APPENDIX F

Indiana Bat Summer Mist Net Survey

for the

American Electric Power
Mountaineer Commercial Scale
Carbon Capture and Storage Project
Mason County, West Virginia

Contract No. 326849x215
February 2011

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INDIANA BAT SUMMER MIST NET SURVEY FOR AMERICAN ELECTRIC POWER'S PROPOSED MOUNTAINEER CCS II PROJECT: CO_2 PIPELINE AND INJECTION WELL SITES, MASON COUNTY, WEST VIRGINIA

5 October 2010

Prepared for:

AEP AMERICAN® ELECTRIC POWER

U.S. DEPARTMENT OF ENERGY

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Executive Summary

American Electric Power (AEP) and the U.S. Department of Energy (DOE), propose to develop a carbon capture and storage (CCS) project at the AEP Mountaineer Power Plant, Mason County, West Virginia.

A study plan dated 9 June 2010, outlining the survey effort for endangered bats, was submitted to the U.S. Fish and Wildlife Service, West Virginia Field Office (USFWS WVFO). On 28 July 2010, the USFWS WVFO accepted the proposed field efforts in the study plan.

Mist netting was completed from 24 July through 15 August 2010 at 28 sites. No Indiana bats or other endangered bat species were caught. A total of 99 bats representing five species was captured: 21 big brown bats (*Eptesicus fuscus*), 71 eastern red bats (*Lasiurus borealis*), 3 tricolor bats (eastern pipistrelle) (*Perimyotis subflavus*), 3 little brown bats (*Myotis lucifugus*), and 1 hoary bat (*Lasiurus cinereous*). Overall, 19 of 28 sites ranked as low quality for roosting bats and 9 ranked as moderate value.

In a letter dated 30 August 2010, a request was made to the USFWS WVFO to seek approval to install a geologic characterization well on a small (≤ 5 acre) portion of the project area (Borrow Area 1). The site was selected because it provided no habitat for the endangered Indiana bat. E-mail correspondence from USFWS WVFO on 8 September 2010 and WV DNR on 20 September confirmed that the proposed activities required for this part of the project were approved. The following report is for the balance of the field studies performed for this project.

The overall netting effort provided no evidence that the Indiana bat or other endangered bat species use the project area during summer months. No endangered bats were caught in mist nets and the available roosting habitat is generally of low to moderate quality. Thus, it is unlikely the Indiana bat or other endangered bat species are present or that the project would adversely affect them. We anticipate that the project would have insignificant and discountable effects to the bat, and on behalf of our clients (DOE and AEP) respectfully suggest that a "May Affect – Is Not Likely to Adversely Affect" determination is appropriate for consultation under Section 7 Endangered Species Act (ESA).

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1.0 Introduction

American Electric Power (AEP) and the U.S. Department of Energy (DOE) propose to develop a carbon capture and storage (CCS) project at the AEP Mountaineer Power Plant located in Mason County, West Virginia. It is referred to as the proposed Mountaineer CCS II Project (or simply "Project") hereafter within this document.

Environmental Solutions & Innovations, Inc. (ESI) was hired by AEP and their prime consultant Potomac-Hudson Engineering, Inc. (PHE) to survey for the federally endangered Indiana Bat (*Myotis sodalis*) along feasible alternative carbon dioxide (CO_2) pipeline corridors and injection well sites (initially characterization wells).

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1.1 Project Description

The Project would capture approximately 1.5 million tonnes of CO_2 annually from a slipstream of flue gas, equivalent in quantity to the flue gas emissions of a 235-megawatt power plant, from the existing 1300-megawatt Mountaineer Power Plant located near New Haven, West Virginia. Captured CO_2 would be transported by pipeline to injection sites located within approximately 12 miles of the plant on other AEP properties. Captured CO_2 would be injected into and permanently stored in geologic formations approximately 1.5 miles underground.

As shown in Figure 1 the following properties are under consideration for potential injection wells. They are listed below in descending order of preference:

- Mountaineer Plant site: 5 acres;
- Borrow Area site: 28 acres;
- Eastern Sporn tract: 400 acres;
- Jordan Tract: 195 acres; and
- Western Sporn tract: 70 acres.

Based on preliminary data, AEP anticipates that the proposed Project will require a minimum of four injection wells located in pairs at two different injection properties (e.g. Mountaineer Plant Site and Borrow Area Site) to a maximum of eight wells, also sited in pairs, but located at four different properties. AEP has identified preferred injection sites on each of the five injection properties, each approximately 5 acres in size. The preferred injection sites, along with preferred locations for Project features,

including access roads and pipelines would be sited based on AEP's siting criteria, which include the following:

1. Avoid wetlands – to the extent practical, Project features would not be sited in wetlands.
2. Avoid streams and floodplains – to the extent practical, Project features would be sited to avoid streams/floodplains and minimize the number of potential stream crossings.
3. Avoid sensitive habitat – to the extent practical, Project features would not be sited in areas that have been identified as containing sensitive habitat.
4. Avoid cultural resources – to the extent practical, Project features would not be sited in areas that have been identified as containing cultural resources.
5. Proximity to Public Roads – to the extent practical, Project features would be sited, to the extent practicable, near ready access to public roads.
6. Topography – to the extent practical, Project features would be sited in areas that are generally flat to minimize grading requirements.

The final location of injection wells, and associated pipeline corridors, will depend on results of geologic and hydrogeologic characterization studies being conducted by AEP to determine the optimal locations and design for the CO_2 injection wells. AEP anticipates acceptable well locations will be identified within the five injection site properties being considered.

As part of the characterization studies, AEP plans to initially install geologic characterization wells at the Borrow Area Site and the Jordan Tract. If sufficient data is not obtained from these wells to determine placement and design parameters of the injection well placement, then additional characterization wells could be installed at one or all of the remaining properties. Data from the characterization studies will be used to determine the number and optimal placement of the wells required to inject the CO_2.

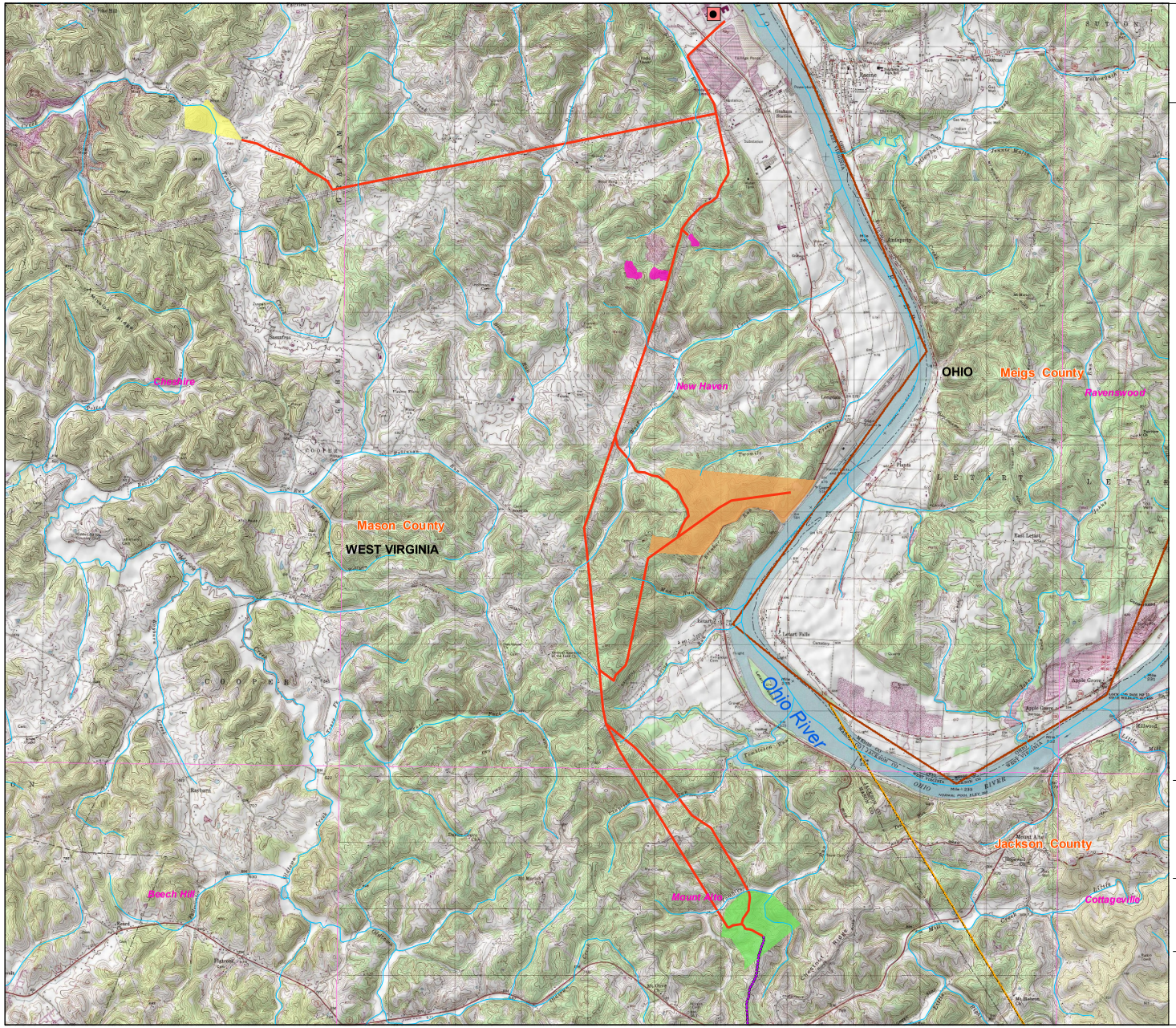

Figure 1. Project location of the Mountaineer CCS II Project: CO_2 Pipeline and Injection Well Sites, Mason County, West Virginia.

CO_2 Pipeline Corridor

Access Road

Mountaineer Plant

Potential Injection Well Site

Eastern Sporn Tract

Jordan Tract

Borrow Area

Western Sporn Tract

Mountaineer Plant Site

USGS Quadrangle

State Boundary

County Boundary

N
W E
S

Miles
0 0.8 1.6

Source: http://www.mapwv.gov

Base Map: USGS Topographic Map

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To the maximum extent feasible, AEP plans to construct the pipeline within existing electric transmission rights-of-way (ROW) and road corridor ROW. The construction right-of-way (ROW), as currently planned, would be 80 to 120 feet in width. However, to be conservative, the netting effort was completed to address the situation where there was no co-location, and all areas were treated as though the line would be adjacent to and outside of the existing ROW.

At this time, it is anticipated that all access roads, other than the one south of the Jordan Tract, which was identified in the study plan and netted, or other lay down or extra work areas required to support construction activities would be located within the 80 to 120 feet wide construction ROW or would be located on the potential well properties.

1.2 Regulatory Setting

1.2.1 Background

The Federal Endangered Species Act (ESA) [16 U.S.C. 1531 *et seq*.] was codified in 1973. This law provides for listing, conservation, and recovery of endangered and threatened species of plants and wildlife. Under ESA, the U.S. Fish and Wildlife Service (USFWS) is mandated to monitor and protect listed species. Many states have enacted similar laws.

Section 7(a)(2) of ESA states that each Federal agency shall insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of designated critical habitat. Federal actions include (1) expenditure of Federal funds for roads, buildings, or other construction projects, and (2) approval of a permit or license, and activities resulting from such permit or license. Compliance is required regardless of whether involvement is apparent, such as issuance of a Federal permit, or less direct, such as Federal oversight of a state-operated program.

Section 9 of ESA prohibits "take" of listed species. "Take" is defined by ESA as "*to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect*" [16 U.S.C. 1532(19)]. USFWS further defines "harm" to include significant habitat modification or degradation [50 CFR §17.3]. Actions of Federal agencies that do not result in jeopardy or adverse modification, but that could result in a take, must also be addressed under Section 7.

Involvement of DOE provides a Federal nexus that will require DOE, as the lead Federal agency, to participate in the National Environmental Policy Act (NEPA) process and in consultation under Section 7 of the ESA.

1.2.2 Study Plan

A study plan, dated 9 June 2010, outlining the field effort to survey for endangered bats was submitted to the USFWS, West Virginia Field Office (WVFO). The plan defined the level of effort, at well areas and along the pipeline corridors and access roads, radio telemetry studies to be completed if endangered bats were caught, and the efforts to locate portals that might serve as winter hibernacula (Appendix A). In a phone call on 28 July 2010, Ms. Barbara Douglas from the USFWS WVFO confirmed that the proposed level and types of field efforts defined in the study plan were acceptable.

Initially, as defined in the study plan, netting at 33 nets sites was anticipated: 6 in well areas, 22 along the pipeline ROW, and 1 for an access road. However, the eastern pipeline ROW alternative was dropped from consideration, resulting in the need for netting at 28 sites.

The study plan also detailed efforts for radio telemetry studies if bats were caught and survey for portals that might be used by bats for autumn swarming, winter hibernation, and spring staging.

1.2.3 Characterization Well at Borrow Area 1

In a letter dated 30 August 2010, a request was made to the USFWS WVFO to seek advanced approval to install a geologic characterization well and an associated access road to Borrow Area 1 located at the existing AEP Mountaineer Plant (Appendix B). The total disturbance area was to be <5 acres. The Borrow Area 1 site is an area used to mine for clay for support of landfill operations. The area has previously been denuded of vegetation and modified by extraction and disposal activities. This area was selected for a characterization well because the entire site was previously disturbed and biological values were essentially lacking, including habitat for the endangered Indiana bat and other listed species. The request letter summarized the field survey activities completed, including a lack of capture of any endangered bats.

On 8 September 2010, an e-mail correspondence was received from Ms. Barbara Douglas, at the USFWS WVFO, and on 20 September 2010 an e-mail was received from Ms. Barbara Sargent of West Virginia Department of Natural Resources, confirming that proposed activities for the geologic characterization were approved, per ESA concerns (Appendix C).

1.2.4 Permits

Studies were carried out under ESI's USFWS Federal Fish and Wildlife Permit (TE02373A-0) and West Virginia Scientific Collections Permits, issued to individual collectors.

1.3 Physiographic Setting

West Virginia is made up of three Physiographic Areas: Mid-Atlantic Ridge and Valley, Northern Cumberland Plateau, and Ohio Hills. The Project is within the Ohio Hills section, which extends north into southern Ohio. Landforms within the Ohio Hills consist primarily of dissected, unglaciated plateaus ranging in elevation from 150 to 450 meters, with some valleys as low as 100 meters and some mountainous areas reaching 1,100 meters. Most of this area was dominated historically by oak-hickory forests and today these cover roughly 4.3 million hectares (10.7 million acres), or 54 percent of the physiographic area. Braun (1950) referred to this as the Cumberland and Allegheny Plateaus section of the Mixed Mesophytic Forest region. The Mixed Mesopytic climax forest is a community where the dominant trees are beech (*Fagus grandifolia*), tuliptree (*Liriodendron tulipifera*), American basswood (*Tilia americana*), sugar maple (*Acer saccharum*), yellow buckeye (*Aesculus octandra*), red oak (*Quercus rubra*), white oak (*Q. alba*), and hemlock (*Tsuga canadensis*), in addition to as many as 30 other species (Braun 1950). Because of the large number of dominants of this climax community, the composition and relative abundance of the dominants vary greatly from location to location. Modern-day forests have been impacted by logging and a variety of other human uses.

Numerous patches of northern hardwood forest occur on north-facing hillsides, particularly near the edges of the Allegheny Mountains. Historically, oak-hickory and oak-pine regeneration was dependent on fire, and recent policies of fire suppression in the southern Appalachians have had major (often negative) effects on native forest composition and structure.

Human populations are relatively sparse through most the area and often are confined to the larger valleys. Roughly 40 percent of the physiographic area is in agricultural production or urban development, mostly in the northern half (including southern Ohio). Timber extraction has been a major activity throughout the history of this region, and it continues to be important on both public (10% of the area) and privately owned forest lands. Extraction of minerals, oil and gas, and coal are also important land uses throughout this region.

2.0 Ecological Setting

Little is known about the ecology of the Indiana bat in the eastern portion of its range (Watrous et al. 2006) where the current survey was conducted. Despite the fact that the species remains poorly known compared to many other native mammals (Kurta and Kennedy 2002), this species is among the most intensively studied bats in North America (Barclay and Kurta 2007). A review of the bat's ecology is provided in the

following sections. The review is based on studies conducted across the range of the species, providing an ecological framework for this study and its conclusions.

2.1 Description

The Indiana bat is a medium-sized bat in the genus *Myotis*. The forearm length has a range of 35 to 41 millimeters (1.4 – 1.6 in). The head and body length range from 41 to 49 millimeters (1.6 – 1.9 in). Its appearance most closely resembles that of congeners little brown bat (*M. lucifugus*) and northern bat (*M. septentrionalis*). Indiana bats differ from similar *Myotis* species in that they have a distinctly keeled calcar (cartilage that extends from the ankle to support the tail membrane). Other minor differences include smaller and more delicate hind feet, shorter hairs on the feet that do not extend past the toenails, and a pink nose. The fur lacks luster, and the wing and ear membranes have a dull, flat coloration that does not contrast with the fur (USFWS 2007). Fur on the chest and belly is lighter than fur on the back, but is not as strongly contrasting as that of similar *Myotis* species. Overall color is slightly grayer, while the little brown bat and northern bat are browner. The skull has a crest and tends to be smaller, flatter, and narrower than that of the little brown bat (USFWS 2007).

2.2 Status

The USFWS listed the Indiana bat (*Myotis sodalis*) as endangered on 11 March 1967. The 2009 range-wide estimate of the population was 387,835 individuals (USFWS 2010), which represents about half of the estimated population of 1960. Long-term, detailed documentation of population changes are lacking across most of its range, with the exception of the state of Indiana (Brack et al. 1984, Johnson et al. 2002, Whitaker and Brack 2002, Brack et al. 2003, Sparks et al. 2008), although such information now being acquired in most states. It is probable that habitat loss during summer (USFWS 2007) and winter disturbances during hibernation (Johnson et al. 1998) both contributed to the overall decline of the species.

Federal Register Documents

41 FR 41914; 24 September 1976: Final Critical Habitat, Critical habitat-mammals

40 FR 58308 58312; 16 December 1975: Proposed Critical Habitat, Critical habitat-mammals

32 FR 4001; 11 March 1967: Final Listing, Endangered

The only official recovery plan for the species was completed on 14 October 1983. A new draft revised recovery was released in April 2007. Although widely used as a regulatory document, the 2007 version of the recovery plan has not been officially approved.

Critical habitat was designated on 24 September 1976, and includes 11 caves and 2 abandoned mines in Illinois, Indiana, Kentucky, Missouri, Tennessee, and West Virginia.

2.3 Regional Species Occurrence

The federally endangered Indiana bat is not known to occur in Mason County, West Virginia (Figure 2). The nearest known hibernacula and records of summer maternity are from Lawrence County, Ohio to the southwest of Mason County. There is a summer record from Athens County, Ohio to the north of a nonreproductive Indiana bat.

2.4 Ecology

The Indiana bat is a "tree bat" in summer and a "cave bat" in winter. There are four ecologically distinct components of the annual life cycle: winter hibernation, spring staging and autumn swarming, spring and autumn migration, and the summer season of reproduction (Figure 3). The USFWS Recovery Plan (2007) provides a description of the life history.

2.4.1 Summer Roosting Ecology

The summer range of the Indiana bat is large and includes much of the eastern deciduous forestlands between the Appalachian Mountains and Midwest prairies (Figure 4). Distribution throughout the range is not uniform and summer occurrences are more frequent in Indiana, northern Missouri, and southern portions of Iowa Michigan, and Illinois. Historically, these areas were vegetated in a mix of prairies, forest, and savannas (Küchler 1964). At the eastern end of the distribution tree densities are greater (Brack et al. 2002), but the bat appears to be less abundant. Cooler summer temperatures associated with latitude or altitude likely affect reproductive success and the summer distribution of the species (Brack et al. 2002). Similarly, the warmer, drier climate of the Midwest allows rapid growth of young and short migration to suitable hibernacula.

2.4.1.1 Males

Some males remain near hibernacula throughout summer while others migrate varying distances (Whitaker and Brack 2002). Males can be caught at hibernacula on most nights during summer (Brack 1983, Brack and LaVal 1985), although there may be a large turnover of individuals between nights (Brack 1983).

Structurally, woodland roosts used by males are similar to those used by maternity colonies (Kiser and Elliott 1996, Schultes and Elliott 2002, Brack and Whitaker 2004, Brack et al. 2004). These trees are smaller (Kurta 2004), perhaps because males are often solitary or form small groups and thus need less space or because males may have different thermal requirements than females. Males appear somewhat nomadic; over time, the number of roosts and the size of an area used increases.

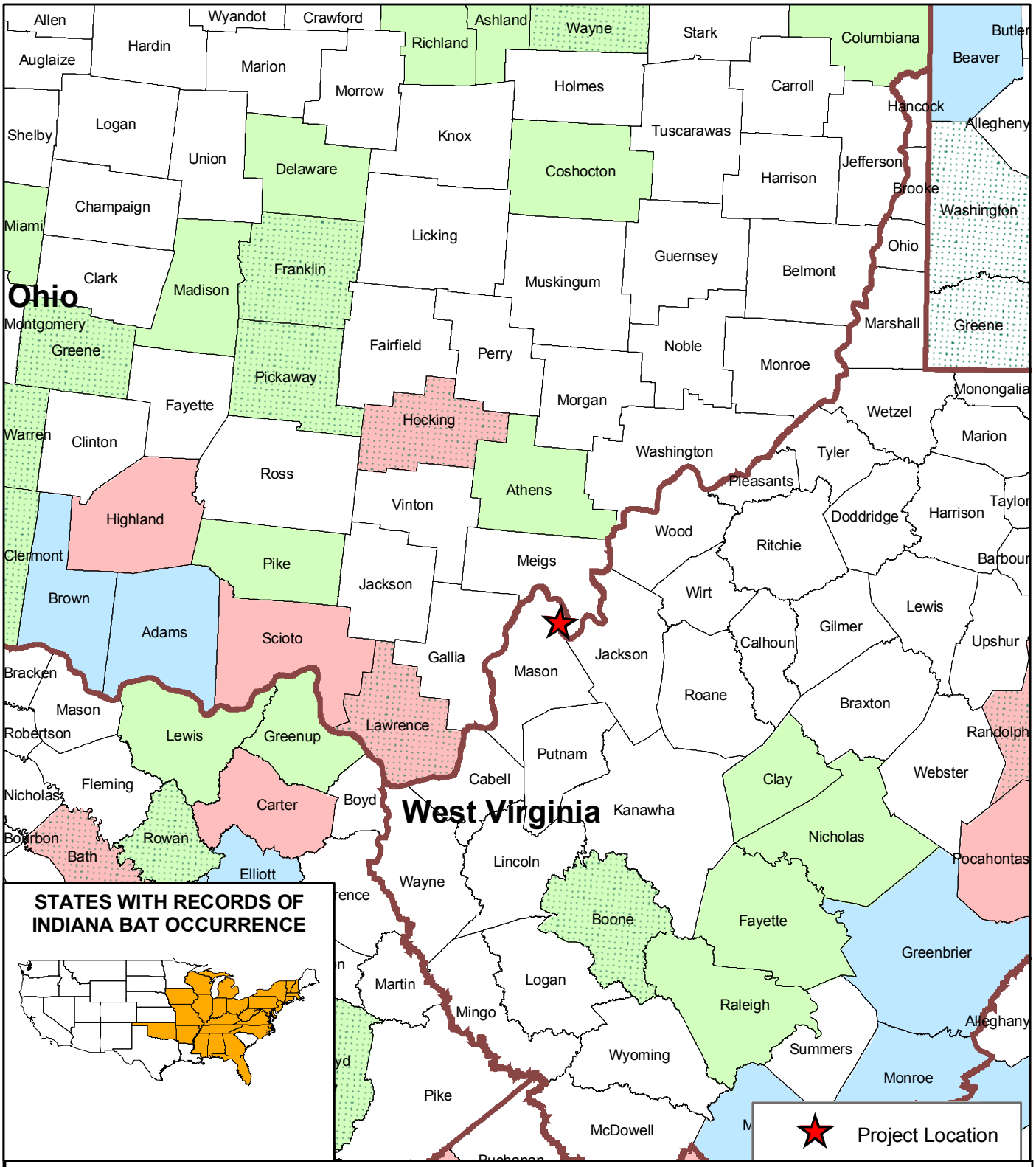

Figure 2. Counties near the project area with hibernacula, summer maternity, and other summer (nonreproductive) records for the Indiana bat (*Myotis sodalis*).

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Sources: USFWS, Indiana Bat Revised Recovery Plan, Agency Draft, 2007. Updated June 2008

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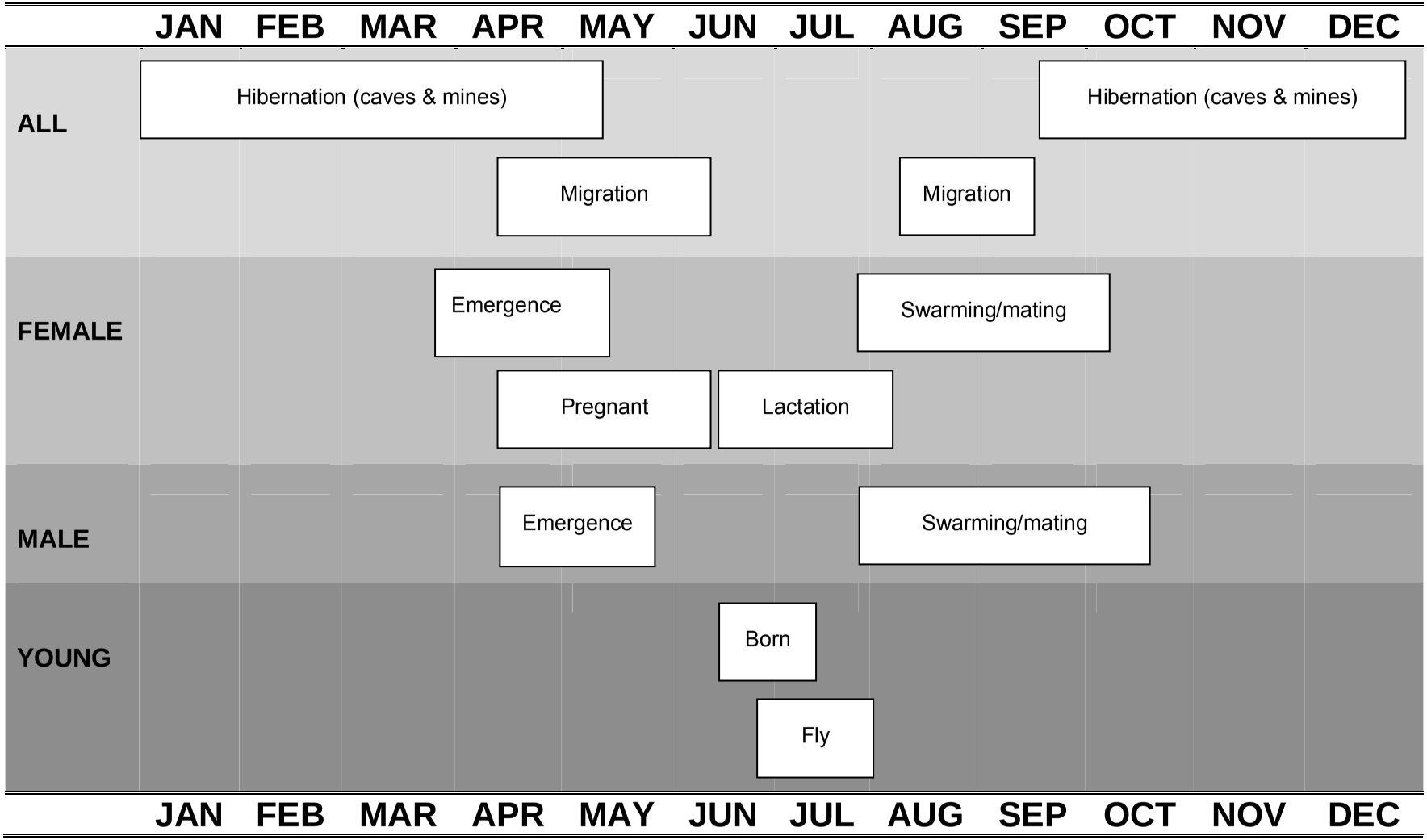

Figure 3. Seasonal chronology of Indiana bat activities.

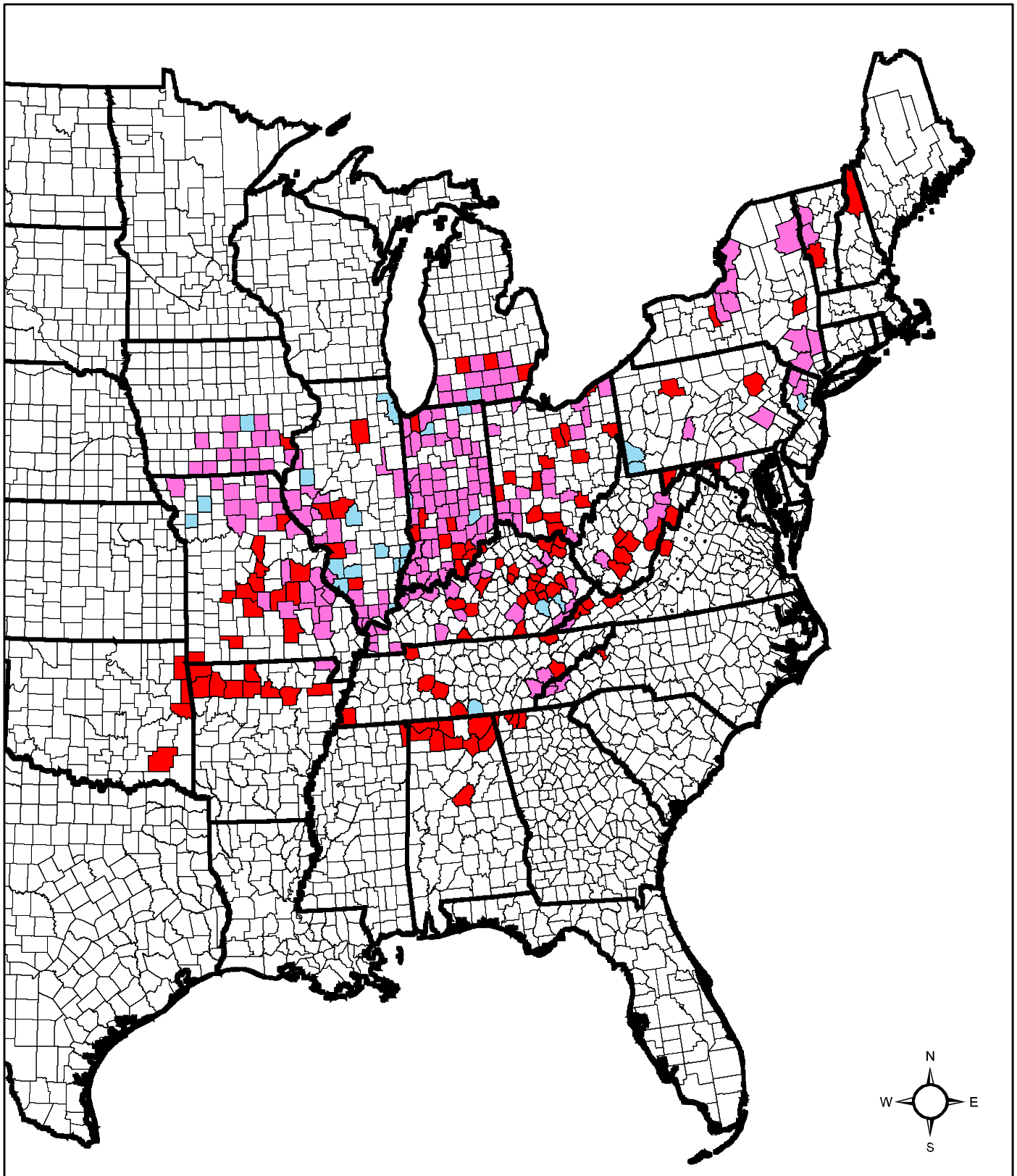

Figure 4. Range-wide distribution of the Indiana bat during summer, showing county records of reproductive (adult female and/or young-of-the-year) and nonreproductive individuals.

County with Record of Indiana Bat Reproductive Occurrence	County with Record of Indiana Bat Summer Non-Reproductive Occurrence	County with Record of Indiana Bat Reproductive and Summer Non-Reproductive Occurrence

Project No. 296	Sources: USFWS, Indiana Bat Revised Recovery Plan, Agency Draft, 2007. Updated: June 2008	ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

Activity areas encompass roads of all sizes, from trails to interstate highways. Roosts have also been located near roads of all sizes (Kiser and Elliott 1996, Schultes and Elliott 2002, Brack et al. 2004), including adjacent to an interstate highway (Sparks et al. 1998, Brack et al. 2004, Whitaker and Sparks 2008, Sparks et al. 2009).

2.4.1.2 Females and Maternity Colonies

When female Indiana bats emerge from hibernation, they migrate to maternity colonies that may be located up to several hundred miles from the hibernacula (Kurta and Murray 2002). Females form nursery colonies under exfoliating bark of dead, dying, and living trees in a variety of habitat types, including uplands and riparian habitats. A wide variety of tree species (Kurta 2004), occasionally including pines (Britzke et al. 2003), are used as nursery colonies indicating that it is tree form, not species that is important for roosts. Because many roosts are in dead or dying trees, they are often ephemeral. Roost trees may be habitable for one to several years, depending on the species and condition of the tree (Callahan et al. 1997). Indiana bats exhibit strong site fidelity to summer roosting and foraging areas (Kurta and Murray 2002, Kurta et al. 2002, Sparks et al. 2004, Whitaker et al. 2004, Whitaker and Sparks 2008, Sparks et al. 2009). This fidelity is to a larger landscape which can change over time. Between the discovery of a colony near the Indianapolis International Airport in 1994 and 2008, this colony of bats essentially abandoned foraging areas north of the expanded Interstate 70 and shifted their center of activity into a conservation area that was designed and managed for them (Sparks et al. 2009). This indicates that it is possible to move colonies of Indiana bats across a developing landscape if suitable long-term habitat is available or developed during the move.

A maternity colony typically consists of 25 to 325 adult females. Nursery colonies often use several roost trees (Kurta et al. 1993, Foster and Kurta 1999, Kurta and Murray 2002, Whitaker and Sparks 2008), moving among roosts within a season. Most members of a colony coalesce into one or a few roost trees about the time of parturition. Once young are volant, the bats spend less time in these major roosts and more time in minor roosts—often roosting alone under the bark of live trees. Roosts that contain large numbers of bats (more than 20 bats) are often called primary roosts, while secondary roosts hold fewer bats. Primary roost trees are often greater than 46 centimeters (18 in) diameter at breast height (dbh) and secondary roost trees are often greater than 23 centimeters (9 in) dbh (Gardner et al. 1991, Callahan et al. 1997, Kurta et al. 2002, Miller et al. 2002, Carter 2003). Numerous suitable roosts may be needed to support a single nursery colony, possibly about 45 stems per hectare (20/acre) (Gardner et al. 1991, Miller et al. 2002, Carter 2003).

Roost trees often have 10 hours of solar exposure per day, with 20 to 80 percent canopy closure (Humphrey et al. 1977, Gardner et al. 1991, Kurta et al. 1993, Kurta et al. 1996, Kurta et al. 2002, Carter 2003), but the need for solar exposure may vary

with latitude. Although Indiana bats typically roost under the exfoliating bark of dead and dying trees, they have also been found roosting in a variety of cracks and hollows in trees (L. C. Watkins in Humphrey et al. 1977, Kurta et al. 1993, Butchkoski and Hassinger 2002, Kurta et al. 2002, Kurta 2004), utility poles (ESI 2004, Hendricks et al. 2004), buildings (Butchkoski and Hassinger 2002, V. Brack Unpublished data, A. C. Hicks Personal communication), and bat boxes (Butchkoski and Hassinger 2002, Carter 2002, Butchkoski 2005, Ritzi et al. 2005, Whitaker et al. 2006). The colony of bats near the Indianapolis Airport have used a combination of both natural roosts (trees) and bat boxes every year since 2003 (Sparks et al. 2008).

Females are pregnant when they arrive at maternity roosts. Females produce one young per year, typical for the genus *Myotis* (Asdell 1964, Hayssen et al. 1993). Parturition typically occurs between late June and early July. Lactating females have been caught 11 June to 29 July in Indiana, 26 June to 22 July in Iowa, and 11 June to 6 July in Missouri (Humphrey et al. 1977, LaVal and LaVal 1980, Brack 1983, Clark et al. 1987). Juveniles become volant between early July and early August. Reproductive phenology is likely dependent upon seasonal temperatures and the thermal character of the roost (Humphrey et al. 1977, Kurta et al. 1996). Like many microchiropterans, Indiana bats are thermal conformists (Stones and Wiebers 1967), with prenatal, neonatal, and juvenile development are temperature dependent (Racey 1982). Cooler summer temperatures associated with latitude or altitude likely affect reproductive success and therefore the summer distribution of the species (Brack et al. 2002).

Nightly non-foraging behavior of Indiana bats is poorly documented. In Michigan, pregnant bats from a maternity colony foraged most of the night, but lactating females returned two to four times to feed young. Both pregnant and lactating females roosted up to six times per night for 14 minutes (*SD* = 1) each (Murray and Kurta 2004). Foraging areas were 0.5 to 4.2 kilometers (0.3 – 2.5 mi) from diurnal roosts. Kiser et al. (2002) found 82 bats under three bridges over a 6-night period in late July and August. Temperatures under the bridges were warmer and less variable than ambient, apparently providing a location to roost and digest food between foraging bouts. These bridges were 1.0 to 1.9 kilometers (0.6 – 1.2 mi) from diurnal roost trees. Additional unpublished information about night roosting is available from the long-term study of a colony near the Indianapolis International Airport (D.W. Sparks Unpublished data). These bats regularly night roosted within wooded areas. When biologists entered woodlots to locate tagged bats to a specific tree, the bats moved to new roosts; this behavior was greatly reduced when human activity in the woodlot was restricted. When bats were located to a specific tree, they were hanging exposed on the tree rather than under bark. More rarely, individual bats night roosted in bat boxes. In one case, an Indiana bat night roosted in a prairie, apparently on big bluestem (*Andropogon gerardii*) or evening primrose (*Oenothera* sp.).

Indiana bats live on anthropogenic landscapes and recent research indicates females include roads in their active area. Although bats do cross roads, the studies that document this behavior were typically not designed to gauge a graded response. On Camp Atterbury, Indiana, female and juvenile Indiana bats routinely night roosted under bridges on 2-lane paved roads (Kiser et al. 2002). Activity areas of nursery colonies in Illinois (Gardner et al. 1991) and Michigan (Kurta et al. 2002) included paved roads. On the campus of Wright State University, Ohio, a roost tree was at the edge of a large parking lot, and about 20 meters (60 ft) from a moderately traveled road. Emerging bats crossed the parking lot and radio-tagged bats crossed highway 444, a four-lane divided highway, to forage in a 73-hectare (180 ac) woodlot (Brown et al. 2001). In eastern Indiana, adjacent to Newport Chemical Depot, a reproductive female Indiana bat was radio-tracked across a 4-lane divided highway to a maternity colony in a small, 0.7-hectare (1.7 ac) isolated woodlot (Brack and Whitaker 2006). The roost tree was on the western edge of the woodlot (adjacent to the highway) and the woodlot was surrounded on other sides by open, farmed agricultural lands. Based on Euclidean distance analysis, small, unimproved roads were the most preferred foraging habitat at Fishhook Creek Watershed in Illinois (Menzel et al. 2005).

Several unpublished data sets describe the response of Indiana bats to roads in finer detail. Indiana bats foraging near the Indianapolis airport cross roads ranging from unimproved tire paths to Interstate highways an average of 11.97 times per night, but most of this activity (11.54 crossings per night) is restricted to small rural roads, and this pattern holds when corrected for the much greater abundance of smaller roads (M. McGuire Unpublished data). Similarly, bats at this site were much more likely to abort attempts to cross a roadway when vehicles were present (Zurcher et al. Unpublished data). By combining species-specific patterns of movement with these observations, it is possible to mathematically model the impacts of roadways on bats. The willingness of a bat to cross a roadway is in part determined by three factors: value of the habitat on the opposite side of the road, size of the road, and intensity of traffic (V. J. Bennett Personal communication). These results suggest that utility corridors are less of a barrier than roadways because they lack traffic. In addition, Indiana bats have been observed using such corridors as both commuting and foraging habitat (Brack and Whitaker 2006). As such, reasonable efforts to avoid and minimize effects of utility corridors include the sharing of a corridor by multiple lines.

2.4.2 Food Habits and Foraging Ecology

The diet of Indiana bats varies substantially among bats of different ages and genders, and in relation to the availability of insects within different habitat types. Based on diets of males, Brack and LaVal (1985) considered the species selective opportunists. In Indiana, aquatic-based insects were more common in the diet of a maternity colony than in the diet of males collected at caves (Brack 1983). The maternity colony was located along the Big Blue River, where only about 11 percent of the land within 3.2 kilometers (2 mi) of the roost was forested (most was riparian),

whereas males were caught at a cave where 42 percent of the area within 3.2 kilometers (2 mi) was forested and only a small portion was riparian. In late summer, the diets of males, females, and juveniles captured at caves were similar to one another and to males' summer diets. Diets reported by Belwood (1979) from a colony along a stream and by Kurta and Whitaker (1998) from a colony within a wooded wetland contained more aquatic-based insects than diets of males foraging in an upland habitat (Brack and LaVal 1985). The repeated seasonal occurrence of the Asiatic oak weevil (*Cyrtepistomus castaneus*) and sporadic abundance of hymenopterans in the diet (Brack 1983, Brack and LaVal 1985, Brack and Whitaker 2004, Tuttle et al. 2006, Brack In press) are both indicative of opportunistic feeding. Insects may be less common late at night, forcing bats to eat a greater variety of insects (Brack 1983). Diet varied across weeks at a maternity colony in Indiana (Tuttle et al. 2006). The diet contains less diversity late in the season (Brack 1983, Brack and LaVal 1985). Diet also varies by lunar cycle (Brack 1983, Brack and LaVal 1985), because the cycle affects insects. Murray and Kurta (2002) found that the diet was flexible across the range and potentially affected by regional and local differences in bat assemblages and availability of foraging habitat and prey. Despite variability of the diet, it should be noted that this variability is a result of eating different amounts of insects belonging to five orders: Lepidoptera (moths), Coleoptera (beetles), Diptera (true flies), Trichoptera (caddisflies), and Hymenoptera (wasps and ants) (Tuttle et al. 2006).

Using a variety of techniques, authors have reported that Indiana bats travel a wide range of distances from their roosts, and the inherent benefits and biases of these techniques must be considered when interpreting the data (Sparks et al. 2004). Using reflective wristbands, Humphrey et al. (1977) found that a maternity colony foraged in areas ranging from 1.5 to 4.5 hectares (3.7 to 11.1 ac). Using telemetry, much larger distances have been recorded. In Illinois, individuals traveled up to 4 kilometers (2.5 mi) from maternity colonies (Gardner et al. 1991). In Michigan, foraging areas were 0.5 to 4 kilometers (0.3 to 2.5 mi) from diurnal roosts (Murray and Kurta 2004), and members of a maternity colony moved a maximum distance among roosts of 5.8 kilometers (3.6 mi) overnight, but 9.2 kilometers (5.7 mi) over 4 years (Kurta et al. 2002). In Missouri, adult males traveled 5 kilometers (3.1 mi) while foraging LaVal and LaVal (1980), and Brack (1983) observed foraging light-tagged bats within 3.22 kilometers (2 mi) of caves used during autumn swarming. In Hoosier National Forest, the mean active foraging area of four adult male bats ranged from 95.1 to 151.9 hectares (235 – 375 ac) based on the method of estimation, while the means of individual bats across three methods of estimation (95% minimum convex polygon, capture radius, and non-circular) ranged from 43.1 to 314.2 hectares (107 – 776 ac) (Brack et al. 2004). At the Indianapolis Airport (Sparks et al. 2004, Sparks et al. 2005), maximum distance flown by Indiana bats averaged 3 kilometers (1.86 mi) but ranged from 0.8 to 8.4 kilometers (0.5 to 5.41 mi). Similarly, using 95 percent minimum convex polygons, home range size averaged 412 hectares (1081.07 ac) but ranged from 50 to 1168 hectares (123.55 to 2886.19 ac), and home ranges of

individuals often overlapped (Sparks et al. 2004, Sparks et al. 2005). Individuals of many species of bats that roost colonially forage independently of one another (Kerth et al. 2001). Like many other species of microchiropterans, the Indiana bat often uses travel corridors that consist of open flyways such as streams, woodland trails, small infrequently used roads, and possibly utility corridors, regardless of suitability for foraging or roosting (Brown and Brack 2003). Such corridors may play an important role in allowing bats to access isolated foraging areas (Murray and Kurta 2004, Sparks et al. 2004), but may not be essential as Indiana bats have been tracked crossing large open areas (Brack 1983).

Members of maternity colonies forage in a variety of woodland settings, including upland and floodplain forest (Humphrey et al. 1977, Brack 1983, Gardner et al. 1991). Foraging activity is concentrated above and around foliage surfaces, such as over the canopy in upland and riparian woods, around crowns of individual or widely spaced trees, and along edges (LaVal et al. 1977). They forage less frequently over old fields, and occasionally over bushes in open pastures (Brack 1983). Forest edges, small openings, and woodlands with patchy trees provide more foraging opportunities than dense woodlands. Most species of woodland bats forage prominently along edges, less in openings, and least within forests (Grindal 1996). Openings also provide a better supply of insects than do wooded areas (Tibbels and Kurta 2003).

At the landscape scale, the species makes preferential use of forested habitat for foraging in both Illinois and Indiana (Menzel et al. 2005, Sparks et al. 2005). The Illinois study was on a wildlife management area with substantial blocks of bottomland hardwood forest. In this landscape, bats foraged closer to roads, forest, and riparian areas than chance alone would predict. Grassland was used in proportion to availability and agricultural areas were avoided. In suburban Indianapolis, Indiana bats preferentially used woodlands more than agricultural, low density residential, and open water, and these habitats more than pasture, parks, and commercial lands, with high density residential least preferred. It should be noted, however, that at this study site most such neighborhoods were new developments within what were previously large agricultural fields. The authors suggest that this pattern might not hold for residential areas where woodland habitat is retained. Finally, it is likely that in heavily forested areas, open habitats would be preferentially used by foraging Indiana bats (Sparks et al. 2004).

2.4.3 Survivorship

Detailed studies of survivorship of the Indiana bat have not been completed. Paradiso and Greenhall (1967) and Humphrey and Cope (1977) determined a terminal age of between 12 and 13 years after marking. Brack et al. (2005b) found that survivorship of white and leucistic *M. sodalis* was low, about 7.7 percent (assuming individuals were 0.5 year old when first found). This calculated rate may be low because bats may have been 1.5 years of age when first found, and they may

have survived an additional year without being found. Low survivorship during adolescence is representative of many mammalian species, although white coloration may make bats more susceptible to predation by visually oriented nocturnal predators.

Extensive winter banding records were used by Humphrey and Cope (1977) to estimate survival between winters. Survival rates were high for years one through six after banding, 75.9 percent annually for females and 69.9 percent for males (72.9 % combined), lower after six years, at 66.0 percent for females and 36.3 percent for males (51.2 % combined), and only 4.1 percent (females) after 10 years. Humphrey and Cope (1977) could not determine survivorship for young of the year, but total survival was much lower the first year after marking (ca. 41%), which was attributed to low survivorship of young-of-the-year. Using more modern approaches, young-of-year survival rate is now estimated at 65 percent (Boyles et al. 2007). Because of substantially increased survival during the first winter, this analysis predicts a greater number of bats from each cohort surviving. Unfortunately, as noted by both sets of authors (Humphrey and Cope 1977, Boyles et al. 2007), these samples are inherently biased by the inability to reliably distinguish age classes among hibernating bats. No estimate of summer survivorship is available although efforts are underway to develop and apply molecular mark-recapture to this species (Sparks et al. 2008). Using emergence counts, the colony at the Indianapolis airport apparently increased in size from a maximum count of 70 individuals in 1997 to 228 in 2007 (Sparks et al. 2008).

