and reclamation operations will not adversely affect a cemetery.
14. After application approval but prior to issue of permit, ASMC reconsidered its approval, based on the compliance review required by Section 880-X-8K-.10(2)(a) in light of any new information submitted under 880-X-8D-.05(8).
15. The applicant has submitted the performance bond or other equivalent guarantee required under Chapter 880-X-9 of the ASMC Rules prior to the issuance of the permit.
16. For mining operations where a waiver is granted from the 100' setback from a public road according to 880-X-7B-.07, the interests of the public and affected landowners have been protected.

### FINDINGS TO BE PLACED ON PERMIT NO.: P-3998-64-24-S PAGE #3


17. The Regulatory Authority has taken into account the effect of the proposed permitting action on properties listed or eligible for listing on the National Register of Historic Places (NRHP). MRS Consultants, LLC conducted a Phase I Cultural Resource Survey on February 12-15 & 20, 2019 for approximately 211 acres in Walker County, Alabama. As a result of this investigation, one archaeological site (1Wa301) was discovered within the survey area. Site 1Wa3101 is not considered eligible for the NRHP and no further work is recommended. One historic resource and associated cemetery were identified in the Area of Potential Effect (APE) for indirect effect. Stave Hollow Methodist Church/Kings Chapel Church does not meet the aspects of integrity for NRHP nomination. The cemetery is still in use and not considered a significant historic property. Based on these findings, the proposed mining project will have no adverse effect upon any significant historic properties. MRS recommends the project area be cleared regarding cultural resources. By a letter dated November 2, 2018 the Alabama Historic Commission (AHC), Re: AHC 19-0706, upon review of the cultural resource assessment conducted for the above referenced project, determined that the project activities will have no effect on cultural resources listed on or eligible for the NRHP. Therefore AHC concurs with the proposed project activities. Upon a pre-mine inspection ASMC noted a second cemetery south of Increment 1 and east of unnamed county road. This finding is supported in part by inclusion of appropriate permit conditions or changes in the operation plan protecting historic resources or a documented decision that the Regulatory Authority has determined that no additional protection measures are necessary. Concerns for unknown resources, which might be discovered during mining, have been made conditions of the permit.
  
18. In a letter dated February 3, 2019 the Alabama Department of Conservation and Natural Resources (ADCNR) states that a biological survey be conducted by trained professionals to ensure that no sensitive species are jeopardized by the development activities. The closest sensitive species are recorded as occurring approximately 2.4 miles from the subject site. In a habitat assessment performed by Dan Spaulding Environmental Consultant (Spaulding) on February 9 - 10, 2019, no potential habitat for any federally listed Threatened & Endangered species was located on site, except for potential summer roosting habitat for the Indiana and Northern Long-eared (NLEB) bats. Spaulding recommended that tree removal activities be limited to October 15 – March 31. By comments dated April 3, 2019 the US Fish and Wildlife Service (FWS) acknowledges the permittee has stated that tree removal is only to occur between October 15 and March 31, therefore FWS concurs that no impacts to the Indiana bat and/or NLEB are anticipated as a result of your proposed project. No other federally listed species/critical habitat are known to occur in the project area. By letter dated October 8, 2019, the US Army Corps of Engineers (USACE) Nationwide Permit 49- Project Number SAM-2018-00621-CMS states the project will involve the placement of fill into 1,537 linear feet (lf) of stream, 1.2 acres of wetlands, 171 lf of ditch and 4.98 acres of pond, incidental to surface coal re-mining activities. Based upon the Pre- Construction Notification (PCN) the USACE has issued the following special conditions: 1) Provide a net increase in aquatic resource functions when mining is complete in accordance with the “Aquatic Resource

**FINDINGS TO BE PLACED ON PERMIT NO.: P-3998-64-24-S PAGE #4**

Improvement” Plan dated July 25, 2019. 2) To avoid adverse effects to the Indiana bat and NLEB all tree removal activities for the project shall occur October 15 – March 31. The Alabama Surface Mining Commission finds that the proposed operation will not jeopardize the continued existence of endangered or threatened species or critical habitat thereof.

**BASED ON THESE FINDINGS, I RECOMMEND THAT THIS PERMIT BE ISSUED.**

**DATE: November 6, 2019**

  
**Mark A. Woodley**  
**Permit Manager**

/mw

cc: I & E, Permit File



MEMORANDUM

TO: Office of Surface Mining Reclamation and Enforcement

Alabama Department of Environmental Management

Alabama Historic Preservation Officer

The District Engineer  
U.S. Corps of Engineers

Alabama Department of Labor  
Division of Safety & Inspection

BLM - District Office

State of Alabama  
Abandoned Mine Land Reclamation

Walker County Commission

U.S. Fish & Wildlife Service

Mr. Keith Guyse, Fish & Game Division

FROM: **KATHY H. LOVE, DIRECTOR**

RE: **PERMANENT PROGRAM PERMIT FOR:**

**Permit P-3998-64-24-S (Stave Hollow Mine) Signal Resources, LLC**

Pursuant to the Alabama Surface Mining Commission Regulation 880-X-8K-.12(2), we are hereby notifying you of the issuance of the above permit.

You may also view a copy of this permit at our web address of:

<http://surface-mining.alabama.gov/PermitDecisions.html>

Enclosed for your information and file is a copy of the permit which shows the legal description of the mine site.

