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Haile Gold Mine, Inc.

Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Lancaster County, South Carolina

Revision: July 20, 2012

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Comprehensive Baseline Wildlife and Aquatic Report

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Abbreviations and Acronyms

AES	Alderman Environmental Services, Inc.
ALUS	Aquatic Life Use Support
Amax	Amax Gold Inc.
amsl	above mean sea level
Analook	Analook W software
ARCADIS	ARCADIS U.S., Inc.
BAEA	Bald Eagle (*Haliaeetus leucocephalus*)
Bat #1	Bat Monitoring Station #1
Bat #2	Bat Monitoring Station #2
Bat #3	Bat Monitoring Station #3
Bat #4	Bat Monitoring Station #4
BC	Buffalo Creek
BCID_10	Bat Call Identification Software
BI	Biotic index
BGEPA	Bald and Golden Eagle Protection Act
CB	Camp Branch
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CPOM	Coarse particulate organic matter
CPUE	catch–per unit effort
CWCS	Comprehensive Wildlife Conservation Strategy
DBH	diameter at breast height
DO	dissolved oxygen
EDT	Eastern Daylight Time
EIS	Environmental Impact Statement
EPT	Ephemeroptera, Plecoptera, and Trichoptera

ESA	Endangered Species Act
ETT	ETT Environmental, Inc.
F	Fahrenheit
ft	feet
ft/s	feet per second
FWD	Fine Woody Debris
Haile	Haile Gold Mine, Inc.
HGMC	Haile Gold Mine Creek
HUC	Hydrolic Unit Code
Hwy	Highway
Kinross	Kinross Gold
LLR	Little Lynches River
LWD	Large Woody Debris
MBTA	Migratory Bird Treaty Act
MYAU	Southeastern myotis (*Myotis austroriparius*)
MYSO	Indiana bat (*Myotis sodalis*)
NCDENR	North Carolina Department of Environment and Natural Resources
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
PAG	potentially acid generating
Piedmont	Piedmont Mining Company
RBP	Rapid Bioassessment Protocol
RCWO	Red-cockaded Woodpecker (*Picoides borealis*)
Romarco	Romarco Minerals, Inc.
SC	South Carolina
SD	standard deviation
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources

SCP	Scientific Collector's Permit
SCSA	South Carolina Stream Assessment
Site	Haile Gold Mine
SWG	State Wildlife Grants
T&E	threatened and endangered
TDS	total dissolved solids
US	United States
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
YOY	young–of–year

1. Introduction

The Haile Gold Mine is located in Lancaster County, South Carolina (Latitude 34.579810º North, Longitude -80.539554ºWest). It consists of privately owned land, bisected by Highway (Hwy) 601, that is owned by Haile Gold Mine, Inc. (Haile), which is a wholly-owned subsidiary of Romarco Minerals, Inc. (Romarco).

Haile has proposed to conduct open pit gold mining operations at the Haile Gold Mine. The proposed mining operations require a US Army Corps of Engineers (Corps) permit for which the Corps has determined that an Environmental Impact Statement (EIS) should be written. To support the permit application and the National Environmental Policy (NEPA) process, ARCADIS U.S. Inc. (ARCADIS) has prepared for Haile this baseline wildlife and aquatic resources study report. The report is a comprehensive report describing the baseline, existing conditions of wildlife and aquatic species resources within permit boundary and additional properties surrounding the permit boundary. The permit boundary is defined as all of the land (approximately 4,224 acres) to be used for mining purposes that is shown in the 404/401[1] permit application pending before the Corps. The additional properties surrounding the permit boundary encompasses approximately 1,020 additional acres, and is defined as all property owned by Haile that is in the vicinity of the project. The permit boundary and property boundaries are shown in Figure 1-1. These two boundaries are collectively referred to in this report as “the Site”.

This report contains baseline information about wildlife and aquatic resources within Site boundaries and in the immediate vicinity of the Site. The primary objective of the report is to document the existing spatial baseline aquatic and wildlife resources in the vicinity of the Site.

Following the primary objective, the specific study objectives include the following:

- Characterize the presence, distribution and relative abundance of passerine/small bird populations, bats, ground-dwelling mammals and large game populations at the Site.

[1] Joint Federal and State Application for Activities Affecting Waters of the United States for Critical Areas of the State of South Carolina (404/401 coverage).

- Determine the occurrence and location of nesting raptor/large bird populations at the Site.
- Characterize the presence of individual Federal/State listed threatened and endangered (T&E) birds at the Site.
- Characterize the presence, abundance and diversity of fish, benthic macroinvertebrate, amphibian and reptile populations in streams at the Site, and upstream and downstream locations from the Site.
- Characterize the quality and condition of instream and riparian habitat conditions of streams at the Site, and upstream and downstream locations from the Site.
- Determine the presence, or potential presence, of special status species likely to be at the Site.

To meet the study objectives, the report provides a review of all the previous wildlife and aquatic resource studies conducted at the Site to date, and the results of species-specific surveys conducted from August through October 2011, as proposed in the *Wildlife Resources Study Plan* (ARCADIS 2011a) and the *Aquatic Resources Study Plan* (ARCADIS 2011b). These documents are referred to henceforth as "the Study Plans". This report does not address potential impacts of the proposed Haile project on wildlife and aquatic resources.

The remainder of this report is organized as follows:

Section 2 – Site Description

Section 3 – Wildlife Resources

Section 4 – Aquatic Resources

Section 5 – Special Status Species Summary

Section 6 – References

2. Site Description

2.1 Site Location

The Site is located approximately 3 miles northeast of the town of Kershaw in southern Lancaster County, South Carolina (Latitude 34.579810º North, Longitude -80.539554º West). Lancaster County lies in the north–central part of the state. The Site is approximately 17 miles southeast of the city of Lancaster, the county seat, which is approximately 30 miles south of Charlotte, North Carolina. The elevation at the Site ranges from ~525 feet (ft) above mean sea level (amsl) along the northeast area of the Site, to less than 350 ft amsl at the confluence between Haile Gold Mine Creek (HGMC) and the Little Lynches River.

The Site lies within the Piedmont physiographic province, which is bordered by the Coastal Plain to the east and the Southern Appalachian Mountains to the west. Geologically, Haile is located within the Carolina Slate Belt, a southwest-northeast trending system of intensively folded metavolcanic and metasedimentary rocks.

2.2 Overview of Proposed Project

The first gold discovery at the Site dates back to 1827. Mining occurred on and off from 1827 until 1991. Mining methods used included placer, surface and underground. The most recent mining was performed by Piedmont Mining Company (Piedmont) who owned and operated the mine from 1984 – 1992. Amax Gold Inc. (Amax) assumed site management in 1992, and initiated studies to potentially re–open the mine to recover gold. Kinross Gold (Kinross) acquired the Site in 1998. Romarco acquired the property from Kinross in 2007, and has since then also acquired additional properties surrounding the original mine site. The Haile Gold Mine is owned and operated by Haile Gold Mine, Inc. (Haile) a wholly owned subsidiary of Romarco. Romarco has conducted an exploration drilling and mine development program in several mineralized zones at the Site.

The proposed mine plan includes removing approximately 241 million tons of overburden, mining approximately 33.6 million tons of ore, construction of a mill and tailing storage area, placement of potentially acid generating (PAG) rock onto a geomembrane–lined facilities, and storage of non–PAG overburden on unlined locations. Haile is proposing to mine ore from several open pits, and refilling the pits over the course of mining. The planned facilities for the Site as set forth in the 404/401 permit application are shown in Figure 2-1.

2.3 Climate

Regional climate is characterized as a humid subtropical climate. Summers are hot and humid with daytime temperatures averaging 86 – 92ºFahrenheit (F). Winters are mild and wet, with overnight temperatures occasionally below freezing. Average annual temperature at the Site is ~60ºF. Precipitation is abundant throughout the year with March being the wettest month. Annual total rainfall measured at the Site between July 1985 and September 2010 averaged 48.3 inches. Annual total snowfall is typically less than 6 inches.

2.4 Watershed and Stream Characteristics

All streams within the permit boundary are part of the Little Lynches River sub–basin watershed (Hydrolic Unit Code (HUC) 03040202-02). Camp Branch and HGMC are the principal streams within the permit boundary and are presented on Figure 2-2. Both streams flow into the Little Lynches River located immediately south of the Site (Figure 2-2). The Little Lynches River discharges to the Lynches River, which eventually discharges into the Pee Dee River. All of these waters are classified as fresh water in the South Carolina Department of Health and Environmental Control (SCDHEC) Regulation R61-69, Classified Waters (SCDHEC 2008). The Pee Dee River flows east–southeast to the coast of South Carolina and empties into the Atlantic Ocean. The distance between the permit boundary and the Atlantic Ocean Coast is approximately 230 river miles.

HGMC drains an area of approximately 3,000 acres, and Camp Branch drains an area of approximately 4,000 acres. Both creeks flow in a predominately southwest direction towards the confluence with the Little Lynches River. Flow in the HGMC upstream of the confluence with Little Lynches River averages around 3 cubic feet per second (cfs), and flow in Camp Branch averages 6.2 cfs. Flow in both streams is greatest in winter and spring. Both streams were classified largely as 1st or 2nd Order streams (ERC 2012a).

The Little Lynches River drains an area of approximately 87,000 acres. The Little Lynches River is fed by numerous small drainages. In the area near the Site, the river flows to the southeast and has an elevation of around 350 ft amsl at its confluence with HGMC. Flow in the Little Lynches River just upstream of the confluence with HGMC averages around 42.3 cfs and is greatest in the winter and spring. The portion of the Little Lynches River that is adjacent to the Site was classified as a >4th Order stream (ERC 2012a).

Other tributaries of interest near the Site include Buffalo Creek and an unnamed tributary ("Unnamed Tributary"). Tributaries to Buffalo Creek dissect some of the adjacent properties to the northeast that are owned by Haile. These tributaries are outside the permit boundary. Buffalo Creek is part of the upper Lynches River watershed sub–basin (HUC 03040202-03). Buffalo Creek flows into Lynches River. The Unnamed tributary is located southeast of the permit boundary and dissects some of the adjacent properties to the southeast that are owned by Haile (Figure 2-2). This drainage is part of the Little Lynches River sub-basin and flows into the Little Lynches River.

The Little Lynches watershed occupies 126,832 acres of the Piedmont and Sand Hills regions of South Carolina (SCDHEC 2007). Land cover in the Little Lynches watershed consists of 55% forested land, 30% agricultural land, 9% forested wetland, and 5% urban land. The remaining 1% of land consists of scrub/shrub, barren, open water or nonforested wetland (SCDHEC 2007).

2.5 Vegetation Communities

The Site is located in northern South Carolina, within the Piedmont ecoregion and the Carolina Slate Belt ecobasin. The region is generally characterized as having rolling forested hills and low lying drainages. Much of the uplands across the Site have been cleared or logged. Dominant vegetation cover consists of forest stands, most of which are managed or naturalized plantation stands (ERC 2012b). The Site is just adjacent to the Fall Line, which is a geomorphic boundary marked by a collection of shoals, waterfalls, and cliffs within rivers and creeks that define the separation between the Piedmont ecoregion and the Sandhills ecoregion.

Vegetation community mapping was completed in fall 2011 (ERC 2012b). All of the vegetation communities identified in ERC (2012b), classified using Nelson (1986), are summarized in Table 2-1. Natural habitats within and adjacent to the Site presently include oak–hickory forests, xeric sandhill scrubs, "streamhead pocosins" (as identified in the report), and small stream forests (ERC 2012b). As shown in Figure 2-3, the majority of the Site is composed of non–natural communities, which presently include managed tree plantations, logged timberland, modified managed upland vegetation types (naturalized and vegetation-scrub regrowth), developed land, agricultural land, and temporary access roads (ERC 2012b). Following closure, the Haile Gold Mine will be reclaimed pursuant to SCDHEC's Division of Mining and Solid Waste Management regulations.

3. Wildlife Resources

This section presents a review of all the previous wildlife resource (avian and mammal) studies conducted at the Site, and presents in detail the results of the 2011 avian and mammal surveys as proposed in ARCADIS (2011a). The organization of this section of the report is as follows:

Section 3.1 – Previous Avian Studies

Section 3.2 – Previous Mammal Studies

Section 3.3 – Overview of ARCADIS 2011 Wildlife Species Surveys

Section 3.4 – The ARCADIS 2011 Passerine Survey

Section 3.5 – The ARCADIS 2011 Raptor/Large Bird and Special Status Avian Surveys

Section 3.6 – The ARCADIS 2011 Bat Survey

Section 3.7 – The ARCADIS 2011 Ground–dwelling Mammal Survey

Section 3.8 – Opportunistic Wildlife Observations During the 2011 Surveys

Section 3.9 – Summary of the ARCADIS 2011 Wildlife Surveys

3.1 Previous Avian Studies

Previous avian studies at the Site focused on identifying the potential presence of the Bald Eagle (BAEA [*Haliaeetus leucocephalus*]), but incidental observations of other avian species were also noted in these studies. A summary of all the bird species observed at the Site during previous surveys is provided in Table 3-1. Descriptions and results of the previous avian studies are presented below in chronological order.

1993: A number of environmental surveys, including a winter bird survey, were either planned or in the process of being conducted at the Site beginning around 1993, as described in NJA (1993). However, these surveys were discontinued in December 1993, prior to completion (and report finalization) of any avian studies, due to the possibility of a future sell of the Site by Amax. Despite survey cancellation,

staff noted incidental observations of avian species at the Site during other 1993 field investigations.

2008: A survey was conducted on July 24, 2008 (Parnell 2008) to evaluate the suitability of open water habitats along the eastern portion of the Site (east of Hwy 601) for use by BAEAs. Dr. Parnell discussed known BAEA locations with South Carolina Department of Natural Resources (SCDNR), and then conducted an onsite visit with Mr. Robert Needham on July 24, 2008. Dr. Parnell's report concludes that the area surveyed appeared unlikely to support regular use by BAEAs. The report notes that BAEAs are known to nest in Kershaw County on or near Lake Wateree and Hermitage Mill Pond, and in Lancaster County on the Catawba River. Dr. Parnell concluded that the Ledbetter Reservoir was too small of a water body to support nesting BAEAs and provide a sufficient prey base, HGMC was too shallow and contained few or no fish populations, and the Little Lynches River had a lack of suitable foraging habitat due to the closed tree canopy. During the BAEA survey, incidental observations of other avian species were recorded, as shown in Table 3-1.

2010: A technical memorandum issued on October 23, 2010 (NEI 2010) assessed the likelihood for BAEA presence on the western portion of the Site (west of Hwy 601, the "Duckwood tract"). Because Dr. Parnell's earlier study found that habitat conditions on the Site were unsuitable for BAEA presence, no additional survey work was recommended for BAEAs at the Duckwood tract in 2010.

3.2 Previous Mammal Studies

Only one previous mammal study was conducted at the Site. NJA (1993) documented the presence/absence of the southeastern myotis (MYAU, *Myotis austroriparius*) on the eastern portion of the Site. Evidence and observations of other mammals present at the Site were also documented during the survey. A summary of all the mammal species observed at the Site during this previous survey is provided in Table 3-2. A description of the previous study is presented below.

An intensive one–day survey for mammal species was performed on July 31, 1993 (NJA 1993). The survey was conducted at sunset to attempt to document MYAU individuals foraging over the farm pond and the Little Lynches River. However, MYAU was not observed at these water bodies. Observations of habitat conditions at HGMC and Ledbetter Reservoir were made that indicated these areas lacked the species' preferred habitat, which include extensive swamp forests and rivers of sufficient volume.

In addition to a search for MYAU, a series of traps, ground–truth efforts, and incidental observations were used to document the presence of mammals on the eastern portion of the Site. Sherman live traps, Museum Special snap traps, and pitfall traps were set in the dense herbaceous growth surrounding the "farm pond" (see Figure 2-2). Pitfall traps were also set in an adjacent pine plantation habitat. Observations and secondary evidence found near the traps were documented. A small section of HGMC and the Little Lynches River were also surveyed to document the presence of mammals, and incidental observations of mammals were recorded while driving on access roads (paved and unpaved) in the vicinity of the Site. All mammals surveyed during this effort are listed in Table 3-2.

3.3 Overview of ARCADIS 2011 Wildlife Species Surveys

3.3.1 Purpose and Objectives

The primary objective of the 2011 wildlife surveys was to characterize the spatial baseline wildlife (avian and mammal) resources at the Site. This baseline information will facilitate the permitting process, provide information on wildlife species assemblages, and can be used to evaluate potential impacts and monitor effects of the proposed project.

Following the primary objective, the specific study objectives included the following:

- Characterize the presence, distribution and relative abundance of passerine/small bird populations at the Site.
- Determine the occurrence and location of nesting raptor/large bird populations at the Site.
- Characterize the presence of individual Federal/State T&E birds at the Site.
- Characterize the presence, distribution and relative abundance of bat populations at the Site.
- Characterize the presence, distribution and relative abundance of ground–dwelling mammal and large game populations at the Site.

3.3.2 Pre–Survey Consultation

ARCADIS and Haile engaged agency stakeholders in a meeting on August 12, 2011, to discuss and solicit input on study plans for all of the wildlife surveys planned for the remainder of 2011. Notes of the meeting are provided in Appendix A. Specific

survey periods recommended by the U.S. Fish and Wildlife Service (USFWS) for federally-protected species were presented during the meeting (Appendix A), and these time periods were incorporated into the Study Plan (ARCADIS 2011a).

3.4 The ARCADIS 2011 Passerine Survey

3.4.1 Sampling Methods for the Passerine Survey

Passerine point-count station locations were established in early August 2011 using plant association information provided by Mr. Dumond (ARCADIS 2011a). This information was used to develop general vegetation community types for the purposes of planning efforts. In the fall of 2011, vegetation communities were re-mapped (see Section 2.5) by ERC (2012b), using the Nelson (1986) vegetation classification system, which is the same classification system used by SCDNR to identify habitat types for wildlife in South Carolina. The Nelson (1986) classifications of habitats are used in this report to interpret distributions of wildlife populations. Updates to the vegetation communities across the Site resulted in reclassification of the habitat types that the passerine point-count stations were located, which subsequently changed the distribution of point-count locations among habitat types from what was presented in the ARCADIS (2011a) Study Plan. The number of point-counts per habitat type are summarized in Table 3-3.

A double observer point–count survey for resident passerines was conducted in accordance with the Study Plan (ARCADIS 2011a). Locations of the point–counts were based on the distribution of different vegetation community types (referred to henceforth as “habitat types”), so as to characterize avian populations in each habitat type at the Site. Point–count locations are shown in Figure 3-1.

The 2011 passerine point–count surveys began August 17, 2011 and were conducted through August 30, 2011. The point–count surveys were conducted between 7:00 am and 11:30 am to capture high bird activity prior to onset of sun and heat. Field crews used a vehicle to access survey point–count stations at the Site. No undesirable weather conditions were encountered that suspended efforts during the survey. Weather conditions and anthropogenic noises were recorded.

3.4.2 Data Analysis Methods for the Passerine Survey

Measures of relative abundance, species richness, Shannon Diversity Index and Shannon Evenness were calculated from the 2011 dataset. Detection rates (number

of birds detected per station sampled) were used to estimate (species) relative abundance. Species richness was defined as the total number of species recorded at a station or within the designated "habitat". The Shannon Diversity Index is an estimate of species diversity, taking into account the relative abundance of species present in the given habitat. The higher the Shannon Diversity Index, the more diverse the community. Shannon Diversity is calculated from the following equation:

(1)

$$H' = -\sum_{i=1}^{R} pi \log pi$$

Where:
H is the index of species diversity;
R is the number of species in the dataset; and
pi is the proportion of individuals belonging to the species in the dataset.

Shannon Evenness is a measure of the evenness in the proportions of each species observed. Evenness values range from zero to one, with values of zero representing communities dominated by a single species, and values of one representing communities with birds evenly distributed among all species (Beals et al. 2000). Shannon Evenness is calculated from the following equation:

(2)

$$Eveness = \frac{H'}{C}$$

Where:
C is the number of species; and
N is the total number of observations

Statistically significant differences in these indices were calculated for the survey dataset as a whole, and among the different habitat types, using ANOVA in Systat 13 (Wilkinson 2000). A p–value <0.05 was interpreted as a statistically significant difference, indicating there is a 95% probability that the means differ between the two populations.

3.4.3 Results of the Passerine Survey

Copies of field data sheets, field notes and photo-documentation taken during the survey are included in Appendix B. During the passerine point–count survey, 168 stations were surveyed and 1,355 birds were detected, representing 49 identifiable species. Birds that could not be identified to species were recorded as "unknown" and were included in the total number of birds and in all analyses. Birds were identified at 165 point-count stations, or 98% of the established stations. The total number of point-count stations, birds detected and avian species detected per habitat type are presented in Table 3-3. A list of all the avian species observed in each habitat type is shown in Table 3-4.

The top ten species surveyed are shown in Figure 3-2. The American Crow (*Corvus brachyrhynchos*), Carolina Wren (*Thryothorus ludovicianus*) and Northern Cardinal (*Cardinalis cardinalis*) were the three most common species detected during the point–count survey, accounting for 37 percent of the total number of detections. The Acadian Flycatcher (*Empidonax virescens*), American Robin (*Turdus migratorius*), Black Vulture (*Coragyps atratus*), Common Nighthawk (*Chordeiles minor*), House Finch (*Carpodacus mexicanus*), Red–winged Blackbird (*Agelaius phoeniceus*), Yellow–throated Vireo (*Vireo flavifrons*), and Yellow–throated Warbler (*Dendroica dominica*) were the least common species, together accounting for <1% of the total number of detections.

The highest number of birds detected at a single point–count station during the survey was 31, recorded at station MVS–13 which was in the modified managed vegetation–scrub regrowth habitat type. There, the surveyors observed a large flock of Brown–headed Cowbirds (*Molothrus ater*) flying over the station during the observation period.

Species richness, Shannon Diversity, Shannon Evenness, and total number of birds calculated for each habitat type and for the Site as a whole are presented in Table 3-5. The Shannon Diversity Index for the Site was 1.50, which indicates low species (community) diversity. Shannon Evenness for the Site was 0.95, which is interpreted to mean that the total number of birds in the habitat communities is distributed equally among all species. The average number of all birds detected during the 2011 survey was 8.11 ± 4.76 (mean ± standard deviation (SD) per station).

Among habitat types, the managed tree plantation, modified managed vegetation–scrub regrowth and "streamhead pocosin" habitat types had the highest species

richness (Table 3-5). The xeric sandhill scrub habitat had a statistically lower diversity index than the developed, managed tree plantation, modified managed vegetation–scrub regrowth, oak–hickory forest, and "streamhead pocosin". The total number of birds was statistically highest in the managed tree plantation and statistically lowest in the xeric sandhill scrub habitat type. No other significant differences in diversity indices between other habitat types were identified.

The dominant avian species observed in each habitat type are summarized in Table 3-6. Relative abundance was highest for the Carolina Wren, Northern Cardinal, Brown–headed Nuthatch (*Sitta pusilla*), Eastern Wood–Pewee (*Contopus virens*), and Field Sparrow (*Spizella pusilla*). Summary statistics were calculated for these species as shown in Table 3-7. There were no significant differences in relative abundance of these species between different habitat types. Time of day did not significantly affect the results except for detections of the Eastern Wood–Pewee, which decreased as the day progressed.

Six species were identified during the avian survey are SCDNR Priority Conservation Species (SCDNR 2005). These species, their priority ranking, and habitats where the species was observed are as follows:

- Acadian Flycatcher (High) – One Acadian Flycatcher was observed at a point–count station within the modified managed upland vegetation–naturalized habitat type.
- Brown–headed Nuthatch (Highest) – Ten Brown–headed Nuthatches were observed in three habitat types during the survey, including managed tree plantation, modified managed vegetation–scrub regrowth and xeric sandhill scrub.
- Eastern Wood–Pewee (Highest) – Five Eastern Wood–Pewees were observed in four different habitat types: managed tree plantation, modified managed vegetation–scrub regrowth, oak–hickory forest and "streamhead pocosin".
- Field Sparrow (Highest) – Four Field Sparrows were observed during the survey, all within the modified managed vegetation–scrub regrowth habitat.
- Northern Bobwhite (Highest) – Three Northern Bobwhites were observed in three habitat types during the survey, including "streamhead pocosin", developed, and modified managed vegetation-scrub regrowth.

- Prairie Warbler (Highest) – Twenty–one Prairie Warblers (*Dendroica discolor*) were observed during the survey, primarily in the modified managed vegetation–scrub regrowth. Other habitats for which the Prairie Warbler was observed included the developed, managed tree plantation, recently-logged timberland and the "streamhead pocosin".

3.5 The ARCADIS 2011 Raptor/Large Bird and Special Status Avian Species Surveys

3.5.1 Sampling Methods for the Raptor/Large Bird and Special Status Avian Species Surveys

Two raptor/large bird surveys were conducted to characterize the occurrence of raptor/large bird nests at the Site. Nests were the focus of the survey because nest habitat is essential for birds and because observers regularly observe birds of prey near nests (Cooperrider et al. 1986). The raptor/large bird and special status avian surveys were evaluated qualitatively in this report.

Prior to beginning field efforts, the SCDNR Rare, Threatened, and Endangered Species Inventory database was reviewed (SCDNR 2010a, SCDNR 2010b) to determine the potential presence of federally-protected birds in or near the Site. This information was cross–referenced with the USFWS T&E species list for Kershaw and Lancaster counties, and current protected species data available on the SCDNR Heritage Trust Program website (SCDNR 2010a, SCDNR 2010b).

The two federally protected avian species that could potentially inhabit in the Site include the Red–cockaded Woodpecker (RCWO [*Picoides borealis*]) and the BAEA. The US Department of the Interior identified the RCWO as a rare and endangered species in 1968 (USDOI 1968). The RCWO was officially listed as endangered in 1970 (USFWS 2003) and is a listed species under the Endangered Species Act (ESA) of 1973. The RCWO is a Federal and State Endangered species listed by the USFWS and SCDNR Heritage Trust Program, respectively, for Kershaw County, South Carolina (SCDNR 2010a). Although, not currently known to occur in Lancaster County (SCDNR 2010b), the RCWO is protected by the ESA wherever it is found. The BAEA is currently federally protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) and the Migratory Bird Treaty Act (16 U.S.C. 703-712). The USFWS lists the BAEA as occurring in Kershaw County (USFWS 2011) and SCDNR Heritage Trust Program indicates the species is known to occur in Kershaw and Lancaster counties (SCDNR 2010a; SCDNR 2010b).

Surveys for BAEA and raptor/large bird nests were conducted from August 18 – 31, 2011 in areas near open water bodies, and surveys were conducted from October 26 – 30, 2011 for special status avian species (RCWO and BAEA) and all raptors/large birds throughout the Site. The surveys concentrated on habitats at the Site where suitable nesting and foraging habitat could potentially be found. These were the habitats where raptors/large birds and special status avian species are most likely to occur.

3.5.1.1 Survey Locations for Raptors/Large Birds and BAEA

Potentially suitable habitats for all types of raptors/large birds were identified prior to beginning field work, concentrating on nest searches to maximize detection. The habitats targeted for the raptor/large bird nests included those surrounding open water bodies and riparian corridors associated with small stream forests and "streamhead pocosin" habitat types (Figure 3-3). Targeted locations for the general raptor/large bird survey included:

- Riparian corridors along Camp Branch, HGMC, the Unnamed Tributary, and the Little Lynches River extending from points upstream of Camp Branch down to the confluence with the Unnamed Tributary; and
- Habitats immediately surrounding open water bodies, including the Ledbetter Reservoir, and former mining pits that have been reclaimed to ponds or lakes.

3.5.1.2 Survey Locations for the Bald Eagle

BAEAs are known to nest, winter roost, and forage in South Carolina and prefer to nest in large trees with an open limb structure that are situated within 0.62 miles of open water (SCDNR 2005). In South Carolina, BAEA nests have been found along the major river drainages of the Lower Coastal Plain, in tall, live pine trees with a higher canopy than surrounding trees (SCDNR 2011). Suitable foraging sites consist of fresh, brackish, and marine open waters, marshes and riverine types. The types of water bodies preferred by the BAEA are described as shallow, slow–moving water bodies with abundant fish and bird prey (SCDNR 2005). In South Carolina, many large reservoirs created for hydroelectric power serve as inland BAEA foraging habitat (SCDNR 2005). BAEA winter roost sites tend to have suitable perches and minimal disturbance.

Specific locations selected as potential BAEA habitat are shown in Figure 3-3. These locations were evaluated for the presence/absence of individual BAEAs and nesting, foraging and winter roosting habitats.

3.5.1.3 Survey Locations for the Red–Cockaded Woodpecker

The RCWO requires open pine woodlands and savannahs with large, mature pines for nesting and roosting habitat (i.e., cavity trees). RCWOs are unique in that they excavate cavities in living pines for roosting and nesting (USFWS 2003). The pines are typically ≥80 years of age (USFWS 2002), and longleaf pine is preferred when available (Walters 1991). Cavity trees must be in open pine stands with little or no mid–story hardwoods and few or no over–story hardwoods. Abundant foraging habitat, which consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine mid–story, few or no over–story hardwoods, and abundant native bunchgrass and forb groundcovers is also a requirement for the RCWO (USFWS 2003).

Four locations at the Site were determined to be potential RCWO habitat. These locations included habitat types that contained longleaf pines or else thinned loblolly pine plantations with open understories. These areas are labeled one through four on Figure 3-4, and were evaluated for the presence/absence of individual RCWOs and suitable nesting and foraging habitat.

Subsequent to the August and October 2011 avian surveys, the vegetation communities at the Site were mapped (ERC 2012b). The mapping identified one additional, isolated area, potentially containing longleaf pine forest habitat. The location of this area is shown in Figure 3-4 (identified as “longleaf pine woodland”). The area consists of 1 acre of forest south of the road, and as described in ERC (2012c), contains pines dominated by trunks averaging 11 inches diameter at breast hight (DBH) and less than 50 ft tall. The forest is an open community with 65-70% cover and spacing between the trees approximately 3-5 ft. The midstory is sparse, approximately 0-10% cover with patches of scrub oak, and lacks an understory. The report suggested that encroachment over time by hardwood species or loblolly pin may transition this community to a xeric sandhills community, which is regionally common. North of the raod, a 2 to 4 acre community contains a younger longleaf pine stand, with trees less than 15 ft tall and trunks less than 3.5 inches DBH. Longleaf pines comprise approximately 5% cover, with the overall canopy dominated by oak species with 70% cover (ERC 2012c). The midstory of this community is also dominated by oak species, and lacks an understory. The report suggested that

without fire suppression or forest management practices, the oak species will outcompete the young longleaf pine species and transition the area to a xeric sandhill scrub community.

Based on the information provided in ERC (2012c), this area is not likely to support potential foraging and nesting habitat for RCWO due to the small size of the community and relatively young forest, most of which is dominated by oak species. Over time, if left untouched, this area is likely to be even less suitable for RWCO due to transition to a xeric sandhills scrub community due to encroachment and competition from other species.

3.5.2 Results of the General Raptor/Large Bird and Special Status Avian Surveys

The objectives of the August 2011 field effort were to survey passerines throughout the Site, and to survey open water body areas for presence of BAEA and other raptor/large bird nests. However, any incidental observations of BAEA, other raptor nests or other animals were to be recorded at passerine point count locations. During the point-count survey, no raptor/large bird nests were incidentally observed at the Site. Additionally, no BAEA or other raptor/large bird nests were observed at the open water bodies surveyed in August 2011. However, raptors and large birds observed either visually or aurally during the August 2011 passerine point–count surveys included the American crow, Black Vulture, Great Blue Heron (*Ardea herodias*), Red–shouldered Hawk (*Buteo lineatus*), Turkey Vulture (*Cathartes aura*), and Wild Turkey (*Meleagris gallopavo*).

The October 2011 field effort surveyed raptor/large bird nests more comprehensively throughout the Site. During this field effort, four potential raptor/large bird nests were observed along the Little Lynches, HGMC, and Unnamed Tributary (PN1, PN2, PN3, and PN4). Locations of the observed nests are shown in Figure 3-5. At PN3, an individual Red–shouldered Hawk was observed calling approximately 50 ft from the nest. Based on the proximity of the hawk to this nest and its defensive behavior (the observed calls), ARCADIS biologists inferred that the nest was likely a Red-shouldered Hawk nest.