2.5 Causes of Past/Current Decline

Long-term, detailed documentation of population changes of Indiana bats are lacking in most areas. Summer habitat degradation (USFWS 2007), pesticides, and winter disturbance (Johnson et al. 1998) are believed to have contributed to an overall decline. The greatest current threat to the species is the emergence of a new disease known as White-nose syndrome (WNS), which has been responsible for dramatic declines in bats throughout the Northeast (Blehert et al. 2008; 2009).

The Indiana bat uses a variety of wooded summer habitats, from large tracts of woodlands to riparian strips and woodlots on an anthropogenic landscape. Summer habitat losses include tree removal or land clearing for a variety of land use practices. Removal of standing dead trees, especially during summer months, is potentially harmful. Removal of riparian forest along streams and ditches also degrades summer habitat. Loss of wooded lands can lead to increased forest fragmentation, and a compounding of adverse effects. In many portions of their core range, Indiana bats utilize savanna-like habitats with large trees, an open canopy, and an uncluttered understory. However, suppression of fire and removal of dominant grazing herbivores, combined with frequent tree harvest, has often produced wooded lands of smaller trees with a closed canopy and a cluttered understory, which may have affected the quality of maternity habitat (USFWS 2007). Similarly, urbanization

removes potential foraging habitat and bats may not cross developed areas to access otherwise suitable foraging habitat (Sparks et al. 2005).

Chemical contamination in non-winter habitats has been implicated in the decline of most North American bats (USFWS 2007). Lethal concentrations of a number of pesticides have been found in several other species of bats that overlap substantially with Indiana bats in foraging habitat and thus have similar risk of exposure (Schmidt et al. 2001, O'Shea and Clark 2002, Schmidt et al. 2002). Of particular concern are organophosphates, which have been detected in the guano of Indiana bats and may indirectly cause mortality or decreased production by causing bats to become torpid or unconscious for long periods, potentially leading to indirect mortality through predation, exposure, or death of dependent offspring (Eidels et al. 2006). However, the importance of this group of contaminates on a species-by-species basis is not clearly documented, and additional studies are needed.

Documented threats to winter habitats, caused by humans, include: (1) disturbance and vandalism, (2) improper cave gates and structures, (3) indiscriminate collecting, and (4) flooding of caves from reservoir construction. Natural hazards include flash flooding of hibernacula (Brack et al. 2005a), ceiling collapse of mines and caves (Elliot 2007), colder or warmer than average winters, and severe summer storms. Natural and/or human-caused changes in the microclimate of caves and mines used as hibernacula can adversely affect the species (Richter et al. 1993).

Populations of hibernating bats in the northeastern United States have been dying in record numbers, and the specific cause of the deaths is unknown. However, this crisis is directly associated with WNS, named for a white fungus evident on the muzzles and wings of affected bats (Meteyer et al. 2009). This affliction was first documented at four sites in eastern New York in the winter of 2006-07 (Blehert et al. 2008; 2009). Since then, WNS has rapidly spread to multiple sites throughout the Northeast and Appalachians. Researchers associate WNS with a newly identified fungus (*Geomyces destructans*) that thrives in the cold and humid conditions characteristic of the caves and mines used by bats (Gargas et al. 2009). Bats apparently have a reduced immune response while hibernating (Carey et al. 2003), which may predispose them to infection by *G. destructans*. WNS ultimately results in inadequate energy reserves during hibernation, forcing bats to leave hibernacula in mid-winter in search of food. In the U.S., biologists and/or cavers have documented WNS in bat hibernacula in New Hampshire, Vermont, New York, Massachusetts, Connecticut, New Jersey, Pennsylvania, West Virginia, Virginia, Tennessee, Missouri, and Oklahoma.

3.0 Methods

The survey followed summer mist netting guidelines provided by the USFWS in the 2007 Indiana Bat Draft Recovery Plan (First Revision) and Draft Survey Protocol (Table 1).

Table 1. U.S. Fish & Wildlife Mist Netting Guidelines

NETTING GUIDELINES

1. Netting Season: 15 May to 15 August, when Indiana bats occupy summer habitat
2. Equipment (Mist Nets): constructed of the finest, lowest visibility mesh commercially available – monofilament or black nylon – with the mesh size approximately 38 millimeters (1½ in)
3. Net Placement: mist nets extend approximately from water or ground level to tree canopy and are bounded by foliage on the sides. Net width and height are adjusted for the fullest coverage of the flight corridor at each site. A "typical" net set consists of three (or more) nets "stacked" on top of one another; width may vary up to 18 meters (60 ft)
4. Net Site Spacing:
   - Streams – one net site per 1 kilometer (0.6 mi)
   - Land Tracts – two net sites per 1 square kilometer (246 ac)
5. Minimum Level of Effort Per Net Site:
   - Two net locations (sets) per net site, with locations (sets) at least 30 meters apart
   - Two (calendar) nights of netting
   - At least four net–nights (1 net–night = 1 net set deployed for 1 night); typically, two net sets are deployed at one site for two nights, resulting in four net nights
   - Sample Period: begin at dusk and net for 5 hours (approximately 0200h)
   - Nets are monitored at approximately 10-minute intervals
   - No disturbance near the nets between checks
6. Weather Conditions: net only if the following weather conditions are met:
   - No precipitation
   - Temperature $\geq$ 10°C (50°F)
   - No strong winds

Source: U.S. Fish and Wildlife Service, 2007

3.1 Summer Mist Net Survey

3.1.1 Study Plan

As detailed above, a study plan was submitted to and approved by the USFWS WVFO.

As noted above, netting at 33 nets sites was anticipated in the study plan, but when the Route 62 pipeline corridor alternative was dropped from consideration, netting was only required at 28 Sites (Figure 5). Net sites were selected as identified in the study plan based on the suitability of available habitat along the length of corridor and areal extent of well sites. Thus, sampling was completed at 6 sites in well areas, 21 sites along the pipeline ROW, and 1 site for an access road. As identified in the study plan, this sampling regime included some overlap among well and corridor sites, based on typical coverage along corridors.

3.1.2 Site Selection and Level of Effort

During field surveys, net sites were numbered simply as KM1 – KM28. Each net site consisted of two nets operated for 2 nights each for a total of 4 net nights per site, or a total of 112 complete net nights (and 3 additional partial nights when netting was discontinued because of adverse weather conditions).

Per ESI's 9 June 2010 Study Plan to USFWS, Section 6 (page 11) "**Inaccessible Properties**," three net sites (KM9, KM12, and KM18) were located outside the 1-kilometer boundaries noted in the study plan. The study plan stated:

> *With a proposed Project of this size, it is not unexpected that we may not gain access to all parcels required for netting. Therefore, the following is proposed for properties for which landowner access cannot be obtained:*
>
> *If access cannot be obtained for a high quality flyway within a 1-kilometer^2 block, the next best property, for which access can be obtained, within that 1-kilometer^2 block will be netted.*
>
> *If access cannot be obtained for any suitable flyways within a 1-kilometer^2 block, the best and most similar habitat, in one of the adjacent blocks will be netted instead. (This may result in two net sites being placed in some 1-kilometer^2 blocks.)*

The following circumstances resulted in relocation of these net sites, to alternate adjacent locations as follows (Figure 5):

- KM9: Suitable bat habitat was limited and good netting sites were not found. This net site was relocated into the KM10 block.
- KM12: Access was denied to all suitable habitat by the landowner. This net

site was relocated into the KM13.

- KM18: This block had a combination of limited land-owner access and limited good net sites. This site was relocated to KM17.

The precise placement of each net was based upon canopy cover, presence of a flight corridor, water, and habitat conditions near the site. Nets were set to maximize coverage of flight paths used by bats along suitable corridors. Riparian corridors often provide successful mist net sites; however, upland corridors (e.g., trails or logging roads) also provide suitable sites (Brown and Brack 2003). In upland areas, road ruts or other areas of standing water frequently facilitate capture of bats, including the Indiana bat. Placement of mist nets was based upon expectation of bat activity and to provide broad coverage of the Project area with potentially suitable Indiana bat habitat. Mist net site selection also included consideration of habitat characterizations described for the Indiana bat in current literature and experience of ESI personnel. Habitat with the following characteristics was selected to the degree feasible:

- Large trees (>16 inches dbh) (frequently used for maternity roosts)
- An open canopy (apparently important for warming roost sites)
- An open, uncluttered understory (used for traveling and foraging)

Figure 5 and Appendix D provide mist net site locations and habitat descriptions. GPS coordinates for each net site were recorded (Table 2) and photos were taken (Appendix E).

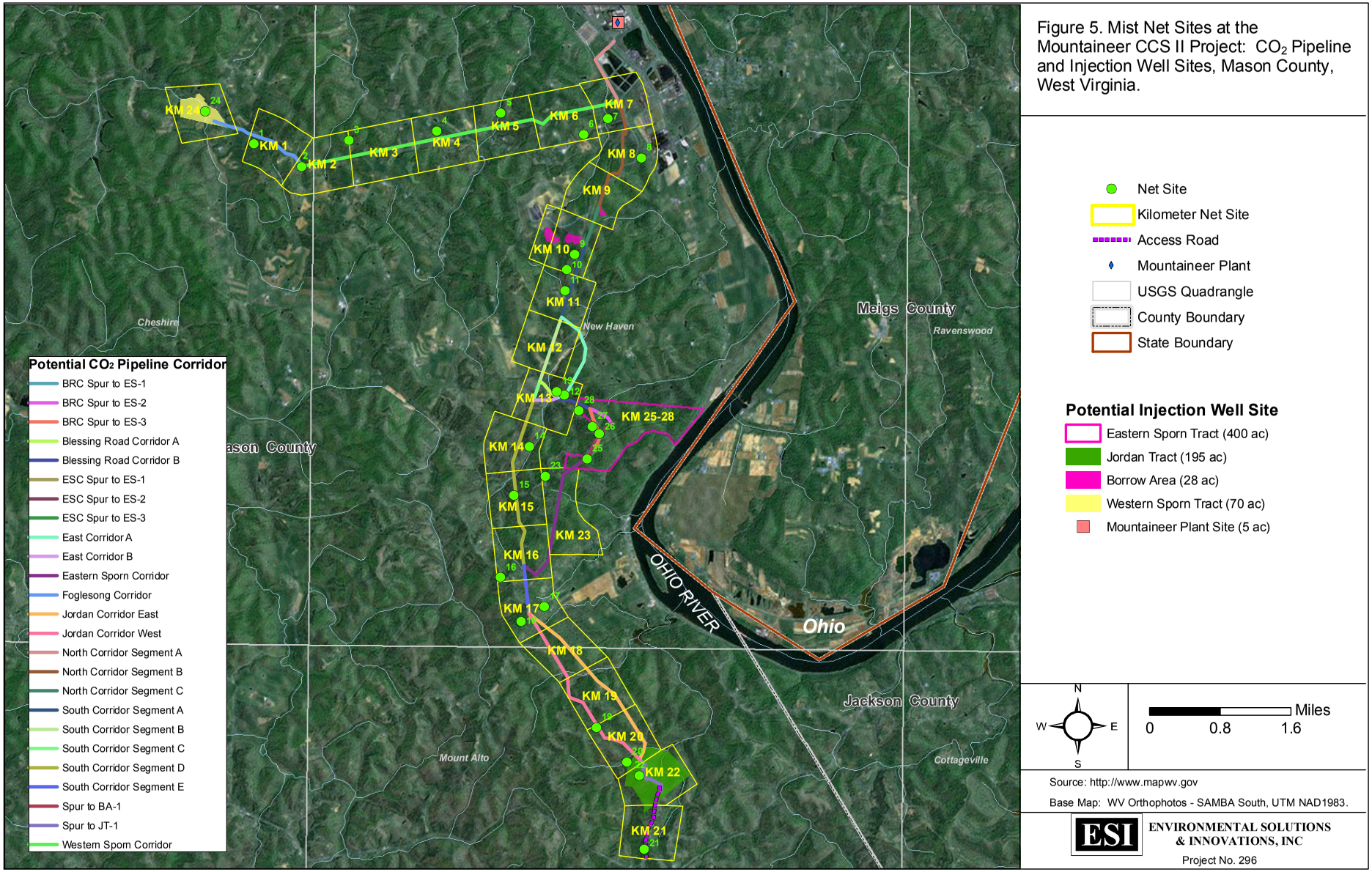

Figure 5. Mist Net Sites at the Mountaineer CCS II Project: CO_2 Pipeline and Injection Well Sites, Mason County, West Virginia.

- Net Site
- Kilometer Net Site
- Access Road
- Mountaineer Plant
- USGS Quadrangle
- County Boundary
- State Boundary

Potential Injection Well Site

- Eastern Sporn Tract (400 ac)
- Jordan Tract (195 ac)
- Borrow Area (28 ac)
- Western Sporn Tract (70 ac)
- Mountaineer Plant Site (5 ac)

N W E S

Miles 0 0.8 1.6

Source: http://www.mapwv.gov

Base Map: WV Orthophotos - SAMBA South, UTM NAD1983.

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Table 2. Mist Net Site Coordinates on the Mountaineer CCS II Project: CO2 Pipeline and Injection Well Sites, Mason County, West Virginia

Site	Latitude	Longitude
KM1	N38 57 25.8	W82 00 45.0
KM2	N38 57 12.5	W82 00 08.7
KM3	N38 57 28.3	W81 59 32.9
KM4	N38 57 34.5	W81 58 26.6
KM5	N38 57 45.5	W81 57 38.2
KM6	N38 57 33.4	W81 56 35.3
KM7	N38 57 42.8	W81 56 17.1
KM8	N38 57 19.8	W81 55 51.5
KM9	N38 56 22.3	W81 56 41.3
KM10	N38 56 13.2	W81 56 47.2
KM11	N38 56 00.8	W81 56 48.3
KM12	N38 54 59.1	W81 56 47.9
KM13	N38 55 01.1	W81 56 53.6
KM14	N38 54 28.5	W81 57 13.9
KM15	N38 53 59.6	W81 57 25.3
KM16	N38 53 11.1	W81 57 34.8
KM17	N38 52 53.9	W81 57 01.5
KM18	N38 52 45.0	W81 57 18.9
KM19	N38 51 42.7	W81 56 20.9
KM20	N38 51 22.4	W81 55 57.8
KM21	N38 50 31.0	W81 55 44.1
KM22	N38 51 14.6	W81 55 48.3
KM23	N38 54 11.1	W81 57 01.6
KM24	N38 57 44.6	W82 01 22.1
KM25	N38 54 21.4	W81 56 30.2
KM26	N38 54 36.4	W81 56 21.3
KM27	N38 54 40.8	W81 56 26.5
KM28	N38 54 49.9	W81 56 36.9

3.1.3 Bat Capture

Mist netting was completed from 24 July through 15 August 2010. Mist nets were used to live capture and release bats unharmed near the point of capture. Bats were identified to species using a combination of morphological characteristics (e.g., ear and tragus, calcar, pelage, size/weight, length of right forearm, and overall appearance of the animal). The species, sex, reproductive condition, age, weight, length of right forearm, time, and location of capture were recorded for all bats captured. Age (adult or juvenile) of bats was


Adam Mann

determined by examining ephiphyseal-diaphyseal fusion (calcification) of long bones in the wing.

Weight was measured to the nearest 0.5 gram using a Pesola spring scale. Length of right forearm was measured to the nearest 0.5 millimeter using a rule marked at 1.0 millimeter intervals. The reproductive condition of captured bats was classified as non-reproductive male, reproductive male, non-reproductive female, or post-lactating female. Morphometric data recorded in the field are provided on Bat Capture Data sheets in Appendix D. Processing and data collection were usually completed in 30 minutes.

3.1.4 White-Nose Syndrome Decontamination Protocol

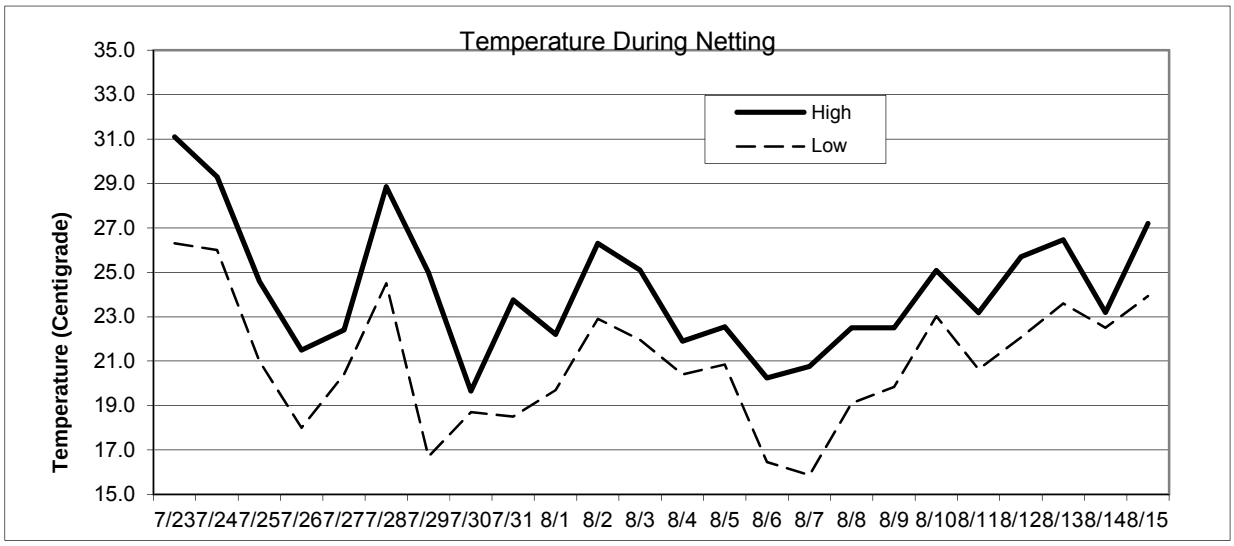
White-nose syndrome (WNS) is an emerging disease that is killing millions of bats in the eastern U.S. The disease, which was first found in New York, is spreading and is now in West Virginia. Bat handling followed current WNS protocols set by the USFWS. Captured bats were examined for damage associated with WNS to the wing and uropatagium (tail) membranes, including use of white and ultraviolet light. ESI biologists followed the Disinfection Protocol for Bat Field Research/Monitoring finalized by USFWS in June 2009. Wing damage was categorized using the Wing-Damage Index Used for Characterizing Wing Condition of Bats Affected by White-nose Syndrome (Reichard 2008).

3.1.5 Weather and Temperature

Weather conditions were monitored each night of mist netting (Appendix D). Conditions recorded included: temperature, wind speed and direction, percent cloud cover, and moon phase (if visible). A standard digital thermometer was used to record temperature, wind speed was determined by use of the Beaufort wind scale, and cloud cover was estimated visually. Netting was terminated early on 11 August 2010 at site KM24 at 2300h, and on 14 August at sites KM27 and KM28 at 2200h because of precipitation. No bats were caught on any of these nights when netting was terminated early and these nights were not included in the total of 112 complete net nights. Nightly temperatures never fell low enough to require the termination of netting (Figure 6).

3.1.6 Net Site Habitat

A habitat assessment was completed for each net site. Habitat descriptions included: size, species, and relative abundance of large trees and snags that potentially serve as roost trees; canopy closure; understory clutter/openness; water availability; and flight corridors.



NOTE: Values are based on averages if netting was completed at more than one site on that night

Figure 6. High and low temperatures (ºC) for nights when netting was completed.

ESI's habitat assessment includes species of large trees near the net site or roost and identifies components of the canopy and subcanopy layers. All trees that reach into the canopy are canopy trees, regardless of their diameter/size. As defined in the Indiana Bat Habitat Suitability Index Model (3D/Environmental 1995), dominant trees are the large trees in the canopy (>40 cm dbh) that have the greatest likelihood of being used by maternity colonies of Indiana bats. Many smaller trees are often also found in the canopy, and in some situations, the canopy can be entirely composed of smaller-diameter trees. ESI's habitat characterization identifies dominant and subdominant elements of the canopy.

The subcanopy, or understory, vegetation layer is well defined in classical ecological literature. It is that portion of the forest structure between the ground vegetation (to approximately 0.6 meter (2 ft) and the canopy layers, usually beginning at about 7.6 meters (25 ft). Vegetation in the understory may come from lower branches of overstory trees, small trees that will grow into the overstory, and small trees and shrubs that are confined to the understory. The amount of understory, or clutter, is also recorded, as many bat species, including the Indiana bat, tend to avoid areas of high clutter.

Roost potential, recorded only at net sites, is characterized by three categories: high, moderate, and low. The determination of roost potential is based on the individual bat biologist's experience and discretion at each site. Certain criteria are evaluated to help in the determination. ESI uses a combination of tree species composition, presence/absence and/or abundance of snags in the immediate area, canopy closure (i.e. solar exposure), and degree of clutter.

Each net site was documented with a sketch on the Net Site Habitat Description data sheet provided in Appendix D.

3.2 Radio Telemetry

No Indiana bats were caught or radio-tagged; no maternity roosts were monitored.

3.3 Portal Surveys

The study plan submitted to and approved by the USFWS WVFO identified known areas of mining from the U.S. Geological Survey GIS databases for mineral mining and all other Abandon Mine Lands and Permit Boundaries information from the West Virginia Department of Environmental Protection (accessed through West Virginia Universities GIS Technical Center (http://wvgis.wvu.edu/).

Portal/cave searches were conducted from 6 June through 25 August 2010 by teams of two individuals walking approximately 150 feet apart, 75 feet to either side of centerline. Each individual searched the areas within 75 feet to either side of the path they were walking. Coverage of potential well properties was completed in a similar manner.

No portals were found, assessed, or sampled.

4.0 Results

4.1 Bat Capture

No Indiana bats were caught during these studies. A total of 99 bats representing five species was captured: 21 big brown bats (*Eptesicus fuscus*), 71 eastern red bats (*Lasiurus borealis*), 3 tricolor (eastern pipistrelle) bats (*Perimyotis subflavus*), 3 little brown bats (*Myotis lucifugus*), and 1 hoary bat (*Lasiurus cinereous*) (Table 3). Red bats were 71 percent of the total catch and big brown bats were 21 percent.

Table 3. Bat captures for the AEP Mountaineer CCS II Project.

	Adult	Adult Female				Juvenile			
Bat Species	Male	L	PL	NR	UNK	Male	Female	Unknown	Total
Big brown bat	4		1		4	4	4	4	21
Eastern red bat	22		2		14	5	13	15	71
Hoary bat	1								1
Little brown bat	2						1		3

Bat Species	Adult Male	Adult Female				Juvenile		Unknown	Total
		L	PL	NR	UNK	Male	Female		
Tricolor bat			1			1	1		3
Total	29		4		18	10	19	19	99

L = lactating; PL = post-lactating; NR = non-reproductive; UNK = reproductive condition not determined (unknown)

4.1.1 Occurrence by Sex and Age

Adult bats were 51.5 percent of captures, including 22 females and 29 males; bats of unknown age were 19.2 percent of the catch. Of the adult individuals, approximately 22 and 29 percent were female and male, respectively. Only 18 percent of adult females (*n* = 4) were post-lactating, while the reproductive condition of most females (*n* = 18) could not be ascertained. The high frequency of individuals of unknown age and unknown reproductive condition precludes meaningful statistical analyses of most parameters for sex and age. Evidence of reproduction (capture of post-lactating females or juvenile bats) was obtained for four of the five species; reproduction was not confirmed for the hoary bat.

4.1.2 Species Diversity

Species richness was five species of bats. The mean number of individuals captured per net site was 3.5 bats; the catch per net night, excluding unproductive partial net nights cancelled because of poor weather, was 0.9 bats. The largest number of individuals caught was at site KM7 (*n* = 15), followed by sites KM5 (*n* = 9), KM14 (*n* = 8), and KM25 (*n* = 8). Three species (species richness) were caught at sites KM5 and KM7.

A MacArthur Diversity Index (*D* = 1.8) indicates that there is the equivalent of 1.8 species evenly represented. Species evenness was 0.356, meaning that 35.6 percent of species captured were equally represented in the sample.

4.2 Habitat Characterization of Net Sites

Mist net sites were placed in association with forested areas of the corridor, based upon their suitability for Indiana bat roosting. A habitat assessment of the immediate area surrounding net sites was conducted to gain a generalized view of the available habitat across the Project area. Table 4 summarizes habitat characteristics at each net site.

Sites were largely characterized as young upland forest (64%). Dominant tree species included white oak (*Quercus alba*) (42.8% of sites) followed by red oak (*Quercus rubra*) (25.0%). Subdominant canopy species consisted of red maple (*Acer rubrum*) and sugar maple (*Acer saccharum*), at 39 and 36 percent of sites, respectively. Nineteen sites (68%) were ranked as having a low roost tree potential with the remainder of sites characterized as moderate. Only three sites had open understory (7 were cluttered and 18 were moderately cluttered), which provides easy access to roosts. Most understory clutter was attributed to saplings, which is again

indicative of relatively young stands and inherent in a relatively low roosting potential.

Overall, 19 of 28 sites ranked as of low quality for roost sites and 9 ranked as of moderate value.

Table 4. Habitat at the AEP Mountaineer CCS II Project mist net survey sites.

Site	Water Source		Tree Species[1]			Subcanopy Clutter			Roost Tree		Habitat Type[5]	Herb. Cover[6]
	Name	Distance (m)	Dominant Canopy	Subdominant Canopy	Subcanopy	CC[2]	Rating[3]	Composition	Potential[4]	Composition		
KM1	UNK	UNK	*Quercus alba, Acer saccharum*	*Carya ovata, Quercus rubra*		M	M	Branches	L	Snags	YU	S
KM2	UNK	UNK	*Quercus rubra*	*Acer rubrum, Fraxinus americana, Quercus rubra*	*Acer rubrum*	M	M	Branches	L	Lrg trees	YU, WF, OF	D
KM3	UNK	UNK	*Liriodendron tulipifera, Quercus alba, Fraxinus americana*	*Acer saccharum, Acer rubrum, Fraxinus americana*	*Acer saccharum, Acer rubrum*	M	M	Branches & Saplings	M	Lrg trees	ML, YL, CPL	D
KM4	UNK	150	*Quercus alba, Platanus occidentalis*	*Juglans nigra, Prunus serotina*	*Rhus radicans*	M	C	Shrubs	M	Snags	ML, YL, WF, CPL, DLP	M
KM5	Broad run	10	*Quercus rubra, Quercus alba, Prunus serotina*	*Juglans nigra, Platanus occidentalis, Acer rubrum*	*Carpinus caroliniana, Acer rubrum, Sassafras albidum*	M	M	Branches	M	Lrg trees & snags	MU, YU, W/FE, S/R	D
KM6	UNK	UNK	*Acer negundo*	*Acer negundo, Crataegus sp.*	*Acer negundo*	M	C	Branches	L	Snags	YU, W/FE	M
KM7	UNK	20	*Platanus occidentalis, Pinus virginiana*	*Acer rubrum, Fagus grandifolia, Acer saccharum*	*Acer negundo, Ulmus rubra, Robinia pseudoacacia*	M	M	Saplings	M	Snags	YL, OF, EW	M
KM8	UNK	UNK	*Robinia pseudoacacia, Fraxinus americana*	*Robinia pseudoacacia, Fraxinus americana*	*Robinia pseudoacacia*	M	M	Branches	L	Snags	YU	S
KM9	UNK	UNK	*Pinus virginiana*	*Quercus rubra, Quercus montana, Acer rubrum*	*Acer saccharum, Quercus montana, Acer rubrum*	M	M	Branches	L	Snags	YU	M

Site	Water Source		Tree Species[1]			Subcanopy Clutter			Roost Tree		Habitat Type[5]	Herb. Cover[6]
	Name	Distance (m)	Dominant Canopy	Subdominant Canopy	Subcanopy	CC[2]	Rating[3]	Composition	Potential[4]	Composition		
KM10	UNK	UNK	*Acer rubrum*	*Acer saccharum, Quercus rubra, Pinus virginiana*	*Acer rubrum, Acer saccharum*	M	M	Saplings	M	Snags	YU	D
KM11	UNK	UNK	*Robinia pseudoacacia, Quercus alba*	*Robinia pseudoacacia*	*Ulmus spp.*	M	M	Saplings	L	Snags	YU,C/PL	M
KM12	UNK	3	*Platanus occidentalis, Liriodendron tulipifera*	*Acer saccharum, Juglans nigra, Pinus virginiana*	*Cercis canadensis, Carpinus caroliniana*	M	M	Saplings	M	Lrg trees	ML, W/FE	D
KM13	UNK	1	*Quercus alba, Platanus occidentalis, Liriodendron tulipifera*	*Juglans nigra, Acer saccharum, Acer rubrum*	*Aesculus flava, Carpinus caroliniana, Cercis canadensis*	M	C	Saplings	M	Lrg trees	ML, YL, W/FE, OF	D
KM14	UNK	UNK	*Acer rubrum, Quercus alba*	*Willow spp.*	*Willow spp., Rhododendron spp.*	M	M	Branches & Saplings	L	Snags	YL, OF	M
KM15	UNK	200	*Quercus stellata, Quercus rubra, Pinus sylvestris*	*Robinia pseudoacacia, Quercus alba, Quercus rubra*	*Cercis canadensis, Cornus florida, Sassafras albidum, Rosa multiflora, Juniperus virginiana, Ulmus americana, Diospyros virginiana*	M	O	Saplings	L	Snags	YU, W/FE, C/PL	M
KM16	UNK	3000	*Quercus alba, Quercus rubra, Carya tomentosa*	*Robinia pseudoacacia, Quercus rubra, Ulmus americana*	*Robinia pseudoacacia, Rhus typhina*	O	C	Saplings	L	Lrg trees & snags	YU, OF	D
KM17	Ohio River	1900	*Quercus alba, Quercus coccinea*	*Asimina triloba, Carya tomentosa, Acer rubrum*	*Robinia pseudoacacia, Asimina triloba, Acer saccharum*	M	M	Saplings	L	Lrg trees	YU,	M
KM18	UNK	UNK	*Acer rubrum*	*Acer rubrum*	*Acer rubrum*	M	O	Branches	M	Lrg trees	YU,C/PL	M

Site	Water Source		Tree Species[1]			Subcanopy Clutter			Roost Tree		Habitat Type[5]	Herb. Cover[6]
	Name	Distance (m)	Dominant Canopy	Subdominant Canopy	Subcanopy	CC[2]	Rating[3]	Composition	Potential[4]	Composition		
KM19	UNK	1000	*Acer saccharum, Liriodendron tulipifera, Robinia pseudoacacia*	*Acer saccharum, Liriodendron tulipifera, Fraxinus americana*	*Carya tomentosa, Smilax sp., Populus grandidentata, Robinia pseudoacacia, Lindera benzoin, Cornus florida, Quercus alba, Pinus virginiana, Acer rubrum*	M	C	Branches & Saplings	L	Snags	YU, W/FE, C/PL	M
KM20	UNK	3	*Platanus occidentalis, Acer saccharum*	*Robinia pseudoacacia, Juglans nigra, Aesculus flava*	*Ulmus rubra, Cercis canadensis, Carpinus caroliniana*	M	C	Saplings	L	Snags	YL, S/R	S
KM21	Ohio River	1km	*Acer saccharum, Robinia pseudoacacia, Quercus rubra*	*Quercus rubra, Acer saccharum, Acer rubrum, Robinia pseudoacacia, Carya ovata, Ailanthus altissima, Liriodendron tulipifera*	*Oxydendrum arboreum, Rubus spp., Lonicera spp., Populus grandidentata, Quercus alba, Cercis canadensis, Sassafras albidum, Rhus typhina, Robinia pseudoacacia, Acer rubrum*	M	C	Branches & Saplings	L	Snags	YU,W/FE	D
KM22	UNK	UNK		*Pinus strobus, Quercus alba, Acer rubrum*	*Pinus strobus, Quercus alba, Aesculus flava*	O	M	Branches	L	Snags	W/FE	M
KM23	UNK	UNK	*Juglans nigra, Robinia pseudoacacia, Ailanthus altissima*	*Robinia pseudoacacia*	*Robinia pseudoacacia*	M	M	Branches & Saplings	L	Snags	YU,OF,C/PL	M
KM24	UNK	1	*Platanus occidentalis, Acer negundo*	*Juglans nigra, Acer saccharum, Liquidambar styraciflua*	*Aesculus flava,*	M	M	Branches & Saplings	L	Lrg trees	YL,S/R	M
KM25	Ohio River	1300	*Quercus alba, Quercus velutina*	*Quercus montana, Ulmus americana, Acer rubrum*	*Quercus montana, Acer rubrum, Ulmus americana*	M	M	Saplings	L	Lrg trees	YU	M

Site	Water Source		Tree Species[1]			Subcanopy Clutter			Roost Tree		Habitat Type[5]	Herb. Cover[6]
	Name	Distance (m)	Dominant Canopy	Subdominant Canopy	Subcanopy	CC[2]	Rating[3]	Composition	Potential[4]	Composition		
KM26	Ohio River	1000	*Quercus rubra, Quercus alba, Acer saccharum, Liriodendron tulipifera*	*Robinia pseudoacacia, Acer saccharum, Liriodendron tulipifera*	*Sassafras albidum, Fraxinus americana, Carya tomentosa, Quercus velutina, Acer saccharum, Ulmus rubra, Fagus grandifolia, Smilax, spp.*	C	M	Branches & Saplings	M	Lrg trees & snags	MU, YU, W/FE,	M
KM27	Ohio River	0.96	*Acer saccharum, Liriodendron tulipifera*	*Acer saccharum, Liriodendron tulipifera*	*Cercis canadensis*	C	O	Branches	L	Lrg trees	YU	D
KM28	UNK	UNK	*Quercus alba, Quercus rubra*	*Quercus alba, Quercus rubra, Robinia pseudoacacia*	*Cercis canadensis, Sassafras albidum*	M	M	Branches	L	Lrg trees & snags	MU	M

[1]**Species:** boxelder (*Acer negundo*), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow buckeye (*Aesculus flava*), tree of heaven (*Ailanthus altissima*), pawpaw (*Asimina triloba*), American hornbeam (*Carpinus caroliniana*), shagbark hickory (*Carya ovata*), mockernut hickory (*Carya tomentosa*), eastern redbud (*Cercis canadensis*), flowering dogwood (*Cornus florida*), hawthorn (*Crataegus* spp.), common persimmon (*Diospyros virginiana*), American beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), black walnut (*Juglans nigra*), eastern red cedar (*Juniperus virginiana*), northern spice bush (*Lindera benzoin*), sweetgum (*Liquidambar styraciflua*), tulip tree (*Liriodendron tulipifera)*, honeysuckle (*Lonicera* spp.), sourwood (*Oxydendrum arboreum*), white pine (*Pinus strobus*), scotch pine (*Pinus sylvestris),* Virginia pine (*Pinus virginiana),* American sycamore (*Platanus occidentalis*), bigtooth aspen (*Populus grandidentata*), black cherry (*Prunus serotina*), white oak (*Quercus alba),* scarlet oak (*Quercus coccinea*), chestnut oak (*Quercus montana*), red oak (*Quercus rubra*), post oak (*Quercus stellata*), black oak (*Quercus velutina*), rhododendron (*Rhododendron* spp.), poison ivy (*Rhus radicans),* staghorn sumac (*Rhus typhina*), black locust (*Robinia pseudoacacia*), multiflora rose (*Rosa multiflora*), raspberry (*Rubus* spp.), sassafras (*Sassafras albidum*), willow (*Smilax* spp.), American elm (*Ulmus americana*), slippery elm (*Ulmus rubra*), elm (*Ulmus* spp.)

[2] **CC: Canopy Closure:** C = Closed, M = Moderate, O = Open

[3] **SC: Subcanopy Clutter:** C = Closed, M = Moderate, O = Open

[4] **Roost Potential Rating:** H = High, M = Moderate, L = Low

[5]**Habitat Type:** MU = Mature Upland Forest; YU = Young Upland Forest; ML = Mature Lowland Forest; YL= Young Lowland Forest; W/FE = Woodlot/Forest Edge; C/P = Crop/Pasture; S/R = Stream/River; OF = Old Field

[6] **Herb Cover:** S = Sparse, M = Moderate, D = Dense

5.0 Discussion

5.1 Bat Capture

Netting provided no evidence that the Indiana bat uses habitat within the project area during the summer season. Mist net sampling efforts met minimum requirements of guidelines set by USFWS and the Indiana bat Recovery Team, as set forth in a study plan approved by USFWS WVFO to survey summer habitat for the presence/absence of the federally-endangered Indiana bat.

Ninety-nine bats, representing five species, were captured at 28 net sites; all but 7 of these were big brown and red bats, the two most common species in the eastern United States. Three little brown bats, three tricolor bats, and one hoary bat were also captured. Twelve species of bats are typically considered to occur in West Virginia: little brown bat, northern bat, Indiana bat, small-footed bat (*Myotis leibii*), big brown bat, evening bat (*Nycticeius humeralis*), tricolor (eastern pipistrelle) bat, eastern red bat, hoary bat, silver-haired bat (*Lasionycteris noctivagans*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), and Townsend's big-eared bat (*Corynorhinus townsendii*) (Whitaker and Hamilton 1998, Harvey et al. 1999). In addition, the gray bat (*Myotis grisescens*) has once been documented in the state (Stihler and Brack 1992).

In general, species richness, diversity, and rate of capture were low (Table 5). Species diversity was 1.39 species per net site (*SD* = 0.74). Only two bats belonging to the genus *Myotis*, both little brown bats, were caught; no northern, Indiana, or small-footed bats were caught. The catch of tri-colored bats, another species that hibernates in caves during winter, was also low, and limited to two individuals. It is even arguable that the catch of big brown bats, which only sometimes hibernate in caves, was low, with an abundance of less than one-third of the catch of red bats, which it often exceeds.

Based on these survey results, it is improbable that the project will have any effect on the Indiana bat that is not insignificant or discountable.

Table 5. Capture success during the present study compared to similar studies in woodland habitats in West Virginia and in the eastern and midwestern United States within the range of the Indiana bat.

	Bats/Net night	Bats/Net site	Sp. Diversity Index[1]	Sp. Rich-ness	Source
AEP Mountaineer CCS II, WV	0.9	3.5	1.8	5	
Camp Dawson, WV	1.4	6.1	4.0	6	Brack et al. 2005
Camp Dawson, WV	5.3	21	2.4	8	ESI 2006
Monongahela NF, WV	0.9	3.7	2.5	6	ESI 2000

	Bats/Net night	Bats/Net site	Sp. Diversity Index[1]	Sp. Rich-ness	Source
Private 2 net sites, WV	1.1	4.5	1.2	2	ESI 2003
Private 15 net sites, WV	0.8	3.3	2.1	4	ESI2003
Private 2 net sites, WV	0.4	1.5	1.8	2	ESI 2005
Private 3 net sites, WV	2.3	9.0	2.8	4	ESI 2005
Private 2 net sites, WV	1.3	2.5	2.8	4	ESI 2005
Private 2 net sites, WV	0.1	0.5	1.0	1	ESI 2005
Private 4 net sites, WV	0.6	2.3	3.5	5	ESI 2005
Private 2 net sites, WV	0.3	1.3	1.0	1	ESI 2005
Private 21 net sites, WV	3.7	14.6	3.8	7	ESI 2006
Private 34 Net Sites, WV	1.9	7.4	3.9	7	ESI 2006
Private 2 net sites, WV	4.0	16	2.4	4	ESI 2009
Private 2 net sites, WV	2.0	8.0	3.3	5	ESI 2010
Potter & McKean Co., PA	2.9	12.1	2.3		Brack 2009
Ravenna, OH	2.4	9.7	2.9		Brack and Duffey 2006
Kentucky	0.4-4.5/1.7	1.5-18.0/6.6	2.0-4.3/2.8		ESI[2] (ranges and means)
Crane, IN	1.8	5.6	4.4		Brack and Whitaker 2004
HNF, IN	2.1		4.3		Brack et al 2004
Ft. Leavenworth, KS	2.9	9.4	1.6		Brack et al. 2007

[1] SDI = $1/\Sigma P_i^2$ (MacArthur 1972)

[2] based on 12 ESI projects, ranging in size from 4 to 212 net nights ($\bar{X}$ = 40)

5.2 Habitat Suitability

The habitat near the 28 net sites was considered representative of the habitat in the project area. In general it was suitable but of low to moderate value in terms of providing suitable roost sites for a maternity colony of the Indiana bat; 19 of 28 sites ranked as low quality for roost sites and 9 were of moderate value.

5.3 Conclusions

This effort provided no evidence that the Indiana bat or other endangered bat uses the project area during summer months. No endangered bats were caught in mist nets and the roosting habitat was generally of low (to moderate) quality. Thus it is unlikely the Indiana bat, or other endangered bat, is present within the study areas or that the project would adversely affect them. Based on our experience, ESI anticipates that the project would have insignificant and discountable effects to bats, and on behalf of our clients (DOE and AEP) respectfully suggest that a "May Affect – Is Not Likely to Adversely Affect" determination is appropriate for Section 7 ESA consultation for this proposed project.

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APPENDIX A
STUDY PLAN DATED 9 JUNE 2010

ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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Phone: (513) 451-1777; Fax: (513) 451-3321

Pesi 926.01 9 June 2010

Ms. Barbara Douglas
U.S. Fish and Wildlife Service
West Virginia Field Office
Ecological Services
694 Beverly Pike
Elkins, West Virginia 26241

RE: *Request for Early Coordination/Informal Consultation for AEP's Proposed Mountaineer CCS II Project in Mason County, West Virginia.*

American Electric Power (AEP) and the U.S. Department of Energy (DOE), as lead Federal agency, propose to develop a carbon dioxide capture and storage (CCS) project at AEP's Mountaineer Power Plant in Mason County, West Virginia. The project is referred to as the proposed Mountaineer CCS II Project (or "Project" hereafter in this transmittal). AEP is seeking financial assistance from DOE for the proposed Project. As such, AEP will support DOE's preparation of an environmental impact statement (EIS) and future consultation under Section 7 of the Endangered Species Act (ESA).

The EIS will address all aspects of the Project; however, site selection for characterization wells and potential corridor alignments for the CO_2 pipeline are currently undergoing feasibility considerations by AEP. Preliminary field studies for characterization wells are expected to precede preliminary development of the Draft EIS. For that reason, Environmental Solutions & Innovations, Inc. (ESI) is writing on behalf of AEP and their consultant Potomac-Hudson Engineering, Inc (PHE), to request early coordination/informal consultation with U.S. Fish and Wildlife Service (USFWS) regarding threatened and endangered species or their critical habitat in the vicinity of the Project. Our approach is to investigate all such concerns as early in the Project as possible.

The following provides a brief description of the Project and plans for characterization work in support of Project planning and EIS development.

Project Description

The Project will add the infrastructure necessary to capture approximately 1.5 million tonnes of carbon dioxide (CO_2) annually from a 235-megawatt slipstream of flue gas from the existing 1300-megawatt Mountaineer Power Plant located near New Haven, West Virginia. Captured CO_2 will be transported by pipeline (primarily underground) to well injection sites within approximately 12 miles of the plant and injected for permanent storage into geologic formations approximately 1.5 miles underground.

AEP will conduct geologic and hydrogeologic characterization activities to support preliminary Project engineering and design. As part of these activities, preliminary characterization work is planned at potential injection well sites and within potential pipeline corridors between the Mountaineer Plant and well sites. Up to three deep characterization wells will be developed to characterize subsurface conditions and assess their suitability for injection and storage of CO_2. Four properties owned by AEP have been identified for potential characterization wells and, in order of preference to support characterization activities; they are the (1) Jordan Tract, (2) AEP Landfill Site, (3) Eastern Sporn Tract, and (4) the Western Sporn Tract. Conceptual pipeline corridors to each of the four locations have been preliminarily identified. The final locations and design of the characterization wells, pipeline corridors, access roads, injection and monitoring wells, and potentially other work areas will be refined after completion of associated environmental studies.

Attachment A contains maps depicting the location of the Mountaineer Plant, characterization well properties, and preliminary conceptual pipeline corridors.

Indiana Bat Surveys

ESI has been contracted to conduct Indiana bat surveys within the study area, following guidelines in the 2007 Indiana Bat Draft Recovery Plan. Along with this early coordination letter, ESI is submitting a Project Study Plan for the Indiana bat to your office and to the West Virginia Division of Natural Resources (WVDNR) for review and approval. Based on the acceptability of the Study Plan, fieldwork will be coordinated with your office and with WVDNR.

Evaluations for Other Species

ESI is also requesting information from USFWS about ecologically significant habitats and/or species of special concern present within or near the Project. We are also coordinating with WVDNR to see whether they have concerns for any protected or unique species or habitats that could be adversely affect. If so, we are seeking to identify appropriate characterization and evaluation needs/studies as a part of our efforts to avoid and minimize adverse impacts and to support our characterization and evaluation of these species and potential Project impacts in the EIS process and applicable documentation.

Ongoing Consultation

On-going coordination and consultation with the USFWS and WVDNR throughout the Project is expected. Updates to your agency will be provided as information becomes available. If you desire, we are available to participate in face-to-face or teleconference meetings to facilitate your review or understanding of the Project.

We would appreciate your participation and request a response as soon as practical within the next 30 days to help us more quickly identify and focus on potential impacts to protected species.

If you need additional information please do not hesitate to contact me at (513) 451-1777, VBrack@EnvironmentalSI.com.

Sincerely,

Virgil Brack, Jr., Ph.D., MBA, Principal Scientist
Certified Wildlife Biologist, TWS
Certified Senior Ecologist, ESA

cc: M. Lusk, DOE/NETL
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enclosures

STUDY PLAN:
ENDANGERED BAT STUDIES FOR AMERICAN ELECTRIC POWER'S PROPOSED MOUNTAINEER CCS II PROJECT: CO_2 PIPELINE AND INJECTION WELL SITES, MASON COUNTY, WEST VIRGINIA

9 June 2010

Submitted to:

Ms. Barbara Douglas, Endangered Species Biologist
U.S. Fish and Wildlife Service
West Virginia Field Office
Elkins, West Virginia 26241

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1.0 Introduction

American Electric Power (AEP) and the U.S. Department of Energy (DOE), propose to develop a carbon dioxide capture and storage (CCS) project at the AEP Mountaineer Power Plant located in Mason County, West Virginia. It is referred to as the proposed Mountaineer CCS II Project (or simply "Project" hereafter within this document).

Environmental Solutions & Innovations, Inc (ESI) was hired by AEP and their prime consultant Potomac-Hudson Engineering, Inc. (PHE) to survey for the federally endangered Indiana Bat (*Myotis sodalis*) along feasible alternative CO_2 pipeline corridors and injection wells (initially characterization wells).

American Electric Power
1 Riverside Plaza
Columbus, OH 43215

Potomac-Hudson Engineering, Inc.
7830 Old Georgetown Road, Suite 220
Bethesda, MD 20814

Studies will be carried out under our U.S. Fish and Wildlife (USFWS) Federal Fish and Wildlife Permit (TE02373A-0). We currently hold West Virginia Scientific Collections Permits, issued to individual collectors (currently 2010.171 through 2010.18), enabling us to work with endangered bats.

2.0 Project Description

The Project will capture approximately 1.5 million tons of carbon dioxide (CO_2) annually from a 235-megawatt slipstream of flue gas from the existing 1300-megawatt Mountaineer Power Plant located near New Haven, West Virginia. Captured CO_2 will be transported by pipeline to injection sites located within approximately 12 miles of the plant. Captured CO_2 will be injected into and permanently stored in geologic formations approximately 1.5 miles underground.