/mw

## CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

**Permit Number P-3998**  
**Signal Resources, LLC**  
**Stave Hollow Mine**

**NPDES AL0078972**  
**HUC 031601090403**  
**HUC 031601090405**

As required under Federal Public Law 95-87, Section 510(b)(3), the Alabama Surface Mining Commission (ASMC) must find in writing the following proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The applicant must submit a determination of probable hydrologic consequences of mining and reclamation operations in Part II.H of the permit application for areas both on and off the mine site. This determination will allow the ASMC to assess probable cumulative impacts of all anticipated mining activities on the surface and ground water hydrology of the permit and adjacent areas as stated in Federal Public Law 95-87, Section 507(b)(11) and ASMC Rule 880-X-8E-.06(1)(g). The following assessment and findings are intended to fulfill the above.

### **I. GENERAL INFORMATION**

The Signal Resources, LLC (P-3998) Stave Hollow Mine is for a surface, highwall and auger coal mining operation encompassing 75.0 acres in Walker County. The proposed mine site is located in parts of Sections 15, 16, 21 and 22, Township 14 South, Range 8 West, Walker County, Alabama as seen from the Jasper and Townley USGS Quadrangles. Of the 75.0 acres, approximately 64.0 acres are mining acres and 11.0 acres are basins, diversions, haul roads, office and stockpile areas. The site is located north of Burlington Railroad and bisected by Lost Creek. Map No. 1 shows the permit area as well as adjacent permits.

#### **Geology of the Warrior Coal Basin**

The Pottsville Formation of Early and Middle Pennsylvanian age in Alabama is divided into four fields: the Warrior, Cahaba, Coosa and Plateau fields. All fields were once connected by an unbroken area of coal measures, however separation occurred as a result of folding, faulting and erosion of uplifted areas.

The Warrior coal field is a gently folded or flat-lying area classified as the Cumberland Plateau. It lies in a large, gentle monoclinial structure that extends west into central Mississippi. The regional dip is towards the southwest. This regional southwest dip is interrupted by two anticlines (the Blue Creek anticline and the Sequatchie anticline) and three synclines or basins (the Blue Creek basin, Coalburg syncline and Warrior syncline).

The Warrior field has numerous normal faults that trend north and northwest up to 4 miles in length with up to 200 feet of displacement ("Geology of Coal Resources of the Coal-Bearing Rocks of Alabama, Alabama Geological Survey Bulletin 1182-B").

During the beginning of the Pennsylvanian age (approximately 320 million years ago), most of Alabama was still part of a shallow, warm ocean basin. The transgressions and regressions of the seas lead to the rhythmic cycle of sandstone, underclay, coal beds, and shale with zones of marine

and brackish water fossils that rest on the basal resistant conglomerate orthoquartzite of the Boyles sandstone formation. This sequence immediately repeats itself with similar rocks (marine shale, sandstone or clay, coal seam, freshwater shale and sandstone). This appears to show the rise of sea level, depositing marine sediments, then the falling of sea level allowing the coal producing forests to grow. This was followed by an influx of river deposited sands and muds, which would rapidly accumulate plant material. Then, the sea would rise again repeating the process.

At the end of the Pennsylvanian, the uplift of the region left the coal bearing ecosystem behind. During this periods of uplift, no new sediments could be deposited for at least 200 million years. The gap in time between the Pennsylvanian deposition and the Cretaceous deposition resulted in an unconformity that allows for surface coal mining to exist in the Alabama coal fields.

Figure No. 1 shows the coal seams of the Pottsville Formation in relation to each other.

## **II. CUMULATIVE IMPACT AREA (CIA)**

The Cumulative Impact Area (CIA) is that area, including the permit area, within which impacts resulting from the proposed operation may interact with the hydrologic impacts of all other past, current and anticipated coal mining on the surface and groundwater systems.

The CIA for surface water for Permit P-3998 has been defined as the area that surrounds P-3947, P-3980, P3929, and parts of P-3920, P-3923, P-3844 and P-3958 which drain to Lost Creek through unnamed tributaries or creeks. This also includes where Burton Creek enters Lost Creek. Burton Creek receives drainage from P-3869 north of the outlined CIA. Permit P-3969 is not shown in the CIA Map, however where Burton Creek enters Lost Creek it represents all the drainage from P-3969 in the West Fork – Lost Creek watershed. All the sediment basins for P-3998 drain into an unnamed tributary to Lost Creek and Lost Creek. There are two proposed permits within the CIA area also which are discussed in the following section. Other stream reaches in the surface water CIA include Burton Creek, Sparks Branch, Queen Branch, Rocky Branch, Slate Creek, Pumpkin Creek, Horse Creek and Hurricane Creek. This includes those areas of mining operations that may impact this assessment area affected by mining. See Map No. 2 for the CIA. See Table No. 1 for information on these permits.

The CIA for groundwater for this permit is limited to the general permit area itself. The CIA has been selected based upon the Department's assessment of the possible hydrologic impacts, which may occur as a result of mining operations. The subsurface hydrologic components considered in this assessment include all significant water-bearing units in, and within the vicinity of, the proposed permit. No cumulative impacts to groundwater are expected due to the lack of a widespread, regional aquifer system.

### **Active or Proposed Mines**

Active mining in this watershed that would interact with activities of the proposed permit include the Quality Coal Co., Inc. Sparks Branch No. 2 Mine (P-3947), part of the Quality Coal Co., Inc. Dutton Hill Mine (P-3920), Quality Coal Co., Inc. Slate Creek Mine (P-3929), Cedar Lake Mining, Inc. Dutton Hill Mine No. 2 (P-3980), Quality Coal Co. Inc. Pleasant Grove South Mine (P-3844), part of Cedar Lake Mining, Inc. Coal Valley East mine (P-3958) and part of the Xinergy of Alabama Inc. Coal Valley Mine (P-3923) and the Drummond Company Surface Mine No. 1 Mine (P-3869).

