



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

West Virginia Field Office  
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Elkins, West Virginia 26241

March 9, 2006



READER

Colonel William E. Bulen  
District Engineer  
Attn: Regulatory Branch  
U.S. Army Corps of Engineers  
502 Eighth Street  
Huntington, West Virginia 25701

Mr. Robert A. Fala  
West Virginia Division of Environmental Protection  
601 57th Street SE  
Charleston, West Virginia 25304

Re: Final Supplemental Biological Opinion for the Laxare East and Black Castle Contour  
Surface Mining Projects

Dear Colonel Bulen and Mr. Fala:

This document transmits the U.S. Fish and Wildlife Service's (Service's) final supplemental biological opinion (BO) on the proposed Laxare East and Black Castle Contour surface mines (hereafter referred to as the "proposed action" or "project") located in Boone County, West Virginia, and its effects on the federally listed Indiana bat (*Myotis sodalis*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The original consultation on the project was completed on February 18, 2005, with issuance of a biological opinion (hereafter referred to as the 2005 BO). Consultation has since been reinitiated. New information has revealed effects of the agency action that may affect the Indiana bat in a manner or to an extent not considered in the 2005 BO. In addition, the project has been modified in a way that causes an effect to the Indiana bat not considered in the 2005 BO. Consequently, the amount or extent of incidental take anticipated in 2005 BO needs to be revised.

A substantial portion of the information and analysis contained in the 2005 BO is still applicable, and therefore is not repeated in this document. Rather, this document addresses the changes to the 2005 BO by providing replacement and supplementary information and analysis and identifying information from the 2005 BO that is no longer applicable. Information and analysis

from the 2005 BO that is no longer applicable is specifically identified where it is not apparent by the presentation of new information and analysis.

With regard to labeling of figures and tables:

Figure 1a in this BO replaces Figure 1 in the 2005 BO

Figures 2a and 2b replace Figure 2 in the 2005 BO

Figure 4a in this BO replaces Figure 4 in the 2005 BO

Table 2a in this BO replaces Table 2 in the 2005 BO

Table 6a replaces Table 6 in the 2005 BO

Table 7a replaces Table 7 in the 2005 BO

Table A is new (no corresponding table in the 2005 BO).

Table 16a replaces Table 16 in the 2005 BO.

All other tables and figures remain the same as in the 2005 BO.

This document addresses the Clean Water Act section 404 permits from the U.S. Army Corps of Engineers (Corps). It also serves to implement the terms and conditions of the programmatic 1996 Formal Section 7 Biological Opinion and Conference Report on surface coal mining and reclamation operations under State and Federal regulatory programs adopted pursuant to the Surface Mining Control and Reclamation Act. The Corps and the West Virginia Department of Environmental Protection (WVDEP) serve as joint action agencies for the reinitiation of this consultation, whereas Massey Energy Company is the applicant.

## **CONSULTATION HISTORY**

*[The following information supplements the "Consultation History" section in the 2005 BO by adding to the chronology since completion of the 2005 BO.]*

Following issuance of the 2005 BO, the WVDEP issued State section 401 water quality certification on May 6, 2005. The Corps issued a 404 permit for the Black Castle Contour mine on August 23, 2005. The applicant's monitoring of the Indiana bat maternity colony, as required under the BO, began on April 1, 2005. On July 5, 2005, Apogee Environmental Consultants, LLC informed the Service's West Virginia Field Office (WVFO) that a lactating female Indiana bat had been captured within the project area (in this document, "project area" refers to the area encompassed by the Laxare East and Black Castle Contour permit boundaries). Shortly thereafter, the bat was tracked to a roost tree within the Indiana Creek watershed, in an area just outside the Laxare East permit boundary. Additional mist netting, radio telemetry, and emergence counts at roost trees continued through the summer maternity period. On August 3, 2005, a conference call was held with representatives from the Service, Corps, and the applicant and their consultant to discuss the current status of the monitoring, action on the permits, and plans for additional survey work. On October 6, 2005, the Corps sent a letter to the Service requesting that formal consultation on the projects be reinitiated, based on the new information that was available. In a letter to the Corps dated November 8, 2005, the Service concurred that reinitiation would be necessary and listed additional information that would be required prior to proceeding. The Corps provided some of the requested additional information in a letter to the Service dated December 8, 2005. On December 21, 2005, a conference call with the Service, the Corps, WVDEP, and the applicant and their consultant was held to discuss the outstanding

additional information that was needed to reinitiate consultation. On January 9, 2006, the applicant provided additional information discussed during the conference call. A meeting between the WVDEP, the Corps, the Service, and the applicant and their consultants was held on January 17, 2006, to discuss the additional information and the process for completing consultation. On January 18, 2006, the Service received a letter from the WVDEP requesting that they be included as a joint action agency for the reinitiation, consistent with the 1996 Formal Section 7 Biological Opinion and Conference Report on Surface Coal Mining and Reclamation Operations Under the Surface Mining Control and Reclamation Act. Additional informal communications between the parties has occurred throughout the remainder of the consultation process. The draft supplemental BO was submitted to the Corps, the WVDEP and the applicant on February 23, 2006. WVDEP provided comments on the draft on February, 27, 2006. Comments from the applicant were received on March 1, 2006, and the Corps' comments were received on March 8, 2006. A conference call to discuss comments was held on March 2, 2006.

### **BIOLOGICAL OPINION**

Subsequent to completion of the 2005 BO, survey and monitoring work required under the Reasonable and Prudent Measures and Terms and Conditions led to the capture and tracking of additional Indiana bats. These resulted in the discovery and confirmation of the primary roosting areas for the maternity colony that was the focus of the 2005 BO. We did not know the exact location or dynamic of the maternity colony when writing the 2005 BO. We therefore made certain assumptions about the roost trees known at that time because we had little information on the colony's location. We now know its precise location. The confirmed location of these roosts proved to be outside of the area that would be directly affected by mining. Nighttime exit counts at the primary roosts resulted in a maximum count of 73 adult and young bats. While the Service had predicted that previous mining impacts in the area had already impacted the maternity colony size by approximately 50%, the colony size, as measured during the counts, is consistent with the size the Service expected for a healthy maternity colony in this location.

In addition to the new information derived since the 2005 BO on the size and location of the primary maternity colony site, the project has been changed in a way that significantly modified the anticipated level of impacts to the maternity colony. In order to reduce the amount of valley fills and resulting destruction of forested and stream habitat, the applicant eliminated three, and reduced one of the proposed valley fills. In the 2005 BO, *all* previously known roost sites were to be eliminated by these mining and valley fill activities, but now, due to the discovery of the maternity colony's primary roost area and to the reduction in valley fills, none of the known roost sites are located in areas that are part of the proposed mining or valley fill operations. The revisions in the proposed action, discovery of the colony in a more favorable location, and verification of an apparently healthy maternity colony, rather than one that was already believed to be in decline, lead to significantly reduced impacts to the colony and, ultimately, a determination of colony persistence, instead of the prior determination of colony extirpation. These factors are discussed in detail in this document.

## DESCRIPTION OF THE PROPOSED ACTION

*[The following information supplements the "Description of the Proposed Action" in the 2005 BO by identifying changes since completion of the 2005 BO.]*

On August 23, 2005, the Corps issued a permit for the Black Castle Contour mine. The Corps has not yet issued a permit for the Laxare East mine.

### Action Area

The action area described in the 2005 BO is expanded to include the entire Indian Creek and Three Fork watersheds. These changes are the result of the new information gathered about roosting and foraging areas used by the Indiana bat maternity colony, which will be affected by these projects. The Indian Creek Watershed contains 3,059 acres and 57,024 linear feet of streams (10.8 miles). The Three Forks Branch Watershed contains 816 acres and 21,659 linear feet of streams (4.1 miles). The revised quantifiable portion of the action area consists of a total of 9,606 acres and is shown in Figure 1a. [Note: the action area in the 2005 BO included a portion of these watersheds. Due to the overlap, one cannot simply add 3,059 acres (for the Indian Creek Watershed) and 816 acres (for the Three Forks Branch Watershed) to the 5,850-acre action area in the 2005 BO, to yield the revised quantifiable portion of these watersheds. We have factored the area of overlap into this revised calculation.]

### Project Description

Changes to the project description in the 2005 BO have been made that reduce impacts to the Indiana bat. These project modifications were developed in accordance with the Terms and Conditions of the 2005 BO and the permitting requirements of the Clean Water Act. The individual projects have been modified as shown in Figures 2a and 2b, Table 2a, and as described below.

**Table 2a. Overview of revised project impacts.**

	<b>Laxare</b>	<b>Black Castle Contour</b>	<b>Total</b>
Forest removal (total acres)	1420	521	1941
Stream impacts (linear ft)	31,961	18,787	50,748
# of valley fills	7	9	16
# of sediment ponds	10	6	16

### *Laxare East Project*

The applicant proposes to eliminate Valley Fill G and reduce the size of Valley Fill C. As a result, the mineral removal area will be reduced by 60.1 acres and valley fill areas will be reduced by 53.5 acres, for a total permit size reduction of 113.6 acres. In addition, the number of sediment ponds has been reduced from 12 to 10. These modifications will reduce impacts to jurisdictional waters by a total of 4,839 feet (0.91 mile), including 3,633 linear feet (0.69 mile) of intermittent streams and 1,206 linear feet (0.23 mile) of ephemeral streams. The Laxare East project will maintain a 250 foot buffer between all mining activities and any currently known Indiana bat roost trees.

### *Black Castle Contour Project*

The applicant and the Corps have modified this project by eliminating Valley Fills 1 and 11. In addition, the number of sediment ponds has been reduced from 8 to 6. The modifications reduce the total permit size by 144 acres and reduce impacts to streams and jurisdictional waters by a total of 7,693 feet (1.42 miles), including 7,411 linear feet (1.40 miles) of intermittent streams and 80 linear feet (0.02 mile) of ephemeral streams. In addition, 202 linear feet (0.04 mile) of secondary stream impacts will no longer occur due to the elimination of Valley Fill 11 and its associated pond.. The stream mitigation described in the 2005 BO remains unchanged.

## **STATUS OF THE SPECIES**

### **Indiana Bat Population Status**

The 2005 BO characterized the population status of the endangered Indiana bat as experiencing a serious, long term population decline throughout most of its range, as a result of large-scale habitat loss and degradation. The population status of the Indiana bat is updated as described below to take into account new information obtained since issuance of the 2005 BO. We have also clarified survey periods.

In general, attempts are made to survey each known occupied cave every other year, and the data are combined for 2 years for reporting purposes. By convention, survey periods typically are referred to by the year of the last survey; hence the 2003 survey period represents data for 2002 and 2003.

### Range-wide Hibernacula Censuses

The 2005 BO (page 14) presented a preliminary population estimate of 387,301 Indiana bats for the time frame erroneously designated as "2003/2004;" this estimate was considered preliminary because quality control of the data had not been completed. The final estimate for the 2003 survey period (covering 2002 and 2003) is 347,670 to 398,220 Indiana bats (Andrew King, personal communication 2006, Service). The lower end of this range (347,670 bats) excludes the Pilot Knob Mine in Missouri which is no longer safe to enter to conduct a standard winter survey. Every few years, since about 2001, attempts have been made to trap bats at the entrance to this mine and population estimates have been derived by comparing Indiana bat capture rates to the previous capture rates when the mine could be entered and surveyed. Due to uncertainties associated with the reliability of this technique, we are reporting a range of numbers for Indiana bats in this mine (give or take 50,550 Indiana bats since 2001).

The 2005 range-wide winter population count (covering 2004 and 2005) is an estimated 406,824 to 457,374 Indiana bats (Andrew King, personal communication 2006, Service). As discussed above, the lower end of this range excludes the Pilot Knob Mine in Missouri. Because confidence intervals are not available for 2005 and previous years, it is unknown whether the 2 to 31% increase between the 2003 and the 2005 population estimates is biologically or statistically significant. Potentially significant sources of uncertainty with these estimates include assumptions about status in caves or portions of caves that cannot be surveyed in a particular year, and changes in counting methodologies (e.g., change from visual estimates to use of digital photography). Because of these uncertainties and the short time frames involved, we do not consider these recent population estimates as representing a halting or reversal of the

species' documented long-term decline. Work is currently underway to compare the results of previous and new methodologies, with a goal of standardizing methodologies in the future to allow for calculation of confidence intervals.

Range-wide Maternity Colony Information

The 2005 BO presented estimates of the number of maternity colonies range-wide. This information is updated in Table 6a below. The erroneous "2003/2004" estimate of maternity colonies in Table 6 of the 2005 BO is revised to reflect the revised population estimate for the 2003 survey period, and estimates of maternity colonies for survey years 2001 and 2005 are added to the table, based on new information since completion of the 2005 BO. While Table 6a shows a recent increase in the estimated number maternity colonies, because of the data uncertainties and the short time frames involved, as explained above, we do not consider these recent population estimates as representing a halting or reversal of the species' documented long-term decline.

**Table 6a. Estimated number of Indiana bat maternity colonies range-wide.** (Dashes indicate that data are not available.)

Year	Hibernating Population	Percent Change (between rows)	Number of Maternity Colonies <sup>1</sup>	Number of known maternity areas <sup>2</sup>	Percent of known maternity Colonies
1960/1970	883,300		5,500	-	-
~1980	678,750	-23	4,200	-	-
~1990	473,550	-31	2,900	-	-
2001	381,156	-20	2,400	-	-
2003	347,670- 398,220 <sup>3,4</sup>	-9 to +4	2,200- 2,500	~225-250	~10
2005	406,824- 457,374 <sup>4</sup>	+2 to +31	2,500- 2,900	-	-

<sup>1</sup> Total rounded to the nearest 100. Estimates of the number of maternity colonies range-wide (Table 6a) were developed based on the following assumptions: 1) the known hibernating population is the source of the entire summer population; 2) there is a 50:50 sex ratio (Humphrey et al. 1977); 3) average maternity colony size of 80 adult females (Whitaker and Brack 2002); and 4) the trend in decline of the total number of maternity colonies follows that of the hibernating population.

<sup>2</sup> This is a rough estimate of the number of areas where reproductive females have been captured during the maternity season.

<sup>3</sup> This range replaces the number presented in the 2005 BO of 387,301.

<sup>4</sup> The larger number assumes the population at Pilot Knob Mine in Missouri has remained stable at 50,550 Indiana bats since the last standard winter survey in approximately 2001.

Status of Indiana Bat Habitat in the Appalachian Coalfields

The 2005 BO (pages 17-18) referred to the Draft Programmatic Environmental Impact Statement (EIS) on mining/valley fills in Appalachia (U.S. Environmental Protection Agency 2003). The Final Environmental Impact Statement was issued in 2005 (U.S. Environmental Protection Agency 2005). The summary information we present here is unchanged from the draft EIS. The

EIS study covered 12.2 million acres, including coal fields of Appalachia in 4 states. The study anticipated significant impacts to aquatic and terrestrial habitats as a result of mining activities. Considering existing and projected (10-year) future impacts, the study estimated roughly 2,400 miles of streams and 2,200 square miles of land or 11% of forested habitat in the Appalachian coalfields region would be adversely impacted. When adding past, present, and future terrestrial disturbance, the Final EIS estimated a 1.4 million acre total loss of forest cover in the multiple state study area. In West Virginia, the study estimated 7,591 acres of direct impacts to streams from mineral extraction and valley fills. This number is underestimated because indirect impacts to streams, such as those that would occur downstream from filled or mined-out stream sections, were not evaluated.