AEP will conduct geologic and hydrogeologic characterization at alternative potential injection well sites and have identified alternative potential pipeline corridors between the Mountaineer plant and the well sites. Four properties owned by AEP have been identified for potential characterization wells, used to characterize subsurface conditions and assess the suitability for injection and storage of CO_2. The approximate acreages at these four sites are:

- Jordan Tract: 195 ac
- AEP Landfill property (3 parcels): 28 ac
- Eastern Sporn Tract: 400 ac
- Western Sporn Tract: 70 ac

Conceptual pipeline corridors to each of these four locations have been also identified. Each corridor may include areas of overlap with other corridors, so the sum for all corridors is greater than the total collective corridor length of 30.4 miles.

Appendix A Map 1 contains maps depicting the location of the Mountaineer Plant, characterization well properties, and preliminary conceptual corridors.

Major portions of each potential corridor parallel and are adjacent to existing corridor rights-of-way (ROW), including utilities and roads. In some cases, the pipeline may be collocated within the existing ROW, but at this time that cannot be ascertained with certainty, so they are treated as though they are not colocated. In addition, access roads, lay-down areas, and other additional work spaces may be required; however, at this time the only such identified area is to the south of the Jordan Tract well site.

3.0 Summer Mist Net Surveys

3.1 Protocol

ESI will follow guidelines provided by the USFWS in the 2007 Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision (Table 1).

Bats are live-caught in mist nets and released unharmed near the point of capture. Captured bats are identified to species, sex, age class, and reproductive condition. Weight and right forearm length of each individual are also recorded (data sheets are provided in Appendix B). Age is determined by examining the ephiphyseal-diaphyseal fusion of long bones in the wing. Reproductive condition of female bats is recorded as pregnant (based on gentle abdominal palpation), lactating, post lactating, or non-reproductive. Time and location/net site of captured bats is recorded. Processing is typically completed within 30 minutes of the time the bat is removed from the net.

Table 1. USFWS Mist Netting Guidelines

NETTING GUIDELINES

1. Netting Season: 15 May to 15 August, when Indiana bats occupy summer habitat.
2. Equipment (Mist Nets): constructed of the finest, lowest visibility mesh commercially available – monofilament or black nylon – with the mesh size approximately 1½ inch (1¼ –1¾) (38 mm).
3. Net Placement: mist nets extend approximately from water or ground level to tree canopy and are bounded by foliage on the sides. Net width and height are adjusted for the fullest coverage of the flight corridor at each site. A "typical" net set consists of three (or more) nets "stacked" on top of one another; width may vary up to 60 feet (20 m).
4. Net Site Spacing:
   - Streams – one net site per 0.6 mile (1 km)
   - Land Tracts – two net sites per 246 acres (1 square km)
5. Minimum Level of Effort Per Net Site:
   - Two net locations (sets) per net site, with locations (sets) at least 100 feet (30 m) apart
   - Two (calendar) nights of netting
   - At least four net–nights (1 net–night = 1 net set deployed for 1 night); typically, two net sets are deployed at one site for two nights, resulting in four net-nights
   - Sample Period: begin at dusk and net for 5 hours (approximately 0200h)
   - Nets are monitored at approximately 10-minute intervals
   - No disturbance near the nets between checks
6. Weather Conditions: net only if the following weather conditions are met:
   - No precipitation
   - Temperature $\geq$ 10°C (50°F)
   - No strong winds

Source: U.S. Fish and Wildlife Service, 2007

3.2 White Nose syndrome

White-nose syndrome (WNS) is an emerging disease that is killing millions of bats in the eastern U.S. The disease, which was first found in New York is spreading and is

now in West Virginia. Bat handling will follow current WNS protocols set by the USFWS. Captured bats will be examined for damage associated with WNS to the wing and uropatagium (tail) membranes, including use of white light and ultraviolet and wing damage will be categorize using the "Wing-Damage Index Used for Characterizing Wing Condition of Bats Affected by White-nose Syndrome" established by Jon Reichard in 2008. We keep current on changes in agency responses to WNS needs.

3.3 Level of Effort

3.3.1 Well Areas

Netting is completed at a rate of 2 net sites per 246 ac (1 km^2). For this project, this equated to 6 net sites, with the following level of effort at each of the well sites:

- Jordan Tract: 2 sites
- AEP Landfill property: no sites as the properties are contained within the corridor coverage
- Eastern Sporn Tract: 4 net sites
- Western Sporn Tract: 2 net sites

3.3.2 Pipeline Corridors

Netting is completed at 1-kilometer intervals along portions of the corridor where appropriate habitat is proposed to be cleared. Netting segments are 1 kilometer long by 1 kilometer wide, creating a netting block of 1 km^2. Net sites may be situated anywhere within each 1 km^2 block; thus, net sites will not be "forced" into even 1-kilometer spacing, although one net site will be completed for each linear kilometer of suitable habitat.

The well sites and pipeline corridors were overlain on aerial photographs in GIS. The pipeline corridors were evaluated to determine where potential habitat (forested or wooded areas) would be removed to install the proposed pipeline. Areas within the construction corridor possessing no roosting habitat (i.e., agricultural, commercial, and occasionally residential) were excluded. Appendix A Map 2 shows the lengths of each segment of all potential corridors with 1-kilometer blocks superimposed upon them where suitable (woodland) habitat is present, and within which a net site will be placed. This produced a total of 26 net sites.

When mist netting is completed, each segment of the corridor is evaluated in the field to verify the accuracy of the habitat determination made from aerial photographs. The final report will include maps identifying all segments, both netted and not. Segments that are not netted (because no wooded habitat is removed) will be identified as such. Likewise the basis for this determination is documented with a

ROW Habitat Exclusion data sheet and a representative photograph. Copies of ESI's data sheets are provided in Appendix B.

3.3.3 Overlap Between Well and Pipeline Corridors

Corridors are attached to well areas. Portions of the corridors may be covered by netting completed within the well areas. Specifically, netting within a well area will include portions of the corridor that are within 1 kilometer of the border of the well area opposite the attachment of the pipeline corridor. At the AEP Landfill property well site, no additional netting is required because it is contained within the area covered by netting of the corridor.

3.3.4 Access Roads and Other Additional Areas

As with the corridor, netting is completed for linear areas other than the corridor (e.g. access roads) where clearing will occur, except when they fall within 0.5 kilometer of the corridor and/or net site, they are covered by ROW netting. At this time the only such identified area is to the south of the Jordan Tract well site, where one additional net site is required (Appendix A) Map 2.

If additional clearing is required outside the established netting "blocks," additional netting will be conducted accordingly.

3.4 Habitat Evaluation

When netting is completed, a habitat description will be completed for each net location. The emphasis of this description is habitat form: size and relative abundance of large trees and/or snags [≥ 2.5 inches Diameter Breast Height (DBH) (Gumbert et al. 2002)] that may potentially serve as roost trees, canopy closure, understory clutter/openness, water availability, and flight corridors. Habitat form is emphasized because the Indiana bat roosts in a great many species of trees. Tree species composition is included in the assessment. Species composition is important because it provides insight to edaphic conditions on site. For example, an oak-hickory stand references a different set of conditions than does a beech-maple stand. ESI's habitat characterization does more than emphasize species of large trees near the net. It identifies components of the canopy and subcanopy layers. ESI's habitat characterization also identifies dominant and subdominant elements of the canopy. The amount of understory, or clutter, is also recorded as many species of bats, including the Indiana bat, tend to avoid areas of high clutter.

The following items are used to ascertain the suitability of net sites and applicability of net placement:

- Netting is not completed in areas that have been cleared (e.g. row crops, hay fields/pastures, residences, etc.). *In contrast, wooded streams in an otherwise cleared area typically provide suitable habitat and will be netted*.

- Netting is not completed in areas where all woody stems are ≤6 inches dbh.
- A decision not to net discreet, specific areas is made if all habitat is unsuitable (e.g., even-age, live, smooth barked, young, small - <10 inches dbh – stands of maple or tulip poplar) and the areas are not within a 1-kilometer netting interval. *In contrast, recently logged areas with a few remaining large trees, or young stands with a few large, old, often dead-or-dying "wolf trees" typically provide suitable habitat and will be netted.*

Excluded areas are documented on our standard ROW Habitat Exclusion data sheet and are provided, with a photograph, in the final report along, with mapping as appropriate.

3.5 Net Placement

Mist nets are set to maximize coverage of flight paths used by Indiana bats along suitable travel corridors, foraging areas, and/or drinking areas. Riparian corridors are often used for travel or foraging by Indiana bats. However, upland corridors (e.g., trails or logging roads) also provide suitable sites for the Indiana bat. In upland areas, nets placed within proximity to road ruts holding water have produced Indiana bats in many portions of the range. Site selection is based upon the extent of canopy cover, presence of an open flyway, and forest conditions near the site. The actual location and orientation of each net is determined in the field.

3.6 Emergence Counts

Where the ROW crosses very small patches of trees (e.g., <5 trees ≥5" dbh) that ESI biologists determine are not suitable for netting, but do merit closer inspection (i.e., contain potentially suitable roost trees), ESI will visually monitor potential roost trees for a minimum of 2 nights at dusk to determine the presence/absence of bats roosting in trees possessing the following characteristics:

- Exfoliating, peeling or loose bark
- Splits in trunks or branches
- Cavities

Emergence counts/surveys are not completed during inclement weather, such as precipitation, strong wind, and/or temperatures below 10° Celsius (50°F).

4.0 Portal Surveys

4.1 Karst and Coal

Underground voids may be used by bats for winter hibernation. Voids may be natural or man made. In this portion of the world, natural caves occur in limestone bedrock or areas of karst topography. There are no natural caves known from within the Project area. In this portion of the world, the mining activity most likely to produce underground voids is coal extraction. Mining has occurred within the region containing the project.

4.2 Search for Portals

Coal deposits in West Virginia have been mined in many areas, with a variety of technologies. Portals, signaling mine voids, are the signature of sub-surface mining, and such voids may be used by bats for winter hibernation.

GIS databases for mineral mining were obtained from the U.S. Geological Survey (2001) and all other Abandon Mine Lands and Permit Boundaries information was from the West Virginia Department of Environmental Protection. These files can be accessed through West Virginia Universities GIS Technical Center (http://wvgis.wvu.edu/) and were used to identify known areas of mining (Appendix A Map 3).

Portal/cave searches will be conducted by teams of two individuals walking approximately 150 feet apart, 75 feet to either side of centerline. Each individual searches the areas within 75 feet to either side of the path they are walking. Coverage of well areas will be completed in a similar manner.

4.3 Initial Portal Assessment

If portals are found, they are assessed for their potential to serve as bat hibernacula, based on a variety of characteristics as identified in the USFWS in the 2007 Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. (Additional detail is provided in Brack (2005) "*Field techniques for biological assessment: assessment of potential hibernacula and swarming/staging habitat*" in Indiana Bat and Coal Mining). These characteristics include:

- Size of portal entrance (and the potential for predation)
- Presence/absence of guano
- Depth of the portal – i.e., did it extend beyond the depth to which a mine light shown, or did it appear to continue around a corner

- Air flow
- Other indications (such as spider webs or debris) that, by presence or state (disturbed vs. undisturbed), would provided evidence of use/no use by bats

Portals are documented with a GPS location, mine portal description data sheet (Appendix B), and photograph.

4.4 Portal Survey Protocol

Portals determined to be potentially suitable for bat use based on the initial Portal Assessment will be trapped. Trapping is completed in accordance with the 2007 Indiana Bat (*Myotis sodalis*) Draft Recovery Plan protocol and accepted trapping procedures (Table 2).

Table 2. Guidelines for mine/cave portal bat trapping surveys.

PORTAL TRAPPING GUIDELINES

1. Season: 10 April to 10 May or 15 September to 31 October
2. Equipment
   - ♦ Harp Trap – Traps are checked at least once every 20 minutes.
   - ♦ Mist Nets – 50 denier, 38mm mesh. Nets checked at least once every 20 minutes
   - ♦ Bat Detector – AnaBat acoustical data collected for duration of trapping on both evenings
3. Net Placement: mist nets extend approximately from water or ground level to tree canopy and are bounded by foliage on the sides. Net width and height are adjusted for the fullest coverage of the flight corridor at each site. A "typical" net set consists of three (or more) nets "stacked" on top of one another; width may vary up to 60 feet (20 m).
4. Sample Period: ½ hour before sunset and continue for at least 5 hours
5. Minimum Level of Effort Per Net Site:
   - ♦ Two (calendar) nights of netting
   - ♦ If no captures occur and no bat activity is noted with
   - ♦ a bat detector on the first evening during acceptable weather conditions, sampling will not be conducted a second night
6. Weather Conditions: net only if the following weather conditions are met:
   - ♦ At least 3 hours free of heavy rain and thunderstorms
   - ♦ Temperature $\geq$ 10°C (50°F) for first 2 hours of sampling
   - ♦ Temperature above 1.6ºC (35ºF) until 0:00hr

Source: Pennsylvania Game Commission, 2004

5.0 Radio Telemetry

5.1 Radio Tagging of Indiana Bats

After collecting morphometric data, all adult Indiana bats are fitted with radio transmitters. If juvenile Indiana bats are captured at a site before adults have been captured, they will be fitted with transmitters; if reproductive females have been caught and fitted with transmitters then juvenile bats from that site will be not be fitted with transmitters. Transmitters affixed to pregnant or juvenile bats will not constitute more than 5 percent of the bat's weight (Aldridge et al. 1988). Transmitters are obtained from Wildlife Materials, Inc., Titley Electronics, PTY LTD, Blackburn Transmitters, or a similarly reputable vendor.

Bat transmitters weigh 0.20 to 0.68 gram; ESI typically favors smaller transmitters to minimize the impact to the bat over the additional tracking window associated with larger devices. These transmitters tend to last 7 to 14 days. Transmitters are activated and tested before attachment. A small interscapular area is trimmed of fur and the transmitter is attached to this area with non-toxic surgical adhesive. The adhesive degrades over time (typically 1 to 4 weeks) and the transmitter falls off the bat. Biologists record the transmitter weight, weight of the bat before and after transmitter attachment, and holding time. Bats are released unharmed near the point of capture. Standardized data forms (Appendix B) are used for transmitter attachment.

5.2 Diurnal Roost Telemetry

5.2.1 Number and Locations of Bats Tagged

No more than 3 bats will be tagged at net sites that are within a 3-kilometer proximity of one another. This should keep us from tagging a bunch of bats from the same colony, where captures are "clustered," but should allow us to locate multiple colonies if they are present. Thus, two or more "clusters" of captures could occur along the alternative ROWs, and for example if there were three "clusters" of captures with three bats tagged at each cluster, nine bats would be tagged.

5.2.2 Length of Time

All Indiana bats tagged with transmitters will be tracked for a minimum of 6 days or until the transmitter is shed by the bat. Because receivers are not water resistant, telemetry will not occur during rain; however, barring rain telemetry typically will occur over 6 consecutive days. A ®Wildlife Materials TRX-2000S PLL Synthesized Tracking Receiver, ®Advanced Telemetry Systems, Inc. Model R2000 Scanning Receiver, or ®Titley Australis 26k receiver, or similar standard equipment, in

conjunction with three or four element folding yagi directional antennas, loop antennas, and whip unidirectional antennas (manufactured by Wildlife Materials, Inc. or a similarly reputable firm) are used to track tagged bats. Signals are detected and followed to roost trees.

Beginning the day after bat capture and transmitter attachment, telemetry will be used to locate each bat's diurnal roost. Roost trees are identified to species and dbh is measured. The approximate height that each bat is roosting and general condition of the roost tree (dead, live, dying, % bark cover, etc.) and percentage of exfoliating bark are noted. A description of habitat near the roost (tree, hibernacula, man-made structure, etc.) is recorded. Roosts and associated habitat are characterized on standardized data forms (Appendix B).

Roosts are flagged or marked in another acceptable manner for ease of future identification. GPS coordinates are recorded for each roost. When feasible, distances among roost trees and other notable landscape features are determined.

5.2.3 Roost Emergence Counts

The value of finding roost trees is to understand the potential impact of the Project on the maternity colony. Unfortunately, many roost trees are often used by the same colony. Fortunately, most roosts contain only a very few bats and usually only one or two, or three roost trees contain a lot of bats. Thus, knowing how many bats are using the roost tree(s) located is an important part of understanding the importance of those trees.

Each tagged bat may roost in one or several trees. Emergence counts are conducted for a minimum of 6 days for each bat at each identified roost.

5.3 Nocturnal Foraging Telemetry

The impact to foraging habitat associated with habitat removal for a linear corridor tends to be small as a proportion of total availability. Likewise, studies have shown that Indiana bats may benefit from pipeline rights-of-way (Brown and Brack 2003, Brack 2006) and/or open green spaces (Rommé et al. 1995, Farmer et al. 2002, Gardner and Cook 2002). However, there is a point at which the anthropogenic nature of a landscape decreases the productivity of the land for foraging bats. Within the project area, abundant suitable foraging habitat exists and it is not anticipated that development of any of the project alternatives would substantially change that equation. As such, ESI proposes not to conduct nighttime foraging telemetry studies if Indiana bats are captured and radio-tagged.

6.0 Inaccessible Properties

With a proposed Project of this size, it is not unexpected that we may not gain access to all parcels required for netting. Therefore, the following is proposed for properties for which landowner access cannot be obtained:

- If access cannot be obtained for a high quality flyway within a 1-kilometer^2 block, the next best property, for which access can be obtained, within that 1-kilometer^2 block will be netted.
- If access cannot be obtained for *any* suitable flyways within a 1-kilometer^2 block, the best and most similar habitat, in one of the adjacent blocks will be netted instead. (This may result in two net sites being placed in some 1-kilometer^2 blocks.)
- If access cannot be obtained for *any* habitat within *multiple*, adjacent 1-kilometer^2 blocks, then the forest habitat quality will be evaluated based upon review from publicly accessible roads and GIS data including forest cover type, percentage of canopy cover, and aspect.
    - If the habitat is low-moderate quality, we will place 2 net sites within the closest, 1-kilometer^2 blocks to the inaccessible properties.
    - If the habitat is moderate-high quality, we will place 4 net sites within the closest, 1-kilometer^2 blocks to the inaccessible properties.

If an Indiana bat is captured, we will likely need to work with new, additional land owners, beyond those identified for mist netting, in order to gain access to roost(s) and/or other active areas. Studies can only be conducted where landowners grant permission to do so. If we locate a roost on a parcel where land access can not be gained, triangulation will be used to approximate the bat's diurnal roost location (s).

7.0 Avoidance and Minimization

To facilitate planning and smooth Project execution, we endeavor to gain agreement from USFWS on what minimization and avoidance measures will be employed under various capture scenarios, if in fact bats are caught:

7.1 Capture of a Single, Adult Male

If a single adult male Indiana bat is captured and:

- a roost tree cannot be located (after 6 days of telemetry efforts) then it will be assumed that the individual is transient and thus a seasonal cutting restriction (1 November to March 31) is not required.
- one or more roosts are located, but emergence counts show that bat to be the only bat roosting in the tree(s), two additional nights of netting and AnaBat data will be conducted nearby. If no additional *sodalis* are captured or detected by the AnaBat, then it will be assumed that the individual is transient and thus a seasonal cutting restriction (1 November to March 31) will be required for the identified roost trees, but not the surrounding area.
- one or more roosts are located and emergence counts reveal multiple bats using the tree(s), then at least two AnaBat acoustical detectors will be placed near the roost tree(s) for at least 2 nights used to identify the species using the tree(s). The two filters provided by the KDFWR / USFWS Frankfort field office and/or direct call identification by a qualified biologist will be used to determine if Indiana bat calls were recorded. If two or more separate call files contain calls of the Indiana bat, it is likely that multiple Indiana bats are using the tree(s). As such, ESI will either conduct additional mist netting in the area to attempt to catch and transmitter additional Indiana bats to understand how the bats are using the area OR assume a maternity colony is present and employ a seasonal cutting restriction within 2.5 miles of identified roost tree(s).

7.2 Capture of Adult Female or Juvenile

Capture of an adult female or juvenile Indiana bat is indicative that a maternity colony is present in the area. In the past, emergence counts of greater than 20 bats were often considered indicative of a “primary roost” while trees with less than 20 bats were considered “secondary roosts”. However, as we have come to understand that most colonies exhibit a fission-fusion society structure, it can be difficult to understand which trees are primary trees, how many trees actually constitute a maternity colony, and if there are multiple colonies present in an area. (In 2007, ESI completed studies in New York where there were up to four colonies present and emergence counts on several trees ranged from zero to over 80 bats in just a few days.) As such, if an adult female or juvenile Indiana bat is captured, ESI will endeavor to collect adequate data to understand the location and number of roosts, and how many bats are using which trees in order to facilitate a determination of if one or more maternity colonies are present as well the overall size of the area used by the bats. Efforts to this end include:

- Completion of dusk emergence counts at all identified roosts for a minimum of 6 days. (Night vision scopes and/or AnaBat recording devices may be used as deemed appropriate by field staff.)
- In the event that only one reproductive bat is captured within any 2.5-mile length of corridor and tracked to any roost tree, it is assumed that a maternity colony is present in the area. If no primary roost (i.e., tree with over 20 bats) is located during the telemetry efforts up to four additional calendar nights of netting will be conducted near the bat's known roost(s) to capture and transmitter additional reproductive individuals from the same colony, to facilitate identification of at least one primary roost.
- If a single reproductive bat is caught and a roost tree cannot be located, we will observe a seasonal cutting restriction within 2.5 miles of the capture site.
- We will observe a seasonal cutting restriction within 2.5 miles of any identified roost tree(s) used by a reproductive individual.

8.0 Timeline and Reporting

Mist net surveys will be conducted between 15 May and 15 August 2010 and a complete survey report, covering all field studies completed will be submitted to USFWS. Our report includes maps showing all project areas including alternative well areas, ROW alignments, construction areas, access roads, net site locations, and areas excluded from netting based on habitat. Copies of all field data sheets and photographs of net sites, excluded areas, etc. are included in the report. The final report will detail survey methods, weather results, net site habitat analysis, and basic statistical analysis of results, including species diversity and richness.

Searches to locate portals will be completed by 15 July 2010 and if any portals are located they will be assessed for their potential to serve as hibernacula. A report of these findings will be submitted to USFWS by early August 2010 with recommendations for trapping of potentially suitable portals. With concurrence from USFWS, potentially suitable portals will be trapped between 25 August and the end of suitable autumn weather, typically about 20 October. The portal/cave search report will be amended to include results of the trapping surveys and resubmitted to USFWS. Our report includes maps showing portal search areas, portals assessed for potential suitability, and portals trapped. The report includes copies of all field

data sheets and photographs of portals. The final report will detail survey methods, weather results, and basic statistical analysis of results.

USFWS will be notified within 24 hours (via phone and/or email) upon capture of any endangered species.

9.0 Personnel

A list of ESI staff that may be involved in the mist netting field work for the Project follows. Other staff not listed here may also participate – resumes can be provided in advance of surveys if requested by USFWS; all individuals responsible for bat identification are listed on ESI's federal and state permits.

1. Dr. Virgil Brack, Jr. – Principal Scientist & Project Manager
2. Mr. Jason Duffey
3. Mr. Adam Mann
4. Ms. Erin (Pfeffer) Basiger
5. Mr. Jack Basiger
6. Dr. Dale Sparks
7. Mr. David Jeffcott
8. Mr. John Timpone
9. Ms. Michelle Gilley

Resumes for all individuals listed above can be provided upon request.

10.0 Literature Cited

Brack, V., Jr. 2005. Field techniques for biological assessment: assessment of potential hibernacula and swarming/staging habitat. Pages 89-92 *in* Indiana Bat and Coal Mining, A Technical Interactive Forum (K.C. Vories and A. Harrington, eds.) U.S. Department of Interior, Office of Surface Mining. Alton, Illinois.

Brack, V., Jr. 2006. Autumn activity of *Myotis sodalis* (Indiana bat) in Bland County, Virginia. Northeastern Naturalist 13:421-434.

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Farmer, A. H., B. S. Cade, and D. F. Stauffer. 2002. Evaluation of a habitat suitability index model. *in* The Indiana Bat: Biology and Management of an Endangered Species (A. Kurta and J. Kennedy, eds.). Bat Conservation International, Austin, Texas. pp. 172-179.

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Rommé, R. C., K. Tyrell, and V. Brack, Jr. 1995. Literature summary and habitat suitability index model: components of summer habitat for the Indiana bat, *Myotis sodalis*. 3D/Environmental, E-1-7, Study No. 8. 174 pp.

APPENDIX A
PROJECT MAPS

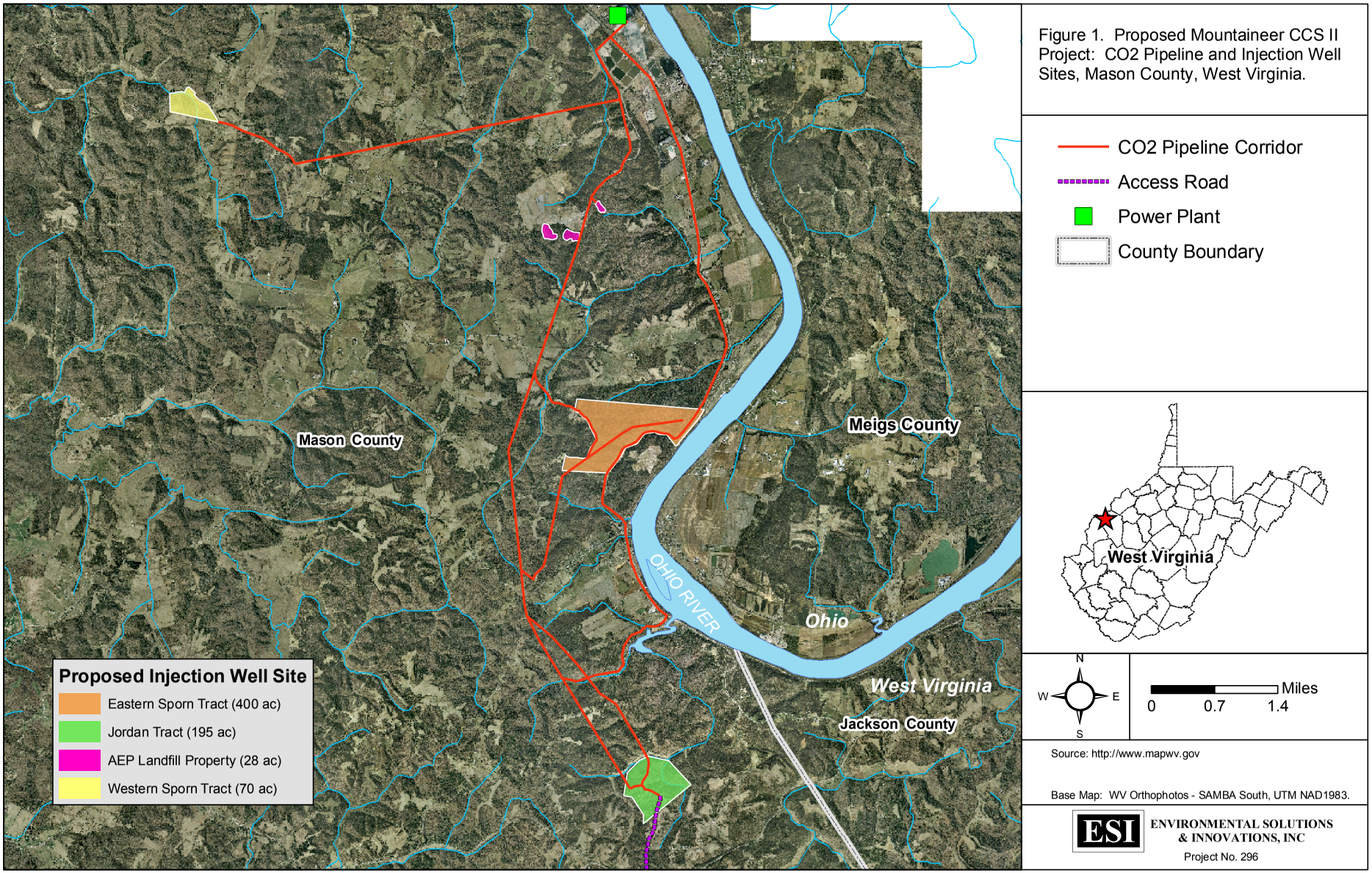
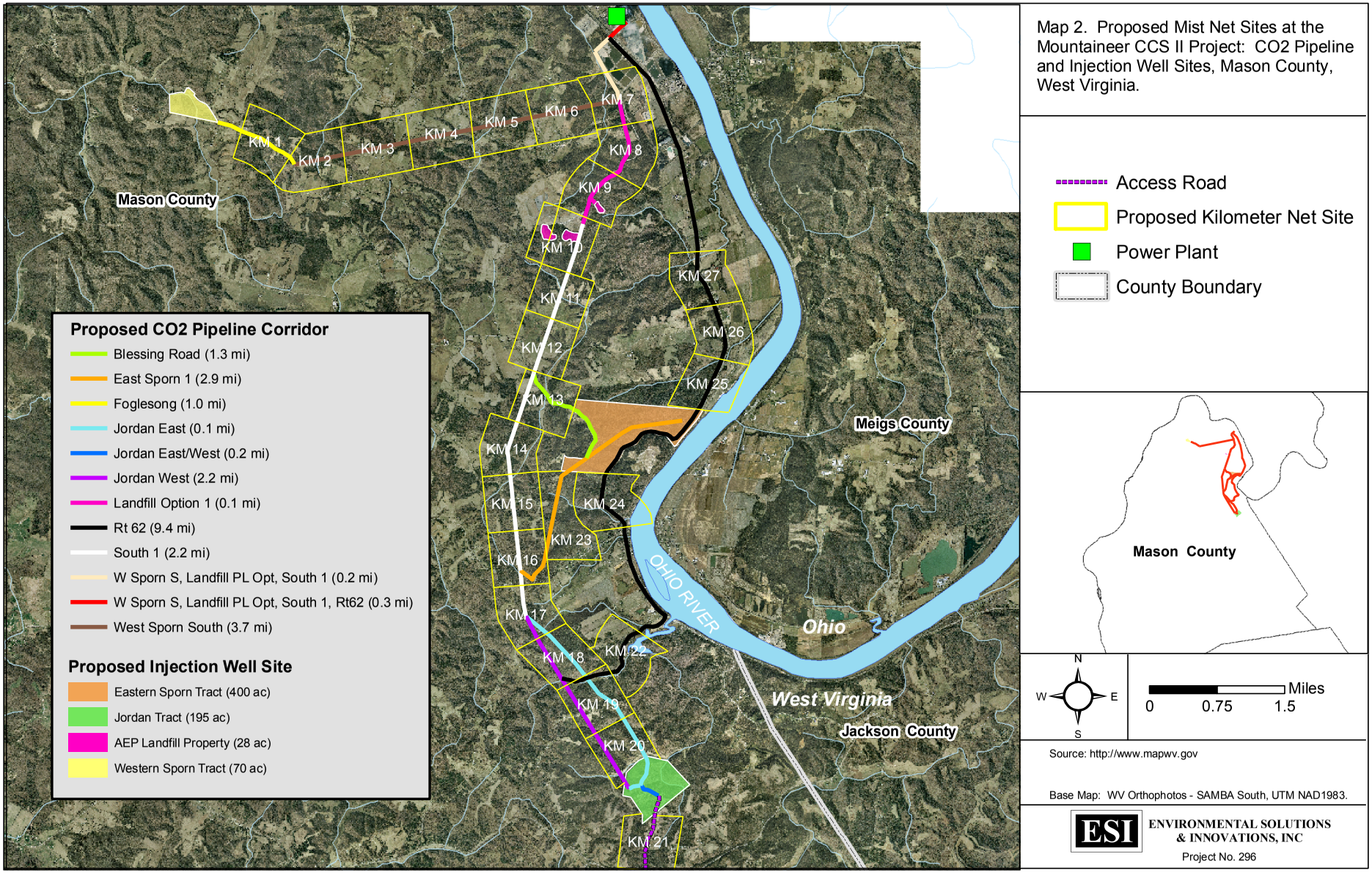


Figure 1. Proposed Mountaineer CCS II Project: CO2 Pipeline and Injection Well Sites, Mason County, West Virginia.


Map 2. Proposed Mist Net Sites at the Mountaineer CCS II Project: CO2 Pipeline and Injection Well Sites, Mason County, West Virginia.
Access Road
Proposed Kilometer Net Site
Power Plant
County Boundary
Proposed CO2 Pipeline Corridor
Blessing Road (1.3 mi)
East Sporn 1 (2.9 mi)
Foglesong (1.0 mi)
Jordan East (0.1 mi)
Jordan East/West (0.2 mi)
Jordan West (2.2 mi)
Landfill Option 1 (0.1 mi)
Rt 62 (9.4 mi)
South 1 (2.2 mi)
W Sporn S, Landfill PL Opt, South 1 (0.2 mi)
W Sporn S, Landfill PL Opt, South 1, Rt62 (0.3 mi)
West Sporn South (3.7 mi)
Proposed Injection Well Site
Eastern Sporn Tract (400 ac)
Jordan Tract (195 ac)
AEP Landfill Property (28 ac)
Western Sporn Tract (70 ac)
KM 1
KM 2
KM 3
KM 4
KM 5
KM 6
KM 7
KM 8
KM 9
KM 10
KM 11
KM 12
KM 13
KM 14
KM 15
KM 16
KM 17
KM 18
KM 19
KM 20
KM 21
KM 22
KM 23
KM 24
KM 25
KM 26
KM 27
Mason County
Meigs County
Jackson County
OHIO RIVER
Ohio
West Virginia
Mason County
N
W
E
S
Miles
0
0.75
1.5
Source: http://www.mapwv.gov
Base Map: WV Orthophotos - SAMBA South, UTM NAD1983.
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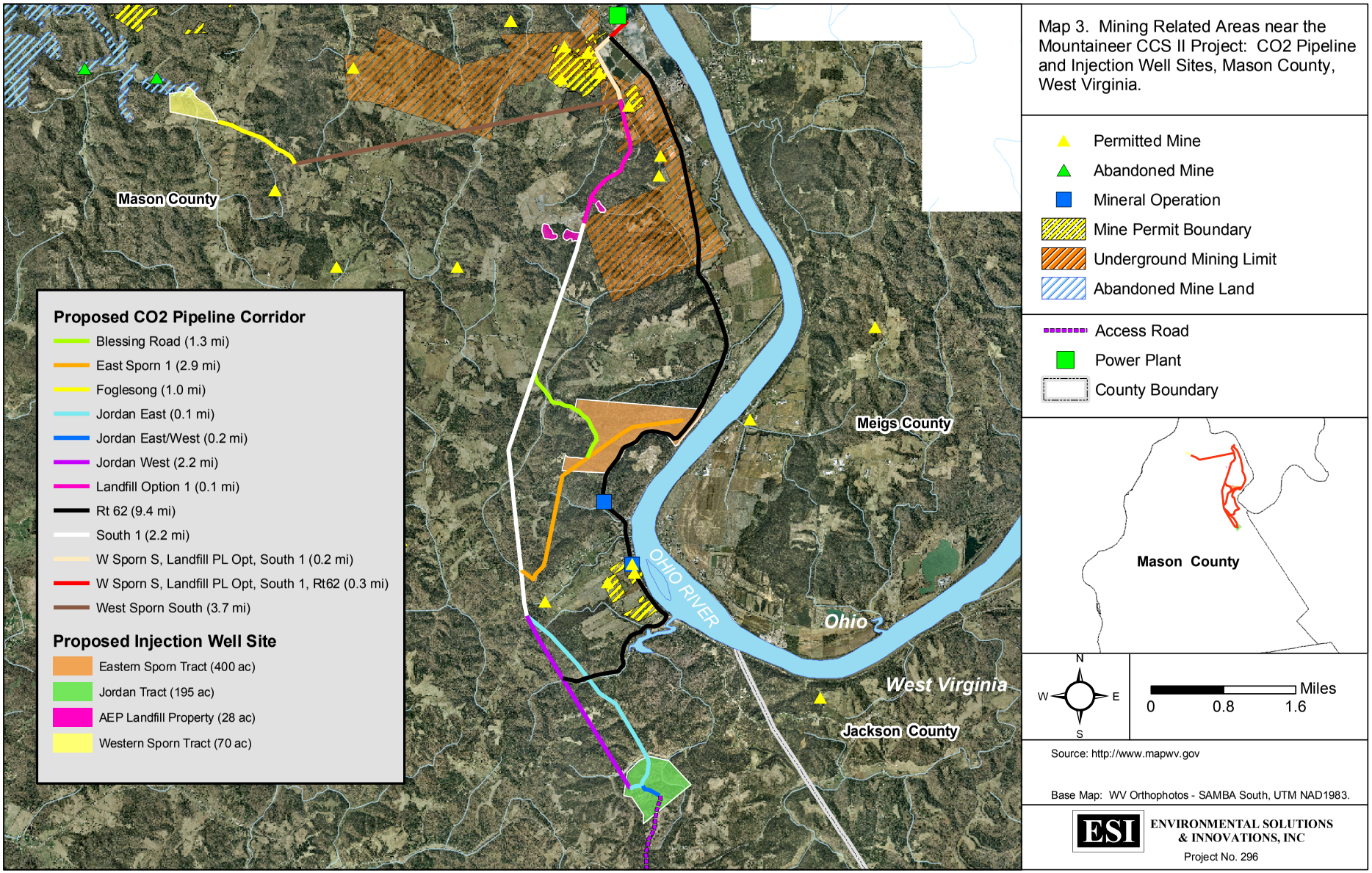
Project No. 296



Map 3. Mining Related Areas near the Mountaineer CCS II Project: CO2 Pipeline and Injection Well Sites, Mason County, West Virginia.

Source: http://www.mapwv.gov

Base Map: WV Orthophotos - SAMBA South, UTM NAD1983.

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APPENDIX B
SAMPLE DATA SHEETS

Property of: Environmental Solutions & Innovations, Inc.
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NET SITE HABITAT DESCRIPTION

Project #:_____ **Date:**_____ **Biologists:**_____

Project Name: _____ **Site Name/#:**_____

State:_____ **County:** _____ **USGS Quad:**_____

Camera #:_____ **Picture #s:**_____ **GPS Unit #:**_____ **Waypoint #:** ___

Latitude: _____°_____'_____"N **Longitude: _____°_____'_____"W**

Distance to closest water source (meters):_____ Type of water source:_____

Water source name:_____

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

_____

_____

_____

Estimated dbh range: Lg: ____ Sm: ____

Subdominant Canopy Species (< 40 cm/16" dbh)

_____

_____

_____

Estimated dbh range: Lg: ____ Sm: ____

Relative abundance of dominant vs. subdominant (ratio):_____

Estimated canopy closure: ___Closed ___Moderate ___Open

Roost tree potential consists of: ___Large Trees ___Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate ___Low

Roost potential comments: _____

Subcanopy clutter: ___Closed ___Moderate ___Open

Subcanopy comprised largely of: ___Lower Branches of Canopy Trees ___Saplings ___Shrubs

Common Subcanopy Species: _____ _____

_____

Habitat Description:_____

_____

Check all that apply:

__Mature Upland Forest __Recently Logged Forest __Crop/Pasture Land __Shrub/scrub Swamp
__Young Upland Forest __Pine Plantation __Stream/River __Vernal Pool
__Mature Lowland Forest __Woodlot/ForestEdge __Emergent Wetland __Deepwater Lake/Pond
__Young Lowland Forest __Old Field __Forested Swamp __Other _____

Herbaceous Cover: ___ Sparse ___Moderate ___Dense

NET SITE HABITAT DESCRIPTION (continued)

Project #:	State/County:	Site Name/#:	Initials:

SKETCH: NETS A and B

LEGEND	COMMENTS
Nets: ●——●	

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BAT CAPTURE DATA

Project #:_____ Date:_____

Project Name:_____

State:_____ County:_____

Biologists:_____

Site name/#:_____

GPS Unit #:_____ Camera #:_____

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA					
Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
		° ' "N	° ' "W					
		° ' "N	° ' "W					
		° ' "N	° ' "W					

Net Placement/Site Description:_____

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

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BAT CAPTURE DATA (continued)

Project #:_____ Date:_____

Project Name:_____ Site Name/#:_____ Initials:_____

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro. [2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample

Beaufort Wind Scale

Wind Speed (mph)	Description	Visible Condition
0	Calm	Smoke rises vertically
1-3	Light Air	Direction of wind shown by smoke but not by wind vanes
4-7	Light Breeze	Wind felt on face; leaves rustle; ordinary wind vane moved by wind
8-12	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag
13-18	Moderate Breeze	Raises dust and loose paper; small branches are moved
19-24	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets on inland water
25-31	Strong Breeze	Large branches in motion; telephone wires whistle; umbrellas used with difficulty
32-38	Moderate Gale	Whole trees in motion; inconvenience in walking against wind
39-46	Fresh Gale	Breaks twigs off trees; generally impedes progress

2010 Lunar Phases

New Moon	First Quarter	Full Moon	Last Quarter
Feb 13	Mar 23	Mar 29	Mar 7
Mar 15	Apr 21	Apr 28	Apr 6
Apr 14	May 20	May 27	May 5
May 13	Jun 18	Jun 26	Jun 4
Jun 12	Jul 18	Jul 25	Jul 4
Jul 11	Aug 16	Aug 24	Aug 2
Aug 9	Sep 15	Sep 23	Sep 1
Sep 8	Oct 14	Oct 22	Oct 30
Oct 7	Nov 13	Nov 21	Nov 28

Wing Index Key

Score	Description
0	No damage. Fewer than 5 small scar spots are present on the membranes.
1	Light damage. Less than 50% of flight membrane is depigmented (splotching), which is often visible only with translumination.
2	Moderate damage. Greater than 50% of wing membrane covered with scar tissue (splotching). Scarring is visible without translumination. Membrane exhibits some necrotic tissue and possibly few small holes (<0.5 cm diameter). Forearm skin may be flaking and discolored along the majority of the forearm.
3	Heavy damage. Deteriorated wing membrane and necrotic tissue. Isolated holes >0.5 cm are present in membranes. Necrotic or receding plagiopatagium and/or chiropatagium are evident.

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ROW HABITAT EXCLUSION

(Linear Corridor Study)

Project #:_____ **Date:**_____ **Biologists:**_____

Project Name: _____ **Picture #:** _____

State:_____ **County:** _____ **USGS Quad:**_____

Location of Excluded Section:

Eastern Terminus

Approximate Milepost: _____ and/or Landmark: _____

Latitude: _____°_____'_____"N Longitude: _____°_____'_____"W

Western Terminus

Approximate Milepost: _____ and/or Landmark: _____

Latitude: _____°_____'_____"N Longitude: _____°_____'_____"W

Approximate Length: _____

Reasons for Exclusion:

_____

_____

_____

Habitat Types: (*Check all that apply*)

__ Industrial / Commercial __ Recent Clearcut __ Open Agriculture
__ Residential __ Saplings only __ Meadow
__ Open Water / Lake __ Scrub / Shrub __ Mowed Grass
__ Large River __ Trees unsuitable as roosts __ Other _____

Estimated tree dbh range: Lg: ____ Sm: ____ Stream Present: ___ No ___Yes

Roost Tree Potential: ___ None ___Poor ___Moderate

Travel Corridor: ___ No ___Yes *IF YES, THEN* ___Riparian ___Upland

Revised 27 December 2007

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BAT TRANSMITTER DATA

Project #:_____ **Date:**_____ **Biologists:**_____

Project Name:_____ **Site Name/#:**_____

State:_____ **County:**_____ **Camera #:**_____

Picture #:_____

Bat Species:_____ **Capture Time:**_____

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)

Transmitter weight = _____ grams Frequency number:_____

Transmitter + bat total weight = _____ grams Band/color number:_____

FINAL CHECK:

1) Transmitter attachment (Y/N):_____
2) Signal receiving (frequency):_____
3) Band attachment (Y/N):_____
4) Condition of animal:_____
5) Description of release:_____

RELEASE TIME:_____ **TOTAL HOLD TIME:**_____**minutes**

RELEASE LOCATION:_____

COMMENTS:

_____

_____

_____

_____

_____

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FIXED TELEMETRY DATA

Project #:_____ **Date:**_____ **Biologists:**_____

Project Name:_____ **State:**_____ **County:**_____

USGS Quad:_____ **GPS Unit #:**_____ **Waypoint:** _____

Bat Species:_____

Transmitter Frequency:

Comments:

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments

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ROOST TREE DATA

Project #:_____ **Date:**_____ **Biologists:**_____

Project Name:_____ **State:**_____ **County:**_____

GPS Unit #:_____ **Waypoint:** _____ **Camera #:**_____ **Picture #:**_____

Latitude: _____°_____'_____"N **Longitude:** _____°_____'_____"W

Bat Species:_____ **Sex(M/F):**_____ **Age(Ad/Jv):**____ **Repro.:**_____

Capture Date:_____ **Capture Site:**_____

Frequency:_____ **Roost Name/#:**_____

ROOST TREE DATA

Roost tree species:_____ dbh:_____ cm

Estimated height from ground to roost:_____(meters)

Exfoliating bark (%):_____ Distance from capture site:_____m or km (circle one)

Tree health: __Live __Dead __Partial

Observed roost potential: __Exfoliating Bark __Cracks/crevasses __Hollow __Unknown

Bat vocalizations: __Yes __No

Guano on ground/foliage: __Yes __No

Is guano fresh (if present)?: __Yes __No

Guano volume (if present): _____

DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh)

_____

_____

_____

Estimated dbh range (cm): Lg: ____ Sm: ____

Subdominant Canopy Species (< 40 cm/16" dbh)

_____

_____

_____

Estimated dbh range (cm): Lg: ____ Sm: ____

Estimated canopy closure at roost: _____%

Slope: ___Steep ___Moderate ___Slight ___None Direction facing:_____

Subcanopy Clutter: ____Closed ____Moderate ____Open

Distance to nearest water source:_____m or km (circle one)

Distance to nearest flight corridor:_____meters

Habitat Description:_____

Check all that apply:

__Mature Upland Forest __Recently Logged Forest __Crop/Pasture Land __Shrub/scrub Swamp
__Young Upland Forest __Pine Plantation __Stream/River __Vernal Pool
__Mature Lowland Forest __Woodlot/ForestEdge __Emergent Wetland __Deepwater Lake/Pond
__Young Lowland Forest __Old Field __Forested Swamp __Other _____

Comments:

Revised May 2006

Property of: Environmental Solutions & Innovations, Inc.
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ROOST TREE DATA (continued)

State/County: _____ **Project Name/#:** _____ **Date:** _____

Frequency: _____ **Roost Name/#:** _____ **Initials:** _____

Sketch: Roost Tree Habitat

N

Comments: _____

_____

Stages of Decay:

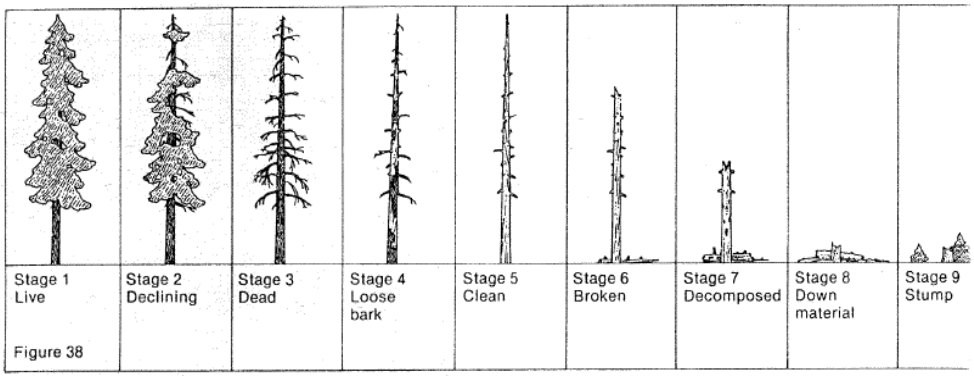

Figure 38

Sketch: Roost Tree

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

ROOST TREE EMERGENCE DATA

Project #:_____ **Date:**_____ **Biologists:**_____

Project Name:_____ **State:** _____ **County:**_____

GPS Unit #:_____ **Waypoint:**_____

Latitude: _____°_____'_____"N **Longitude:** _____°_____'_____"W

Roost Name/#:_____

Radio-tagged bat present in tree: Yes____ No____

Complete the following information only if a radio-tagged bat is present in the roost

Bat species:_____ **Sex(M/F):**_____ **Age(Ad/Jv):**_____ **Repro.:**_____

Capture date:_____ **Capture site:**_____ **Frequency:** _____

NOTE: Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: _____ Departure time: _____

Emergence Time	Number of Bats	Emergence Aspect

ROOST TREE EMERGENCE DATA (continued)

Project #:_____ **Project name:**_____
Frequency:_____ **Roost #:**_____

Emergence Time	Number of Bats	Emergence Aspect

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmittered bat(s) emerge? What direction did the transmittered bat fly?