For the other three nests, no individuals were observed. Because the October survey effort was conducted outside of the nesting and breeding season, ARCADIS biologists were unable to determine if the observed nests had been active, inactive, successful, or unsuccessful during the previous nesting and breeding season. Based on the size of the nests and the habitats in which the nests were built,

ARCADIS biologists determined that all four potential raptor/large bird nests were not likely BAEA nests. The vegetation communities in these areas are characterized as having a dense canopy cover and low base flow (see ERC 2012c), which is not an ideal foraging habitat for BAEA. No raptor or large bird nests were observed along Camp Branch or open water areas.

3.5.3 Results of the Red–Cockaded Woodpecker Survey

No RCWO were observed during the August and October 2011 surveys, and no RCWO clusters have been documented in or within 3 miles of the Site. The nearest known active (or inactive) RCW cluster is located 13.5 miles away from the Site, at the Carolina Sandhills National Wildlife Refuge (SCDNR 2006). With the exception of a small amount of suitable foraging habitat observed in Area 1, all other potential habitat for RCWOs at the Site were not found to be suitable RCWO nesting and foraging habitat, as these areas lacked habitat requirements of the species. Results of the survey by specific area are summarized below.

3.5.3.1 RCWO Area 1

This area was within an active loblolly pine plantation located in the northwest portion of the Site. Trees observed in the pine plantation were approximately 35 to 45-years old, and there was little to no understory of hardwoods. A small amount of this managed tree plantation habitat may potentially be suitable RCWO foraging habitat; however, no suitable RCWO nesting habitat was observed in the area, and no RCWOs were observed. A photograph of Area 1 is provided in Appendix C.

3.5.3.2 RCWO Area 2

This area was located on a sandy ridge between two small stream forest drainages. The primary reason for investigating this area was the potential presence of mature longleaf pines. Approximately three or four mature to semi–mature longleaf pines were observed in this area, each with an average approximate DBH of 20 inches. The trees appeared to be approximately 50 years old. There was significant hardwood encroachment in the understory by turkey oak, blackjack oak, and some hickories. Area 2 did not contain suitable foraging or nesting habitat for RCWOs, and no RCWOs were observed. A photograph of Area 2 is provided in Appendix C.

3.5.3.3 RCWO Area 3

This area was within an active Loblolly pine plantation located on the western side of the Site. Trees observed within the pine plantation were approximately 25 to 35 years old. Hardwood encroachment in the understory was apparent, with sweetgum and red maple dominating the hardwood species observed. Area 3 did not contain suitable foraging or nesting habitat for RCWOs, and no RCWOs were observed. A photograph of Area 3 is provided in Appendix C.

3.5.3.4 RCWO Area 4

This area was within a xeric sandhill scrub habitat located on the southeast portion of the Site. Similar to Area 2, the primary factor for investigating this area was the potential presence of mature longleaf pines. Approximately 10 to 15 semi–mature longleaf pines were observed in this area, with an average DBH of 15 inches. Hardwood encroachment in the understory was observed; specific species noted included turkey oak, black gum, and hickories. Area 4 did not contain suitable foraging or nesting habitat for RCWOs, and no RCWOs were observed. Photographs of Area 4 are provided in Appendix C.

3.5.4 Results of the Bald Eagle Survey

During the August and October 2011 surveys, no BAEA were observed either visually or aurally in any of the potential BAEA habitat areas or elsewhere at the Site during other surveys. Habitat types at the Site were not found to be suitable BAEA nesting and foraging habitat, as these areas lacked habitat requirements of the species. Results of the survey by specific area are summarized below.

3.5.4.1 Little Lynches River

The Little Lynches River is a relatively large drainage adjacent to the Site's southern boundary. Surveys were conducted along the river channel. At the time of the surveys, the Little Lynches River channel was approximately 30 to 40 ft wide and 10 to 15 ft deep in most places bordering the Site. This survey area did not contain suitable foraging or nesting habitat for BAEA and no BAEA were observed. The upland habitat along the Little Lynches River was consistent with a dense, small stream forest. Photographs of the survey area are provided in Appendix C.

3.5.4.2 Ledbetter Reservoir

Ledbetter Reservoir is a large, approximately 10 acres, open water impoundment within HGMC. At its widest point, the reservoir appeared to be approximately 250 ft wide. The upland habitat surrounding Ledbetter Reservoir is wooded with a predominantly oak–hickory forest and developed areas. The survey was conducted on the northern and southern sides of Ledbetter Reservoir, as well as at various other opportunistic locations near the impoundment. Photos of the survey area are provided in Appendix C. This survey area did not contain suitable foraging or nesting habitat for BAEA and no BAEA were observed. These results are consistent with previous surveys (Parnell 2008) that found that this area contained too small of a prey base for the BAEA and lacked sufficient nesting habitat.

3.5.4.3 Former Mining Pits

Former mining pits that have been reclaimed to ponds or lakes were surveyed for potential presence of BAEA. These areas included Snake Pit Lake, Gault Pit Lake, and Champion Pit Lake. These water features did not have an observed inlet or outlet for stream flow. Surveys were conducted around each of these water features. Photos of the survey areas are provided in Appendix C. This survey area did not contain suitable foraging or nesting habitat for BAEA and no BAEA were observed. These reclaimed mining pits appear to support only small populations of fish prey species, and the trees surrounding the reclaimed mining pits were young and small. Therefore, it is likely that these water bodies do not provide suitable nesting, foraging and winter roosting structures.

3.5.4.4 Camp Branch

Camp Branch is a tributary to the Little Lynches River. The portion of Camp Branch surveyed for BAEA consisted of a relatively mature mesic riparian forest with an even age class of tree species and a sparse understory. The survey was conducted along the stream channel from the confluence with the Little Lynches River to ~3 miles upstream of the confluence. This survey area did not contain suitable foraging or nesting habitat for BAEA and no BAEA were observed. The tree canopy and sub–canopy surrounding Camp Brach were dense, which would limit BAEA foraging capability and therefore is not likely to provide suitable nesting and winter roosting locations. Additionally, the small size of the water body suggests this water body would not be suitable foraging habitat. Photos of the survey areas are provided in Appendix C.

3.5.4.5 Haile Gold Mine Creek

HGMC is a tributary to the Little Lynches River. The canopy and sub–canopy cover at HGMC was similar to that of Camp Branch. The survey was conducted from the confluence with the Little Lynches River up to Ledbetter Reservoir. Photos of the survey areas are provided in Appendix C. This survey area did not contain suitable foraging or nesting habitat for BAEA and no BAEA were observed. The dense canopy cover at HGMC was unsuitable for BAEA nesting, winter roosting and foraging locations, and the small size of the water body and low density of fish populations made this habitat unsuitable for foraging. The portion of HGMC upstream of Ledbetter Reservoir was not surveyed because of the dense nature of the canopy, which would not be suitable nesting or foraging habitat for the BAEA.

3.5.4.6 Unnamed Tributary

The Unnamed Tributary is a drainage east of HGMC and south of Haile Gold Mine Road. This small tributary to the Little Lynches River has a dense canopy and understory with low, slow–flowing water. The survey was conducted along the portion of the drainage feature within Site boundaries. This survey area did not contain suitable foraging or nesting habitat for BAEA and no BAEA were observed. Lack of large trees with open limb structures, and insufficient water depth and flow to support abundant prey species suggest that the habitat surrounding the unnamed tributary were unsuitable for nesting, winter roosting and foraging activities. Photos of the survey areas are provided in Appendix C.

3.5.4.7 Buffalo Creek

Buffalo Creek is a drainage along the northeast side of the Site. Although located within Site boundaries, this drainage and its headwaters were not surveyed during the October 2011 field efforts due to land access issues. However, a small portion of Buffalo Creek was surveyed on October 24 – 28, 2011 during the aquatic surveys (a qualified wildlife biologist was present during the aquatic surveys). The habitat surrounding Buffalo Creek was typical of a “streamhead pocosin” habitat type. The dense canopy was dominated by hardwood species and the sub–canopy was comprised of dense sapling species. The hardwood species surrounding Buffalo Creek typically measured between 2 and 10 inches DBH. This survey area did not contain suitable foraging or nesting habitat for BAEA and no BAEA were observed. This habitat type would not support BAEA nesting requirements and did not contain preferred winter roosting structures. Also, the small nature of the stream and shallow

water depth observed were not likely to support sufficient fish prey species of the BAEA. Photos of the survey areas are provided in Appendix C.

3.6 The ARCADIS 2011 Bat Survey

3.6.1 Sampling Methods for the Bat Survey

Four passive acoustic bat call monitoring stations were installed on trees on the Site on August 20 – 21, 2011. These locations were selected along forest edges with varying habitat types in areas roughly near the north, south, east, and west Site boundaries. As shown in Figure 3-6, the four bat call monitoring stations were located predominantly in natural vegetation community types using the new habitat information.

A team of two biologists installed the four bat call monitoring stations. Equipment details and installation protocol is described in detail in the Study Plan (ARCADIS 2011a). The echolocation detectors were programmed to automatically record bat calls between 1900 and 0700 Eastern Daylight Time (EDT) every night during the survey period. Following initial testing, ARCADIS biologists downloaded bat call data each day while survey teams were onsite. After ensuring proper operation of the equipment, the units were left in the field to record bat calls. ARCADIS biologists periodically returned to the Site to download data during the remainder of the monitoring period and to ensure continued proper operation of the equipment. The total monitoring period was from August 22 to October 28, 2011. All monitors and associated equipment were removed from the Site at the end of the monitoring period.

3.6.2 Data Analysis Methods for the Bat Survey

Bat call data were analyzed using Analook W software, version 3.7w (Analook). This software displays ultrasonic bat calls as sonograms, where characteristics such as slope, frequency, minimum frequency, consistency of minimum frequency, and shape of pulse assist in the identification of bat vocalizations. Prior to examining the files, a filter was applied to the data in Analook to remove extraneous noise (such as insect or wind noise). The files were then visually examined for the presence of bat passes (defined as two or more bat call pulses separated by less than one second). Published literature and reference calls were used to assist in bat call identification, including Keinath (2008), Wyoming Natural Diversity Database (2008) University of New Mexico (2000), O'Farrell et al. (2000) and Obrist (1995).

Bats were identified to the lowest taxonomic level possible. After determining the bat species with the potential to occur at the Site (Table 3-8), identifiable bat calls were categorized into five primary species groups. Species that could not be identified to the species level were documented as unknown. The primary species groups are described below:

1. Myotis sp. – Calls were identified by steep, straight calls, usually with minimum frequency >40kHz. This group includes little brown myotis (MYLU, *M. lucifugus*), northern myotis (MYSE, *M. septentrionalis*), MYAU, and Indiana bat (MYSO, *M. sodalis*).
2. Non–myotis over >35 kHz minimum frequency (abbreviated as "35kHz bats") – Calls were identified by curvilinear calls (not steep like myotis and usually individual call pulses did not have a wide frequency range). This group includes eastern red bat (LABO, *L. borealis*), Seminole bat (LASE, Lasiurus *seminolus*), eastern pipistrelle (PESU, *P. subflavis*), and evening bat (NYHU, *N. humeralis*).
3. 25kHz bat – Calls were identified with a minimum frequency between 25 and 30 kHz. This group includes big brown bat (EPFU, *E. fuscus*), Brazilian free-tailed bat (TABR, *Tadarida brasiliensis*), and silver-haired bat (LANO, *L. noctivagans*).
4. LACI – Calls were identified as the only species with a minimum frequency below 25 kHz. This included the Hoary Bat (*Lasiurus cinereus*).
5. CORA – Calls were identified as having a low intensity and two distinct harmonics, similar to Townsend's big-eared bat (*Corynorhinus townsendii*).
6. Unknown – Calls could not be classified to any of the groups listed above (e.g., if harmonics were sporadic or the calls were weak).

A "bat pass" was defined as an Analook data file containing at least one bat call sequence. Data were analyzed to identify the number of bat passes per week and number of bat passes per hour. Bat activity was summarized as the total number of bat passes and number of bat passes per detector–night, where one detector–night is defined as one bat detector operating for one night.

Bat call data were analyzed using Bat Call Identification 10 (BCID_10). BCID_10 is a software program created by C. Ryan Allen, designed to be used on large scale (i.e., >>5,000 call files) acoustic surveys. The software was developed in response to the immense datasets that were being created as a result of wide–spread bat surveys for

wind farm development and white–nose syndrome. Such large datasets make manually identifying individual call files to a species level either unrealistic or extremely costly. BCID_10 works by launching the Analook W software program, version 0.3.7.23 (Analook). This software displays ultrasonic bat calls as sonograms, where characteristics such as slope, frequency, minimum frequency, consistency of minimum frequency, and shape of pulse assist in the identification of bat vocalizations. From these sonograms, BCID_10's default setting filters noise, extracts parameters, identifies the calls by species (organized by state), and produces an output file. An output file contains a prediction of all bat files analyzed based on weighted call characteristics within each call file and each individual pulse within the files.

Although BCID_10 predicts the most likely bat that would produce each call sequence, it is should not be considered 100 percent accurate. As such, ARCADIS biologists used the BCID_10 output files as a tool to cross–reference their results from manual identification of calls and published literature. The program was used to identify calls with characteristics of special status species. Specifically, BCID_10 was used to flag calls of special status species in two primary species groups: Myotis sp. (Indiana bat and southeastern myotis) and CORA (Rafinesque's big-eared bat). All flagged calls were individually evaluated. Because Myotis sp. calls are difficult to discern to a species level or from one another, a second filter (MORENET.abf) was used that is specific to Indiana bats on all files BCID_10 identified as having characteristics of that species to further evaluate the potential presence/absence of this species at the Site.

3.6.3 Results of the Bat Survey

Copies of the field notes and photo-documentation are included in Appendix D. Acoustic bat monitoring was conducted for 67 detector-nights. During this monitoring period, nightly bat activity was high. A total of 14,012 bat passes were recorded from all stations combined (averaging 209 bat passes per detector night), with approximately 61 percent of those passes occurring at Bat Monitoring Station #2 (located near Ledbetter Reservoir). Bat activity was higher in August and September (particularly in mid- to late September), as compared to October (Figure 3-7).

Hourly bat activity was similar among the four bat call monitoring stations (Figure 3-8). Bat activity was greatest in the two to three hours following sunset, and then declined over night, increasing again a few hours prior to sunrise. Bat Monitoring Station #2 had the greatest decrease in bat activity overnight.

The distribution of primary bat groups was relatively consistent among all four bat call monitoring stations (Figure 3-9). The distribution of primary bat groups was such that the 35kHz bat group was the most abundant, followed in descending order by 25kHz bats, Myotis sp., LACI, and CORA. The number of bat calls that could not be identified to a species group (i.e., the unknown group) is also shown in Figure 3-9; this number represented approximately 17% of bat calls recorded during the monitoring period.

No special status species of bats were identified in the survey calls. There were 8 recordings with characteristics of Myotis species that could not be identified to species level. The Southeastern myotis, a South Carolina priority conservation species, is grouped within this category (secondary filters did screen out the possibility of the calls BCID_10 identified as having characteristics of the Indiana bat, as described in the methods section). Similarly, 157 recordings grouped as CORA could not be identified to species level. Rafinesque's big-eared bat, also a South Carolina priority conservation species, is grouped within this category. However, the habitat types within and adjacent to the Site are not suitable for these species, and neither species is known to occur in Lancaster County (SCDNR 2010a,b). Thus, the potential for these two species to occur in at the Site is thought to be low.

Results by monitoring station are summarized below:

3.6.3.1 Bat Monitoring Station #1

During the monitoring period, a total of 3,191 bat passes were recorded at this station, with a nightly activity of 48 bat passes per detector night. Nightly bat activity at this station was highest in August and early September, and declined the remainder of the monitoring period (Figure 3-7). Hourly night activity was relatively consistent throughout the night, with peaks in the two to three hours following sunset and prior to sunrise (Figure 3-8). The 35kHz bats were the most abundant species group, followed Myotis sp., 25kHz bats, LACI, and CORA (Figure 3-9).

3.6.3.2 Bat Monitoring Station #2

This monitoring station recorded the highest number of bat passes. During the monitoring period, a total of 8,620 bat passes were recorded, with a nightly activity of 129 bat passes per detector night. Nightly bat activity at this station was highest in August and September, particularly mid- to late-September (Figure 3-7). Hourly night activity at this station varied greatly, with peaks in the two to three hours

following sunset and prior to sunrise (Figure 3-8). The 35kHz bats were the most abundant species group, followed by 25kHz bats, Myotis sp., LACI, and CORA (Figure 3-9).

3.6.3.3 Bat Monitoring Station #3

During the monitoring period, a total of 1,333 bat passes were recorded at this station, with a nightly activity of 20 bat passes per detector night. Nightly bat activity at this station was highest in August (Figure 3-7). Hourly night activity varied moderately, with peaks in the two to three hours following sunset and prior to sunrise (Figure 3-8). The 35kHz bats were the most abundant species group, followed by Myotis sp., 25kHz bats, and CORA (Figure 3-9).

3.6.3.4 Bat Monitoring Station #4

Bat monitoring station #4 recorded the lowest number of bat passes. During the monitoring period, a total of 868 bat passes were recorded, with a nightly activity of 13 bat passes per detector night. Nightly bat activity at this station was relatively low throughout the monitoring period. It was highest in August and had a second peak in mid-October (Figure 3-7). Hourly night activity varied, with peaks in the two to three hours following sunset and prior to sunrise (Figure 3-8). The 35kHz bats were the most abundant species group, followed by Myotis sp., 25kHz bats, and LACI (Figure 3-9).

3.7 The ARCADIS 2011 Ground–dwelling Mammal and Game Survey

3.7.1 Sampling Methods for the Ground-dwelling Mammal and Game Survey

On October 28 – 30, 2011, ARCADIS biologists conducted a small mammal and game survey within the Site boundaries. The survey was conducted on foot, documenting observed individuals and secondary signs of mammals and game species (e.g., tracks, burrows, dens, and scat) along approximately 400 ft transects located throughout the Site. Four ARCADIS biologists, working in teams of two, visually and audibly searched the sixteen, 400 ft transects laid out among various habitat types at the Site (Figure 3-10). Additional surveys were made along the Little Lynches River, Camp Branch, HGMC and the Unnamed Tributary. Specific stream reaches surveyed were the same as those surveyed for raptors and large birds (Section 3.5).

Transects were established throughout the Site based on vegetation information provided by Mr. Dumond (Dumond 2010). Since the survey was conducted, upland habitat types within and surrounding the Site boundaries were remapped (ERC 2012b). As shown in Figure 3-10, using the new habitat information, some of the 400 ft transects fall across several habitat types. Habitats subsequently surveyed for small mammals and game are summarized in Table 3-9.

ARCADIS biologists navigated to the aforementioned survey locations using a handheld GPS unit with an accuracy of ± 33 ft. Upon arrival at a survey location, biologists walked the extent of the linear transect or major stream reach looking for individuals and secondary signs of small mammals and game species. Secondary signs observed at a survey location were recorded in field notebooks and digital photographs were taken. Other secondary signs and primary signs (e.g., visual and audible observations) not specifically detected at a survey location were recorded as incidental observations. Prior to navigating to the next survey location, completeness of recordable data were confirmed by the survey team.

3.7.2 Data Analysis Methods for the Ground-dwelling Mammal and Game Survey

Data analysis methods for the ground-dwelling mammal and game survey were largely qualitative. The results describe information on mammals' abundance and distribution among habitat types within the Site boundaries.

3.7.3 Results of the Ground-dwelling Mammal and Game Survey

A summary of the mammals, game species and secondary signs of animal presence is shown in Table 3-10. The associated digital photographs and field notes are included in Appendix E.

As summarized in Table 3-10, scat was the most common secondary sign of mammals observed. Other secondary signs included observations of tracks, burrows, bones, gnawed hardwoods, and evidence of foraging (e.g., hog wallows/rooting). No secondary signs of special status mammal species were observed.

A greater number of secondary signs and a greater diversity of mammal species were observed in the non–natural communities as compared to natural communities. Secondary signs were observed at six of the seven transects in non–natural communities, and indicated evidence of feral hog (*Sus scrofa*), unknown rodent spp.,

mole (or vole) (Class Mammalia), white–tailed deer (*Odocoileus virginianus*), and coyote (*Canis latrans*). Secondary signs were also observed at one of the eight transects laid out in the natural community habitat types, and indicated evidence of feral hog. Secondary signs were also observed in habitats along all surveyed stream reaches. Evidence of white–tailed deer, feral hog, beaver (*Castor canadensis*) and raccoon (*Procyon Lotor*) were observed.

3.8 Opportunistic Wildlife Observations During the 2011 Surveys

During the avian surveys, mammalian observations or evidence incidentally noted within the Site included:

- White-tailed deer (*Odocoileus virginianus*)
- Muskrat (*Ondatra zibethicus*) (tracks on the Little Lynches River)
- Possum (Order *Diprotodontia*)
- Unknown Squirrel (*Family Sciuridae*)
- Black Racer Snake (*Coluber constrictor priapus*)

During the passerine survey, opportunistic observations of raptors included:

- American Kestrel (*Falco sparverius*) and
- Red–tailed Hawk (*Buteo jamaicensis*)

During the raptor and large bird surveys, opportunistic observations of passerines included:

- Belted Kingfisher (*Megaceryle alcyon*)
- Blue Jay (*Cyanocitta cristata*)
- Carolina Chickadee (*Poecile carolinensis*)
- Carolina Wren
- Downy Woodpecker (*Picoides pubescens*)
- Northern Cardinal
- Northern Flicker (*Colaptes auratus*), and
- White–throated Sparrow (*Zonotrichia albicollis*).

The bat monitoring equipment picked up the following bird calls during the survey period:

- Red–shouldered Hawk calling by bat monitoring station #3
- Red–tailed Hawk by bat monitoring station #4
- Yellow–bellied Sapsucker (*Sphyrapicus varius*) by bat monitoring station #4.

Finally, biologists also noted that one of the landowners regularly records digital photographs using a Cuddeback Capture Camera on the Duckwood tract. In speaking with this landowner, he mentioned the camera recently recorded activity of bobcats, coyotes, deer, raccoons, and feral hogs, and that feral hog activity was greatest by the Little Lynches River.

3.9 Summary of the ARCADIS 2011 Wildlife Surveys

Over thirteen-hundred and fifty birds were detected during the passerine survey, representing 49 identified species. The most frequently detected species included the American Crow, Carolina Wren, and Northern Cardinal, accounting for 37% of the total number of detections across the Site as a whole. Species diversity was low, and species were approximately evenly distributed in habitats throughout the Site. A statistically higher number of birds were detected in the xeric sandhill scrub habitat type, but this habitat type also contained a statistically lower diversity index than some other habitat types. Five species were identified during the avian survey that are South Carolina Priority Conservation Species. These species included the Acadian Flycatcher, Brown-headed Nuthatch, Eastern Wood-Pewee, Field Sparrow and Prairie Warbler.

Raptors and large birds observed during field surveys included the American crow, Black Vulture, Great Blue Heron, Red-shouldered Hawk, Turkey Vulture, and Wild Turkey. Four potential raptor nests of unknown species (although one nest was thought to belong to a Red-shouldered Hawk) were observed along the Little Lynches, HGMC, and Unnamed Tributary. Based on nest size and species habitat preferences, none of the nests are thought to be BAEA nests. No raptor or large bird nests were observed along Camp Branch or open water areas.

No RCWO were observed during the August and October 2011 surveys, and no RCWOs have been observed within 3 miles of Site boundaries (SCDNR 2010c). With the exception of a small amount of suitable foraging habitat observed in Area 1,

all other potential habitat for RCWOs at the Site were not found to be suitable RCWO nesting and foraging habitat, as these areas lacked habitat requirements of the species.

During the August and October 2011 surveys, no BAEA were observed either visually or aurally in any of the potential BAEA habitat areas or elsewhere at the Site during other surveys. Habitat types at the Site were not found to be suitable BAEA nesting and foraging habitat, as these areas lacked habitat requirements of the species. These observations are consistent with previous BAEA surveys at the Site.

Bat monitoring stations recorded a total of 14,012 bat passes during the period of survey (August-October), averaging 209 bat passes per night. Approximately 61% of those passes occurred at Bat Monitoring Station #2 (located near the Ledbetter Reservoir). Bat activity was higher in August and September (particularly in mid- to late September), as compared to October. The distribution of primary bat groups was relatively consistent among all four bat call monitoring stations. Overall, the 35kHz bats (*L. borealis, P. subflavis, N. humeralis*) were the most abundant at the Site, followed in descending order by the 25kHz bats (*E. fuscus and L. noctivagans*), Myotis species, LACI (*Lasiurus cinereus*), and CORA (*Corynorhinus rafinesquii*). No special status bat species were identified during the survey.

Signs of ground-dwelling mammal and game species surveyed on the Site included feral hog, rodents, moles, white-tailed deer, coyote, beaver, raccoon, white-tailed deer, muskrat, possum, and squirrel. Anecdotal accounts of bobcat signs have been observed on the Site by others in the past. No special status ground-dwelling mammal and game species were identified during the survey.

4. Aquatic Resources

This section presents a review of all the previous aquatic resource studies conducted at and immediately adjacent to the Site, and presents in detail the results of the 2011 habitat assessment, fish, macroinvertebrate and herptile surveys as proposed in the Study Plan (ARCADIS 2011b). The organization of this section of the report is as follows:

Section 4.1 – Previous Aquatic Habitat Studies

Section 4.2 – Previous Fish Studies

Section 4.3 – Previous Macroinvertebrate Studies

Section 4.4 – Previous Mollusk Studies

Section 4.5 – Previous Herptile Studies

Section 4.6 – Overview of the ARCADIS 2011 Aquatic Surveys

Section 4.7 – The ARCADIS 2011 Habitat Assessment

Section 4.8 – The ARCADIS 2011 Fish Survey

Section 4.9 – The ETT-ARCADIS 2011 Macroinvertebrate Survey

Section 4.10 – The ETT-ARCADIS 2011 Herptile Survey

4.1 Previous Aquatic Habitat Studies

Stream assessments were conducted for stream segments in HGMC and in the upper portion of Camp Branch in 2010 (ERC 2010) following methods described in Cowardin et al. (1979). The assessments characterized existing wetland and stream habitat characteristics and conditions at the Site. A map showing the locations of previous study survey points is provided in Figure 4-1. A description of this previous habitat study is presented below.

Following a desktop review of aerial maps to identify general wetland habitat types, a site–specific field evaluation was conducted to document existing conditions throughout the Site (ERC 2010). The Cowardin Classification System (Cowardin et al. 1979) was used to describe and classify Riverine systems based on water permanence, gradient, water velocity, substrate, floodplain development and type/duration of flooding. A summary of the Riverine system classifications identified at the Site is shown in Table 4-1. Stream segments were then grouped into priority categories and functional categories based on criteria established in Cowardin et al. (1979). HGMC and Camp Branch were classified as 1st or 2nd Order streams (ERC 2010). The portion of the Little Lynches River that is adjacent to the Site was classified as a 4th Order stream (ERC 2010).

Following the Cowardin guidelines, the assessment also identified priority categories of aquatic resources at the Site. A summary of these categories and occurrence at the Site is shown in Table 4-2. In summary, none of the streams met the following priority categories:

- State Heritage Trust Preserves
- Wild & Scenic River

- Anadromous Fish Spawning
- Outstanding Resource Waters
- State Trout Natural Streams
- Waters Adjacent to Federal or State Protected Areas
- Waters with Federal/State Listed T&E Species
- Waters with Federal Species of Management Concern
- State Trout Put, Grow & Take Streams
- Streams within 0.5 miles of a Primary Priority Reach
- State Scenic River Corridors

Some stream segments met the following priority categories:

- 303(d) Listed – Portions of the Little Lynches River that are listed in SCDHEC's Final 2010 Clean Water Act Section 303(d) list of water quality limited segments includes: PD-006, located at the US-601 highway (Gold Mine Highway) crossing, listed for due to fecal coliform; PD-640 and PD-432, extending from state route 903 (Flat Creek Road) through to state route 157 (Jones Road) crossing, due to impaired macroinvertebrate communities.
- Waters with State Listed Rare/Uncommon Species – portions of HGMC and Camp Branch were determined to have met this category based on previously documented presence of the Sandhills Chub (*Semotilus lumbee*).

The stream reaches were also assigned existing condition values. The values were assigned based on assessment scores that were measured using the "low gradient stream assessment data sheet" provided in the Cowardin guidelines. A summary of stream assessment scores and existing condition values for each stream reach is provided in Table 4-3. Overall, the scores for stream reaches in Camp Branch, HGMC ranged from 6.6 to 14.5, interpreted as systems that are "impaired" to "partially impaired" based on protocols in Cowardin et al. (1979).

4.2 Previous Fish Studies

Studies of resident fish within water bodies on and in the vicinity of the Site have been conducted since 1993 to the present. Studies conducted between 1993 and 2010 focused on presence and distribution of the sandhills chub in water bodies in

and immediately adjacent to the Site. In March 2011, the SCDNR performed a quantitative fish community study in two sections of HGMC, one section of Camp Branch, and a portion of the Little Lynches River adjacent to the Site. A map showing the locations of all the previous study survey points is provided in Figure 4-2. A summary of all the fish observed in the streams in and around the Site during previous studies is provided in Table 4-4. A list of studies performed to date, and descriptions and results of each study, are presented below, shown chronologically by year of study:

1993: The primary objective of Rohde (1993) was to document the presence and distribution of the sandhills chub in HGMC. In July 1993, fish were surveyed by Dr. Rohde from 11 locations using a 10 foot by 4 foot by ⅛–inch mesh flat nylon seine. Survey collections were performed in the Little Lynches River, Camp Branch, HGMC and its tributaries, and in the farm pond and Ledbetter Reservoir. The presence of sandhills chub was documented in the upper section of HGMC. Other fish species collected during this study were also documented. Four out of the 11 locations yielded no fish; two of these locations were shallow tributary streams leading into HGMC (stations R93-3 and R93-4) and two locations were within HGMC (R93-6 and R93-8), below the historically mined area. Two lentic (i.e., impounded) sites were surveyed along the shoreline, including a farm pond (R93-5) and Ledbetter Reservoir (R93-7). Five species of fish were observed at the lentic stations, including species typical of this habitat (mosquitofish, sunfish species, largemouth bass). Three species of fish (pirate perch, mud sunfish, and sandhills chub) were found at the two locations in the upper section of HGMC. Both the sandhills chub and the mud sunfish are listed as SCDNR priority fish species. Two locations were surveyed in the Little Lynches River, and the number of species collected (18) was higher than what was observed in the smaller tributaries. At these two locations, four SCDNR priority fish species were found, including: fieryblack shiner; greenhead shiner; flat bullhead; and Piedmont darter. The one Camp Branch location (R93-11) surveyed yielded eight species of fish, including greenhead shiner, a SCDNR priority fish species. In total, 23 species of fish were observed during the 1993 fish surveys.

2008: The primary purpose of Rohde (2008) was to document the presence and distribution of the sandhills chub. Several collection techniques were used based on habitat conditions, including: seining in larger open creek areas, large fine–meshed dip net for smaller and heavily vegetated areas, and kick sets (i.e., disturbing substrate upstream of dip net). In July 2008, fish were surveyed from nine locations within Site boundaries (with one location (R08-8), that included two sub–areas). Surveys were performed at seven locations in HGMC and its tributaries, and two

locations were surveyed in the Little Lynches River (above and below the confluence with HGMC). Surveys conducted at locations: R08-04, R08-05, R08-06, and R08-07 did not yield any fish. Sandhills chub were found at three locations in HGMC (R08-1,-2,-3). Similar to the 1993 survey efforts, the three same fish species (pirate perch, mud sunfish, sandhills chub) were found in the upper section of HGMC. Both the sandhills chub and mud sunfish are listed as SCDNR priority fish species. The study confirmed previous findings of sandhills chub occurrence within HGMC. A total of 18 fish species were found within the two surveyed locations of the Little Lynches River (R08-8,-9), but no sandhills chub were found in the Little Lynches River, which was consistent with survey results in 1993. The greenfin shiner and Piedmont darter, both SCDNR priority fish species, were found in the Little Lynches River.