### **Indiana Bat Status in West Virginia**

#### Hibernating Population

The 2005 BO (page 18) stated that the hibernating population of Indiana bats in West Virginia appears to be increasing in recent years. This appears to continue to be the case. The counting methodology has been consistent (density estimates extrapolated from photos of bat clusters on cave walls). During the 2005 survey season (covering winter 2004 and 2005), approximately 11,890 (93%) of West Virginia's 12,667 known hibernating Indiana bats wintered in Hellhole Cave (West Virginia Division of Natural Resources 2006). The number of Indiana bats counted at Hellhole during the winter has increased roughly 39% from the 2001 survey season (8,566 bats) to the 2005 season (11,890 bats). This increase in numbers continues to exceed hypothetical population growth rates, further suggesting that bats immigrating from other hibernacula and/or their progeny may be a substantial contributing factor. Recent data from three counties surrounding the action area (Greenbrier, Mercer, and Monroe counties) continue to suggest a relatively stable population of roughly 70-95 Indiana bats in the local area over the last 5 years (Table 7a) (West Virginia Division of Natural Resources 2005). In this table, which includes historical data, the year column deviates from the standard naming convention and does not refer to the standard 2-year survey seasons now used; rather, the year column represents the year during which the individual named cave was surveyed (coinciding with the end of the winter season). For example, in the last row, the year 2004 represents data collected during the winter beginning in 2003 and ending in 2004. Data for these caves in 2005 is not yet available.

Table 7a. Populations of hibernating Indiana bats in West Virginia closest to the action area.<sup>1</sup>

	Greenbrier County			Mercer County			Monroe County			
	Bob Gee Cave	General Davis Cave	Higginbot- hams Cave system	McFerrin Cave	Organ Cave	Piercy's Cave	Honacker Cave	Argobrites Cave	Greenville Saltpete Cave	Patton Cave Bats present (#s not recorded
1952				39					300+	8
1963			1	0				0		
1976	8	6, 10 (2 surveys)								
1981	6			2					2	3
1984	9			0		11, 47 (2 surveys)				
1986		2								
1987	6				11					
1989										
1990	3				12	24			3	
1991		8			9				2	
1992										
1993		7							1	
1994		7			5	26			3	17
1998						50	20			
1999					3	54	40		4	8
2000		6					16			
2001					11	40			6	10
2002	0	5			14	35	31		3	8
2004		3								

<sup>1</sup> No entry for a cell represents no data. If surveys were conducted and no Indiana bats were documented, the value is "0".

### Maternity Activity

The 2005 BO presented information on maternity colony activity in West Virginia through 2003 and partial information for 2004. At that time, two maternity colony sites were known from West Virginia, the maternity colony on the project site in Boone County and a maternity colony in Tucker County. Since then, we have received final reports on surveys conducted during the summer of 2004 and spring of 2005.

Since completion of the 2005 BO, a third maternity colony was discovered. This colony, also in Boone County, consists of at least 49 bats and is located near Kanawha State Forest, approximately 10 miles away from the other Boone County maternity site.

In addition, during summer 2004, three male Indiana bats were captured on the Monongahela National Forest in Pendleton County. These bats were tracked to a roost tree and subsequent emergence counts on that tree revealed 23 bats. Although maternity activity (through the presence of female Indiana bats) was not confirmed at this site, data suggest that this site may also support a maternity colony.

### **Indiana Bat Status near the Action Area**

#### Maternity Activity

The 2005 BO identified the three reproductively active female Indiana bats caught within the action area as the only bats that had been captured in Boone County, and as representing the only maternity colony that had been discovered in southwestern West Virginia. This assessment is updated to incorporate the information regarding Indiana bats within the action area (see ENVIRONMENTAL BASELINE/2005 Survey Efforts section of this document below) and the additional maternity colony discovered in Boone County near Kanawha State Forest (see Indiana Bat Status in West Virginia/Maternity Activity section of this document above).

### **INDIANA BAT LIFE HISTORY**

*[The life history of the Indiana bat in the 2005 BO is updated below to take into account new information obtained since issuance of the 2005 BO.]*

### **Indiana Bat Status Summary**

The 2005 BO presented an analysis indicating a precarious outlook for the Indiana bat. This analysis included a population projection using observed rates of decline through 2000/2001 (Diagram 1 in the 2005 BO), and acknowledged the small potential increase in the population estimate based on preliminary data for 2003 and 2004. We have not revised the analysis to take into account population estimates after 2001, including the final population estimate for the 2003 survey season and the population estimate for the 2005 survey season, which have since become available. Although the estimates from 2003 and 2005 indicate a potential increase in the population, incorporating estimates after 2001 would not substantially change the results of the analysis since it was based on long term average rates of change and intended to show the potential consequences to the population if the rates of decline experienced in the past were to continue into the future. The analysis was not intended to assess the potential consequences to the population resulting from a change from a declining population to an increasing population or from a sustained increase. Whether the recent increase in population estimates reflects a

change in the long term decline of the species cannot be determined because of data uncertainties and the short time frames involved, as explained previously in this document.

## **ENVIRONMENTAL BASELINE**

*[The following information updates the Environmental Baseline section of the 2005 BO by describing new information obtained since completion of the 2005 BO.]*

### **Indiana Bat Survey Efforts**

#### *2005 Survey Efforts*

The following discussion is based primarily on information contained in the Apogee Environmental Consultants (2006) report completed in accordance with the Terms and Conditions of Reasonable and Prudent Measure 2 of the 2005 BO (pages 107-108), which the Service has independently reviewed. To evaluate the presence/absence of Indiana bats in the project area, 18 sites were selected to be surveyed in 2005. Survey efforts were conducted during three separate time periods, including Indiana bat pregnancy (May 15 – June 15), lactation (June 15 – July 15), and post-lactation/juvenile volancy (July 15 – August 15). A total of 216 net nights of effort were completed resulting in the capture of 242 bats of 9 species. In order of decreasing abundance, the species captured were: big brown bat (*Eptesicus fuscus*), northern bat (*Myotis septentrionalis*), eastern pipistrelle (*Pipistrellus subflavus*), eastern red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*), little brown bat (*Myotis lucifugus*), eastern small-footed bat (*Myotis leibii*), evening bat (*Nycticeius humeralis*), and Indiana bat.

A lactating female Indiana bat was captured in the project area on July 2, 2005. The bat was captured near a tributary of Orchard Branch at the same site as bat #3352 from the 2003 survey season. A radio-transmitter was attached to the bat and subsequent roost tree and foraging data were collected. Over the 11-day tracking period, the female Indiana bat used two different roosts, both of which were dead pine trees with abundant exfoliating bark (> 25% bole surface area) located within the upper portions of the Indian Creek drainage. At both roosts, numerous bats, including the radio tagged bat, were roosting underneath peeling bark on the main tree trunks. Roost tree #1-05 was a large pitch pine (*Pinus rigida*) and was used by the bat for 8 days (two periods of 4 consecutive days). Roost tree #2-05 was a large shortleaf pine (*P. echinata*). This roost was only used for 2 consecutive days, and on the following day the bat returned to roost tree #1-05.

Both trees were canopy-dominant trees located within an interior forest and were slightly larger than the surrounding forest in regard to diameter-at-breast height (dbh) and canopy height. Average dbh of the roost trees was 15.9+2.6 inches, and average height was 55.1 + 7.2 feet. The habitat surrounding both roosts had recently been burned (1-3 years). Consequently, the majorities of pine trees within the plots, including the roost, were dead and possessed fire scars at the base of the bole. The death of trees in close proximity to one another has created large canopy gaps around the roost which provides ample solar exposure to the roosting sites throughout the day.

Emergence counts were carried out throughout the study. Simultaneous emergence counts were only accomplished on two evenings (July 11 and 12), but no bats emerged from roost tree #1-05

on the second evening. The number of bats emerging from tree 1-05 increased over time, with 23 bats emerging on July 6, and 73 emerging on July 14. A maximum number of 51 bats emerged from tree 2-05 on July 9. Counts conducted in mid-July most likely represent some combination of adults and newly volant young. Emergence counts on roost trees used in 2004 (trees # 449, 459, 460) near the western portion of the Laxare project were also conducted. Indiana bats were documented using trees 449 and 459; however, no more than one individual was counted leaving each tree. A simultaneous count conducted on July 17, resulted in one bat leaving each of these two trees.

Both new roost trees identified during the 2005 surveys were considerably different than those located in previous years within the vicinity of the proposed mine site (Apogee Environmental Consultants 2003, 2004a). First, these trees were considerably larger (average dbh 15.9 inches; average height 55.1 feet) and housed a larger number of bats (range 15-73) than in previous years. The average dbh and height for the seven roost trees previously found within the project area were 6.9 inches and 30.2 feet, respectfully. Secondly, the largest number of bats observed exiting one of the earlier trees was four. According to the criteria used by Callahan et al. (1997) and later modified by Britzke et al. (2003) for periphery populations of Indiana bats in the south, all seven previously documented roost trees would be considered alternate roosts. In contrast, both trees located during the 2005 study could be ranked as primary roost trees using either classification scheme (Callahan et al. 1997, Britzke et al. 2003).

Both new roosts were located just off the ridge tops on mid- to upper slopes (1,345-1,499 feet). In addition, roost trees were positioned in areas of excessively steep terrain (11-32%), with varying aspects. Distance between the two roosts was 0.42 mile, and each day roost was 1.6 miles (roost tree #1-05) and 1.7 miles (roost tree #2-05) from the core foraging range. The two roosts were 1.2-3.0 miles from other Indiana bat roosting areas located within the same project area in previous years. The capture site was located 1.5-1.6 miles from the two roost trees. These two roost trees are located approximately 1,500 feet from the eastern edge of the Laxare East permit, and are within the large block of intact habitat to the northeast of the projects that was identified within the 2005 BO as being a likely area to support, and potentially maintain, an Indiana bat maternity colony. In the 2005 BO, we suggested that bats in the project area would most likely be displaced into adjacent habitats, specifically the large contiguous forest located to the northeast of the Laxare East permit (Indian Creek); the new information confirms that the colony is already established in this area.

The home range and foraging area was determined after the captured lactating female Indiana bat was tracked from July 4-15, 2005. The home-range size (Minimum Convex Polygon, MCP) for the bat was 1,226.3 acres. The bat's foraging area was located approximately 1.7 miles southwest from the roost trees. This bat used the same foraging area every night. The major foraging area for this bat, where it spent 50% of its time, was 15.1 acres; while the area where it spent 95% of its time was 97.1 acres. The range in elevation of the major foraging area was 1,332-1,601 feet and the aspect was southeast. The slope of the major foraging area ranged from 8 to 41%. The foraging area for this bat was almost exclusively located in a steep ravine containing a headwater stream that is a tributary of Sandlick Creek. The top of the ravine consisted of an area that had been harvested by "high-grading" (cutting the larger trees within a specified size range) adjacent to an area that had not been recently harvested. The area lower in

the ravine was very open, with high canopy and open understory, which is conducive habitat for a volant animal. The commuting area seemed to be a linear path from the roost trees to the foraging area and the bat did not seem to be following any particular ridge tops or ravines for travel toward the foraging area. Both 2nd and 3rd order streams with well developed riparian zones are located within the foraging range of the tracked bat (range 0.11-1.2 miles). Occasionally the bat was observed within the riparian zones of both Sandlick Creek and Indian Creek (both 2nd order streams), however no significant amount of time was spent within these areas. Heavy fog and cool temperatures that settles in the valleys associated with mountain streams may explain why the bat consistently foraged higher up the slope. In addition, the ravine also provides shelter from strong winds typical of the ridge tops. Thus the foraging ravine may provide ideal conditions for both the bat and its insect prey.

Located within the home range of this bat were three additional ravines with similar attributes as the main foraging ravine. Occasionally the bat would spend small amounts of time within one of these ravines but none were used extensively. This study of foraging was conducted on a single individual. In studies of multiple individuals in Pennsylvania, foraging areas of individual Indiana bats often did not overlap (Butchkoski and Hassinger 2002), therefore it is likely that the other headwater and first order streams within the action area are used by other individuals within the maternity colony.

### **Factors Affecting the Indiana Bat Habitat within the Action Area**

#### *Mining Activities Conducted in the Action Area in 2005 (new section)*

A total of 293 acres of land, including 198 acres on the Laxare East project area, and 95 acres on the Black Castle Contour project area, was cleared of trees during the November 15, 2004 – March 31, 2005 seasonal clearing period. An additional 192 acres on the Laxare East project area, and 100 acres on the Black Castle Contour project area have been or are anticipated to be cleared during the November 15, 2005 – March 31, 2006 seasonal clearing period. These activities were conducted on the western portion of the Laxare East project areas in and around valley fills A, B, and C; and in the head of George's Branch near Valley Fills 7 and 8 and in an unnamed tributary near Valley Fill 6 within the Black Castle Contour project area. Excavation activities were initiated in these cleared areas. Material excavated in the Laxare East permit area was hauled to an adjacent permitted off-site disposal area.

### **Indiana Bat Population within the Action Area**

#### *Maternity Activity*

The 2005 BO presumed the presence of at least one maternity colony based on the capture of three female bats in reproductive condition. Since issuance of the 2005 BO, a maternity colony with a minimum of 73 adult and juvenile bats has been documented using the project area. Nine roost trees have been identified. As discussed in the 2005 BO, exit counts should be considered to represent the minimum number of individual Indiana bats that comprise a maternity colony, particularly since all known roost trees were not surveyed simultaneously. Considering these factors, the data from 2005 surveys appear to be consistent with an "average size" maternity colony. Whitaker and Brack (2002) estimated that 80 bats was an average maternity colony size. In a separate analysis, Kurta (2004) differentiated between counts conducted pre and post volancy and estimated that an average maternity colony size was 60-70 adult bats or 119 bats when including both adults and volant young.

The two roost areas surveyed during 2005 are approximately 3 miles apart. This could potentially indicate that more than one colony is present. However, all Indiana bats captured to date have been captured along Sandlick Creek, and the bat tracked to the Indian Creek roost area was captured in the same location as one of the bats initially captured during the 2003 surveys. Furthermore, the distances between these roosts are within the range of distances between colonies' roost trees previously reported (see page 41 of the 2005 BO). As noted above, all the roosts identified during the 2003 and 2004 surveys were characteristic of alternate roosts, whereas the trees identified during 2005 are characteristic of primary roosts. We therefore conclude that the capture of four reproductively active females within the action area is most likely indicative of the presence of one maternity colony, and that this colony is most likely consistent with an average sized maternity colony of from 60 to 80 adult bats. Based on this information, we estimate the colony size, for purposes of analysis, as approximately 75 adult female bats. (Additional information regarding the estimated size of the colony can be found in the administrative record – March 6, 2006, Memo to file).