_____
_____
_____

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MINE PORTAL DESCRIPTION

Project No: _____ **Project Name:** _____

Date: _____ **Biologists:** _____

State: _____ **County:** _____

Site Name/# _____ **No. of Portals:** _____

GPS: **Unit #:** _____ **Waypoint Name:** _____

Latitude: _____°_____'_____"N **Longitude:** _____°_____'_____"W

Camera #: _____ **Photo ID #s:** _____

Portal/opening	#1	#2	#3	#4
Diameter (height x width)				
Is opening vertical or horizontal (V or H)				
Is opening sloped (estimated degree of slope)				
Estimated length of portal				
Estimated internal dimensions (height x width)				
Entrance appears stable?				
Evidence of collapse?				
Ceiling condition stable?				
Amount of airflow (slight, moderate, heavy)				
Direction of airflow (in or out)				
Outside temperature				
Temperature at portal				
Evidence of past flooding?				
% Canopy closure at entrance				
Estimated distance to nearest water source				
Evidence of foraging (insect remains)?				
Presence of guano?				
Portal obstructed by vegetation?				
Portal obstructed by spider webs?				
Would use make bat susceptible to predation?				

Is portal recommended for bat survey? No___ Yes___ Why_____

_____

Comments: _____

_____

Please include site sketch on back when feasible.

APPENDIX B
USFWS WVFO REQUEST LETTER DATED 30 AUGUST 2010

ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

781 Neeb Road
Cincinnati, OH 45233
Phone: (513) 451-1777; Fax: (513) 451-3321

Pesi 296.03 30 August 2010

Ms. Barbara Douglas
U.S. Fish and Wildlife Service
West Virginia Field Office
Ecological Services
694 Beverly Pike
Elkins, West Virginia 26241

RE: AEP's Mountaineer CCS II Project, Mason County, West Virginia – Request for USFWS Approval to Install a Characterization Well at Borrow Area No. 1

Dear Ms. Douglas:

As you will recall, American Electric Power (AEP) and the U.S. Department of Energy (DOE), as lead Federal agency, propose to develop a carbon dioxide capture and storage (CCS) project at AEP's Mountaineer Power Plant in Mason County, West Virginia. In correspondence dated June 9, 2010, Environmental Solutions & Innovations, Inc. (ESI), on behalf of AEP, DOE, and Potomac-Hudson Engineering, Inc. (PHE), AEPs prime consultant, requested early coordination/informal consultation with U.S. Fish and Wildlife Service (USFWS) regarding threatened and endangered species or their critical habitat in the vicinity of the Project. That correspondence included "*Study Plan: Endangered Bat Studies for American Electric Power's Proposed Mountaineer CCS II Project: CO_2 Pipeline and Injection Well Sites, Mason County, West Virginia*." We subsequently completed the field studies and no endangered bats were found. We anticipate completion of a detailed report by October 2010 that will address all fieldwork completed in support of the Project. However, in advance of your review of that report, AEP is seeking your approval to install a geologic characterization well and an associated access road to a single location on one of AEP's existing properties.

Initially, AEP had identified four potential sites, all on AEP-owned properties, for the development of a geologic characterization well. AEP later determined that the preferred location for the well would be at the AEP Mountaineer Plant. An area identified as Borrow Area No. 1 was selected because the entire site is previously disturbed and biological values are essentially lacking, including habitat for the endangered Indiana bat and other listed species.

The purpose of this letter is to seek your approval to install a characterization well and an associated access road to Borrow Area 1 ("BA-1") located at the existing AEP Mountaineer Plant. Included below is a description of BA-1, and a summary of the field survey for endangered bats undertaken on and adjacent to BA-1. An additional Field Survey Report will be submitted in the near future for the entire project.

Description of Current Project Needs

Map 1 provides an overview of the project area, which also identifies the field mist net sampling sites. In the upper portion of the map, areas identified as mist net sampling areas KM9 and KM10 include three small areas that are colored deep pink. The western most of these three areas is labeled "Borrow Area 1." This small site is the area intended for placement of the characterization well, located within the property boundary of AEP's Little Broad Run Landfill. The landfill commenced operation with the inception of operations of the Mountaineer Plant in 1980. A maximum of 5 acres will be used for the geologic characterization well activities at the Borrow Area 1 site.

Borrow Area 1 is one of three borrow areas initially considered as a potential location for a characterization well. The other two borrow areas are no longer under consideration as potential characterization well sites. All three borrow areas and the proposed access road to Borrow Area 1 are shown on Map 2. Borrow Area 1 (as well as the other two areas) falls within the existing clay borrow pits that have been actively mined for clay to use in lining disposal cells within the landfill. Generally, this area consists of upland ridge finger landforms and steep slopes at elevations ranging from 700 to 840 ft. AMSL. The landscape has been heavily denuded of vegetation and modified by extraction and disposal activities. Existing vegetation on these previously disturbed areas consists mostly of short grasses and provides no suitable roosting habitat for the Indiana bat.

Summary of Field Efforts Completed to Date

A total of 28 sites, as Identified on Map 1, were netted. No endangered bats were caught. A total of 97 bats of 5 species were caught: 71 red bats, 21 big brown bats, 2 little brown bats, 2 tri-colored bats, and 1 hoary bat. This equates to 3.5 bats per net site and an average species richness of 1.2 species per net site.

At site KM10, which encompassed Borrow Area 1, the only captures were two red bats. At the two adjoining sites, KM 9 and KM 11, the only captures were three and one red bats, respectively. Surveys at site KM 10 were completed on August 4 - 5, 2010; and surveys on sites KM9 and KM 11 were completed on August 2 - 3 and on August 4 - 5, respectively.

In summary, no endangered bats were caught anywhere on lands to be used for the Project. In general, the rate of bat capture and species richness were low. Across the entire project, only two bats belonging to the genus *Myotis*, both little brown bats, were caught; no northern, Indiana, or small-footed bats were caught. The catch of tri-colored bats, another species that hibernates in caves during winter, was also low, and limited to two individuals.

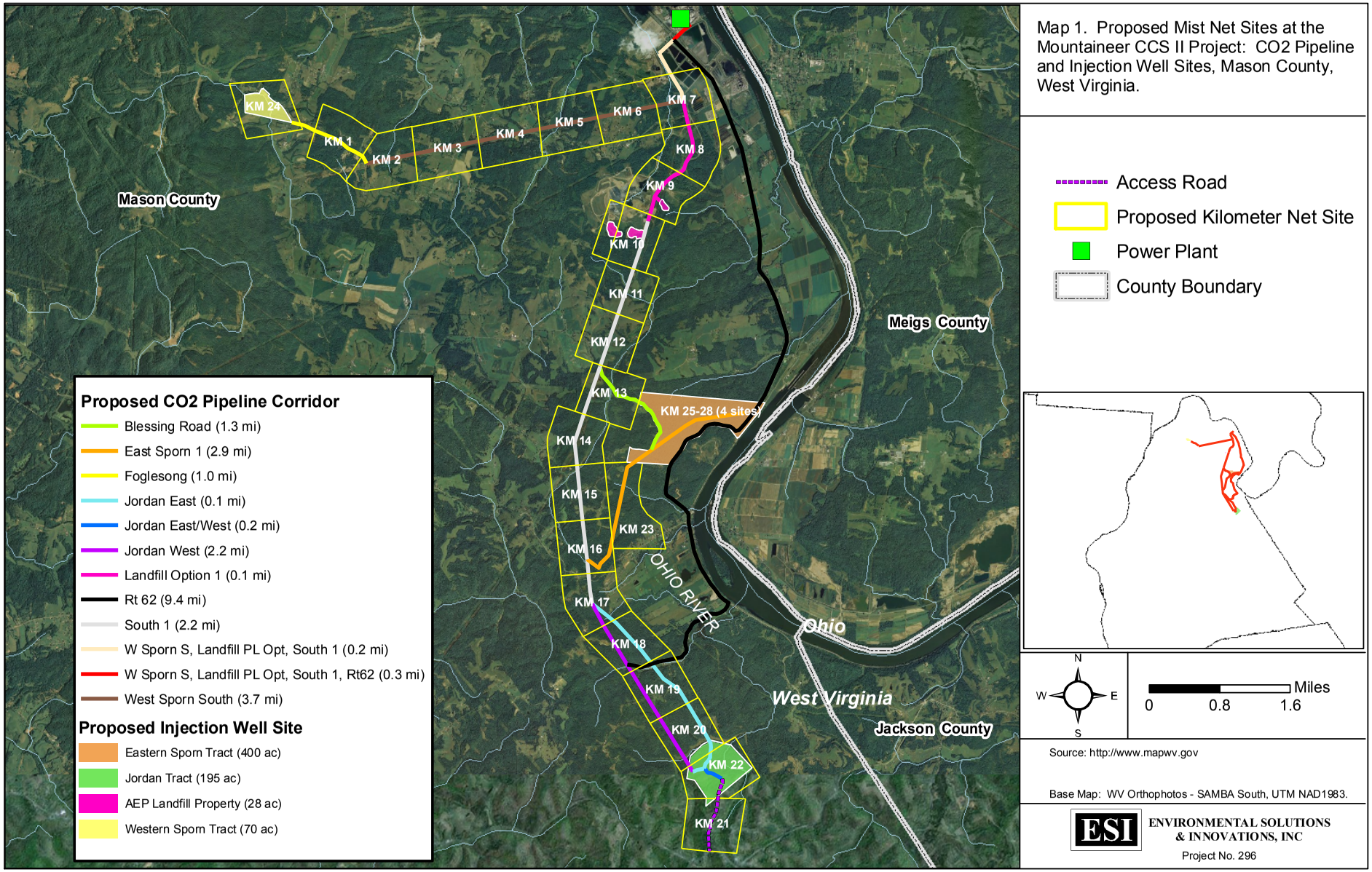
It is even arguable that the catch of big brown bats, which only sometimes hibernate in caves, was low, with an abundance of less than one-third of the catch of red bats, which it often exceeds. The community of bats at the mist net sites nearest Borrow Area 1 was depauperate and limited to a single species. The area required for the characterization well and access road has been heavily disturbed for 30 years, is a very small part of the overall project area, and provides no suitable roosting habitat for endangered bats. As such, AEP requests concurrence to proceed with installation of the characterization well at Borrow Area No. 1 prior to further ESA and NEPA consultation.

We look forward to your concurrence with this request for AEP to install the characterization well at the Borrow Area No. 1 location. If you have questions or require additional information, please contact me at (513) 451-1777, or Vbrack@EnvironmentalSI.com.

Sincerely,

Virgil Brack, Jr., Ph.D., MBA, Principal Scientist
Certified Wildlife Biologist, TWS
Certified Senior Ecologist, ESA
Email: VBrack@EnvironmentalSI.com

cc: B. Sargent, WVDNR
M. Lusk, DOE/NETL
M. McMillian, DOE/NETL
B. Whipple, PHE
F. Blake, AEP
J. Magalski, AEP
B. Sherrick, AEP



Map 1. Proposed Mist Net Sites at the Mountaineer CCS II Project: CO2 Pipeline and Injection Well Sites, Mason County, West Virginia.

Access Road
Proposed Kilometer Net Site
Power Plant
County Boundary

N
W E
S

Miles
0 0.8 1.6

Source: http://www.mapwv.gov

Base Map: WV Orthophotos - SAMBA South, UTM NAD1983.

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC
Project No. 296

Map 2. Aerial photograph of AEP Borrow Area 1, where the proposed characterizations well and associated access road are proposed to be sited.

Borrow Area Potential Injection Property

APPENDIX C
E-MAIL CONFIRMATION FROM USFWS AND WVDNR, DATED 8 SEPTEMBER AND 20 SEPTEMBER 2010

From: barbara_Douglas@fws.gov
Sent: Wednesday, September 08, 2010 4:16 PM
To: Virgil Brack
Subject: geologic characterization well - AEP Mason County, WV

Hi Virgil - I received your letter dated 30 August 2010 regarding the proposal to install a geologic characterization well and associated access road for AEP's Mountaineer CCS II project in an area of Mason County, West Virginia identified as Borrow Area 1 on the maps attached to your letter. This 5 acre area had been previously disturbed and is devoid of potential Indiana bat habitat. There should be no endangered species concerns regarding the construction of this portion of the project.
Thanks and give me a call if you have questions.
Barb

_____

Barbara Douglas
Senior Endangered Species Biologist
U. S. Fish and Wildlife Service
West Virginia Field Office
694 Beverly Pike
Elkins, WV 26241
Phone: 304-636-6586 x19
Fax: 304-636-7824

From: Barbara Sargent [mailto:barbarasargent@wvdnr.gov]
Sent: Monday, September 20, 2010 11:14 AM
To: Virgil Brack
Subject: RE: geologic characterization well - AEP Mason County, WV

Virgil—

I concur with the USFWS that this project will not impact rare, threatened or endangered species.

Barb

Barbara Sargent
WVDNR - Wildlife Resources Section
PO Box 67 - Ward Road
Elkins, WV 26241
304/637-0245 x 2048 (voice)
304/637-0250 (fax)
www.wvdnr.gov

"Speak when you are angry and you will make the best speech you will ever regret." ~ Ambrose Bierce

---

From: Virgil Brack [mailto:VBrack@environmentalsi.com]
Sent: Monday, September 20, 2010 10:22 AM
To: BarbaraSargent@wvdnr.gov
Subject: FW: geologic characterization well - AEP Mason County, WV

Barbara,

Thanks for taking the time to talk with me this morning about AEP's Mountaineer CCSII project. As you can see below, and as I mentioned in our conversation, USFWS was in agreement that proceeding with work for the characterization well in this small area would not present a threat for T&E species. For our project records, could you concur via return e-mail, with the statement below by USFWS.

Thanks

Virgil Brack, Jr., Ph.D., MBA
CEO and Principal Scientist
Environmental Solutions & Innovations Inc.
781 Neeb Road
Cincinnati, OH 45233
Office: 513-451-1777; Cell: 513-235-1076; Fax: 451-3321

From: barbara_Douglas@fws.gov [mailto:barbara_Douglas@fws.gov]
Sent: Wednesday, September 08, 2010 4:16 PM
To: Virgil Brack
Subject: geologic characterization well - AEP Mason County, WV

Hi Virgil - I received your letter dated 30 August 2010 regarding the proposal to install a geologic characterization well and associated access road for AEP's Mountaineer CCS II project in an area of Mason County, West Virginia identified as Borrow Area 1 on the maps attached to your letter. This 5 acre area had been previously disturbed and is devoid of potential Indiana bat habitat. There should be no endangered species concerns regarding the construction of this portion of the project.
Thanks and give me a call if you have questions.
Barb

_____
Barbara Douglas
Senior Endangered Species Biologist
U. S. Fish and Wildlife Service
West Virginia Field Office
694 Beverly Pike
Elkins, WV 26241
Phone: 304-636-6586 x19
Fax: 304-636-7824

APPENDIX D
COMPLETED DATA SHEETS

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Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 24 July 2010 **Biologists:** D. Jeffcott, C. Murphy

Project Name: AEP CO2 **Site Name/#:** KM1

State: WV **County:** Mason **USGS Quad:**

Camera #: 61 **Picture #s:** **GPS Unit #:** 6 **Waypoint #:** KM1A

Latitude: 38 ° 57 ' 25.8 "N **Longitude:** 82 ° 00 ' 45.0 "W

Distance to closest water source (meters): — Type of water source: —

Water source name: —

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: ____meters Channel Width: ____meters Stream Width: ____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): ____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Quercus alba

Acer Saccharum

Subdominant Canopy Species (< 40 cm/16" dbh)

Carya ovata

Quercus rubra

Estimated dbh range: Lg: 24 Sm: 16

Estimated dbh range: Lg: 15 Sm: 3

Relative abundance of dominant vs. subdominant (ratio):____

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees X Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: some dead pines with flaking bark

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees ___Saplings ___Shrubs

Common Subcanopy Species: ____

Habitat Description: Horse pasture with distinct browsing line and sparse vegetation in forest. Upland trees on hill where nets are placed.

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other ____

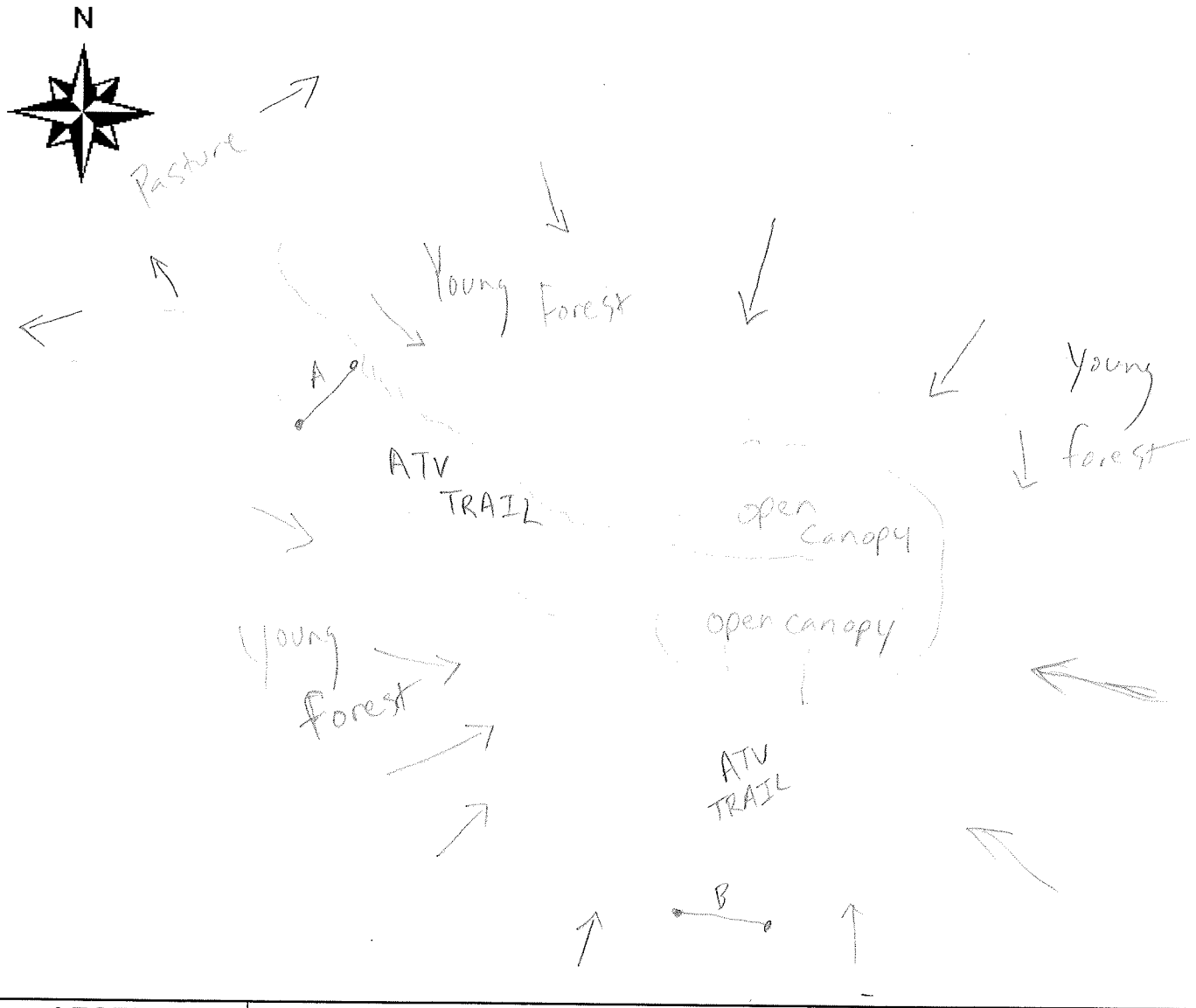
Herbaceous Cover: X Sparse ___Moderate ___Dense

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV/Mason	Site Name/#: KM1	Initials: CM

SKETCH: NETS A and B



LEGEND

Nets: ●——●

↗ = slope

COMMENTS

Not drawn to scale

Pasture and forest are sparsely vegetated in herbaceous layer.

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

2006?
Project #: 296 Date: 23 July 2010

Project Name: AEP CO2

State: WV County: Mason

Biologists: D. Seffcoth, C. Murphy

Site name/#: KM1

GPS Unit #: Camera #: 61

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
X Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	31.1	0	—	20%	
2100	28.5	0	—	20%	
2130	27.6	4-7	SW to NE	20%	—
2200	27.3	4-7	SW to NE	10%	gusting winds
2230	26.9	4-7	SW to NE	20%	—
2300	26.6	4-7	SW to NE	20%	—
2330	26.4	8-12	SW to NE	10%	—
0000	26.5	4-7	SW to NE	10%	—
0030	26.3	8-12	SW to NE	10%	—
0100	26.3	8-12	SW to NE	10%	—
0130	26.3	8-12	SW to NE	0%	—
0145	26.3	8-12	SW to NE		

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	MN	° ' "N	° ' "W	12	9	2030	0135	
B	MN	° ' "N	° ' "W	9	6	2045	0150	
		° ' "N	° ' "W					

Net Placement/Site Description: ___

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2105	Ad	F	PL	14.9	40	E	0	
2	B	Eptesicus fuscus	2230								ESCAPED Net

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 Date: 24 July 2010

Project Name: AEP CO2

State: WV County: Mason

Biologists: D. Stott, C. Murphy

Site name/#: KM1

GPS Unit #: _____ Camera #: 61

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
X Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	29.3	1-3		0	
2100	28.8	1-3		0	
2130	28.3	1-3	SW to NE	0	
2200	27.9	1-3	SW to NE	0	
2230	27.8	0	—	0	
2300	27.7	0	—	0	
2330	27.4	1-5	SW to NE	0	
0000	27.1	1-3	SW to NE	0	
0030	26.8	1-5	SW to NE	0	
0100	26.5	4-7	SW to NE	0	
0130	26.3	4-7	SW to NE	0	
0200	26.0	4-7	SW to NE	0	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 57 ' 25.8 "N	82 ° 00 ' 45.0 "W	12	9	2035	0150	
B	NN	38 ° 57 ' 24.1 "N	82 ° 00 ' 43.7 "W	9	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets over road connecting to open field

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2215	Ad	F	PL	14.2	38½	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 26 July 2010 **Biologists:** D. Jeffcott, C. Murphy

Project Name: AEP CO2 **Site Name/#:** KM2

State: WV **County:** Mason **USGS Quad:**

Camera #: 61 **Picture #s:** **GPS Unit #:** 6 **Waypoint #:**

Latitude: 38 ° 57 ' 12.5 "N **Longitude:** 82 ° 00 ' 08.7 "W

Distance to closest water source (meters): Type of water source:

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: meters Channel Width: meters Stream Width: meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): Average Water Depth: ____m or cm Clarity (H,M,L):

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Quercus rubra

Subdominant Canopy Species (< 40 cm/16" dbh)

Acer rubrum

Fraxinus americana

Quercus rubra

Estimated dbh range: Lg: 19" Sm: 16" Estimated dbh range: Lg: 16" Sm: 6"

Relative abundance of dominant vs. subdominant (ratio): 1:10

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees ___Snags ___Both X Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments:

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees ___Saplings ___Shrubs

Common Subcanopy Species: Acer rubrum

Habitat Description:

Check all that apply:

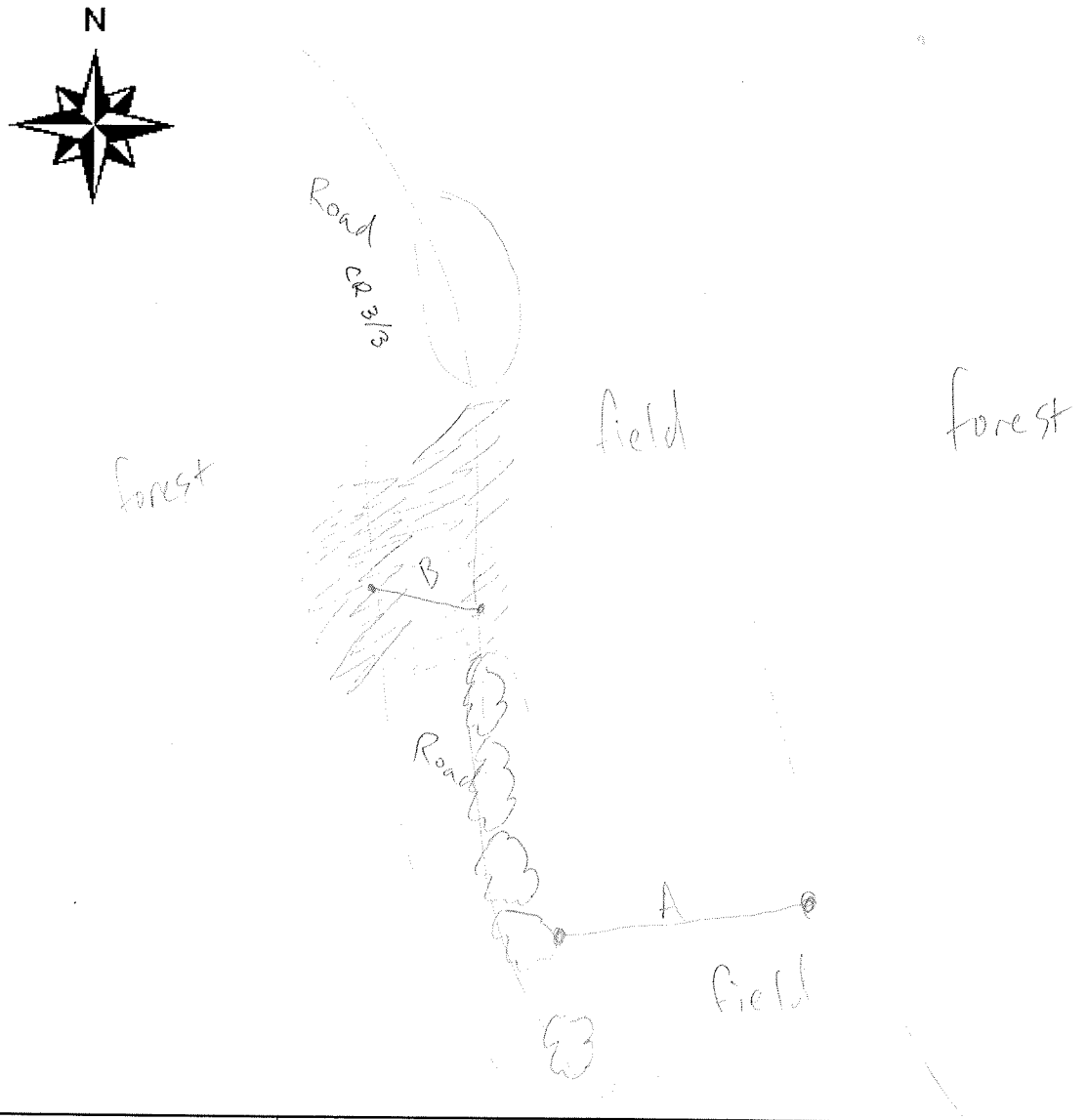
__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	X Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	X Old Field	__Forested Swamp	__Other

Herbaceous Cover: ___ Sparse ___Moderate X Dense

NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV/Mason	Site Name/#: KMZ	Initials: CM

SKETCH: NETS A and B



LEGEND

Nets:

Canopy cover =

shrubs =

trees =

COMMENTS

Not drawn to scale

grasses in field to a foot tall.

Nets placed to capture all bats flying through this wide area between forests.

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 **Date:** 25 July 2010

Project Name: AFP CO2

State: WV **County:** Mason

Biologists: D. Seffcott, C. Murphy

Site name/#: KM2

GPS Unit #: 6 **Camera #:** 61

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous X Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	24.6	0	—	100%	
2100	24.1	0	—	100%	
2130	23.6	0	—	50%	
2200	23.8	0	—	30%	
2230	23.4	0	—	30%	
2300	22.9	1-3	NW to SE	30%	
2330	23.3	1-3	NW to SE	30%	
0000	22.5	0	—	20%	
0030	22.6	4-7	NW to SE	60%	
0100	22.3	8-12	NW to SE	60%	gusty
0130	21.0	4-7	NW to SE	30%	
0145	21.0	4-7	NW to SE	30%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 57 ' 12.5 "N	82° 00 ' 08.7 "W	12	9	2030	0145	
B	NN	38° 57 ' 13.3 "N	82° 00 ' 09.4 "W	6	6	2040	0150	
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed in field w/ line of trees on both sides of net. B placed over road corridor w/ canopy

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO									
		BATS									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 **Date:** 26 July 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: D. Jeffcott, C. Murphy

Site name/#: KMZ

GPS Unit #: 6 **Camera #:** G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous _X_Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	21.5	0	—	30%	—
2100	20.8	0	—	30%	—
2180	20.8	0	—	10%	—
2200	20.4	1-3	NW to SE	10%	—
2230	20.3	1-3	NW to SE	10%	—
2300	18.9	0	—	0%	—
2330	18.7	1-3	SW to NE	0%	—
0000	18.7	0	—	0%	—
0030	18.5	1-3	NW to SE	0%	—
0100	17.7	0	—	10%	—
0130	18.0	0	—	10%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 57 ' 12.5 "N	82 ° 00 ' 08.7 "W	12	9	2030		
B	NN	38 ° 57 ' 13.3 "N	82 ° 00 ' 09.9 "W	6	6	2030		
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed in field with line of trees on both sides of net, B placed over road corridor w/ canopy cover.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Lasiurus borealis	2240	JV	F	NR	10.6	39	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 28 July 2010 **Biologists:** D. Jeffcott, C. Murphy

Project Name: AEP Co2 **Site Name/#:** KM3

State: WV **County:** Mason **USGS Quad:**

Camera #: 61 **Picture #s:** 7 **GPS Unit #:** 13 **Waypoint #:** 38

Latitude: 38 ° 57 ' 27.3 "N **Longitude:** 81 ° 59 ' 31.3 "W

Distance to closest water source (meters): Type of water source:

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: meters Channel Width: meters Stream Width: meters

Substratum: Bedrock Boulder Cobble Gravel Sand Silt/Clay

Still Water Present (Y/N): Average Water Depth: m or cm Clarity (H,M,L):

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Liriodendron tulipifera

Quercus alba

Fraxinus americana

Estimated dbh range: Lg: 22" Sm: 16"

Subdominant Canopy Species (< 40 cm/16" dbh)

Acer saccharum

Acer rubrum

Fraxinus americana

Estimated dbh range: Lg: 16" Sm: 6"

Relative abundance of dominant vs. subdominant (ratio): 1:7

Estimated canopy closure: Closed X Moderate Open

Roost tree potential consists of: X Large Trees X Snags Both Neither

Roost tree potential for the area is: High X Moderate Low

Roost potential comments: few flaky white oaks, some snags

Subcanopy clutter: Closed X Moderate Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings Shrubs

Common Subcanopy Species: Acer saccharum Acer rubrum

Habitat Description: Variable sized trees in a sloping forest with open canopy fields. Field is grass and makes good foraging area.

Check all that apply:

Mature Upland Forest	Recently Logged Forest	X Crop/Pasture Land	Shrub/scrub Swamp
Young Upland Forest	Pine Plantation	Stream/River	Vernal Pool
X Mature Lowland Forest	Woodlot/ForestEdge	Emergent Wetland	Deepwater Lake/Pond
X Young Lowland Forest	Old Field	Forested Swamp	Other

Herbaceous Cover: Sparse Moderate X Dense

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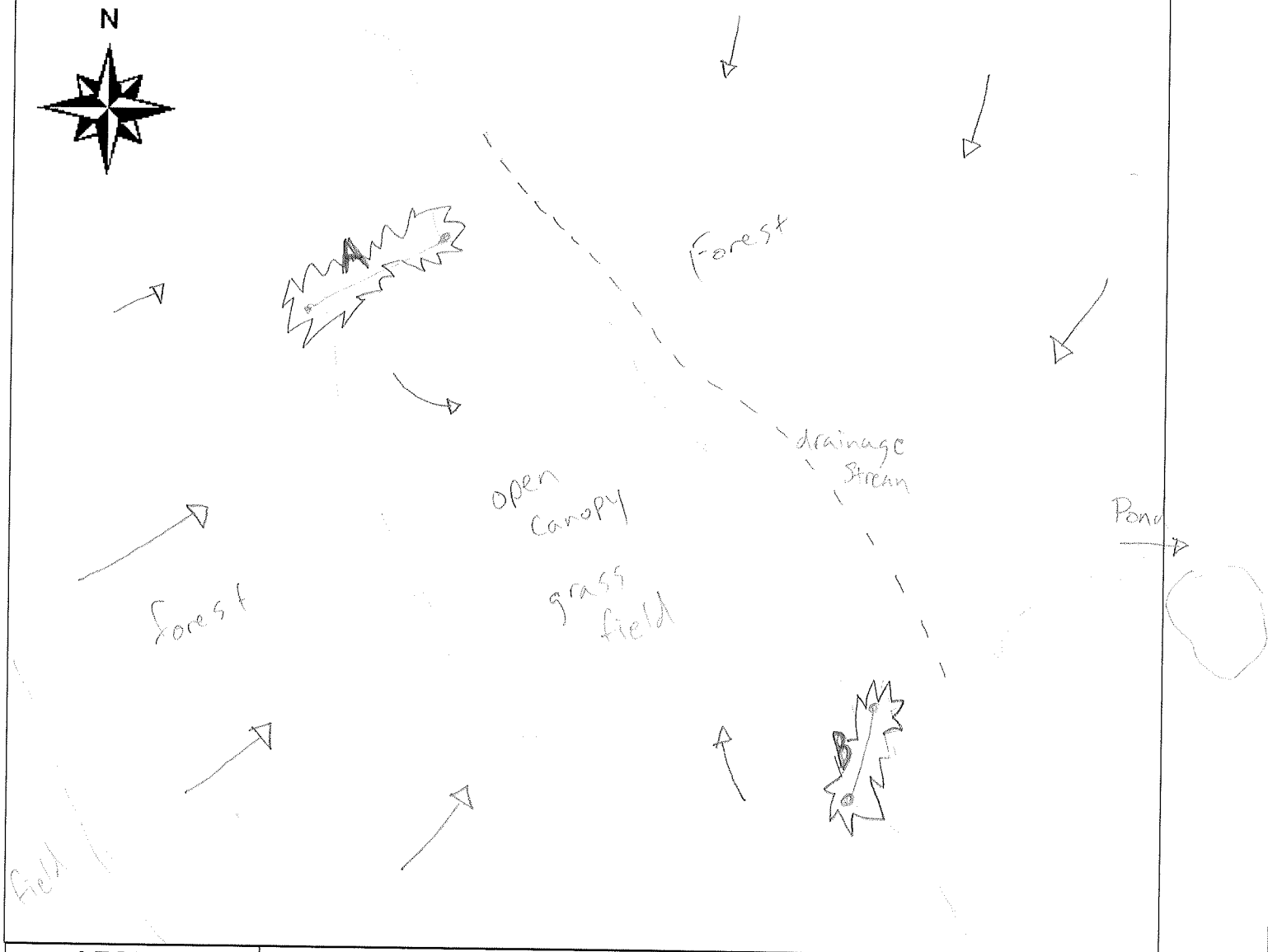
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV/Mason	Site Name/#: KM3	Initials: CM

SKETCH: NETS A and B



LEGEND

Nets: ●——●

drainage Stream - - -

Slope = →

canopy cover = ES

COMMENTS

Not drawn to scale

grass in field a foot long

ESI

BAT CAPTURE DATA

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

Project #: 296.03 Date: 27 July 2010

Project Name: AEP CO2

State: WV County: Mason

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM3

GPS Unit #: #13 Camera #: G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous X Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2130	22.4	0	—	20%	—
2200	22.0	0	—	10%	—
2230	21.6	0	—	10%	—
2300	21.4	1-3	S-N	10%	—
2330	21.5	0	—	10%	—
0000	21.3	0	—	10%	—
0030	21.1	0	—	30%	—
0100	20.9	0	—	20%	—
0145	20.4	0	—	20%	—

WPT

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
3A A	NN	38 ° 57 ' 28.3 "N	81 ° 59 ' 32.9 "W	12	9	2030	0130	
3B B	NN	38 ° 57 ' 27.3 "N	81 ° 59 ' 31.3 "W	9	6	2045	0145	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets placed in opening of forest. Corridors blocked by nets leading to open fields.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Eptesicus fuscus	2145	Ad	M	↑	15.4	45	M	0	
2	B	E. fuscus	2220	JV	F	NR	16.1	44	M	0	
3	B	E. fuscus	2245	JV	M	↑	15.5	46	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

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BAT CAPTURE DATA (continued)

Project #:_____ Date:_____

Project Name:_____ Site Name/#:_____ Initials:_____

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample

Beaufort Wind Scale

Wind Speed (mph)	Description	Visible Condition
0	Calm	Smoke rises vertically
1-3	Light Air	Direction of wind shown by smoke but not by wind vanes
4-7	Light Breeze	Wind felt on face; leaves rustle; ordinary wind vane moved by wind
8-12	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag
13-18	Moderate Breeze	Raises dust and loose paper; small branches are moved
19-24	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets on inland water
25-31	Strong Breeze	Large branches in motion; telephone wires whistle; umbrellas used with difficulty
32-38	Moderate Gale	Whole trees in motion; inconvenience in walking against wind
39-46	Fresh Gale	Breaks twigs off trees; generally impedes progress

2010 Lunar Phases

New Moon	First Quarter	Full Moon	Last Quarter
Feb 13	Mar 23	Mar 29	Mar 7
Mar 15	Apr 21	Apr 28	Apr 6
Apr 14	May 20	May 27	May 5
May 13	Jun 18	Jun 26	Jun 4
Jun 12	Jul 18	Jul 25	Jul 4
Jul 11	Aug 16	Aug 24	Aug 2
Aug 9	Sep 15	Sep 23	Sep 1
Sep 8	Oct 14	Oct 22	Oct 30
Oct 7	Nov 13	Nov 21	Nov 28

Wing Index Key

Score	Description
0	**No damage.** Fewer than 5 small scar spots are present on the membranes.
1	**Light damage.** Less than 50% of flight membrane is depigmented (splotching), which is often visible only with translumination.
2	**Moderate damage.** Greater than 50% of wing membrane covered with scar tissue (splotching). Scarring is visible without translumination. Membrane exhibits some necrotic tissue and possibly few small holes (<0.5 cm diameter). Forearm skin may be flaking and discolored along the majority of the forearm.
3	**Heavy damage.** Deteriorated wing membrane and necrotic tissue. Isolated holes >0.5 cm are present in membranes. Necrotic or receding plagiopatagium and/or chiropatagium are evident.

ESI

BAT CAPTURE DATA

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

Project #: 296.03 Date: 28 July 2010

Project Name: AEP CO2

State: WV County: Mason

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM3

GPS Unit #: 13 Camera #: G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon X Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2100	25.5	0	—	70%	—
2130	24.9	0	—	60%	—
2200	25.1	0	—	80%	—
2230	24.7	0	—	60%	—
2300	24.9	0	—	60%	—
2335	24.6	0	—	60%	—
0000	24.4	0	—	70%	—
0030	24.1	0	—	60%	—
0100	23.7	0	—	30%	—
0130	23.4	0	—	60%	—

WPT

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
3A A	NN	38 ° 57 ' 28.3 "N	81 ° 59 ' 32.9 "W	12	9	2030	0130	
3B B	NN	38 ° 57 ' 27.3 "N	81 ° 59 ' 31.3 "W	9	6	2030	0155	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets placed at edge of forest where open canopy field is. Corridors blocked by nets.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Eptesicus fuscus	2335								ESCAPED

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA (continued)

Project #:_____ Date:_____

Project Name:_____ Site Name/#:_____ Initials:_____

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample

Beaufort Wind Scale

Wind Speed (mph)	Description	Visible Condition
0	Calm	Smoke rises vertically
1-3	Light Air	Direction of wind shown by smoke but not by wind vanes
4-7	Light Breeze	Wind felt on face; leaves rustle; ordinary wind vane moved by wind
8-12	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag
13-18	Moderate Breeze	Raises dust and loose paper; small branches are moved
19-24	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets on inland water
25-31	Strong Breeze	Large branches in motion; telephone wires whistle; umbrellas used with difficulty
32-38	Moderate Gale	Whole trees in motion; inconvenience in walking against wind
39-46	Fresh Gale	Breaks twigs off trees; generally impedes progress

2010 Lunar Phases

New Moon	First Quarter	Full Moon	Last Quarter
Feb 13	Mar 23	Mar 29	Apr 6
Mar 15	Apr 21	Apr 28	May 5
Apr 14	May 20	May 27	Jun 4
May 13	Jun 18	Jun 26	Jul 4
Jun 12	Jul 18	Jul 25	Aug 2
Jul 11	Aug 16	Aug 24	Sep 1
Aug 9	Sep 15	Sep 23	Sept 30
Sep 8	Oct 14	Oct 22	Oct 30
Oct 7	Nov 13	Nov 21	Nov 28

Wing Index Key

Score	Description
0	**No damage.** Fewer than 5 small scar spots are present on the membranes.
1	**Light damage.** Less than 50% of flight membrane is depigmented (splotching), which is often visible only with translumination.
2	**Moderate damage.** Greater than 50% of wing membrane covered with scar tissue (splotching). Scarring is visible without translumination. Membrane exhibits some necrotic tissue and possibly few small holes (<0.5 cm diameter). Forearm skin may be flaking and discolored along the majority of the forearm.
3	**Heavy damage.** Deteriorated wing membrane and necrotic tissue. Isolated holes >0.5 cm are present in membranes. Necrotic or receding plagiopatagium and/or chiropatagium are evident.

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NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 07/28/10 (28 Jul x) **Biologists:** M. Little, T. Hern

Project Name: AEP CO_2 **Site Name/#:** KM4

State: WV **County:** Mason **USGS Quad:**

Camera #: ? **Picture #s:** 001, 002 **GPS Unit #:** **Waypoint #:**

Latitude: 38 ° 57 ' 34.5 "N **Longitude:** 81 ° 58 ' 26.6 "W

Distance to closest water source (meters): 150 Type of water source: Pond

Water source name: Unknown - private pond

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)
Quercus alba
Platanus occidentalis

Subdominant Canopy Species (< 40 cm/16" dbh)
Juglans nigra
Prunus serotina

Estimated dbh range: Lg: 70 Sm: 35

Estimated dbh range: Lg: 30 Sm: 7

Relative abundance of dominant vs. subdominant (ratio): 75:25

Estimated canopy closure: ___Closed ✓Moderate ___Open

Roost tree potential consists of: ✓Large Trees ✓Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ✓Moderate ___Low

Roost potential comments: _____

Subcanopy clutter: ✓Closed ___Moderate ___Open

Subcanopy comprised largely of: ___Lower Branches of Canopy Trees ___Saplings ✓Shrubs

Common Subcanopy Species: poison ivy

Habitat Description: Paved public single lane road with small/short corridor w/moderate canopy closure

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	✓Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
✓Mature Lowland Forest	✓Woodlot/ForestEdge	__Emergent Wetland	✓Deepwater Lake/Pond
✓Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

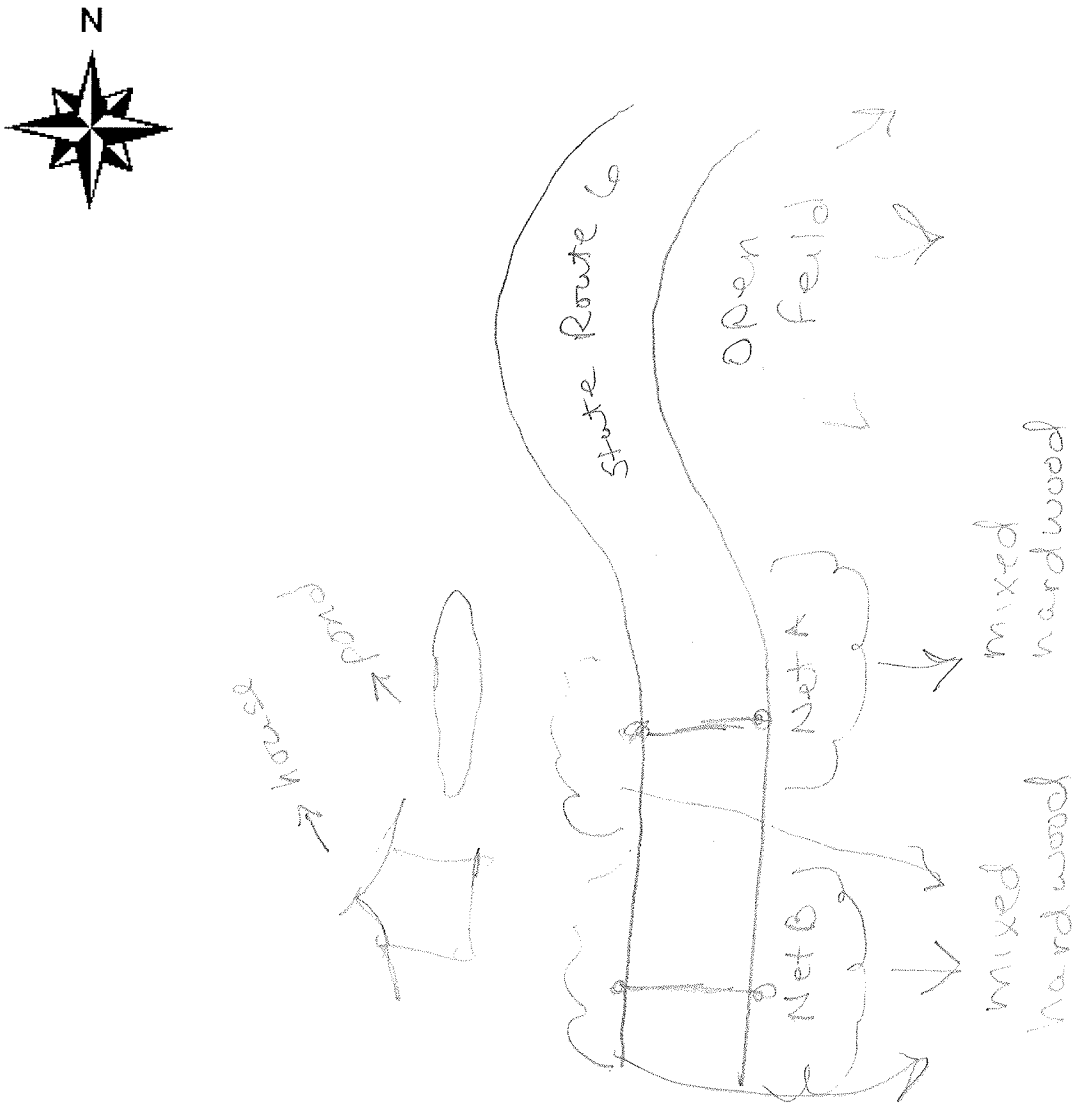
Herbaceous Cover: ___ Sparse ✓Moderate ___Dense

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV / Mason	Site Name/#:	Initials: ML

SKETCH: NETS A and B



LEGEND

Nets: ●——●

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 Date: 07/28/2010 (28 July)

Project Name: AEP CO2

State: WV County: Mason

Biologists: M. Little, T. Hern

Site name/#: KM 4

GPS Unit #: _____ Camera #: _____

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°F)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
20:30	90	0	—	0	
21:30	90	0	—	0	
22:30	86	0	—	50	
23:30	80	0	—	50	
00:30	80	0	—	50	
01:30	78	0	—	50	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 57 ' 34.5 "N	81° 58 ' 26.6 "W	6	6	2030	0130	0001
A	NN	38° 57 ' 34.1 "N	81° 58 ' 24.9 "W	6	6	2030	0130	0002
		° ' "N	° ' "W					

Net Placement/Site Description: Both nets on Rt. 6

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2149	Jv	F	NR	15g	40	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

29 July

Project #: 296.03 Date: 07/29/2010

Project Name: AEP CO2

State: WV County: Mason

Biologists: M. Cuttle, T. Hern

Site name/#: KM4

GPS Unit #: _____ Camera #: _____

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	70	0	—	0	
2130	75	0	—	0	
2230	69	0	—	0	
2330	65	0	—	0	
0030	62	0	—	0	
0130	62	0	—	0	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 57 ' 34.5 "N	081 ° 58 ' 26.6 "W	6	6	2030	2030	0001
B	NN	38 ° 57 ' 34.1 "N	081 ° 58 ' 24.8 "W	6	6	2030	2030	0002
		° ' "N	° ' "W					

Net Placement/Site Description: both nets on Rt 6

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2330	Jv	F	NR	14.5	41.0	M	0	
2	A	Myotis lucifugus	0015	Jv	F	NR	7.0	34.5	F	0	
3	A	Lasiurus borealis	0015	Jv	F	NR	15.0	38.0	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 30 July 2010 **Biologists:** D. Jeffcott, C. Murphy

Project Name: AEP CO_2 **Site Name/#:** KM5

State: WV **County:** Mason **USGS Quad:**

Camera #: G1 **Picture #s:** **GPS Unit #:** 13 **Waypoint #:** KM5A & B

Latitude: 38 ° 57 ' 45.5 "N **Longitude:** 81 ° 57 ' 38.2 "W

Distance to closest water source (meters): 10m from A, on B Type of water source: Ephemeral Stream

Water source name: Broad Run

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS) (NET B ONLY)

Bank Height: 2 meters Channel Width: 8-10 meters Stream Width: 5-6 meters

Substratum: X Bedrock ___ Boulder X Cobble X Gravel X Sand X Silt/Clay

Still Water Present (Y/N): Y Average Water Depth: 2 m or (cm) → DRY IN MOST AREAS Clarity (H,(M),L): M

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Quercus rubra	Juglans nigra
Quercus alba	Platinus occidentalis
Prunus serotina	Acer rubrum

Estimated dbh range: Lg: 24" Sm: 16" Estimated dbh range: Lg: 16" Sm: 4"

Relative abundance of dominant vs. subdominant (ratio): 1:7

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: X Large Trees X Snags ___Both ___ Neither

Roost tree potential for the area is: ___High X Moderate ___Low

Roost potential comments: Several white oaks w/ shaggy bark and a few snags

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees ___Saplings ___Shrubs

Common Subcanopy Species: Carpinus caroliniana Sassafras albidinum Acer rubrum

Habitat Description: Mature upland forest to East, uphill from nets. Younger trees along stream and closer to the road. Stream is mostly dry with some pools.