2010: In August 2010, Rohde (2010) performed a survey to identify the presence and distribution of the sandhills chub at six locations in Camp Branch. Seine and dip net techniques were used to collect fish. The presence of sandhills chub was documented in three locations (R10-2,-4,-6) along Camp Branch. One location (R10-1) in the right fork of Camp Branch did not have any observed fish species. A total of 12 fish species, including the sandhills chub, was observed during this survey.

2011: In March 2011, as part of SCDNR's state-wide annual stream assessment program, a fish population survey was completed at five locations within and adjacent to the Site following South Carolina Stream Assessment (SCSA) standard operating procedures (Scott and Kubach 2011). The survey was done using backpack electrofishing techniques. Survey locations included two locations in HGMC (SC11-193,-194), one location in Camp Branch (SC11-195), and two locations in the Little Lynches River (SC11-86893,-94450) adjacent to the Site. Sandhills chub was the only fish species found in HGMC at location SC11-194, which is located within the vicinity of the Rohde 1993 location (R93-2). Five fish species were observed in the lower portion of HGMC at location SC11-193, as shown in Table 4-4. This site is located within the vicinity of the Rohde 1993 location (R93-08), as shown in Figure 4-2. The five species found are primarily insectivores and included one SCDNR priority species: flat bullhead.

Seven fish species were observed during the survey in Camp Branch (SC11-195), similar to those found in the Rhode 1993 survey at location (R93-11), as shown in Table 4-4. These species are primarily insectivores and included one SCDNR priority species: greenhead shiner. Thirteen fish species were observed during the survey in the upper Little Lynches River location (SC11-86893), as shown in Table 4-4. The 14 fish species observed are primarily insectivores and included two SCDNR

priority species: snail bullhead and flat bullhead. A total of 25 fish species were observed during the survey in the lower Little Lynches River location (SC11-94450), as shown in Figure 4-2. The species observed were primarily insectivores. Two species of pickerel (chain [*Esox niger*] and redfin [*Esox americanus*]) were the only predators observed at location SC11-94450. Three SCDNR priority species were observed at this location and included: greenfin shiner (*Cyprinella chloristia*), flat bullhead (*Ameiurus platycephalus*), and Piedmont darter (*Percina crassa*).

4.3 Previous Macroinvertebrate Studies

ETT Environmental, Inc. (ETT) has conducted qualitative benthic macroinvertebrate stream assessments at the Site annually since 1987. The purpose of the assessments from 1987 through 1990 was to monitor the condition of the macroinvertebrate communities for potential effects of previous mining activities at the Site on the ecological condition of the stream. In 1990, SCDHEC requested monitoring in the Little Lynches River at a location upstream and downstream of the confluence with HGMC to determine potential water quality impacts to the Little Lynches River.

Additionally, an annual benthic macroinvertebrate assessment program is required by the National Pollutant Discharge Elimination System (NPDES) permit No. SC0040479, held by Haile, for a permitted outfall location (Outfall 002) on the Site. Historically, Haile has had 2 NPDES permitted outfalls, however based on reclamation activities performed at the Site, Outfall 001 was closed permanently in 2001 (ETT 2010). Treated discharge continues to be periodically released from Outfall 002 into HGMC from holding ponds that are located 300 ft downstream from the Ledbetter Reservoir dam (ETT 2010). Since completion of closure activities, Outfall 002 has been primarily used to manage storm water and residual flows from the closed facilities (ETT 2010).

In addition to the annual surveys along HGMC and the confluence with Little Lynches, ETT conducted a supplementary benthic macroinvertebrate survey at sites along Camp Branch and Little Lynches River on April 25 and 26, 2011 (ETT 2011).

4.3.1 Survey Locations and Methods

The locations of the annual survey sites are shown in Figure 4-3. The locations of the supplementary survey sites are shown in Figure 4-4. For the annual assessment, four of the current locations (1, A, B, 7) are monitored for pH only, while

the remaining 12 sites are monitored for benthic macroinvertebrates and water quality parameters, including pH, DO, temperature and conductivity. All of the supplemental sites surveyed in April 2011 were monitored for water quality and benthic macroinvertebrates. A description of each site is provided in Table 4-5.

Macroinvertebrate sampling was targeted in both riffle and depositional habitats at each survey site. Collection methods were consistent with SCDHEC (1998). Community assessment methods were calculated for each survey effort, and included the following metrics: taxa richness, EPT index, biotic index, EPT to Chironomid ratio, percent dominant taxon, community loss index, scraper to collector–filterer ratio, shredders to total number of organisms ratio, and bioclassification scores. In addition to these metrics, a biological condition score was typically assigned to each survey site. The biological condition measures a perceived level of impairment of the benthic macroinvertebrate community.

4.3.2 Summary of Previous Benthic Macroinvertebrate Survey Results – Annual Monitoring

General findings of the annual benthic macroinvertebrate community assessments are summarized below for various reaches of HGMC for the last six years of collection (ETT 2006 – 2011). Note that this report summarizes the results of the surveys as reported by ETT; calculations of community metrics and stream conditions were not performed on the raw data for purposes of this report. Detailed results can be found directly in the individual annual reports prepared by ETT. Results of the supplementary survey sites are described in Section 4.3.3.

Overall, the annual surveys reported a range of habitat conditions, from those that fully support aquatic life uses to some that do not support aquatic life use. Bioclassification scores ranged from poor to good. Habitat differences among sites, changes in precipitation, previous mining activity and naturally low pH conditions were given in explanation for the varying levels of impairments observed over time.

4.3.2.1 Upper Haile Gold Mine Creek (Site 2A)

This survey site is used as a reference site to compare with the more downstream reaches of HGMC. At this site, taxa richness and diversity has generally been moderate, with the number of total organisms averaging 106 and the number of taxa averaging 22 species during the past six years (2006 to 2011). The predominant taxa have typically been species of stoneflies. The number of EPT species has been low, with an average near 5 species, indicative of impaired conditions. Biotic index

and EPT index values have combined to yield fair to good–fair bioclassification scores that are indicative of an environment that partially supports aquatic life use.

4.3.2.2 Downstream Haile Gold Mine Creek (Sites 3A, 4, 5, 6, 8, 9)

Conditions of the benthic community in the lower section of HGMC have shown consistently lower taxa richness and EPT index values over time compared to the upstream reach (Site 2A). The predominant taxa have typically been species of tolerant midges, Diptera (black fly larvae), and hydropsychid caddisflies. Biotic index and EPT index values have combined to yield poor to good–fair bioclassification scores that are indicative of an environment that will not support or only partially support aquatic life use. Compared to the upstream reach, these reaches show a level of impairment that is moderate to severe.

4.3.2.3 Ledbetter Reservoir (Sites 2B, 2C, 3)

Conditions of the benthic community in Ledbetter Reservoir have shown relatively low EPT index scores, as expected given the lentic habitats sampled and limited number of EPT species adapted to such habitats. The dominant taxa at these sites have ranged from Tanyopodinae midges, mayflies, hydropyschid caddisflies, and damselflies. Surveys have focused on the fringe habitats and substrates along the shoreline, which may not be representative of the entire reservoir benthic community. SCDHEC protocols are developed for wadeable streams and rivers, and extrapolation of results to the lentic habitats within the reservoir have been made through professional judgment by ETT biologists. Bioclassification scores for each individual site have shown poor to fair conditions, indicative of an environment that does not support or only partially supports aquatic life use. The lower of the two sites, Site 2C and Site 3, are relatively unimpaired to moderately impaired compared to Site 2B.

4.3.2.4 Little Lynches River (Sites 10 and 11)

Conditions of the benthic community in the Little Lynches River immediately above and below the confluence with HGMC have shown consistent EPT index values over time. On average, the taxa richness has been approximately 13% lower below the HGMC confluence (Site 11) than above the HGMC confluence (Site 10), but overall the downstream site does not show a significant level of difference compared to the upstream site. The predominant taxa have included EPT species (primarily stoneflies) and midges at both sites. Biotic index and EPT index values have

combined to yield fair to good bioclassification scores that are indicative of an environment that partially to fully support aquatic life use.

4.3.3 Summary of the April 2011 Supplementary Benthic Macroinvertebrate Survey Results

Below is a summary of the supplementary April 2011 survey results by stream reach as reported by ETT. Detailed results can be found directly in ETT (2011). Overall, the April 2011 survey showed variable habitat conditions that either fully or partially support aquatic life uses. Bioclassification scores were fair to good.

4.3.3.1 Upper Haile Gold Mine Creek (Site B)

Taxa richness was moderate, with 185 organisms surveyed, comprising 19 species. The number of EPT species was low, as only 4 species were found, indicative of impaired conditions. The predominant taxa surveyed were species of stoneflies, Tanyopodinae and Chironomidae midges, and isopods. Biotic index (4.35) and EPT index (4) values combine to yield a good–fair bioclassification score, which is indicative of an environment that partially supports aquatic life use.

4.3.3.2 Upper Camp Branch (Site CB1)

Taxa richness was moderate, with 62 organisms surveyed, comprising 17 species. The number of EPT species was low, as only 5 species were found, indicative of potentially impaired conditions. The predominant taxa surveyed were species of stoneflies, damselflies, Diptera (black fly larvae), Tanyopodinae midges, crayfish, and amphipods. Biotic index (5.89) and EPT index (5.0) values combine to yield a good–fair bioclassification score, which is indicative of an environment that partially supports aquatic life use.

4.3.3.3 Lower Camp Branch (Site CB2)

Taxa richness was moderate, with 163 organisms surveyed, comprising 41 species. The number of EPT species was moderate, as 17 species were found. The dominant taxa surveyed were species of mayflies, stoneflies, hydropyschid caddisflies, and damselflies. Biotic index (4.98) and EPT index (17) values combine to yield a good bioclassification score that is indicative of an environment that fully supports aquatic life use.

4.3.3.4 Little Lynches River (Site LL1)

Taxa richness was high, with 353 organisms surveyed, comprising 64 species. The number of EPT species was moderate, as 18 species were found. The dominant taxa surveyed were primarily species of mayflies and to a lesser degree stoneflies and caddisflies. Despite the high EPT index, individual mayfly species more tolerant of impaired conditions were observed. Biotic index (6.06) and EPT index (18) values combine to yield a good–fair bioclassification score that is indicative of an environment that partially supports aquatic life use.

4.4 Previous Mollusk Studies

Mollusk surveys have been conducted periodically in the vicinity of the Site since 1991 to the present. The primary focus of these surveys has been to identify the presence of the federally endangered and state endangered mussel, the Carolina heelsplitter (*Lasmigona decorata*). None of the surveys found the Carolina heelsplitter in or adjacent to the Site. Additional mollusk species incidentally observed during these surveys were also documented.

A list of studies performed to date, and descriptions and results of each study, are presented below, shown chronologically by year of survey:

1991: A survey for the Carolina heelsplitter was performed by Dr. Keferl in the Little Lynches River below the confluence of HGMC to nearly 12.5 miles downstream within the Little Lynches River (study referenced in Keferl 2008). The only mollusks found were the non–native Asiatic clam (*Corbicula fluminea*) and a species of the freshwater snail, genus Campeloma.

1992: A survey for the Carolina heelsplitter was performed by Dr. Keferl in both HGMC and the Little Lynches River (study referenced in Keferl 2008). The Carolina heelsplitter was not observed, and no freshwater mussels were found in HGMC or the Little Lynches River.

2008: On July 24 and 25 2008, Dr. Keferl performed a survey for the Carolina heelsplitter in the North Fork of HGMC down to the confluence with the Little Lynches River, and within areas of the Little Lynches River above and below the confluence with HGMC (Keferl 2008). A total of 12 survey locations were established. Information on specific survey point locations was not provided in the report, but general descriptions of the locations were provided, as summarized below:

1. HGMC near Snake Access Road, above Ledbetter Reservoir;
2. Ledbetter Reservoir, northern shoreline;
3. North Fork of HGMC, west of Chase Hill;
4. North Fork of HGMC, just above confluence with main branch;
5. Gault Lake, northwest of HGMC;
6. HGMC from Haile Gold Mine Road to its confluence with Little Lynches River;
7. Little Lynches River, from HGMC confluence to 660 ft downstream;
8. Little Lynches River, from HGMC confluence to approximately halfway to US 601 bridge (upstream);
9. Little Lynches River, Pleasant Plains Road bridge, survey reach 660 ft upstream and 985 ft downstream of bridge;
10. Little Lynches River, 660 ft upstream of US 601 bridge downstream to approximately halfway to HGMC confluence;
11. Little Lynches River, survey reach 1,970 ft upstream and 985 ft downstream of South Carolina (SC) 157 bridge (Jones Road);
12. Little Lynches River, survey reach 660 ft upstream and 985 ft downstream of SC 341 bridge (Bethune Road).

As described in Keferl (2008), each area surveyed was visually examined for any signs of mollusks. In deeper pools, a rake and/or hand methods were used to examine the substrate for mussels. The amount of time spent at each area was variable, based on the amount of area covered and the perceived mussel habitat.

The survey concluded that the Carolina heelsplitter was not found in HGMC or the Little Lynches. The results of the surveys concluded that no living freshwater mussel species were found in the Little Lynches River above the SC 341 bridge. A relic shell of an Eastern pondhorn mussel (*Uniomerus carolinianus*) was found between the US 601 Bridge and the confluence of HGMC. No mollusks were found in HGMC. No gastropods were found in the Little Lynches River above the SC 341 bridge. The Asiatic clam was found living in all areas of the Little Lynches River surveyed.

<u>2010</u>: On August 11 2010, Dr. Keferl performed a survey for the Carolina heelsplitter along Camp Branch (Keferl 2010). General location descriptions of survey points were provided, as summarized below:

- The beaver ponds and downstream section of the eastern fork of Camp Branch;
- The stream section and series of beaver ponds within the middle fork of Camp Branch;
- The stream section and beaver pond within the western fork of Camp Branch;
- The main stem of Camp Branch

The general methodology was described as "similar to previous studies," where visual, hand, and rake methods were used to survey areas. The survey concluded that the Carolina heelsplitter was not found in Camp Branch. No evidence of mollusks were observed in the beaver ponds or stream sections of Camp Branch. The Asiatic clam was found in the main stream of Camp Branch in a section of creek upstream of Tom Gregory Road crossing.

2011: In August and September of 2011, Alderman Environmental Services, Inc. (AES) performed a survey for the Carolina heelsplitter in several water bodies in and around Haile Gold Mine (AES 2011). The 2011 surveys included Haile Gold Mine Creek, Camp Branch, Buffalo Creek, the Little Lynches River, and an Unnamed Tributary to Little Lynches River adjacent to the Site.

Survey reaches and individual sites were established in the field for each of the water bodies (Figure 1 in AES 2011). Surveys were conducted using visual and tactile methods, including the use of bathyscopes.

For Buffalo Creek, freshwater mussels were only found downstream of Raley Millpond near the SC 346 crossing in Kershaw County (AES 2011). Two specimens of the freshwater mussel eastern elliptio (*Elliptio complanata*) were identified. Several relic shells of eastern elliptio and Eastern pondhorn were identified as well. Several areas of Buffalo Creek were not surveyed due to lack of appropriate mussel habitat.

For Little Lynches River, no freshwater mussel species were found despite the considerable level of effort. Several other taxa of mollusk were observed, including two genus of snails: pond snail (*Physa sp*.) and two–ridge rams–horn (*Helisoma anceps*), and the non–native Asiatic clam.

For Camp Branch, HGMC, and several tributaries within the Site, including the unnamed tributary, no freshwater mussels were found in these areas. The Asiatic clam was present in Camp Branch. Some areas of these water bodies were not surveyed due to unsuitable habitat.

In summary, AES found no instances of Carolina heelsplitter and very few instances of other freshwater mussel species overall. AES (2011) cited a lack of appropriate mussel habitat due to historical land use patterns, including sedimentation of creeks due to 19th century agriculture, to explain the dearth of freshwater mussel observations.

4.5 Previous Herptile Studies

Amphibian surveys were planned, but never conducted for the Site (NJA 1993). However, during an intensive one–day field event for mammals (Section 3.2), incidental herptile observations were documented. A list of herptile species that were observed during this study is shown in Table 4-6.

4.6 Overview of ARCADIS 2011 Aquatic Surveys

4.6.1 Purpose and Objectives

The purpose and objectives of the ARCADIS 2011 aquatic surveys were to gather baseline information on fish and macroinvertebrate populations, including special status species, in representative reaches throughout the Site and in adjacent and downstream areas. Aquatic habitat information was collected in conjunction with the surveys to provide context for species survey findings.

4.6.2 Pre–Survey Consultation

ARCADIS and Haile engaged agency stakeholders in a meeting on August 12, 2011 to discuss and solicit input on study plans for the fish and other wildlife surveys planned for the remainder of 2011. Notes of the meeting are provided in Appendix A. During this meeting, the agencies referred ARCADIS and Haile to SCDNR biologists and requested a Scientific Collector's Permit (SCP) be completed for the survey. Personal communication to SCDNR biologist (Mr. Kevin Kubach) was made to understand what equipment (e.g., the type of electrofishing equipment), might be most appropriate to work with for the water bodies to be surveyed, and a referral was given to current sampling methodologies found in the South Carolina Stream

Assessment (SCSA) standard operating procedures. The SCSA procedures were incorporated into the Study Plan (ARCADIS 2011b) and followed during the surveys.

4.7 The ARCADIS 2011 Aquatic Habitat Assessment

4.7.1 Sampling Methods for the Aquatic Habitat Assessment

Aquatic habitat assessments were conducted from October 15 through October 18, 2011, to support interpretation of aquatic species surveys. Locations of the survey are shown in Figure 4-5. The survey locations include streams within Site boundaries as well as streams adjacent to the Site. The entire area that was surveyed in 2011 is referred to in the below sections as "the study area." A study area reconnaissance was conducted immediately prior to initiating habitat assessments to understand the variability of the stream habitats and assure representativeness of sample reaches. Habitat assessments were performed by ARCADIS personnel following U.S. Environmental Protection Agency's (USEPA) Rapid Bioassessment Protocol (RBP) for low gradient streams (Barbour et al 1999) and SCDNR's Habitat Assessment Protocol (Scott et al 2011). Specific methods for the habitat assessment were described in detail in the Study Plan (ARCADIS 2011b). All methods described in the plan were followed during the assessment, except for the following two departures:

1. SCDNR's Stream Assessment Protocol includes methods for quantitative measures of substrate type, depth and flow velocity. The method involves traversing a random zig–zag transect along the length of the sample reach and recording depth, flow velocity and substrate measurements at 50 points. These measurements are used to understand habitat heterogeneity in flow velocity, depth and substrate types. Field crew applied this protocol at each study location, but reduced the number of measurements to 25 in smaller tributaries due to the homogeneity of these parameters in these systems.
2. The Study Plan identified fifteen aquatic study areas within five stream systems (Figure 4-5), including Camp Branch, HGMC, Little Lynches River, Buffalo Creek, and an unnamed tributary to the southeast of HGMC. Two locations in Buffalo Creek were not formally assessed due to habitat limitations, as described in the results section.

Prior to initiating field surveys, field staff verified with Haile staff and local weather reports that no precipitation had occurred within 48 hours of field surveys, consistent with SCDNR recommendations.

USEPA's RBP includes an evaluation of 10 physical habitat parameters related to general land use, riparian vegetation features and instream parameters. These habitat parameters are scored through visual assessment of the quality of habitat structure based on RBP guidance and best professional judgment.

The RBP protocol also provides a relative rank for overall habitat quality (optimal, suboptimal, marginal and poor) based on scorings for specific habitat parameters. These ranks provide information on the overall quality and condition of instream and surrounding physical habitat. This information supplements data gathered from the concurrent biological sampling because the quality of habitat structure influences the condition of the resident aquatic community (Barbour et al. 1999).

Some of the stream habitats within the study area were assessed previously in support of a Compensation Mitigation Plan (ERC 2010), as described in Section 4.1. The procedure used in ERC (2010) is very similar to USEPA's RBP, the only significant difference being the ranking scale used for each of the 10 habitat parameters: the Compensation Plan protocol uses a two–point scale (e.g., 0-2) for each parameter while the RBP protocol uses a twenty–point scale (e.g., 0-20). Thus, correcting for order of magnitude difference allowed for more direct comparability between results. To compare results from the two studies, this adjustment in scale was made to results presented in ERC (2010) for stream segments that overlapped, or were spatially proximate, to study reaches described below.

4.7.2 Data Analysis Methods for the Aquatic Habitat Assessment

Aquatic habitat structure was evaluated qualitatively in this report. RBP habitat scores generated through this habitat assessment were used to make relative comparisons of habitat quality among sample locations. Physical measurements of wetted width, depth and flow were averaged over the length of each sampling reach. This information was used to supplement the biological sampling data and provide general descriptions of habitat structure and quality.

4.7.3 Results for the Aquatic Habitat Assessment

The following section describes the results of the habitat assessments conducted by ARCADIS in 2011 to support fish and macroinvertebrate surveys. Locations surveyed are shown in Figure 4-5. Tables 4-7 through 4-9 provide summaries of water quality parameters measured, measures of physical parameters per SCDNR protocol, and RBP scores and rank. Inorganic substrate composition of each survey

point is summarized in Figures 4-6 through 4-11. Field data sheets, notes and photo–documentation are provided in Appendix F. Results are described below by survey reach.

4.7.3.1 HGMC 1

HGMC1 is located in the headwaters area of HGMC. The reach surveyed at HGMC1 consists of a mostly dry channel with some shallow, non–flowing water present as standing pools on the day of the assessment (10/18/2011). Upland areas adjacent to the drainage were recently logged, but a forest buffer of approximately 250 ft on each side of the channel remains intact. The channel is mostly shaded (approximately 85% shaded) and the dominant riparian species consisted of American Holly, Water Oak, Swamp Blackgum, Tulip Poplar, Red and Sweet Bay. Channel banks on each side of the surveyed reach of the channel were stable with dense vegetation, and there was no evidence of bank erosion or failure. No species of aquatic vegetation (including periphyton) were observed within the channel. No channel alterations, including channelization or dredging, were evident within this survey reach.

The inorganic substrate is composed primarily of a sandy–silt (approximately 20% sand) with a small portion (4%) of gravel (Figure 4-6). Coarse particulate organic matter (CPOM) and large woody debris (LWD) were abundant throughout the sample reach and were estimated to cover approximately 48% and 24% of the channel bottom, respectively. LWD estimates for this reach (1,500 $ft^2/mile^2$) were among the highest values recorded during the habitat survey despite the lack of flowing water (estimates of LWD only include woody structure in contact with water, per RPB guidance). Because this survey reach is not a high–energy system, as reflected by channel flow status, bank stability and channel configuration, organic substrates such as woody debris and CPOM are less likely to be immediately transported downstream compared to more downstream reaches. However, when the channel is mostly dry, as observed during this assessment, these substrate types have limited functionality because the biotic community is limited by water persistence.

A total RBP score of 118 (suboptimal) was determined for HGMC1, which is consistent with the total score of 125 (scaled up by an order of magnitude to account for differences in ranking scale) reported by ERC (2010) for the closest downstream location (R-HR-17) surveyed.

4.7.3.2 HGMC 2

HGMC2 is located downstream of the mine operation area, approximately 250 ft downgradient of the culvert crossing on Haile Gold Mine Road. On the day of the assessment (10/18/2011), average flow velocity was 0.56 feet per second (ft/s) and average depth was 0.43 ft. Baseflow and the corresponding wetted width reached the edge of banks throughout most of the reach. Minimal exposed substrate was observed. Stream morphology of this reach was represented by approximately 40% riffle habitat, 50% run habitat and 10% pool habitat. All pool habitats were characterized as small–shallow according to guidelines presented in Barbour et al. (1999).

The channel substrate is composed primarily of gravel (56%), cobble (20%) and sand (12%) with a small proportion (8%) of exposed bedrock (Figure 4-6). Cobble represented the primary source of stable substrate and epifaunal available cover; other sources of stable substrate, such as large woody debris, undercut banks and root mats, were largely absent within this reach. LWD estimates determined at HGMC2 were the lowest of all reaches evaluated. Heavy deposits of sand were not observed within this sample reach, and the marginal increases in bar formation observed were composed primarily of gravel. Within the shallow pool habitats, sediment deposition was minimal.

With the exception of a small clearing (approximately 65 ft x 65 ft) within the left overbank area, the riparian vegetative zone width was greater than 59 ft on each side of the channel. The dominant species of riparian vegetation consisted of Loblolly Pine with some Tag Alder and Sweetgum interspersed. Channel banks on each side are densely vegetated with trees, shrubs, non–woody macrophytes and herbaceous ground cover providing optimal bank stability. No signs of channel alteration, including channelization or dredging, were observed. An abundance of filamentous periphyton was observed throughout this sample reach, and was visually estimated to cover 90% of the available substrate. Periphyton was the only type of aquatic vegetation observed in this reach. Lack of LWD and dense periphyton mats distinguished this study reach from others.

A total RBP score of 126 (suboptimal) was determined for HGMC2, which is consistent with the total score of 120 (scaled up by an order of magnitude to account for differences in ranking scale) reported by ERC (2010) for the same location.

4.7.3.3 CB1

CB1 is located near the headwaters of Camp Branch on the main fork of the drainage. The average wetted width was 2.8 ft and the survey reach length was 328 ft. On the day of the assessment (10/17/2011), the average depth of the reach was 0.42 ft and the average flow velocity was 0.57 ft/s. The channel is partly shaded with an estimated 40% canopy cover. The riparian vegetative zone width was greater than 59 ft on the sides of both channel banks. No channel alterations were observed within this reach. Adjacent uplands are densely vegetated and dominant species consists of Tulip Poplar, Sweetgum, Dogwood, and American Elm. Portions of the channel banks are also densely vegetated with trees, understory shrubs and grasses. Segments of channel banks within the survey reach were also moderately incised and unstable.

Channel substrate is composed primarily of exposed bedrock (20%), gravel (16%), clay (16%) and sand (12%) with a small proportion (4%) of cobble (Figure 4-7). An abundance of CPOM (estimated at 32%), including leaf litter and sticks, was also present in the stream reach. LWD was also abundant; estimated LWD density (1,240 $ft^2/mile^2$) was about 3 to 4 times greater than downstream Camp Branch reaches. Shallow runs represented the majority of stream morphology types observed (85%) with only a small proportion of riffles (10%) and pools (5%). During the habitat assessment, baseflow was low to moderate as indicated by the extent that water filled the available channel (on average, water filled about 75% of the available channel). As a result, riffle substrates were mostly exposed. The few observed pool habitats were all small–shallow with a mix of sand/clay substrate. A few aquatic vegetation species were observed including *Polygonum* and *Sparganium* species. In addition, a small amount of green filamentous periphyton was observed on cobble substrate located within a non–shaded portion of the study reach.

A total RBP score of 116 (suboptimal) was determined for CB1, which is comparable with the total score range of 125 – 130 reported by ERC (2010) for locations in Camp Branch adjacent to the CB1 reach.

4.7.3.4 CB2

The CB2 reach was located at an intermediate point in the stream in between CB1 and CB3. On the day of the assessment (10/17/2011), the average depth was 0.49 ft and the average flow velocity was 0.48 ft/s. This channel flow status, on average, filled about 75% of the available channel and resulted in many exposed riffle

substrates. Shallow runs composed the majority (about 75%) of the stream morphology types with 20% riffles and 5% pools. Most of the pools were poorly defined as a result of low baseflow conditions, and were characterized as small–shallow pools with substrate composed primarily of sand. Inorganic substrate type consisted mostly of gravel (64%) and sand (20%) and smaller proportions of boulders (4%) and organic substrates, including 8% CPOM and 4% fine woody debris (Figure 4-7).

Portions of the adjacent uplands in the left overbank area (towards the prison property) are clear–cut, with evidence of some localized erosion and a riparian vegetative zone width less than 59 ft. The canopy cover is partly open with approximately 20 – 30% shade, averaged over the length of the sampling reach. Dominant riparian species include American Holly, Sweetgum, Water Oak and Ironwood. Other than sparse periphyton, which was represented by mostly red/brown algae, aquatic vegetation was not observed within the channel. Channelization or other forms of channel alteration were not observed within the sample reach.

Moderate deposition of gravel and sand were observed on old and new bar formations, on meanders and in pools. Channel banks were characterized as moderately unstable, with about 30% of eroded channel banks and areas bank failure evident throughout the reach. In addition, incised banks and sections of confined channel were common throughout the sample reach. A total RBP score of 111 (suboptimal) was determined for CB2, which is the lowest score of the Camp Branch reaches assessed mostly as a result of the sediment deposition and reduced riparian zone width.

4.7.3.5 CB3

The lower Camp Branch reach (CB3) was located approximately 0.62 miles upgradient of the Little Lynches River confluence in a relatively higher gradient section of the stream. On the day of the assessment (10/17/2011), the average depth was 0.44 ft and the average flow velocity was 0.79 ft/s. Compared to upstream Camp Branch locations, this section of the stream is wider (average width of 10.6 ft) with a greater mix of cover available for epifaunal colonization, including exposed bedrock (8%), boulder (4%), cobble (16%), large woody debris, undercut banks and root mat. Other substrate types included gravel (36%), sand (24%), and a smaller proportion (12%) of CPOM (Figure 4-7).

As indicated by greater substrate sorting and variety, riffle habitats (20%) had larger substrate types relative to upstream Camp Branch reaches. Low baseflow was evident during the time of sampling as indicated by exposed riffle habitat and lack of water throughout the available channel width. As a result, pools were difficult to distinguish from run habitat but were estimated to occur as small–shallow pools over 5% of the sampling reach. Slight to moderate deposits of sand and fine gravel were observed in the bottom of pools, along existing bar formations, and in depositional habits. The red/brown periphyton observed upgradient of this reach was also observed at CB3 in lower densities, but no other species of aquatic vegetation were observed.

Channelization or other forms of channel alterations were not observed at CB3. Dominant riparian species were similar to upgradient Camp Branch reaches, but with fewer shrubs and greater density of trees growing along the channel banks and in the riparian zone. No anthropogenic impacts were observed within the riparian vegetative zone, which was greater than 59 ft on both overbank areas. Channel banks were relatively stable throughout the sample reach, but some evidence of bank erosion and sloughing were observed in confined segments with incised banks.

A total RBP score of 129 (suboptimal) was determined for CB3, which is the highest score of the Camp Branch reaches assessed. Increased functional epifaunal substrate and bank stability were the primary factors contributing to the higher RPB score.

4.7.3.6 LLR1

LLR1 is located approximately 0.5 miles upgradient of the confluence of Camp Branch, and approximately 500 ft downstream of the bridge crossing on Pleasant Plains road. On the day of the assessment (10/15/2011), the average wetted width was 19 ft and the survey reach length was 564 ft. Baseflow was low during the time of the assessment, as indicated by exposed channel substrate with water estimated to fill approximately 35% of the available channel. Average flow velocity was measured at 0.13 ft/s with an average depth of 0.67 ft. Shallow runs comprised the majority of stream morphology types (80 – 90%), with few noticeable shallow pools and riffles (each estimated to represent about 5 – 10% of the stream morphology types within the assessment reach). Channel substrate was composed primarily of sand (46%) and fine gravel (38%) (Figure 4-8). CPOM, including new leaf fall, was also abundant (8%). In addition, LWD density estimates (1,130 $ft^2/mile^2$) for LLR1 were the highest of the Little Lynches River reaches that were assessed.

Available epifaunal substrate cover was considered marginal because very few stable substrates were observed, and consisted mostly of submerged logs and a few undercut banks with root mats. However, as a result of low baseflow, many of the root mats and woody habitats were not in contact with the water and thus unavailable for cover during the time of sampling. The few shallow pools observed consisted of sand bottoms, without root mats or submerged vegetation. No species of aquatic vegetation, including periphyton, were observed within the survey reach. Sediment deposition was prevalent throughout the survey reach, with moderate deposition of sand and gravel on old and new bars and around bends.

Surrounding areas were generally heavily forested, such that the potential for local erosion from surrounding uplands did not appear likely within the survey reach area. The riparian zone width was generally greater than 59 ft, but a small section of the left bank area was reduced to about 49 ft by a small clearing. The channel banks were relatively stable, with most of the streambank surfaces covered by a mix of vegetation including trees, shrubs and non–woody macrophytes. Mild bank incision was observed in isolated areas of the sample reach. Dominant riparian species observed included Black Walnut, Tulip Poplar, Water Oak, and Box Elder.