At the time of this assessment, two other proposed mines are known within the vicinity. The Signal Resource, LLC Wolf Branch West Mine application (ASMC P-3997) is currently under review. It is located within the footprint of part of the Quality Coal Co., Inc. Pleasant Grove South Mine, P-3844. Also the Signal Resources, LLC New Jagger Coal Fines Recovery application (P-3994), which is located between Sparks Branch and Rocky Branch, south of the Quality Coal Co., Inc. Sparks Branch Mine No. 2 (ASMC P-3947). Both of these permits are included in the CIA.

## **A. Geologic/Hydrogeologic Information**

### **i. Geology**

The proposed P-3998 permit area is located in the Warrior Coal Basin. According to the "Depositional Settings of the Pottsville Formation in the Black Warrior Basin", the Plateau Coal Field is a small, transitional basin which connects the Black Warrior Basin with smaller basins in southeastern Tennessee. The Pottsville Formation underlies and outcrops in this region, which is of Pennsylvanian Age.

Locally, the strata which outcrops in the immediate vicinity of the Stave Hollow Mine site includes sandstones, shales, underclays and coal seams associated with the Mary Lee Coal group. In this permit area, the lithology is predominantly shale. The target seams at this site include the New Castle, Mary Lee and Blue Creek coal seams.

The innerburden between the New Castle and Mary Lee seams is an average 17.9 feet and the innerburden between the Mary Lee and Blue Creek seams averages 22.0 feet. All seams will be mined using area mining and the Mary Lee and Blue Creek seams will also be auger or highwall mined.

### **ii. Potentially Acid- and Toxic-Forming Materials**

Overburden analysis was conducted on three overburden samples adjacent to and outside of the permit area. The analysis was run to determine the potential for acid- and toxic-forming properties. Potentially acid- and toxic-forming materials are those that exhibit a pH of less than 4.0 s. u. or a deficiency in calcium carbonate equivalent of at least 0.0 tons per 1,000 tons of material (T/KT). Samples were collected every 5 feet or change in lithology and analyzed for pH (paste), total sulfur, potential acidity, neutralization potential and fizz rating. Results of analysis show that the overburden at the Stave Hollow Mine contains +2030 tons  $\text{CaCO}_3$ /1000 tons overburden excess neutralization potential, with an acid-base account of +10.36 (tons  $\text{CaCO}_3$ /1000 tons overburden). Information from the permits within the CIA was also considered in evaluating the potential for neutralization. This includes the overburden analysis from P-3947, P-3920, P-3929, P-3844 (expired Pleasant Grove South Permit) and P-3858. Along with overburden analysis information, water quality history of the above referenced surrounding permits was taken into consideration.

### **iii. Surface Water**

The permit area is located in the Warrior Basin and is drained by Lost Creek. It is located in sub watershed 170 of HUC 03160109. Four sediment basins are proposed for this site, all of which are proposed as permanent structures. Two surface water monitoring sites have been established for this permit. One upstream on Lost Creek and one downstream on Lost Creek.

To characterize the existing quality and quantity of water within the above-mentioned stream, baseline data was obtained and submitted in the permit application. Baseline water quality was characterized from a downstream site on Lost Creek (P3980-P3929 SW-3) and an upstream site on Lost Creek (SRSHM-SW1). Also included is current water data on a downstream surface water monitoring site for the Quality Coal Co., Inc. Pleasant Grove South Mine (site P3844-0245000), downstream on Lost Creek from all mining in the chosen cumulative impact area. These data from these surface water sites show little to no impact from previous mining of the watershed at this location. This is most likely due to the size of the watersheds (40,784 acres for the Lower Lost Creek watershed and 35,437 acres for the West Fork – Lost Creek watershed). Baseline data for surface water monitoring sites SRSHM-SW1 and P3980–P3929 SW-3 are shown in Table No. 2 at the end of this assessment. Additionally, metals data was obtained for baseline reference for high flow and a low flow. This data is shown in Table No. 3.

Post-Mining water quality and quantity estimates are based on several factors:

1. Baseline surface water quality
2. Estimated impact during mining
3. Size of the permit area compared to the impacted watershed
4. Amount of previous mining within the watershed

Map No. 2 shows the surface water Cumulative Impact Area for the permit area.

All drainage from this mine site enters Lost Creek. Impact from these mines will best be seen in surface water monitoring site P-3844-02454000 downstream on Lost Creek (at Tubbs Bridge).

#### **iv. Ground Water**

Groundwater in the Warrior Basin occurs in fractures, weathered zones and along bedding planes in the Pottsville Formation. The sandstone beds within 250 to 350 ft. of the surface generally contain the most productive water-bearing openings. Regionally, the primary source of recharge to groundwater is rainfall, which averages 54 inches per year. According to the U.S. Geological Survey Report: Geohydrology and Susceptibility of Major Aquifers to Surface Contamination in Alabama; Area 3 Water-Resources Investigations Report 88-4120, the Pottsville aquifer is tightly cemented and has small primary porosity and permeability, and the yields of public water for wells completed in this aquifer are less than 0.15 Mgal/d (million gallons per day). This aquifer is also commonly high in iron. In the central section of the Warrior Basin groundwater recharges in small valleys and moves southwest to rivers and streams (Assessment of Groundwater Resources in Alabama, 2010 – 2016, Geological Survey of Alabama Bulletin 186).

#### **Domestic Wells**

A well inventory conducted in April, 2019 showed thirty-two structures or residences within a ½ mile radius of the mine site. Four of those had wells, with one well utilized as a primary water source.