Check all that apply:

X Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	X Stream/River	__Vernal Pool
__Mature Lowland Forest	X Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
X Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

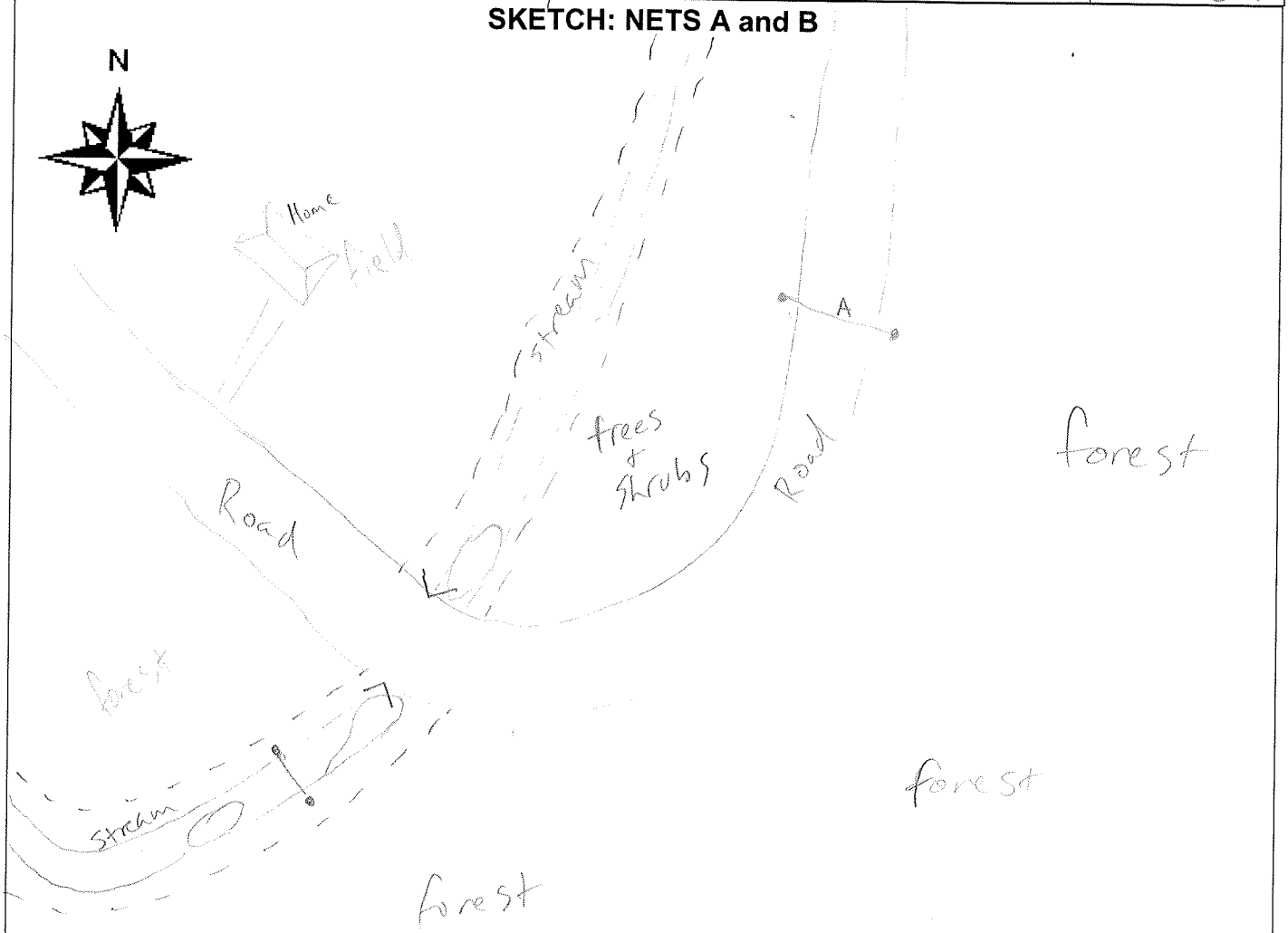
Herbaceous Cover: ___ Sparse ___Moderate X Dense

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION (continued)

Project #: 276.03	State/County: WV/Mason	Site Name/#: KM5	Initials: CM

SKETCH: NETS A and B



LEGEND

Nets: ●——●

bridge = > <

pools in stream =

Channel = = =

COMMENTS

NOT DRAWN TO SCALE

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 **Date:** 29 July 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM5

GPS Unit #: 13 **Camera #:** G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon X Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	23.3	0	—	—	—
2100	21.2	0	—	—	—
2130	20.6	0	—	0	—
2200	20.0	0	—	0	—
2230	19.5	0	—	0	—
2300	19.2	0	—	* 30%	—
2330	19.0	1-3	SW to NE	40%	—
0000	18.3	1-3	W to E	70%	—
0030	18.0	0	—	70%	—
0100	17.2	1-3	SW to NE	40%	—
0130	16.7	0	—	0%	—

WPT

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
KM5A A	NN	38 ° 57 ' 45.5 "N	81 ° 57 ' 38.2 "W	9	9	2030	0130	
KM5B B	NN	38 ° 57 ' 43.4 "N	81 ° 57 ' 40.6 "W	6	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed over road corridor w/ canopy cover, adjacent to creek. Net B placed over creek corridor.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Eptesicus fuscus	2125	JV	F	NR	16.7	44	E	0	
2	A	E. fuscus	2210	Ad	F	PL	19.8	46 1/2	M	1	
3	B	Myotis lucifugus	2235	Ad	M	↑	7.3	35	M	0	
4	A	E. fuscus	2340	—	—	—	—	—	—	—	ESCAPED
5	A	E. fuscus	2340	—	—	—	—	—	—	—	ESCAPED
6	A	E. fuscus	0015	JV	M	↑	14.7	44	M	0	
7	A	Lasiurus borealis	0015	—	—	—	—	—	—	—	ESCAPED
8	A	L. borealis	0015	—	—	—	—	—	—	—	ESCAPED
9	A	L. borealis	0100	JV	F	NR	10.9	39	M	0	
—	—	—	—	—	—	—	—	—	—	—	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

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BAT CAPTURE DATA

Project #: 296.03 **Date:** 30 July 2010
Project Name: AEP CO2
State: WV **County:** Mason
Biologists: D. Jeffcott, C. Murphy
Site name/#: KM5
GPS Unit #: 13 **Camera #:** G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon X Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	19.6	0	—	40%	—
2100	19.2	0	—	50%	—
2130	19.0	0	—	70%	—
2200	18.4	1-3	NW to SE	60%	—
2230	18.5	0	—	90%	—
2300	18.9	0	—	60%	—
2330	18.4	0	—	70%	—
0000	18.3	0	—	90%	—
0030	18.4	0	—	100%	—
0100	18.8	0	—	100%	—
0130	18.6	0	—	100%	—

WPT

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
KM5A A	NN	38 ° 57 ' 45.5 "N	81 ° 57 ' 38.2 "W	9	9	2030		
KM5B B	NN	38 ° 57 ' 43.4 "N	81 ° 57 ' 40.6 "W	6	6	2030		
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed over road corridor w/ canopy cover. Net B placed over creek corridor.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Eptesicus fuscus	2110	JV	M	↑	14.7	42½	M	0	
2	A	Lasiurus borealis	2220	—	F	—	—	—	—	—	ESCAPE
3	A	E. fuscus	2245	JV	M	↑	17.9	46	M	0	
4	A	L. borealis	2320	JV	F	NR	9.0	40½	M	0	
5	A	L. borealis	0015	—	—	—	—	—	—	—	ESCAPE
6	A	L. borealis	0015	JV	F	NR	9.3	36½	M	0	
7	A	L. borealis	0125	Ad	M	↓	9.5	37	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

ESI

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 07/30/10 (30 July) **Biologists:** M. Little, T. Hern

Project Name: AEP CO_2 **Site Name/#:** Km 6

State: WV **County:** Mason **USGS Quad:** ____

Camera #: 7 **Picture #s:** 0003, 0004 **GPS Unit #:** 13 **Waypoint #:**

Latitude: 38° 57' 33.4"N **Longitude:** 81° 56' 35.3"W

Distance to closest water source (meters): none Type of water source: —

Water source name: —

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: ____ meters Channel Width: ____ meters Stream Width: ____ meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): ____ Average Water Depth: ____m or cm Clarity (H,M,L): ____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Acer negundo	Acer negundo
	Crataegus sp.
Estimated dbh range: Lg: 15 Sm: 7	Estimated dbh range: Lg: 5 Sm: 3

Relative abundance of dominant vs. subdominant (ratio): 50:50

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees ___Snags ___Both X Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: ____

Subcanopy clutter: X Closed ___Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings X Shrubs

Common Subcanopy Species: Acer negundo

Habitat Description: Small trees along a dirt trail and very cluttered

Check all that apply:

- __Mature Upland Forest
- X Young Upland Forest
- __Mature Lowland Forest
- __Young Lowland Forest
- __Recently Logged Forest
- __Pine Plantation
- X Woodlot/ForestEdge
- __Old Field
- __Crop/Pasture Land
- __Stream/River
- __Emergent Wetland
- __Forested Swamp
- __Shrub/scrub Swamp
- __Vernal Pool
- __Deepwater Lake/Pond
- __Other ____

Herbaceous Cover: ___ Sparse X Moderate ___Dense

Revised June 2007

Property of: Environmental Solutions & Innovations, Inc.
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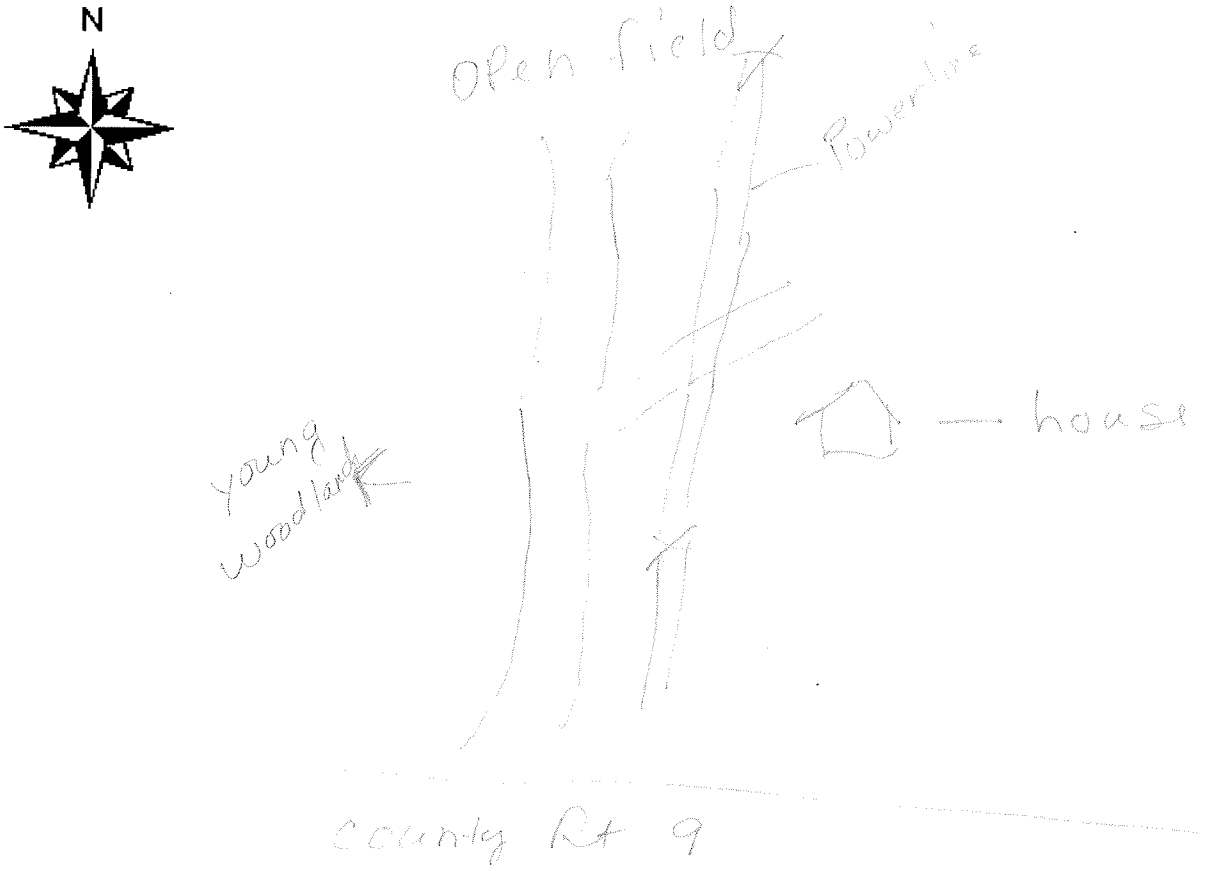
NET SITE HABITAT DESCRIPTION (continued)

Project #:	State/County:	Site Name/#:	Initials:

SKETCH: NETS A and B



LEGEND	COMMENTS
Nets: ●——●	

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BAT CAPTURE DATA

Project #: 296.03 Date: 30 July 2010

Project Name: AEP COR

State: KY County: Mason

Biologists: M. Gillie, T. Hern

Site name/#: KM6

GPS Unit #: 12 Camera #: ?

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	19.7	0	—	20	
2100	19.5	0	—	60	
2130	19.4	0	—	80	
2200	19.0	0	—	80	
2230	19.2	1-3	N→S	80	
2300	19.1	0		70	
2330	A.1	0		80	
0000	18.8	1-3	N→S	80	
0030	18.7	0		70	
0100	18.8	0		70	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 57 ' 33.4 "N	81 ° 56 ' 35.3 "W	6	6	2030		
B	NN	38° 57 ' 35.0 "N	81 ° 56 ' 35.8 "W	6	6	2030		
		° ' "N	° ' "W					

Net Placement/Site Description: _____

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO									
		BATS									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 Date: 31 July 2010

Project Name: AEP CUZ

State: WV County: Mason

Biologists: M. Little, T. Hem

Site name/#: KM6

GPS Unit #: 13 Camera #: ?

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
20:30	82	0	—	0	
21:30	80	0	—	0	
22:30	73	0	—	0	
23:30	70	0	—	0	
00:30	66	0	—	0	
01:00	66	0	—	0	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 57 ' 33.4 "N	081 ° 56 ' 35.3 "W	6	6	20:36	01:30	2003
B	NN	38 ° 57 ' 35.0 "N	081 ° 56 ' 35.8 "W	6	6	20:30	01:30	2004
		° ' "N	° ' "W					

Net Placement/Site Description: nets placed across dirt path on powerline ROW

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 01 August 2010 **Biologists:** D. Jeffcott, C. Murphy

Project Name: AEP CO2 **Site Name/#:** KM7

State: WV **County:** Mason **USGS Quad:**

Camera #: 61 **Picture #s:** **GPS Unit #:** A13 **Waypoint #:**

Latitude: 38 ° 57 ' 42.8 "N **Longitude:** 81 ° 56 ' 17.1 "W

Distance to closest water source (meters): 20m from A Type of water source: wetland

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Platanus occidentalis

Pinus virginiana

Subdominant Canopy Species (< 40 cm/16" dbh)

Acer rubrum

Fagus grandifolia

Acer saccharum

Estimated dbh range: Lg: 22" Sm: 16"

Estimated dbh range: Lg: 16" Sm: 5"

Relative abundance of dominant vs. subdominant (ratio): 1:12

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees X Snags ___Both ___ Neither

Roost tree potential for the area is: ___High X Moderate ___Low

Roost potential comments: lots of snags in wetland

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: ___Lower Branches of Canopy Trees X Saplings ___Shrubs

Common Subcanopy Species: Acer negundo Robinia pseudoacacia Ulmus rubra

Habitat Description: Young forest surrounds wetland with many snags. Wetland has open canopy with water present.

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	X Emergent Wetland	__Deepwater Lake/Pond
X Young Lowland Forest	X Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: ___ Sparse X Moderate ___Dense

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NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV / Mason	Site Name/#: KM 7	Initials: CAJ

SKETCH: NETS A and B

LEGEND

Nets: ●——●

wetland = X

COMMENTS

Not drawn to scale

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 **Date:** 31 July 2010
Project Name: AEP CO_2
State: WV **County:** Mason
Biologists: D. Jeffcott, C. Murphy
Site name/#: KM7
GPS Unit #: 13 **Camera #:** GI

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon X Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	19.7	0	—	20%	—
2100	19.5	0	—	60%	—
2130	19.4	0	—	80%	—
2200	19.0	0	—	90%	—
2230	19.2	1-3	N to S	80%	—
2300	19.1	0	—	70%	—
2330	19.1	0	—	80%	—
0000	18.8	1-3	N to S	50%	—
0030	18.9	0	—	70%	—
0100	18.3	0	—	50%	—
0130	18.1	0	—	50%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 57 ' 42.8 "N	81 ° 56 ' 17.1 "W	12	9	2030	0130	
B	NN	38° 57 ' 41.6 "N	81 ° 56 ' 17.9 "W	6	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed in corridor leading to wetland surrounded by forest. Net B placed in corridor of forest

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2130	JV	M	↑	9.8	37	E	0	
2	A	Lasiurus borealis	2145	Ad	m	↓	12.5	38	E	0	
3	A	Lasiurus borealis	2145	Jv	m	↑	9.7	38	E	0	
4	A	Lasiurus borealis	2145	Jv	M	↑	10.0	37.5	M	0	
5	A	Perimyotis subflavus	2220	JV	M	↑	5.5	32	M	0	
6	A	Lasiurus borealis	2253	Jv	F	NR	9.9	39.5	E	0	
7	A	L. borealis	2310	JV	M	↑	10.3	38.5	M	0	
8	A	L. borealis	2345	Ad	M	↓	9.9	39	M	0	
9	A	L. borealis	2345	Ad	M	↓	10.7	37	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 29.03 Date: 01 Aug 2010

Project Name: AEP Co.

State: WV County: Mason

Biologists: J. Jeffcoat, C. Murphy

Site name/#: KM7

GPS Unit #: A13 Camera #: 61

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
___Waxing crescent
___Full moon
___Waning crescent
___First quarter
X Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	23.4	0	—	10%	
2100	23.0	0	—	10%	
2130	22.1	0	—	10%	
2200	21.4	0	—	10%	
2230	20.8	0	—	10%	
2300	20.5	0	—	30%	
2330	20.2	0	—	30%	
0000	20.3	0	—	60%	
0030	20.4	0	—	50%	
0100	20.7	1-3	S to N	60%	
0130	20.2	0	—	40%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 57 ' 42.8 "N	81 ° 56 ' 17.1 "W	12	9	2030	0135	
B	NN	38 ° 57 ' 41.6 "N	81 ° 56 ' 17.9 "W	6	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed in corridor lead up to wetland surrounded by forest, Net B in corridor of forest

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Eptesicus fuscus	2150	JV	F	NR	17.1	41	M	0	
2	A	E. fuscus	2210	Ad	F	NR	15.8	41	M	0	
3	A	E. fuscus	2210	JV	F	NR	19.5	46	M	0	
4	A	Lasiurus borealis	2305	JV	F	NR	10.9	37½	M	0	
5	A	L. borealis	2330	JV	F	NR	11.8	40	M	0	
6	B	L. borealis	0055	Ad	M	↓	12.1	37½	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 1 Aug 08/01/10 **Biologists:** M. Luttle / T. Hern

Project Name: AEP CO2 **Site Name/#:** KM 8

State: WV **County:** Mason **USGS Quad:**

Camera #: **Picture #s:** 005, 006 **GPS Unit #:** 13 **Waypoint #:**

Latitude: 38 ° 57 ' 19.8 "N **Longitude:** 81 ° 55 ' 51.5 "W

Distance to closest water source (meters): N/A Type of water source: N/A

Water source name: N/A

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Robinia pseudoacacia

Fraxinus americana

Subdominant Canopy Species (< 40 cm/16" dbh)

Robinia pseudoacacia

Fraxinus americana

Estimated dbh range: Lg: 15 Sm: 10

Estimated dbh range: Lg: 7 Sm: 5

Relative abundance of dominant vs. subdominant (ratio): 50/50

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees ___Snags ___Both X Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: _____

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings X Shrubs

Common Subcanopy Species: Robinia pseudoacacia

Habitat Description: Young upland woodlot on hill next to an old water tower

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: X Sparse ___Moderate ___Dense

Property of: Environmental Solutions & Innovations, Inc.
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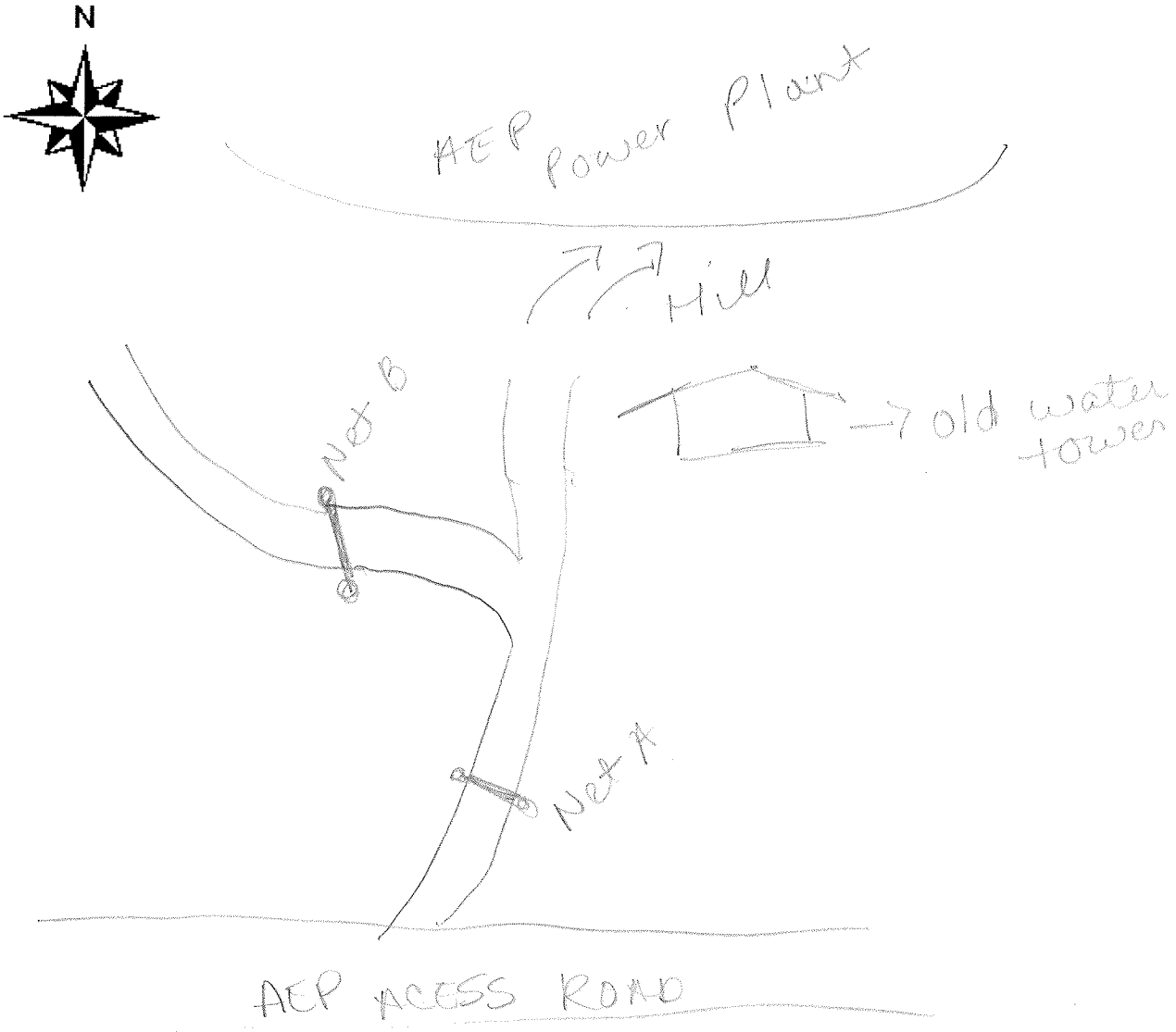
NET SITE HABITAT DESCRIPTION (continued)

Project #:	State/County:	Site Name/#:	Initials:

SKETCH: NETS A and B



LEGEND

Nets: ●——●

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 Date: 1 Aug 08/01/2010

Project Name: AEP CO2

State: WV County: Mason

Biologists: M. Little, T. Hern

Site name/#: KMB

GPS Unit #: 13 Camera #: 2

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	21	0	—	10	
2100	21	0	—	10	
2130	21	0	—	0	
2200	19.7	0	—	0	
2230	19.2	0	—	0	
2300	19.2	0	—	0	
0000	19.1	0	—	0	
0030	19.1	0	—	0	
0100	19.2	0	—	0	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 57 ' 19.8 "N	81° 55 ' 51.5 "W	9	6	2030	0130	005
B	NN	38° 57 ' 20.6 "N	81° 55 ' 49.4 "W	6	6	2030	0127	006
		° ' "N	° ' "W					

Net Placement/Site Description: Dirt path on AEP property - upland

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
B	1	Lasiurus borealis	2145	Ad	F	NR	15.5	41 mm	M	0	
A	2	Eptesicus Fuscus	2245	Ad	F	NR	19.5	44 mm	F	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

3 Aug

Project #: 296.03 Date: 08/03/10

Project Name: NCP CO2

State: WV County: Mason

Biologists: M. Little, T. Hern

Site name/#: KMB

GPS Unit #: 13 Camera #:

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	22	0	—	100	
2100	23	0	—	100	
2130	20	0	—	100	
2200	19	0	—	100	
2230	20	0	—	100	
2300	20	0	—	100	
0000	20	0	—	100	
0030	19	0	—	70	
0100	19	0	—	90	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 57 ' 19.8 "N	81° 55 ' 51.5 "W	9	6	2030	0130	005
B	NN	38° 57 ' 20.6 "N	81° 55 ' 49.4 "W	6	6	2030	0130	006
		° ' "N	° ' "W					

Net Placement/Site Description: Upland woodlot w/two track dirt road

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	E. fuscus	2245	Ad	F	NR	21.5	46	E	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 3 August 2010 **Biologists:** D. Jeffcott, C. Murphy

Project Name: AEP CO2 **Site Name/#:** KM9

State: WV **County:** Mason **USGS Quad:**

Camera #: G2 **Picture #s:** **GPS Unit #:** A13 **Waypoint #:** KM9A

Latitude: 38 ° 56 ' 22.3 "N **Longitude:** 81 ° 56 ' 41.3 "W

Distance to closest water source (meters): Type of water source:

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: meters Channel Width: meters Stream Width: meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): Average Water Depth: m or cm Clarity (H,M,L):

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Pinus virginiana

Subdominant Canopy Species (< 40 cm/16" dbh)

Quercus rubra

Quercus montana

Acer rubrum

Estimated dbh range: Lg: 45cm Sm: 42cm

Estimated dbh range: Lg: 39cm Sm: 10cm

Relative abundance of dominant vs. subdominant (ratio): 1:100

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees X Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments:

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings ___Shrubs

Common Subcanopy Species: Acer saccharum Acer rubrum Quercus montana

Habitat Description: young upland forest w/ low diversity of trees and few bigger trees, Slope downward to W and E of site.

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other

Herbaceous Cover: ___ Sparse ___Moderate ___Dense

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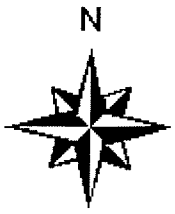
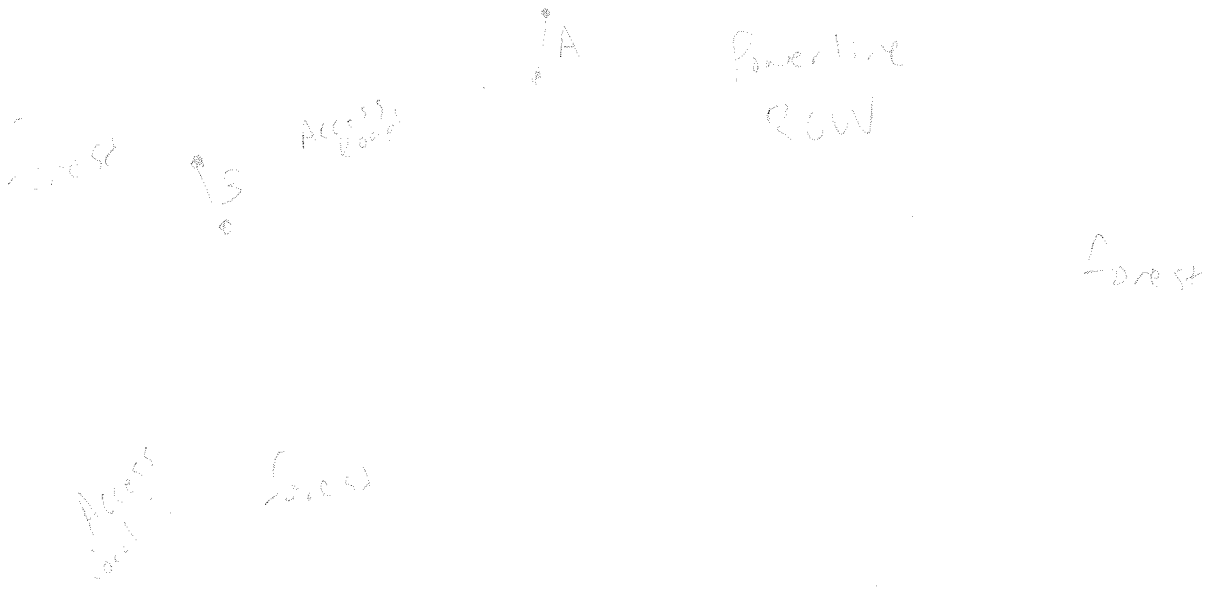
NET SITE HABITAT DESCRIPTION (continued)

Project #:	State/County:	Site Name/#:	Initials:
29.07	NW / Mason	KMS	JM

SKETCH: NETS A and B





LEGEND	COMMENTS
Nets: ●——●	Not drawn to scale

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 **Date:** 02 Aug 2010

Project Name: AEP CO$_2$

State: WV **County:** Mason

Biologists: D. Jeffcott, T. Hern

Site name/#: KM 9

GPS Unit #: AT3 **Camera #:** G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
X Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	26.3	0	—	50%	
2100	25.7	0	—	50%	
2130	24.6	0	—	50%	
2200	24.4	0	—	50%	
2230	24.1	0	—	50%	
2300	23.6	0	—	—	
2330	23.6	0	—	—	
0000	23.6	0	—	—	
0030	23.5	0	—	—	
0100	23.5	0	—	—	
0130	22.9	0	—	—	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 56 ' 22.3 "N	81 ° 56 ' 41.3 "W	9	6	2030	0135	
B	NN	38 ° 56 ' 21.8 "N	81 ° 56 ' 44.2 "W	9	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets placed in access road corridor leading to Powerline ROW.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Lasiurus borealis	2105	Ad	M	↓	9.5	36.5	E	0	
2	A	Eptesicus fuscus	2156	Ad	F	NR	19.5	45.5	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 Date: 3 August 2010

Project Name: AEP CO2

State: WV County: MASON

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM9

GPS Unit #: A13 Camera #: G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
X Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	28.2	0	—	100%	—
2100	27.8	0	—	100%	—
2130	27.7	0	—	100%	—
2200	27.4	0	—	100%	—
2230	27.1	0	—	100%	—
2300	26.6	0	—	100%	—
2330	25.5	0	—	100%	—
0000	25.3	0	—	100%	—
0030	25.3	0	—	100%	—
0100	25.0	0	—	30%	—
0130	24.9	0	—	30%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 56 ' 22.3 "N	81 ° 56 ' 41.3 "W	9	6	2030	0135	
B	NN	38 ° 56 ' 21.8 "N	81 ° 56 ' 44.2 "W	6	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets placed in access road corridor leading to powerline ROW.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Lasiurus borealis	0000								+ Scraped from net
2	A	Lasiurus borealis	0030								+ Scraped from net

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

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NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 05 August 2010 **Biologists:** D. Jeffcott, C. Murphy

Project Name: AEP CO2 **Site Name/#:** KM10

State: WV **County:** MASON **USGS Quad:**

Camera #: G1 **Picture #s:** **GPS Unit #:** A13 **Waypoint #:** KM10A

Latitude: 38 °56 ' 13.2 "N **Longitude:** 81 °56 ' 47.2 "W

Distance to closest water source (meters): Type of water source:

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: meters Channel Width: meters Stream Width: meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): Average Water Depth: m or cm Clarity (H,M,L):

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)
Acer rubrum

Subdominant Canopy Species (< 40 cm/16" dbh)
Acer saccharum
Quercus rubra
Pinus virginiana

Estimated dbh range: Lg: 45+ Sm: 4+

Estimated dbh range: Lg: 39+ Sm: 12+

Relative abundance of dominant vs. subdominant (ratio): 1:100

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees X Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments:

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings ___Shrubs

Common Subcanopy Species: Acer rubrum Acer saccharum

Habitat Description: Young upland forest. Few big trees. Wetland area is near open field at ROW leading downhill E and W.

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other

Herbaceous Cover: ___ Sparse ___Moderate X Dense

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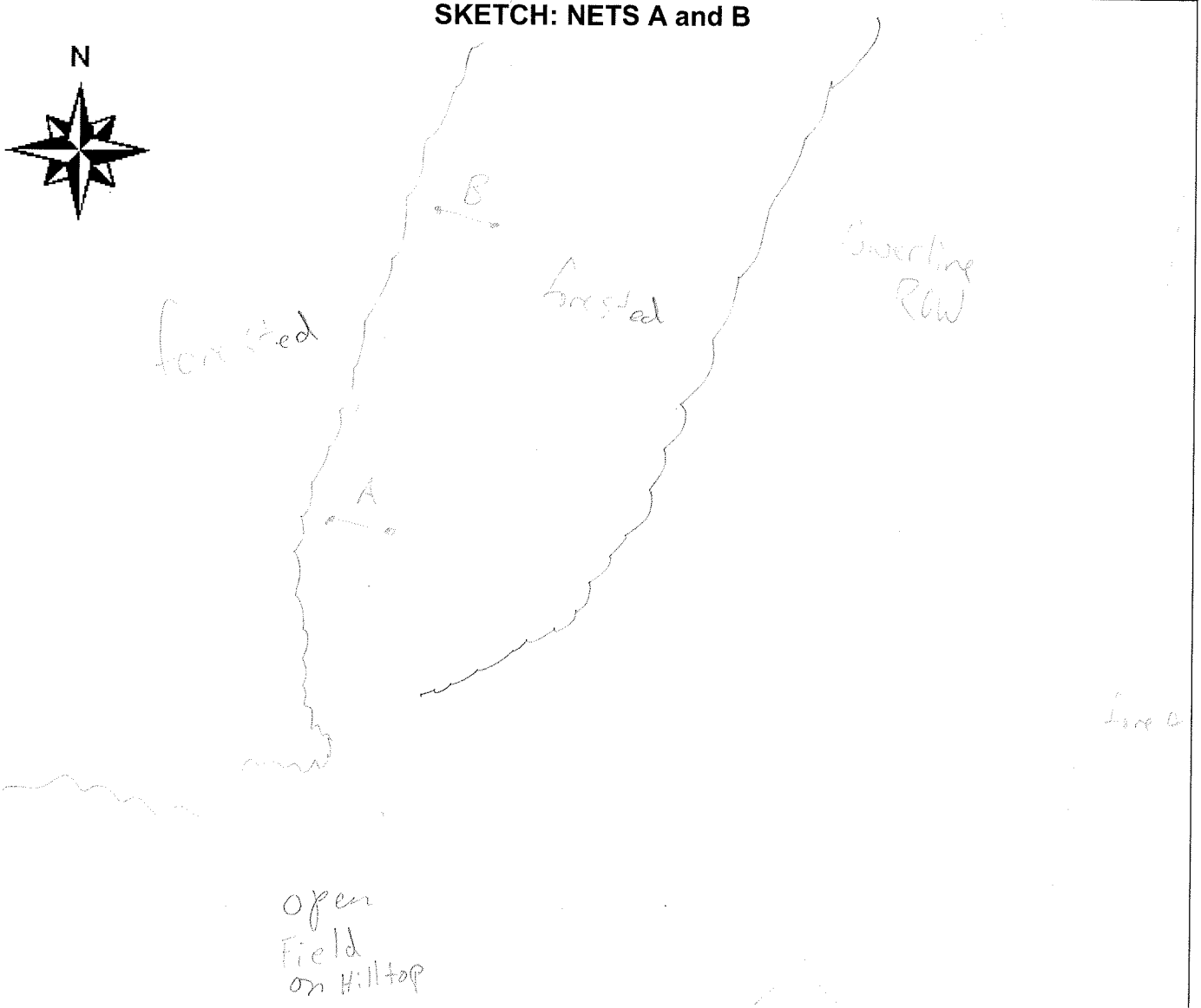
NET SITE HABITAT DESCRIPTION (continued)

Project #: 19.03	State/County: WV/MASON	Site Name/#: KM10	Initials: CM

SKETCH: NETS A and B



LEGEND	COMMENTS
Nets: ●——●	Not drawn to Scale

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 **Date:** 4 Aug 2010

Project Name: AEP CO.

State: WV **County:** MASON

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM10

GPS Unit #: A13 **Camera #:** G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
X Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2045	22.8	1-3	NE to SW	60%	
2115	22.7	4-7	S to N	70%	
2145	22.4	4-7	SW to NE	40%	
2215	22.3	4-7	SW to NE	30%	
2245	22.4	1-3	SW to NE	30%	
2315	22.0	1-3	SW to NE	30%	
2345	22.2	1-3	SW to NE	0%	
0030	22.1	1-3	SW to NE	90%	
0100	22.3	13-18	W to E	100%	
0130	21.8	1-3	SW to NE	100%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 56 ' 13.2 "N	81 ° 56 ' 47.2 "W	9	6	2035	2135	
B	NN	38 ° 56 ' 14.7 "N	81 ° 56 ' 47.2 "W	6	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets placed in access road corridor adjacent to powerline ROW.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2110								ESCAPED from net
2	A	L. borealis	0105	JV	M	↑	9.3	39	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

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BAT CAPTURE DATA

Project #: 296.03 Date: 05 August 2010

Project Name: AEP CO2

State: WV County: MASON

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM 10

GPS Unit #: A13 Camera #: G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
X Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2100	24.1	0	—	10%	—
2130	23.8	0	—	0%	—
2200	23.6	0	—	0%	—
2230	23.5	0	—	0%	—
2300	23.5	0	—	5%	
2330	23.4	1-3	W to E	0%	
0000	23.3	0	—	0%	
0030	23.1	1-3	W to E	10%	
0100	23.0	1-3	W to E	0%	
0130	22.7	1-3	W to E	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 56 ' 13.2 "N	81 ° 56 ' 47.2 "W	9	6	2030	0130	
B	NN	38 ° 56 ' 14.7 "N	81 ° 56 ' 47.2 "W	9	6	2030	0135	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets placed in access road corridor ending at ROW for powerline

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NC									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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NET SITE HABITAT DESCRIPTION

4 Aug

Project #: 296.03 **Date:** 08/04/10 **Biologists:** M. Little, T. Hern

Project Name: NEP CO2 **Site Name/#:** KMH

State: WV **County:** Mason **USGS Quad:**

Camera #: **Picture #s:** 007/008 **GPS Unit #:** 13 **Waypoint #:**

Latitude: 38 ° 56 ' 00.8 "N **Longitude:** 81 ° 56 ' 48.3 "W

Distance to closest water source (meters): N/A Type of water source:

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: _____m or cm Clarity (H,M,L):_____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Robinia pseudoacacia

Quercus alba

Subdominant Canopy Species (< 40 cm/16" dbh)

Robinia pseudoacacia

Estimated dbh range: Lg: 10 Sm: 7

Estimated dbh range: Lg: 5 Sm: 3

Relative abundance of dominant vs. subdominant (ratio): 50:50

Estimated canopy closure: ___Closed __X__Moderate ___Open

Roost tree potential consists of: ___Large Trees ___Snags ___Both __X__ Neither

Roost tree potential for the area is: ___High ___Moderate __X__ Low

Roost potential comments:

Subcanopy clutter: ___Closed __X__Moderate ___Open

Subcanopy comprised largely of: ___Lower Branches of Canopy Trees __X__Saplings __X__Shrubs

Common Subcanopy Species: (Elm spp.)