The RPB score determined for LLR1 was 115 (suboptimal), one of the highest of the Little Lynches River reaches surveyed. Increased bank stability was the primary factor contributing to the higher RPB score.

4.7.3.7 LLR2

LLR2 is located approximately 0.25 miles downstream of the Camp Branch confluence in a low–gradient section of the river, with habitat characteristics similar to LLR1. On the day of the assessment (10/15/2011), the average wetted width was 24.0 ft and the reach length was 715 ft. Average flow velocity (0.16 ft/s) and depth (0.95 ft) were similar to LLR1 conditions and is characterized as having a marginal channel flow status (about 35% of the available channel filled with water). As a result of low baseflow conditions and the low gradient of the channel, riffle and pool habitats were poorly defined (each estimated to occur over 5 – 10% of the reach) and shallow runs (80 – 90%) dominated stream morphology types of the reach. Channel substrates consisted primarily of sand (52%) and gravel (32%), with a few boulders (6%) and abundant CPOM in the form of new leaf fall and branches (Figure 4-8). Epifaunal substrate and available cover was considered marginal due to lack of stable substrate, represented mostly by LWD (592 $ft^2/mile^2$). Moderate deposition of

sand and fine gravel was observed throughout the sample reach, particularly in shallow pool habitats, on old and new bar formations and around meanders.

Stream banks were moderately stable, with only infrequent and small areas of bank erosion observed. Most bank areas were covered by a dense mix of vegetation consisting of trees, shrubs and non–woody macrophytes. Bank incision was comparable to the upstream LLR1 reach.

The RPB score determined for LLR2 was 112 (suboptimal), which was slightly lower than LLR1. Decreased functional epifaunal and pool substrates were contributing factors to the lower RPB score.

4.7.3.8 LLR3

LLR3 is located approximately 0.8 miles downstream of LLR2 and 0.14 miles upstream of the Highway 601 bridge crossing. During the study area reconnaissance, a historical dam structure composed of sheet pile was observed in the Little Lynches River approximately 0.62 miles upstream of LLR3 (and approximately 0.3 miles downstream of LLR2). This structure has modified surface flow, creating impounded pools and depositional habitats upstream of the structure, and reducing flow in the immediate downstream area.

On the day of the assessment (10/15/2011), average depth was 0.81 ft, average flow velocity was 0.25 ft/s, average wetted width was 18 ft, and the reach length was 545 ft. Habitat characteristics at LLR3 were similar to the two upstream reaches on the Little Lynches River. Substrate consisted primarily of sand (52%) and gravel (34%) with an abundance of CPOM in the form of new leaf fall and woody debris (Figure 4-8). Available epifaunal substrate was characterized as marginal due to the dominance of sandy bottoms and lack of stable habitat available for colonization. LWD was the primary source of stable habitat (769 $ft^2/mile^2$) observed throughout this study reach.

Compared to upstream reaches in Little Lynches River, bank incision was greater throughout LLR3, with segments of the channel bank incised to about 11.5 ft. Isolated areas of bank sloughing and other areas with high erosion potential during high flows were observed throughout the study reach. Bank stability appeared to be marginal based on these observations. Other LLR3 streambank areas not affected by incision or erosion were mostly covered by a mix of vegetation similar to the

above LLR reaches. Dominant riparian species included Iron Wood, Black Walnut, Sycamore and Ash.

A total RBP score of 103 (marginal to suboptimal) was determined for LLR3, which is lower than the upstream LLR reaches. Decreased bank stability and epifaunal substrate cover were the primary factors contributing to the lower RBP score.

4.7.3.9 LLR4

LLR4 is approximately 0.2 miles downstream of the HGMC confluence in a more sinuous section of the Little Lynches River relative to upstream reaches. On the day of the assessment (10/16/2011), the average wetted width was 25.6 ft with an average depth of 0.84 ft. Similar to upstream reaches, baseflow was low and estimated to fill approximately 50% of the channel when averaged over the length of the reach; average flow velocity was 0.30 ft/s. Low gradient runs (75%) accounted for the majority of stream morphology types with few shallow riffles (15%) and pool (10%) habitats.

Similar to other LLR reaches, channel substrate consisted primarily of sand (50%) and fine gravel (32%) with few sections containing a smaller proportion (4%) of exposed bedrock (Figure 4-9). CPOM (10%) and LWD (841 $ft^2/mile^2$) were also abundant throughout the reach. Undercut banks and root mats were observed throughout the reach but were mostly out of contact with the water surface due to low baseflow conditions.

Bank incision and channel confinement throughout the LLR4 reach were more pronounced compared to upstream reaches, with incised segments about 13 ft above the channel bottom. Evidence of bank failure and sloughing were observed throughout the reach, which frequently resulted in LWD inputs in the form of trees and logs. Several deeper pools were observed throughout the reach, although the majority of pools were small–shallow pools. As such, pool variability was greater than upstream LLR reaches and thus characterized as marginal.

ERC (2010) conducted habitat assessments at a location in the Little Lynches River in between LLR3 and LLR4 and determined an adjusted (Section 4.6) total habitat score of 110 (suboptimal), which is comparable to the RBP scores of 103 (marginal to suboptimal) and 115 (suboptimal) determined for study reaches LLR3 and LLR4, respectively.

4.7.3.10 LLR5

LLR5 is approximately 0.5 miles downstream of the confluence of the unnamed tributary. On the day of the assessment (10/16/2011), average channel wetted width was 24.9 ft, average depth was 0.94 ft and the reach length was 751 ft. Baseflow was low and estimated to fill approximately 50% of the available channel, with an average flow velocity of 0.33 ft/s. Riffle habitats were frequently exposed. Low gradient runs were the primary stream morphology type (80%) with some riffles (15%) and fewer pools (5%).

Channel substrate was primarily sand (54%) and fine gravel (22%) with abundant CPOM (Figure 4-9). Epifaunal substrate was characterized as marginal, with the highest substrate availability score of the LLR reaches evaluated. LWD (710 $ft^2/mile^2$) and undercut banks comprised the majority of stable substrate types.

Despite the marginal epifaunal substrate, decreased bank stability and protection factored in most heavily to produce one of the lowest total RBP scores (104, marginal to suboptimal) within the Little Lynches River.

4.7.3.11 LLR6

LLR6 was identified in the Aquatic Resources Study Plan (ARCADIS 2011) as a potential downstream–survey location. This location is 3.4 miles downgradient of the confluence with HGMC.

However, during study area reconnaissance, significant habitat alterations associated with adjacent agricultural operations were observed in the riparian and adjacent upland areas. Erosion, bank sloughing and failure were observed where cattle access the river, and increased periphyton growth was also observed throughout the reach (periphyton was not observed in upstream reaches).

Substrate composition was similar to upstream reaches, consisting primarily of sand (46%) and fine gravels (Figure 4-9). Relative to upstream reaches, average depth (0.55 ft) was slightly less and average flow velocity was slightly greater (0.81 ft/s), as measured on 10/16/2011, but channel flow status was comparable, estimated to fill about 50% of the available channel. Sandy sediments were softer than upstream reaches, and it was estimated that more than 80% of the bottom changes frequently due to the mostly fine substrates. Pools were nearly absent (estimated to comprise less than 5% of the stream morphology types of the assessment reach, and nearly

indistinguishable from shallow run habitats, which comprised about 80% of the stream morphology types in the assessed reach. Shallow riffle habitat (15%) was evident throughout the sample reach, with much of the substrate exposed due to low baseflow.

A total RBP score of 94 (marginal), the lowest of the LLR reaches, was determined for LLR6 based on the limited epifaunal substrate, lack of pool variability and reduced riparian zone. Agricultural impacts to this reach, including bank sloughing and erosion associated with cattle use, were determined to limit the suitability of this reach for fish sampling.

4.7.3.12 BC1

BC1 is located in the upper headwater reach within a tributary fork of Buffalo Creek. No evidence of a channel, or presence of pooled water, was observed in the vicinity of this location during the aquatic survey (10/18/2011). As a result, habitat assessments were not conducted here.

4.7.3.13 BC2

BC2 is located in the upper section of the main branch of Buffalo Creek in an area just east of the Site. Habitat within this section of the creek is typical of a lower ordered stream, and consisted of a mostly shaded channel, with a relatively narrow wetted width (10.2 ft), dense riparian vegetation and abundant allocthonous matter including LWD, CPOM and detritus. On the day of the assessment (10/18/2011), the average depth was 0.44 ft and average flow velocity was 0.32 ft/s.

The reach of the creek that was assessed contained mixed substrate, including gravel (48%), sand (20%), LWD (12%), FWD (4%), cobble (4%) and boulder (Figure 4-10). Undercut banks and exposed root mats were abundant throughout the sample reach. These habitats were mostly in contact with surface water because water filled most of the channel during the time of survey. Runs were the most common stream morphology type (comprising ~50% of stream morphology types) but numerous riffles (30%) and shallow pools (20%) were also observed throughout the reach. Some deposition of fine gravel and sand occurred throughout the reach, for example, bar formation and deposition in pool habitats were observed. Aquatic vegetation was sparse and limited to sedge species (*Carex*), estimated to occur at 2% over the length of the reach.

The section of the stream assessed was moderately sinuous, and bends in the stream were estimated to increase the stream length by almost 2 times longer than a straight line. Streambanks were also stable, with little evidence of bank erosion or failure. More than 90% of streambank surfaces and immediate riparian zones were covered by a mix of vegetation including trees, understory shrubs, and non–woody macrophytes. The riparian vegetative zone was undisturbed and the vegetative zone width was greater than 59 ft on each side of the channel. Within the riparian buffer area, American Holly, Swamp Blackgum, Red Maple and Tulip Poplar were the primary species present.

Based on lower sedimentation, with increased sinuosity, pool variability and bank stability, the total RBP score of 149 (suboptimal) was the highest observed during the fall surveys.

4.7.3.14 BC3

BC3 is located near the Fernwood Drive culvert crossing approximately 1.1 miles downstream of BC2. The culvert used at the road crossing appeared to be undersized and field crew observed an abundance of woody debris, leaf litter and sediment in the upstream portion of the culvert that resulted in an impoundment to surface water flow. As a result, the upstream aquatic habitat is more pond–like than stream, with a large inundated area and depths too deep to wade. Habitat assessments following the referenced protocols were therefore not conducted. Water quality measurements were recorded, along with photo–documentation as provided in Appendix F.

4.7.3.15 BC4

BC4 was not included in the Study Plan but was added to the program at the request of SCDNR. BC4 is located approximately 3.1 miles downstream of BC3 just downstream of the Mt. Pisgah bridge crossing in a relatively confined section of the creek. On the day of the assessment (10/18/2011), the average depth was 0.61 ft with an average flow velocity of 0.33 ft. The average wetted width of the reach was 16.1 ft and the survey length was 486. Relative to the upstream BC2 location, this survey reach was wider and deeper but had a similar flow velocity. Channel substrate was represented by mixed types including gravel (36%), bedrock (20%), sand (16%), CPOM (10%), cobble (8%) boulder (4%), LWD (4%) and FWD (Figure 4-10). The abundance of exposed bedrock was one feature that distinguished this reach from other locations surveyed in this study.

Stream morphology types included runs (50%), pools (30%) and riffles (20%). Epifaunal substrate and available cover was rated suboptimal, consisting of textured bedrock, LWD, cobble, boulder and undercut banks. Areas of fine gravel and sand were present across much of the survey reach. Sediment deposition was estimated to affect about 50% of the bottom, with slight deposition in pools and new increases in bar and island formation. With the exception of exposed bar and island formations, water filled most of the available channel.

Streambanks were moderately stable but infrequent, and small areas of erosion and sloughing were observed at a frequency of about 10% of the reach, mostly in areas with incised or undercut banks. With the exception of these areas, most of the streambank surfaces and immediate riparian zone were covered with mixed vegetation including trees, understory shrubs and herbaceous groundcover.

The total RBP score of 142 (suboptimal) was comparable to the upstream BC2 reach. A slight reduction in the score was based primarily on reduced bank stability, despite increased substrate and cover.

4.7.3.16 UT1

The Unnamed Tributary intersects a small portion of the Site along the southeastern boundary and is a tributary to the Little Lynches River. The location assessed (UT1) is in the middle section of the stream, approximately 2.1 miles upstream of the Little Lynches River confluence. On the day of the assessment (10/18/2011), the average depth was 0.41 ft and the average flow velocity was 0.21 ft/s. The channel was relatively full, with water reaching the base of both lower banks (average wetted width of 4.6 ft) and minimal amount of channel substrate exposed.

Most of the reach consisted of run habitats (65%), with fewer riffles (25%) and very few pools (10%). Inorganic substrates were dominated by sand (28%) and gravel (24%) with an abundance of organic matter in the form of CPOM (32%) and LWD (Figure 4-11). Dense woody debris, undercut streambanks and root mats were the primary source of stable habitat and epifaunal cover. LWD density estimates (1,630 $ft^2/mile^2$) for UT1 were the greatest of all locations assessed in this study.

Streambanks were stable throughout the length of the survey reach, with minimal evidence of bank erosion or failure. More than 90% of the streambank surfaces and immediate riparian zone were covered by mixed vegetation consisting of trees, understory shrubs and herbaceous ground cover. Dominant species were consistent

with other reaches and consisted of American Holly, Water Oak, Swamp Blackgum, Red Maple and Tulip Poplar.

A total RBP score of 147 (suboptimal) was determined for UT1, which is comparable to the sections of Buffalo Creek surveyed. The primary factors for this score included stable epifaunal substrate and cover, with moderate bank stability.

4.8 The ARCADIS 2011 Fish Survey

4.8.1 Sampling Methods for the Fish Survey

A biologist team, consisting of qualified ARCADIS and AES personnel conducted fish community surveys at 11 locations (Figure 4-5) in October 2011, following the methods outlined in the Study Plan (ARCADIS 2011b). Five water bodies were surveyed during the effort including: four locations in Little Lynches River, two locations each in HGMC, Camp Branch and Buffalo Creek, and one location in an Unnamed Tributary to the southeast of HGMC. Specific survey coordinates of the fish study reaches are provided in Table 4-10.

Fish survey methods followed SCSA protocols, with sampling conducted on established stream reaches 20 to 30 times the average stream width (minimum length of 328 ft), using primarily backpack electrofishing techniques, supplemented with block nets and seines as appropriate. Based on the average stream widths, surveys were conducted with one to three backpack units. Specific protocols used at each location (i.e., number of backpack units, length of the survey reach) are provided in the field notes in Appendix G.

The lower Buffalo Creek location (BC4) was located below the Fall Line. The Fall Line is a geomorphic boundary marked by a collection of shoals, waterfalls, and cliffs within rivers and creeks that define the separation between the Piedmont region and the Sandhills region. This location therefore falls within the Sandhills/Coastal Plain region and was surveyed using three sample passes, as per procedures in SCSA protocols. The remaining 10 survey locations were above the Fall Line, and following SCSA protocols, require only one survey pass.

4.8.2 Data Analysis Methods for the Fish Survey

All fish captured during the pass(es) were enumerated and identified to species level, and recorded on fish data forms along with any noted anomalies. Taxonomic

identification was performed using key diagnostics found primarily in *Freshwater Fishes of South Carolina* (Rohde et al. 2009). Personnel from ARCADIS and AES independently keyed out some individuals periodically during the survey to provide an additional level of quality assurance/quality control.

Based on SCSA protocols, young–of–year (YOY) fish were identified to lowest practical level and enumerated separately. These were noted predominately at LLR5 station (Table 4-11). Photographs were taken of each species observed during the study. Additionally, water quality parameters measuring temperature, pH, conductivity, turbidity, dissolved oxygen (DO), and total dissolved solids (TDS) were recorded at each survey reach, prior to sampling.

The trophic group classifications are based on those found in Table 4 of North Carolina Department of Environment and Natural Resources' (NCDENR) *Standard Operating Procedure Biological Monitoring – Stream Fish Community Assessment Program* (NCDENR 2006). Relative abundance is a measure of the number of a particular species as a percentage of the total number of individuals observed. Inverse index of diversity (1/D) is based on Simpson's formula for diversity:

$$D = \sum_{i=1}^{s} \left[\frac{n_i(n_i - 1)}{N(N-1)} \right] \quad \textbf{(3)}$$

Where:

ni = number of individuals per species

N = number of total individuals

The inverse index of diversity can range from 1 to the number of species observed. The higher the index value, then the higher the diversity.

4.8.3 Results of the Fish Survey

The following describes the results of the fish community survey work, and includes a summary of applicable community metrics, occurrence of SCDNR priority fish species, comparisons to historic survey results, and relative distribution of SCDNR priority fish species. Tables 4-11 through 4-16 provide summaries of species observed, composition of major trophic groups, relative abundance, inverse index of diversity, SCDNR priority fish species, water chemistry, and stream characteristics.

Field data sheets, notes and photo–documentation are provided in Appendix G. Results are presented by survey location.

4.8.3.1 HGMC1

Location HGMC1 consisted of non–flowing shallow water habitat with an average stream width of 2.8 ft and survey reach length of 328 ft. This location was sampled using one pass with one backpack electrofishing unit, and then was supplemented with additional sweep netting of available habitats within the survey reach. Upon completion of these activities, no fish were observed; however several crayfish were observed. Water quality parameters for this location indicated acidic pH conditions (5.31), a low dissolved oxygen concentration (5.74 ppm), and lack of flowing water, which are limiting to some fish species.

Previous survey locations by Rohde in July 1993 (R93-2) and SCDNR in March 2011 (SC11-194) were conducted in a reach of HGMC located approximately 0.3 miles downstream of HGMC1. During the July 1993 survey, three species were observed in this section of HGMC, including two SCDNR priority species (sandhills chub and mud sunfish), along with pirate perch. During the March 2011 survey, the sandhills chub was the only fish species observed.

The difference in the number and types of species observed during Rhode's spring and summer surveys compared to ARCADIS' fall 2011 survey are probably due to differences in flow conditions encountered in the fall (no flow and little water present) compared to other times of the year, particularly in the spring when water levels are usually higher and presumably flow was present in the reaches. Differences in microhabitat conditions between ARCADIS' survey location and previous survey locations could also be a factor in observed differences. Inconsistent presence of sandhills chub was observed by Rhode in 2010, for example, along reaches in Camp Branch surveyed <500 ft apart. Presumably these differences were the result of microhabitat differences among survey points.

Based on the habitat information available for the sandhills chub (Snelson and Snuttkus 1978, Rohde and Arndt 1991), along with local survey information provided in Rohde (2008), this species is typically found in headwater creeks with sandy and/or gravel substrates and sparse aquatic vegetation. HGMC1 is a first to second order stream, with a sandy substrate, stable and narrow channel, and no aquatic vegetation presence. However, stagnant flow conditions were observed during the ARCADIS 2011 survey, which could explain the absence of sandhills chub during

this survey period. The stagnant flow conditions coupled with a highly tannic (blackwater) stained color, lack of functional instream cover, low pH (5.31) and low DO (5.74 ppm) conditions could also explain why other fish species were not observed in this area. Another possibility is that in-stream barriers, such as the culvert observed upstream of the historic survey location (R93-2) may limit the ability of fish (including the sandhills chub) to move upstream. At least on a seasonal basis, fish populations if present at all in this area could have moved downstream to more suitable habitat conditions.

4.8.3.2 HGMC2

The lower location (HGMC2) within HGMC was below the culvert crossing on Haile Gold Mine Road and had flowing water, with primarily riffle and runs and few shallow pool habitats. The average stream width was 5.6 ft and survey reach length was 328 ft. This location was sampled using one pass with one backpack electrofishing unit. Three fish species were observed during the survey, including creek chubsucker, green sunfish, and bluegill. No SCDNR priority fish species were observed at this location.

Previous survey locations by Rohde in July 1993 (R93-8) and SCDNR in March 2011 (SC11-193) were conducted slightly upstream in the vicinity of HGMC2. Historic observations also indicate limited numbers of fish at this location. In July 1993, Rohde did not observe any fish through the survey efforts. In March 2011, the SCDNR performed a survey near this location and observed five fish species: creek chubsucker, green sunfish, bluegill, golden shiner, and flat bullhead. During this survey, additional sampling effort was made outside of the standard sample section to yield the three additional fish species: creek chubsucker, bluegill, and golden shiner.

4.8.3.3 CB2

The upper Camp Branch location (CB2) was in a confined channel portion of the stream, with steep cut banks, flow moderate, and the majority of the reach was shallow runs, with few riffles and shallow pools. The average stream width was 6.0 ft and the survey reach length was 328 ft. This location was sampled using one pass with one backpack electrofishing unit. A total of 691 fish collected, representing 10 species, and a catch–per unit effort (CPUE) of nearly 2.1 fish per foot was achieved. Ten fish species were observed during this survey, which resulted in a moderate inverse index of diversity of 4.5. Bluehead chub and rosyside dace accounted for

approximately 60% relative abundance of the species observed at CB2. One SCDNR priority fish species, greenhead chub, was observed during the survey.

Previous surveys were conducted by Rohde in August 2010 at six locations in the upper portions of Camp Branch. The closest location (R10-6) was approximately 0.43 miles upstream from CB2, and eight fish species were found during that survey. Of these eight species, two were SCDNR priority fish species (greenhead shiner and sandhills chub). During the ARCADIS 2011 survey, a similar fish community was observed, comprised of six of the same fish species surveyed in August 2010.

4.8.3.4 CB3

The lower Camp Branch location (CB3) was in a higher gradient section of the stream, with firmer substrates and flows that could support riffles and runs. The average stream width was 10.6 ft and the survey reach length was 328 ft. This location was sampled using one pass with two backpack electrofishing units. A total of 326 fish, representing 13 species, were collected at this location, and a CPUE of approximately 1 fish per foot was achieved. The inverse index of diversity was moderate with a value of 5.0. Bluehead chub and rosyside dace accounted for nearly 60% relative abundance of the species observed at CB3. Two SCDNR priority fish species, greenfin shiner and greenhead shiner, were observed during the survey.

Previous surveys were performed just downstream of CB3 by both Rohde in July 1993 (R93-11) and SCDNR in March 2011 (SC11-195). The results of these surveys showed similar fish species observed (n = 9) and relative abundance of bluehead chub and rosyside dace was similar to the results found in ARCADIS 2011 survey.

4.8.3.5 LLR1

LLR1 is located on the Little Lynches River, upstream of the Camp Branch confluence, in a section of river with primarily low gradient runs and few shallow pool and riffle habitats, comprised mainly of sandy and gravel substrate. The average stream width was 19 ft and the survey reach length was 564 ft. This location was sampled using one pass with two backpack electrofishing units. A total of 740 fish, representing 15 species, were collected and a CPUE of approximately 1.3 fish per foot was achieved. The inverse index of diversity was moderate with a value of 4.1. Highfin shiner and swallowtail shiner accounted for nearly 65% relative abundance of

the species observed at LLR1. Two SCDNR priority fish species, greenfin shiner and flat bullhead, were observed during the survey.

In March 2011, SCDNR performed a fish community survey approximately 1.1 miles upstream of LLR1 (at location SC11-86893). A total of 13 fish species were observed at this location during the SCDNR survey, whereas 11 fish species were observed during the ARCADIS 2011 survey. Similar fish communities were observed, as highfin shiner and tessellated darter were two of the primary abundant fish species observed.

4.8.3.6 LLR2

LLR2 is approximately 0.25 miles downstream of the Camp Branch confluence, in a section of the Little Lynches River with primarily low gradient runs and few shallow pool and riffle habitats, comprised mainly of sandy substrate. The average stream width was 24 ft and the survey reach length was 715 ft. This location was sampled using one pass with three backpack electrofishing units. A total of 1,190 fish, representing 13 species, were collected and a CPUE of approximately 1.7 fish per foot was achieved. The inverse index of diversity was low at a value of 2.1, based on the high relative abundance of two species. Highfin shiner and swallowtail shiner accounted for around 80% relative abundance of the species observed at LLR2. One SCDNR priority fish species, flat bullhead, was observed during the survey. No historic fish surveys have been performed in the vicinity of location LLR2 to our knowledge.

4.8.3.7 LLR4

LLR4 is approximately 0.2 miles downstream of the HGMC confluence, in a section of the Little Lynches River with primarily low gradient runs and few shallow riffles and deeper pool habitats, comprised mainly of sandy substrate. The average stream width was 25.6 ft and the survey reach length was 768 ft. This location was sampled using one pass with three backpack electrofishing units. A total of 352 fish, representing 21 species, were collected and a CPUE of approximately 0.5 fish per foot was achieved. The inverse index of diversity was high with a value of 8.0, based on the species richness and more equivalent relative abundance of species observed. Bluehead chub and redbreast sunfish accounted for nearly 40% relative abundance of the species observed at LLR4. One SCDNR priority fish species, greenfin shiner, was observed during the survey.

Historic fish surveys were performed by Rohde at the confluence of HGMC in July 1993 (R93-10) and July 2008 (R08-9). During these surveys, 19 fish species were observed, including four SCDNR priority species: greenfin shiner, greenhead shiner, flat bullhead, and Piedmont darter. Highfin shiner and tessellated darter comprised nearly 40% relative abundance of the species observed.

4.8.3.8 LLR5

LLR5 is approximately 0.5 miles downstream of the Unnamed Tributary confluence, in a section of the Little Lynches River with primarily low gradient run and shallow pool and exposed riffle habitats, comprised mainly of sandy substrate. The average stream width was 24.9 ft and the survey reach length was 751 ft. This location was sampled using one pass with three backpack electrofishing units. A total of 840 fish, representing 24 species were collected and a CPUE of approximately 1.1 fish per foot was achieved. The inverse index of diversity was high with a value of 7.2, based on the high species richness. Bluehead chub and highfin shiner accounted for approximately 45% relative abundance of the species observed at LLR5. Two SCDNR priority fish species, greenfin shiner and Piedmont darter, were observed during the survey.

In March 2011, SCDNR performed a fish community survey on the Little Lynches River just upstream of the Unnamed Tributary confluence (location SC11-94450). During this survey, 25 fish species were observed, including three SCDNR priority species: greenfin shiner, flat bullhead, and Piedmont darter. Tesselated darter, bluehead chub, and redbreast sunfish accounted for approximately 55% relative abundance of the species observed.

4.8.3.9 BC2

BC2 is in the upper section of Buffalo Creek approximately 328 ft upstream of the bridge crossing on Payne Road. The section of creek surveyed was narrow with mixed substrates, undercut banks, and woody debris. Stream morphology in this section of creek consisted of runs, with numerous riffles, and several shallow pool habitats. The average stream width was 10.2 ft and the survey reach length was 328 ft. This location was sampled using one pass with two backpack electrofishing units. A total of 23 fish, representing 7 species, were collected and a CPUE of approximately 0.07 fish per foot was achieved. The inverse index of diversity was moderate at a value of 4.6, based on the species richness observed for the relatively small number of individuals collected. Sandhills chub and pirate perch accounted for

approximately 65% relative abundance of the species observed at BC2. Two SCDNR priority fish species, sandhills chub and mud sunfish, were observed during the survey. No historic fish surveys have been performed in the near vicinity of this location to our knowledge.

4.8.3.10 BC4

BC4 is located in a much more downstream reach of Buffalo Creek, near the SCDNR survey point (SC11-91052), approximately 0.2 miles downstream of the bridge crossing on Mt. Pisgah Road. BC4 is located below the Fall Line in the middle section of Buffalo Creek and the section of creek surveyed was in a confined channel with a mix of firm substrates, including bedrock outcrops. Stream morphology in this section of creek included primarily runs, several pools (including a scour pool), and a few riffle habitats. The average stream width was 16.1 ft and the survey reach length was 486 ft. This location was sampled using three passes with two backpack electrofishing units. An average of 352 fish was observed per pass (total of 1,055 fish were observed in entirety). A total of 15 species were collected and an average CPUE of approximately 0.7 fish per foot was achieved per survey pass. The inverse index of diversity was low at a value of 2.1, based on the high relative abundance of two species. Dusky shiner and tessellated darter accounted for approximately 83% relative abundance of the species observed at BC4. One SCDNR priority fish species, sandhills chub, was observed during the survey.

In July 2011, SCDNR performed a fish community survey in Buffalo Creek in the vicinity of BC4 (location SC11-91052). Currently, results from SCDNR for this location have not been made available for comparison. No other historic fish surveys have been performed in this area to our knowledge.

4.8.3.11 Unnamed Tributary

The fish community survey included one location in the Unnamed Tributary (UT1; Figure 4-5). UT1 is in the middle section of the Unnamed Tributary, and was narrow with mixed substrates, some undercut banks, and woody debris. Stream morphology in this section of creek consisted primarily of runs, with fewer riffles, and limited pool habitats. The average stream width was 4.6 ft and the survey reach length was 328 ft. This location was sampled using one pass with one backpack electrofishing unit. A total of 135 fish, representing 2 species (sandhills chub and pirate perch) were collected and a CPUE of approximately 0.4 fish per foot was achieved. The inverse index of diversity was very low at a value of 1, based on the high relative abundance

of the sandhills chub. Sandhills chub accounted for approximately 98% relative abundance of the species observed at UT1. One SCDNR priority fish species, sandhills chub, was observed during the survey. No historic fish surveys have been performed in the Unnamed Tributary to our knowledge.

4.8.4 Summary and Discussion of Results

The five water bodies surveyed in 2011 by ARCADIS and AES confirmed the distribution and occurrence of historic fish species observed during other surveys within sections of HGMC, Camp Branch, and Little Lynches River, and documented for the first time fish species found in the upper section of Buffalo Creek and the Unnamed Tributary.

Water quality conditions were consistent with Piedmont region streams, which included a naturally low pH, tannic (blackwater) stained color, and low to moderate dissolved oxygen conditions. Water temperatures ranged from approximately 54 to 64 degrees Fahrenheit; relatively normal for the season.

The water bodies surveyed are shown to support primarily insectivore fish species, representing mainly cyprinids (minnows) and centrarchids (sunfish). Few omnivore and predator species were observed in these water bodies. Fish abundance was moderate to high at most locations, except for HGMC survey reaches. Relative abundance of fish species across all locations was comprised primarily of five dominant species: highfin shiner, dusky shiner, bluehead chub, swallowtail shiner, and tessellated darter. The inverse index of diversity indicated moderate fish diversity within most locations, with the highest diversity observed at LLR4 and the lowest diversity observed at UT1. Overall the species richness was found to be higher in the larger Little Lynches River system, compared to the smaller creek systems of Camp Branch, HGMC, and the Unnamed Tributary, as to be expected given the relatively more desirable habitat conditions and greater habitat availability in the Little Lynches.

SCDNR priority fish species were found in all water bodies except the two study reaches surveyed in HGMC. Historic observations of fish, including the sandhills chub, in HGMC upstream of Ledbetter Reservoir have been made previously by Rohde (1993, 2008) and SCDNR (2011). The survey conducted at HGMC1 was approximately 500 meters upstream of these historic survey locations, and was conducted in springtime during relatively higher flows. The flow conditions measured in this section of HGMC during the ARCADIS 2011 survey were consistent with

observations noted by ERC in November 2010 (ERC 2010), which indicated stagnant flow conditions. Coupled with the sparse cover and absence of aquatic vegetation, low DO and low pH, the habitat conditions within the upper reaches are not likely to support fish species, at least on a seasonal basis.

4.9 The ETT–ARCADIS 2011 Macroinvertebrate Survey

4.9.1 Sampling Methods for the Macroinvertebrate Survey

Benthic macroinvertebrate population surveys were conducted following methods described in the Study Plan (ARCADIS 2011b). ETT personnel conducted the field survey. Data analysis and data interpretation was completed by ARCADIS. Sampling methods followed the same methods used for the annual NPDES–required macroinvertebrate survey program in HGMC (ETT 2011). These methods are consistent with SCDHEC's macroinvertebrate sampling SOP (SCDHEC 1998). Populations were surveyed qualitatively and quantitatively at all locations at least 2 – 3 days after other surveys were completed (i.e., for fish, aquatic habitat). All methods described in the plan were followed during the survey, except for the following departures:

1. The Study Plan identified eleven macroinvertebrate survey locations within five stream systems (Figure 4-5), including Camp Branch, HGMC, Little Lynches River, Buffalo Creek, and an unnamed tributary to the southeast of HGMC. Two locations in Buffalo Creek were not formally assessed due to habitat limitations (described previously). Also described in Section 4.7, land access issues prevented completing the survey at CB2. Finally, the water level in the stream at UT1 was judged to be too low to complete a macroinvertebrate survey at this location (see Appendix H for photos).
2. Macroinvertebrate surveys began on October 18, 2011. All survey locations on the Little Lynches River were completed by October 18, 2011. However, due to a rainfall event on October 19, 2011, the macroinvertebrate survey was discontinued (per SCDNR protocol), and resumed on November 2, 2011. The benthic macroinvertebrate survey was completed on November 2, 2011.