#### **Company Installed Wells**

To characterize existing groundwater conditions at the site and adjacent, two groundwater

monitoring sites were utilized for information. These include monitoring wells SRSHM-MW1 and SRSHM-MW2. Ten samples were collected from each site between September 2017 and March 2019.

SRSHM-MW1 is at an elevation of 470 feet msl (mean sea level) and drilled to a total depth of 220 feet, below the Blue Creek seam into a shale unit. It is cased to approximately 60 feet in grey clay, then open hole for the remainder of the depth. This well will be utilized as a groundwater monitoring well for the life of the mine.

Monitoring well SRSHM-MW2 is at an elevation of 477 feet msl and drilled to a depth of 210 feet, below the Blue Creek seam into a shale unit. It is cased to approximately 60 feet in red clay, then open hole for the remainder of the depth. This well will be monitored quarterly for the life of the mine.

Well locations that will be used for performance monitoring can be seen in Map No. 1.

There are no known wellhead protection zones or public water supply wells in or within 1,000 feet of the proposed permit area.

#### **B. Coal Processing Waste**

Coal processing waste (gob and slurry) will not be generated or disposed of at the site.

#### **C. Material Damages**

Material Damage can be considered a long term effect on the hydrologic balance by the mining operation that prevents the reasonable foreseeable future use of surface or ground water from supporting its current, potential or existing use outside of the permit area.

With respect to the CHIA, material damage to the hydrologic balance means quantifiable changes to the hydrologic balance caused by surface mining and reclamation operations to the extent that these changes would significantly affect present or potential uses as designated by the regulatory authority and that cannot be mitigated by reclamation or provision of alternate water supplies. This includes the hydrologic impact that results from the cumulation of flows from all coal mining sites in a cumulative impact area. Examples of material damage are: permanent destruction of a major regional aquifer; temporary contamination of an aquifer in use that cannot be mitigated; and solute contributions to streams above receiving stream standards.

A CHIA is based on the best currently available data and is a prediction of mining-related impacts to the hydrologic balance. Permittees (and permit applicants) are required to monitor water quality and quantity. Exceeding material damage thresholds might also cause significant reduction of the capability of an area to support aquatic life, livestock and wildlife communities.

### **III. FINDINGS**

Based on the information presented above, the following findings have been made relative to the proposed permit area.

## **A. Potentially Acid- and Toxic-Forming Materials**

Laboratory analyses of the bedrock overlying, and immediately below, the Blue Creek seam reveals favorable overburden with an average of +5322 tons/acre excess  $\text{CaCO}_3$ . Because of the excess neutralization potential adverse effects to the hydrologic balance of the area are not anticipated if the overburden is mixed thoroughly prior to reclamation.

The materials handling plan included in the permit application will require any potentially acid- and toxic-forming strata encountered (such as spoiled coal) to be covered with a minimum of four feet of non-toxic, non-combustible earthen material. Also, this material may not be placed within the root zone. The material will undergo relatively quick burial that will restrict the development of acid-forming conditions.

As mentioned earlier, data from adjacent permits was also utilized in the determination for potential acid- and toxic-forming materials. Permit P-3844 (originally Bailey Excavating Company, Inc.) is located south of the Stave Hollow Mine area (see Map No. 1) and is geologically similar to the Stave Hollow Mine area. This permit was issued in July of 2005 and has since expired and has received a phase III bond release or is in reclamation. The New Castle and Mary Lee seams were mined on this permit. Initial overburden data showed an average of 6.51 (tons  $\text{CaCO}_3$ /1000 tons overburden) excess neutralization potential.

Utilized for information purposes was the Quality Coal Co., Inc. Sparks Branch Mine No. 2, P-3947. This permit is located directly east of the Stave Hollow Mine area, with identical geology and hydrology including mining on the New Castle, Mary Lee and Blue Creek seams. This permit was issued in March of 2012, and is active. Average neutralization potential showed +9.93 (tons  $\text{CaCO}_3$ /1000 tons overburden).

The Quality Coal Co., Inc. Dutton Hill Mine, P-3920) is adjacent to the east of the Dutton Hill No. 2 area and also utilized for information purposes. The geology is identical for these two permits, with mining on the New Castle, Mary Lee and Blue Creek seams. The permit was issued in January 2010. Average neutralization potential showed +20.49 (tons  $\text{CaCO}_3$ /1000 tons overburden).

Each of these permits is essential in the determination of potential impacts from the Stave Hollow Mine permit. They cover several years of mining activities, and are in different phases of the mining process.

## **B. Surface Water**

Laboratory analyses of the samples collected from the waterways reveal relatively low conductivity levels and sulfate values considering previous coal related disturbance in this watershed. According to the Alabama Department of Environmental Management the receiving streams' use classification is 'Fish and Wildlife'. Current surface mining regulations include Best Management Practices and mining techniques that have greatly improved environmental protection since pre-law mining days.

Water quality within Lost Creek shows alkaline pH, slightly elevated iron, low manganese and low suspended solids, varying on the discharge at the time of sample.

Changes in the quantity and quality of the waters in the streams draining the site are expected to be minimal due to the proposed mining activities. During mining, runoff from the disturbed areas will be diverted into sediment basins. Effluent from the sediment basins will be monitored by the permittee in accordance with National Pollution Discharge Elimination System (NPDES) permit requirements issued by the Alabama Department of Environmental Management. The effluent will be chemically treated, if necessary, in accordance with the NPDES permit. The basins will be monitored quarterly through final bond release in order to characterize and document any effects the mining may have on the surface-water hydrologic balance. The basins are all proposed as permanent water impoundments.