#### **Summary of Indiana Bat Status in the Action Area**

In the 2005 BO, the Service stated it believed that maternity activity in the action area was believed to have already been adversely affected by the removal of potential foraging and roosting habitat, including the removal of established roost trees, and assumed that previous mining and logging activities had severely reduced the viability of maternity activity, rendering the existing population to a single remnant maternity colony consisting of 20-40 female bats and their young. New information reveals otherwise. The Service now believes that an average-sized maternity colony of approximately 75 adult female bats uses the action area. Because the colony's primary roosts were located outside the project area near the headwaters of Indian Creek and Three Forks Branch, watersheds which are relatively un-impacted and in which no mining is proposed as part of this project, the Service now believes that this colony has not been pushed into decline and toward extirpation by previous mining and logging activities.

#### **Conservation Needs of the Indiana Bat in the Action Area**

The 2005 BO stated that maintenance of adequate roosting and foraging habitat in the upper portion of the Sandlick Creek watershed is critical to maintain the possibility of persistence of Indiana bat maternity activity in this general area. Based on the new information indicating that the colony is an averaged-sized colony with its primary roosts outside the project area, the Service now believes that the maternity colony likely uses substantial areas outside the project area for foraging and roosting in addition to those areas within the project area. Consequently, the Service believes that while loss of some foraging habitat and secondary roosts within the project area would affect some bats, the project would not cause extirpation of the maternity colony. In addition, the project has been changed to avoid impacts to the areas of the two first-discovered roost areas. Therefore, the priority conservation needs of the Indiana bat in the action area beyond those achieved by the project changes already identified would consist of increasing the likelihood of persistence of the maternity colony through protection from future non-project impacts.

## **EFFECTS OF THE ACTION**

The 2005 BO described the context for the evaluation of the effects of the proposed action as a continuing population decline of the Indiana bat. The 2005 BO described the decline in general terms as the result of mortality exceeding recruitment, and identified the vulnerabilities of the species arising from its life cycle and low fecundity.

Although it is well documented that the species has experienced a long-term, significant decline from historical levels, recent census information appears to indicate an increase in the population. However, as described in the ENVIRONMENTAL BASELINE section of this document, because of data uncertainties and the short time frames involved, we do not consider these recent population estimates as representing a halting or reversal of the species' documented long-term decline.

The 2005 BO also describes the context of the evaluation of effects of the proposed action in terms of the loss of additional habitat of a maternity colony already significantly impacted by previous mining and logging activities. As described in the ENVIRONMENTAL BASELINE section of this document, the Service has since received new information indicating that the maternity colony is of an average size of approximately 75 adult female bats and that the colony's primary roosts are located outside the project area near the headwaters of Indian Creek and Three Forks Branch. Based on this information, the Service now believes that the maternity colony has not been pushed into decline and toward extirpation by previous mining and logging activities.

The EFFECTS OF THE PROPOSED ACTION section of the 2005 BO is revised here to account for the new information concerning the size of the maternity colony and location of its primary roosts, and the project modifications proposed by the applicant. This new information results in a reduction of both the amount and severity of the impacts of the proposed action to the maternity colony.

### **Home Range Analysis**

In the 2005 BO, the Service predicted the effects of the action without knowledge of the precise location of the colony's primary roost area. In assessing the effects of the action, the 2005 BO (Analysis of Adjacent Habitat section, pages 82 to 86) analyzed whether sufficient suitable habitat would remain to support a colony in the vicinity of each then-known roost area (western and eastern). This analysis calculated the forest acreage and stream miles that would not be impacted within a 2-mile radius of each roost. However, with the discovery of the maternity colony's primary roost area, the current home range of the colony can be estimated. With an estimated current home range of the colony, the portion of the project impacting the colony can be estimated.

Based on the available information, we believe it is reasonable to assume that the maternity colony's home range is approximately centered on the primary roost location in the Indian Creek and Three Forks Branch watersheds. The location of the primary roost site in this area, along with information suggesting that the vast majority of the general area is forested, indicate that this general area may be suitable Indiana bat habitat. As explained in the ENVIRONMENTAL

BASELINE section of the 2005 BO, female Indiana bats typically have foraging ranges less than 2 miles from the primary roost site. For all bats studied to date, the distances between foraging areas and roost trees, and between capture locations and roost trees, have been approximately 1.5 to 1.7 miles. The maximum distance between the colonies' roost trees is approximately 3.0 miles. Of the four bats captured, 2 were captured about 2.4 miles from the primary roost tree. The other two bats, including the bat captured this year were captured within 2 miles (1.5 miles) of the primary roost. Therefore, we presume that the individual home ranges of most, but not all, of the colony members will be within 2 miles of the primary roosts.

Maternity colonies are known to use a large number of roost trees, including many lesser used alternate trees. Obviously, not all of these trees could be located at the center point of the colonies' home range. Also, it would not be reasonable to expect that a colony's primary roost area would always be located at the center point of the colony's home range, or that the home range would be a regularly shaped circle. Studies of other maternity colonies have shown that over a 3-year period, the focal point of a colony's roosting activity shifted almost 2 miles to another location within the bats' established home range. Despite this change in roosting activity, the bats continued to use the same foraging areas and commuting corridors (Kurta et al 2002). Therefore, it is difficult to predict the exact shape of a colony's home range and the location of its primary roost area within that home range. However, in this case, with knowledge of the primary roost area, and in the absence of information suggesting that the colony favors habitat in one direction from the primary roost area disproportionately over other directions, we believe a 2-mile radius circle centered on the primary roost area provides a reasonable estimate of the colony's current home range.

The area encompassed by a 2-mile radius circle centered on the primary roost site is approximately 8,040 acres (Figure 4a). However, some of the Indiana bat captures and documented roost sites within the Sandlick Creek drainage fall outside this 2-mile radius circle. Thus, the colony home range estimate is expanded to include an estimated 729 acres of habitat in the Sandlick Creek drainage encompassing the Indiana bat captures and roost sites in that area (see area in Figure 4a identified as the "nub" in the legend of the map). Therefore, for the purpose of assessing the magnitude of the impact of both mines on the maternity colony, the total current home range for the colony is estimated to be approximately 8,769 acres (8,040 + 729).

While other bats may have established home ranges that extend beyond 2 miles of the primary roost, we have no specific information to determine the presence or absence of additional individual bat home ranges beyond 2 miles, other than negative surveys in other parts of the project area. Expanding the size of the 2-mile radius circle to include other bats (in addition to those identified using the Sandlick Creek drainage) that may possibly be using areas beyond 2 miles of the primary roost would not significantly affect our analysis because, while a greater portion of the project would be captured by a larger circle, the percentage of the circle impacted by the project would not change significantly (a larger portion of the project area within a larger circle would be a similar percentage as a smaller portion of the project area within a smaller circle).

Approximately half of the Laxare East permit area is located within, while most of the Black Castle permit area falls outside of, the estimated home range of the colony. Thus, the likely

concentration of the majority of individual bat home ranges is now anticipated to exist outside the mining and valley fill impact zone. Also, the impact to the colony's home range will be lessened by the elimination or reduction of each of the 4 previously proposed valley fills containing known roosting habitat; within the 729-acre area of the Sandlick Creek drainage, 258 acres was previously proposed to be impacted, while under the proposed project modifications these impacts will be avoided. Using these figures, the proposed Laxare East and Black Castle project footprints will impact approximately 912 acres (704 acres within 2-miles of the primary roost area plus an estimated 208 acres within the Sandlick Creek drainage) of the estimated current home range of the colony. This is approximately 10% of the estimated current home range of the colony (912 acres/8,769 acres). Based on this analysis, we predict that substantially less of the colony's home range will be impacted by the proposed project footprint than previously predicted. This area of impact represents the foraging habitat of approximately 8 bats (10% of the approximately 75 estimated adult female bats within the colony).

Information from studies of other colonies indicates that individual bats have home ranges of from about 100 acres to over 200 acres (Butchkoski and Hassinger 2002). As noted in the ENVIRONMENTAL BASELINE section of this document, the major foraging area for a lactating female Indiana bat tracked within the project area was 97.1 acres, where it spent 95% of its time. If bats in this colony have individual home ranges of about 100 acres, the lower end of the observed range for the species, the portion of the project within the estimated home range of this colony (912 acres) would represent the total of individual home ranges of about 9 bats (912 acres/100 acres per bat = 9.12 bats). This information suggests that an estimate of 8 - 9 bats impacted by the project footprint is reasonable.

While the above analysis estimates the portion of the likely current home range of the colony impacted by the project footprint, additional areas of the home range may be impacted by fragmentation, noise and vibration, and indirect stream impairment. These additional effects are discussed in this section of the document below.

**Effects of Proposed Project Modifications**

As described in the DESCRIPTION OF THE PROPOSED ACTION section of this document, the applicant has either eliminated or reduced the size of each of four of the originally proposed valley fills. These project modifications have reduced project impacts by a total of 258 acres of forested habitat and 9,294 linear feet (1.75 miles) of streams, as detailed in Table A.

**Table A: Effects of Proposed Project Modifications**

	Forest Removal (acres)			Stream Impacts (feet)		
	Original	Revised	Reduction	Original	Revised	Reduction
Laxare East	1534	1420	114	36,745	31,961	4,784
Black Castle Contour	665	521	144	26,480 <sup>1</sup>	18,787	7,693
<i>Total</i>	<i>2199</i>	<i>1941</i>	<i>258</i>	<i>63,072</i>	<i>50,748</i>	<i>12,477</i>

*1: The February 2005 BO incorrectly cited this figure as 26,437 feet.*

These project modifications were developed in order to modify the placement of fill in waters of the United States and reduce impacts to known Indiana bat foraging and roosting areas, consistent with Reasonable and Prudent Measure 3.0 of the 2005 BO. These measures should effectively and substantially reduce the anticipated impacts of the proposed action.

### **Project Impacts to Forested Habitats**

The current project will remove a total of 1,941 acres of forested habitat; a 258-acre (or 12%) reduction from that previously proposed. However, the above forest acreage figure does not provide a reasonable estimate of the impacts to the colony. Based on the results of our home range analysis, we expect that approximately 10% of the colony's home range to be impacted by the project footprint. This area of impact represents the foraging habitat of approximately 9 bats.

Although we estimate that 10% of the colony's home range, and therefore 10% or 9 of the adult bats within the colony, will be impacted by the project footprint directly through forest removal, bats continuing to use habitats adjacent to these areas may experience other impacts from habitat fragmentation and noise and vibration. The 2005 BO (page 65) included descriptions of two separate areas of forested habitat that would remain after project construction: 370 acres along the mainstem of Sandlick Creek; and 280 acres in between Mudlick Fork and the headwater tributaries of Sandlick Creek. It was originally anticipated that these areas would be fragmented from each other and would become successively less suitable to support Indiana bats as the mining progressed through the watershed. However, as a result of project modifications, these two areas will remain contiguous with each other and with the 258 acres of retained habitat previously proposed for Valley Fills 1, 11, G and C. Thus, one large block of approximately 908 acres of contiguous forested riparian habitat will remain along Sandlick Creek, its tributaries and headwaters. The roosting areas identified during 2003 and 2004, and all four Indiana bat capture sites, are located within this area. Therefore, we know that Indiana bats are already using this area for roosting and commuting. However, because this riparian forested area will now be much larger and wider than before, the previously predicted impacts will be greatly reduced. Indiana bats seem to use forested stream corridors as preferred foraging and commuting areas (Hobson 1993; Humphrey et al. 1977; LaVal and LaVal 1980; Butchkoski and Hassinger 2002; 3D/International, Environmental Group 1995). Indiana bats have also been known to continue to use even fragmented riparian corridors (Clark et al 1987; Humphrey et al 1977). Given these factors and the species' documented site fidelity (see "Life History" section of the 2005 BO, particularly pages 25-26 and 35-37), is it likely that Indiana bats will continue to use this area for commuting and roosting.

Impacts from stream impairment are addressed separately below in the "Project Impacts to Aquatic Habitat" section of this document.

In summary, the current project will remove a total of 1,941 acres of forested habitat. However, our home range analysis indicates that approximately 10% of the colony's home range (the foraging habitat of 9 bats) will likely be impacted by the project footprint. One large block of approximately 908 acres of contiguous forested riparian habitat along Sandlick Creek, its tributaries and headwaters, which contains the roosting areas identified during 2003 and 2004, and all four Indiana bat capture sites, was previously predicted to be impacted; however, as a result of project modifications, it is likely that Indiana bats will continue to use this area for commuting and roosting although experiencing an unquantifiable level of impact from noise and vibration. Also, the colony's home range likely currently includes a large portion of the 3,875 acres of primarily forested habitat in the Indian Creek and Three Forks Branch watersheds where

the colony's primary roosts were discovered which is outside the project area and will not be impacted by the project.

### **Project Impacts to Aquatic Habitats**

As described in the 2005 BO, streams and their associated forested riparian areas are important areas for bat foraging and prey production. The proposed project will impact aquatic habitat through loss from mining and filling and through impairment. The current project will result in the loss of a total of 50,748 linear feet of stream (9.6 miles). This represents a 12,477-foot (2.4 miles or 20%) reduction from that previously proposed. However, these stream mileage figures do not provide a reasonable estimate of the impacts to the colony from stream loss. Project modifications, elimination or reduction of each of four valley fills, were targeted on stream corridors that are known to support Indiana bat roosting and commuting habitat. Therefore, some of the aquatic and riparian areas key to supporting the maternity colony will now be retained. In addition, the Indian Creek and Three Forks Branch watersheds have now been added to the action area, based on the documented use of these areas by Indiana bats. Based on the results of our home range analysis, we estimate that the project will cause the loss of 5.0 miles of streams within the estimated current home range of the colony (3.6 within the 2-mile radius of the primary roost area plus approximately 1.4 miles within the Sandlick Creek drainage).

Areas within the estimated colony's current home range will also be impacted by indirect stream impairment. Stream reaches downstream of proposed fills will be subject to the effects described under "Indirect Stream Impairment" in the 2005 BO (pages 68-71) that will degrade foraging habitat and reduce the availability of prey for the Indiana bat. As a result, it is still anticipated that some bats will suffer "harm" through malnutrition; increased energy expenditures; decreased fitness; increased susceptibility to failed pregnancies; and delayed volancy and maturation of pups. However, the impacts are expected to be reduced as a result of the project modifications that reduce stream fills and the new information indicating that much of the home range of the colony is outside of the project area. We estimate that a total watershed area of approximately 1,669 acres will be subject to indirect stream impairment (approximately 1,148 acres within 2-miles of the primary roost area plus approximately 521 acres within the Sandlick Creek drainage). Based on our home range analysis, this area represents 19% of the estimated current home range of the colony (1,669 acres/8,769 acres) or the individual home ranges of about 17 bats (1,669 acres/100 acres). These bats are in addition to the 9 bats impacted within the project footprint.