At each survey location, macroinvertebrates were collected from erosional (riffle) and depositional stream habitats using sampling equipment appropriate for the habitat. Collection from riffle habitats included the use of an aquatic dip net (0.024 inches) mesh, a #30 mesh sieve, and hand collection of snag habitats. Aquatic dip nets

were also used to sample depositional areas of streams that included submerged leaf packs, undercut banks and root mats.

4.9.2 Data Analysis for the Macroinvertebrate Survey

Three types of metrics were calculated from the data collected:

1. RBP metrics
2. Bioclassification Score
3. Aquatic Life Use Support (ALUS)

4.9.2.1 RBP Metrics

RBP metrics were calculated at each location to assess community structure and provide interpretation as to level of impairment observed at each location. The eight metrics that were calculated followed the guidelines for benthic community evaluation metrics provided in the USEPA RBP protocols (Barbour et al., 1999). Each metric is defined below:

Taxa richness – Total number of species collected at a location and indicative of diversity. Reduced diversity has been positively associated with various forms of environmental pollution, including nutrient loading, toxic substances, and sedimentation (Barbour et al., 1996).

EPT index – total number of species from the Ephemeroptera, Plecoptera, and Trichoptera orders of insects. Species in these orders are typically sensitive to pollution and are therefore good indicators of water quality in fast moving streams (Barbour et al. 1996, Lenat 1988).

EPT to Chironomid ratio – ratio of sensitivity of EPT insects to species (i.e., Chironomids) more tolerant of reduced water quality. The relative abundance of these four indicator groups is a measure of community balance. When compared to a reference location, good biotic conditions are reflected in a fairly even distribution among these four groups (Plafkin et al. 1989). A high ratio indicates a greater proportion of the macroinvertebrate community is composed of sensitive species.

Percent dominant taxon – percent of the most abundant species identified at each location. This measures the redundancy and evenness of the community structure.

It assumes a highly redundant community reflects an impaired community because as the more sensitive taxa are eliminated, there is often a significant increase in the remaining tolerant forms (Barbour et al. 1996).

Community loss index – similarity between upstream control locations and downstream locations that have been impacted in some way. It is an index of dissimilarity, with value increasing as the degree of dissimilarity from the reference condition increases (Plafkin et al. 1989).

Ratio of scrapers to collector–filterers – the ratio of two trophic categories of invertebrates. A low ratio is often indicative of streams undergoing nutrient loading and eutrophication. As nutrient loading to a stream increases, so does fine particulate organic matter, such as diatoms, which in turn supports a higher proportion of filter feeding benthic organisms.

Ratio of Shredders to Total Number of Organisms – a ratio of shredders to the total number of organisms. A low ratio is often indicative of the presence of pollutants associated with coarse organic matter. Shredders that consume coarse organic matter are frequently disproportionately affected by such forms of pollution.

Biotic index (BI) – a weighted average of tolerance values (indicating tolerance to environmental pollution) for the species collected at the location. This index is similar to the Hilsenhoff Biotic Index, with tolerance values derived from the NC database based on a 0 – 10 scale, where 0 represents the best water quality and 10 represents the worst (NCDENR 2011). The NCDENR protocols have established criteria for three ecological regions: mountain, Piedmont, and coastal plain. The classification of BI is sensitive to the time of collection with respect to available community organisms and thus correction factors were established (NCDENR 2011).

A classification rating is scaled based on the BI score and may represent five categories, ranging from “Poor”, “Fair”, “Good–Fair”, “Good”, and “Excellent” (NCDENR 2011). The scores in relation to these ratings are as such:

- Excellent = <5.42
- Good = 5.42 – 6.00
- Good–Fair = 6.01 – 6.67
- Fair = 6.68 – 7.68
- Poor = >7.68

Low values for the BI are indicative of habitat that has high numbers of sensitive species. BI may not measure impacts that are largely due to habitat changes (e.g., sediment composition changes), especially if measurements are conducted after a period of scour when sediment–tolerant species (i.e., stable–sand community) have not re–established, or chironomids are sparse (NCDENR 2011). For locations where such habitat changes are the primary cause of stress, BI should be used with caution and discussion of results should clearly note the influence of sediment and flow (NCDENR 2011).

4.9.2.2 Bioclassification

Bioclassification scores were determined for each location. Scores were determined for the Sandhills and Piedmont regions for all samples for ease of comparability across survey sites. The ecoregion designation of each survey point is shown in Table 4-19. SCDHEC protocols (SCDHEC 1998) were followed to assign a bioclassification score, which uses the EPT Index and the BI to categorize impairment levels and aquatic life usage within the Sandhills region. The SCDHEC protocols are used to make stream impairment judgments for South Carolina's Watershed Water Quality Management Strategy program and for point/nonpoint source impact assessments (SCDHEC 1998). The bioclassification scoring system is detailed in Table 4-17. Bioclassification of streams in South Carolina is based on the combination of equally weighted BI and EPT scores, and parallels North Carolina's criteria range, where:

- Excellent = 5
- Good = 4
- Good–Fair = 3
- Fair = 2
- Poor = 1

Borderline classifications are assigned near half–step values (1.4, 2.6, etc.) and are defined as boundary EPT and BI values (SCDHEC 1998). The two ratings are averaged together to produce a combined score which determines the final bioclassification. When the combined score falls between two bioclassifications, it is either rounded up or down based on whether the decimal fraction is larger or smaller than 0.5 (SCDHEC 1998). In cases where the decimal fraction is exactly 0.5, other metrics are considered to determine which bioclassification to assign. Metrics

considered are: taxa richness, EPT abundance, feeding groups (i.e. filter feeders, predators, etc.) and habitat information (SCDHEC 1998).

4.9.2.3 Aquatic Life Use Support

The bioclassification scores are used to assign an aquatic life use support (ALUS), based on the provisions outlined in the Clean Water Act (Section 305b). The criteria used to measure ALUS are summarized in three categories: Fully Supporting, Partially Supporting and Not Supporting. Definitions of these terms are as follows:

Fully Supporting: Data indicate the presence of functioning, sustainable biological assemblages (e.g. fish, macroinvertebrates, or algae which have not been modified significantly beyond the natural range of the reference condition.

Partially Supporting: At least one assemblage indicates moderate modification of the biological community as compared to the reference condition.

Not Supporting: At least one assemblage indicates a severely impacted macroinvertebrate community. Data clearly indicate severe modification of the biological community compared to the reference condition).

The SCDHEC's Aquatic Biology Section determines the ALUS based on the bioclassification of the stream, where:

Bioclassification Rank	**ALUS Rank**
Excellent and Good	Fully Supporting
Good–Fair and Fair	Partially Supporting
Poor	Not Supporting

4.9.3 Results of the Macroinvertebrate Survey

Locations of the survey locations are shown in Figure 4-5. Tables 4-18 through 4-19 show the benthic macroinvertebrate species collected and the community assessment metrics calculated for each survey location. Field notes and photo documentation of each survey site is shown in Appendix H. Results of the ETT–ARCADIS 2011 survey are described below by survey location. During the survey, it was noted that many species were unidentifiable due to immaturity or simply not

present due to their respective phenologies. Macroinvertebrate metrics as described below are based on the Sandhills ecoregion classification.

4.9.3.1 HGMC1

Taxa richness was low as 12 species comprised the 25 total organisms observed at the location. The number of EPT species was very low, as only a single species was found, indicative of impaired conditions. The dominant taxa at this location were primarily *Hydroporus* sp. beetles, *Cambarus* sp. crustaceans, and *Zavrelimyia* sp. dipterans. Biotic index (7.37) and EPT index (1) values yielded a bioclassification score of fair that is indicative of an environment that partially supports aquatic life use.

4.9.3.2 HGMC2

Taxa richness was low as 11 species comprised the 39 total organisms observed at the location. The number of EPT species was very low, as only a single species was found; indicative of impaired conditions. The dominant taxa at this location were megalopterans in the *Sialis* genus. Biotic index (7.38) and EPT index (1) values yielded a bioclassification score of fair that is indicative of an environment that partially supports aquatic life use.

4.9.3.3 CB1

Taxa richness was moderate as 21 species comprised the 266 total organisms observed at the location. The number of EPT species was low, as only 3 species were found, indicative of impaired conditions. The dominant taxa at this location were plecopterans in the *Leuctra* genus. Biotic index (4.50) and EPT index (3) values yielded a bioclassification score of good–fair that is indicative of an environment that partially supports aquatic life use.

4.9.3.4 CB3

Taxa richness was moderate as 46 species comprised the 278 total organisms observed at the location. The number of EPT species was moderate, as 15 species were found. The dominant taxa at this location consisted of mayfly, stonefly, caddisfly, and dipteran species. Biotic index (5.23) and EPT index (15) values yielded a bioclassification score of good that is indicative of an environment that fully supports aquatic life use.

4.9.3.5 BC2

Taxa richness was moderate as 32 species comprised the 122 total organisms observed at this location. The number of EPT species was moderate, as 12 species were found. The dominant taxa at this location were primarily species of stonefly. Biotic index (4.90) and EPT index (12) values yielded a bioclassification score of good–fair that is indicative of an environment that partially supports aquatic life use.

4.9.3.6 BC4

Taxa richness was high as 54 species comprised the 214 total organisms observed at this location. The number of EPT species was moderate, as 13 species were found. The dominant taxa at this location were primarily species of mayfly. Biotic index (4.83) and EPT index (13) values yielded a bioclassification score of good that is indicative of an environment that fully supports aquatic life use.

4.9.3.7 LLR1

Taxa richness was high as 52 species comprised the 213 total organisms observed at this location. The number of EPT species was low, as only 4 species were found, indicative of impaired conditions. The location lacked any plecopteran species, and only a single trichopteran specimen was collected. Of the four EPT species found at this location, the dominant species (*Caenis diminuta*) is highly tolerant of stream impairment, which resulted in higher BI values and therefore lower bioclassification scores. Biotic index (7.30) and EPT index (4) values yielded a bioclassification score of fair that is indicative of an environment that marginally to partially supports aquatic life use.

4.9.3.8 LLR2

Taxa richness was moderate as 44 species comprised the 185 total organisms observed at this location. The number of EPT species was low, as only 3 species were found, indicative of impaired conditions. No stonefly species were found and only a single caddisfly specimen was collected. Of the three EPT species found at this location, the dominant species (*Caenis diminuta*) is highly tolerant of stream impairment, which resulted in higher BI values and therefore lower bioclassification scores. Biotic index (7.59) and EPT index (3) yielded a bioclassification score of poor that is indicative of an environment that does not support aquatic life use.

4.9.3.9 LLR3

Taxa richness was high as 53 species comprised the 457 total organisms observed at this location. The number of EPT species was low, as only 6 species were found, indicative of impaired conditions. Of the six EPT species found at this location, the dominant species (*Caenis diminuta*) is highly tolerant of stream impairment, which resulted in higher BI values and therefore lower bioclassification scores. Biotic index (7.34) and EPT index (6) values yielded a bioclassification score of fair that is indicative of an environment that partially supports aquatic life use.

4.9.3.10 LLR4

Taxa richness was moderate as 38 species comprised the 190 total organisms observed at this location. The number of EPT species was very low, as only 2 species were found, indicative of impaired conditions. *Caenis diminuta* was the dominant species surveyed at this location, which resulted in higher BI values. Biotic index (7.38) and EPT index (2) values yielded a bioclassification score of fair that is indicative of an environment that partially supports aquatic life use.

4.9.3.11 LLR5

Taxa richness was moderate as 46 species comprised the 278 total organisms observed at this location. The number of EPT species was low, as only 6 species were found, indicative of impaired conditions. *Caenis diminuta* was the dominant species surveyed at this location, which resulted in higher BI values. Biotic index (7.19) and EPT index (6) values yielded a bioclassification score of fair that is indicative of an environment that partially supports aquatic life use.

4.9.3.12 LLR6

Taxa richness was moderate, as 48 species comprised the 222 total organisms observed at this location. The number of EPT species was moderate, as 12 species were found. *Caenis diminuta* was the dominant species surveyed at this location, which resulted in higher BI values, although this location exhibited the lowest BI value all the locations surveyed. Biotic index (6.82) and EPT index (12) values yielded a bioclassification score of fair that is indicative of an environment that partially supports aquatic life use.

4.9.4 Summary and Discussion of Results

Bioclassification scores for the benthic macroinvertebrate communities surveyed in the Little Lynches River and HGMC ranged from poor to fair, which indicates that many areas were not fully capable of supporting aquatic life uses. There was little difference in scores in the Little Lynches River between upstream and downstream locations. Benthic communities at all six locations were dominated by the mayfly species *Caenis diminuta*, which is highly tolerant of impaired stream conditions, resulting in similar bioclassification scores among locations. The lowest bioclassificatoin score was measured at LLR2, located just downstream of Camp Branch, and had bioclassification score of poor, indicative of an environment that does not support aquatic life use.

Higher scores were measured in Camp Branch and Buffalo Creek, with bioclassification scores ranging from good–fair to good, indicative of environments that partially to fully support aquatic life. Bioclassification scores were slightly lower for the upper reaches of Camp Branch and Buffalo Creek compared to the downstream reaches. There was essentially no difference in scores between upstream and downstream reaches of HGMC.

Bioclassification scores and ALUS in reaches of the Little Lynches River, Camp Branch and HGMC were lower as measured in October – November 2011 compared to previous surveys, all of which were conducted in the spring (April – May). These differences probably largely reflect seasonal influences. Some species were likely not present due to habitat preferences; for example, reaches surveyed in the spring were dominated by lotic habitats (i.e., moving water), whereas during the fall survey, stream reaches were dominated by lentic habitats (i.e., still water). This shift in habitat conditions will result in a shift in the types of benthic macroinvertebrates present in the system. Other species were immature at the time of sampling in October and November, and subsequent taxonomic identification was limited in some cases to family level rather than genus or species level. These factors led to lower EPT indices, which results in lower scoring for bioclassification and ALUS.

Low flow conditions during the October – November timeframe also likely have an effect. For example, Location LL1 (sampled in April 2011) and Location LLR1 (sampled in October 2011), are both located on the Little Lynches River at the Pleasant Plains Road Bridge. In April, flow conditions were noted to be rapid, and the wetted channel width extending up to 9 meters throughout the sample reach. Comparatively, slow flow conditions were observed in October and a maximum

wetted channel width of 5.8 meters was measured during this time. Location LL1 had 13 EPT taxa and a BI of 6.06, and in October, only 4 EPT taxa were sampled, and the BI was 7.30. As EPT and BI are the two primary metrics used to determine bioclassification scores, scores fell from 3.2 (good–fair) to 1.5 (poor–fair) in the fall. In this case, physical changes to the habitat, based on seasonal factors and climatic conditions, likely yield significant changes to the benthic community observed.

4.10 The ETT–ARCADIS 2011 Herptile Survey

Herptile surveys were conducted by ETT personnel from October 18 to November 2, 2011. These surveys were conducted concurrently with the benthic macroinvertebrate surveys in five stream systems (Figure 4-5), and followed methods described in the Study Plan (ARCADIS 2011b). Variances in sampling locations from those proposed in the Study Plan are described above in Section 4.9.1.

The herptile species that were observed during the survey are shown in Table 4-20. Herptiles were observed at most survey locations. Typically observed species included common frogs, salamanders, and lizards. The number of species observed was highest along the Little Lynches River. The northern cricket frog (*Acris crepitans*) was the only special status herptile species observed (SCDNR 2005). Field notes and photo documentation of each survey site is shown in Appendix H.

5. Special Status Species Summary

In preparation for the ARCADIS 2011 wildlife and aquatic surveys, potential presence of special status species at the Site was reviewed. In particular, this review focused on species that are federally protected or identified as priority conservation species by SCDNR. The review also included species raptors and Birds of Conservation Concern, as protection of these species also falls under the jurisdiction of the USFWS. In the sections below, brief descriptions of the programs that identify these types of special status species are provided. Special status species that were observed at the Site during the surveys were identified in each respective report section. Additionally, a summary table is provided (Table 5-1) that lists all special status species with the potential to occur in the north-central part of South Carolina. This table evaluates the potential for each of these special status species to occur at the Site (seasonally or as a resident).

5.1 Threatened, Endangered and Candidate Species

The USFWS provides lists of federally-listed T&E species for South Carolina. Table 5-1 summarizes species listings for the state and Lancaster County.

5.2 South Carolina Priority Conservation Species

In May of 2002, the SCDNR began a process to develop the Comprehensive Wildlife Conservation Strategy (CWCS) that was funded through the State Wildlife Grants (SWG) program. The SCDNR developed the Strategy and begin implementing the conservation actions by October 1, 2005.

The CWCS must identify and be focused on the "species in greatest need of conservation," yet address the "full array of wildlife" and wildlife–related issues. Species were grouped by major taxonomic category and ranked in terms of conservation priority status. The species lists are not specific to ecoregion. Species that could potentially be in the Sandhills or Piedmont ecoregions were reviewed (SCDNR 2005).

5.3 South Carolina Natural Heritage Trust Program

The SCDNR's Heritage Trust Program was created in 1976 to protect critical natural habitats and significant cultural sites. SCDNR, in concert with other state agencies, works to establish a system of heritage preserves to be protected for the benefit of present and future generations.

Areas targeted for preserves throughout South Carolina are selected through a process that involves a systematic search for sites of high natural value, an evaluation of the sites' value, and the application of various legal mechanisms for protecting the most highly valued sites. During this process, a list of species and community types in the different counties throughout South Carolina are compiled and ranked, using aerial photo interpretation and aerial and ground survey techniques. Lists of species for Lancaster and Kershaw counties, as well as state–wide, were reviewed (SCDNR 2010a, 2010b, 2010c).

5.4 Birds of Conservation Concern

The USFWS lists certain species as Birds of Conservation Concern (BCC) (USFWS 2008). Although BCC are not afforded additional protections other than those under

the Migratory Bird Treaty Act (MBTA), the USFWS identifies BCC as bird species (beyond those already designated as federally threatened or endangered) that represent the agency's highest conservation priorities. The Site falls within Bird Conservation Regions 27 and 29 on the USFWS (2008) BCC list.

5.5 Raptors

In addition to the ESA (16 U.S.C. 1531-1544), other federal statute that protect avian species (administered by the USFWS) is the MBTA and the BGEPA (16 U.S.C. 703-712). The MBTA renders it illegal to take any migratory bird, nest, egg, or part thereof. While all migratory birds, including raptors, are protected under the MBTA, raptors observed at the Site during the surveys or opportunistically are included in Table 5-1. The BGEPA affords specific protection to BAEAs and Golden Eagles (*Aquila chrysaetos*).

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ARCADIS

Tables

Table 2-1
Vegetation Community Types and Abbreviations

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Community Type	Abbreviation	Vegetation Community Name - from *Natural Communities of South Carolina*
Natural	OHF	Oak-Hickory Forest
	SHP	Streamhead Pocosin
	SSF	Small Stream Forest
	XSC	Xeric-Sandhill Scrub
Non-Natural	A	Agriculture
	D	Developed
	MTP	Managed Tree Plantation
	MVF	Modified Managed Upland Vegetation-Naturalized
	MVS	Modified Managed Vegetation-Scrub Regrowth
	OW	Open Water
	RL	Recently-logged Timberland
	TAR	Temporary Access Road

Source: (ERC 2012b)

Table 3-1
Avian Species Incidentally Observed at the Site During Previous Surveys

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Species Common Name	Species Scientific Name	Previous Survey:	
		NJA (1993)	Parnell (2008)
Acadian Flycatcher	*Empidonax virescens*		
American Crow	*Corvus brachyrhynchos*	x	
American Kestrel	*Falco sparverius*	x	
American Robin	*Turdus migratorius*	x	
American Woodcock	*Scolopax minor*	x	
Barn Swallow	*Hirundo rustica*		x
Belted Kingfisher	*Ceryle alcyon*		x
Blue Grosbeak	*Passerina caerulea*	x	
Blue-gray Gnatcatcher	*Polioptila caerulea*	x	
Bobwhite (Northern)	*Colinus virginianus*	x	
Carolina Chickadee	*Poecile carolinensis*	x	
Carolina Wren	*Thryothorus ludovicianus*	x	x
Chimney Swift	*Chaetura pelagica*	x	
Chuck-will's Widow	*Caprimulgus carolinensis*	x	
Common Grackle	*Quiscalus quiscula*		x
Common Nighthawk	*Chordeiles minor*	x	
Common Yellowthroat	*Geothlypis trichas*		x
Downy Woodpecker	*Picoides pubescens*	x	
Eastern Bluebird	*Sialia sialis*		x
Eastern Kingbird	*Tyrannus tyrannus*	x	
Eastern Phoebe	*Sayornis phoebe*	x	
Eastern Towhee	*Pipilo erythropthalmus*		x
Gray Catbird	*Dumetella carolinensis*	x	
Great Blue Heron	*Ardea herodias*	x	
Great Egret	*Ardea alba*		x
Hooded Warbler	*Wilsonia citrina*		x
Indigo Bunting	*Passerina cyanea*	x	
Little Blue Heron	*Egretta caerulea*	x	
Mourning Dove	*Zenaida macroura*	x	x
Northern Cardinal	*Cardinalis cardinalis*	x	x
Northern Mockingbird	*Mimus polyglottos*	x	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*		x
Pileated Woodpecker	*Dryocopus pileatus*	x	
Purple Martin	*Progne subis*		x
Red-eyed Vireo	*Vireo olivaceus*	x	
Red-shouldered Hawk	*Buteo lineatus*	x	

Table 3-1
Avian Species Incidentally Observed at the Site During Previous Surveys

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Species Common Name	Species Scientific Name	Previous Survey:	
		NJA (1993)	Parnell (2008)
Red-tailed Hawk	*Buteo jamaicensis*	x	x
Rock Dove (Pigeon)	*Columba livia*	x	
Roufous-sided Towhee	*Pipilo erythrophthalmus*	x	
Summer Tanager	*Piranga rubra*		x
Tufted Titmouse	*Baeolophus bicolor*	x	x
Turkey Vulture	*Cathartes aura*	x	
Turkey Vulture	*Cathartes aura*		x
Whip-poor-will	*Caprimulgus vociferus*	x	
White-eyed Vireo	*Vireo griseus*	x	
Wild Turkey	*Meleagris gallopavo*		x
Wood Duck	*Aix sponsa*	x	
Yellow-billed Cuckoo	*Coccyzus americanus*		x

Table 3-2
Mammal Species Observed During 1993 Fieldwork at the Site

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Species Common Name	Species Scientific Name	Location Observed
Beaver (no fresh signs)	*Castor canadensis*	"Farm Pond", Haile Gold Mine Creek, Little Lynches River
Bobcat (scat only)	*Felis rufus*	"Farm Pond"
Domestic Dog	–	"Farm Pond", Haile Gold Mine Creek, Little Lynches River
Eastern Cottontail	*Sylvilagus floridanus*	"Farm Pond", Observed on Property
Eastern Gray Squirrel	*Sciurus carolinesis*	Observed on Property
Eastern Mole	*Scalopus aquaticus*	"Farm Pond"
Eastern Pipistrelle	*Pipestrellus subflavus*	Little Lynches River
Hispid Cotton Rat	*Sigmodon hispidus*	"Farm Pond"
Moles	–	"Farm Pond"
Muskrat	*Ondatra sibethicus*	"Farm Pond"
Raccoon	*Procyon lotor*	Haile Gold Mine Creek, Little Lynches River
Red Bat	*Lasiurus borealis*	“Farm Pond”, Little Lynches River
River Otter	*Lutra candensis*	Haile Gold Mine Creek, Little Lynches River
Seminole Bat	*Lasirus seminolus*	Little Lynches River
White-tailed Deer	*Odocoileus virginiaus*	"Farm Pond", Haile Gold Mine Creek, Little Lynches River

Source: (NJA 1993)

Table 3-3
Total Number of Point-Count Stations, Birds Detected and Avian Species Detected per Habitat Type

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Habitat Type	Total Number of Point Count Stations	Total Number of Birds Detected	Total Number of Species Detected
Agriculture	1	5	4
Developed	12	76	17
Managed Tree Plantation	15	167	28
Modified Managed Upland Vegetation-Naturalized	13	121	25
Modified Managed Vegetation-Scrub Regrowth	50	448	41
Oak-Hickory Forest	34	221	27
Open Water*	0	11	9
Recently-Logged Timberland	2	24	9
Small Stream Forest	4	34	24
Steamhead Pocosin	19	162	15
Temporary Access Roads	9	37	11
Xeric Sandhill Scrub	9	49	15
Total	**168**	**1,355**	**–**

*There were no point count locations in the open water habitat type as defined by Nelson (1986), however there were 11 birds representing nine species that were observed over the open water habitat type.

Table 3-4
Avian Species Observed in Each Habitat Type

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Agriculture	Developed	Managed Tree Plantation	Modified Managed Upland Vegetation-Naturalized	Modified Managed Upland Vegetation-Scrub Regrowth	Oak-Hickory Forest	Open Water	Streamhead Pocosin	Small Stream Forest	Temporary Access Roads	Xeric Sandhill Scrub
American Crow	American Crow	American Crow	Acadian Flycatcher	American Crow	American Crow	American Crow	American Crow	American Crow	American Crow	(blank)
Blue Jay	Barn Swallow	Barn Swallow	American Crow	Barn Swallow	Blue Jay	Blue Grosbeak	Blue Jay	Blue Jay	Carolina Chickadee	American Crow
Mourning Dove	Blue Grosbeak	Blue Jay	American Robin	Black Vulture	Blue-gray Gnatcatcher	Carolina Chickadee	Blue-gray Gnatcatcher	Carolina Chickadee	Carolina Wren	Blue Jay
Tufted Titmouse	Blue Jay	Blue-gray Gnatcatcher	Barn Swallow	Blue Grosbeak	Brown-headed Nuthatch	Carolina Wren	Carolina Chickadee	Carolina Wren	Chipping Sparrow	Blue-gray Gnatcatcher
	Carolina Chickadee	Brown-headed Nuthatch	Blue Grosbeak	Blue Jay	Carolina Chickadee	Chipping Sparrow	Carolina Wren	Chimney Swift	Eastern Towhee	Brown-headed Cowbird
	Carolina Wren	Carolina Chickadee	Blue Jay	Blue-gray Gnatcatcher	Carolina Wren	Eastern Kingbird	Common Yellowthroat	Downy Woodpecker	Northern Cardinal	Brown-headed Nuthatch
	Chipping Sparrow	Carolina Wren	Blue-gray Gnatcatcher	Brown-headed Cowbird	Chipping Sparrow	Northern Cardinal	Downy Woodpecker	Mourning Dove	Pileated Woodpecker	Carolina Chickadee
	Common Yellowthroat	Chimney Swift	Carolina Chickadee	Brown-headed Nuthatch	Downy Woodpecker	Prairie Warbler	Eastern Kingbird	Northern Cardinal	Prairie Warbler	Carolina Wren
	Eastern Kingbird	Chipping Sparrow	Carolina Wren	Carolina Chickadee	Eastern Phoebe	Tufted Titmouse	Eastern Towhee	Pileated Woodpecker	Summer Tanager	Chimney Swift
	Eastern Towhee	Common Nighthawk	Chipping Sparrow	Carolina Wren	Eastern Towhee		Eastern Wood-Pewee	Pine Warbler	Tufted Titmouse	Eastern Towhee
	Mourning Dove	Downy Woodpecker	Downy Woodpecker	Chimney Swift	Eastern Wood-Pewee		Great Crested Flycatcher	Red-Bellied Woodpecker	Turkey Vulture	Mourning Dove
	Northern Bobwhite	Eastern Towhee	Fish Crow	Chipping Sparrow	Gray Catbird		Hooded Warbler	Red-Shouldered Hawk		Northern Cardinal
	Northern Cardinal	Eastern Wood-Pewee	Gray Catbird	Downy Woodpecker	Great Crested Flycatcher		Mourning Dove	Summer Tanager		Prairie Warbler
	Prairie Warbler	Great Crested Flycatcher	Great Crested Flycatcher	Eastern Kingbird	Mourning Dove		Northern Bobwhite	Tufted Titmouse		Red-Shouldered Hawk
	Red-Bellied Woodpecker	Mourning Dove	Mourning Dove	Eastern Phoebe	Northern Cardinal		Northern Cardinal	Yellow-billed Cuckoo		Summer Tanager
	Tufted Titmouse	Northern Cardinal	Northern Cardinal	Eastern Towhee	Northern Mockingbird		Pileated Woodpecker			Tufted Titmouse
	White-eyed Vireo	Northern Flicker	Pileated Woodpecker	Eastern Wood-Pewee	Pileated Woodpecker		Prairie Warbler			
		Pileated Woodpecker	Prairie Warbler	Field Sparrow	Pine Warbler		Red-Bellied Woodpecker			
		Pine Warbler	Red-Bellied Woodpecker	Fish Crow	Prairie Warbler		Ruby-throated Hummingbird			
		Red-Bellied Woodpecker	Ruby-throated Hummingbird	Hooded Warbler	Red-Bellied Woodpecker		Summer Tanager			
		Red-Eyed Vireo	Tufted Titmouse	Mourning Dove	Red-Shouldered Hawk		Tufted Titmouse			
		Ruby-throated Hummingbird	Turkey Vulture	Northern Bobwhite	Summer Tanager		Turkey Vulture			
		Summer Tanager	White-eyed Vireo	Northern Cardinal	Tufted Titmouse		White-eyed Vireo			
		Tufted Titmouse	Wild Turkey	Northern Flicker	White-eyed Vireo		Yellow-billed Cuckoo			
		White-eyed Vireo	Yellow-billed Cuckoo	Northern Mockingbird	Wild Turkey					
		Wild Turkey		Pileated Woodpecker	Yellow-billed Cuckoo					
		Yellow-billed Cuckoo		Pine Warbler	Yellow-breasted Chat					
		Yellow-throated Warbler		Prairie Warbler						
				Red-Bellied Woodpecker						
				Red-Shouldered Hawk						
				Red-winged Blackbird						
				Ruby-throated Hummingbird						
				Summer Tanager						
				Tufted Titmouse						
				Turkey Vulture						
				White-eyed Vireo						
				Wild Turkey						
				Yellow-billed Cuckoo						
				Yellow-breasted Chat						
				Yellow-throated Vireo						
				House Finch						

Table 3-5
Summary Statistics and Calculated Indices for Birds
In Each Habitat Type and in the Study Area

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Habitat Type		Richness	Shannon Diversity	Shannon Evenness	Total Number of Birds
Entire Site (all habitats combined)	Mean	5.46	1.49	0.95	8.11
	SD	2.57	0.54	0.05	4.76
Agriculture	Mean	5.000	1.561	0.970	6.000
	SD	0.000	0.000	0.000	0.000
Developed	Mean	4.417[a]	1.595[a]	0.937	7.583
	SD	3.423	0.438	0.059	5.401
Managed Tree Plantation	Mean	7.467[abc]	1.827[b]	0.927	12.067[ab]
	SD	2.295	0.294	0.040	4.652
Modified Managed Upland Vegetation-Naturalized	Mean	5.154	1.519	0.958	7.231
	SD	1.676	0.310	0.030	3.320
Modified Managed Vegetation-Scrub Regrowth	Mean	6.000[d]	1.591[c]	0.950	9.180
	SD	2.563	0.488	0.061	5.333
Oak Hickory Forest	Mean	5.118[b]	1.448[d]	0.965	7.118[a]
	SD	2.240	0.544	0.033	3.674
Recently-Logged Timberland	Mean	4.500	1.402	0.933	6.000
	SD	0.707	0.225	0.052	0.000
Streamhead Pocosin	Mean	5.789	1.638[e]	0.954	8.000
	SD	1.782	0.306	0.044	2.828
Small Stream Forest	Mean	3.750	1.020	0.973	5.500
	SD	2.630	0.828	0.034	4.796
Temporary Access Roads	Mean	4.333	1.357	0.945	6.333
	SD	1.225	0.292	0.080	3.202
Xeric Sandhill Scrub	Mean	3.111[cd]	0.885[abcde]	0.980	4.222[b]
	SD	2.261	0..663	0.036	3.866

Notes:
[a,b,c,d,e,f] = similarly superscripted indicates statistically significant difference
* = only one Acadian Flycatcher was observed during the survey and means were not tested between habitat types

Table 3-6
Dominant Avian Species Surveyed in Each Habitat Type and for the Entire Study Area

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Habitat	Dominant Species	Percent Dominance*
Entire Site	Carolina Wren, American Crow, Northern Cardinal	37
Agriculture	Mourning Dove	33
Developed	Mourning Dove, Tufted Titmouse, Barn Swallow, Carolina Wren	45
Managed Tree Plantation	Pine Warbler, Carolina Wren, Carolina Chickadee	37
Modified Managed Upland Vegetation-Naturalized	Carolina Wren, American Crow, Northern Cardinal	41
Modified Managed Vegetation-Scrub Regrowth	American Crow, Carolina Wren, Eastern Towhee	36
Oak Hickory Forest	Carolina Wren, American Crow, Northern Cardinal	49
Recently-Logged Timberland	Carolina Wren, American Crow	50
Small Stream Forest	Carolina Wren, Yellow-billed Cuckoo, Northern Cardinal	44
Streamhead Pocosin	American Crow, Carolina Wren, Eastern Towhee	31
Temporary Access Roads	Tufted Titmouse, Carolina Chickadee, Northern Cardinal	54
Xeric Sandhill Scrub	American Crow, Carolina Chickadee, Northern Cardinal	51
Open Water	Carolina Chickadee, Carolina Wren	36

Notes:

*if more than one species is listed, the percent dominance reflects a combined total percent.