Once mining has begun, the applicant will continue to sample and monitor Lost Creek at two locations. Surface Water monitoring site SRSHM-SW1 is located upstream on Lost Creek and has a drainage area of 100 square miles. Surface water monitoring site P3980-P3929 SW-3 is located downstream of the mine site on Lost Creek and has a drainage area of 125 square miles. Baseline data is summarized in Table 2. These surface water monitoring sites will be used to characterize and document any effects the mining may have on the surface-water hydrologic balance. Table 3 shows metals analysis for the baseline sites. Parameters and frequency of monitoring can be seen in the approved Hydrologic Monitoring Plan.

Table 4 at the end of this assessment shows the post mining water quality projections for surface water site P3980-P3928 SW-3, downstream of the Signal Resources, LLC P-3998 on Lost Creek. The CIA point for this evaluation is the P3844-02454000 located downstream on Lost Creek. This surface water site has been sampled and analyzed for over thirty years for several permits at the ASMC. It is also a USGS gauging station since at least 1965, with data from 1965 until 1981. It is located downstream of every mine in the P-3998 CIA. The water data and seasonal data submitted to the ASMC since 2006 is summarized in Table 5.

Table 6 and. shows the Water Quality & Quantity Projections from the Probable Hydrologic Consequences from the Quality Coal Co. Inc. Pleasant Grove South Mine P-3844 using surface water site 02454000, the Signal Resources, LLC Stave Hollow Mine P-3998 CIA point. Data was observed for post mining for the P-3844 permit. Samples from 2010 on were used to determine if the water quality predictions were accurate. Table 6a. shows that surface water quality mimics the post mining predictions from the P-3844 permit. Taken into consideration that other permits are within this same CIA and the P-3844 surface water quality post mining predictions still hold even with active mining within the area, it can be concluded that this watershed is capable of tolerating additional mining operations.

### **C. Ground Water**

Laboratory analyses of samples collected from the installed wells reveal the ground water within the bedrock strata below the Blue Creek seam ranges from neutral to alkaline. The water is only slightly mineralized with low levels of (at a minimum) iron and manganese resulting in low (at or less than 1000 umho/cm) conductivity measurements. For a summary of the baseline data collected from the bedrock wells, please refer to Table 7 at the end of this assessment.

The proposed operations are not expected to have a permanent adverse impact on the overall quality of the ground water at the site or surroundings. No long term impact is anticipated to the ground water quality for the aquifer below the Blue Creek seam due to the inability of



infiltrated water to migrate downwards into an insitu hydrostratigraphic unit. The groundwater above the bedrock strata is generally mineralized resulting in marginal quality, and show indications of coal related impact.

Monitoring wells SRSHM-MW1 and SRSHM-MW2 will be monitored quarterly through final bond release for pH, iron, manganese and water. If it is indicated that further parameters need to be monitored, they will be added to the Hydrologic Monitoring Plan as needed.

As discussed previously, the bedrock strata that will be excavated during the mining operations are predominantly non-acid and non-toxic. Although the strata are the same units that were disturbed during the previous mining, improved mining and management practices/techniques and contemporaneous reclamation should result in less water quality issues as compared to the historical mining. Should any increase in mineralization occur in the ground water as a result of the proposed activities, it is anticipated the levels will diminish and return to pre-mining concentrations once mining and reclamation activities are complete. Ground water will be further protected by properly sealing and abandoning all drill holes completed at the site (with the exception of blast holes) that will not be used for monitoring purposes. With regard to the availability of ground water after mining and reclamation is complete as compared to existing quantities, the backfilled spoil material will have a greater recharge capacity as compared to the undisturbed strata.

#### **IV. CONCLUSION**

The assessment of probable cumulative impacts of the Signal Resources, LLC Stave Hollow Mine (P-3998) finds the proposed operations have been designed to prevent material damage to the hydrologic balance outside the proposed permit area.

**Table 1**  
**Mining Operations in the Cumulative Impact Area**  
**P-3998**

Permit No.	Permittee	Permit Name	Date Issued	Acres*	Description	Coal Seam(s)
P-3844	Quality Coal Co., Inc.	Pleasant Grove South Mine	7/21/2005	69	Surface Mine	New Castle Mary Lee
P-3869	Drummond Company, Inc.	Surface Mine No. 1	10/03/2005	437	Surface Mine	New Castle Mary Lee Blue Creek
P-3920	Quality Coal Co., Inc.	Sparks Branch Mine	12/01/2010	137	Surface Mine	New Castle Mary Lee Blue Creek
P-3923	Xinergy of Alabama, Inc.	Coal Valley Mine	6/17/2009	738	Surface Mine	Black Creek
P-3929	Yellowhammer Energy Solutions, LLC	Slate Creek Mine	02/01/2012	229	Surface Mine	New Castle Mary Lee Blue Creek
P-3947	Quality Coal Co., Inc.	Sparks Branch Mine No. 2	03/14/2012	214	Surface Mine	New Castle Mary Lee Blue Creek
P-3958	Cedar Lake Mining, Inc.	Coal Valley East Mine	06/27/2013	492	Surface Mine	Corona
P-3980	Cedar Lake Mining, Inc.	Dutton Hill Mine No. 2	10/16/2015	187	Surface Mine	Mary Lee Blue Creek