In summary, the proposed project will impact the maternity colony through stream loss and indirect stream impairment, but to a substantially lesser extent than we previously predicted. Impacts from stream loss have already been accounted for, in terms of number of bats estimated to be impacted, in the analysis of project impacts to forested habitats. We predict that an additional approximately 17 bats will be impacted by indirect stream impairment.

### **Project Impacts to Indiana Bat Biological and Behavioral Factors**

#### *Roosting Habitat Loss & Roost Tree Loss - Summary*

The 2005 BO stated that the proposed project will cause extensive loss of maternity roosting habitat within the action area, including the loss of all roost trees known at that time. While the

project will still eliminate 1,941 acres of forest comprising potential roost habitat within the action area, based on the project modifications and new information indicating that much of the home range of the colony is outside of the project area, the project impacts will be substantially less than previously predicted, and the above forest acreage figure does not provide a reasonable estimate of the loss of roost habitat. Based on the results of our home range analysis, we expect that approximately 10% of the colony's home range, representing the foraging habitat of approximately 9 bats, to be impacted by the project footprint.

The project has been modified to retain the roost area in the headwaters of Sandlick Creek. Also, the headwaters of Indian Creek and Three Forks Branch, where the colony's primary roost site was discovered, provides approximately 3,875 acres of forest comprising current and potential roost habitat, a large portion of which is likely within the colony's home range currently.

It is unlikely that currently established roost trees will remain suitable throughout the life of the project. Therefore, the maternity colony will still occasionally have to relocate as established roost trees become degraded. However, it is known that Indiana bats show site fidelity to roost areas, not just to individual trees (Gumbert et al 2002); therefore, as long as the remaining roost areas have, or continue to produce, other suitable roost trees, the maternity colony should continue to use these areas. However, the project will eliminate 912 acres of forested habitat within the estimated current home range of the colony. It is likely that some, as of yet, unidentified roost trees will be removed within the estimated current home range of the colony. These losses will reduce the overall availability of roosting habitat within the estimated current home range of the colony and restrict the ability of the colony to move throughout this range and adapt to changing conditions in previously used roost trees, as would occur under "natural" conditions (Kurta et al. 2002).

In summary, the removal of 912 acres of forested habitat within the estimated current home range of the colony will likely remove some unknown current roost trees and reduce the availability of future roosting habitat currently provided by this 912-acre area. Therefore, the project is still expected to impact individual bats as described in the "*Roosting Habitat Loss*" and "*Roost Tree Loss – Summary*" sections of the 2005 BO (pages 71-75). However, project modifications designed to retain all known roost sites and discovery of the maternity colony's primary roosts outside the project area indicate that much of the home range of the colony will not be impacted by the project, and therefore, the impacts to roosting habitat are expected to be considerably less than previously predicted. Based on the results of our home range analysis, we expect that approximately 10% of the colony's home range to be impacted by the project footprint. This area of impact represents the foraging habitat of 9 bats. Therefore, only 10% of the colony is expected to be impacted by the project through loss of potential roost habitat. Rather than being forced with "finding suitable maternity sites at a time when they are already stressed from the rigors of hibernation, migration, and the increased energy costs of pregnancy" (Garner and Gardner 1992), or being displaced from known roosts for multiple, successive years, 90% of the Indiana bats returning to the action area in the spring will be able to utilize a variety of familiar roost areas. This should significantly reduce or eliminate impacts to colony cohesion as described in the 2005 BO, along with a resulting reduction in impacts to thermoregulatory efficiency, energy expenditures, fitness, and reproductive success.

#### *Foraging Habitat Loss*

The 2005 BO stated that the project will cause a reduction, or at least a dramatic change, in the foraging habitat available to support the Indiana bat within the action area as a result of the clearing of forest and loss and degradation of streams. The proposed project will still result in the loss of Indiana bat foraging habitat through the removal of 1,941 acres of forested habitat and 50,748 linear feet (9.6 miles) of stream. However, based on our home range analysis, the above forest acreage and stream mileage figures do not provide a reasonable estimate of the impacts to the colony. Based on our analyses above (Project Impacts to Forested Habitats and Project Impacts to Aquatic Habitats), we expect that 9 bats will be impacted by forest and stream loss and approximately 17 additional bats by indirect stream impairment.

The 2005 BO assumed that Indiana bats were foraging within the forested corridors around the headwaters, tributaries, and mainstem of Sandlick Creek. Of the four Indiana bats tracked within the action area to date, only one has had its foraging area defined. This bat's foraging area was within the upper reaches of an unnamed tributary of Sandlick Creek, to the west of Orchard Branch. This confirms the assumptions made in the 2005 BO. And as noted in the ENVIRONMENTAL BASELINE section of this document, it is likely that other headwater and first order streams within the action area are used by other members of the maternity colony. The one identified foraging area will be filled by Laxare East Valley Fill E. In addition, the large non-forested area that will be created by construction of the Laxare East project will bisect the remaining foraging habitats within the Sandlick Creek watershed from the primary roosting area at the headwaters of Indian Creek. However, the newly retained areas are contiguous with the riparian areas of Sandlick Creek and should provide foraging area, as well as travel corridors from established alternate roosting areas to other remaining foraging areas.

In summary, the project is still expected to cause the kinds of impacts described in the 2005 BO (pages 75-79). Forest and stream loss will cause bats using these areas for foraging to be displaced from these areas. Depending on severity, stream impairment may cause bats using these areas for foraging to be displaced or to experience decreased foraging efficiency. Bats affected by foraging habitat impacts will likely experience increased energy demands, increased inter- and intra-specific competition, and social disruption, with the result that some of these bats may experience increased risk of mortality and decreased reproductive success. The headwaters of Indian Creek, where the primary roost area is located, and the adjacent Three Forks Branch watershed include 78,683 linear feet (14.9 miles) of streams, and much of this area is within the likely current home range of the colony; these two watersheds are relatively unimpacted by previous mining, and the proposed project does not propose any mining or filling in these watersheds. Bats using this area for foraging will not be impacted by the project. Bats whose foraging areas will be impacted by the project may find substitute foraging habitat in this area. As a result of these factors, the severity of the anticipated effects to the maternity colony from foraging habitat impacts will be substantially less than previously predicted. We predict that approximately 9 bats will be impacted by forest and stream loss and approximately 17 additional bats by indirect stream impairment.

#### *Interspecific and Intraspecific Competition*

The 2005 BO stated that clearing of forested habitat will displace all bats (Indiana bats as well as bats of a minimum of seven other species documented within the action area) from the project

area, and that these bats may move into adjacent remaining habitats and compete for foraging and roosting areas with bats (including other members of the Indiana bat maternity colony) already using these adjacent habitats. Based on our new analysis, we expect that impacts from interspecific and intraspecific competition will still occur but to a lesser extent than previously predicted.

Our new analysis indicates that 9 bats from the maternity colony will be displaced by removal of foraging and roosting habitat. All displaced bats will likely move into areas already used by other bats including some Indiana bats. Therefore, the 9 displaced Indiana bats plus some additional Indiana bats will experience increased interspecific and intraspecific competition as a result of the project. It is not possible to predict exactly where all of the displaced bats will go and to what extent they will compete with un-displaced Indiana bats for foraging and roosting areas. It can be expected that un-displaced bats (into whose habitat displaced bats move) will experience lesser effects than displaced bats, because displaced bats must enter less familiar habitat. Also, because an Indiana bat maternity colony and local populations of other bat species experience some level of mortality and recruitment each year, it is reasonable to assume that individual members of an Indiana bat maternity colony experience natural changes in competition for foraging and roost areas during and between years, and that bats adjust to these changes. In addition, the estimated 9 displaced bats from the maternity colony are not expected to be displaced at the same time but rather over the several years in which forest habitat will be cleared. Considering these factors, we expect that the impact from increased competition will likely affect only a small number of bats within the colony and that this effect will be small and short term.

#### *Colony Cohesion and Social Structure*

The 2005 BO concluded that the maternity colony will likely be extirpated as a result of the suspected small colony size, ongoing impacts to the colony from previous mining and logging activities, and the cumulative total of all the anticipated adverse impacts to individual bats. Primary factors in this analysis were the expected loss of foraging and roosting habitat of individual bats and the colony's primary roosts which would significantly affect the colony's cohesion and social structure.

As a result of project modifications and the discovery of the colony's primary roosts outside the project area, we believe that impacts to colony cohesion and social structure will be significantly less than previously predicted. Because the primary roost area will not be impacted by the project, individual members of the colony are expected to be able to locate each other when returning each spring. In addition, the size of the colony, estimated at approximately 75 adult bats, is considerably larger than previously believed with a large proportion (approximately 90%) of these bats estimated to have individual home ranges outside the project area. These factors increase the likelihood that colony cohesion will be maintained. Approximately 26 bats are expected to be impacted by habitat impacts (i.e., forest and stream loss and indirect stream impairment). Some of these bats are expected to be displaced and to search for substitute habitat. Displacement of bats may result in some disruption to the social structure of the colony depending on the extent of impacts to the individual bats and their response to the impacts (e.g., the distances they must travel to find replacement habitat which may affect their interactions with other closely related bats within the colony). However, because only a relatively small

number of the bats in the colony are expected to be potentially displaced by the project's habitat impacts, it is likely that social structure disruption stemming from these habitat impacts will be small and temporary, and likely affecting only a small number of bats.

### **Analysis of Adjacent Habitat**

As described in the Home Range Analysis section of this document, the 2005 BO analysis of adjacent habitat is no longer appropriate and has been replaced with the new home range analysis.

#### *Other Major Mining Projects within Adjacent Habitats*

Two projects, West of Stollings and Lexerd, were previously described in this section. Consultation on these projects was previously completed and the projects are currently under construction. Based on the location of our estimated colony home range, it is expected that these projects will not impact the colony.

### **Effects of Conservation Measures**

#### *Summer Habitat Retention*

The applicant previously proposed leaving summer habitat on the lower slopes for both the mountaintop removal and contour mine projects, and on the upper slopes for the contour mine projects. During consultation on the 2005 BO, we concluded that: 1) many of the areas that the applicant proposed to leave intact would not be suitable to support Indiana bats; 2) the conservation measure as previously proposed did not serve to retain aquatic foraging areas such as headwater or intermittent streams, a habitat type that has been shown to be of biological importance to the Indiana bat; 3) there were no assurances that this habitat would remain intact; and 4) that this measure was not truly a conservation measure because the project had not been modified to minimize impacts to summer habitat.

Since the time of that consultation, the applicant has proposed measures to retain an additional 258 acres of forested habitat (including all known roost trees) and 12,477 linear feet of stream (2.3 miles). These project modifications were targeted to address items 1, 2, and 4 in the paragraph above, and will result in aquatic and forested habitats that are known to be suitable to Indiana bats being retained. This revised conservation measure is expected to substantially minimize or offset project related adverse effects to the Indiana bat. To date, long term conservation of these areas (item 3, above) has not been established. This remaining issue was addressed under Reasonable and Prudent Measure 2 of the 2005 BO, which requires the applicant to implement reasonable measures to provide for long-term conservation within 3 years of permit issuance (i.e., by no later than August 23, 2008).

Terms and Conditions 2.5 and 2.6 in this opinion discuss the need for identifying priority conservation areas and means to protect these areas over the long-term. Data from the 2005 surveys suggest that lands and waters within the Indian Creek and Three Forks Branch watersheds, especially those containing and immediately adjacent to the primary roost area, will be of particular importance in ensuring the long-term survival and health of the colony. Efforts to implement these terms and conditions should focus on the forested and aquatic habitats in these two watersheds surrounding the primary roost area.

### **Effects of the Action Summary**

The proposed action will still result in a significant change in the summer environment for the Indiana bat maternity colony present in the action area. The proposed action will remove approximately 1,941 acres of habitat and will directly impact 50,748 linear feet (9.6 miles) of streams. The impacts to these areas will reduce the availability of roosting habitat; eliminate preferred foraging areas, flyways, and watering areas; and reduce the availability of prey. Remaining streams will be subject to indirect effects that will further degrade remaining foraging habitat and reduce the availability of prey for the Indiana bat. As a result, it is anticipated that bats will suffer "harm" through malnutrition; increased energy expenditures; decreased fitness; increased susceptibility to failed pregnancies; and delayed volancy and maturation of pups. These types of effects remain the same as described in the 2005 BO, but their extent and severity now differ.

Project modifications have reduced project impacts by 258 acres of forested habitat and 12,477 linear feet (2.3 miles) of stream. These modifications were targeted to retain forested and aquatic habitats that are known to support Indiana bat roosting and commuting habitats. These modifications have also substantially reduced proposed fragmentation of remaining forested and riparian habitats. One large block of approximately 908 acres of contiguous forested riparian habitat will remain along Sandlick Creek, and its tributaries and headwaters. The roosting areas identified during 2003 and 2004, and all four Indiana bat capture sites, are located within this area.

In addition, surveys conducted in 2005 documented two primary roost trees located near the upper reaches of the Indian Creek and Three Forks Branch watersheds. These watersheds provide forested and aquatic habitats that are presumed to constitute the majority of the home range of the colony, and that will not be impacted by the project. Retaining established roosting and commuting areas will reduce impacts to thermoregulatory efficiency, energy expenditure, fitness, and reproductive success. Adverse effects from disruption of colony cohesion and social structure and from inter- and intra-specific competition will be lessened.

A home range analysis indicates that the proposed project footprint will impact up to 10% of the home range of the colony, representing the foraging habitat of approximately 9 bats (12% of the approximately 75 estimated adult bats within the colony). An additional 17 bats are expected to be impacted by stream impairment. Therefore, only 26 of the current 75 adult bats within the colony are estimated to be impacted by the project's habitat impacts. Based on this analysis, we predict that the impacts of the proposed project will be substantially less than previously predicted, and we therefore anticipate that the colony will persist.

### **CUMULATIVE EFFECTS**

*[The following four paragraphs supplement the Cumulative Impacts section of the 2005 BO, pp. 95-99 BO.]*

The 2005 BO listed three additional mining projects that could occur within the action area: the Checkmate Amendment, Black Castle Contour Amendment #1, and Short Ridge. One additional project, the Indian Creek Haulroad has also been proposed to occur in the action area. The 2005 BO (pages 95-99) described the jurisdictional issues between the Clean Water Act section 404

permits issued by the Corps and the Surface Mining Control and Reclamation Act (SMCRA) permits issued by the WVDEP, and the resulting uncertainty regarding whether impacts, such as tree clearing resulting from adjacent mining actions, should be considered future federal actions that would undergo separate section 7 consultation.

Since the time of that consultation, the WVDEP has indicated that they intend to address mining projects in the action area through implementation of the 1996 Formal Section 7 Biological Opinion and Conference Report on Surface Coal Mining and Reclamation Operations under the SMRCA. This is reflected in their letter requesting that they join with the Corps as joint action agencies for this current consultation. As a result, these adjacent projects will be addressed through separate consultations. They are therefore considered future Federal actions subject to consultation and not cumulative effects, and will not be considered further here.