Table 3-7
Summary Statistics and Calculated Indices for Most Common Species Observed in the Study Area

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Habitat		Species							
		American Crow	Carolina Wren	Northern Cardinal	Acadian Flycatcher*	Brown-headed Nuthatch	Eastern Wood-Pewee	Field Sparrow	Prairie Warbler
Entire Site (all habitats combined)	Mean	0.032	0.026	0.020	0.000	0.002	0.000	0.001	0.002
	SD	0.016	0.085	0.070	0.002	0.019	0.007	0.010	0.020
Agriculture	Mean	0.033	0.000	0.033	0.000	0.000	0.000	0.000	0.000
	SD	0.075	0.000	0.075	0.000	0.000	0.000	0.000	0.000
Developed	Mean	0.011[a]	0.019	0.007	0.000	0.000	0.000	0.000	0.014[abcdef]
	SD	0.073	0.066	0.037	0.000	0.000	0.000	0.000	0.060
Managed Tree Plantation	Mean	0.016[b]	0.013	0.007	0.000	0.005	0.001	0.000	0.000[a]
	SD	0.064	0.044	0.027	0.000	0.038	0.006	0.000	0.004
Modified Managed Upland Vegetation-Naturalized	Mean	0.032[c]	0.026	0.024	0.001	0.000	0.000	0.000	0.000[b]
	SD	0.080	0.098	0.070	0.009	0.000	0.000	0.000	0.000
Modified Managed Vegetation-Scrub Regrowth	Mean	0.027[d]	0.026	0.018	0.000	0.003	0.000	0.002	0.003[c]
	SD	0.087	0.091	0.066	0.000	0.023	0.005	0.018	0.021
Oak Hickory Forest	Mean	0.033[e]	0.032	0.024	0.000	0.000	0.001	0.000	0.000[d]
	SD	0.106	0.084	0.080	0.000	0.000	0.007	0.000	0.000
Recently-Logged Timberland	Mean	0.037	0.074	0.037	0.000	0.000	0.000	0.000	0.019
	SD	0.073	0.169	0.073	0.000	0.000	0.000	0.000	0.056
Streamhead Pocosin	Mean	0.031[f]	0.028	0.016	0.000	0.000	0.002	0.000	0.001[e]
	SD	0.087	0.084	0.052	0.000	0.000	0.016	0.000	0.010
Small Stream Forest	Mean	0.087	0.043	0.054	0.000	0.000	0.000	0.000	0.000
	SD	0.258	0.116	0.135	0.000	0.000	0.000	0.000	0.000
Temporary Access Roads	Mean	0.055	0.037	0.044	0.000	0.000	0.000	0.000	0.000[f]
	SD	0.120	0.103	0.100	0.000	0.000	0.000	0.000	0.000
Xeric Sandhill Scrub	Mean	0.118[abcdef]	0.022	0.056	0.000	0.005	0.000	0.000	0.000
	SD	0.283	0.081	0.144	0.000	0.027	0.000	0.000	0.000

Notes:
[a,b,c,d,e,f] = similarly superscripted indicates statistically significant difference

* = only one Acadian Flycatcher was observed during the survey and means were not tested between habitat types

Table 3-8
Bat Species with the Potential to Occur in the Study Area

Haile Gold Mine, Inc.
Lancaster, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Common Name	Scientific Name	Species Code	Primary Species Group	Special Status (Y/N)
Indiana Bat*	*Myotis sodalis*	MYSO	Myotis sp.	Y - FE
Southeastern Myotis	*Myotis austroriparius*	MYAU	Myotis sp.	Y - SCDNR High Priority
Little Brown Myotis	*Myotis lucifugus*	MYLU	Myotis sp.	N
Northern Myotis	*Myotis septentrionalis*	MYSE	Myotis sp.	N
Eastern Pipistrelle	*Perimyotis (Pipestrellus) subflavus*	PESU	35kHz bat	N
Eastern Red Bat	*Lasiurus borealis*	LABO	35kHz bat	N
Evening Bat	*Nycticeius humeralis*	NYHU	35kHz bat	N
Seminole Bat	*Lasiurus seminolus*	LASE	35kHz bat	N
Big Brown Bat	*Eptesicus fuscus*	EPFU	25kHz bat	N
Brazilian Free-tailed Bat	*Tadarida brasiliensis*	TABR	25kHz bat	N
Silver-haired Bat	*Lasionycteris noctivagans*	LANO	25kHz bat	N
Hoary Bat	*Lasiurus cinereus*	LACI	LACI	N
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	CORA	CORA	Y - SE & SCDNR High Priority

Source: (Gates and Johnson 2010; NatureServe 2011; SCDNR 2010; SCDNR 2011a; SCDNR 2011b; USFWS 2011a; USFWS 2011b; USFWS 2011c)

*This known range of this species does not suggest this species would have the potential to occur in the study area. It was included in this table due to the output results produced by the BCID_10 software.

Abbreviations: FE = federally endangered, SE = state endangered; SCDNR = South Carolina Department of Natural Resources

Table 3-9
Habitats Surveyed in the Ground-Dwelling Mammal and Game Survey

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Transect or Stream Reach	Vegetation Community Type	Natural or Non-Natural Vegetation Community
Transect		
D-1	D	Non-Natural
MTP-1	MTP	Non-Natural
MTP-2	MTP	Non-Natural
MVF-1/SHP-2	MVF/SHP	Non-Natural/Natural
MVS-1	MVS	Non-Natural
MVS-2/TAR-1	MVS/TAR	Non-Natural/Non-Natural
MVS-3	MVS	Non-Natural
OHF-1/SSF-2/XSC-1	OHF/SSF/XSC	Natural/Natural/Natural
OHF-2	OHF	Natural
RL-1	RL	Non-Natural
SHP-1	SHP	Natural
SHP-3/OHF-3	SHP/OHF	Natural/Natural
SHP-4	SHP	Natural
SSF-1	SSF	Natural
SSF-3	SSF	Natural
XSC-2	XSC	Natural
Stream Reach		
Buffalo Creek	SHP	Natural
Camp Branch	SSF	Natural
Haile Gold Mine Creek	SSF	Natural
Little Lynches River	SSF	Natural
Unnamed Tributary	SHP	Natural

Table 3-10
Game Species and Secondary Signs of Animal Presence Observed

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Transect or Stream Reach	Vegetation Community Type	Natural or Non-Natural Vegetation Community	Secondary Mammal Sign	Mammal Likely Associated with Secondary Mammal Sign	Ditigal Photographs Taken (Y/N)	Other Opportunistic Observations of Mammals
Mammal Transects						
D-1	D	Non-Natural	Hog Wallow/Rooting	Feral Hog	N	None observed
			Scat	Unknown	N	
MTP-1	MTP	Non-Natural	Burrow	Unknown Rodent sp.	N	None observed
MTP-2	MTP	Non-Natural	Burrow	Mole or Vole	N	None observed
MVF-1/SHP-2	MVF/SHP	Non-Natural/Natural	None observed	N/A	Y (Photo 1)	Two different scat piles (fox/coyote and white-tailed deer) observed near, but outside of transect
MVS-1	MVS	Non-Natural	Tracks	White-tailed Deer	N	None observed
			Scat	Eastern Cottontail Rabbit	N	
			Hog Wallow/Rooting	Feral Hog	N	
MVS-2/TAR-1	MVS/TAR	Non-Natural/Non-Natural	None observed	N/A	N/A	None observed
MVS-3	MVS	Non-Natural	Burrow	Unknown Rodent sp.	N	None observed
			Tracks	Feral Hog	N	
			Scat	Feral Hog	Y (Photo 2)	
			Scat	Canine sp.	N	
			Scat	Eastern Cottontail Rabbit	Y (Photo 3)	
OHF-1/SSF-2/XSC-1	OHF/SSF/XSC	Natural/Natural/Natural	None observed	N/A	N/A	None observed
OHF-2	OHF	Natural	None observed	N/A	N/A	Squirrel calling
			Scat	White-tailed Deer	N	
RL-1	RL	Non-Natural	Bones	Coyote	N	None observed
			Burrow	Unknown Rodent sp.	N	
			Tracks	Feral Hog	N	
SHP-1	SHP	Natural	None observed	N/A	N/A	None observed
SHP-3/OHF-3	SHP/OHF	Natural/Natural	Hog Wallow/Rooting	Feral Hog	N	None observed
			Scat	Unknown	Y (Photo 4)	
SHP-4	SHP	Natural	None observed	N/A	N/A	None observed
SSF-1	SSF	Natural	None observed	N/A	N/A	None observed
SSF-3	SSF	Natural	None observed	N/A	N/A	None observed
XSC-2	XSC	Natural	None observed	N/A	N/A	Eastern Cottontail Rabbit
Major Stream Reaches						
Buffalo Creek*	SHP	Natural	N/A	N/A	N/A	N/A
Camp Branch	SSF	Natural	Scat	White-tailed Deer	N	Southern Flying Squirrel
			Tracks	Raccoon	Y (Photo 5)	
			Burrow	Mole	Y (Photo 6)	
Haile Gold Mine Creek	SSF	Natural	Hog Wallow/Rooting	Feral Hog	N	None observed
			Scat	Bobcat	Y (Photo 7)	
			Tracks	Bobcat	N	
			Tracks	White-tailed Deer	N	
Little Lynches River	SSF	Natural	Chewed Hardwood	Beaver	N	None observed
			Hog Wallow/Rooting	Feral Hog	N	
			Scat**	Raccoon or Bobcat	Y (Photos 8 and 9)	
			Scat	White-tailed deer	N	
			Scat	Coyote or Fox sp.	N	
			Tracks	Raccoon	N	
Unnamed Tributary	SHP	Natural	Scat	Raccoon	N	Golden Mouse

Notes:

*Stream reach not surveyed because outside of Haile property boundary; ARCADIS biologists did not have access (landowner permission)

*Observed at confluence of Camp Branch with Little Lynches River

N/A = not applicable

Source: (Elbroch 2003; Reid 2006)

Table 4-1
Cowardin Classifications of the Riverine Systems Assessed in ERC (2012a)

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Cowardin Classification	Total Acres	Dominant Substrate Type	Class	Flooding Frequency	Relative % of all Habitat Types Mapped
R2UB2F	7.96	sand	perennial	semi-permanently flooded	3.6
R2UB2H	9	sand	perennial	permanently flooded	4
R4SB4C	7.45	sand	intermittent	seasonally flooded	3.3
R4SB5C	1.1	mud	intermittent	seasonally flooded	0.5

Table 4-2
Stream Priority Category Occurrence Determination for the Study Area*

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Designation	Category Type	Occurrence at Site? (Y/N)	Stream in Which Designation Occurs	Reason Given	Citations
State Heritage Trust	Primary	No		The Site is not listed as a State Heritage Trust Preserve Preserves. Nearest preserve is the Forty Acre Rock Heritage Preserve/Wildlife Management Area (approximately 4 miles north).	http://www.dnr.sc.gov/mlands/hpprogram.html
Wild & Scenic River	Primary	No		No streams are listed on and around the Site by the National Wild and Scenic Rivers System. Only SC river listed is the Chatooga River in northwest SC.	http://www.rivers.gov/wildriverslist.html
Anadromous Fish Spawning Habitat	Primary	No		Site Streams are not accessible by anadromous fish.	
Outstanding Resource Waters	Primary	No		Per SC Department of Health & Environmental Control (SC DHEC) report on classified waters, there are no Site waters classified as Outstanding Resource Waters.	http://www.scdhec.gov/environment/water/regs/r61-69.pdf
Essential Fish Habitat	Primary	No		Site Streams are not identified as Essential Fish Habitat.	http://sero.nmfs.noaa.gov/hcd/pdfs/efhdocs/sa guide 2010.pdf; http://www.safmc.net/EcosystemManagement/EcosystemBoundaries/MappingandGISData/tabid/632/Default.aspx; http://ocean.floridamarine.org/efhcoral/ims/viewer.htm
State Trout Natural Streams	Primary	No		Per SC DHEC report on classified waters, there are no Site waters classified as Trout-Natural Streams; SC Department of Natural Resources (SC DNR) does not identify any trout streams in Lancaster County or the Site.	http://www.scdhec.gov/environment/water/regs/r61-69.pdf; http://www.dnr.sc.gov/fish/pdf/TroutBook.pdf
Waters Adjacent to Federal or State Protected Areas	Primary	No		Site is not identified adjacent to Federal or State Protected Areas	
Waters with Federal/State Listed Threatened & Endangered Species	Primary	No		Threatened & endangered species do not occur on Site	Needham Environmental Inc. 2008
303(d) Listed	Secondary	Yes	Little Lynches River	Little Lynches is listed on SC DHEC 2010 303(d) list.	http://www.scdhec.gov/environment/water/tmdl/docs/tmdl10-303d.pdf
Waters with Federal Species of Management Concern	Secondary	No		No Federal Species of management concern are known to occur on site	Needham Environmental Inc. 2008
Waters with State Listed Rare/ Uncommon Species	Secondary	Yes	Camp Branch, HGMC	Portions of Haile Gold Mine Creek & Camp Branch contain known populations of Sandhill Chub-state rare/uncommon species however not State protected.	Needham Environmental, Inc. 2008; http://www.dnr.sc.gov/species/pdf/lancaster.pdf
State Trout Put, Grow & Take Streams	Secondary	No		Per SC DHEC report on classified waters, there are no Site waters classified as Trout-Put, Grow & Take Streams.	http://www.scdhec.gov/environment/water/regs/r61-69.pdf
Streams within 0.5-miles of Primary Priority reach	Secondary	No		No Primary Priority Reaches Identified within 0.5-miles	
State Scenic River Corridors	Secondary	No		SC DNR does not identify the streams on Site as State Scenic River Corridors. Site is tributary to the Lynches River (approx. 20 miles downstream) which is listed as a State Scenic River Corridor.	http://www.dnr.sc.gov/water/envaff/river/desig rivers.html
Tertiary	Teriary	Yes	all	All other streams not categorized as Priority or Secondary	

Notes:

*The "Study Area" includes all stream segments surveyed within the boundaries of the Haile Gold Mine site, which included Camp Branch and HGMC in their entireties, and the portion of the Little Lynches River immediately adjacent to Haile property boundary.

Table 4-3
Assessment Scores and Existing Condition Values Assigned to Stream Reaches Addressed in ERC (2010)

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Reach Number	Stream	Linear Feet	Assessment Score	Assessment
R-D01	Camp Branch	3,830	12.5	Partially Impaired
R-D02	Camp Branch	1,986	13	Partially Impaired
R-D03	Camp Branch	4,058	12.5	Partially Impaired
R-D04	Camp Branch	265	12.5	Partially Impaired
R-D05	Camp Branch	696	11.75	Partially Impaired
R-D06	Camp Branch	811	12.5	Partially Impaired
R-D07	Camp Branch	1,500	12	Partially Impaired
R-D09	Camp Branch	1,693	12.5	Partially Impaired
R-D10	Camp Branch	455	12.5	Partially Impaired
R-D11	Camp Branch	2,425	13	Partially Impaired
R-D12	Camp Branch	349	11	Partially Impaired
R-D13	Camp Branch	2,419	13.5	Partially Impaired
R-D14	Camp Branch	4,522	14.5	Partially Impaired
R-D15	Camp Branch	892	11.5	Partially Impaired
R-H01	Little Lynches	3,730	11	Partially Impaired
R-H02	HGMC	2,793	10	Impaired
R-H03	HGMC	4,248	10.5	Impaired
R-H04	HGMC	2,526	10.5	Impaired
R-H05	HGMC	1,179	9	Impaired
R-H06	HGMC	6,215	12	Partially Impaired
R-H07	HGMC	1,892	12	Partially Impaired
R-H08	HGMC	1,601	10	Impaired
R-H09	HGMC	823	10.5	Impaired
R-H10	HGMC	2,662	13	Partially Impaired
R-H11	HGMC	3,249	12	Partially Impaired
R-H12	HGMC	934	6.5	Impaired
R-H13	HGMC	1,425	12	Partially Impaired
R-H14	HGMC	108	11	Partially Impaired
R-H15	HGMC	6,354	12.5	Partially Impaired
R-H16	HGMC	2,028	11.5	Partially Impaired
R-H17	HGMC	5,299	12.5	Partially Impaired
R-H18	HGMC	2,040	12	Partially Impaired

Table 4-4
Summary of Fish Observed During Previous Fish Studies at Haile

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Rpt for the Haile Gold Mine Site

Study:		Rohde 1993	Rohde 1993	Rohde 1993	Rohde 1993	Rohde 1993	Rohde 1993	Rohde 1993	Rohde 1993	Rohde 1993
Water Body		HGMC	HGMC	HGMC (T)	HGMC (T)	Farm Pond	HGMC	Reservoir	HGMC	LLR
Survey Location (Site #):		R93-1	R93-2	R93-3	R93-4	R93-5	R93-6	R93-7	R93-8	R93-9
Scientific Name	**Common Name**									
Clinostomus funduloides	Rosyside dace	--	--	--	--	--	--	--	--	--
Cyprinella chloristia	Greenfin shiner*	--	--	--	--	--	--	--	--	--
Cyprinella nivea	Whitefin shiner	--	--	--	--	--	--	--	--	--
Cyprinella pyrrhomelas	Fieryblack shiner*	--	--	--	--	--	--	--	--	--
Nocomis leptocephalus	Bluehead chub	--	--	--	--	--	--	--	--	x
Notemigonus crysoleucas	Golden shiner	--	--	--	--	--	--	--	--	x
Notropis altipinnis	Highfin shiner	--	--	--	--	--	--	--	--	x
Notropis chlorocephalus	Greenhead shiner*	--	--	--	--	--	--	--	--	x
Notropis cummingsae	Dusky shiner	--	--	--	--	--	--	--	--	--
Notropis petersoni	Coastal shiner	--	--	--	--	--	--	--	--	--
Notropis procne	Swallowtail shiner	--	--	--	--	--	--	--	--	--
Notropis scepticus	Sandbar shiner	--	--	--	--	--	--	--	--	--
Semotilus atromaculatus	Creek chub	--	--	--	--	--	--	--	--	x
Semotilus lumbee	Sandhills chub*	x	x	--	--	--	--	--	--	--
Erimyzon oblongus	Creek chubsucker	--	--	--	--	--	--	--	--	--
Minytrema melanops	Spotted sucker	--	--	--	--	--	--	--	--	--
Moxostoma sp.	Brassy jumprock	--	--	--	--	--	--	--	--	--
Ameiurus brunneus	Snail bullhead*	--	--	--	--	--	--	--	--	--
Ameiurus natalis	Yellow bullhead	--	--	--	--	--	--	--	--	--
Ameiurus platycephalus	Flat bullhead*	--	--	--	--	--	--	--	--	x
Noturus gyrinus	Tadpole madtom	--	--	--	--	--	--	--	--	--
Noturus insignis	Margined madtom	--	--	--	--	--	--	--	--	x
Esox americanus	Redfin pickerel	--	--	--	--	--	--	--	--	--
Esox niger	Chain pickerel	--	--	--	--	--	--	--	--	--
Umbra pygmaea	Eastern mudminnow	--	--	--	--	--	--	--	--	--
Aphredoderus sayanus	Pirate perch	x	x	--	--	--	--	x	--	--
Gambusia holbrooki	Eastern mosquitofish	--	--	--	--	x	--	--	--	x
Acantharchus pomotis	Mud sunfish*	--	x	--	--	--	--	--	--	--
Lepomis auritus	Redbreast sunfish	--	--	--	--	--	--	--	--	x
Lepomis cyanellus	Green sunfish	--	--	--	--	--	--	--	--	--
Lepomis gibbosus	Pumpkinseed	--	--	--	--	--	--	--	--	--
Lepomis macrochirus	Bluegill	--	--	--	--	x	--	x	--	x
Lepomis marginatus	Dollar sunfish	--	--	--	--	--	--	--	--	x
Lepomis microlophus	Redear sunfish	--	--	--	--	x	--	--	--	--
Micropterus salmoides	Largemouth bass	--	--	--	--	x	--	--	--	x
Etheostoma olmstedi	Tessellated darter	--	--	--	--	--	--	--	--	x
Percina crassa	Piedmont darter*	--	--	--	--	--	--	--	--	x
Total Number of Species:		2	3	0	0	4	0	2	0	14

Table 4-4
Summary of Fish Observed During Previous Fish Studies at Haile

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Rpt for the Haile Gold Mine Site

Study:		Rohde 1993	Rohde 1993	Rohde 2008	Rohde 2008	Rohde 2008	Rohde 2008	Rohde 2008	Rohde 2008	Rohde 2008
Water Body		LLR	CB	HGMC	HGMC	HGMC	HGMC (T)	HGMC (N)	HGMC (N)	HGMC
Survey Location (Site #):		R93-10	R93-11	R08-1	R08-2	R08-3	R08-4	R08-5	R08-6	R08-7
Scientific Name	**Common Name**									
Clinostomus funduloides	Rosyside dace	--	x	--	--	--	--	--	--	--
Cyprinella chloristia	Greenfin shiner*	--	--	--	--	--	--	--	--	--
Cyprinella nivea	Whitefin shiner	x	--	--	--	--	--	--	--	--
Cyprinella pyrrhomelas	Fieryblack shiner*	x	--	--	--	--	--	--	--	--
Nocomis leptocephalus	Bluehead chub	x	x	--	--	--	--	--	--	--
Notemigonus crysoleucas	Golden shiner	--	--	--	--	--	--	--	--	--
Notropis altipinnis	Highfin shiner	x	x	--	--	--	--	--	--	--
Notropis chlorocephalus	Greenhead shiner*	x	x	--	--	--	--	--	--	--
Notropis cummingsae	Dusky shiner	--	--	--	--	--	--	--	--	--
Notropis petersoni	Coastal shiner	--	--	--	--	--	--	--	--	--
Notropis procne	Swallowtail shiner	x	--	--	--	--	--	--	--	--
Notropis scepticus	Sandbar shiner	--	--	--	--	--	--	--	--	--
Semotilus atromaculatus	Creek chub	--	x	--	--	--	--	--	--	--
Semotilus lumbee	Sandhills chub*	--	--	x	x	x	--	--	--	--
Erimyzon oblongus	Creek chubsucker	--	--	--	--	--	--	--	--	--
Minytrema melanops	Spotted sucker	--	--	--	--	--	--	--	--	--
Moxostoma sp.	Brassy jumprock	x	x	--	--	--	--	--	--	--
Ameiurus brunneus	Snail bullhead*	--	--	--	--	--	--	--	--	--
Ameiurus natalis	Yellow bullhead	--	--	--	--	--	--	--	--	--
Ameiurus platycephalus	Flat bullhead*	--	--	--	--	--	--	--	--	--
Noturus gyrinus	Tadpole madtom	--	--	--	--	--	--	--	--	--
Noturus insignis	Margined madtom	--	--	--	--	--	--	--	--	--
Esox americanus	Redfin pickerel	--	--	--	--	--	--	--	--	--
Esox niger	Chain pickerel	--	--	--	--	--	--	--	--	--
Umbra pygmaea	Eastern mudminnow	--	--	--	--	--	--	--	--	--
Aphredoderus sayanus	Pirate perch	--	--	x	x	--	--	--	--	--
Gambusia holbrooki	Eastern mosquitofish	--	--	--	--	--	--	--	--	--
Acantharchus pomotis	Mud sunfish*	--	--	x	x	--	--	--	--	--
Lepomis auritus	Redbreast sunfish	x	x	--	--	--	--	--	--	--
Lepomis cyanellus	Green sunfish	--	--	--	--	--	--	--	--	--
Lepomis gibbosus	Pumpkinseed	--	--	--	--	--	--	--	--	--
Lepomis macrochirus	Bluegill	--	--	--	--	--	--	--	--	--
Lepomis marginatus	Dollar sunfish	--	--	--	--	--	--	--	--	--
Lepomis microlophus	Redear sunfish	--	--	--	--	--	--	--	--	--
Micropterus salmoides	Largemouth bass	x	--	--	--	--	--	--	--	--
Etheostoma olmstedi	Tessellated darter	x	x	--	--	--	--	--	--	--
Percina crassa	Piedmont darter*	x	--	--	--	--	--	--	--	--
Total Number of Species:		11	8	3	3	1	0	0	0	0

Table 4-4
Summary of Fish Observed During Previous Fish Studies at Haile

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Rpt for the Haile Gold Mine Site

Study:		Rohde 2008	Rohde 2008	Rohde 2008	Rohde 2010	Rohde 2010	Rohde 2010	Rohde 2010	Rohde 2010	Rohde 2010
Water Body		LLR	LLR	LLR	CB	CB	CB	CB	CB	CB
Survey Location (Site #):		R08-8a[1]	R08-8b[1]	R08-9	R10-1	R10-2	R10-3	R10-4	R10-5	R10-6
Scientific Name	**Common Name**									
Clinostomus funduloides	Rosyside dace	--	--	x	--	--	x	--	--	x
Cyprinella chloristia	Greenfin shiner*	--	x	x	--	--	--	--	--	--
Cyprinella nivea	Whitefin shiner	--	--	--	--	--	--	--	--	--
Cyprinella pyrrhomelas	Fieryblack shiner*	--	--	--	--	--	--	--	--	--
Nocomis leptocephalus	Bluehead chub	--	x	x	--	--	--	--	--	x
Notemigonus crysoleucas	Golden shiner	--	x	--	--	--	--	--	--	--
Notropis altipinnis	Highfin shiner	--	x	x	--	--	--	--	--	x
Notropis chlorocephalus	Greenhead shiner*	--	--	--	--	--	--	--	--	x
Notropis cummingsae	Dusky shiner	--	--	--	--	--	--	--	--	--
Notropis petersoni	Coastal shiner	--	--	--	--	--	--	--	--	--
Notropis procne	Swallowtail shiner	--	x	--	--	--	--	--	--	--
Notropis scepticus	Sandbar shiner	--	--	--	--	--	--	--	--	--
Semotilus atromaculatus	Creek chub	--	--	--	--	--	--	--	--	x
Semotilus lumbee	Sandhills chub*	--	--	--	--	x	--	x	--	x
Erimyzon oblongus	Creek chubsucker	--	x	x	--	--	--	x	--	--
Minytrema melanops	Spotted sucker	--	x	--	--	--	--	--	--	--
Moxostoma sp.	Brassy jumprock	--	--	--	--	--	--	--	--	--
Ameiurus brunneus	Snail bullhead*	--	--	--	--	--	--	--	--	--
Ameiurus natalis	Yellow bullhead	--	--	x	--	--	--	--	--	--
Ameiurus platycephalus	Flat bullhead*	--	--	--	--	--	--	--	--	--
Noturus gyrinus	Tadpole madtom	--	--	--	--	--	--	--	--	--
Noturus insignis	Margined madtom	--	--	--	--	--	--	--	--	--
Esox americanus	Redfin pickerel	--	--	--	--	--	--	--	--	--
Esox niger	Chain pickerel	--	--	--	--	--	--	--	--	--
Umbra pygmaea	Eastern mudminnow	--	--	--	--	--	--	--	--	--
Aphredoderus sayanus	Pirate perch	--	--	x	--	--	--	--	--	--
Gambusia holbrooki	Eastern mosquitofish	x	--	x	--	--	--	--	--	--
Acantharchus pomotis	Mud sunfish*	--	--	--	--	--	--	--	--	--
Lepomis auritus	Redbreast sunfish	x	--	x	--	x	--	--	--	--
Lepomis cyanellus	Green sunfish	--	--	--	--	--	--	x	--	--
Lepomis gibbosus	Pumpkinseed	x	--	x	--	--	--	--	--	--
Lepomis macrochirus	Bluegill	x	x	--	--	--	--	--	--	x
Lepomis marginatus	Dollar sunfish	x	--	x	--	--	x	--	x	--
Lepomis microlophus	Redear sunfish	--	--	--	--	--	--	--	--	--
Micropterus salmoides	Largemouth bass	--	x	x	--	--	--	--	--	--
Etheostoma olmstedi	Tessellated darter	x	x	x	--	x	--	--	--	x
Percina crassa	Piedmont darter*	--	x	--	--	--	--	--	--	--
Total Number of Species:		6	11	13	0	3	2	3	1	8

Table 4-4
Summary of Fish Observed During Previous Fish Studies at Haile

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Rpt for the Haile Gold Mine Site

Study:		SCDNR 2011	SCDNR 2011	SCDNR 2011	SCDNR 2011	SCDNR 2011
Water Body		HGMC	HGMC	CB	LLR	LLR
Survey Location (Site #):		SC11-193	SC11-194	SC11-195	SC11-86893	SC11-94450
Scientific Name	**Common Name**					
Clinostomus funduloides	Rosyside dace	--	--	x	x	x
Cyprinella chloristia	Greenfin shiner*	--	--	--	--	x
Cyprinella nivea	Whitefin shiner	--	--	--	--	--
Cyprinella pyrrhomelas	Fieryblack shiner*	--	--	--	--	--
Nocomis leptocephalus	Bluehead chub	--	--	x	x	x
Notemigonus crysoleucas	Golden shiner	x	--	--	--	--
Notropis altipinnis	Highfin shiner	--	--	--	x	x
Notropis chlorocephalus	Greenhead shiner*	--	--	x	--	--
Notropis cummingsae	Dusky shiner	--	--	--	--	x
Notropis petersoni	Coastal shiner	--	--	--	--	x
Notropis procne	Swallowtail shiner	--	--	--	x	x
Notropis scepticus	Sandbar shiner	--	--	--	--	x
Semotilus atromaculatus	Creek chub	--	--	x	x	x
Semotilus lumbee	Sandhills chub*	--	x	--	--	--
Erimyzon oblongus	Creek chubsucker	x	--	--	x	x
Minytrema melanops	Spotted sucker	--	--	--	--	--
Moxostoma sp.	Brassy jumprock	--	--	--	--	x
Ameiurus brunneus	Snail bullhead*	--	--	--	x	--
Ameiurus natalis	Yellow bullhead	--	--	--	--	--
Ameiurus platycephalus	Flat bullhead*	x	--	--	x	x
Noturus gyrinus	Tadpole madtom	--	--	--	x	x
Noturus insignis	Margined madtom	--	--	x	x	x
Esox americanus	Redfin pickerel	--	--	--	--	x
Esox niger	Chain pickerel	--	--	--	--	x
Umbra pygmaea	Eastern mudminnow	--	--	--	--	x
Aphredoderus sayanus	Pirate perch	--	--	--	x	x
Gambusia holbrooki	Eastern mosquitofish	--	--	--	--	--
Acantharchus pomotis	Mud sunfish*	--	--	--	--	--
Lepomis auritus	Redbreast sunfish	--	--	x	x	x
Lepomis cyanellus	Green sunfish	x	--	--	x	x
Lepomis gibbosus	Pumpkinseed	--	--	--	--	x
Lepomis macrochirus	Bluegill	x	--	--	--	x
Lepomis marginatus	Dollar sunfish	--	--	--	--	--
Lepomis microlophus	Redear sunfish	--	--	--	--	x
Micropterus salmoides	Largemouth bass	--	--	--	--	--
Etheostoma olmstedi	Tessellated darter	--	--	x	x	x
Percina crassa	Piedmont darter*	--	--	--	--	x
Total Number of Species:		5	1	7	14	25

Table 4-4
Summary of Fish Observed During Previous Fish Studies at Haile

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Notes:

[1] Little Lynches River location R08-8a,8b was sampled in a series of pools 50 yards upstream and downstream of the confluence with Haile Gold Mine Creek.