\* Acres at Issuance of P-3998

**Table 2**  
**Ranges/Averages of Surface-Water Quality/Quantity**  
**Baseline Data**  
**P-3998**

<b>Parameter</b>	<b>SRSHM - SW1 Up Stream Lost Creek</b>	<b>P3980 - P3929 SW-3 Down Stream Lost Creek</b>
Discharge Rate (cfs)	16.04 – 191.13 (80.02)	2.55 - 571 (185.4)
Field pH (S. U.)	6.99 – 8.52	6.57 – 8.49
Acidity (mg/L)	BDL	NA
Alkalinity (mg/L)	14 – 114 (50.7)	NA
Total Suspended Solids (mg/L)	7 - 56 (23.9)	1 – 26 (7.6)
Total Iron (mg/L)	0.02 – 3.6 (1.42)	0.07 – 1.13 (0.58)
Total Manganese (mg/L)	BDL – 0.11 (0.03)	0.04 – 1.0 (0.20)
Sulfates* (mg/L)	1.91 – 546 (311.4)	NA
Specific Conductance (u-mhos/cm)	462.2 - 1521 (311.4)	223 - 1930 (949.4)
Total Dissolved Solids (mg/L)	424.5 – 1111.5 (695.8)	NA

Average values are set in parentheses.

Averages calculated as geometric means.

BDL – Below Detection Limit Detection. Manganese MDL limit is 0.02 mg/l, a value of 0.005 mg/l used for average.

NA – Not Applicable. No analysis or limited analysis.

**Table 3**  
**Metals Baseline Data**  
**P-3998**

<b>Parameter</b>	<b>SRSHM-SW1 Low Flow 09/13/2018 16.04 CFS</b>	<b>SRSHM-SW1 High Flow 01/31/2019 191.13 CFS</b>	<b>P3980-P3929 SW-3 Low Flow 12/19/2013 65 CFS*</b>	<b>P3980-P3929 SW-3 High Flow 02/20/2014 84 CFS*</b>
Antimony (µg/l)	BML	BML	---	---
Arsenic (µg/l)	BML	BML	0.62	BML
Beryllium (µg/l)	BML	BML	BML	BML
Cadmium (µg/l)	BML	BML	0.26	BML
Chromium (µg/l)	BML	BML	BML	BML
Copper (µg/l)	BML	BML	2.41	1.11
Lead (µg/l)	BML	BML	0.57	BML
Nickel (µg/l)	BML	BML	BML	BML
Selenium (µg/l)	BML	BML	BML	BML
Silver (µg/l)	BML	BML	0.98	BML
Thallium (µg/l)	BML	BML	BML	BML
Zinc (µg/l)	BML	BML	BML	BML

BML = Below Measurable Limits

--- Not Analyzed

\*Metals data available for data set of P-3980, therefore they do not match the high/low in the baseline data.

**Table 4**  
**Post Mining Water Quality Estimates for P3980-P3929 SW-3**  
**Average Event, Post Mining 1.084 cfsm**  
**P-3998**

<b>Parameter</b>	<b>P3980-P3929 SW-3</b>
pH (S. U.)	7.63
Total Suspended Solids (mg/L)	4.95
Total Iron (mg/L)	0.35
Total Manganese (mg/L)	0.12
Specific Conductance (u-mhos/cm)	724.5

**Table 5**  
**P-3844 02454000 Historical Water Data / Seasonal Water Data**  
**P-3998**

Parameter	P-3844-02454000	Winter	Spring	Summer	Fall
Flow (cfs)	0.607 – 458.9 (103.8)	0.607 – 458.9 (156.8)	0.524 – 385.6 (167.9)	5.23 – 58.3 (42.9)	6.8 – 183.67 (55.8)
pH (s.u.)	6.15- 8.78	6.72 – 8.04	6.25 – 8.17	3 – 16	6.15 – 8.54
Iron (mg/l)	0.06 – 4.11 (0.54)	0.2 – 2.52 (1.10)	0.11 – 4.11 (0.67)	0.13 – 0.55 (0.32)	0.06 – 0.31 (0.22)
Manganese (mg/l)	0.01– 0.43 0.02(0.08)	0.01-0.22 (0.11)	0.05 – 0.43 (0.10)	0.01 – 0.13 (0.07)	0.01 – 0.12 (0.05)
Total Suspended Solids (mg/l)	0.01-79 (8.9)	0.01-56 (14.8)	2 – 79 (12.6)	3 – 16 (6.3)	1 – 8 (3.4)
Conductivity (umhos)	236 – 2350 (1114)	236 – 1212 (621.6)	340 – 1699 (891.8)	718 – 2060 (1352.8)	826 – 2350 (1467)

Average values are set in parentheses.  
 Averages calculated as geometric means.

**Table 6**  
**P-3844 Water Quality & Quantity Projections**  
**Surface Water Monitoring Site 02454000**

Watershed Drainage Area 134 mi<sup>2</sup>

	Baseline	Baseline	During	During	Post	Post
	cfsm	cfs	cfsm	cfs	cfsm	cfs
7Q2 event	0.11	14.74	0.1098	14.7	0.1101	14.7
AVE event	1.5	201	1.499	200.9	1.5	201
2Yr event*	32.48	4352	32.47	4350	32.47	4350

**Table 6a.**  
**P-3844 Water Data with Water Quality & Quantity Projections**  
**Surface Water Monitoring Site 02454000**

<b>Date</b>	<b>Flow</b>	<b>Conductivity</b>	<b>Iron</b>	<b>Manganese</b>	<b>pH</b>	<b>TSS</b>
	<b>cfs</b>	<b>umhos</b>	<b>mg/l</b>	<b>mg/l</b>	<b>s.u.</b>	<b>mg/l</b>
<b>7Q2</b>	14.7	2278	0.252	0.093	8.01	3.5
10/8/2010	8.8	2350	0.12	0.04	6.15	4
6/14/2011	33	2060	0.19	0.06	8.78	4
10/18/2013	30	1843	0.2	0.04	8.18	2
11/10/2014	19.74	1484	0.3	0.04	7.94	1
11/6/2015	25.5	1045	0.06	0.01	6.71	3
12/15/2016	16.572	1212	0.2	0.01	7.39	4
9/18/2018	17.872	1790	0.1	0.04	7.47	1