The 2005 BO described the 12,000 acres of land within and around the action area that the applicant currently has under long-term lease, including over 6,000 acres of largely contiguous forest located immediately northeast of the Laxare East project area. The 2005 BO stated that this is the area that the colony would most likely move to when displaced from the project area, and that, therefore, loss of all or a significant portion of this area would reduce the likelihood that a viable colony could be maintained in the area. Because a substantial portion of the maternity colony is believed to be already using this area (based on the discovery of the primary roosts in this area), we continue to believe, as expressed in the 2005 BO, that this area is important to the likelihood that a viable maternity colony could be maintained.

Private landowners own the surface rights to the lands northeast of the Laxare East project area. These private landowners will likely undertake activities in the future that will alter existing vegetation on their properties such as timber harvesting, grazing, or other commercial or agricultural development. Based on the pattern of past land use practices in the general area, it is likely that these activities would impact Indiana bat maternity colony habitat to an extent that the viability of the maternity colony could be compromised. Whether the colony would become extirpated would depend on the nature, timing, and magnitude of the impacts; these impacts could be influenced by the colony's potential natural relocation of primary roosting areas within its home range or to adjacent areas, and by other factors. Because these activities that impact Indiana bat maternity colony habitat would likely result in take of the species, an Endangered Species Act section 10 permit would be required from the Service. Issuance of such a permit is considered a Federal action and would be subject to intra-Service section 7 consultation. Because they are considered future Federal actions subject to consultation and not cumulative effects, they will not be considered further here.

## **CONCLUSION**

*[The following section replaces the Conclusion section in the 2005 BO, pp. 99-101.]*

The 2005 BO described the Indiana bat as a species in serious decline and provided projections of the future population should past rates of decline continue (e.g., a reduction of 50% in the next 15 to 30 years). Although census information for the 2003 and 2005 survey periods appear to indicate an increase in the Indiana bat population, because confidence intervals are not available for these and previous estimates, it is unknown whether the increase represented by the 2003 and

2005 estimates is biologically or statistically significant. Potentially significant sources of uncertainty with these estimates include assumptions about status in caves or portions of caves that cannot be surveyed in a particular year, and changes in counting methodologies (e.g., change from visual estimates to use of digital photography). Because of these uncertainties and the short time frames involved, we do not consider these recent population estimates as representing a halting or reversal of the species' documented long-term decline.

Based on the capture of two Indiana bats within the project area in 2003 and the past impacts in and adjacent to the action area, the Service concluded in the 2005 BO that the maternity colony had already experienced substantial impacts. The Service further concluded that, while the proposed action was likely to cause significant impacts to the remaining members of the colony, the effects will exacerbate, rather than create, a decline that may have been set in motion by habitat loss and degradation caused by previous logging and mining activities. Based on past impacts, current site conditions, and small size and probably declining status of the colony, the 2005 BO concluded that the project would not cause species-level impacts to the Indiana bat, and that, therefore, the project would not result in jeopardy to the species.

The Service has since received new information indicating that the maternity colony is of an average size of approximately 75 adult bats and that the colony's primary roosts are located outside the project area near the headwaters of Indian Creek and Three Forks Branch. Based on this information, the Service now believes that the maternity colony has not been pushed into decline and toward extirpation by previous mining and logging activities. Also, the proposed action has been modified by eliminating or reducing the size of each of four valley fills to reduce impacts to known Indiana bat foraging and roosting areas. In addition, as a result of the discovery of the colony's primary roost site outside the project area, we predict that roughly 10% of the colony's home range, representing the foraging areas of 9 of the colony's approximately 75 adult bats, will be impacted by the project footprint, with an additional 17 bats impacted by stream impairment. Therefore, only 26 of the bats in the maternity colony are expected to be affected by the project's habitat impacts. The impacts to many of these bats are expected to be small and/or temporary. Based on this information, the Service now predicts that the maternity colony is not likely to become extirpated. Although the colony may be reduced in size, colony persistence will avoid species-level impacts.

In conclusion, after evaluating the current status of the species, the environmental baseline for the action area, the effects of the proposed mining projects, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Indiana bat by engaging in an action that reasonably would be expected, directly, or indirectly, to reduce appreciably the likelihood of both survival and recovery of the Indiana bat in the wild by reducing reproduction and distribution of the species. Whereas critical habitat for this species has been designated at hibernacula in Illinois, Indiana, Kentucky, Missouri, Tennessee, and West Virginia, this action does not affect these areas, and no destruction or adverse modification of critical habitat is anticipated.

#### **INCIDENTAL TAKE STATEMENT**

Implementation of the Laxare East and Black Castle Contour projects is expected to result in the permanent loss of approximately 10% (912 acres) of suitable summer foraging and roosting

habitat for Indiana bats, as well as 5.0 miles of stream habitat. An undetermined number of stream miles within approximately 19% of the home range of the colony will be indirectly degraded by mining due to the presence of upstream valley fills. Forest and aquatic invertebrates, the prey sources for Indiana bats, will be affected by forest and stream loss and degradation, resulting in a reduction in the quality, quantity, and seasonal availability of food for Indiana bats. Due to the nature of the project, and the historical lack of success in reclaiming diverse, high-quality forest and stream habitats on mined lands, Indiana bats will not re-colonize the mined areas of the project footprint.

The Service anticipates that take in the form of killing, harm and harassment (as defined in 50 CFR §17.3) will occur as a result of the direct and indirect effects of the proposed mining action and that individuals present within the action area will be subjected to take through lost reproductive capacity, predation, or reduced fitness leading to injury or death. Harm may be most often manifested percent in sub-lethal injury in the form of lost reproductive capacity, or reduced fitness. Approximately 10% of the foraging habitat that is likely to be currently supporting a portion of the colony will be eliminated, fragmented or degraded. Additionally, the streams within another 19% of the home range of the colony that are down stream of the valley fills will be subject to long-term degradation. The loss, degradation and fragmentation of upland and aquatic foraging and roosting habitat is expected to result in injuries in the form of a reduction in the reproductive output, as a result of increased metabolic expenditures, decreased food supply and water supply, increased exposure to predation, and increased competition, for those individuals that are displaced by mining activities. These factors may result in the death of some bats (fetal, juvenile, and adults). Behavioral and physiological responses of Indiana bats to habitat loss will likely result in some bats being in poorer body condition (*e.g.*, having less stored fat) during migration and hibernation. Therefore, increased Indiana bat mortality may also be expected at hibernacula, and along spring and fall migration routes by those bats whose habitat is destroyed.

These effects at the individual level may be further reflected at the colony level, by temporarily reducing the size and reproductive potential of the maternity colony over the 12-year life of the project. Based on our analysis of the environmental baseline and effects of the proposed action, all of the bats located within 31% of the Indiana bat maternity colony will be impacted as a result of the proposed project. As discussed in the "Environmental Baseline" section of this opinion, this colony is likely consistent with an average size maternity colony of 60-80 adult bats. Despite the potential temporary colony size reduction, the colony is anticipated to persist throughout and beyond the life of the project due to the reduction in project impacts to forested and aquatic habitats, the retention of all known roost areas, and the crucial fact that primary roost areas are now known to be established in areas outside of the project footprint and will not be directly impacted by the proposed action. These factors most greatly influenced the magnitude of impacts anticipated in these revised findings. In the 2005 BO, it was anticipated that the entire maternity colony population, which was believed to be decreasing, would be displaced over the life of the project and eventually extirpated due to the effects of the mining. These revised findings indicated that the majority of the maternity colony population will remain largely unaffected by the proposed action.

Since many of the anticipated effects of the action will occur to individual bats at a sub-lethal level, the overall health, fitness, and reproductive success or failure of individual bats will not be detectable, and nearly impossible to assess throughout the life of the project. Therefore, the most feasible means of evaluating the ultimate impacts of the project will be by monitoring the size and persistence of the colony over time. Even under natural conditions, however, colony size is likely fluid from year to year. Climatic factors such as weather (temperature, precipitation) can have significant impacts on the survival and reproductive success of individual bats. The condition and availability of established roost trees, and colony dynamics (fission-fusion reactions) may also cause the colony population to fluctuate. Therefore, detection of anticipated effects of the action will be difficult to differentiate from normal population fluctuations and monitoring criteria will be required to ensure that project impacts are not having a greater impact on the population than anticipated without creating a reinitiation level that is triggered by normal population fluctuations. Since the impacts of the project will not happen to all affected bats in all years, only a small portion of the individuals anticipated to be impacted (designated in Table 16a, below), are likely to be affected each year and most of those affected are expected to survive the following years. Therefore, any sudden drop in maternity colony population size may indicate project impacts to the colony, or changed conditions that have not been considered in this biological opinion and may signify the need for reinitiation of consultation<sup>2</sup>. Examples of situations that indicate the need to consider reinitiation are given in the REINITIATION notice at the end of this Biological Opinion.

#### **Amount or Extent of Take**

The Service anticipates the following levels of incidental take as a result of project implementation (Table 16a). Take of the entire colony is not anticipated or authorized.

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<sup>2</sup> Based on those factors, we have determined that a 20% decrease in population in two consecutive years would signify a level of population decline that is much greater than the anticipated level of project impacts alone as described in this supplemental BO, and further, could not be reasonably accounted for by anticipated project impacts plus any yearly population fluctuations. Therefore, documentation of such decreases indicates the need to consider reinitiation of consultation to assess this level of population reduction.

**Table 16a. Indiana bat incidental take estimates for the Laxare East and Black Castle Contour Projects**

Take Unit	Amount of Take	Type of Take (or Effect)	Area Within Which Take (or effect) is Anticipated to Occur
Individual	Up to 9 adult females, plus their pups over the life of the project	Harm due to habitat loss, degradation and fragmentation – resulting in increased injury, mortality, and failed reproduction during and after displacement and relocation. We anticipate that most of these effects will be at a temporary and sub-lethal level, sufficient to allow for colony persistence, however, lethal impacts are anticipated for a small portion of the adults, fetuses, and pups.	Laxare East and Black Castle Contour Mines within Primary Roost Area, and Sandlick Creek drainage valley fills C and D.
Forested Habitat	Estimated 912 acres (10 % of the home range of colony.)	Permanent loss of foraging and roosting habitat, habitat fragmentation and degradation, resulting in loss of potential foraging and roosting habitat	Laxare East Black Castle Contour Mines within Primary Roost Area and Sandlick Creek Drainage valley fills C and D.
Stream Habitat	5.0 miles	Permanent loss of streams and their associated watering and prey base for Indiana bats	Laxare East Mine within Primary Roost Area and Sandlick Creek Drainage valley fills C and D.
Individual	No more than 17 adult females, plus their pups over the life of the project.	Harm due to long term degradation of streams, and reduction of associated prey base, water source, resulting in increased injury, mortality, and failed reproduction We anticipate that most of these effects will be at a temporary and sub-lethal level, sufficient to allow for colony persistence, however, lethal impacts are anticipated for a small portion of the adults, fetuses, and pups.	Areas downstream of Laxare East and Black Castle mining/fill areas within the primary roost area and the Sandlick Creek Drainage.
Indirect Stream Impacts	Streams within an estimated 19% of the home range of the colony.	Long-term alteration of streams and their associated watering and prey base for Indiana bats	Laxare East Black Castle Contour Mines within Primary Roost Area and the Sandlick Creek Drainage valley fills C and D.

The *Reasonable and Prudent Measures* and their implementing *Terms and Conditions* provide for monitoring to more clearly establish the pre-project baseline, to document take, and to determine whether the effects of the project on Indiana bats and their habitat are consistent with those anticipated in this opinion.

### **Effect of the Take**

In this biological opinion, the Service has determined that this level of expected take is not likely to result in jeopardy to the Indiana bat.

### **REASONABLE AND PRUDENT MEASURES**

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize incidental take of Indiana bats. In order to be exempt from prohibitions of Section 9 of the Act, the Corps, the WVDEP, and the applicant must comply with the following terms and conditions which implement the reasonable and prudent measures and outline reporting/monitoring requirements. These terms and conditions are non-discretionary. In summary, these actions include surveys and monitoring of Indiana bat populations and habitat, protection of priority suitable habitat, avoidance of winter hibernacula, seasonal restrictions on tree cutting to avoid bat presence, and reduction of impacts to bat foraging and roosting areas.

So that a complete list of all the RPMs that apply to the projects are contained in one document, the text of all the RPMs and their associated Terms and Conditions are repeated below. For each RPM we have noted whether the requirements of the RPM have been initiated, and the current status of that effort. We have also updated the introductory text and literature citations in the RPMs, as needed. Other than changes to the text of RPM 5.8, no substantial changes to the RPMs are being recommended as a result of this reinitiation of consultation. Changes to RPM 5.8 are being recommended to clarify the intention of previous text, and to target pre-maternity period season monitoring on the most important trees while ensuring the overall level of effort is focused on the more critical maternity period monitoring. In addition, limited monitoring at the Orchard Branch roost area is being recommended to determine if this roost area is still being used.

***RPM 1: Avoid direct take by conducting all timber harvesting and tree cutting activities when Indiana bats are unlikely to be present.***

*This RPM was implemented during the 2005/2006 season and will continue to remain in effect for the life of the project.*

Cutting trees while bats are present may cause death and injury to adult Indiana bats and their young, and may also disrupt roosting and maternity behavior. The potential for direct take will be avoided by conducting all tree clearing activities during the hibernation period for the Indiana bat (November 15 to March 31) when Indiana bats are either hibernating or congregating around the hibernacula.

RPM 1: Terms and Conditions:

- 1.1 The applicant shall conduct all timber harvesting and tree cutting in the permit area between November 15 to March 31, when Indiana bats are unlikely to be present within the permit area.

*RPM 2: Conduct a comprehensive survey within and adjacent to the permit area using a variety of techniques to identify areas of concentrated Indiana bat usage; conduct an assessment to identify priority suitable habitat within the permit area that are not proposed to be cleared and areas adjacent to the permit area; and implement reasonable measures to conserve these priority suitable habitats.*

*The applicant has submitted a survey plan in accordance with 2.4, and conducted some limited surveys in adjacent areas in accordance with 2.1. Additional work to fully implement this RPM is required.*

To establish baseline conditions and ensure compliance with the established level of take, comprehensive surveys within the permit area are necessary. Indiana bats present within the permit area will most likely be displaced into adjacent habitats. The currently identified primary roost trees are located in a large block of contiguous forest located to the northeast of the permit area. Once displaced from the permit area, it is likely that Indiana bats will heavily rely on this area to support the colony. This area is currently under lease entirely by the applicant and that does not appear to be bisected by any other adverse surface leases. Only limited mist net surveys have been conducted for Indiana bats within this area. It is possible that this area is already occupied by Indiana bats, and that these bats would be impacted by displaced Indiana bats moving into their established home ranges. To establish current baseline conditions and ensure compliance with the established level of take, it is necessary to conduct comprehensive surveys within these adjacent habitats in addition to the permit area.

Project impacts to Indiana bats could be minimized by protecting priority suitable habitat in areas Indiana bats currently and may continue to use and areas to which Indiana bats may be displaced as a result of the project. Identification of these priority suitable habitat areas will guide the identification of reasonable measures to conserve these areas.