Habitat Description: Narrow grass path lined with young trees adjacent to pasture

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__X__Crop/Pasture Land	__Shrub/scrub Swamp
__X__Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: ___ Sparse __X__Moderate ___Dense

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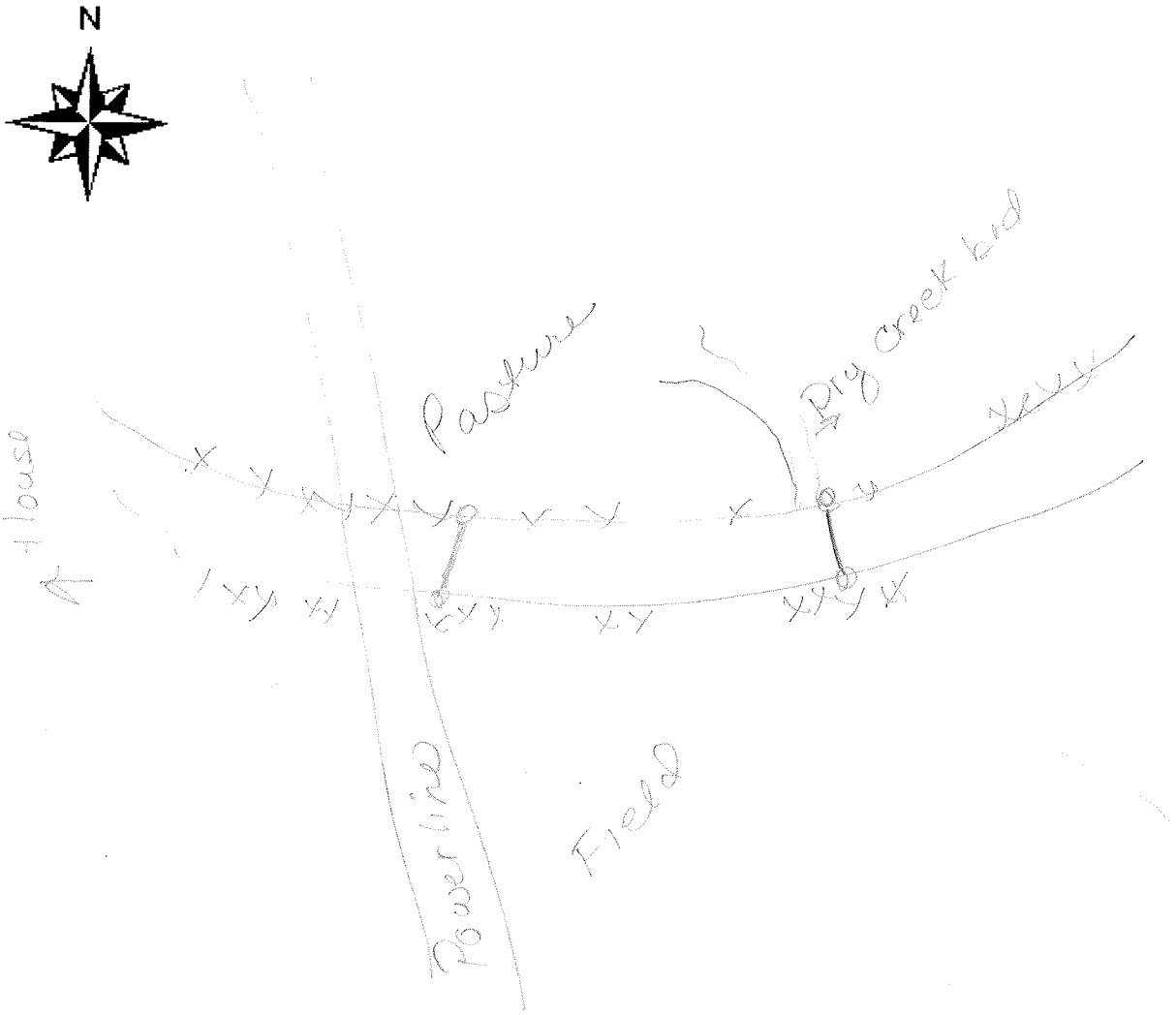
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV/Mason	Site Name/#: KM 11	Initials: MC

SKETCH: NETS A and B



LEGEND	COMMENTS
Nets: ●——●	

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 Date: 4 Aug 08/04/10

Project Name: AEP CO2

State: WV County: Mason

Biologists: M. Little, T. Hern

Site name/#: Kmill

GPS Unit #: 13 Camera #:

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	21	0	—	70	
2100	20	0	—	100	
2130	19.5	0	—	100	
2200	19.5	1-3	N-S	80	
2300	19	0	—	50	
2330	19	0	—	50	
2000	19	30	N-S	80	
0030	19	30	N-S	100	
0100	19	15	N-S	100	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 56 ' 00.8 "N	81 ° 56 ' 48.3 "W	2.6	6	2030	0130	007
B	NN	38 ° 56 ' 02.5 "N	81 ° 56 ' 49.8 "W	6	6	2030	0130	008
		° ' "N	° ' "W					

Net Placement/Site Description: Grassy trail underneath powerlines adjacent to open fields

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Lasiurus borealis	2245	Jv	F	NR	11.5	41 mm	E	0	007/008

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 Date: 08/05/10

Project Name: ACP COn

State: WV County: MASON

Biologists: M. L. Hile, T. Hern

Site name/#: KM H

GPS Unit #: 13 Camera #: _____

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	21	0	—	10	
2100	21	0	—	10	
2130	21	0	—	10	
2200	19.5	0	—	0	
2230	19.5	0	—	0	
2300	19.1	0	—	0	
2330	19.0	0	—	0	
0000	19.0	0	—	0	
0030	19.0	0	—	0	
0100	19.0	0	—	0	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 56' 60.8 "N	81° 56' 49.3 "W	2.6	6	2130	0130	
B	NN	38° 56' 62.5 "N	81° 56' 49.8 "W	6	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Grassy trail underneath powerlines adjacent to open field

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample

NO BATS

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.04 **Date:** 11 August 2010 **Biologists:** D. Jeffcott, C. Murphy
Project Name: AEP - CO_2 **Site Name/#:** KM24
State: WV **County:** MASON **USGS Quad:**
Camera #: 61 **Picture #s:** **GPS Unit #:** A13 **Waypoint #:** KM24A
Latitude: 38 ° 57 ' 44.6 "N **Longitude:** 82 ° 01 ' 22.1 "W
Distance to closest water source (meters): under B 1m from A Type of water source: ephemeral stream
Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: 1 meters Channel Width: 4-7 meters Stream Width: 3-4 meters
Substratum: ___Bedrock ___Boulder X Cobble X Gravel ___Sand X Silt/Clay
Still Water Present (Y/N): Y Average Water Depth: 4 m or (cm) Clarity (H,M,L): L

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)
Platinus occidentalis
Acer negundo

Subdominant Canopy Species (< 40 cm/16" dbh)
Juglans nigra
Acer saccharum
Liquidambar styraciflua

Estimated dbh range: Lg: 55cm Sm: 40cm
Estimated dbh range: Lg: 39cm Sm: 15cm
Relative abundance of dominant vs. subdominant (ratio): 1:10

Estimated canopy closure: ___Closed X Moderate ___Open
Roost tree potential consists of: ___Large Trees ___Snags ___Both X Neither
Roost tree potential for the area is: ___High ___Moderate X Low
Roost potential comments:

Subcanopy clutter: ___Closed X Moderate ___Open
Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings ___Shrubs
Common Subcanopy Species: Aesculus flava

Habitat Description: old non-maintained pipeline ROW paralleling small ephemeral stream w/ multiple areas of standing water

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	X Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
X Young Lowland Forest	__Old Field	__Forested Swamp	__Other

Herbaceous Cover: ___ Sparse X Moderate ___Dense

Property of: Environmental Solutions & Innovations, Inc.
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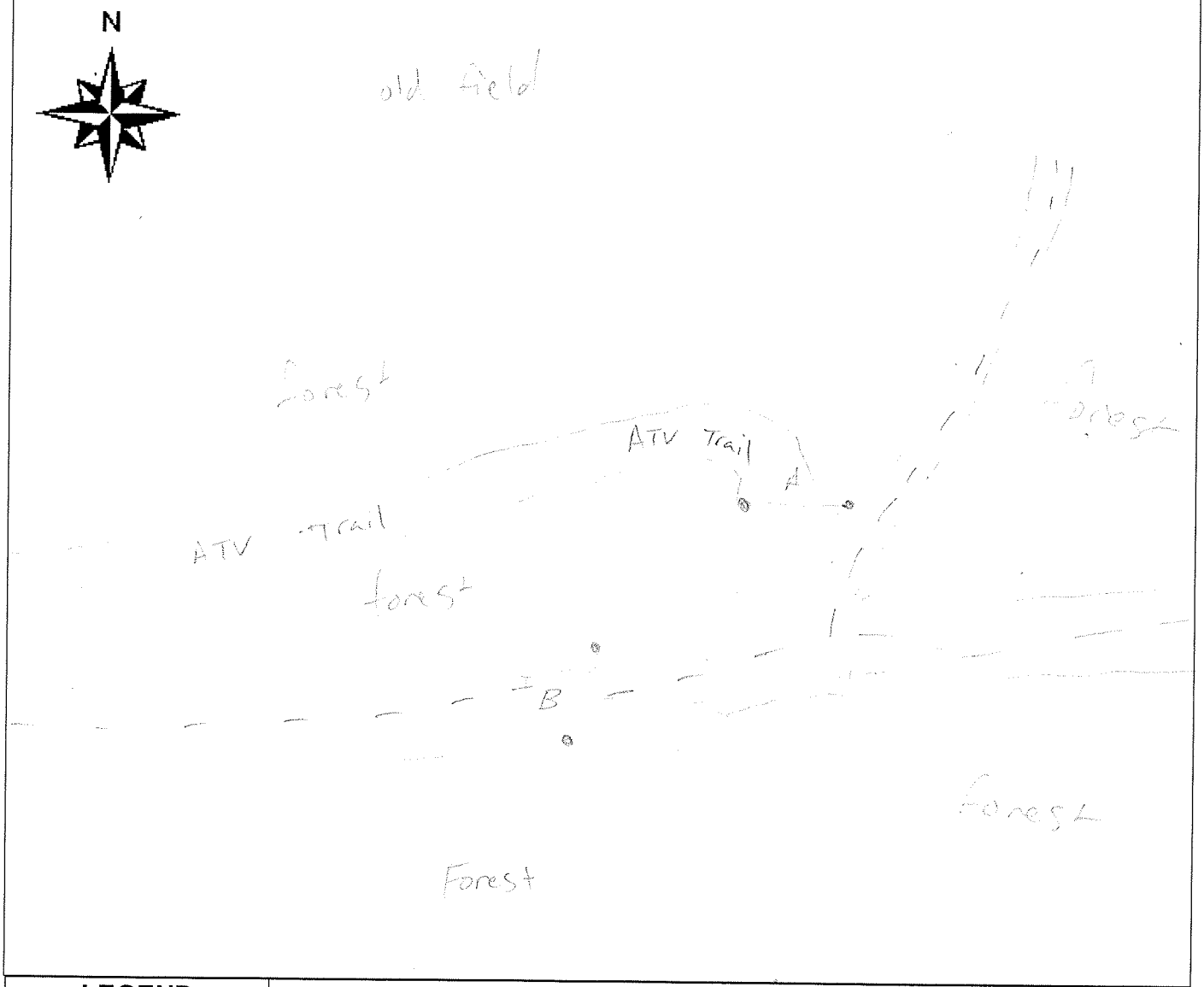
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.04	State/County: WV/MASON	Site Name/#: KMEA	Initials: CM

SKETCH: NETS A and B



LEGEND

Nets: ●——●

ephemeral Stream = - - - -

Channel = ——

COMMENTS

Forest to S is more mature than that of N.

NE part of forest is more open understory

Flow is usually low, due to heavy rain on 11 August, streams are high with low clarity.

Not drawn to scale

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.04 **Date:** 10 August 2010
Project Name: AEP - CO2
State: WV **County:** MASON
Biologists: D. Jeffcott, C. Murphy
Site name/#: KM 24
GPS Unit #: A13 **Camera #:** G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	25.9	0	—	10%	—
2100	25.1	0	—	10%	—
2130	24.6	0	—	0%	—
2200	24.1	0	—	0%	—
2230	23.6	0	—	0%	—
2300	23.3	0	—	0%	—
2330	22.9	1-3	SW to NE	0%	—
0000	22.8	0	—	0%	—
0030	22.4	1-3	SW to NE	0%	—
0100	22.4	1-3	SW to NE	0%	—
0130	22.4	0	—	0%	—

WPT

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
KM24A A	NN	38 ° 57 ' 44.6 "N	82 ° 01 ' 22.1 "W	6	6	2045	0145	
KM24B B	NN	38 ° 57 ' 45.6 "N	82 ° 01 ' 22.9 "W	6	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed in corridor between forested area near stream and old field. Net B placed over stream in forest.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO CAPTURES									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

ESI

BAT CAPTURE DATA

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

Project #: 296.04 **Date:** 11 August 2010

Project Name: AEP CO_2

State: WV **County:** Mason

Biologists: D. Seffcott, C. Murphy

Site name/#: km 24

GPS Unit #: A13 **Camera #:** 61

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	22.9	0	—	80%	Hard rain from 4:00 PM to 7:00 PM
2100	22.5	0	—	80%	
2130	21.9	0	—	70%	
2200	21.6	0	—	10%	
2230	22.9	0	—	0%	FOG
2300	20.9	0	—	0%	FOG
		FOG OUT			

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
WPT KM24A	NN	38 ° 57 ' 44.6 "N	80 ° 01 ' 22.1 "W	9	6	2030	2330	
KM24B	NN	38 ° 57 ' 45.6 "N	80 ° 01 ' 22.9 "W	6	6	2030	2335	
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed in corridor between forested area near stream and old field. Net B placed over stream in forest

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO CAPTURES									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

ESI

BAT CAPTURE DATA

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

Project #: 296.04 **Date:** 12 August 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM24

GPS Unit #: A13 **Camera #:** 61

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
X Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	23.3	0	—	0	
2100	22.6	0	—	—	
2130	22.1	0	—	0	
2200	21.8	1-3	SW to NE	0	
2230	21.4	0	—	0	
2300	21.3	0	—	0	
2330	21.4	1-3	SW to NE	0	
0000	21.3	1-3	SW to NE	0	
0030	20.7	0	—	0	
0100	20.4	0	—	0	
0150	19.9	0	—	0	

Net/Trap/Anabat #	Net/Trap Type¹	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 57' 44.6"N	82° 01' 22.1"W	9	6	2030	0130	
B	NN	38° 57' 45.6"N	82° 01' 22.9"W	6	6	2030	0145	
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed in corridor between forest [illegible] near stream and old field. Net B placed over stream in forest.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.²	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Perimyotis subflavus	2110	Ad	F	PL	6.0	34½	M	0	
2	B	Myotis lucifugus	2345	Ad	M	↓	7.3	35	M	0	

¹ M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

² Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

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Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.04 **Date:** 12 Aug 2010 **Biologists:** M. Michaels + S. Reeves

Project Name: AEP CO2 **Site Name/#:** km 25

State: WV **County:** Mason **USGS Quad:**

Camera #: kz760 **Picture #s:** 5833-5836 **GPS Unit #:** A4 **Waypoint #:** km25-28

Latitude: 38 ° 54 ' 21.4 "N **Longitude:** 81 ° 56 ' 30.2 "W

Distance to closest water source (meters): 1,300 m Type of water source: River

Water source name: Ohio River

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS): N/A

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)
Quercus alba
Quercus velutina

Subdominant Canopy Species (< 40 cm/16" dbh)
Quercus montana
Ulmus americana
Acer rubrum

Estimated dbh range: Lg: 80 Sm: 40 Estimated dbh range: Lg: 39 Sm: 10

Relative abundance of dominant vs. subdominant (ratio): 1:50

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: X Large Trees ___Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: _____

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: ___Lower Branches of Canopy Trees X Saplings ___Shrubs

Common Subcanopy Species: Quercus montana Ulmus americana Acer rubrum

Habitat Description: Young upland forest with ravine to the East. A paved county road intersecting.

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: ___ Sparse X Moderate ___Dense

Property of: Environmental Solutions & Innovations, Inc.
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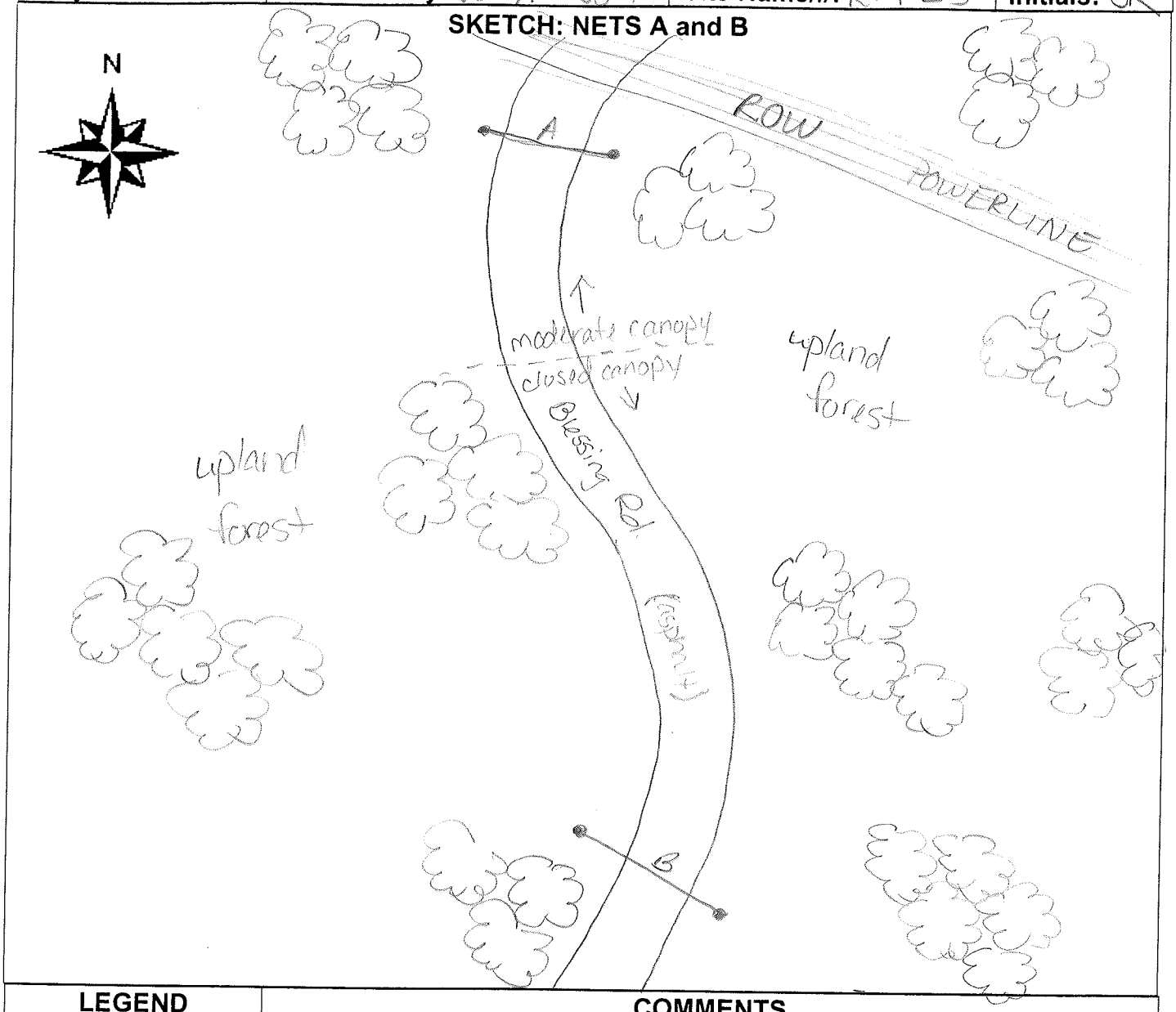
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296	State/County: WV/Mason	Site Name/#: KM 25	Initials: SR

SKETCH: NETS A and B



LEGEND

Nets: ●——●

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.04 **Date:** 12 Aug 2010

Project Name: AEP CO_2

State: WV **County:** Mason

Biologists: M. Michaels + S. Reeves

Site name/#: km 25

GPS Unit #: A4 **Camera #:** KZ 760

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	26.0	0	—	20%	
2100	25.7	0	—	20%	
2130	25.5	0	—	20%	
2200	25.1	0	—	0%	
2230	24.9	0	—	0%	
2300	24.6	0	—	0%	
2330	24.5	0	—	0%	
0000	24.3	0	—	0%	
0030	24.0	0	—	0%	
0100	23.7	0	—	0%	
0130	23.2	0	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 54' 21.4"N	81° 56' 30.2"W	9	6	2030	0130	5835 - 5836
B	NN	38° 54' 19.8"N	81° 56' 29.8"W	6	6	2030	0130	5833 - 5834
		° ' "N	° ' "W					

Net Placement/Site Description: Nets across asphalt road (Blessing Rd) w/ closed - moderate canopy

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Lasiurus borealis	2200	Ad	M	↓	14.5	44	E	0	—
2	A	L. borealis	0015	Ad	F	NR	12.3	44	M	0	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.04 **Date:** 15 Aug 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: M. Michaels & S. Reeves

Site name/#: km 25

GPS Unit #: A4 **Camera #:** K2760

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
X Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	28.2	0	—	10%	—
2100	27.5	0	—	10%	—
2130	26.8	0	—	10%	—
2200	27.0	0	—	20%	—
2230	27.1	0	—	20%	—
2300	25.7	0	—	20%	—
2330	26.0	0	—	20%	—
0000	24.7	0	—	20%	—
0030	25.3	0	—	20%	—
0100	26.3	0	—	20%	—
0130	26.0	0	—	20%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	39 ° 54 ' 21.4 "N	81 ° 56 ' 30.2 "W	9	6	2030	0130	5835-5836
B	NN	39 ° 54 ' 19.9 "N	81 ° 56 ' 29.9 "W	6	6	2030	0130	5833-5834
		° ' "N	° ' "W					

Net Placement/Site Description: Nets across asphalt road (Blessing Rd) w/ closed-moderate canopy

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2035	Ad	M	↓	10.2	40	M	0	—
2	B	Lasiurus borealis	2320	Ad	F	NR	11.6	44	M	0	—
3	B	L. borealis	0000	Ad	M	↓	9.3	39	F	0	—
4	B	L. borealis	0000	Ad	F	NR	12.8	44	M	0	—
5	B	L. borealis	0000	—	—	—	—	—	—	—	Escaped from net
6	B	L. borealis	0000	—	M	—	—	—	—	—	Escaped from net

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296-04 **Date:** 12 August 2010 **Biologists:** J. Wilson, Tyler Herrn

Project Name: AEPCO2 **Site Name/#:** KM 26

State: WV **County:** Mason **USGS Quad:**

Camera #: 69 **Picture #s:** 104-0429, 0430 **GPS Unit #:** A-6 **Waypoint #:** 44

Latitude: 38 ° 54 ' 36.4 "N **Longitude:** 81 ° 56 ' 21.3 "W

Distance to closest water source (meters): 1 Km Type of water source: River

Water source name: Ohio River

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____ meters Channel Width: _____ meters Stream Width: _____ meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L): ____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Quercus rubra / Quercus alba	Robinia pseudoacacia
Acer saccharum	Acer saccharum
Liriodendron tulipifera	Liriodendron tulipifera
Estimated dbh range: Lg: 150 Sm: 41	Estimated dbh range: Lg: 39 Sm: 25

Relative abundance of dominant vs. subdominant (ratio): 1:10

Estimated canopy closure: X Closed ___Moderate ___Open

Roost tree potential consists of: X Large Trees X Snags X Both ___ Neither

Roost tree potential for the area is: ___High X Moderate ___Low

Roost potential comments: Few large trees with exfoliating bark and shaded snags

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings X Shrubs

Common Subcanopy Species: Sassafras albidum, Carya tomentosa, Quercus velutina, Acer saccharum, Ulmus rubra, Fagus grandifolia, Fraxinus americana, Smilax sp.

Habitat Description: Rolling upland hills with dense understory with open patches, site adjacent to open woodlot

Check all that apply:

X Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	X Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

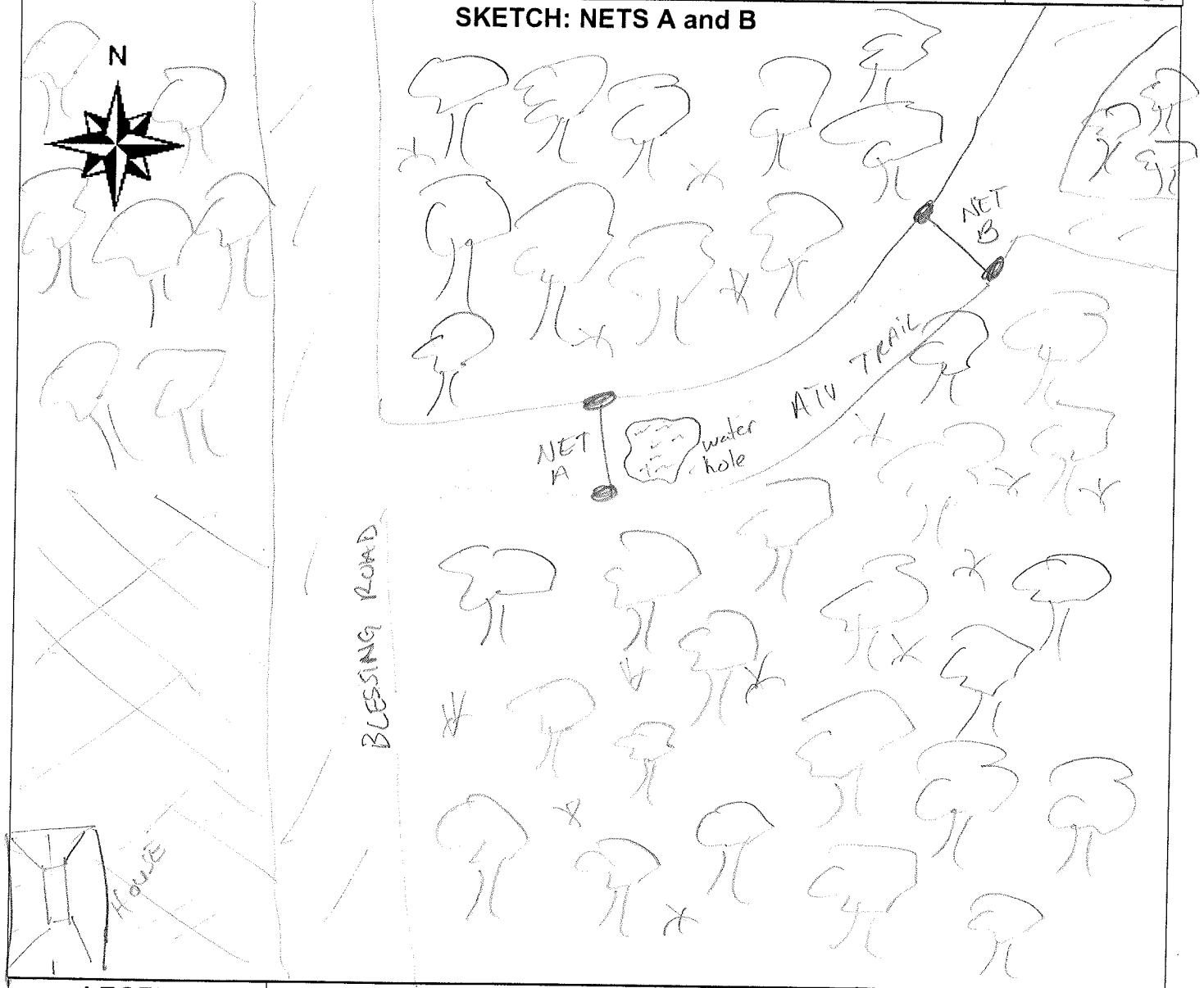
Herbaceous Cover: ___ Sparse X Moderate ___Dense

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION (continued)

Project #: 296-04	State/County: WV / Mason	Site Name/#: km 26	Initials: JW

SKETCH: NETS A and B



LEGEND

Nets:

TREE:

GRASSY AREA:

WATER:

SHRUBS:

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296-04 Date: 12 August 2010

Project Name: AEP CO2

State: WV County: Mason

Biologists: J. Wilson, Tyler Hern

Site name/#: Km 26

GPS Unit #: A-6 Camera #: 69

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
X Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	27.8	—	—	0%	
2100	27.3	—	—	0%	
2130	27.6	—	—	0%	
2200	25.4	—	—	0%	
2230	25.5	—	—	0%	
2300	25.6	—	—	0%	
2330	25.1	—	—	0%	
0000	24.6	1-3	W-E	0%	
0030	23.8	1-3	W-E	0%	
0100	23.2	1-3	W-E	0%	
0130	23.1	—	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 54 ' 36.4 "N	81 ° 56 ' 21.3 "W	6	6	2030	0130	104-0429
B	NN	38 ° 54 ' 39.3 "N	81 ° 56 ' 20.2 "W	6	6	2030	0130	104-0430
		° ' "N	° ' "W					

Net Placement/Site Description: Nets stacked over canopied ATV trail

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	0110	Ad	M	↓	9.5	41mm	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296-04 Date: 13 August 2010

Project Name: AEP Co2

State: WV County: Mason

Biologists: J. Wilson, Tyler Hern

Site name/#: Km26

GPS Unit #: A-6 Camera #: 69

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
X Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	28.6	—	—	0%	—
2100	26.8	—	—	0%	—
2130	26.4	—	—	0%	—
2200	26.2	—	—	0%	—
2230	26.0	—	—	0%	—
2300	25.3	—	—	0%	—
2330	24.7	—	—	0%	—
0000	24.2	—	—	0%	—
0030	24.2	1-3	W-E	0%	—
0100	23.8	1-3	W-E	0%	—
0130	24.0	1-3	W-E	0%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 54 ' 36.4 "N	81 ° 56 ' 21.3 "W	6	6	2030	0130	104-0429
B	NN	38 ° 54 ' 37.3 "N	81 ° 56 ' 20.2 "W	6	6	2030	0130	104-0430
		° ' "N	° ' "W					

Net Placement/Site Description: Nets stacked over canopied ATV trail

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
				NO BATS							

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

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NET SITE HABITAT DESCRIPTION

Project #: 296.64 **Date:** 13 Aug 2016 **Biologists:** D. Jeffcoat, M. Little

Project Name: AEP CO2 **Site Name/#:** KM 27

State: WV **County:** Mason **USGS Quad:** ~~~~

Camera #: ____ **Picture #s:** ____ **GPS Unit #:** A13 **Waypoint #:** 012

Latitude: 38 ° 54 ' 40.8 "N **Longitude:** 81 ° 56 ' 26.5 "W

Distance to closest water source (meters): ____ Type of water source: river

Water source name: Ohio River

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: ____meters Channel Width: ____meters Stream Width: ____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): ____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Acer saccharum sugar maple

Liriodendron tulipifera

Estimated dbh range: Lg: 20" Sm: 16"

Subdominant Canopy Species (< 40 cm/16" dbh)

Acer saccharum

Liriodendron tulipifera

Estimated dbh range: Lg: 16" Sm: 4"

Relative abundance of dominant vs. subdominant (ratio): 1:20

Estimated canopy closure: X Closed ___Moderate ___Open

Roost tree potential consists of: X Large Trees ___Snags ___Both ___Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: ____

Subcanopy clutter: ___Closed ___Moderate X Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees ___Saplings ___Shrubs

Common Subcanopy Species: Cercis canadensis ____

Habitat Description: Small trail through woods, mostly sugar maple

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other ____

Herbaceous Cover: ___ Sparse ___Moderate X Dense

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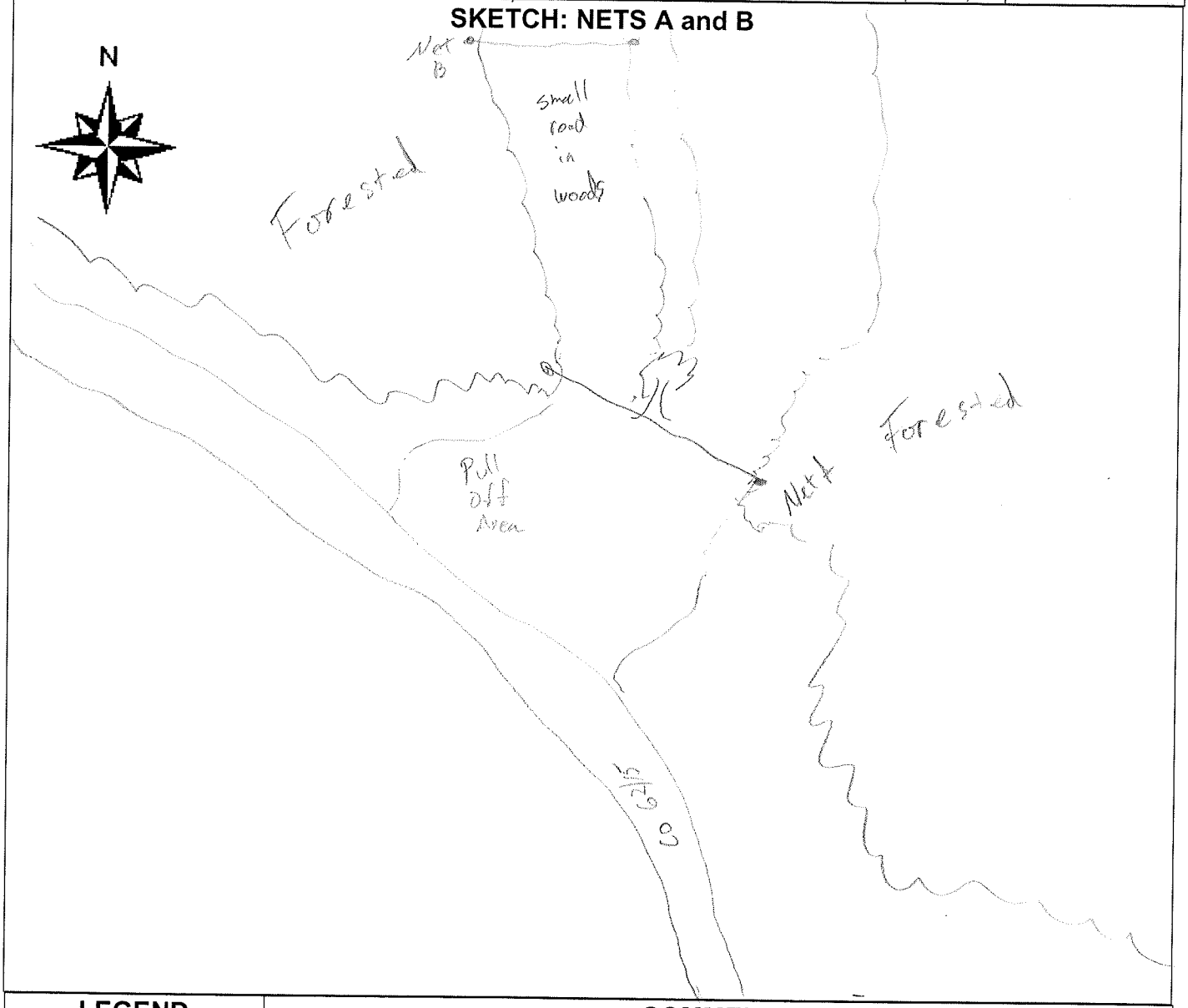
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296	State/County: WV / Mason	Site Name/#: KM 27	Initials:

SKETCH: NETS A and B



LEGEND

Nets: ●——●

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 2916.04 **Date:** 13 Aug 2010
Project Name: AEP CO2
State: WV **County:** Mason
Biologists: M Michaels S Reeves
Site name/#: KM 27
GPS Unit #: A13 **Camera #:**

MOON PHASE*

___New moon ___Waxing gibbous ___Last quarter
_X_Waxing crescent ___Full moon ___Waning crescent
___First quarter ___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	27.1	1-3	SE-NW	0%	
2100	26.8	1-3	SE-NW	0%	
2130	26.8	1-3	SE-NW	0%	
2200	26.5	0	—	0%	
2230	25.4	0	—	0%	
2300	24.8	1-3	SE-NW	0%	
2330	24.5	0	—	0%	
0000	24.8	0	—	0%	
0030	23.8	1-3	SE-NW	0%	
0100	23.6	0	—	0%	
0130	23.6	0	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 53 ' "N	81 ° 57 ' "W	12	6	2030	0130	
B	NN	38 ° 53 ' "N	81 ° 57 ' "W	6	6	2030	1140	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets over small trail through woodlot

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Lasiurus borealis	0115	Ad	M	↓	10.4	39	M	0	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

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BAT CAPTURE DATA

Project #: 296.04 **Date:** 14 August 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: D. Jeffcott T. Herm

Site name/#: Km 27

GPS Unit #: A13 **Camera #:** 61

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
X Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	23.2	8-12	W to E	100%	Rain
2100	23.2	8-12	W to E	100%	Rain
2130	22.5	8-12	W to E	100%	Rain
2200		1-3	W to E	100%	Rain
					Rain Out

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 53 ' "N	81 ° 57 ' "W	12	6	2030	2200	
B	NN	38° 53 ' "N	81 ° 57 ' "W	6	6	2030	2215	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets over trail through woodlot

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO captures - Rain out									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

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BAT CAPTURE DATA

Project #: 296.04 **Date:** 15 Aug 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: M. Little

Site name/#: KM 27

GPS Unit #: A13 **Camera #:**

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
X Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	26.7	0	—	50%	
2100	26.6	0	—	40%	
2130	25.5	0	—	40%	
2200	25.0	0	—	20%	
2230	24.6	0	—	20%	
2300	23.9	0	—	10%	
2330	23.9	0	—	10%	
0000	23.9	0	—	10%	
0030	23.5	0	—	10%	
0100	22.9	0	—	10%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 54 ' 40.8 "N	81 ° 56 ' 26.5 "W	6	6	2630	0130	
B	NN	38 ° 54 ' "N	81 ° 56 ' "W	9	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Net over small trail in woodlot @ a forest edge opening

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO CATCH									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

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NET SITE HABITAT DESCRIPTION

Project #: 296.04 **Date:** 15 Aug 2010 **Biologists:** D. Jeffcott

Project Name: AEPCO2 **Site Name/#:** KM 28

State: WV **County:** Mason **USGS Quad:**

Camera #: 61 **Picture #s:** **GPS Unit #:** A13 **Waypoint #:** KM28A

Latitude: 38 ° 54 ' 49.9 "N **Longitude:** 81 ° 56 ' 36.9 "W

Distance to closest water source (meters): Type of water source:

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: meters Channel Width: meters Stream Width: meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): Average Water Depth: m or cm Clarity (H,M,L):

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Quercus alba

Quercus rubra

Estimated dbh range: Lg: 18" Sm: 16"

Subdominant Canopy Species (< 40 cm/16" dbh)

Quercus alba

Quercus rubra

Robinia pseudoacacia

Estimated dbh range: Lg: 14" Sm: 4"

Relative abundance of dominant vs. subdominant (ratio): 1:10

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees ___Snags X Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments:

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees ___Saplings ___Shrubs

Common Subcanopy Species: Cercis canadensis Sassafras albidum

Habitat Description: Forested road/gravel, oak dominated forest to east, open field to west

Check all that apply:

X Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other

Herbaceous Cover: ___ Sparse X Moderate ___Dense

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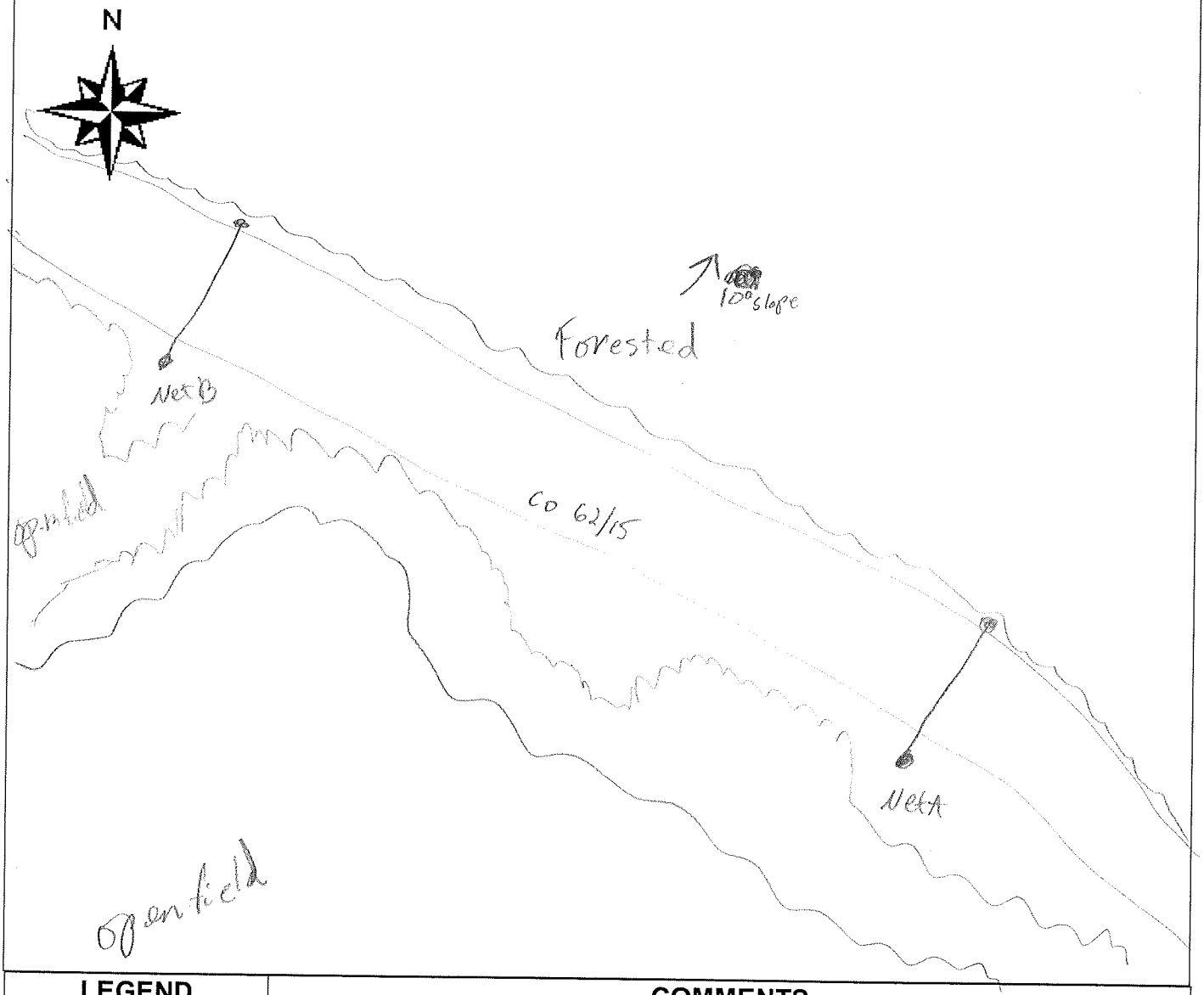
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.04	State/County: WV / Mason	Site Name/#:	Initials:

SKETCH: NETS A and B



LEGEND

Nets: ●——●

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.04 Date: 13 August 2010

Project Name: AEP-CO2

State: WV County: MASON

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM 28

GPS Unit #: A13 Camera #: G1

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
X Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	24.3	0	—	10%	
2100	24.0	0	—	10%	
2130	23.5	0	—	10%	
2200	23.0	0	—	0%	
2230	22.4	0	—	0%	
2300	22.0	0	—	0%	
2330	21.9	0	—	0%	
0000	21.8	0	—	0%	
0030	22.2	0	—	0%	
0100	23.0	0	—	0%	
0130	23.2	0	—	0%	

WPT

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
KM 28A A	NN	38 ° 54 ' 49.9 "N	81 ° 56 ' 36.9 "W	9	6	2030	0130	
KM 28B B	NN	38 ° 54 ' 50.9 "N	81 ° 56 ' 38.6 "W	6	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets placed over gravel road in forested area. Good corridor w/ canopy

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2120	Ad	M	↓	9.9	37 ½	M	0	
2	A	L. borealis	2345	Ad	F	NR	15.5	41 ½	M	0	
3	A	L. borealis	2345	JV	F	NR1	12.3	40	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

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BAT CAPTURE DATA

Project #: 296.04 **Date:** 14 August 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: D. Jeffcott

Site name/#: Km 28

GPS Unit #: A13 **Camera #:** 61

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
X Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	23.2	9-12	WNW to E	100%	Rain
2100	23.2	8-12	W to E	100%	Rain
2130	22.5	8-12	W to E	100%	Rain
2200	22.5	1-3	W to E	100%	Rain
					Rain Out

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 54' 49.9" N	81° 56' 36.9" W	9	6	2030	2200	
B	NN	38° 54' 50.9" N	81° 56' 38.6" W	6	6	2030	2205	
		° ' " N	° ' " W					

Net Placement/Site Description: Nets over gravel Road

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO									
		Captures									
		- Rain Out -									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

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BAT CAPTURE DATA

Project #: 296.04 **Date:** 15 August 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: D. Seffcott

Site name/#: Km 28

GPS Unit #: A13 **Camera #:** 61

MOON PHASE*

___New moon ___Waxing gibbous ___Last quarter
X Waxing crescent ___Full moon ___Waning crescent
___First quarter ___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	26.7	0	—	50%	
2100	26.6	0	—	40%	
2130	25.5	0	—	40%	
2200	25.0	0	—	20%	
2230	24.6	0	—	20%	
2300	23.9	0	—	10%	
2330	23.9	0	—	10%	
0000	23.9	0	—	10%	
0030	23.9	0	—	10%	
0100	23.5	0	—	10%	
0130	22.9	0	—	10%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 54' 49.9" N	81° 56' 36.9" W	9	6	2030	0130	
B	NN	38° 54' 50.9" N	81° 56' 38.6" W	6	6	2030	0145	
		° ' " N	° ' " W					

Net Placement/Site Description: Nets over gravel road

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO Captures									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

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NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 7 August 2010 **Biologists:** D. Jeffett, C. Murphy

Project Name: AEP CO_2 **Site Name/#:** KM12

State: WV **County:** Mason **USGS Quad:**

Camera #: G1 **Picture #s:** **GPS Unit #:** A13 **Waypoint #:** KM12A

Latitude: 38 ° 54 ' 59.1 "N **Longitude:** 81 ° 56 ' 47.9 "W

Distance to closest water source (meters): 3m Type of water source: ephemeral stream

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Platanus occidentalis

Liriodendron tulipifera

Subdominant Canopy Species (< 40 cm/16" dbh)

Acer saccharum

Juglans nigra

Pinus virginiana

Estimated dbh range: Lg: 50cm Sm: 40cm

Estimated dbh range: Lg: 39cm Sm: 10cm

Relative abundance of dominant vs. subdominant (ratio): 1:10

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: X Large Trees ___Snags ___Both ___ Neither

Roost tree potential for the area is: ___High X Moderate ___Low

Roost potential comments:

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings ___Shrubs

Common Subcanopy Species: Cercis canadensis Carpinus caroliniana

Habitat Description: open fields used as hunting grounds w/ open fields and open canopy. Several wide trails through woods.

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
X Mature Lowland Forest	X Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: ___ Sparse ___Moderate X Dense

Property of: Environmental Solutions & Innovations, Inc.
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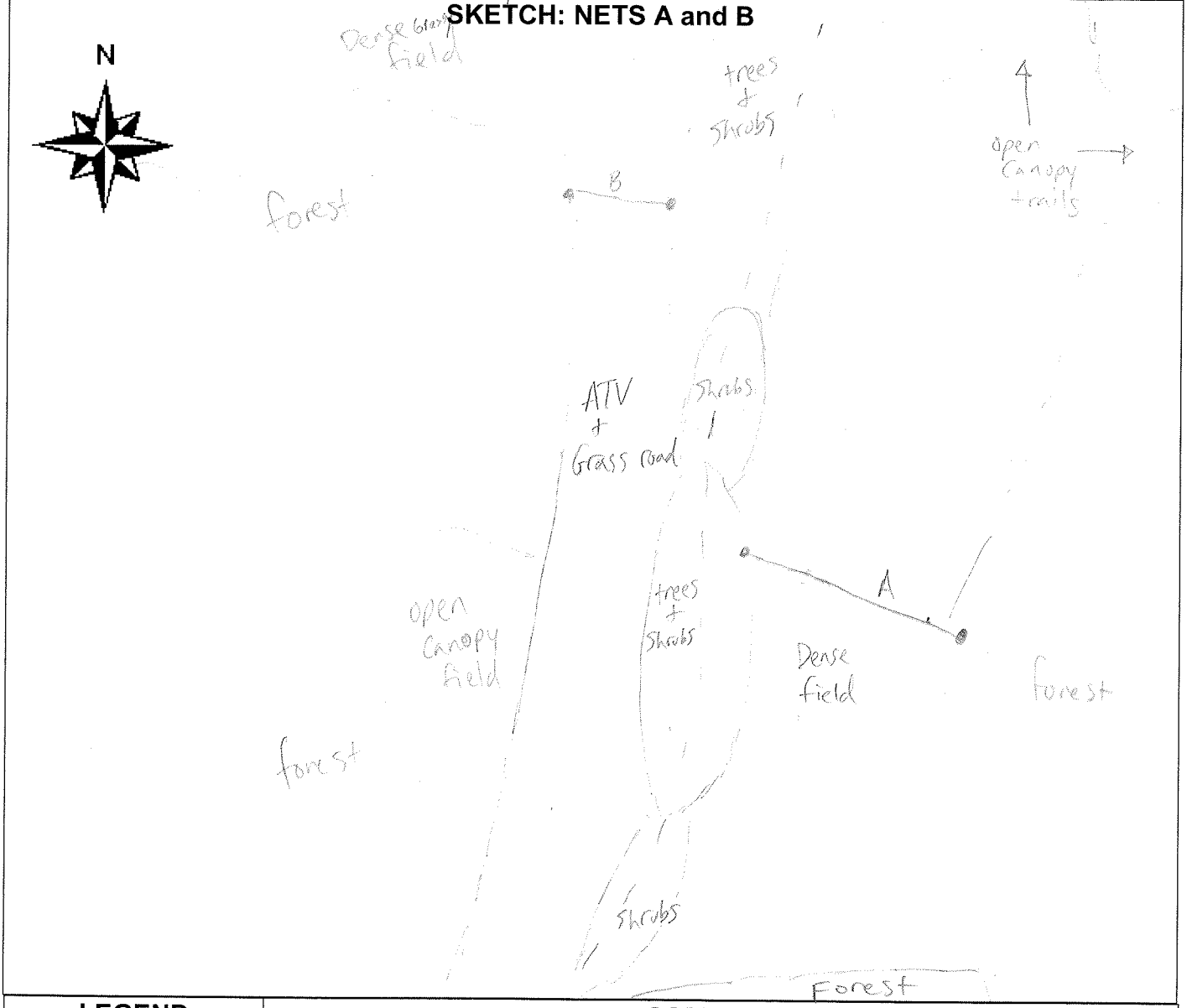
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV/Mason	Site Name/#: KM 12	Initials: CAL

SKETCH: NETS A and B



LEGEND

Nets: ●——●

ephemeral stream: - - - - -

COMMENTS

Parts of trail leading North to net B have canopy cover.

ATV/Grass road not highly used.

Not drawn to Scale.