<b>Date</b>	<b>Flow</b>	<b>Conductivity</b>	<b>Iron</b>	<b>Manganese</b>	<b>pH</b>	<b>TSS</b>
	<b>cfs</b>	<b>umhos</b>	<b>mg/l</b>	<b>mg/l</b>	<b>s.u.</b>	<b>mg/l</b>
<b>AVE Event</b>	<b>201</b>	<b>534</b>	<b>0.74</b>	<b>0.13</b>	<b>7.58</b>	<b>15.8</b>
3/29/2010	385.6	536	0.95	0.07	7.79	11
1/14/2013	228.4	236	2.7	0.22	7.03	56
4/23/2013	268	591	0.26	0.06	7.86	5
4/20/2015	255	340	1.01	0.09	6.68	18
1/6/2016	229.47	924	0.5	0.18	7.87	5
4/4/2016	321.23	463	0.52	0.06	6.8	8
5/8/2017	250.03	691	0.24	0.05	7.23	2
2/5/2018	458.94	310	2.23	0.15	6.91	19

\*No submitted data showed flow values for a 2Year Event.

**Table 7**  
**Ground Water Data**  
**P-3998**

<b>Parameter</b>	<b>SRSHM-MW1</b>	<b>SRSHM-MW2</b>
Water Level (feet below surface)	131 – 143.6 (137.9)	133 – 155 (146.5)
Acidity (mg/L)	BDL	BDL
Alkalinity (mg/L)	22 - 118 (53)	14 – 96 (42.6)
Field pH (S. U.)	6.76 – 9.06	6.6-8.95
Total Iron (mg/L)	0.13 – 2.89 (1.59)	0.04 – 5.01 (1.09)
Total Manganese (mg/L)	BDL – 0.08 (0.03)	BDL – 0.08 (0.03)
Specific Conductivity 25 °C (µmhos/cm)	257.1 - 1009 (678.6)	31.4 - 825 (506.1)
Sulfates (mg/L)	1.73 – 40.9 (19.8)	0.74 – 25.1 (12.9)
Total Dissolved Solids (mg/l)	18.2 – 838.5 (520)	118.2 – 630.5 (439.1)

Average values are set in parentheses.

Averages calculated as geometric means

\* Data only available from 6-9-09 through 11-03-08

BML = Below Method Detection Level

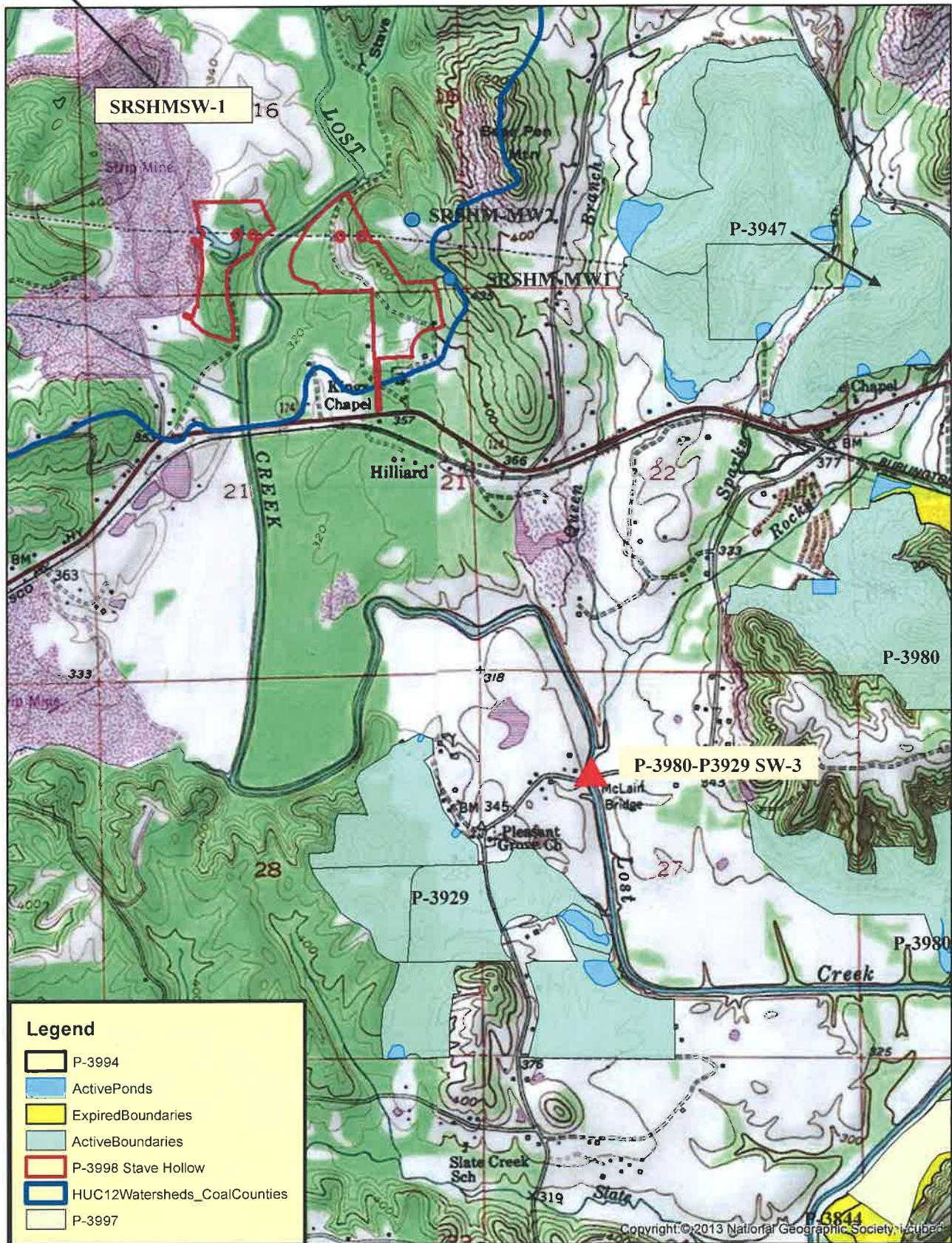
**Figure No. 1**  
**Coal Seam Relationships, Chronological**  
**P-3998**