-- = Not observed

* = South Carolina Priority Fish Species

CB = Camp Branch

HGMC = Haile Gold Mine Creek

HGMC (N) = North Branch of Haile Gold Mine Creek

HGMC (T) = Tributary to Haile Gold Mine Creek

LLR = Little Lynches River

Reservoir = Ledbetter Reservoir on Haile Gold Mine Site

Table 4-5
Descriptions of Sites Previously Surveyed for Benthic Macroinvertebrates

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Annual Monitoring Sites on HGMC and Little Lynches:

Site 2A is located upstream of previous mining activities in HGMC, and is characterized by slow flow and high clarity of the water. The substrate has consisted typically of cobble and gravel, along with black organic mud. Channel width is 3 to 5 feet and and recorded water depths ranged from 0 to 1 feet in the spring (April-May). The adjacent riparian zone consists of deciduous forest. This site is considered a reference or "control" site with which biotic indices are compared to assess impacts in more downstream reaches.
Site 2B is located at the upstream end of Ledbetter Reservoir, characterized by slow flow and high clarity of the water. Until 2001, this location received treated effluent from previous mining operations through a now closed outfall. The substrate has been composed of thick clayey mud overlain by detritus and aquatic vegetation. Channel width at this portion of the reservoir is ~600 feet, and recorded water depths ranged from 0 to 10 feet in the spring (April-May). The adjacent riparian zone consists of pine forest.
Site 2C is located at the midpoint of the Ledbetter Reservoir, characterized by slow flow and high clarity of the water. The substrate has typically consisted of thick clayey mud overlain by detritus and aquatic vegetation. Channel width is ~600 feet and water depth slopes quickly to over 10 feet as measured in the spring (April-May). The adjacent riparian zone consists of pine forest and interspersed grassy areas.
Site 3 is located at the outlet channel of the Ledbetter Reservoir, characterized by slow flow and high clarity of the water. The substrate has been composed primarily of clayey mud and submerged aquatic vegetation, with scattered sticks, logs, and rocks. Channel width is 6 feet, and recorded water depths ranged from 0.5 to 2 feet in the spring (April-May). The adjacent riparian zone includes an earthen dam, grass banks, and mixed shrub and pine communities.
Site 3A is located in HGMC, 50 feet downstream of the earthen dam at the west end of Ledbetter Reservoir, and is characterized by rapid flow and high clarity of the water. The substrate is mainly composed of large rocks and algal mats. Channel width is 4 to 5 feet, and recorded water depths ranged from 0.5 to 1 feet in the spring (April-May). The adjacent riparian zone consists of shaded grassy areas with scattered pine trees.
Site 4 is located on HGMC, 50 feet upstream of the Outfall 002 discharge point, and is characterized by slow flow and high but dark (tannic) clarity of the water. The substrate consists primarily of silt, with thick cattail growth. Channel width is ~10 feet, and recorded water depths ranged from 0.5 to 2 feet in the spring (April-May). The adjacent riparian zone consists of open grassy areas.
Site 5 is located in HGMC, 100 feet downstream of the Outfall 002 discharge point, and is characterized by rapid flow and high clarity of the water. The substrate consists primarily of hard clayey mud. Channel width ranges from 3 to 6 feet, and recorded water depths ranged from 0.5 to 2 feet in the spring (April-May). The adjacent riparian zone is composed of grassy areas interspersed with small pine and deciduous trees.

Table 4-5
Descriptions of Sites Previously Surveyed for Benthic Macroinvertebrates

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Annual Monitoring Sites on HGMC and Little Lynches:

Site 6 is located on HGMC, 500 feet downstream of the Outfall 002 discharge point, and is characterized by moderate flow and high clarity of the water. The substrate consists of hard clayey mud, with some silt and gravel. Channel width ranges from 9 to 10 feet, and recorded water depths ranged from 0.5 to 1.5 feet in the spring (April-May). The adjacent riparian zone consists of steeply sloping banks with mixed pine and grassy areas.
Site 8 is located on HGMC, 300 feet downstream of County Road 188, and is characterized by rapid flow and high clarity of the water. The substrate consists of cobble and gravel with someclay. Channel width ranges from 5 to 10 feet and recorded water depths ranged from 0.5 to 2 feet in the spring (April-May). The adjacent riparian zone consists of grassy vegetation on banks with mixed pine and deciduous forest.
Site 9 is located on HGMC, 500 feet upstream of the confluence with the Little Lynches River, and is characterized by rapid flow and high clarity of the water. The substrate has consists of cobble and gravel and with significant clay. Channel width ranges from 5 to 10 feet and recorded water depths ranged from 0.5 to 2 feet in the spring (April-May)The adjacent riparian zone consists of grassy vegetation on banks with mixed forest.
Site 10 is located on the Little Lynches River at the Highway 601 Bridge, three-quarters of a mile upstream from the confluence with HGMC. This location is characterized by moderate flow and slightly turbid water. The substrate consists of silt, and to a lesser degree, cobble and gravel. The channel width ranges from 20 to 30 feet and recorded water depths ranged from 2 to 10 feet in the spring (April-May). The adjacent riparian zone consists of deciduous woodland.
Site 11 is located on the Little Lynches River at the Road 157 Bridge (downstream of the confluence with HGMC), and is characterized by moderate flow and slightly turbid water. The substrate consists of gravel and silts, with scattered sticks and logs. The channel width is ~30 feet wide, and recorded water depths ranged from 1 to 10 feet in the spring (April-May)The adjacent riparian zone consists of deciduous woodland.

Table 4-5
Descriptions of Sites Previously Surveyed for Benthic Macroinvertebrates

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Supplementary Survey Sites (April 2011):

Site B is located in HGMC, upstream of previous mining activities. At the time of the survey, the substrate consisted of 70% gravel, sand and 30% black organic mud, with scattered sticks and logs. Channel width ranged from 2 to 4.9 feet and water depth was 0 to 1 foot. Water flow was slow and the water clarity was high.
Site CB1 is located in the upper portion of Camp Branch, immediately downstream of the confluence with two main tributaries. At the time of the survey, the substrate was composed of primarily silt with scarce logs and debris. Channel width was approximately 2 to 3.9 feet and water depth was 0.7 feet. Water flow was slow and the water clarity was slightly turbid.
Site CB2 is located on Camp Branch near the bridge crossing at Uriah Road. At the time of the survey, the substrate consisted of 50% silt and 50% gravel, with scattered sticks and logs. Channel width was 4.9 to 9.8 feet and water depth was approximately 1 foot. Water flow was moderately swift and water clarity was slightly turbid.
Site LL1 is located on the Little Lynches River, approximately 0.75 miles upstream of the Camp Branch confluence. At the time of the survey, the substrate was composed of cobble, gravel, and silts, with scattered logs and debris. Channel width was approximately 20 to 30 feet and water depth was 1 to 3.9 feet. Water flow was moderately swift and water clarity was slightly turbid.

Table 4-6
Herptile Species Observed During 1993 Surveys at the Site

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Species Common Name	Species Scientific Name	Location Observed
Bullfrog	*Rana catesbeina*	"Farm Pond"
Eastern Garter Snake	*Thamnophis sirtalis*	Observed on Property
Green Frog	*Rana clamitans*	"Farm Pond", Haile Gold Mine Creek, Little Lynches River
Redbelly Water Snake	*Nerodia erythrogaster*	Haile Gold Mine Creek, Little Lynches River
Six-lined Racerunner	*Cnemidophorus sexlineatus*	"Farm Pond"
Southern Toad	*Bufo terestris*	Observed on Property

Source: (NJA 1993)

Table 4-7
Physical Measurements Collected During the Habitat Surveys

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Parameter	Locations														
	LLR1	LLR2	LLR3	LLR4	LLR5	LLR6	HGMC1	HGMC2	CB1	CB2	CB3	BC2	BC3[1]	BC4	UT1
Wetted width (ft)	19.0	24.0	18.0	25.6	24.9	18.4	2.8	5.6	2.8	6.0	10.6	10.2	NA	16.1	4.6
Reach Length (ft)	564	715	545	768	751	551	328	328	328	328	328	328	NA	486	328
Reach Area ($mile^2$)	0.39	0.61	0.35	0.70	0.67	0.36	0.03	0.07	0.03	0.07	0.12	0.12	NA	0.28	0.05
Depth (ft)	0.67	0.95	0.81	0.84	0.94	0.55	0.15	0.43	0.42	0.49	0.44	0.44	NA	0.61	0.41
Flow Velocity (ft/s)	0.13	0.16	0.25	0.30	0.33	0.81	0.0052	0.56	0.57	0.48	0.79	0.32	NA	0.33	0.21
LWD Density ($ft^2/mile^2$)	1130	592	769	841	710	249	1500	22.5	1240	407	337	699	NA	625	1630

Notes:

1. Habitat surveys not conducted due to impounded surface water at culvert crossing.

BC = Buffalo Creek

CB = Camp Branch

HGMC = Haile Gold Mine Creek

ft = feet

$ft^2/mile^2$ = square feet per square mile

ft/s = feet per second

$mile^2$ = square miles

NA = Not applicable

LLR = Little Lynches River

UT = Unnamed Tributary

Table 4-8
Water Quality Measurements Collected During the Habitat Surveys

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Water Quality Parameter[1]	Locations														
	HGMC1	HGMC2	CB1	CB2	CB3	UT1	BC2	BC3	BC4	LLR1	LLR2	LLR3	LLR4	LLR5	LLR6
Temperature (°F)	59.9	65.8	56.5	63.7	54.0	60.5	60.4	60.3	61.7	58.8	60.3	62.2	56.5	57.9	63.1
pH	4.76	4.98	7.10	7.39	7.57	4.6	5.3	5.53	5.89	7.45	7.71	7.57	7.54	7.92	7.38
Specific Conductivity (mS/cm)	0.071	0.184	0.060	0.065	0.074	0.05	0.057	0.062	0.05	0.138	0.114	0.115	0.17	0.147	0.122
Turbidity (NTU)	0	9.4	11.9	5.5	2.5	1.8	0.9	2	6.7	14	4.1	4.5	10.3	5.3	2
Dissolved Oxygen (ppm)	NA	11.57	9.74	9.64	11.21	6.93	7.41	4.99	8.83	6.09	6.76	6.44	8.6	9.1	0.122
Total Dissolved Solids (%)	0.0046	0.012	0.0039	0.0042	0.0048	0.0032	0.0037	0.0040	0.0032	0.0090	0.0074	0.0075	0.011	0.010	0.0079
ORP (mV)	182.6	183.5	161.5	257.9	132.8	278.9	263.9	187.5	367.9	234.1	170.3	207.5	190.5	162	54.8

Notes:
[1] Water quality parameters measured in the field using a Horiba U-52 multi-parameter probe meter.
% = percent
°F = degrees Fahrenheit
BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River
mV = millivolts
mS/cm = milliSiemens per centimeter
NTU = nephelometric turbidity units
ppm = parts per million

Table 4-9
Summary of RBP Habitat Assessment Scores for Low-Gradient Streams

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Sample Reach	Epifaunal Substrate	Pool Substrate Characterization	Pool Variability	Sediment Deposition	Channel Flow Status	Channel Alteration	Channel Sinuosity	Bank Stability		Vegetative Protection		Riparian Vegetative Zone Width		Total
								left bank	right bank	left bank	right bank	left bank	right bank	
Litte Lynches River														
LLR1	10	8	6	5	7	20	10	8	8	7	9	7	10	115
LLR2	8	6	7	5	7	20	10	7	7	8	9	9	9	112
LLR3	6	7	6	5	8	20	10	4	4	7	7	10	9	103
LLR4	10	7	10	6	8	20	12	3	3	8	8	10	10	115
LLR5	12	7	7	6	8	20	10	3	3	6	5	10	7	104
LLR6	6	6	4	4	8	20	10	6	6	6	6	9	3	94
Haile Gold Mine Creek														
HGMC1	7	6	3	13	5	20	10	9	9	9	9	9	9	118
HGMC2	8	6	3	13	16	20	10	9	9	9	5	8	10	126
Camp Branch														
CB1	12	11	2	12	11	20	10	4	4	5	5	10	10	116
CB2	11	8	7	8	9	20	10	5	5	6	6	6	10	111
CB3	14	8	6	13	10	20	10	7	7	7	7	10	10	129
Buffalo Creek														
BC2	13	10	10	11	13	20	14	9	9	10	10	10	10	149
BC4	15	11	10	11	14	20	11	6	6	9	9	10	10	142
Unnamed Tributary														
UT1	15	9	9	11	16	20	11	9	9	9	9	10	10	147

Table 4-10
Summary of ARCADIS 2011 Fish Survey Locations

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Bsaeline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Survey Location	Survey Reach Coordinates[1]				Survey Reach Measurements	
	Upstream Point		Downstream Point		Mean Wetted Width (ft)	Reach Length (ft)
	Latitude	Longitude	Latitude	Longitude		
HGMC1	34.59241	-80.51999	34.591473	-80.521625	2.8	328
HGMC2	34.57375	-80.54306	34.57306	-80.54369	5.6	328
CB2	34.600526	-80.55556	34.59933	-80.55665	6.0	328
CB3	34.59123	-80.567419	34.59021	-80.56815	10.6	328
UT1	34.57389	-80.5217	34.57382	-80.52272	4.6	328
BC2	34.599592	-80.497275	34.59885	-80.49597	10.2	328
BC4	34.56815	-80.43639	34.56739	-80.43503	16.1	486
LLR1	34.58569	-80.57916	34.58525	-80.57701	19	564
LLR2	34.58177	-80.57088	34.57973	-80.57031	24	715
LLR4	34.55925	-80.55063	34.55715	-80.54955	25.6	768
LLR5	34.54565	-80.5436	34.54351	-80.54463	24.9	751

Notes:

[1] Sample coordinates are in decimal degrees, based on WGS 84 reference datum.

ft = feet

BC = Buffalo Creek

CB = Camp Branch

HGMC = Haile Gold Mine Creek

LLR = Little Lynches River

UT = Unnamed Tributary

Table 4-11
Species and Number of Individuals Surveyed

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Scientific Name	Common Name	Locations											
		HGMC1 Count	HGMC2 Count	CB2 Count	CB3 Count	UT1 Count	BC2 Count	BC4 Count	LLR1 Count	LLR2 Count	LLR4 Count	LLR5 Count	Species Total
Clinostomus funduloides	Rosyside dace	--	--	169	98	--	--	1	--	--	9	1	278
Cyprinella chloristia	Greenfin shiner*	--	--	--	2	--	--	--	57	--	2	72	133
Nocomis leptocephalus	Bluehead chub	--	--	247	91	--	--	9	19	5	75	160	606
Notemigonus crysoleucas	Golden shiner	--	--	--	--	--	--	--	--	--	2	3	5
Notropis altipinnis	Highfin shiner	--	--	--	8	--	--	--	302	784	34	209	1337
Notropis chlorocephalus	Greenhead shiner*	--	--	97	10	--	--	--	--	--	--	--	107
Notropis cummingsae	Dusky shiner	--	--	--	--	--	3	705	1	--	6	9	724
Notropis procne	Swallowtail shiner	--	--	--	--	--	--	--	173	198	42	116	529
Notropis scepticus	Sandbar shiner	--	--	--	--	--	--	--	--	--	--	11	11
Semotilus atromaculatus	Creek chub	--	--	67	50	--	--	--	10	1	3	4	135
Semotilus lumbee	Sandhills chub*	--	--	--	--	132	9	45	--	--	--	--	186
Erimyzon oblongus	Creek chubsucker	--	1	12	17	--	1	21	4	7	11	5	79
Minytrema melanops	Spotted sucker	--	--	--	--	--	--	--	--	--	--	2	2
Ameiurus natalis	Yellow bullhead	--	--	--	--	--	--	2	--	--	--	--	2
Ameiurus platycephalus	Flat bullhead*	--	--	--	--	--	--	--	2	8	--	--	10
Noturus gyrinus	Tadpole madtom	--	--	--	--	--	--	--	--	--	1	--	1
Noturus insignis	Margined madtom	--	--	15	3	--	--	4	2	2	2	6	34
Esox americanus	Redfin pickerel	--	--	--	--	--	2	10	--	--	1	--	13
Aphredoderus sayanus	Pirate perch	--	--	10	7	3	6	12	47	35	37	27	184
Gambusia holbrooki	Eastern mosquitofish	--	--	--	--	--	--	18	--	--	4	17	39
Acantharchus pomotis	Mud sunfish*	--	--	--	--	--	1	--	--	--	--	--	1
Centrarchus macropterus	Flier	--	--	--	--	--	--	--	--	--	--	1	1
Enneacanthus gloriosus	Bluespotted sunfish	--	--	--	--	--	--	1	--	--	--	--	1
Lepomis auritus	Redbreast sunfish	--	--	27	17	--	--	49	30	67	60	43	293
Lepomis cyanellus	Green sunfish	--	1	--	4	--	--	--	1	3	1	1	11
Lepomis gibbosus	Pumpkinseed	--	--	--	--	--	--	--	--	--	5	16	21
Lepomis gulosus	Warmouth	--	--	--	--	--	--	--	--	--	1	--	1
Lepomis macrochirus	Bluegill	--	1	8	2	--	--	6	11	5	11	28	72
Lepomis marginatus	Dollar sunfish	--	--	--	--	--	--	--	--	--	--	1	1
Lepomis sp. (YOY)	Sunfish species	--	--	--	--	--	--	--	--	--	--	25	25
Micropterus salmoides	Largemouth bass	--	--	--	--	--	--	--	10	3	2	3	18
Etheostoma olmstedi	Tessellated darter	--	--	39	17	--	1	171	71	72	43	78	492
Etheostoma serrifer	Sawcheek darter	--	--	--	--	--	--	1	--	--	--	--	1
Perca flavescens	Yellow perch	--	--	--	--	--	--	--	--	--	--	1	1
Percina crassa	Piedmont darter*	--	--	--	--	--	--	--	--	--	--	1	1
Total Number of Fish:		0	3	691	326	135	23	1055	740	1190	352	840	**5355**
Total Number of Species:		0	3	10	13	2	7	15	15	13	21	24	**34**

Table 4-11
Species and Number of Individuals Surveyed

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Notes:
-- = Not observed
* = South Carolina Priority Fish Species
YOY = Young-of-year
BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River
UT = Unnamed Tributary

Table 4-12
Trophic Group Composition of Fish

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Trophic Group[1]	Locations											Overall
	HGMC1	HGMC2	CB2	CB3	UT1	BC2	BC4	LLR1	LLR2	LLR4	LLR5	
% Predator	NA	0	0	0	0	8.7	1.0	1.4	0.3	0.9	0.5	0.6
% Omnivore	NA	33.3	37.5	33.1	0	4.3	3.0	3.1	1.0	25.0	20.6	13.0
% Insectivore	NA	66.7	62.5	66.9	100	87.0	96.0	95.5	98.7	74.1	78.9	86.4

Notes:

[1] Trophic group assignments are based on those found in Table 4 of: (NCDENR, 2006) *Standard Operating Procedure Biological Monitoring - Stream Fish Community Assessment Program* . North Carolina Department of Environment and Natural Resources, Division of Water Quality, Environmental Sciences Section, Biological Assessment Unit. August 1, 2006. 51 pp.

NA = Not applicable
BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River
UT = Unnamed Tributary

Table 4-13
Water Quality Parameters Measured During ARCADIS 2011 Fish Survey

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Water Quality Parameter[1]	Locations										
	HGMC1	HGMC2	CB2	CB3	UT1	BC2	BC4	LLR1	LLR2	LLR4	LLR5
Temperature (°F)	64.51	62.19	55.15	59.25	63.93	57.04	56.89	58.55	56.30	53.69	54.93
pH	5.31	4.75	7.23	6.85	4.43	5.66	6.12	8.05	7.74	7.58	9.35
Specific Conductivity (mS/cm)	0.053	0.135	0.029	0.036	0.024	0.030	0.025	0.106	0.089	0.178	0.099
Turbidity (NTU)	1.0	3.3	4.3	14.6	0.0	2.9	0.1	8.6	5.4	4.2	4.7
Dissolved Oxygen (ppm)	5.74	10.54	9.25	9.90	6.97	9.55	8.82	9.29	9.86	8.11	10.98
Total Dissolved Solids (%)	0.0034	0.0088	0.0019	0.0023	0.0015	0.0019	0.0016	0.0069	0.0058	0.0116	0.0064

Notes:
[1] Water quality parameters measured in the field using a Horiba U-52 multi-parameter probe meter.

% = percentage
°F = degrees Fahrenheit
mS/cm = milliSiemens per centimeter
NTU = nephelometric turbidity units
ppm = parts per million

BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River
UT = Unnamed Tributary

Table 4-14
Relative Abundance[1] of Fish Observed

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Scientific Name	Common Name	Locations											
		HGMC1	HGMC2	CB2	CB3	UT1	BC2	BC4	LLR1	LLR2	LLR4	LLR5	Overall
Clinostomus funduloides	Rosyside dace	--	--	24.5	30.1	--	--	0.095	--	--	2.6	0.12	5.2
Cyprinella chloristia	Greenfin shiner*	--	--	--	0.61	--	--	--	7.7	--	0.57	8.8	2.5
Nocomis leptocephalus	Bluehead chub	--	--	35.7	27.9	--	--	0.85	2.6	0.42	21.3	19.6	11.4
Notemigonus crysoleucas	Golden shiner	--	--	--	--	--	--	--	--	--	0.57	0.37	0.094
Notropis altipinnis	Highfin shiner	--	--	--	2.5	--	--	--	40.8	65.9	9.7	25.6	25.1
Notropis chlorocephalus	Greenhead shiner*	--	--	14.0	3.1	--	--	--	--	--	--	--	2.0
Notropis cummingsae	Dusky shiner	--	--	--	--	--	13.0	66.8	0.14	--	1.7	1.1	13.6
Notropis procne	Swallowtail shiner	--	--	--	--	--	--	--	23.4	16.6	11.9	14.2	9.9
Notropis scepticus	Sandbar shiner	--	--	--	--	--	--	--	--	--	--	1.3	0.21
Semotilus atromaculatus	Creek chub	--	--	9.7	15.3	--	--	--	1.4	0.084	0.85	0.49	2.5
Semotilus lumbee	Sandhills chub*	--	--	--	--	97.8	39.1	4.3	--	--	--	--	3.5
Erimyzon oblongus	Creek chubsucker	--	33.3	1.7	5.2	--	4.3	2.0	0.54	0.59	3.1	0.61	1.5
Minytrema melanops	Spotted sucker	--	--	--	--	--	--	--	--	--	--	0.25	0.038
Ameiurus natalis	Yellow bullhead	--	--	--	--	--	--	0.19	--	--	--	--	0.038
Ameiurus platycephalus	Flat bullhead*	--	--	--	--	--	--	--	0.27	0.67	--	--	0.19
Noturus gyrinus	Tadpole madtom	--	--	--	--	--	--	--	--	--	0.28	--	0.019
Noturus insignis	Margined madtom	--	--	2.2	0.92	--	--	0.38	0.27	0.17	0.57	0.74	0.64
Esox americanus	Redfin pickerel	--	--	--	--	--	8.7	0.95	--	--	0.28	--	0.24
Aphredoderus sayanus	Pirate perch	--	--	1.4	2.1	2.2	26.1	1.1	6.4	2.9	10.5	3.3	3.5
Gambusia holbrooki	Eastern mosquitofish	--	--	--	--	--	--	1.7	--	--	1.1	2.1	0.73
Acantharchus pomotis	Mud sunfish*	--	--	--	--	--	4.3	--	--	--	--	--	0.019
Centrarchus macropterus	Flier	--	--	--	--	--	--	--	--	--	--	0.12	0.019
Enneacanthus gloriosus	Bluespotted sunfish	--	--	--	--	--	--	0.095	--	--	--	--	0.019
Lepomis auritus	Redbreast sunfish	--	--	3.9	5.2	--	--	4.6	4.1	5.6	17.0	5.3	5.5
Lepomis cyanellus	Green sunfish	--	33.3	--	1.2	--	--	--	0.14	0.25	0.28	0.12	0.21
Lepomis gibbosus	Pumpkinseed	--	--	--	--	--	--	--	--	--	1.4	2.0	0.39
Lepomis gulosus	Warmouth	--	--	--	--	--	--	--	--	--	0.28	--	0.019
Lepomis macrochirus	Bluegill	--	33.3	1.2	0.61	--	--	0.57	1.5	0.42	3.1	3.4	1.4
Lepomis marginatus	Dollar sunfish	--	--	--	--	--	--	--	--	--	--	0.12	0.019
Lepomis sp. (YOY)	Sunfish species	--	--	--	--	--	--	--	--	--	--	--	--
Micropterus salmoides	Largemouth bass	--	--	--	--	--	--	--	1.4	0.25	0.57	0.37	0.34
Etheostoma olmstedi	Tessellated darter	--	--	5.6	5.2	--	4.3	16.2	9.6	6.1	12.2	9.6	9.2
Etheostoma serrifer	Sawcheek darter	--	--	--	--	--	--	0.095	--	--	--	--	0.019
Perca flavescens	Yellow perch	--	--	--	--	--	--	--	--	--	--	0.12	0.019
Percina crassa	Piedmont darter*	--	--	--	--	--	--	--	--	--	--	0.12	0.019

Table 4-14
Relative Abundance[1] of Fish Observed

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Notes:
[1] Relative abundance is the percentage of the number of an individual species observed relevant to the total number of fish observed.
-- = Not applicable
* = South Carolina Priority Fish Species
YOY = Young-of-year
BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River
UT = Unnamed Tributary

Table 4-15
Diversity[1] and Species Richness[2] of Fish Observed

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Locations	Species Richness	Diversity (1/D)
HGMC1	0	NA
HGMC2	3	NA
CB2	10	4.5
CB3	13	5.0
UT1	2	1.0
BC2	7	4.6
BC4	15	2.1
LLR1	15	4.1
LLR2	13	2.1
LLR4	21	8.0
LLR5	24	7.2
Overall	**34**	**8.1**

Notes:

[1] Inverse index of diversity (1/D) is based on Simpson's formula:

$$D = \sum_{i=1}^{s} \left[\frac{n_i(n_i - 1)}{N(N - 1)} \right]$$

[2] Species richness is equal to total number of species observed.

NA = Not applicable

BC = Buffalo Creek

CB = Camp Branch

HGMC = Haile Gold Mine Creek

LLR = Little Lynches River

UT = Unnamed Tributary

Table 4-16
South Carolina Priority Fish Species Observed

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Scientific Name	Common Name	Priority Classification[2]	Locations											
			HGMC1	HGMC2	CB2	CB3	UT1	BC2	BC4	LLR1	LLR2	LLR4	LLR5	Overall
Cyprinella chloristia	Greenfin shiner	Moderate	--	--	--	2 (0.61)	--	--	--	57 (7.7)	--	2 (0.57)	72 (8.8)	133 (2.5)
Notropis chlorocephalus	Greenhead shiner	High	--	--	97 (14.0)	10 (3.1)	--	--	--	--	--	--	--	107 (2.0)
Semotilus lumbee	Sandhills chub	Highest	--	--	--	--	132 (97.8)	9 (39.1)	45 (4.3)	--	--	--	--	186 (3.5)
Ameiurus platycephalus	Flat bullhead	Moderate	--	--	--	--	--	--	--	2 (0.27)	8 (0.67)	--	--	10 (0.19)
Acantharchus pomotis	Mud sunfish	Moderate	--	--	--	--	--	1 (4.3)	--	--	--	--	--	1 (0.019)
Percina crassa	Piedmont darter	High	--	--	--	--	--	--	--	--	--	--	1 (0.12)	1 (0.019)

Notes:
[1] For each location, the number observed and the percent relative abundance (in parentheses) for each priority fish species is presented.
[2] Based on criteria presented in Chapter 2 of the SCDNR's 2005 *Comprehensive Wildlife Conservation Strategy* plan document.
-- = Not observed
BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River
UT = Unnamed Tributary

Table 4-17
The Bioclassification Scoring System Provided in SCDHEC (1998)

Haile Gold Mine, Inc.
Lancaster, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Score	BI Values			EPT Values		
	M	P	S/CA	M	P	S/CA
5	<4.00	<5.14	<5.42	>43	>33	>29
4.6	4.00-4.04	5.14-5.18	5.42-5.46	42-43	32-33	28
4.4	4.05-4.09	5.19-5.23	5.47-5.51	40-41	30-31	27
4	4.10-4.83	5.24-5.73	5.52-6.00	34-39	26-29	22-26
3.6	4.84-4.88	5.74-5.78	6.01-6.05	32-33	24-25	21
3.4	4.89-4.93	5.79-5.83	6.06-6.10	30-31	22-23	20
3	4.94-5.69	5.84-6.43	6.11-6.67	24-29	18-21	15-19
2.6	5.70-5.74	6.44-6.48	6.68-6.72	22-23	16-17	14
2.4	5.75-5.79	6.49-6.53	6.73-6.77	20-21	14-15	13
2	5.80-6.95	6.54-7.43	6.78-7.68	14-19	10-13	8-12
1.6	6.96-7.00	7.44-7.48	7.69-7.73	12-13	8-9	7
1.4	7.01-7.05	7.49-7.53	7.74-7.79	10-11	6-7	6
1	>7.05	>7.53	>7.79	0-9	0-5	0-5

Notes:

M = Mountain

P = Piedmont

S/CA = Sandhills/Coastal Plain

Table 4-18
Species Collected During the ETT - ARCADIS 2011 Benthic Macroinvertebrate Survey

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Taxa	Species or Family	Stage	Survey Site											
			HGMC1	HGMC2	CB1	CB3	BC2	BC4	LLR1	LLR2	LLR3	LLR4	LLR5	LLR6
Ephemeroptera	*Acentrella parvula*	N												1
	Acerpenna macdunnoughi	N					3	2						
	Acerpenna pygmaea	N				2								
	Apobaetis etowah	N						3						
	Baetidae - immature	N							1		1			
	Baetis pluto	N				4								
	Baetis propinquus	N												4
	Caenis diminuta	N		1		2			39	48	269	62	142	79
	Callibaetis sp.	N								2				
	Ephemerella nr. invaria	N												5
	Eurylophella sp.	N				3	2	2						
	Hexagenia limbata	N				3		3					1	
	Leptophlebiidae	N												1
	Maccaffertium modestum	N				33	1	25						10
	Paraleptophlebia sp.	N					14	20						
	Plauditus sp.	N				1								
	Plauditus dubius	N						2						
	Stenacron interpunctatum	N				1			1		1			
Plecoptera	*Allocapnia sp.*	N					19							3
	Clioperla clio	N				9		14						
	Leuctra sp.	N			99	40		9			8		3	4
	Perlesta sp.	N					1							
	Perlidae	N			1						2		5	5
	Perlodidae	N					19							2
	Taeniopteryx sp.	N				1	1	13					5	4
Trichoptera	*Cheumatopsyche sp.*	L				23			1					1
	Chimarra aterrima	L				4								
	Neophylax sp.	P					1							
	Oecetis sp.	L				1								
	Phylocentropus sp.	L						5						
	Psilotreta frontalis	L					1	3						
	Ptilostomis sp.	L	1		1		4	1				1	1	
	Triaenodes sp.	L				2	2			1	2			
Odonata	*Argia sedula*	N							9					
	Argia tibialis	N								2		5	4	4
	Boyeria vinosa	N				3		7	5	1	4	2	5	4
	Calopteryx dimidiata	N				6		2	1					2
	Cordulegaster bilineata	N							1					1
	Cordulegaster sp.	N			1	1	3	5						
	Enallagma divagans	N							5	9	7	3	2	1
	Enallagma signatum	N							1					
	Enallagma sp.	N											2	
	Erythemis simplicicollis	N							4	5	1			
	Gomphidae	N											1	
	Gomphus lividus	N		1		3		5	8		2	2	1	6
	Helocordulia sp.	N						1						