RPM 2: Terms and Conditions:

- 2.1 The applicant shall comprehensively survey forested and aquatic habitats within and adjacent to the permit area to determine baseline conditions for the Indiana bat. Surveys adequate to detect the presence of Indiana bats; identify currently used roosting and foraging areas; estimate the number and size of maternity colonies; and establish the size of Indiana bat home ranges shall be conducted as defined under RPM 5 during the 2006 maternity season. These surveys should include areas currently under lease by the applicant that are located to the north/northeast of the permit area. The applicant and/or their consultants shall make reasonable efforts to obtain permission to conduct surveys on any adjacent or nearby lands that Indiana bats within the permit area may also be using. Surveys within these additional areas shall comply with the terms and conditions

established for surveys within the permit area (RPM 5) with the exception that monitoring of adjacent areas need not be conducted in subsequent years unless data indicate that Indiana bats may be utilizing these areas.

- 2.2 All Indiana bat monitoring efforts shall be supervised by a qualified surveyor with experience identifying and working with Indiana bats. At the time work is conducted, lead surveyors on-site must hold any permits required by the Service and have a valid collecting permit from the WVDNR.
- 2.3 The applicant shall coordinate all surveys with the Service prior to conducting the work. Proposed survey locations, frequency, level of effort, and methods for each field season shall be submitted to the Service for review and concurrence at least 45 days prior to the beginning of each monitoring season.
- 2.4 Within one year of permit issuance (i.e. by August 23, 2006), the applicant shall conduct qualitative and quantitative roosting and foraging habitat assessments in areas accessible to the applicant by right or by permission to determine whether habitats that will remain in the permit area and habitats adjacent to the permit area are suitable to support Indiana bats and to identify areas that would be most suitable to support Indiana bat maternity activity. These assessments shall focus on, but not be limited to, habitats located along the riparian areas of Sandlick Creek and its tributaries, and existing forested habitat located to the north/northeast of the Laxare East permit (including the Indian Creek and Three Forks Branch watersheds surrounding where the primary roost trees have been identified). This assessment may use existing Habitat Suitability Indexes or other methods, as appropriate. The applicant shall submit an assessment plan to the Service, WVDEP and the Corps for concurrence at least 45 days prior to the initiation of the work.
- 2.5 Within two years of permit issuance (i.e. by August 23, 2007), the applicant shall identify priority conservation areas based on the results of RPM 2.1 and RPM 2.4 above. These areas shall be selected based on demonstrated Indiana bat usage or on their ability to provide: 1) large forest blocks; 2) migration corridors and connectivity among existing stream corridors and blocks of forested habitat; 3) intact ephemeral, intermittent, and perennial stream courses with forested riparian buffers for foraging and travel; and 4) high quality roost and maternity trees. All information regarding the identified priority conservation areas shall be submitted to the Service for review and concurrence.
- 2.6 Within three years of permit issuance (i.e. by August 23, 2008), the applicant shall implement reasonable measures to provide for long-term conservation of the priority conservation areas identified pursuant to RPM 2.5. Measures to achieve long-term conservation may include, but are not limited to, purchasing timber rights and establishing a management agreement, conservation easement, or other legal mechanism. The applicant shall provide to the Corps, WVDEP and the Service documentation that all available reasonable measures have been identified and implemented.

***RPM 3: Implement reasonable measures to modify the placement of fill in waters of the United States to reduce impacts to known Indiana bat foraging and roosting areas.***

*This RPM has been completed.*

The applicant indicated by electronic mail dated November 29, 2004, that they believe they have minimized fills to the maximum extent practicable based on engineering design constraints. However, the Corps is required to conduct a National Environmental Policy Act analysis and Clean Water Act 404(b) (1) analysis under regulations governing the issuance of individual Clean Water Act permits. That analysis may reveal additional reasonable measures that could be implemented to avoid and minimize impacts to foraging and roosting habitat.

RPM 3: Terms and Conditions:

- 3.1 In accordance with the National Environmental Policy Act and other regulations governing the issuance of individual permits under the Clean Water Act, the Corps must evaluate measures that may be available that would minimize fills in Waters of the United States, focusing on measures that would reduce impacts to the Sandlick Creek watershed and avoid or minimize impacts to known Indiana bat roosting and foraging areas, including those areas designated as Black Castle Contour fill 11 and Laxare East fills C and G. If that analysis indicates that reasonable measures are available that would reduce impacts to the Indiana bat, the Corps, in accordance with its authorities, shall require that these measures be implemented. The results of that analysis shall be coordinated with the Service to confirm reduction of impacts to Indiana bats. The applicant shall provide to the Corps and the Service documentation that all available reasonable measures have been identified and implemented.

***RPM 4: Implement reasonable measures to delay impacts to foraging and roosting habitat within and/or adjacent to the permit area to minimize impacts to Indiana bats.***

*This RPM has been implemented by modifying the project to avoid impacts to known roosting areas in the footprints of the valley fills as listed below. Additional measures may be developed based on coordination between the parties as described.*

As described in the "Effects of the Action" section, the proposed project will limit the availability of suitable roost trees and foraging habitat. Maintaining suitable roosting and foraging habitat is important so that Indiana bats returning to the area will be able to find enough habitat in close proximity to established maternity areas to overcome post-migration stress, have enough suitable habitat to support the colony, or find sufficient travel corridors to shift their foraging and maternity ranges to adjacent intact habitat and adjust to changing habitat conditions. Delaying impacts to known foraging and roosting habitat within the permit area will reduce the potential for take from these effects and increase the possibility that the colony will persist.

RPM 4: Terms and Conditions:

4.1 The Corps, WVDEP and the applicant, in coordination with the Service, shall review the results of surveys conducted under RPMs 2 and 5, and the applicant shall use this information to identify and implement all reasonable measures to minimize impacts caused by displacing Indiana bats through modification of the timing and phasing of clearing and/or construction. These measures shall focus on delaying disturbances to known roosting and foraging areas, including disturbances resulting from Black Castle Contour's valley fill 11 (known foraging area of Indiana bats) and Laxare East's valley fills C and G (known roost area for Indiana bats), and designing construction to allow for travel corridors from existing roosting/foraging area into conservation areas as identified pursuant to RPM 2.5. The applicant shall provide to the Corps, WVDEP and the Service documentation that all available reasonable measures have been identified and implemented.

*RPM 5: Monitor Indiana bats to identify areas on-site that are used by the bat and to quantify the amount and type of take.*

*This RPM was initiated during the 2005 maternity season and will continue to remain in effect for the life of the project.*

It is anticipated that some of the foraging and roosting areas used by Indiana bats will be destroyed, degraded, and fragmented. Bats will be displaced from foraging and roosting areas. These impacts will result in reduced survival, reproduction, and fitness of individual bats and reduce the overall size of the maternity colony. Monitoring studies have the potential to identify these effects. A plan for surveying, monitoring, and reporting on the Indiana bat within the permit area and adjacent habitat shall be developed and conducted in consultation with the Service.

The purpose of the monitoring plan is to: 1) determine whether the actual level of take occurring is in compliance with the established level of incidental take; 2) assess the effectiveness of RPMs and conservation measures over time; 3) determine the need for adjustments to management of the Indiana bat habitat; and 4) evaluate the response of bats to the disturbance that will occur in the permit area. The monitoring plan shall be designed to meet these minimum specifications and include mist-netting, acoustical surveys, telemetry, emergence counts, and reporting of results.

RPM 5: Terms and Conditions:

5.1 The applicant shall monitor Indiana bats annually over the life of this project beginning in the year that the first permit was issued (2005) and continuing at least two years past the completion of all mining and reclamation within the permit area. Each year, monitoring shall be conducted during each the survey season April 1 to November 15, and shall include mist netting, telemetry, and emergence counts during the sampling periods of Indiana bat pregnancy (May 15 – June 15); lactation (June 15- July 15); and post-lactation/juvenile volancy (July 15 – August 15). Survey elements shall be designed to meet the minimum qualifications as outlined below.

5.2 All Indiana bat monitoring efforts shall be supervised by a qualified surveyor with experience identifying and working with Indiana bats. At the time work is conducted, lead surveyors on-site must hold any permits required by the Service and have a valid collecting permit from the WVDNR.

5.3 The applicant shall coordinate all surveys with the Service prior to conducting the work. Proposed survey locations, frequency, level of effort, and methods for each field season shall be submitted to the Service for review and concurrence at least 45 days prior to the beginning of each monitoring season.

5.4 The applicant shall conduct mist-net and acoustical monitoring surveys annually throughout the permit area and adjacent areas that Indiana bats are likely to colonize or be displaced into. Surveys shall be sufficient to monitor previously identified foraging and roosting areas, and identify new roosting and foraging areas that may be used by displaced bats. Acoustical monitoring shall be used to screen and prioritize potential mist net locations, and/or monitor general bat activity at a location. Mist netting once annually during each sampling period (as defined in 5.1) need not exceed the level of effort as defined under the mist net survey protocols\*. Mist netting during each sampling period may be discontinued when the target number of bats is caught (as defined in 5.6). Mist net survey locations shall be designed to avoid the use of invasive techniques that may cause roost abandonment. Sampling locations may be adjusted each sampling period as original locations are impacted by construction or if previous monitoring suggests more productive sample locations. The applicant and/or their consultants shall make reasonable efforts to obtain permission to conduct surveys on any adjacent or nearby lands that Indiana bats within the permit area may also be using.

\* The number of mist net sites required has not changed as a result of this supplemental B.O. To meet these requirements, 18 sites will be surveyed for a total of 72 net nights of effort during each of the three separate survey periods. Thus, combined will be 216 net nights of effort for the project each year. The surveys conducted under RPM 2.1 are in addition to the sites listed above.

5.5 All Indiana bats captured shall be fitted with a numbered, lightweight band. The most current banding procedure or marking recommendations shall be followed. Wing punches and hair samples shall be gathered and retained for all Indiana bats captured. Hair and wing samples shall be retained, processed and analyzed according to the direction of the Service. Stable isotope analyses shall be conducted on hair samples unless otherwise directed by the Service. Other data collected on captured bats shall include species, age, sex, right forearm length, weight, and reproductive condition. Capture specifics such as vertical location in the net, flight direction, and time of capture shall also be recorded. All bats shall be released at the net site unharmed in compliance with procedures designated by the Indiana bat recovery team, or other Service protocols.

5.6 The applicant shall conduct telemetry studies annually during each sampling period (as defined in 5.1) in order to identify, characterize, and map current foraging areas, roost trees, and home ranges, as well as determine bat use of, and movement between these areas. All Indiana bats captured during the mist netting surveys, with a target of 4 Indiana bats per sampling period, shall be fitted with a radio transmitter. Telemetry studies shall prioritize tracking of female Indiana bats, although tracking of males and juveniles may also be conducted. The bats shall be

tracked as long as the signal can be detected. Roost trees shall be identified and mapped during daylight hours and used as starting points for the next night's tracking. Triangulation methods shall be used to establish bat locations during night tracking. Because monitoring must be geared to evaluating the response of the bats at the colony level, mist netting and telemetry work shall be designed to include tracking as many different bats as possible, and tracking shall be conducting during the three sampling periods within the maternity season: pregnancy (May 15 – June 15); lactation (June 15- July 15); post-lactation/juvenile volancy (July 15 – August 15).

5.7 Upon identification of a roost tree from telemetry studies, the applicant shall gather information to document the location of the roost and record site-specific data relative to the roost area. For each tree containing a roost used by an Indiana bat, the species, the height, diameter at breast height (dbh), condition (alive or dead), aspect, elevation, and the percentage of exfoliating bark shall be recorded. Distances from the roost tree to other roosts used by the bat(s), to the nearest perennial and intermittent stream, and to the edge of mining, tree clearing or other related disturbances shall be measured. Percent canopy closure above roost trees and habitat cover type near each roost shall also be recorded. Roost trees shall be marked in a manner sufficient to identify the trees in the field.

5.8 The applicant shall conduct emergence counts in order to determine the size of the maternity colony, and document the colony's rate of production. Emergence counts shall be conducted at all roost trees actively used during the previous year and any new roost trees identified during that monitoring year. Emergence (dusk) counts shall be conducted at each identified roost tree at least once weekly throughout the period from May 15 and continue through August 15 or until the bats' departure in the fall (defined as at least one week beyond the date that no bats are found emerging from any known roost tree), whichever is later. Every other week, emergence counts shall be conducted at all roost trees simultaneously to determine overall size of colony. Specific trees may be dropped from emergence counts if no bats are documented using that tree for five consecutive emergence counts conducted after May 15, and if no bats have been documented using that tree during that time period through other sampling methods (telemetry/acoustical monitoring).

In addition, any primary roost trees used during the previous year shall be monitored at least once a week between April 1 and May 15. Monitoring may be completed by conducting emergence counts, through acoustical monitoring, or other similar methods. Additional trees may be designated based on the professional opinion of the qualified surveyor under consultation with the Service.

Roost trees within the Orchard Branch area have not been evaluated since the initial surveys conducted in 2003. In order to determine if this area is still being used for roosting, emergence counts, acoustical monitoring, or other similar methods shall be conducted on trees used in this area over a five week period during the lactation (June 15- July 15) and post-lactation/juvenile volancy (July 15 – August 15) periods of 2006. If it is documented that no bats are using these trees, they may be dropped from monitoring, according to the criteria described above.

5.9 In order to document the fate of affected Indiana bats during hibernation, the applicant shall coordinate with the Service to design and conduct a study to determine the source hibernacula of Indiana bats that will be impacted by the project. Efforts should include stable isotope analysis and providing banding information to individuals conducting hibernacula surveys. Other tracking methods may also be used to accomplish this objective. Study plans shall be submitted to the Service within one year of the date that this biological opinion is issued, and at least 45 days prior to the initiation of the study. Studies shall begin no later than the second hibernation period after the project is initiated. Study plans may be modified or discontinued with concurrence of the Service based on the results of previous years' surveys.

5.10 The applicant shall monitor bat boxes constructed and installed as outlined in the Biological Assessment (Apogee Environmental Consultants, 2004b). The bat boxes shall be monitored and maintained for the life of the project, and findings shall be reported in accordance with 5.11 below. Monitoring shall be conducted by annually inspecting each box at least twice per sampling period for signs of bat usage (fecal matter, bats present, etc.). If a box shows signs of Indiana bat usage, that box shall be monitored consistent with the protocols for roost tree monitoring as defined in 5.8.

5.11 The applicant shall notify the Service and the WVDNR within 5 days of the capture of each Indiana bat. Field data relative to captures and observations of the Indiana bat shall be reported regularly to the Service in an informal manner as notable events occur. An annual report of all findings regarding the Indiana bat including raw data shall be furnished to the Service with copies to the Corps, WVDEP and the WVDNR no later than January 15 following each monitoring year. This report shall include all data gathered during the study season, methods, data analysis, and a description of the mining, reclamation, and monitoring planned for the next year. In order to ensure compliance with the established level of incidental take, the applicant shall also document the amount of roosting and foraging habitat (in terms of the forested acres and feet of stream impacted) that was disturbed the previous year, and any stream or forestland reclamation efforts that were implemented that year. Contact information for the Service and the WVDNR, as well as reporting requirements for the discovery of dead or moribund bats is found under 8.3.