AGE	FM.	CYCLE	COAL BED
PENNSYLVANIAN	POTTSVILLE	Brookwood	
		Utley	
		Gwin Cobb	<i>Gwin Thompson Mill Cobb Thomas</i>
		Pratt	<i>Pratt Corona Nickel Plate</i>
		Curry	<i>Curry</i>
		Gillepsy	<i>Gillepsy</i>
		Mary Lee	<i>New Castle Mary Lee Blue Creek Jagger</i>
		Upper Black Creek	<i>Lick Creek</i>
		Lower Black Creek	<i>Jefferson Black Creek</i>
		LOWER	



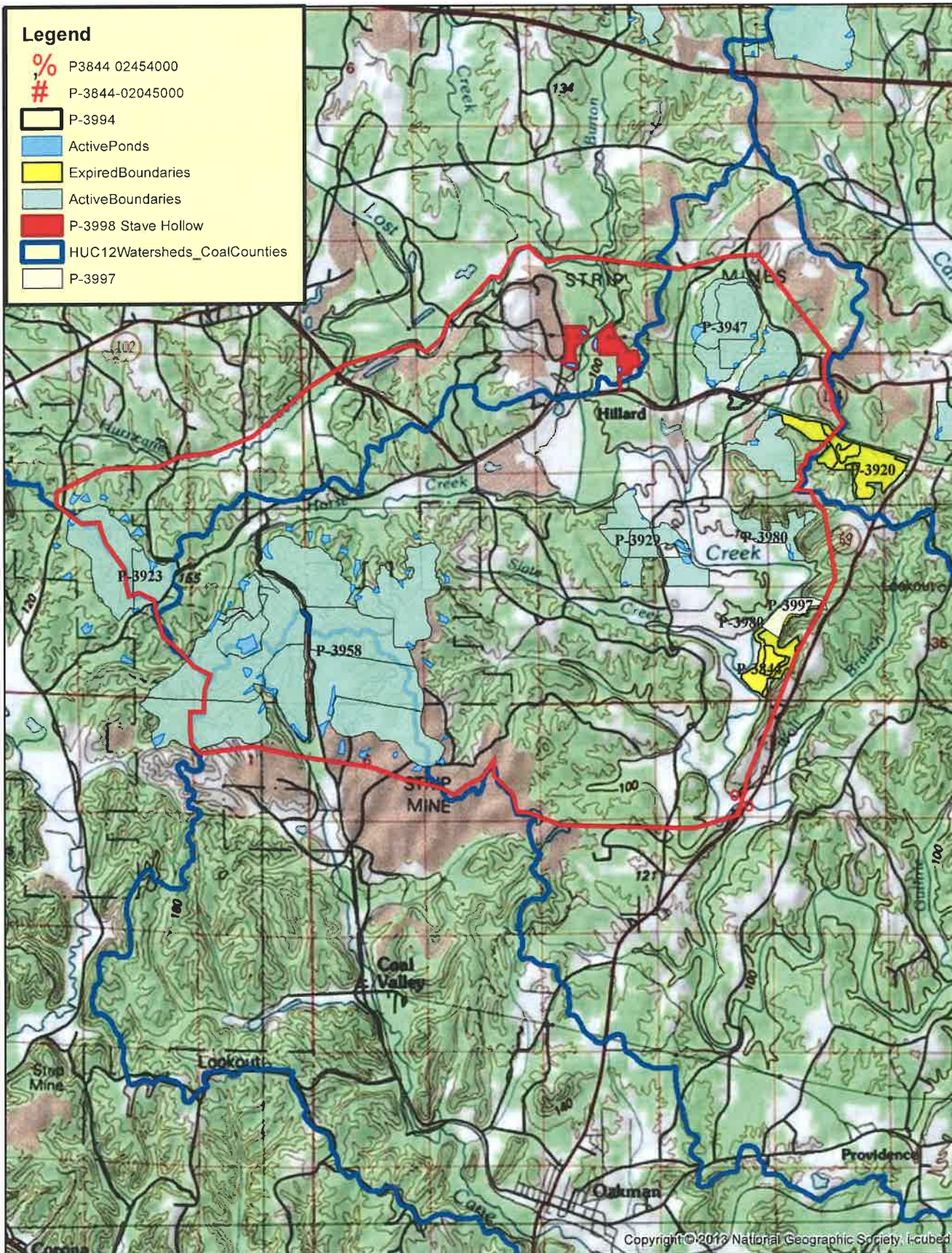
### Map No. 1 P-3998 Stave Hollow Permit and Adjacent Areas

1



### Map No. 2 P-3998 Stave Hollow Mine Cumulative Impact Area

1



0 0.4 0.8 1.6 2.4 3.2 Miles