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 **Date:** 6 August 2010
Project Name: AEP-CO2
State: WV **County:** MASON
Biologists: D. Jeffcott, C. Murphy
Site name/#: KM12
GPS Unit #: A13 **Camera #:** G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	20.0	0	—	10%	
2100	19.5	0	—	10%	
2130	18.6	1-3	S to N	0%	
2200	18.0	1-3	SW to NE	0%	
2230	17.6	0	—	0%	
2300	17.2	1-3	SW to NE	0%	
2330	16.9	1-3	SW to NE	0%	
0000	16.4	1-3	SW to NE	0%	
0030	15.8	1-3	SW to NE	0%	
0100	15.4	1-3	SW to NE	0%	
0145	14.9	1-3	SW to NE	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 54 ' 59.1 "N	81 ° 56 ' 47.9 "W	18	6	2030	0135	
B	NN	38 ° 54 ' 59.3 "N	81 ° 56 ' 45.2 "W	6	6	2030	0130	
		° ' "N	° ' "W					

Net Placement/Site Description: A placed between forest and ephemeral stream in field, B placed in ATV corridor between forest and ephemeral stream.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	0000								ESCAPED From net

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 **Date:** 7 August 2010

Project Name: AEP. CO_2

State: WV **County:** MASON

Biologists: D. Jeffcoff, C. Murphy

Site name/#: KM 12

GPS Unit #: A13 **Camera #:** G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2100	19.5	0	—	0%	—
2130	18.7	0	—	0%	—
2200	17.9	0	—	0%	—
2230	17.4	0	—	0%	—
2300	16.7	1-3	SW to NE	0%	—
2330	16.1	1-3	S to N	0%	—
0000	15.8	1-3	S to N	0%	—
0030	15.3	1-3	S to N	0%	—
0100	14.9	1-3	S to N	0%	—
0200	14.0	0	—	0%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 54 ' 59.1 "N	81 ° 56 ' 47.9 "W	18	6	2035	0135	
B	NN	38 ° 54 ' 59.3 "N	81 ° 56 ' 45.2 "W	6	6	2040	0140	
		° ' "N	° ' "W					

Net Placement/Site Description: A placed between forest and ephemeral stream in field. B placed in ATV corridor between forest and ephemeral stream

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO CAPTURES									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 7 August 2010 **Biologists:** D. Jeffcott, C. Murphy

Project Name: AEP - CO_2 **Site Name/#:** KM13

State: WV **County:** MASON **USGS Quad:**

Camera #: G1 **Picture #s:** **GPS Unit #:** A13 **Waypoint #:** KM13A

Latitude: 38 ° 55 ' 1.1 "N **Longitude:** 81 ° 56 ' 53.6 "W

Distance to closest water source (meters): under A 1m from B Type of water source: ephemeral stream

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: 1 meters Channel Width: 2 meters Stream Width: NA meters

Substratum: X Bedrock ___ Boulder X Cobble ___ Gravel ___ Sand ___ Silt/Clay

Still Water Present (Y/N): N Average Water Depth: NA m or cm Clarity (H,M,L): NA

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Quercus alba	Juglans nigra
Platanus occidentalis	Acer saccharum
Liriodendron tulipifera	Acer rubrum

Estimated dbh range: Lg: 50cm Sm: 40cm Estimated dbh range: Lg: 39cm Sm: 10cm

Relative abundance of dominant vs. subdominant (ratio): 1:12

Estimated canopy closure: X Closed X Moderate ___ Open

Roost tree potential consists of: X Large Trees ___ Snags ___ Both ___ Neither

Roost tree potential for the area is: ___ High X Moderate ___ Low

Roost potential comments: Some large white oaks

Subcanopy clutter: X Closed ___ Moderate ___ Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings ___ Shrubs

Common Subcanopy Species: Aesculus flava Cercis canadensis Carpinus caroliniana

Habitat Description: Old road w/ dense canopy and closed understory. Ephemeral stream ~~SW~~ runs through.

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
X Mature Lowland Forest	X Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
X Young Lowland Forest	X Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: ___ Sparse ___ Moderate X Dense

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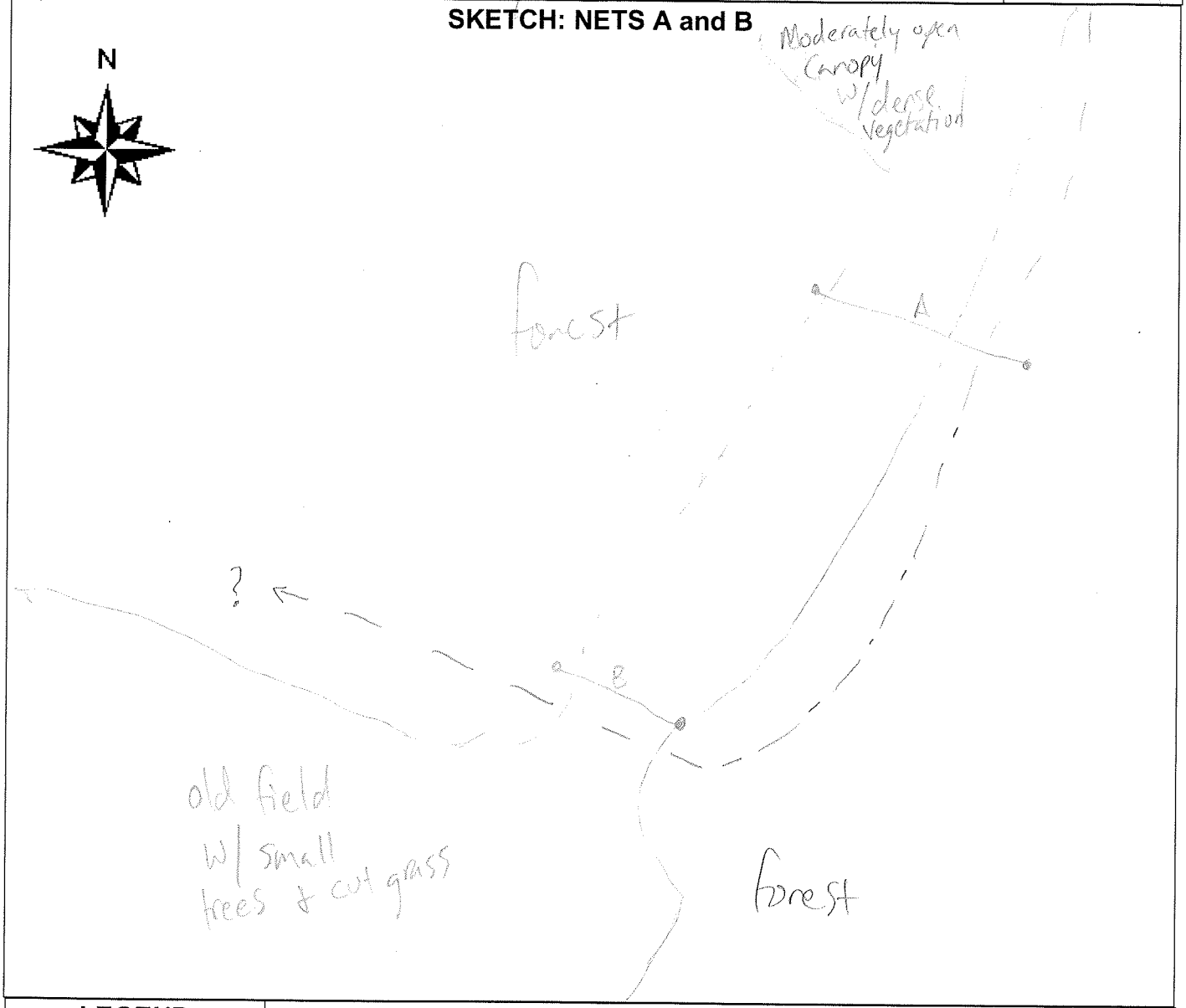
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV / Mason	Site Name/#: KM 13	Initials: CM

SKETCH: NETS A and B



LEGEND

Nets: ●——●

ephemeral stream - - - -

COMMENTS

Not drawn to Scale

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 **Date:** 6 August 2010
Project Name: AEP - CO_2
State: WV **County:** MASON
Biologists: D. Jeffcott, C. Murphy
Site name/#: KM 13
GPS Unit #: A13 **Camera #:** 61

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
___Waxing crescent
___Full moon
X Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	20.0	0	—	10%	—
2100	19.5	0	—	10%	—
2130	18.6	1-3	SW to N	0%	—
2200	18.0	1-3	SW to NE	0%	—
2230	17.6	0	—	0%	—
2300	17.2	1-3	SW to NE	0%	—
2330	16.9	1-3	SW to NE	0%	—
0000	16.4	1-3	SW to NE	0%	—
0030	15.8	1-3	SW to NE	0%	—
0100	15.4	1-3	SW to NE	0%	—
0145	14.9	1-3	SW to NE	0%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 55 ' 01.1 "N	81 ° 56 ' 53.6 "W	9	6	2030	0140	
B	NN	38 ° 55 ' 01.0 "N	81 ° 56 ' 56.8 "W	6	6	2030	0145	
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed in ATV corridor and over ephemeral stream in forest. B placed in forested ATV corridor adjacent to ephemeral stream.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2215								ESCAPED from net
2	B	L. borealis	2220								"
3	B	L. borealis	2240	Ad	M	↓	10.1	36.5	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

ESI

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 Date: 7 August 2010

Project Name: AEP - CO2

State: WV County: MASON

Biologists: D. Jeff Cottt, C. Murphy

Site name/#: KM 13

GPS Unit #: A13 Camera #: G1

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2100	19.5	0	—	0%	—
2130	18.7	0	—	0%	—
2200	17.9	0	—	0%	—
2230	17.4	0	—	0%	—
2300	16.7	1-3	SW to NE	0%	—
2330	16.1	1-3	S to N	0%	—
0000	15.8	1-3	S to N	0%	—
0030	15.3	1-3	S to N	0%	—
0100	14.9	1-3	S to N	0%	—
0200	14.0	0	—	0%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 55 ' 01.1 "N	81 ° 56 ' 53.6 "W	9	6	2030	0145	
B	NN	38 ° 55 ' 01.0 "N	81 ° 56 ' 56.8 "W	6	6	2030	0155	
		° ' "N	° ' "W					

Net Placement/Site Description: Net A placed in ATV corridor and over ephemeral stream in forest. B placed in forested ATV corridor adjacent to ephemeral stream.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO CAPTURES									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

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NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 6 Aug 08/06/10 **Biologists:** m. Little / T. Hem

Project Name: ACP CO2 **Site Name/#:** KM14

State: WV **County:** Mason **USGS Quad:**

Camera #: **Picture #s:** 011, 012 **GPS Unit #:** A-6 **Waypoint #:**

Latitude: 38 ° 54 ' 28.5 "N **Longitude:** 81 ° 57 ' 13.9 "W

Distance to closest water source (meters): 0 Type of water source: Pond

Water source name: N/A

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: < 1 meters Channel Width: meters Stream Width: meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand X Silt/Clay

Still Water Present (Y/N): Y Average Water Depth: 1 m or cm Clarity (H,M,L): L

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Acer rubrum	willow spp.
quercus alba	
Estimated dbh range: Lg: 15 Sm: 10	Estimated dbh range: Lg: 5 Sm: 3

Relative abundance of dominant vs. subdominant (ratio):

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees ___Snags ___Both X Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments:

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings X Shrubs

Common Subcanopy Species: willow rhododendron

Habitat Description: Old field with path through narrow sheltered corridor, small pond near by.

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
X Young Lowland Forest	X Old Field	__Forested Swamp	__Other

Herbaceous Cover: ___ Sparse X Moderate ___Dense

Property of: Environmental Solutions & Innovations, Inc.
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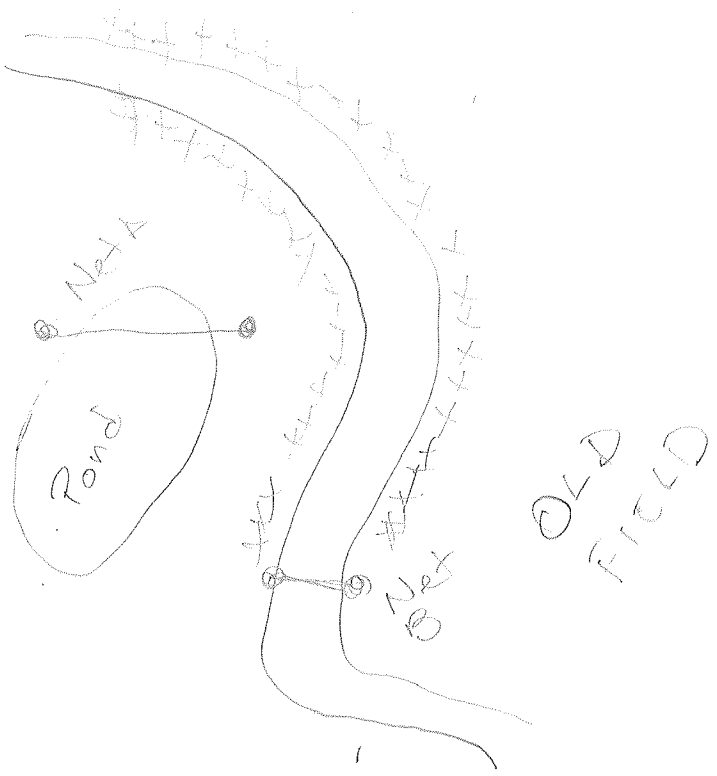
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV/Mason	Site Name/#: ACP	Initials: ML

SKETCH: NETS A and B

N



LEGEND	COMMENTS
Nets: ●——●	

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

6 Aug

Project #: 296.03 Date: 08/06/10

Project Name: AEP WV

State: WV County: Mason

Biologists: M. Little, T. Hern

Site name/#: Km 14

GPS Unit #: A-6 Camera #:

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	20	0	—	0	
2100	21	0	—	1	
2130	20	0	—		
2200	20	0	—		
2230	20	0	—		
2000	19	0	—		
2030	19	0	—		
0100	18.5	0	—	V	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	MN	38 ° 54 ' 28.5 "N	81 ° 57 ' 13.9 "W	6	6	2030	0130	011
B	MN	38 ° 54 ' 28.1 "N	81 ° 57 ' 15.5 "W	6	6	2030	0130	012
		° ' "N	° ' "W					

Net Placement/Site Description: Net A is over small pond. Net B is over 2-track grassy path

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO BATS									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 Date: 7 Aug 08/07/10

Project Name: AEP CO2

State: WV County: mason

Biologists: M. Little, T. Hern

Site name/#: KM14

GPS Unit #: A-6 Camera #:

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	20	3	↓	0	
2100	20	0			
2130	19.5	0			
2200	19.2	0			
2230	18.5	2			
2300	18	3			
2330	18	1			
0000	18	↓			
0030	18				
0100	18				

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 54' 28.5"N	81° 57' 13.9"W			2030	0130	011
B	NN	38° 54' 28.1"N	81° 57' 19.5"W			2030	0130	012
		° ' "N	° ' "W					

Net Placement/Site Description: Net A is over a small pond, Net B is on a grassy path

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO BATS									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

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NET SITE HABITAT DESCRIPTION

Project #: 296-03 **Date:** 06 Aug 2010 **Biologists:** J. Wilson, S. Baggs

Project Name: AEP COZ **Site Name/#:** KM 15

State: WV **County:** Mason **USGS Quad:**

Camera #: 69 **Picture #s:** 104-0421, 0422 **GPS Unit #:** A-6 **Waypoint #:** 38

Latitude: 38 ° 53 ' 59.6 "N **Longitude:** 81 ° 57 ' 25.3 "W

Distance to closest water source (meters): 200 m Type of water source: stream

Water source name: UNK

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Quercus stellata	Robinia pseudoacacia
Quercus rubra	Quercus alba
Pinus sylvestris	Quercus rubra
Estimated dbh range: Lg: 80 Sm: 41	Estimated dbh range: Lg: 39 Sm: 25

Relative abundance of dominant vs. subdominant (ratio): 1:15

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees X Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: Snags small with no exfoliating bark & in shaded areas

Subcanopy clutter: ___Closed ___Moderate X Open

Subcanopy comprised largely of: ___Lower Branches of Canopy Trees X Saplings X Shrubs

Common Subcanopy Species: Cercis canadensis Sassafras albidum

Ulmus americana, Diospyros virginiana Cornus florida Rosa multiflora, Juniperus virginiana

Habitat Description: Rolling hills of upland forest adjacent to pasture land, young upland forest with mostly open understory

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	X Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	X Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: ___ Sparse X Moderate ___Dense

Property of: Environmental Solutions & Innovations, Inc.
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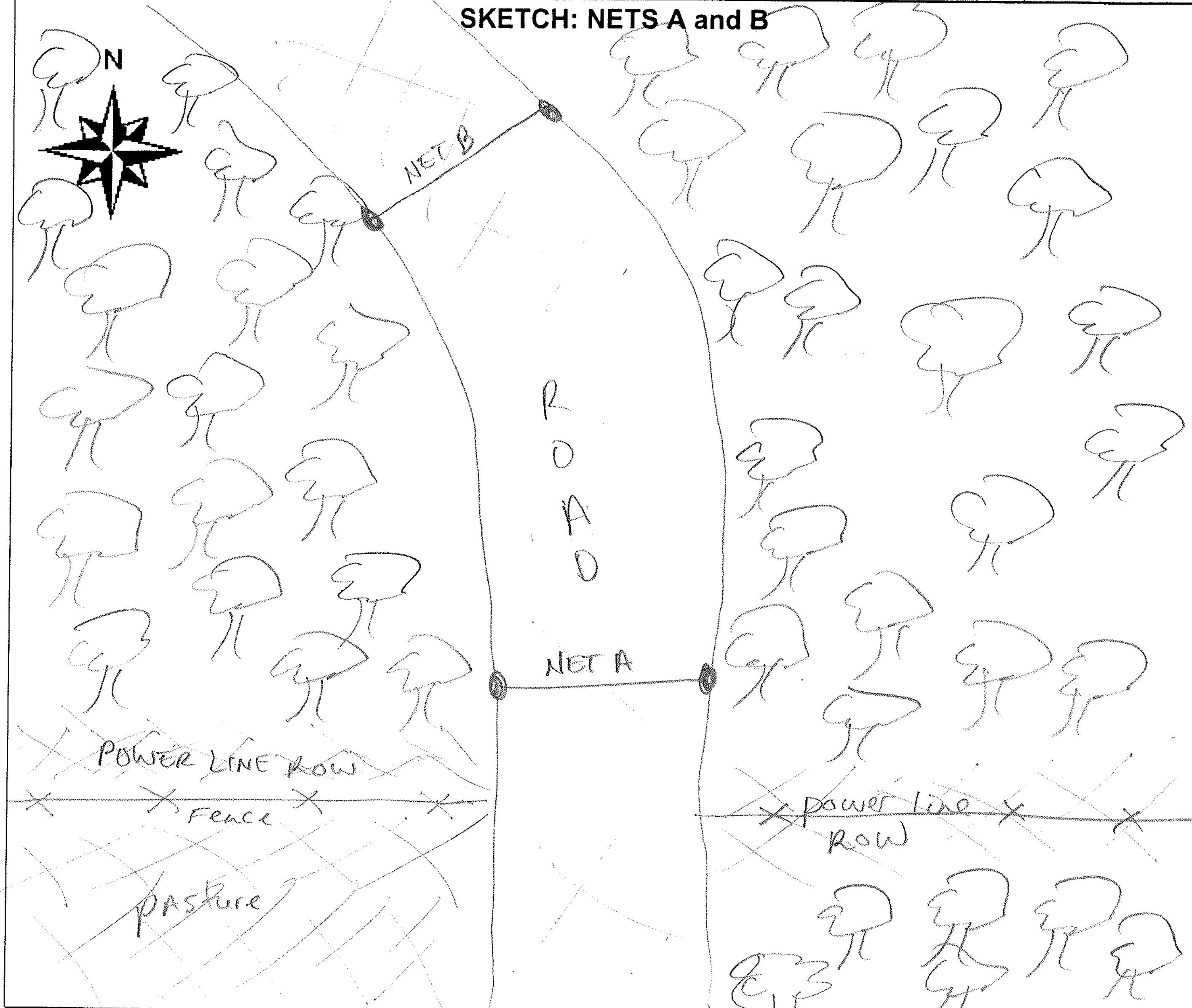
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296-03	State/County: WV / Mason	Site Name/#: Km 15	Initials: JW

SKETCH: NETS A and B



LEGEND

Nets:

TREE:

Grassy Area:

power line:

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296-03 Date: 06 August 2010

Project Name: AEP CO2

State: WV County: Mason

Biologists: J. Wilson, C. Boggs

Site name/#: Km 15

GPS Unit #: A-6 Camera #: 69

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	21.0	1-3	E-W	Ø%	
2100	20.8	1-3	E-W	Ø%	
2130	19.8	1-3	E-W	Ø%	
2200	19.6	1-3	E-W	Ø%	
2230	19.1	—	—	Ø %	
2300	18.6	—	—	Ø%	
2330	18.4	—	—	Ø%	
0000	17.9	—	—	Ø%	
0030	17.5	1-3	E-W	Ø%	
0100	17.3	—	—	Ø %	
0130	16.6	1-3	E-W	Ø%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 53 ' 59.6 "N	81 ° 57 ' 25.3 "W	6	6	2030	0130	104-0421
B	NN	38 ° 53 ' 59.5 "N	81 ° 57 ' 26.9 "W	6	6	2030	0130	104-0422
		° ' "N	° ' "W					

Net Placement/Site Description: Nets stacked over road with same canopy

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2300	Ad	m	↓	9.2	39	E	Ø	—
2	A	Lasiurus borealis	2300	Ad	m	↓	9.5	41.5	E	Ø	—
3	A	Lasiurus borealis	2305	—	—	—	10.Ø	—	—	—	ESCAPED
4	A	Perimyotis subflavus	2320	Jv	F	NR	5.Ø	33	m	Ø	—
5	A	Lasiurus borealis	0000	Ad	F	NR	11.Ø	40	m	Ø	—
6	A	Lasiurus borealis	0045	Ad	F	NR	—	—	m	Ø	ESCAPED
7	B	Lasiurus borealis	0050	Ad	m	↓	—	39	m	1	—
8	A	Lasiurus borealis	0115	Ad	m	↓	9.8	39	m	1	—
9	B	Lasiurus borealis	0125	Ad	F	NR	11.5	40.5	m	1	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296-03 **Date:** 07 Aug 2010

Project Name: AEPCO2

State: WV **County:** Mason

Biologists: J. Wilson, C. Boggs

Site name/#: Km 15

GPS Unit #: A-6 **Camera #:** 69

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	20.9	—	—	0%	
2100	20.6	—	—	0%	
2130	20.3	—	—	0%	
2200	19.4	—	—	0%	
2230	18.9	1-3	E-W	0%	
2300	18.2	1-3	E-W	0%	
2330	17.7	—	—	0%	
0000	17.5	—	—	0%	
0030	17.3	—	—	0%	
0100	17.1	—	—	0%	
0130	16.7	—	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 53 ' 59.6 "N	81 ° 57 ' 25.3 "W	6	6	2030	0130	104-0421
B	NN	38 ° 53 ' 59.5 "N	81 ° 57 ' 26.9 "W	6	6	2030	0130	104-0422
		° ' "N	° ' "W					

Net Placement/Site Description: Nets stacked over road with some canopy

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2335	Ad	F	NR	12.4	42	m	0	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 6 Aug 2016 **Biologists:** MMichaels SReeves

Project Name: AEP CO2 **Site Name/#:** KM16

State: WV **County:** Mason **USGS Quad:** Ohio River

Camera #: KZ760 **Picture #s:** 4923 - 4927 **GPS Unit #:** A4 **Waypoint #:** KM16-NETA

Latitude: 38 ° 53 ' 11.1 "N **Longitude:** 81 ° 57 ' 34.8 "W

Distance to closest water source (meters): 3000 m Type of water source: river

Water source name: Ohio River

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS): N/A

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)
Quercus alba
Quercus rubra
Carya tomentosa

Subdominant Canopy Species (< 40 cm/16" dbh)
Robinia pseudoacacia
Quercus rubra
Ulmus americana

Estimated dbh range: Lg: 60 Sm: 40cm

Estimated dbh range: Lg: 39cm Sm: 10cm

Relative abundance of dominant vs. subdominant (ratio): 1 : 100

Estimated canopy closure: ___Closed ___Moderate X Open

Roost tree potential consists of: ___Large Trees ___Snags X Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: 1

Subcanopy clutter: X Closed ___Moderate ___Open

Subcanopy comprised largely of: ___Lower Branches of Canopy Trees X Saplings ___Shrubs

Common Subcanopy Species: Robinia pseudoacacia
Rhus typhina

Habitat Description: young upland forest/early successional forest
unimproved path through forest

Check all that apply:

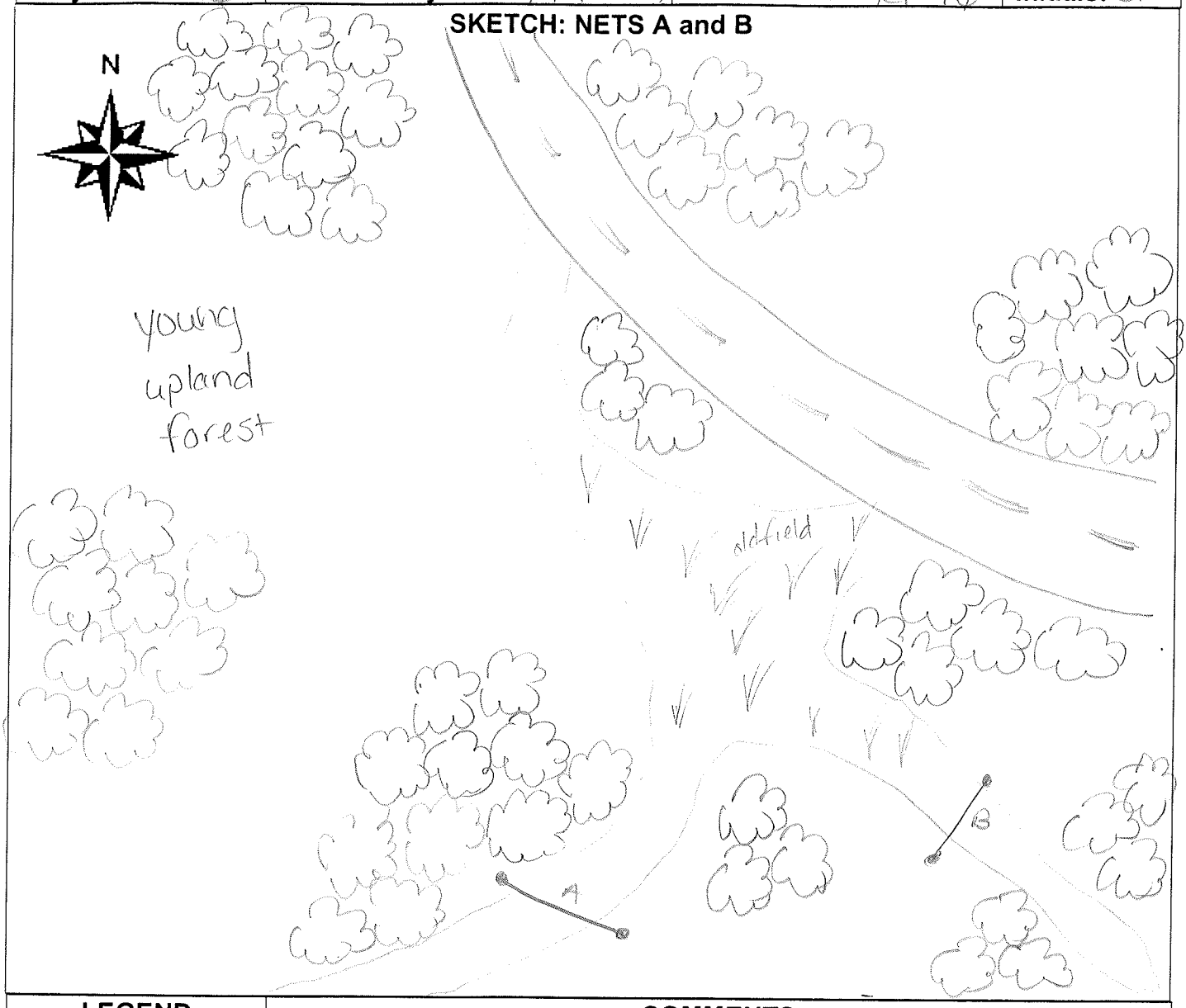
__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	X Old Field	__Forested Swamp	X Other Highway

Herbaceous Cover: ___ Sparse ___Moderate X Dense

NET SITE HABITAT DESCRIPTION (continued)

Project #: 296	State/County: WV/Mason	Site Name/#: KM16	Initials: SR

SKETCH: NETS A and B



LEGEND	COMMENTS
Nets: ●——●	Not to scale

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 2916.03 **Date:** 6 Aug 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: M Michaels S Reeves

Site name/#: KM 116

GPS Unit #: A4 **Camera #:** KE760

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	20.2	0	—	10%	—
2100	20.0	0	—	10%	—
2130	19.5	0	—	10%	
2200	18.8	0	—	0%	
2230	19.0	0	—	0%	
2300	19.4	0	—	0%	
2330	18.2	0	—	0%	
0000	17.9	0	—	0%	
0030	17.8	0	—	0%	
0100	17.4	0	—	0%	
0130	17.4	0	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 53 ' 11.1 "N	81 ° 57 ' 34.8 "W	9	6	2030		4923 - 4924
B	NN	38 ° 53 ' 10.4 "N	81 ° 57 ' 33.9 "W	9	6	2030		4925 - 4927
		° ' "N	° ' "W					

Net Placement/Site Description: Nets across moderately canopied unimproved path

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2245	Ad	F	NR	11.2	41	M	0	—
2	A	Eptesicus fuscus	2245	Ad	M	↓	15.7	46	M	0	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 2916.03 **Date:** 7 Aug 2010
Project Name: AEP
State: WV **County:** Mason
Biologists: M Michaels S Reeves
Site name/#: KM16
GPS Unit #: AC **Camera #:** KZ760

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	23.9	0	—	20%	
2100	22.4	0	—	10%	
2130	19.4	0	—	10%	
2200	18.6	0	—	0%	
2230	18.2	0	—	0%	
2300	17.8	0	—	0%	
2330	17.5	0	—	0%	
0000	17.6	0	—	0%	
0030	17.5	0	—	0%	
0100	17.1	0	—	0%	
0130	16.6	0	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 53 ' 11.1 "N	81 ° 57 ' 34.8 "W	9	6	2030	0130	4923 - 4924
B	NN	38 ° 53 ' 10.4 "N	81 ° 57 ' 33.9 "W	9	6	2030	0130	4925 - 4927
		° ' "N	° ' "W					

Net Placement/Site Description: Nets across unimproved road with moderate canopy

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
			NO BATS CAPTURED								

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

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NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 8 Aug 2010 **Biologists:** M Michaels S Reeves

Project Name: AEP CO2 **Site Name/#:** KM 17

State: WV **County:** Mason **USGS Quad:** Ohio River

Camera #: KZ760 **Picture #s:** 5071-5074 **GPS Unit #:** 14 **Waypoint #:** KM 16 NETA

Latitude: 38 ° 52 ' 53.9 "N **Longitude:** 81 ° 57 ' 01.5 "W

Distance to closest water source (meters): 1900m Type of water source: river

Water source name: Ohio River

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS): N/A

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)
Quercus alba
Quercus coccinea

Subdominant Canopy Species (< 40 cm/16" dbh)
Asimina triloba
Carya tomentosa
Acer rubrum

Estimated dbh range: Lg: 200cm Sm: 40cm

Estimated dbh range: Lg: 39cm Sm: 15cm

Relative abundance of dominant vs. subdominant (ratio): 1:50

Estimated canopy closure: ___Closed ✓Moderate ___Open

Roost tree potential consists of: ✓Large Trees ___Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate ✓Low

Roost potential comments: N/A

Subcanopy clutter: ___Closed ✓Moderate ___Open

Subcanopy comprised largely of: ___Lower Branches of Canopy Trees ✓Saplings ___Shrubs

Common Subcanopy Species: Robinia pseudoacacia Acer saccharum Asimina triloba

Habitat Description: young upland forest (w/ few large oaks) along gravel road, nearby power line right-of-way, rural residents nearby

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
✓Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	✓Other residential

Herbaceous Cover: ___ Sparse ✓Moderate ___Dense

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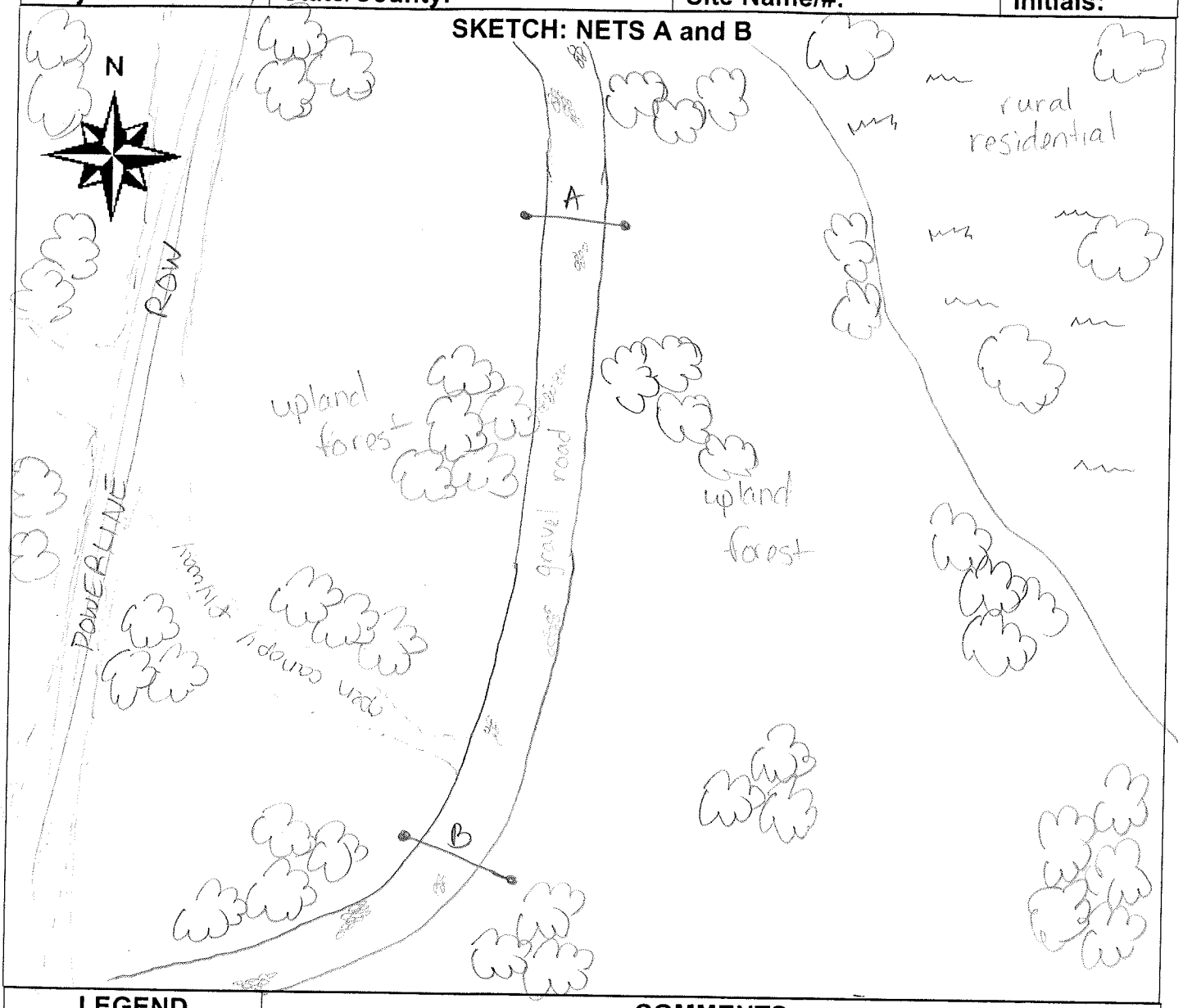
NET SITE HABITAT DESCRIPTION (continued)

Project #:	State/County:	Site Name/#:	Initials:

SKETCH: NETS A and B



LEGEND

Nets: ●——●

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 **Date:** 8 Aug 2010

Project Name: AEP CO_2

State: WV **County:** Mason

Biologists: M Michaels S Reeves

Site name/#: KM 17

GPS Unit #: A4 **Camera #:** KZ760

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	23.1	0	—	40%	
2100	22.4	1-3	SW-NE	20%	
2130	22.1	0	—	0%	
2200	21.6	1-3	SW-NE	0%	
2230	21.4	1-3	SW-NE	0%	
2300	21.1	1-3	SW-NE	0%	
2330	21.1	0	—	0%	
0000	21.0	0	—	0%	
0030	20.7	0	—	0%	
0100	20.6	0	—	0%	
0130	20.5	0	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 52 ' 53.9 "N	81 ° 57 ' 01.5 "W	2.6	6	2030	0130	5071 - 5072
B	NN	38 ° 52 ' 51.6 "N	81 ° 57 ' 01.9 "W	6	6	2030	0130	5073 - 5074
		° ' "N	° ' "W					

Net Placement/Site Description: Nets across gravel road w/ closed canopy in young upland forest

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Lasiurus borealis	2200	Ad	F	NR	11.6	44	M	0	—
2	B	Lasiurus borealis	0015	Ad	M	↓	8.7	41	E	0	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 Date: 9 Aug 2010

Project Name: AEP CO_2

State: WV County: Mason

Biologists: M Michaels S Reeves

Site name/#: KM 17

GPS Unit #: A4 Camera #: KZ760

MOON PHASE*

- ✓ New moon
- ___ Waxing crescent
- ___ First quarter
- ___ Waning gibbous
- ___ Waxing gibbous
- ___ Full moon
- ___ Waning crescent
- ___ Last quarter

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	26.3	0	—	30%	
2100	24.0	0	—	30%	
2130	23.6	0	—	40%	
2200	23.3	0	—	70%	
2230	22.4	0	—	70%	
2300	22.5	0	—	70%	
2330	22.2	0	—	70%	
0000	22.1	0	—	10%	
0030	22.1	0	—	10%	
0100	22.0	0	—	10%	
0130	21.9	0	—	10%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 52 ' 53.9 "N	81 ° 57 ' 01.5 "W	2.6	6	2030	0130	5071 - 5072
B	NN	38 ° 52 ' 57.6 "N	81 ° 57 ' 01.9 "W	6	6	2030	0130	5073 - 5074
		° ' "N	° ' "W					

Net Placement/Site Description: Nets across gravel road w/ closed canopy in upland forest

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Lasiurus borealis	2245	Ad	F	NR	11.8	42	E	0	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

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NET SITE HABITAT DESCRIPTION

Project #: 2916.03 **Date:** Aug 8, 2010 **Biologists:** M. Little, T. Hern

Project Name: NEP **Site Name/#:** Km 18

State: WV **County:** Mason **USGS Quad:**

Camera #: **Picture #s:** 013, 014 **GPS Unit #:** 13 **Waypoint #:**

Latitude: 38 ° 52 ' 45 "N **Longitude:** 81 ° 57 ' 18.9 "W

Distance to closest water source (meters): N/A Type of water source:

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: meters Channel Width: meters Stream Width: meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): Average Water Depth: m or cm Clarity (H,M,L):

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)
Acer rubrum

Subdominant Canopy Species (< 40 cm/16" dbh)
Acer rubrum

Estimated dbh range: Lg: 12 Sm: 10

Estimated dbh range: Lg: 7 Sm: 5

Relative abundance of dominant vs. subdominant (ratio): 50/50

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: X Large Trees ___Snags ___Both ___ Neither

Roost tree potential for the area is: ___High X Moderate ___Low

Roost potential comments:

Subcanopy clutter: ___Closed ___Moderate X Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees ___Saplings ___Shrubs

Common Subcanopy Species: Acer rubrum

Habitat Description: Large to medium trees along roadside near houses and open fields

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	X Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other

Herbaceous Cover: ___ Sparse X Moderate ___Dense

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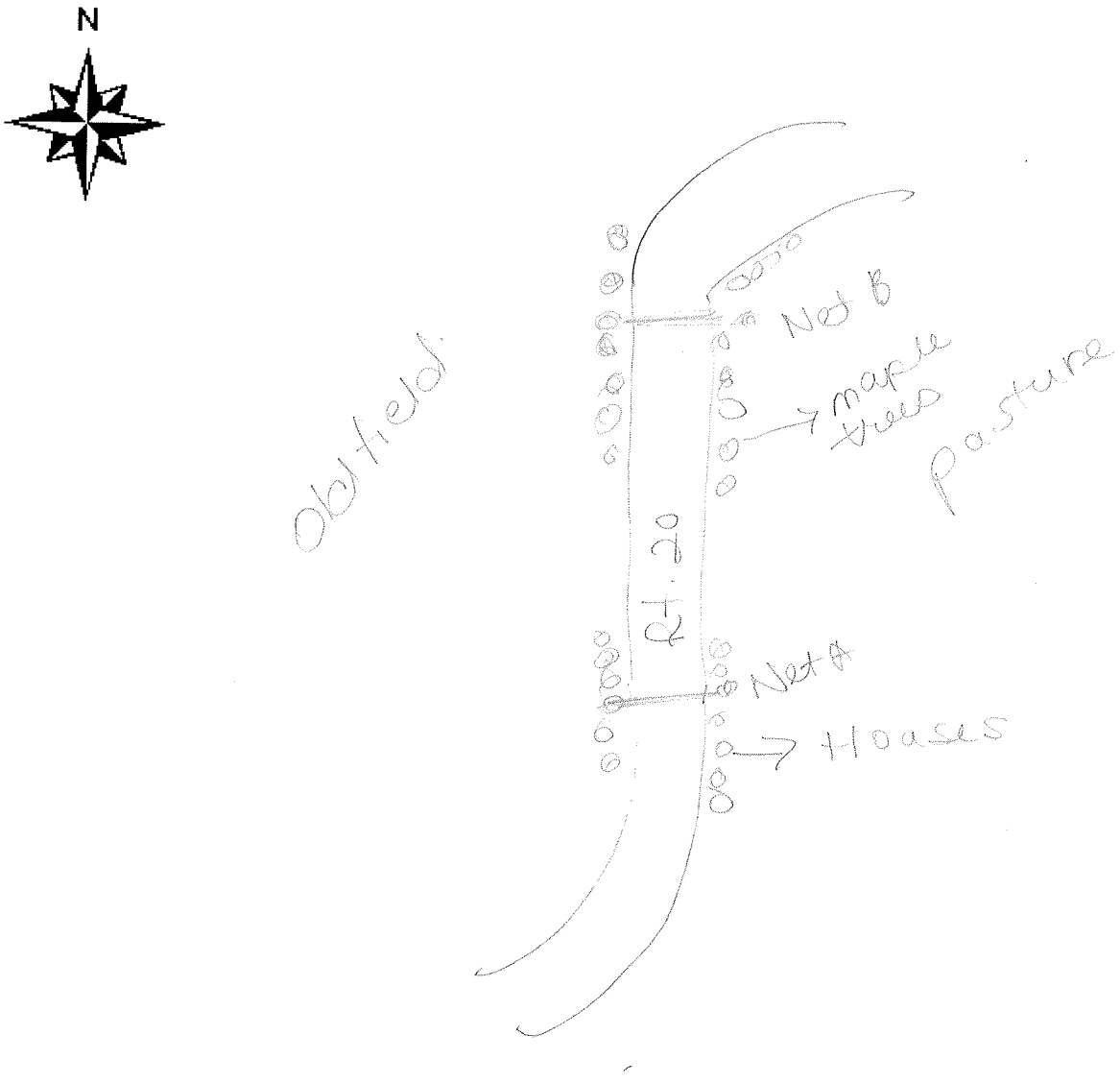
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV / Mason	Site Name/#: KM17	Initials: MC

SKETCH: NETS A and B



LEGEND	COMMENTS
Nets: ●——●	

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 **Date:** 08, Aug 2010.