5.12 Study plans may be modified with written concurrence of the Service based on the results of the previous years' efforts.

***RPM 6: Monitor water quality and biotic health of streams within the action area to quantify the amount and type of take of Indiana bats.***

*This RPM was initiated during 2005 and will continue to remain in effect for the life of the project.*

Indiana bats are known to concentrate foraging behavior around streams and riparian areas (Hobson, 1993; 3D/International, Environmental Group, 1995). Streams provide an important source of prey for Indiana bats (Whitaker 2004). Aquatic benthic organisms are susceptible to changes in water quality. The final programmatic environmental impact statement on

mountaintop mining/valley fills in Appalachia (U.S. Environmental Protection Agency 2005) macroinvertebrate study showed that the EPT index (an index of combined orders Ephemeroptera, Plecoptera, and Trichoptera) was significantly lower in stream portions below some valley fills than in reference streams. The draft EIS also showed increased concentrations of numerous chemical parameters downstream of some valley fills. If biological and chemical degradation results from the proposed project, this could reduce the amount of Indiana bat prey that are produced by remaining streams in the action area, causing bats to spend increased energy foraging greater distances from their roosts; or cause adverse impacts to foraging Indiana bats from exceeding toxic thresholds through food chain bioaccumulation of aquatic insects. Water quality and biotic monitoring will assist in determining the cause and effect of any observed adverse effects to Indiana bat prey base, and allow appropriate, focused, remedial measures to be developed and implemented. The applicant has initiated monitoring as required in 6.1 below.

RPM 6: Terms and Conditions:

6.1 The applicant shall monitor water quality within the mainstem of Sandlick Creek and its tributaries over the life of the project, beginning the first season after permit issuance (2005). Such monitoring shall be conducted twice annually, with results reported to the Service annually concurrently with the reporting requirement under 5.11. Monitoring shall occur once annually during each of the following time periods: February 15 – April 15, and October 15 – December 15. Monitoring shall include the following: full metal suite, pH, dissolved solids, total suspended solids, specific conductance, alkalinity, potassium, acidity, and nitrate/nitrite. Water quality samples shall be collected and analyzed using procedures outlined in the most recent version of Standard Methods for the Examination of Water and Wastewater (Greenburg et al. 1992). Detection limits shall be at or below the chronic aquatic life water quality criterion for each parameter.

6.2 The applicant shall conduct bio-monitoring of the mainstem of Sandlick Creek and its tributaries, at the same stations used for water quality monitoring (as specified in 6.1, above), over the life of the project, beginning the first season after permit issuance. Bio-monitoring shall be conducted in accordance with Rapid Bioassessment Protocols and/or the methods used in Green and Childers (2000). Monitoring shall occur once during February 15 – April 15, and once during October 15 – December 15, concurrently the water quality monitoring. Results of this effort shall be reported simultaneously with water quality monitoring results. A detailed protocol shall be submitted to the Service for review and concurrence prior to initiation of the sampling.

6.3 Any water quality degradation below state and federal water quality standards and remedial actions taken shall be described in the annual report.

6.4 The applicant shall submit a water quality monitoring and bio-monitoring report to the Service, WVDEP and the Corps annually by January 15 of each year. In addition to the results of the previous years' monitoring, the report shall include a discussion as to the condition of the streams as compared to the baseline condition described in this biological opinion and the applications for the Clean Water Act section 404/surface mine permits. Also, the report shall

include a summary that compares these results to any information regarding Indiana bat habitat usage throughout the area (as determined by RPM 5 above).

6.5 The applicant shall conduct water quality and bio-monitoring sampling as described in 6.1 and 6.2 at ten sampling stations in the following locations as described in the Alliance Consulting (2003) section of the August 2003 Laxare East Surface Mine application for the Corps of Engineers' permit.

- ER 20: mouth of Long Branch of Sandlick Creek
- ER 21: Sandlick Creek downstream of Orchard Branch
- ER-24 (Orchard Fork off Sandlick)
- ER 26: Sandlick Creek upstream of unnamed Tributary 1200
- ER 28A: left descending fork of Sandlick Creek
- ER 29A: Sandlick Creek – 0.3 miles upstream of ER 28C
- ER 52: mouth of Sandlick Creek
- ER 31: mouth of right descending branch of Sandlick Creek
- ER-58 (new point in Sandlick below Long Branch. Not in the Potesta report. Completes coverage of Sandlick)
- One additional station to be selected based on the results of surveys conducted under RPM 2.

6.6 The bio-monitoring plan may be modified with written concurrence of the Service based on the results of the Indiana bat habitat use monitoring.

***RPM 7: In order to ensure that no hibernacula will be impacted by the project, the permit area and adjacent areas shall be surveyed to determine whether any winter habitat is present.***

*This RPM has been completed.*

Indiana bats use caves or old mine portals for winter hibernacula. In order to ensure that take does not exceed the Incidental Take Statement due to removal of any winter hibernacula, a survey for old mine portals or caves in the Laxare East and Black Castle permit areas is necessary. Deep mines constructed before the 1977 Surface Mine Control and Reclamation Act (SMCRA) were often not mapped so reliance on old mine maps for potential deep mines is not sufficient. Because blasting could damage old portals that occur an unknown distance from the blast site, it is necessary to include in the survey adjacent areas within 1000 feet of the permit boundaries. The area that was proposed to be logged in preparation for mining in 2004 was surveyed in the early spring of 2004 and the information from that survey was considered in our biological opinion. This area does not need to be resurveyed.

RPM 7: Terms and Conditions:

7.1 Prior to project initiation, the applicant shall survey the permit area and adjacent areas within 1000 feet of the permit boundaries for potential Indiana bat hibernacula either on foot or by vehicle, during late fall to early spring when portals or caves would be the most visible.

Any open portals or caves shall be evaluated by a qualified bat surveyor (as defined in 5.2) using the Phase I portal survey form. The completed forms shall be provided to the Service for review within 30 days. The Service will determine at that time whether additional surveys, such as mist net or harp trap surveys, of the openings are warranted. If they meet criteria, a bat survey of the portals shall be conducted according to protocols to be provided by the Service in order to determine bat use of the portals. Any portals that are located shall not be disturbed or modified until it is determined that they are not being used by listed bats. If listed bats are discovered to be using the permit area or adjacent areas as winter habitat, consultation must be reinitiated.

***RPM 8: Implementation of these minimization measures shall be ensured by training all project personnel as appropriate, allowing the Service to inspect the project, and promptly reporting any Indiana bat finds.***

*This RPM will continue for the life of the project.*

The Corps, WVDEP, and the applicant have the responsibility to ensure that all RPMs and their associated terms and conditions are fully implemented over the life of the project, and that the permitted level of take is not exceeded. Unless workers on-site are familiar with the terms of the BO and the presence of the bat, they may inadvertently engage in actions that would adversely impact the bat in violation of the terms and conditions of the BO. The opportunity for periodic inspections will further ensure the terms and conditions are enforced. Established procedures for reporting any dead or injured bats will assist in accurately monitoring the level of take.

RPM 8: Terms and Conditions:

- 8.1 In order to ensure compliance with these terms and conditions, the applicant shall instruct all personnel operating within the permit area and their supervisors as appropriate about the requirements and restrictions identified within, or developed as required by, the terms and conditions of this BO before construction begins. These requirements and restrictions shall be placed as special provisions in contract specifications and described in any work manuals as appropriate.
- 8.2 Employees of the Service and the WVDNR shall be granted right of access to the project at any reasonable time and with reasonable notice for the inspection and monitoring of the terms and conditions of this BO.
- 8.3 In the event that direct mortality of bats is detected or that dead, injured, or moribund bats are found, the following procedures shall be followed:
  - a. Throughout the duration of the project, the licensee, their designee, or the approved bat surveyor shall notify the Service and the WVDNR regarding the discovery, and the circumstances surrounding the discovery, of any dead, sick, or injured Indiana bat or other bat where the species determination is unclear.

- b. The Service Law Enforcement Officer (Special agent, Charleston, WV 304-965-6059), Project Leader (West Virginia Field Office, Elkins, WV 304-636-6586; fax 304-636-7824), and the WVDNR (Scientific Collecting Permit Coordinator or the Endangered Species Coordinator, Wildlife Diversity Program, Elkins, WV, 304-637-0245; fax 304-637-0250) shall be notified within 4 hours of discovery of an injured Indiana bat, and within 24 hours of a dead Indiana bat.
- c. In conjunction with the proper preservation of any dead specimen(s), the licensee, their designee, or the approved bat surveyor shall attempt to insure that evidence intrinsic to determining the cause of death of the specimen is preserved to the maximum extent practicable. Within five calendar days of the discovery of any dead, sick, or injured bat, the licensee, their designee, or the approved bat surveyor shall provide any known information to the Service describing the circumstances, location, et cetera, of any such discovery, and the measures specific to the incident, if any, that were taken to avoid injury or death.

The reasonable and prudent measures, and their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If during the course of the action, the numerical or narrative levels of incidental take are exceeded (see Table 16), such incidental take represents new information requiring reinitiation of consultation and a review of the reasonable and prudent measures provided.

## CONSERVATION RECOMMENDATIONS

*[The following paragraph supplements the Conservation Recommendations section of the 2005 BO, pp. 116-117 BO.]*

The Service currently has no additional conservation recommendations, beyond those described in the 2005 BO. In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any of the previously made conservation recommendations.

## REINITIATION NOTICE

*[The following replaces the Reinitiation of Formal Consultation section in the 2005 BO, pp. 117-118.]*

As required by 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the

action. In instances where the amount or extent of incidental take is exceeded, any operations causing such a take must cease pending reinitiation.

Examples of situations that may require the need to consider reinitiation of consultation, include, but are not limited to:

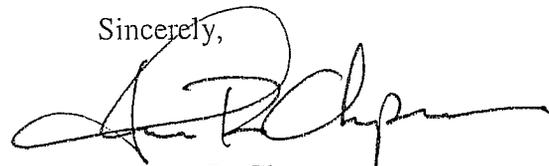
- No evidence of Indiana bat activity within the action area (capture no bats; no bats are seen emerging from known roost trees; acoustical monitoring detects no Indiana bats) is found after the end of one full years' monitoring season.
- The results of emergence counts (as described in RPM 5.8) decline to less than 60 bats (including adults and young) for two successive years, indicating a colony size decrease of greater than 20% from the current maximum emergence count of 73 bats (adults and young).
- Indiana bats are found to be using portals within a 5-mile radius of the project area.

In addition to standard reinitiation triggers identified above in the first paragraph, if any of the examples listed above as bulleted items occur, then the action agencies and the applicant shall contact the Service to discuss the possibility of reinitiating consultation, including a discussion of whether the take level has possibly been exceeded, and/or whether new information reveals effects of the action that were not considered in this BO. This discussion should also include whether the monitoring results indicate that the monitoring plan should be revised.

This concludes formal consultation on the action outlined in the Corps' and WVDEP's request. No further section 7 consultation on these projects will be necessary except if any reinitiation criteria are met.

The Service appreciates the opportunity to work with the Corps, WVDEP, and Massey Energy Company in fulfilling our mutual responsibilities under the Endangered Species Act. Please contact me at (304) 636-6586 extension 12, if you have any questions about this opinion.

Sincerely,



Thomas R. Chapman  
Field Supervisor

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Colonel William E. Bulen  
March 9, 2006

45

cc:

Project File

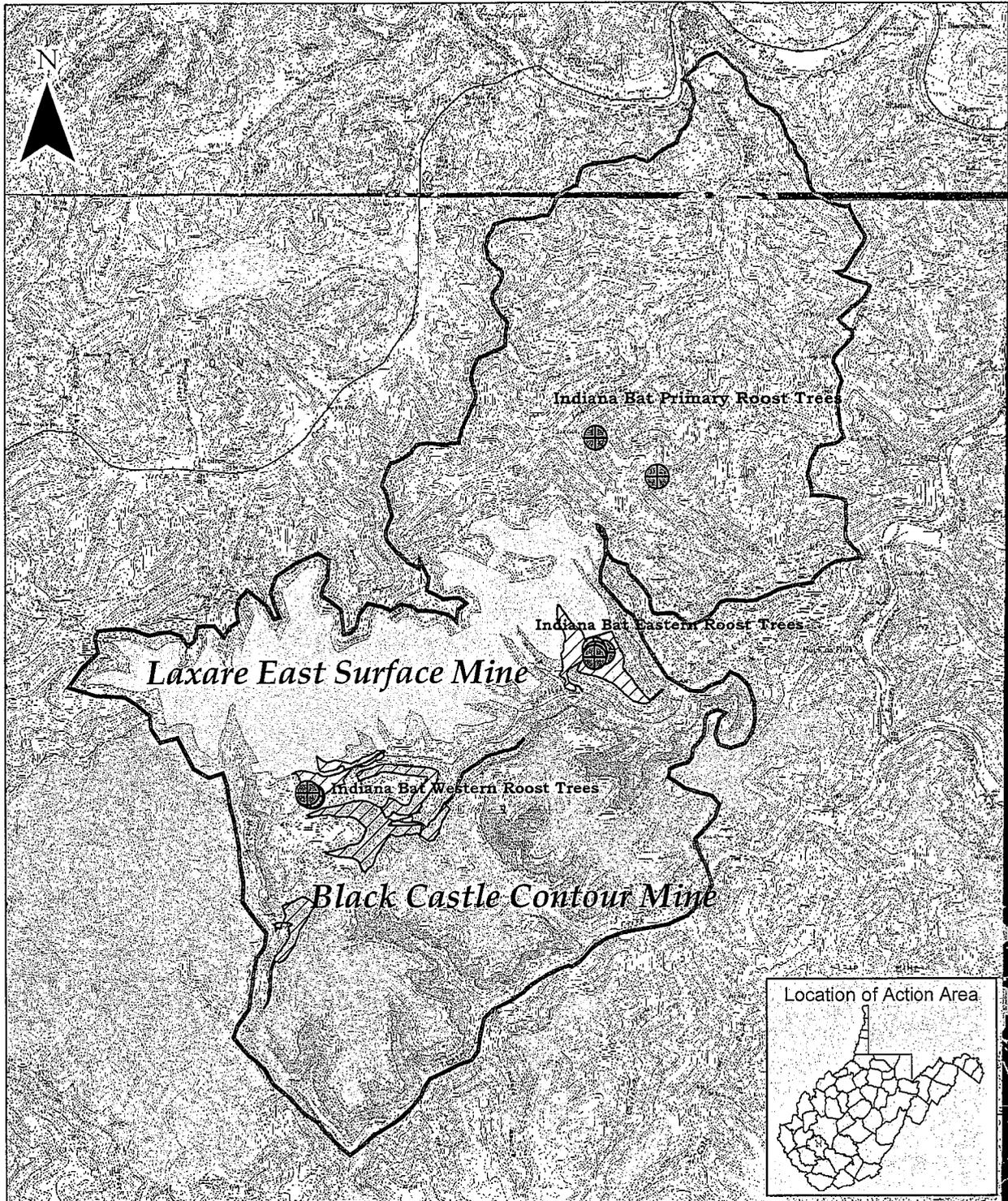
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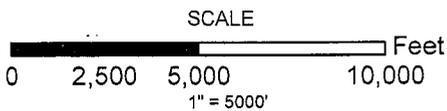
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Figure 1a. Revised Action Area (March 2006, Supplemental B.O.)

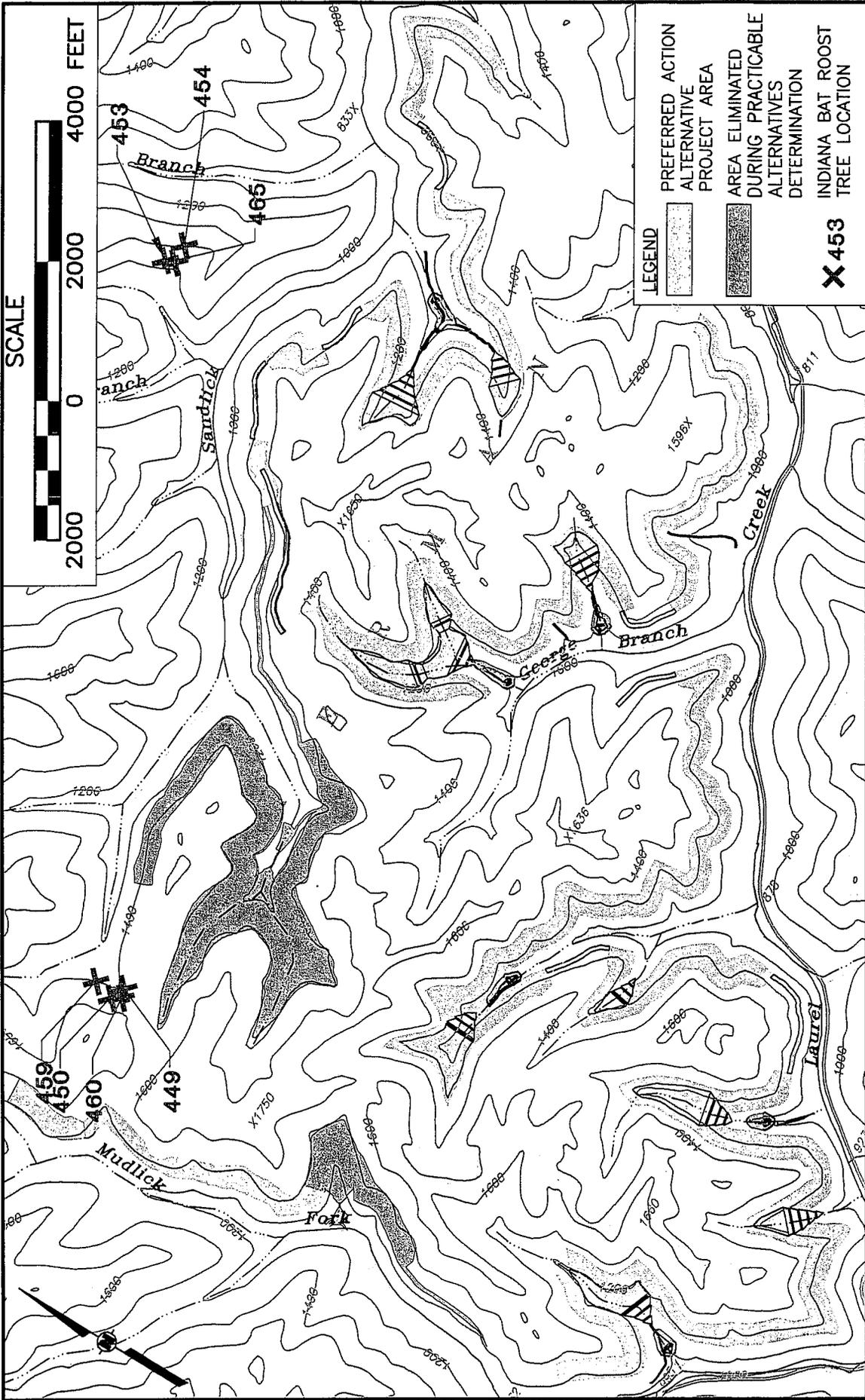


Williams Mountain 7.5 min quad  
 Map Projection: NAD\_1983\_UTM\_Zone\_17N  
 Graticule Units: degrees, minutes, seconds  
 Map Gnd Unit: Meter  
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Legend

- ACTION AREA
- ROOST TREE LOCATIONS
- PERMITTED MINING ACTIVITY
- LAXARE EAST SURFACE MINE
- BLACK CASTLE CONTOUR SURFACE MINE
- PROJECT MODIFICATION AREAS



DRAWN BY	TLG	12/21/05
CHECKED BY	GWB	12/22/05
APPROVED BY	GWB	12/22/05
DRAWING NUMBER		FIGURE
B99-461-A32		2a

PROJECT MODIFICATION TO  
 BLACK CASTLE CONTOUR SURFACE MINE  
 BOONE COUNTY, WEST VIRGINIA

**Alliance Consulting, Inc.**  
 Engineers  
 Constructors  
 Scientists

BECKLEY, WV (304) 255-0461  
 RALEIGH, NC (919) 861-2257

**FIGURE 2a REVISED BLACK CASTLE CONTOUR SURFACE MINE PROJECT (MARCH 2006, SUPPLEMENTAL B.O.)**

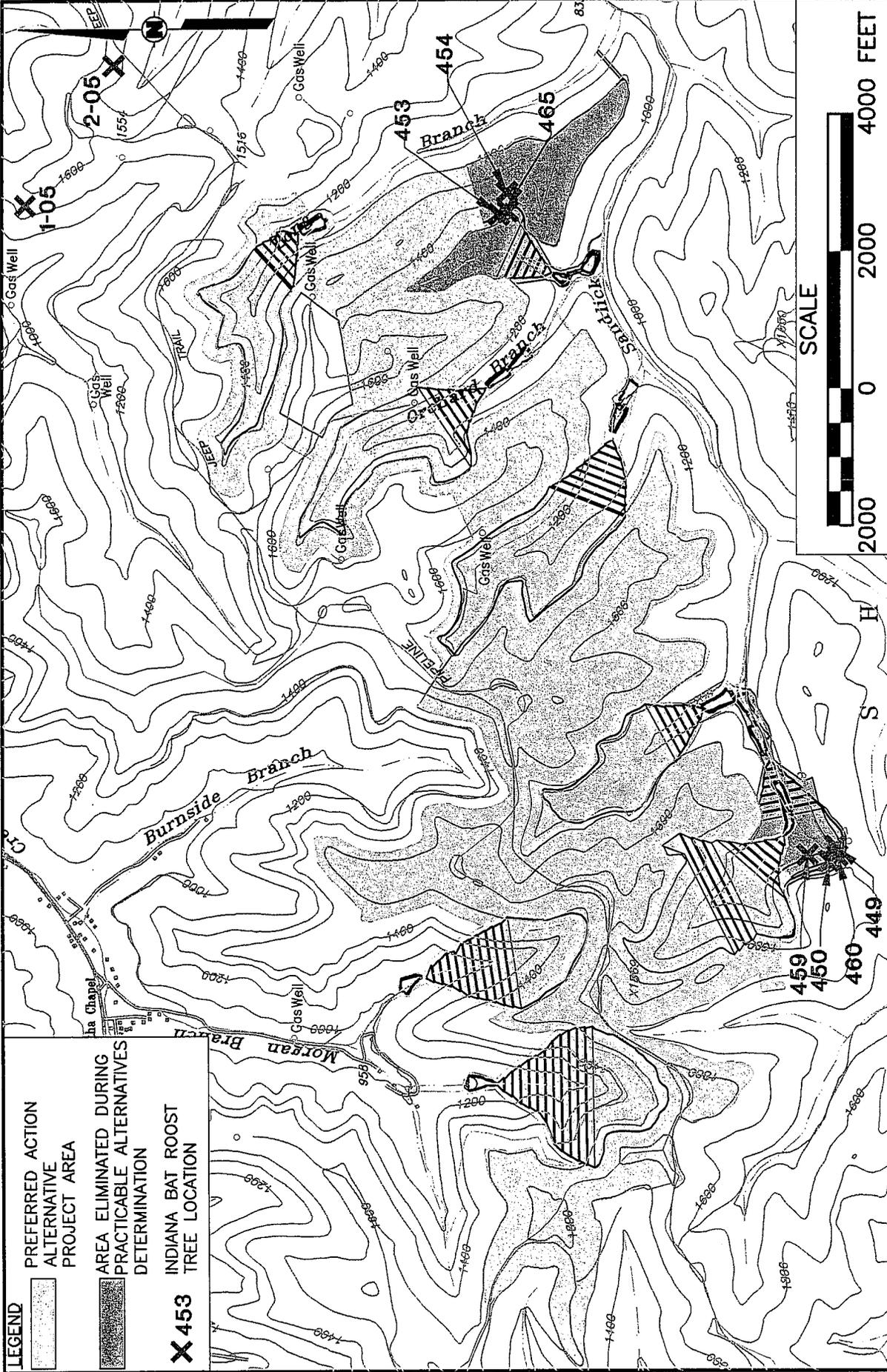
**U.S. FISH & WILDLIFE SERVICE**



**LEGEND**

- PREFERRED ACTION ALTERNATIVE PROJECT AREA
- AREA ELIMINATED DURING PRACTICABLE ALTERNATIVES DETERMINATION
- INDIANA BAT ROOST TREE LOCATION

**X 453**



DRAWN BY	TLG	12/21/05
CHECKED BY	GWB	12/22/05
APPROVED BY	GWB	12/22/05
DRAWING NUMBER	B04-222-A19	
FIGURE	2b	

PROJECT MODIFICATION TO  
 LAXARE EAST SURFACE MINE  
 SHERMAN DISTRICT, BOONE COUNTY, WEST VIRGINIA

BECKLEY, WV (304) 255-0481  
 RALEIGH, NC (919) 861-2287

Engineers  
 Constructors  
 Scientists

**Alliance Consulting, Inc.**

**FIGURE 2b REVISED LAXARE EAST SURFACE MINE PROJECT (MARCH 2006, SUPPLEMENTAL B.O.)**

**U.S. FISH & WILDLIFE SERVICE**



**LEGEND**

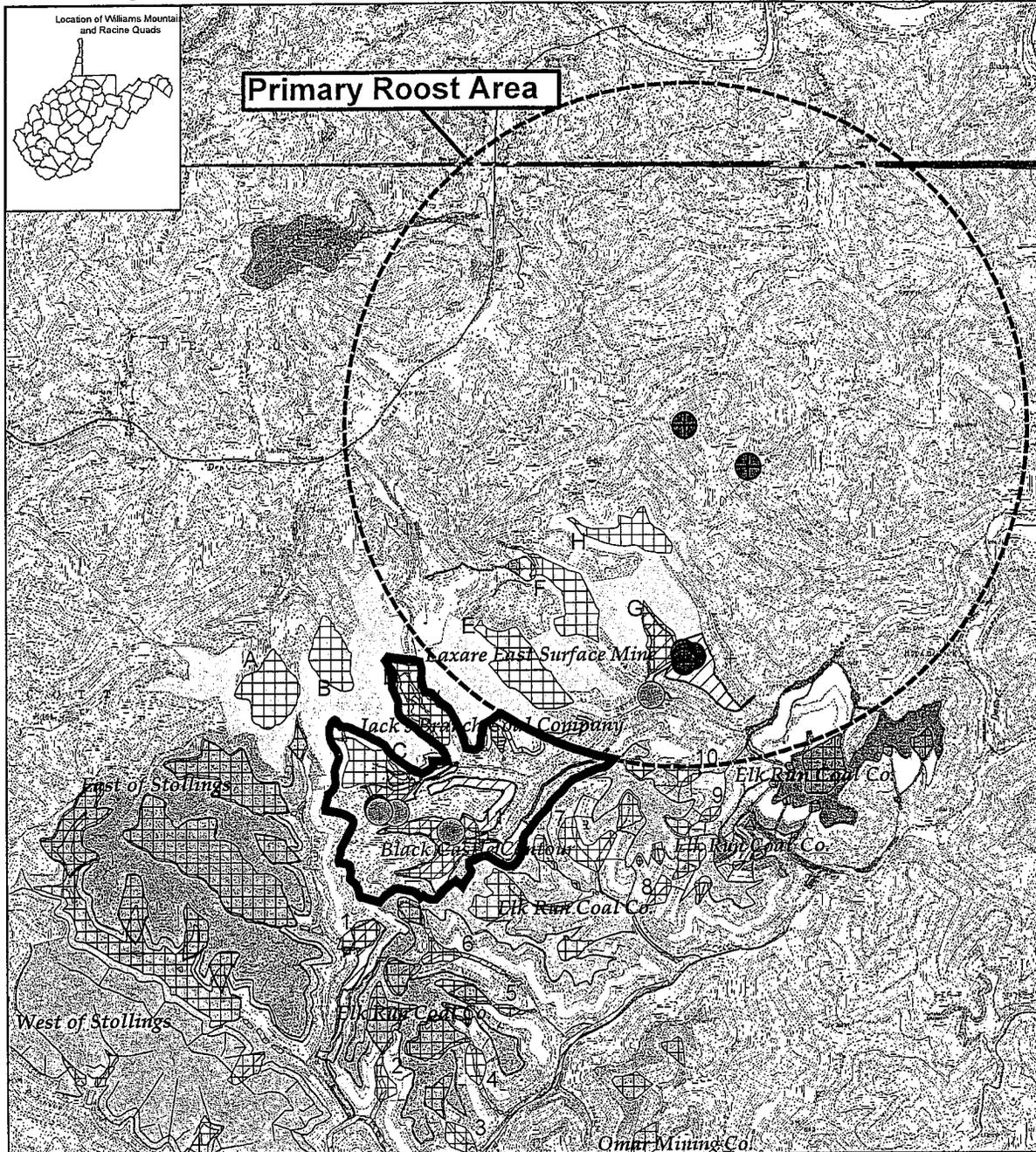
PREFERRED ACTION ALTERNATIVE PROJECT AREA

AREA ELIMINATED DURING PRACTICABLE ALTERNATIVES DETERMINATION

**X 453** INDIANA BAT ROOST TREE LOCATION



Figure 4a. Estimated home range of the colony shown in relation to all existing surface mining permits (March 2006, Supplemental B.O.)



**Legend**

- INDIANA BAT CAPTURE LOCATIONS
- INDIANA BAT ROOST TREES
- VALLEY FILLS
- DRAINAGE CONTROL STRUCTURES
- HISTORICAL SURFACE MINING PERMITS

**DEP Surface Mining Permits**

- BLACK CASTLE CONTOUR SURFACE MINE
- LAXARE EAST SURFACE MINE
- PROJECT MODIFICATION AREAS
- NUB AREA

Scale  
0 2,500 5,000 10,000  
1" = 5000'  
Feet

SURFACE MINING PERMIT		PERMIT ID, MINE NAME	
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