Project Name: AEP

State: WV **County:** Mason

Biologists: M. Little, T. Hern

Site name/#: KM18

GPS Unit #: 13 **Camera #:**

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	21	0	—	0	
2100	21	0	—	0	
2130	20	0	—	0	
2200	19.5	0	—	0	
2230	19.1	0	—	0	
0000	19.1	0	—	0	
0030	19	0	—	0	
0100	19	0	—	0	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NP	38° 52 ' 45.0 "N	81° 57 ' 18.9 "W	9	6	2030	0130	013
B	NN	38° 52 ' 43.5 "N	81° 57 ' 18.5 "W	6	6	2030	0130	014
		° ' "N	° ' "W					

Net Placement/Site Description: On Route 20 near houses

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasirus borealis	2130	Ad	F	NR	11	41mm	E	0	
2	B	Lasirus borealis	2215	Ad	F	NR	9.5	36mm	M	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

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BAT CAPTURE DATA

Project #: 296.03 **Date:** 9, Aug 2010

Project Name: AEP

State: WV **County:** MASON

Biologists: M. Little, T Hogan

Site name/#: EM18

GPS Unit #: 13 **Camera #:**

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2130	21	0	—	0	
2200	21	0	—	0	
2130	20	5	—	0	
2200	19.6	5	—	0	
2230	19.3	0	—	0	
2300	19.1	0	—	0	
0000	19.0	0	—	5	
0030	19.0	0	—	0	
0100	18.0	0	—	5	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	MN	38 ° 52 ' 45.0 "N	81 ° 57 ' 18.9 "W	9	6	2030	0130	013
B	MN	38 ° 52 ' 45.3 "N	81 ° 57 ' 18.4 "W	6	6	2030	0130	014
		° ' "N	° ' "W					

Net Placement/Site Description:

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2150	Ad	M	↑	12	42mm	E	0	
2	A	L. borealis	2223	Jv	F	NR	12	42mm	E	0	

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

Property of: Environmental Solutions & Innovations, Inc.
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NET SITE HABITAT DESCRIPTION

Project #: 2760-03 **Date:** 07 Aug 2010 **Biologists:** J. Wilson, C. Boggs

Project Name: AEP CO2 **Site Name/#:** km 19

State: WV **County:** Mason **USGS Quad:**

Camera #: 69 **Picture #s:** 104-0431, 0433 **GPS Unit #:** A-6 **Waypoint #:** 40

Latitude: 38 ° 51 ' 42.7 "N **Longitude:** 81 ° 56 ' 20.9 "W

Distance to closest water source (meters): 1km Type of water source: Tributary of Ohio River

Water source name: UNK

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)
Acer saccharum
Liriodendron tulipifera
Robinia pseudoacacia

Subdominant Canopy Species (< 40 cm/16" dbh)
Acer saccharum
Liriodendron tulipifera
Fraxinus americana

Estimated dbh range: Lg: 63 Sm: 41

Estimated dbh range: Lg: 39 Sm: 25

Relative abundance of dominant vs. subdominant (ratio): 1:25

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees X Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: few large trees and minimal snags present in net area

Subcanopy clutter: X Closed ___Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings X Shrubs

Common Subcanopy Species: Robinia pseudoacacia, Cornus florida, Quercus alba, Smilax sp., Carya tomentosa, Populus grandidentata, Lindera benzoin, Pinus virginiana, Acer rubrum

Habitat Description: Young upland forest, rolling hills adjacent to ROW and pasture land, dense shrub & sapling layer

Check all that apply:

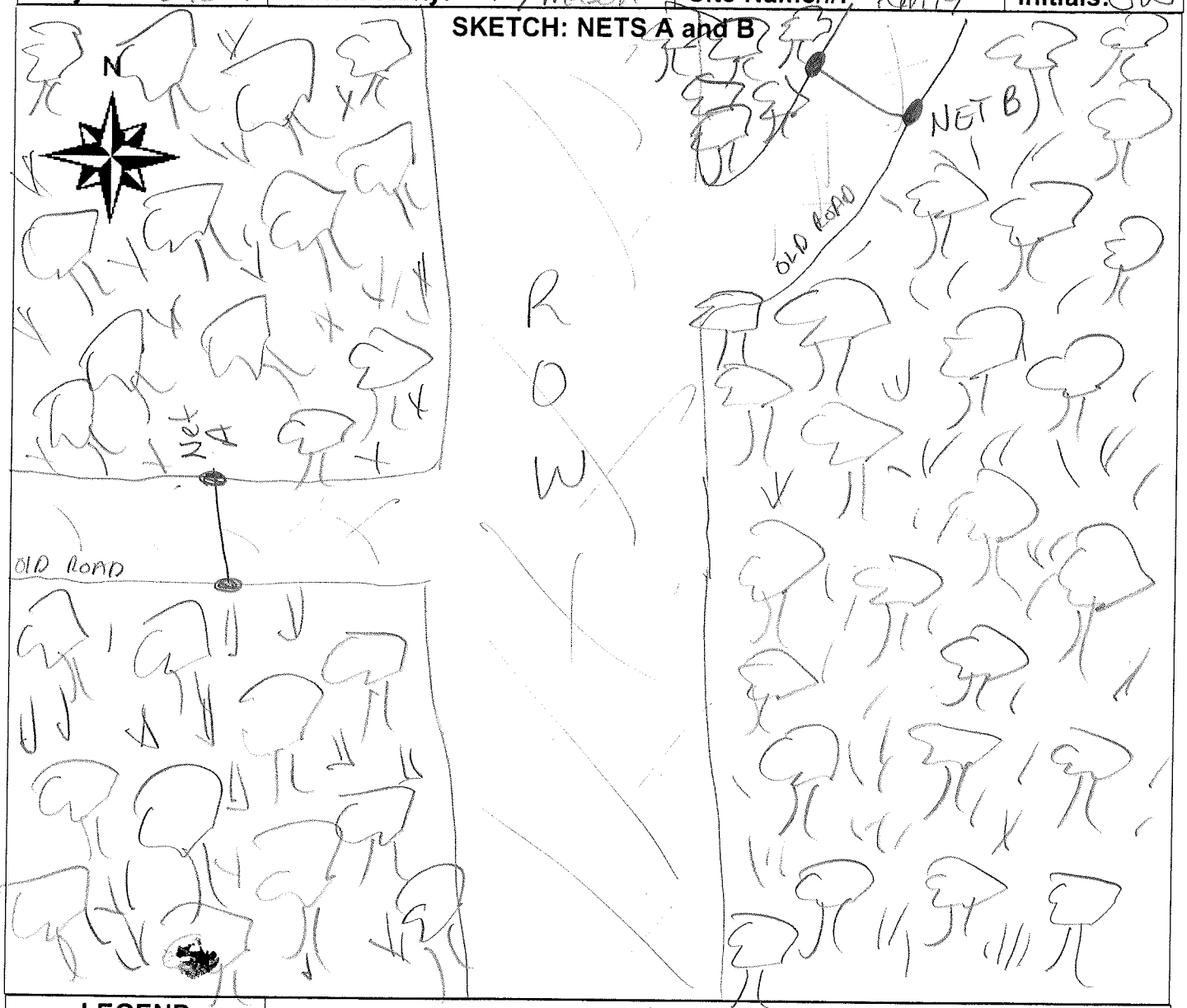
__Mature Upland Forest	__Recently Logged Forest	X Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	X Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: ___ Sparse X Moderate ___Dense

NET SITE HABITAT DESCRIPTION (continued)

Project #: 296-03	State/County: WV/Mason	Site Name/#: Km 19	Initials: JW

SKETCH: NETS A and B



LEGEND

Nets: ●——●

Trees:

Shrubs: V V

Grassy Area: ///

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296-03 Date: 08 August 2010

Project Name: AEP CO2

State: WV County: Mason

Biologists: J. Wilson, C. Boggs

Site name/#: km 19

GPS Unit #: A-6 Camera #: 69

MOON PHASE*

- [x] New moon
- [ ] Waxing crescent
- [ ] First quarter
- [ ] Waxing gibbous
- [ ] Full moon
- [ ] Waning gibbous
- [ ] Last quarter
- [ ] Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	23.1	—	—	10%	
2100	22.8	—	—	10%	
2130	22.2	—	—	0%	
2200	21.8	—	—	0%	
2230	20.9	—	—	0%	
2300	20.7	—	—	0%	
2330	20.5	—	—	0%	
0000	20.3	—	—	0%	
0030	20.2	—	—	0%	
0100	19.9	—	—	0%	
0130	19.5	—	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 51 ' 42.7 "N	81 ° 56 ' 20.9 "W	6	6	2030	0130	104-0431
B	NN	38 ° 51 ' 42.7 "N	81 ° 56 ' 17.9 "W	9	6	2030	0130	104-0433
		° ' "N	° ' "W					

Net Placement/Site Description: Nets stacked over road; heavily canopied

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO BATS									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296-03 Date: 09 August 2010

Project Name: AEP COZ

State: WV County: Mason

Biologists: J. Wilson, C. Boggs

Site name/#: Km 19

GPS Unit #: A-6 Camera #: 69

MOON PHASE*

X New moon
___Waxing gibbous
___Last quarter
___Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	24.7	—	—	0%	
2100	24.3	—	—	0%	
2130	23.7	—	—	0%	
2200	24.6	—	—	0%	
2230	24.2	—	—	0%	
2300	23.0	—	—	0%	
2330	22.8	—	—	0%	
0000	22.5	—	—	0%	
0030	22.6	—	—	0%	
0100	21.8	—	—	0%	
0130	21.4	—	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 51 ' 42.7 "N	81 ° 56 ' 20.9 "W	6	6	2030	0130	104-0431
B	NN	38 ° 51 ' 42.7 "N	81 ° 56 ' 19.9 "W	9	6	2030	0130	104-0433
		° ' "N	° ' "W					

Net Placement/Site Description: Nets stacked over road, heavily canopied

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
					NO BATS						

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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NET SITE HABITAT DESCRIPTION

Project #: 296.03 **Date:** 09 August 2010 **Biologists:** D. Jeffcott, C. Murphy

Project Name: AEP-CO_2 **Site Name/#:** KM20

State: WV **County:** Mason **USGS Quad:**

Camera #: G1 **Picture #s:** **GPS Unit #:** A13 **Waypoint #:** KM20B

Latitude: 38 ° 51 ' 22.4 "N **Longitude:** 81 ° 55 ' 57.8 "W

Distance to closest water source (meters): 3m Type of water source: ephemeral stream

Water source name: NA

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____meters Channel Width: _____meters Stream Width: _____meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Platinus occidentalis

Acer saccharum

Subdominant Canopy Species (< 40 cm/16" dbh)

Robinia pseudoacacia

Juglans nigra

Aesculus flava

Estimated dbh range: Lg: 45cm Sm: 40cm Estimated dbh range: Lg: 35cm Sm: 10cm

Relative abundance of dominant vs. subdominant (ratio): 1:30

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees ___Snags ___Both X Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: _____

Subcanopy clutter: X Closed ___Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings ___Shrubs

Common Subcanopy Species: Ulmus rubra Carpinus caroliniana Cercis canadensis

Habitat Description: County Rd 62/19 running adjacent to ephemeral stream w/ standing water. Subcanopy is dense. Field adjacent to stream w/ tall grasses.

Check all that apply:

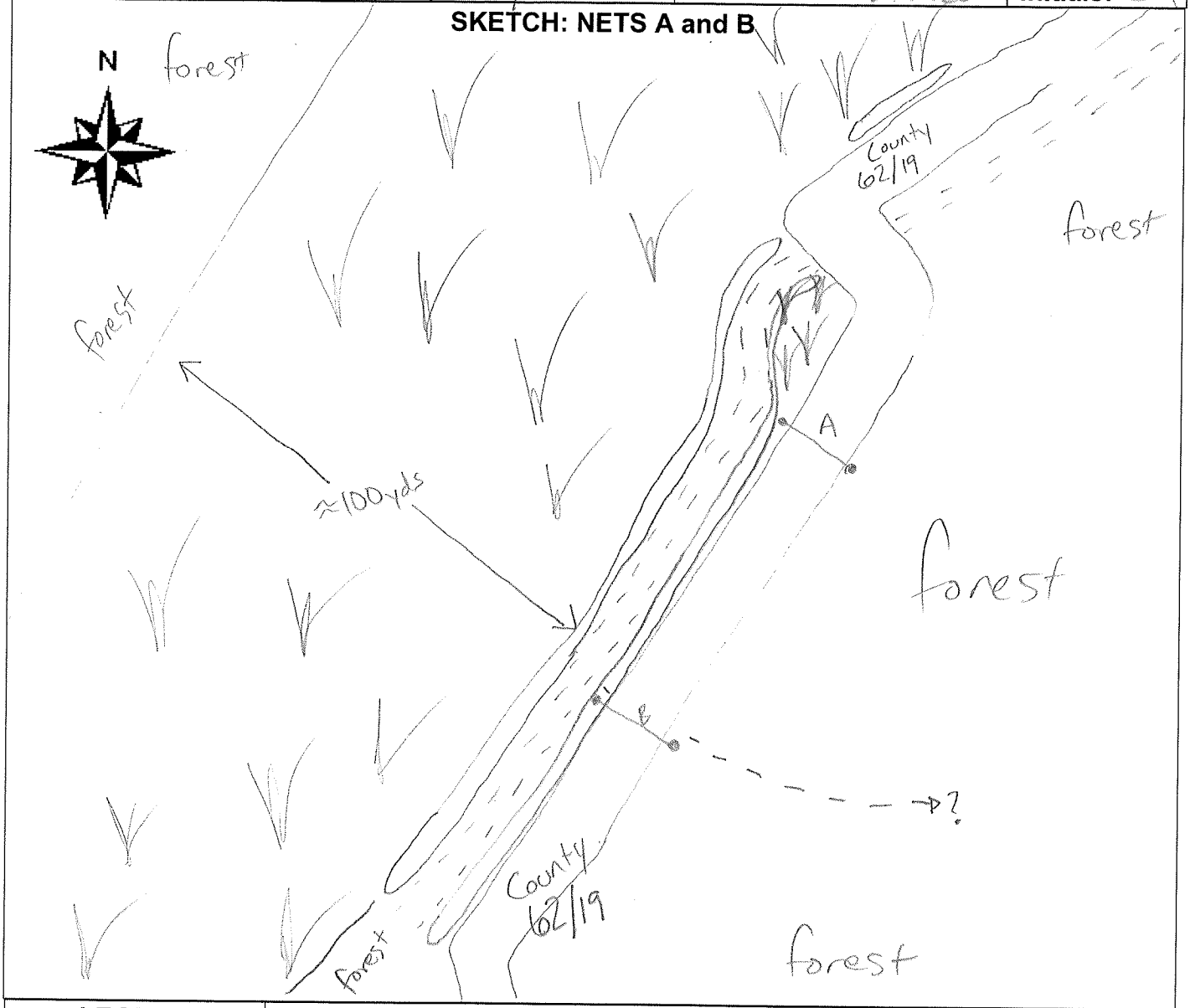
__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	X Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
X Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: X Sparse ___Moderate ___Dense

NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV / MASON	Site Name/#: KM20	Initials: CM

SKETCH: NETS A and B



LEGEND

Nets: ●——●

ephemeral stream = - - -

open canopy = Y Y grass

tree line = ○

COMMENTS

Dense tree-line on both sides of ephemeral stream. Canopy along road is sporadic with coverage over both nets. Still water present in stream.

NOT DRAWN TO SCALE

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 Date: 08 August 2010

Project Name: AEP - CO_2

State: WV County: MASON

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM20

GPS Unit #: A13 Camera #: 61

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter X Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	22.8	0	—	10%	—
2100	21.0	1-3	SW to NE	10%	—
2130	20.4	0	—	0%	—
2200	19.7	0	—	0%	—
2230	19.1	0	—	0%	—
2300	18.6	1-3	SW to NE	0%	—
2330	18.2	0	—	0%	—
0000	18.0	0	—	0%	—
0030	17.7	1-3	SW to NE	0%	—
0100	17.6	1-3	W to E	0%	—
0130	17.4	1-3	SW to NE	0%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 51 ' 25.2 "N	81 ° 55 ' 55.8 "W	6	6	2030	0130	
B	NN	38 ° 51 ' 22.4 "N	81 ° 55 ' 57.8 "W	9	6	2035	0135	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets placed in road corridor between forest and wooded ephemeral stream.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	A	Lasiurus borealis	2220								ESCAPED FROM NET
2	B	L. borealis	2235								"

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

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BAT CAPTURE DATA

Project #: 296-03 **Date:** 09 August 2010

Project Name: AEP - CO_2

State: WV **County:** Mason

Biologists: D. Jeffcott, C. Murphy

Site name/#: KM 20

GPS Unit #: A13 **Camera #:** 61

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
___Waxing crescent
___Full moon
X Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	—	— 0	—	0 %	—
2100	21.8	0	—	0 %	—
2130	21.2	1-3	SW to NE	0 %	—
2200	20.9	1-3	SW to NE	0 %	—
2230	20.5	0	—	0 %	—
2300	20.1	0	—	0 %	—
2330	19.7	0	—	0 %	—
2400	19.5	1-3	W to E	0 %	—
0030	19.3	1-3	W to E	0 %	—
0100	19.2	1-3	W to E	0 %	—
0130	19.1	0	—	0 %	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 51 ' 25.2 "N	81 ° 55 ' 55.8 "W	6	6	2030	0130	
B	NN	38 ° 51 ' 22.4 "N	81 ° 55 ' 57.8 "W	9	6	2035	0140	
		° ' "N	° ' "W					

Net Placement/Site Description: Nets placed in road corridor between forest and wooded ephemeral stream

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Lasiurus cinereus	2245	Ad	M	↓	23.5	50	M	0	
2	A	Lasiurus borealis	0005	Ad	M	↓	8.9	38	M	0	
3	A	L. borealis	0010	Ad	M	↓	8.9	38	M	0	Possible Re-capture
4	B	L borealis	0025	Ad	M	↓	8.9	38	M	0	Re-Capture

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
* Refer to table on the back

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

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NET SITE HABITAT DESCRIPTION

Project #: 296-03 **Date:** 10 August 2010 **Biologists:** J. Wilson, C. Boggs

Project Name: AEP COZ **Site Name/#:** KM21

State: WV **County:** Mason **USGS Quad:**

Camera #: 69 **Picture #s:** 104-0428, 0427 **GPS Unit #:** A-6 **Waypoint #:** 42

Latitude: 38 ° 50 ' 31.0 "N **Longitude:** 81 ° 55 ' 44.1 "W

Distance to closest water source (meters): 1 Km Type of water source: river

Water source name: Ohio River

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____ meters Channel Width: _____ meters Stream Width: _____ meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: ____ m or cm Clarity (H,M,L): ____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Acer saccharum

Robinia pseudoacacia

Quercus rubrum

Estimated dbh range: Lg: 60 Sm: 41

Subdominant Canopy Species (< 40 cm/16" dbh)

Quercus rubrum, Carya ovata, Acer rubrum

Robinia pseudoacacia, Ailanthus altissima

Acer saccharum, Leriodendron tulipifera

Estimated dbh range: Lg: 39 Sm: 20

Relative abundance of dominant vs. subdominant (ratio): 1/25

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees X Snags ___Both ___ Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments: no big trees w/ exfoliating bark

Subcanopy clutter: X Closed ___Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings X Shrubs

Common Subcanopy Species: Oxydendron arboreum Rubus spp., Lonicera spp.
Populus grandidentata Quercus alba, Cercis canadensis,
Sassafras albidum, Rhus typhinie, Robinia pseudoacacia, Acer rubrum

Habitat Description:

Open area off of road with multiple trails leading to forest & pasture - upland hardwood

Check all that apply:

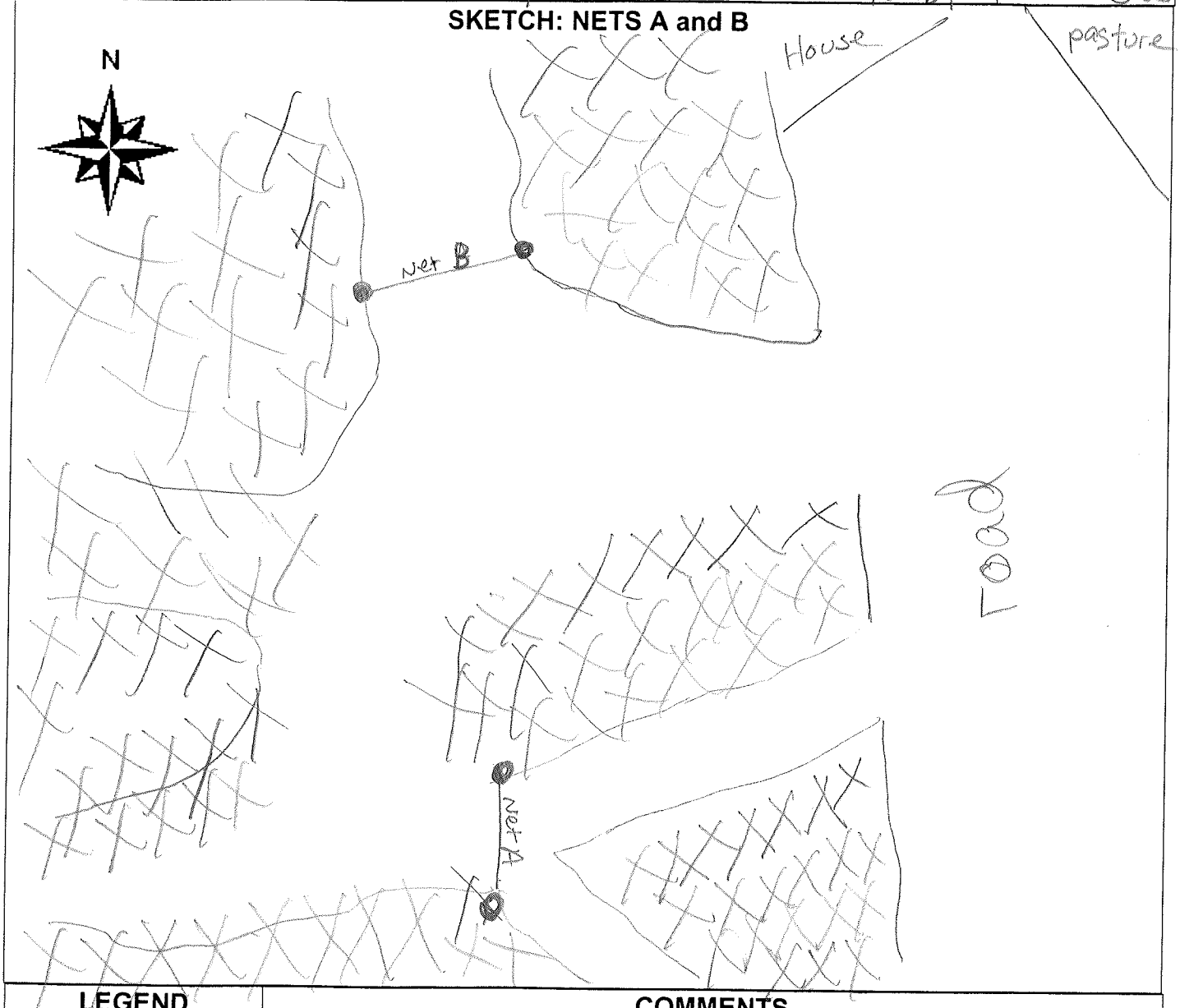
__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	X Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	__Other _____

Herbaceous Cover: ___ Sparse ___Moderate X Dense

NET SITE HABITAT DESCRIPTION (continued)

Project #: 296-03	State/County: WV / Mason	Site Name/#: KM21	Initials: JW

SKETCH: NETS A and B



LEGEND

Nets: ●——●

forest - XXX

COMMENTS

little canopy over roadway

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 2960-03 **Date:** 10 August 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: J. Wilson, C. Boggs

Site name/#: KM21

GPS Unit #: A-6 **Camera #:** 69

MOON PHASE*

X New moon
___ Waxing crescent
___ First quarter
___ Waxing gibbous
___ Full moon
___ Waning gibbous
___ Last quarter
___ Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	26.1	—	—	0-1%	
2100	25.8	—	—	0-1%	
2130	25.7	—	—	0-1%	
2200	26.1	—	—	0-1%	
2230	25.6	—	—	0-1%	
2300	25.1	—	—	0-1%	
2330	24.8	—	—	0-1%	
0000	25.2	—	—	0-1%	
0030	24.8	—	—	0-1%	
0100	24.5	—	—	0-1%	
0130	24.4	—	—	0-1%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 50 ' 31.0 "N	81 ° 55 ' 44.1 "W	6	6	2030	0130	104-0428
B	NN	38 ° 50 ' 32.3 "N	81 ° 55 ' 43.4 "W	6	6	2030	0130	104-0427
		° ' "N	° ' "W					

Net Placement/Site Description: Nets stacked over unimproved road with canopy

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Eptesicus fuscus	2035	Ad	m	↓	19.0	47	E	0	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296-03 **Date:** 11 August 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: J. Wilson, C. Boggs

Site name/#: Km21

GPS Unit #: A-6 **Camera #:** 69

MOON PHASE*

- X New moon
- ___ Waxing crescent
- ___ First quarter
- ___ Waxing gibbous
- ___ Full moon
- ___ Waning gibbous
- ___ Last quarter
- ___ Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	22.0	1-3	W-E	100%	—
2100	22.0	4-7	W-E	100%	—
2130	21.9	1-3	W-E	100%	—
2200	21.9	1-3	W-E	0%	—
2230	21.7	1-3	W-E	0%	—
2300	21.5	1-3	W-E	0%	—
2330	21.6	1-3	W-E	0%	—
0000	21.6	1-3	W-E	0%	—
0030	21.7	1-3	W-E	0%	—
0100	21.5	—	—	0%	—
0130	21.5	1-3	W-E	0%	—

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 50 ' 31.0 "N	81 ° 55 ' 44.1 "W	6	6	2030		104-0428
B	NN	38 ° 50 ' 32.3 "N	81 ° 55 ' 43.4 "W	6	6	2030		104-0427
		° ' "N	° ' "W					

Net Placement/Site Description: Nets stacked over unimproved road with canopy

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
				NO BATS							

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
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NET SITE HABITAT DESCRIPTION

Project #: 296.04 **Date:** 10 Aug 2010 **Biologists:** M.Michaels + S.Reeves

Project Name: MEP CO2 **Site Name/#:** km22

State: WV **County:** Mason **USGS Quad:**

Camera #: kz760 **Picture #s:** 5129-5132 **GPS Unit #:** A4 **Waypoint #:** km22 WP 4

Latitude: 38 ° 51 ' 14.6 "N **Longitude:** 81 ° 55 ' 48.3 "W

Distance to closest water source (meters): Type of water source:

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS): NA

Bank Height: meters Channel Width: meters Stream Width: meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): Average Water Depth: ____m or cm Clarity (H,M,L):____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
	Pinus Strobus
	Quercus alba
	Acer rubrum
Estimated dbh range: Lg: ____ Sm: ____	Estimated dbh range: Lg: 35 Sm: 18

Relative abundance of dominant vs. subdominant (ratio):

Estimated canopy closure: ___Closed ___Moderate X Open

Roost tree potential consists of: ___Large Trees ___Snags ___Both X Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments:

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees ___Saplings ___Shrubs

Common Subcanopy Species: Pinus Strobus Quercus alba Aesculus Octandra

Habitat Description: Pinus strobus plantation w/an old forest edge lining a gravel road.

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	__Crop/Pasture Land	__Shrub/scrub Swamp
__Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	X Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	__Old Field	__Forested Swamp	X Other Pinus Strobus Plantation

Herbaceous Cover: ___ Sparse X Moderate ___Dense

Property of: Environmental Solutions & Innovations, Inc.
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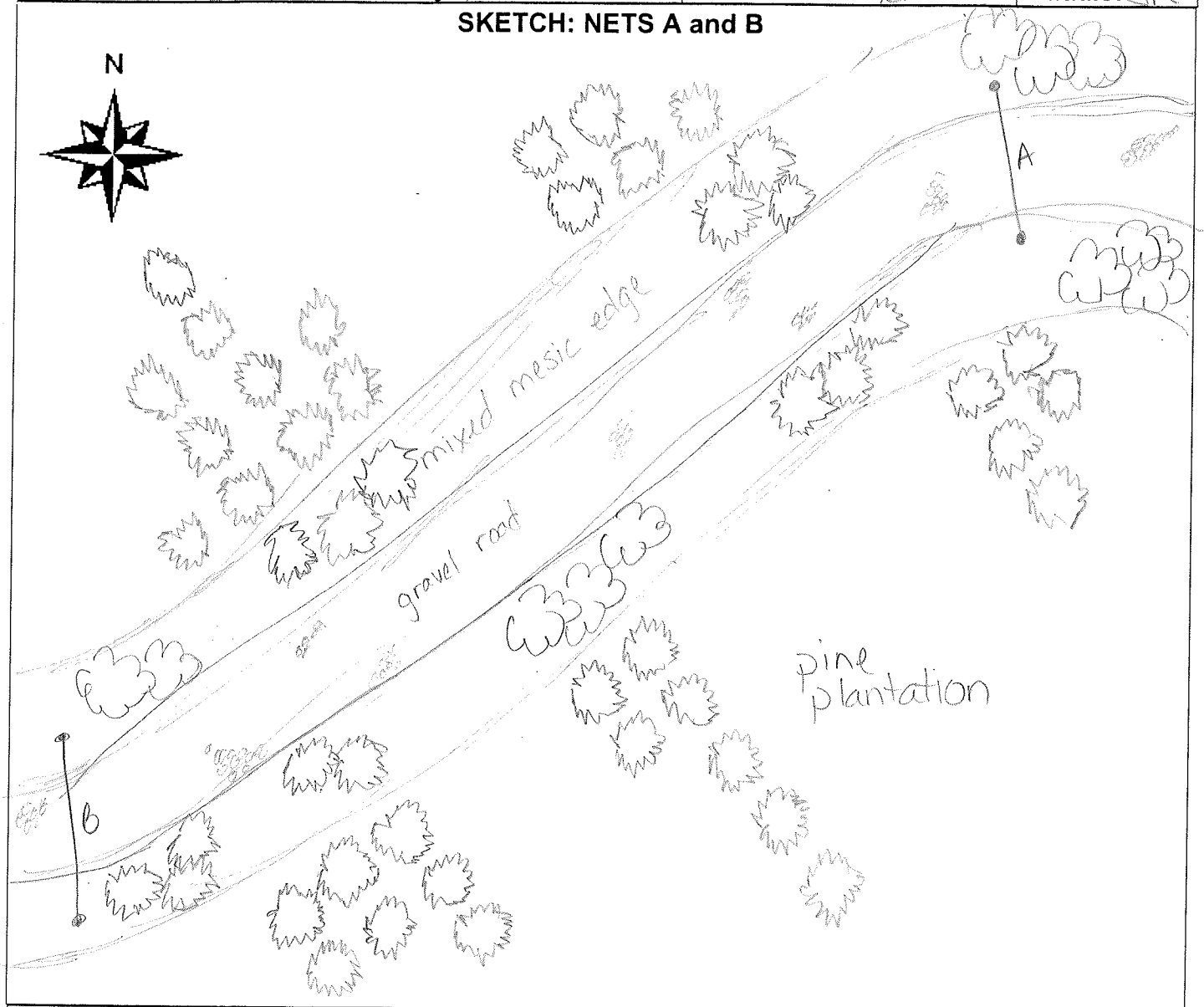
NET SITE HABITAT DESCRIPTION (continued)

Project #: 29604	State/County: WV	Site Name/#: KM 22	Initials: SR

SKETCH: NETS A and B



LEGEND

Nets: ●——●

COMMENTS

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.04 **Date:** 10 Aug 2010

Project Name: AEP CO2

State: WV **County:** Mason

Biologists: M. Michaels + S. Reeves

Site name/#: Km 22

GPS Unit #: A4 **Camera #:** Kz760

MOON PHASE*

___New moon
___Waxing gibbous
___Last quarter
_X_Waxing crescent
___Full moon
___Waning crescent
___First quarter
___Waning gibbous

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	27.3	0	—	30%	
2100	26.3	0	—	30%	
2130	26.0	0	—	40%	
2200	25.5	0	—	40%	
2230	25.3	0	—	40%	
2300	25.1	0	—	0%	
2330	24.9	0	—	0%	
0000	24.6	0	—	0%	
0030	24.7	0	—	0%	
0100	24.4	0	—	0%	
0130	25.3	0	—	0%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38° 51' 14.6"N	81° 55' 49.3"W	6	6	2030		5130-5132
B	NN	38° 51' 13.7"N	81° 55' 50.4"W	6	6	2030		5128-5129
		° ' "N	° ' "W					

Net Placement/Site Description: Pinus Strobus Plantation (young) with young cedar forest on edge. Gravel Road intersect.

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
1	B	Eptiscus fuscus	0120	Ad	M	↓	17.5	45	F	0	—

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat
[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓
* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.04 **Date:** 11 Aug 2010

Project Name: AEP CO_2

State: WV **County:** Mason

Biologists: M Michaels S Reeves

Site name/#: KM 22

GPS Unit #: A4 **Camera #:** KZ760

MOON PHASE*

___New moon
✓Waxing crescent
___First quarter
___Waxing gibbous
___Full moon
___Waning gibbous
___Last quarter
___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	26.8	1-3	W-E	80%	
2100	22.3	1-3	W-E	40%	
2130	22.0	1-3	W-E	30%	
2200	21.8	1-3	W-E	50%	
2230	21.5	1-3	W-E	50%	
2300	21.2	0	—	50%	
2330	21.1	0	—	20%	
0000	20.9	0	—	20%	
0030	21.3	0	—	20%	
0100	21.0	1-3	W-E	20%	
0130	21.1	0	—	20%	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	38 ° 51 ' 14.6 "N	81 ° 55 ' 48.3 "W	6	6	2030	0130	5130-5132
B	NN	38 ° 51 ' 13.7 "N	81 ° 55 ' 50.4 "W	6	6	2030	0130	5128-5129
		° ' "N	° ' "W					

Net Placement/Site Description: Net A+B across Shirley Rd. (gravel) in young Pine plantation

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO BATS CAPTURED									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

NET SITE HABITAT DESCRIPTION

Project #: 29610 3 **Date:** Aug 11, 2010 **Biologists:** M. Little, T. Hern

Project Name: AEP **Site Name/#:** KM 23

State: WV **County:** Mason **USGS Quad:**

Camera #: **Picture #s:** 015, 016 **GPS Unit #:** 13 **Waypoint #:**

Latitude: °' " N **Longitude:** °' " W

Distance to closest water source (meters): N/A Type of water source:

Water source name:

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: meters Channel Width: meters Stream Width: meters

Substratum: ___Bedrock ___Boulder ___Cobble ___Gravel ___Sand ___Silt/Clay

Still Water Present (Y/N): Average Water Depth: m or cm Clarity (H,M,L):

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)
- Juglan nigra
- black locus
- tree of heaven

Subdominant Canopy Species (< 40 cm/16" dbh)
- black locust

Estimated dbh range: Lg: 20 Sm: 15

Estimated dbh range: Lg: 7 Sm: 5

Relative abundance of dominant vs. subdominant (ratio): 75/25

Estimated canopy closure: ___Closed X Moderate ___Open

Roost tree potential consists of: ___Large Trees ___Snags ___Both X Neither

Roost tree potential for the area is: ___High ___Moderate X Low

Roost potential comments:

Subcanopy clutter: ___Closed X Moderate ___Open

Subcanopy comprised largely of: X Lower Branches of Canopy Trees X Saplings ___Shrubs

Common Subcanopy Species: Black locust

Habitat Description: Forest edge along roadside

Check all that apply:

__Mature Upland Forest	__Recently Logged Forest	X Crop/Pasture Land	__Shrub/scrub Swamp
X Young Upland Forest	__Pine Plantation	__Stream/River	__Vernal Pool
__Mature Lowland Forest	__Woodlot/ForestEdge	__Emergent Wetland	__Deepwater Lake/Pond
__Young Lowland Forest	X Old Field	__Forested Swamp	__Other

Herbaceous Cover: ___ Sparse X Moderate ___Dense

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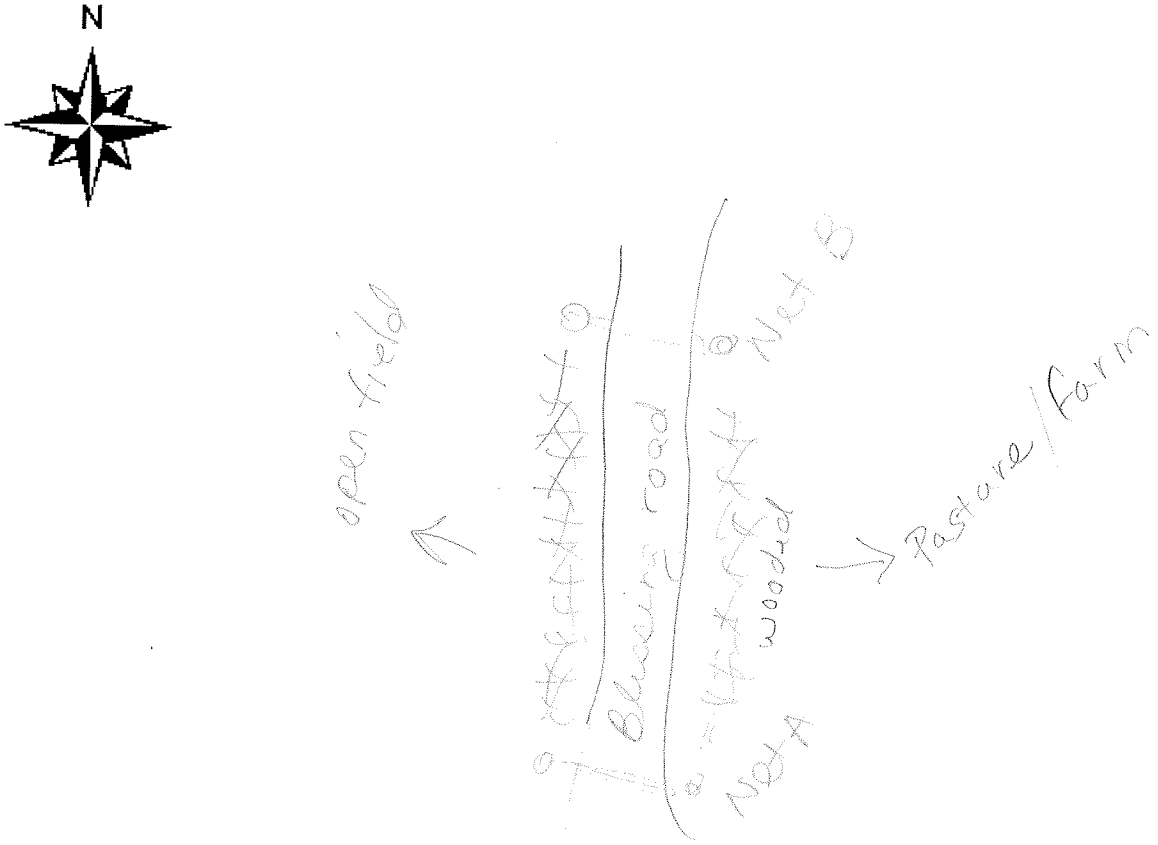
NET SITE HABITAT DESCRIPTION (continued)

Project #: 296.03	State/County: WV / Mason	Site Name/#: KM 23	Initials: ML

SKETCH: NETS A and B



LEGEND	COMMENTS
Nets: ●——●	

ESI

Property of: Environmental Solutions & Innovations, Inc.
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BAT CAPTURE DATA

Project #: 296.03 Date: Aug 10, 2010

Project Name: AEP

State: WV County: Mason

Biologists: M. Little, T. Stern

Site name/#: Km 23

GPS Unit #: 13 Camera #: _____

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	21	6	—	10	
2190	21	0	—	10	
2130	21	0	—	0	
2200	20	6	—	0	
2230	20	0	—	0	
0000	20	0	—	0	
0030	21	0	—	0	
0100	20	0	—	0	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	° ' "N	° ' "W	6	6	2030	0130	015
B	NN	° ' "N	° ' "W	6	6	2030	0130	016
		° ' "N	° ' "W					

Net Placement/Site Description: Both nets on roadway

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO BATS									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

Property of: Environmental Solutions & Innovations, Inc.
781 Neeb Road. Cincinnati, OH 45233 (Phone: 513-451-1777)

BAT CAPTURE DATA

Project #: 296.03 Date: Aug 11, 2010

Project Name: AEP

State: WV County: Mason

Biologists: M. Little, T. Hern

Site name/#: KM23

GPS Unit #: 13 Camera #:

MOON PHASE*

___New moon ___Waxing crescent ___First quarter
___Waxing gibbous ___Full moon ___Waning gibbous
___Last quarter ___Waning crescent

WEATHER DATA

Time (0000 h)	Temp (°C)	Wind Speed (estimated – see chart)*	Wind Direction: From ___ to ___	% Cloud Cover (estimated)	Comments
2030	21	0	—	100	
2100	21	0	—	75	
2130	20	0	—	100	
2200	20	0	—	100	
2230	20.5	0	—	100	
2300	21	0	—	100	
2330	20	0	—	100	
0000	19	0	—	100	
0030	19	0	—	75	
0100	19	0	—	100	

Net/Trap/Anabat #	Net/Trap Type[1]	Latitude	Longitude	Length (m)	Height (m)	Time Up (0000 h)	Time Down (0000 h)	Picture #
A	NN	° ' "N	° ' "W	6	6	2030	0130	015
B	NN	° ' "N	° ' "W	6	6	2030	0130	016
		° ' "N	° ' "W					

Net Placement/Site Description: Both nets on roadway

Capt #	Net #	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro.[2]	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Comments Picture # /Guano/Hair Sample
		NO BATS									

[1] M = Monofilament, ON = Old Nylon, NN = New Nylon, HT = Harp Trap; A = Anabat

[2] Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓

* Refer to table on the back

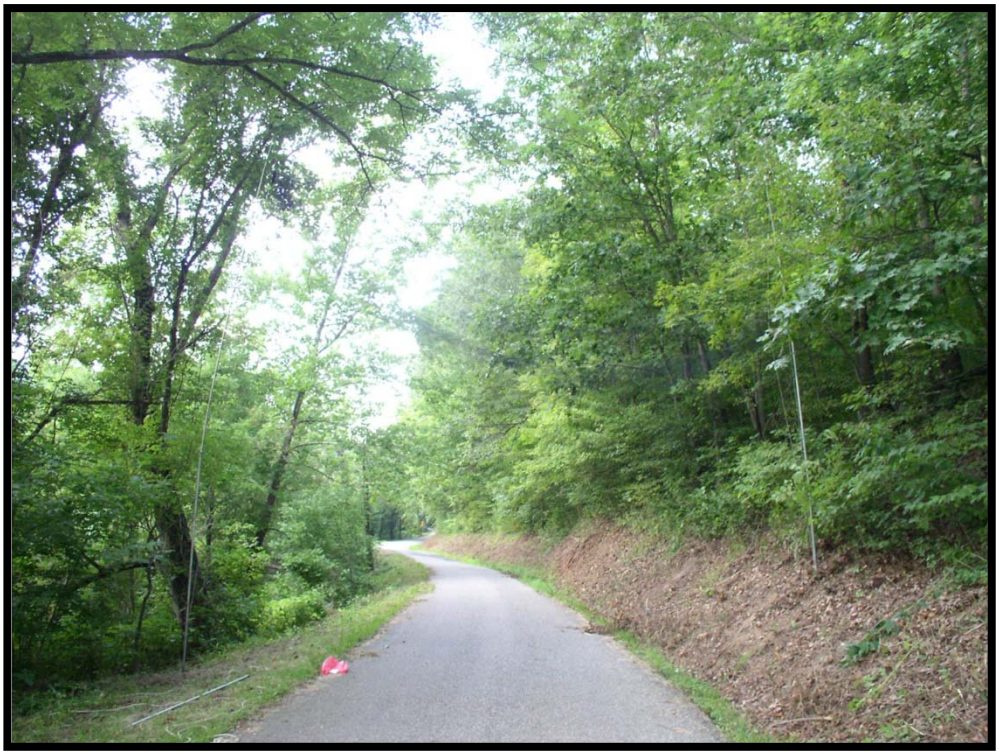
APPENDX E
MIST NET SITE PHOTOGRAPHS

Site KM1 – Net A

Site KM2 – Net B

Site KM3 – Net A

Site KM4 – Net B



Site KM5 – Net A

Site KM6 – Net A

Site KM7 – Net A

Site KM8 – Net B

Site KM9 – Net A

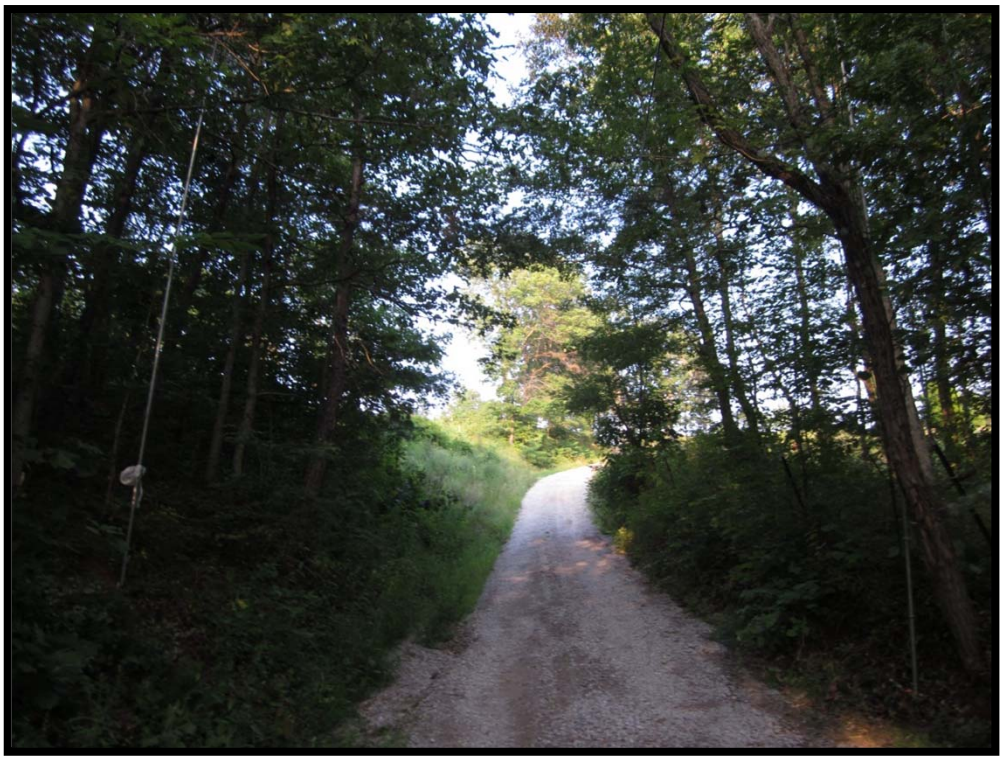
Site KM10 – Net B

Site KM11 – Net A

Site KM12 – Net B

Site KM13 – Net A

Site KM14 – Net B



Site KM15 – Net A

Site KM16 – Net B

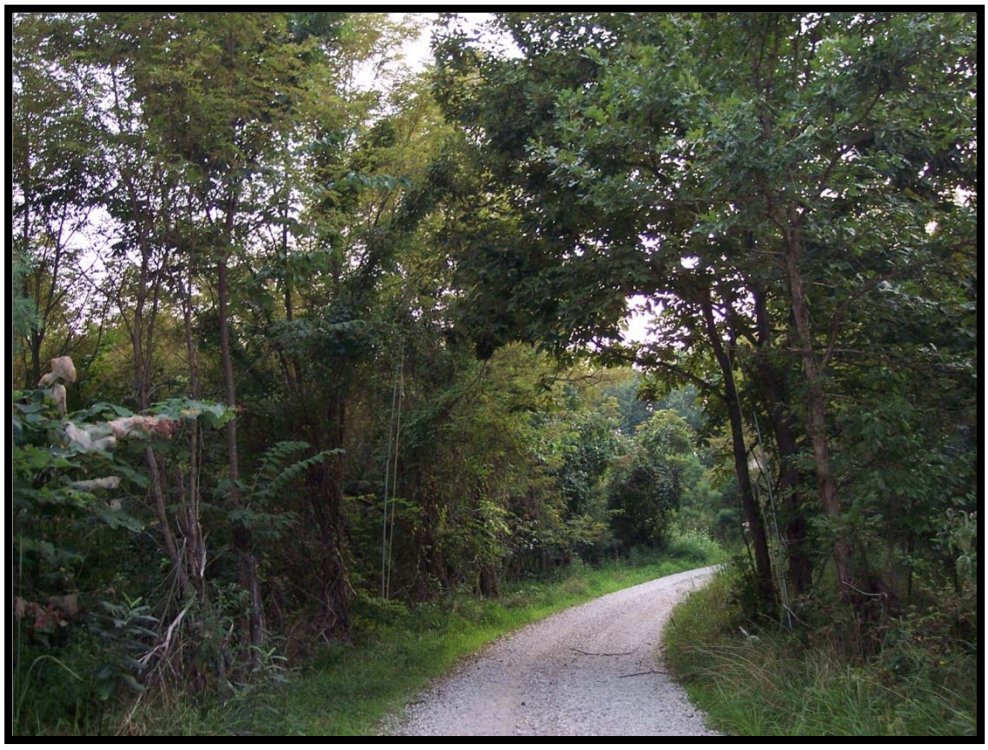
Site KM17 – Net A

Site KM18 – Net A

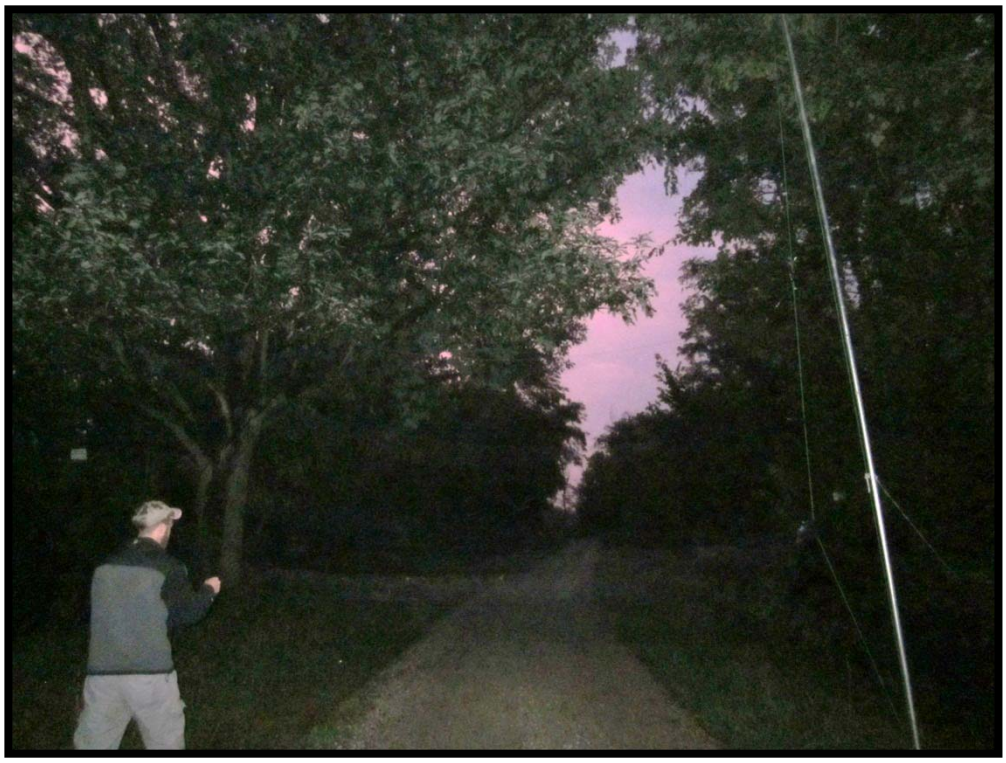
Site KM19 – Net A

Site KM20 – Net B

Site KM21 – Net A



Site KM22 – Net B



Site KM23 – Net A

Site KM24 – Net B

Site KM25 – Net B

Site KM26 – Net A

Site KM27 – Net A

Site KM28 – Net B

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