Table 4-18
Species Collected During the ETT - ARCADIS 2011 Benthic Macroinvertebrate Survey

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Taxa	Species or Family	Stage	Survey Site											
			HGMC1	HGMC2	CB1	CB3	BC2	BC4	LLR1	LLR2	LLR3	LLR4	LLR5	LLR6
Odonata	*Ischnura sp.*	N								1			1	
	Libellula sp.	N		6					3			1		
	Macromia nr. taeniolata	N						5	1		1	8	5	9
	Ophiogomphus mainensis	N				1								
	Progomphus obscurus	N				2		3	2	1	2	1	5	7
	Stylurus sp.	N						1						
	Sympetrum sp.	N							2					
	Tetragoneuria sp.	N							1					1
Heteroptera	*Belostoma sp.*	A								1				
	Microvelia sp.	N							1					1
	Notonecta sp.	A										1		
	Ranatra beunoi	N							1					
	Trepobates sp.	A							1		1			
	Trichocorixa calva	A								3		1		
Megaloptera	*Corydalus cornutus*	L				1								
	Nigronia serricornis	L					1	1	1				1	1
	Sialis sp.	L		20				1		1		1		
Coleoptera	*Anchytarsus bicolor*	L						3						
	Ancyronyx variegatus	L,A					1	4	3	2	1	7	2	
	Dineutus ciliatus	A							1		1	6	1	1
	Dineutus discolor	A							5		3	3		
	Dubiraphia sp.	L							6	5	11	1	7	5
	Dubiraphia vittata	A						1	6	7	15	2	1	2
	Enochrus nr. blatchleyi	A							1			1		
	Gonielmis dietrichi	A						1						
	Gyrinus sp.	A									1			
	Helichus sp.	A				2	1				2			
	Hydroporus oblitus gp.	A	1	3				1	14	19	14	4	3	1
Coleoptera	*Hydroporus sp.*	L	7				5	2	5	9	3	15	1	2
	Hydroporus sp. 2	A						1	2	8	3		2	
	Macronychus glabratus	L,A						2	5	1	2	5	4	1
	Optioservus sp.	L				4								
	Peltodytes sp.	A									3			
	Psephenus herricki	A				1		3						
	Scirtes sp.	L								2	2			
	Sperchopsis tessellatus	L,A		1			2	2						
	Stenelmis sp.	L,A		1		4	2	7	6	1	5	2	2	
	Tropisternus sp.	L												1

Table 4-18
Species Collected During the ETT - ARCADIS 2011 Benthic Macroinvertebrate Survey

Haile Gold Mine, Inc.
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Taxa	Species or Family	Stage	Survey Site											
			HGMC1	HGMC2	CB1	CB3	BC2	BC4	LLR1	LLR2	LLR3	LLR4	LLR5	LLR6
Diptera - Excluding midges	*Anopheles nr. walkeri*	L							6		1			
	Bezzia sp.	L								1	1	1		
	Chaoborus sp.	L								1				
	Cnephia pecuarum/ornithophilia	L			78		4							
	Crysops sp.	L			5		2	1						
	Culex sp.	L									2			
	Ectemnia invenusta	L						2						
	Erioptera sp.	L			2									
	Gonempeda sp.	L			1									
	Hexatoma sp.	L						1						
	Limoninae	L			1	2	1			1				
	Palpomyia sp.	L				1								
	Pilaria sp.	L					1							
	Stilobezzia sp.	L							1					
	Simulium nr. hayesi	L						5						
	Simulium sp.	L											1	3
	Simulium tuberosum gp.	L						7						
	Tipula (Nippo.) abdominalis	L			19	5		2						
	Tipula (Yamato.) sp.	L	2		2	3	2							
	Tipula sp.	L									2	12		10
	Tipulidae	P								1				
Diptera - Midge only	*Ablabesmyia janta*	L							5					
	Ablabesmyia mallochi	L						1	4		3	3	2	8
	Ablabesmyia sp.	P								2				
	Chironomus sp.	L									1			
	Cladotanytarsus sp.	L						1	1				1	
	Clinotanypus pinguis	L		1				3		4			1	
	Conchapelopia gp.	L			1			6			5	6	6	6
	Corynoneura sp.	L	1			22	1							
	Corynoneura sp. C	L											1	1
	Cricotopus sp.	L											1	
	Dicrotendipes neomodestus	L							1					
	Diplocladius sp.	L			32	23							8	6
	Eukiefferiella claripennis gp.	L						1						
	Heterrotrissocladius sp.	L			2		3							
	Labrundinia pilosella	L					2		2		5		1	
	Limnophyes sp.	L			5									
	Microtendipes pedellus	L				2		1					1	1
	Microspectra sp.	L											1	
	Monopelopia	L								5	31	5		
	Nanocladius rectinervis	L				1		3			4		9	
	Orthicladiinia sp. C	L						1						
	Orthocladius/Cricotopus sp.	L			2									
	Parachironomus carinatus	L								2	1			
	Parametriocnemus sp.	L				1			1					
	Paratanytarsus sp.	L												1
	Paratendipes albimanus	L								2		1		
	Phaenospectra flavipes	L				1								
	Polypedilum aviceps	L				30		4						1
	Polypedilum fallax sp. A	L										2		

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Taxa	Species or Family	Stage	Survey Site											
			HGMC1	HGMC2	CB1	CB3	BC2	BC4	LLR1	LLR2	LLR3	LLR4	LLR5	LLR6
Diptera - Midge only	*Polypedilum illinoense gp.*	L								1	1	8		2
	Polypedilum sp.	L	1	3										
	Procladius sp.	L						1		2		1	1	1
	Rheocrictopus robacki	L				6							1	
	Rheotanytarsus sp.	L							2		1			2
	Stenochironomus sp.	L									1			
	Tanypus sp.	L	1											
	Tanytarsus sp. A	L									1		5	
	Tanytarsus sp. C	L				1				1	1	1		
	Tanytarsus sp. L	L						4						3
	Tanytarsus sp. M	L				1								
	Tanytarsus sp. T	L							1		2	3		
	Thienemanniella xena gp.	L				3							1	
	Tribelos jucundum	L				1	2		1	1				1
	Unniella multivirga	L						8						
	Zavrelimyia sp.	L	3			6			1	1		7		
Annelida	*Carambincola sp.*		2											
	Placobdella sp.										1			
	Tubificidae (w/o cap. setae)						1		1	1				
Crustacea	*Caecidotea sp.*	J	1		3	1								
	Cambarinae	J	4		7	9	14	1						
	Cambarus latimanus	J	1		1									
	Cragonyx obliquus gp.	J		1	2		1	1			1			
	Hyallela azteca	J			1				9	6	8		1	1
	Procambarus sp.	J							4	8	6	1	1	4
Mollusca	*Corbicula fluminea*	Clam		1		2			17	9	3	3	23	1
	Helisoma anceps	Snail							1	1	1			
	Physa acuta	Snail							4	2	5	1	1	1
	Sphaerium sp.	Clam					5			2	2			
Misc.	**Acari - Hydracarina - Lebertea**	N							8	1		1	4	
	Turbellaria - *Dugesia tigrina*	N								1				

Notes:
BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River

Table 4-19
Community Assessment Metrics for the ETT - ARCADIS 2011 Benthic Macroinvertebrate Survey

Haile Gold Mine, Inc.
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Parameters	HGMC1	HGMC2	CB1	CB3	BC2	BC4	LLR1	LLR2	LLR3	LLR4	LLR5	LLR6
Ecoregion Designation[1]	SH	SH	SH	P	SH	SH	P	P	P	P	P	P
Biological Parameter Results												
Taxa Richness	12	11	21	46	32	54	52	44	53	38	46	48
Total No. Organisms / Site	25	39	266	278	122	214	213	185	457	190	278	222
EPT Index	1.0	1.0	3.0	15.0	12.0	13.0	4.0	3.0	6.0	2.0	6.0	12.0
EPT/Chironomid Ratio	0.17	0.25	2.4	1.32	8.50	3.00	2.2	2.43	4.96	1.7	3.96	3.61
Scraper/Filterer Ratio	1.00	1.00	1.00	0.89	1.00	1.37	1.00	3.00	15.95	5.79	2.58	4.95
Biotic Index	7.37	7.38	4.50	5.23	4.90	4.83	7.30	7.59	7.34	7.38	7.19	6.82
% Dominant Taxon	28%	51%	37%	14%	16%	12%	18%	26%	59%	33%	51%	36%
Shredder/Total No. Organisms Ratio	0.2	0.09	0.46	0.24	0.23	0.18	0.01	0.02	0.03	0.09	0.03	0.11
Water Quality Rating Score (Specified as Sand Hills/Coastal Plain)												
EPT Score	1.0	1.0	1.0	3.0	2.0	2.4	1.0	1.0	1.4	1.0	1.4	2.0
Biotic Index Score	2.0	2.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Mean Score	**1.5**	**1.5**	**3.0**	**4.0**	**3.5**	**3.7**	**1.5**	**1.5**	**1.7**	**1.5**	**1.7**	**2.0**
Bioclassification of Site (Independent)	**fair**	**fair**	**good-fair**	**good**	**good-fair**	**good**	**fair**	**fair**	**fair**	**fair**	**fair**	**fair**
Aquatic Life Use Support	**partially**	**partially**	**partially**	**fully**	**partially**	**fully**	**partially**	**not**	**partially**	**partially**	**partially**	**partially**
Water Quality Rating Score (Specified as Piedmont)												
EPT Score	1.0	1.0	1.0	2.4	2.0	2.0	1.0	1.0	1.4	1.0	1.4	2.0
Biotic Index Score	2.0	2.0	5.0	4.4	5.0	5.0	2.0	1.0	2.0	2.0	2.0	2.0
Mean Score	**1.5**	**1.5**	**3.0**	**3.4**	**3.5**	**3.5**	**1.5**	**1.0**	**1.7**	**1.5**	**1.7**	**2.0**
Bioclassification of Site (Independent)	**fair**	**fair**	**good-fair**	**good-fair**	**good-fair**	**good**	**fair**	**poor**	**fair**	**fair**	**fair**	**fair**
Aquatic Life Use Support	**partially**	**partially**	**partially**	**partially**	**partially**	**fully**	**partially**	**not**	**partially**	**partially**	**partially**	**partially**
Water Quality Rating Score (Per Ecoregion Designation)												
EPT Score	1.0	1.0	1.0	3.0	2.0	2.4	1.0	1.0	1.4	1.0	1.4	2.0
Biotic Index Score	2.0	2.0	5.0	5.0	5.0	5.0	2.0	1.0	2.0	2.0	2.0	2.0
Mean Score	**1.5**	**1.5**	**3.0**	**4.0**	**3.5**	**3.7**	**1.5**	**1.0**	**1.7**	**1.5**	**1.7**	**2.0**
Bioclassification of Site (Independent)	**fair**	**fair**	**good-fair**	**good**	**good-fair**	**good**	**fair**	**poor**	**fair**	**fair**	**fair**	**fair**
Aquatic Life Use Support	**partially**	**partially**	**partially**	**fully**	**partially**	**fully**	**partially**	**not**	**partially**	**partially**	**partially**	**partially**

Notes:
[1] Ecoregion designations are based on the mapping provided in the benthic community protocol SCDHEC (1998), using Omernik (1987) ecoregion designations.
P = Piedmont
SH = Sand Hills
BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River

Table 4-20
Herptile Species Surveyed in 2011

Haile Gold Mine, Inc.
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Species	Status	Order	Family	Sampling Location/Stream Reach			
				LLR	HGMC	CB	BC
Frogs/Toads							
Northern Cricket Frog (*Acris crepitans*)	SCDNR Moderate	Anura	Hylidae	LLR1	HGMC2	-	-
Southern Cricket Frog (*Acris gryllus*)	Common	Anura	Hylidae	LLR2	-	-	-
Pine Wood Tree Frog (*Hyla femoralis*)	Common	Anura	Hylidae	LLR2	-	-	-
Green Tree Frog (*Hyla cinerea*)	Common	Anura	Hylidae	LLR3	-	-	-
River Frog (*Rana heckscheri*)	Common	Anura	Ranidae	LLR1	-	-	-
Unidentified tadpoles	Unknown	Anura	Unknown	-	-	-	-
Salamanders							
Southern 2-Lined Salamander (*Eurycera cirriger*)	Common	Caudata	Plethodontidae	LLR1 LLR3 LLR4 LLR5	-	CB3	-
Lizards							
Anole (*Anolis carolinensis*)	Common	Squamata	Polychrotidae	LLR4	-	-	BC4
Southeastern Five-Lined Skink (*Eumeces inexpectatus*)	Common	Squamata	Scincidae	-	HGMC2	-	-

Table 5-1
Summary of Special Status Species Potentially Present in the Area and Likeliness of Occurrence at the Site

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Species	Status	Season and Range in South Carolina	Habitat Association	Observed in the HGM Project Boundary (Y/N)	Potential to Occur in the HGM Project Boundary (None/Low/Medium/High)	Habitat(s) that Species May Occupy in HGM Project Boundary Based on NCSC Vegetation Classification
Birds						
Red-cockaded Woodpecker *Picoides borealis*	FE SE	Year-round Resident	Longleaf pine forests with scarce understory.	N	Low - No suitable nesting habitat is present; limited foraging habitat.	Oak-Hickory Forest Xeric Sandhill Scrub
Bald Eagle *Haliaeetus leucocephalus*	BGEPA MBTA SE SCDNR High & USFWS Bird of Conservation Concern BCR27 & BCR29	Year-round in the eastern half of the state	Large trees near rivers, lakes, reservoirs, and coastlines	N	Low - no suitable nesting and foraging habitat are present, although a few large trees suitable for perching/roosting are adjacent to open water habitats	"Streamhead Pocosin" Small Stream Forest
Acadian Flycatcher *Empidonax virescens*	SCDNR High	Breeding Resident	Moist deciduous forests with a moderate understory, generally near a stream	Y	High - observed during 2011 avian point-count surveys and 2008 Bald Eagle survey	"Streamhead Pocosin" Small Stream Forest
American Bittern *Botaurus lentiginosus*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27	Spring/fall migration and winter statewide	Freshwater and brackish marshes	N	None - no suitable marsh habitat in project area	N/A
American Coot *Fulica americana*	SCDNR Highest	Winter statewide	Freshwater lakes, ponds, marshes, and rivers	N	Low - there are limited areas of potentially suitable open water habitats	"Streamhead Pocosin" Small Stream Forest
American Golden Plover *Pluvialis dominica*	SCDNR Highest	Passage Migrant Spring/Fall	Mostly tidal flats/riparian. Nests in tundra grasslands	N	Low - there are limited areas of potentially suitable habitat	N/A
American Kestrel *Falco sparverius*	MBTA SCDNR Highest & USFWS Bird of Conservation Concern BCR27	Year-round Resident	Various. Woodlands, open grasslands, savanna, longleaf pine sandhills. Often seen perching on wire/poles.	Y	High-observed during 1993 field investigations	Oak-Hickory Forest Xeric Sandhill Scrub
American Woodcock *Scolopax minor*	SCDNR Moderate	Year-round Resident	Hardwood Forest, Mixed Forest, Woodlands	Y	High-observed during 1993 field investigations	Oak-Hickory Forest Xeric Sandhill Scrub
Bachman's Sparrow *Peucaea aestivalis*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27 & BCR29	Year-round Resident	Oak woodland, old growth pine forest,	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Barn Owl *Tyto alba*	MBTA SCDNR High	Year-round Resident	Open and partly open country (grassland, marsh, lightly grazed pasture, hayfields) in a wide variety of situations, often around human habitation. Nests in buildings (church steeples, attics, platforms in silos and barns, wooden water tanks, duckblinds), caves, crevices on cliffs, burrows, and hollow trees	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub Structures
Black Duck *Anas rubripes*	SCDNR Highest	Non-breeding Resident	Lakes, Ponds	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Black-crowned Night Heron *Nycticorax nycticorax*	SCDNR Highest	Summer - breeding	Wetlands	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Black Rail *Laterallus jamaicensis*	USFWS Bird of Conservation Concern BCR27 & BCR29	Year-round Resident Eastern Portion of State	Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy "swamps"	N	None - no suitable habitat in project area	N/A
Black Vulture *Coragyps atratus*	MBTA	Year-round Resident	Nearly ubiquitous except in heavily forested regions; more common in lowland than in highland habitats.	Y	High - observed during 2011 avian point-count surveys	Oak-Hickory Forest Xeric Sandhill Scrub
Black-throated Green Warbler *Dendroica virens*	USFWS Bird of Conservation Concern BCR27	Passage Migrant Spring/Fall	Various open forest, woodland, scrub, second growth, and thicket habitats	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Blue-winged Teal *Anas discors*	SCDNR High	Passage Migrant Spring/Fall	Marshes, ponds, sloughs, lakes, and sluggish streams	N	Medium - Suitable habitat available	"Streamhead Pocosin" Small Stream Forest
Blue-winged Warbler *Vermivora cyanoptera*	USFWS Bird of Conservation Concern BCR27 & BCR29	Breeding Resident Spring/Summer	Brushy hillsides, second growth, partly open situations with saplings, bogs, woodland edge and clearings, stream edges, overgrown pastures, swamps	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Brown-headed Nuthatch *Sitta pusilla*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27 & BCR29	Year-round Resident	Longleaf pine forests.	Y	High - observed during 2011 avian point-count surveys	Oak-Hickory Forest Xeric Sandhill Scrub

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Summary of Special Status Species Potentially Present in the Area and Likeliness of Occurrence at the Site

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Species	Status	Season and Range in South Carolina	Habitat Association	Observed in the HGM Project Boundary (Y/N)	Potential to Occur in the HGM Project Boundary (None/Low/Medium/High)	Habitat(s) that Species May Occupy in HGM Project Boundary Based on NCSC Vegetation Classification
Canvasback *Aythya valisineria*	SCDNR High	Passage Migrant Spring/Fall	Marshes, ponds, lakes, rivers and bays	N	Medium - Suitable habitat available	"Streamhead Pocosin" Small Stream Forest
Curulean Warbler *Dendroica cerulea*	USFWS Bird of Conservation Concern BCR27 & BCR29	Passage Migrant Spring/Fall	Woodland, second growth, and scrub habitats; forest canopy, gaps and edges, semi-open areas, usually high in trees	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Chuck-will's-widow *Caprimulgus carolinensis*	USFWS Bird of Conservation Concern BCR27	Breeding Resident Spring/Summer	Deciduous forest, pine-oak association, live-oak groves, and edges of clearings	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Common Ground-Dove *Columbina passerina*	USFWS Bird of Conservation Concern BCR27	Vagrant - Sightings Uncommon	Once inhabited open country with trees and bushes, sandy reefs, open sandy areas in forest and savannah, but over much of its range now primarily a bird of cultivated land, villages and towns	N	Low - there are limited areas of potentially suitable habitat	Oak-Hickory Forest Xeric Sandhill Scrub
Common Loon *Gavia immer*	SCDNR Highest	Passage Migrant Spring/Fall	Open Water, Lakes, Rivers	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Dunlin *Calidris alpina*	SCDNR Highest	Passage Migrant Spring/Fall	Wetlands, Mudflats, Marshes	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Eastern Meadowlark *Sturnella magna*	SCDNR Highest	Year-round Resident	Grasslands, Cultiveted Lands, Savanna	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Eastern Wood Pewee *Contopus virens*	SCDNR Highest	Summer - breeding	Wooded upland and lowland habitats including deciduous, coniferous, or mixed forests	Y	High - observed during 2011 avian point-count surveys	Oak-Hickory Forest Xeric Sandhill Scrub
Field Sparrow *Spizella pusilla*	SCDNR Highest	Year-round Resident	Old fields, brushy hillsides, overgrown pastures, thorn scrub, deciduous forest edge, sparse second growth	Y	High - observed during 2011 avian point-count surveys	Oak-Hickory Forest Xeric Sandhill Scrub
Forster's Tern *Sterna forsteri*	SCDNR High	Passage Migrant Spring/Fall	Freshwater and salt marshes, in migration and winter also seacoasts, bays, estuaries, rivers and lakes	N	None - no suitable habitat in project area	N/A
Grasshopper Sparrow *Ammodramus savannarum*	SCDNR Highest	Year-round Resident	Savanna, Grasslands	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Great Blue Heron *Ardea herodias*	SCDNR Moderate	Year-round Resident	Freshwater and brackish marshes, along lakes, rivers, bays, lagoons, ocean beaches, mangroves, fields, and	Y	High - observed during 2011 avian point-count surveys	"Streamhead Pocosin" Small Stream Forest
Great Egret *Ardea alba*	SCDNR Moderate	Passage Migrant Spring/Fall	Marshes, swampy woods, tidal estuaries, lagoons, mangroves, streams, lakes, and ponds; also fields and meadows.	Y	High - observed during 2008 Bald Eagle survey	"Streamhead Pocosin" Small Stream Forest
Greater Scaup *Aythya marila*	SCDNR Moderate	Non-breeding Resident	In migration and winter, found in bays, estuaries, and large open inland lakes and rivers	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Greater Yellowlegs *Tringa melanoleuca*	SCDNR Moderate	Passage Migrant Spring/Fall	Marshes, ponds, lakes, stream margins and sand and gravel bars, lagoons, salinas, and coastal mudflats	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Green Heron *Butorides virescens*	SCDNR Moderate	Breeding Resident Spring/Summer	Swamps, mangroves, marshes, and margins of ponds, rivers, lakes, and lagoons	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Henslow's Sparrow	USFWS Bird of Conservation Concern BCR27 & BCR29	Non-breeding Resident Winter	Grassy areas adjacent to pine woods or second-growth woods	N	Low - there are limited areas of potentially suitable habitat	Oak-Hickory Forest Xeric Sandhill Scrub
Horned Grebe *Podiceps auritis*	SCDNR Moderate	Non-breeding Resident	Commonly in inland freshwater habitats, especially lakes and rivers	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Kentucky Warbler *Oporornis formosus*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27 & BCR29	Summer - breeding	Humid deciduous forest, dense second growth, swamps.	N	Medium - Suitable habitat available	"Streamhead Pocosin" Small Stream Forest
King Rail *Rallus elegans*	SCDNR Highest	Breeding Resident	Freshwater marshes, upland-wetland marsh edges	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Least Bittern *Ixobrychus exilis*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27	Breeding Resident	Tall emergent vegetation in marshes, primarily freshwater, less commonly in coastal brackish marshes and mangrove swamps	N	None - no suitable marsh habitat in project area	N/A

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Species	Status	Season and Range in South Carolina	Habitat Association	Observed in the HGM Project Boundary (Y/N)	Potential to Occur in the HGM Project Boundary (None/Low/Medium/High)	Habitat(s) that Species May Occupy in HGM Project Boundary Based on NCSC Vegetation Classification
Le Conte's Sparrow *Ammodramus leconteii*	USFWS Bird of Conservation Concern BCR27	Non-breeding Resident Winter	Variety of old field and prairie habitats with dense cover of grass or sedge. Examples include: moist fields of broomsedge, rice stubble, airfield grasslands, and damp weedy or grassy fields	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Least Sandpiper *Calidris minutilla*	SCDNR Highest	Non-breeding Resident	Wet meadows, mudflats, flooded fields, shores of pools and lakes, narrow channels, edge of salt marsh, river sandbars, sometimes sandy beaches	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Lesser Scaup *Aythya affinis*	SCDNR Highest	Passage Migrant Spring/Fall	Lakes, Ponds, Rivers	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Lesser Yellowlegs *Tringa flavipes*	SCDNR Highest	Passage Migrant Spring/Fall	Marshes, ponds, wet meadows, lakes and mudflats	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Little Blue Heron *Egretta caerulea*	SCDNR Highest	Passage Migrant Spring/Fall	Marshes, ponds, lakes, meadows, mudflats, lagoons, streams, mangrove lagoons	Y	High-observed during 1993 field investigations	"Streamhead Pocosin" Small Stream Forest
Loggerhead Shrike *Lanius ludovicianus*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27 & BCR29	Year-round Resident	Grassland/herbaceous, Old field, Savanna, Shrubland/chaparral	N	Low - there are limited areas of potentially suitable habitat	Xeric Sandhill Scrub
Louisiana Waterthrush *Parkesia motacilla*	SCDNR Moderate	Breeding Resident Spring/Summer	Moist forest, woodland, and ravines along streams; mature deciduous and mixed floodplain and swamp forests	N	Medium - Suitable habitat available	"Streamhead Pocosin" Small Stream Forest
Mallard *Anas platyrhynchos*	SCDNR Highest	Year-round Resident	Primarily shallow waters such as ponds, lakes, marshes, and flooded fields	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Northern Bobwhite *Colinus virginianus*	SCDNR Highest	Year-round Resident	Occurs in croplands, grasslands, pastures, fallow fields, grass-brush rangelands, open pinelands, open mixed pine-hardwood forests. Note that this species was observed in the "streamhead pocosin" habitat during the fall 2011 survey.	Y	High - observed during 2011 avian point-count surveys	Oak-Hickory Forest Xeric Sandhill Scrub
Northern Pintail *Anas acuta*	SCDNR Highest	Non-breeding Resident	Lakes, rivers, marshes and ponds	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Pectoral Sandpiper *Calidris melanotos*	SCDNR Moderate	Passage Migrant Spring/Fall	Wet meadows, mudflats, flooded fields and golf courses, and shores of ponds and pools	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Pied-billed Grebe *Podilymbus podiceps*	SCDNR Highest	Year-round Resident	Occurs in ponds, sloughs, and marshes, in marshy inlets and along edges of rivers, lakes, and reservoirs, and occasionally in estuarine wetlands	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Prairie Warbler *Dendroica discolor*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27 & BCR29	Breeding Resident	Brushy second growth, dry scrub, low pine-juniper, mangroves, pine barrens, burned-over areas, sproutlands	Y	High - observed during 2011 avian point-count surveys	Oak-Hickory Forest Xeric Sandhill Scrub
Prothonotary Warbler *Protonotaria citrea*	USFWS Bird of Conservation Concern BCR27	Breeding Resident Spring/Summer	Mature deciduous floodplain, river, and swamp forests; wet lowland forest. Primary habitats are almost always near standing water	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Peregrine Falcon *Falco peregrinus*	MBTA USFWS Bird of Conservation Concern BCR27 & BCR29	Non-breeding Resident Eastern Portion of State	Various open situations from tundra, moorlands, steppe, and seacoasts, especially where there are suitable nesting cliffs, to mountains, open forested regions	N	None - No suitable habiitat in project area	N/A
Redhead *Aythya americana*	SCDNR High	Passage Migrant Spring/Fall	Large marshes, lakes, lagoons, rivers and bays	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Red-headed Woodpecker *Melanerpes erythrocephalus*	USFWS Bird of Conservation Concern BCR27	Year-round Resident	Open woodland, especially with beech or oak, open situations with scattered trees, parks, cultivated areas and gardens	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Red-shouldered Hawk *Buteo lineatus*	MBTA	Year-round Resident	Bottomland hardwoods and riparian areas, upland deciduous or mixed deciduous-conifer forest	Y	High - observed during 2011 avian point-count surveys and 1993 field investigations	Oak-Hickory Forest Xeric Sandhill Scrub

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Red-tailed Hawk *Buteo jamaicensis*	MBTA	Year-round Resident	Nests in tall trees with open feeding areas nearby	Y	High - opportunistically observed during 2011 avian point-count surveys, 2008 Bald Eagle survey, and 1993 field investigations	Oak-Hickory Forest Xeric Sandhill Scrub
Ringneck *Aythya collaris*	SCDNR Moderate	Non-breeding Resident	Marshes, lakes, rivers, swamps, especially in wooded areas. Winters primarily on freshwater and brackish situations of larger lakes, rivers, and estuaries	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Rusty Blackbird *Euphagus carolinus*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27 & BCR29	Non-breeding Resident	Wooded wetlands and riparian areas but also includes various open woodlands, scrub, pastures, and cultivated lands	N	Medium - Suitable habitat available	"Streamhead Pocosin" Small Stream Forest
Scarlet Tanager *Piranga olivacea*	SCDNR Moderate	Breeding Resident	Deciduous forest and mature deciduous woodland, including deciduous and mixed swamp and floodplain forests and rich moist upland forests, often where oaks predominate	N	Medium - Suitable habitat available	"Streamhead Pocosin" Small Stream Forest Oak-Hickory Forest
Sedge Wren *Cistothorus platensis*	USFWS Bird of Conservation Concern BCR27 & BCR29	Passage Migrant Spring/Fall	Brushy grasslands. Brackish and freshwater sedge meadows and marshes	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Semipalmated Plover *Charadrius semipalmatus*	SCDNR High	Passage Migrant Spring/Fall	Mudflats, shallow marshes, beaches, flooded fields, salinas, shores of river mouths, and shores of lakes and ponds (AOU 1983). Use of freshwater habitats occurs mostly during migration	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Semipalmated Sandpiper *Calidris pusilla*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27	Passage Migrant Spring/Fall	Mudflats, sandy beaches, shores of lakes and ponds, and wet meadows	N	None - No beach habitat in project area	N/A
Short-eared Owl *Asio flammeus*	MBTA USFWS Bird of Conservation Concern BCR29	Non-breeding Resident Winter	Abandoned dumps, quarries, gravel pits, storage yards, stump piles, old fields, small evergreen groves, bayberry thickets, dunes, and open, abandoned cellars	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub Mine Area
Snowy Egret *Egretta thula*	SCDNR Highest	Passage Migrant Spring/Fall	Marshes, lakes, ponds, lagoons, mangroves, and shallow coastal habitats	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Solitary Sandpiper *Tringa solitaria*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27	Passage Migrant Spring/Fall	Freshwater ponds, stream edges, temporary pools, flooded ditches and fields, more commonly in wooded regions, less frequently on mudflats and open marshes	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Spotted Sandpiper *Actitis macularius*	SCDNR High	Passage Migrant Spring/Fall	Seacoasts and shores of lakes, ponds, and streams, sometimes in marshes; prefers shores with rocks, wood, or debris	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Stilt Sandpiper *Calidris himantopus*	SCDNR Highest	Passage Migrant Spring/Fall	Mudflats, flooded fields, shallow ponds and pools, and marshes	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Swainson's Warbler *Limnothlypis swainsonii*	USFWS Bird of Conservation Concern BCR27 & BCR29	Breeding Resident Spring/Summer	Rich, damp, deciduous floodplain and swamp forests; requires areas with deep shade from both canopy and understory cover	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Swallow-tailed Kite *Elanoides forficatus*	MBTA USFWS Bird of Conservation Concern BCR27	Breeding Resident along Coast	Nesting and foraging habitats include various pine forests and savannas, cypress swamps and savannas, cypress-hardwood swamps, hardwood hammocks, mangrove (*Avicennia*) swamps, narrow riparian forests, prairies, and freshwater and brackish marshes	N	None - No suitable habitat in project area	N/A
Turkey Vulture *Cathartes aura*	MBTA	Year-round Resident	Forested and open situations, more commonly in the latter, from lowlands to mountains	Y	High - observed during 2011 avian point-count surveys, 2008 Bald Eagle survey, and 1993 field investigations	Oak-Hickory Forest Xeric Sandhill Scrub

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Upland Sandpiper *Bartramia longicauda*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27	Passage Migrant Spring/Fall	Native prairie and other dry grasslands, including airports and some croplands.	N	Low - there are limited areas of potentially suitable habitat	Oak-Hickory Forest Xeric Sandhill Scrub
Whip-poor-will *Caprimulgus vociferus*	USFWS Bird of Conservation Concern BCR27 & BCR29	Breeding Resident Spring/Summer	Forest and open woodland, both arid and humid, from lowland moist and deciduous forest to montane forest and pine-oak association	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
White-rumped sandpiper *Calidris fuscicollis*	SCDNR Moderate	Passage Migrant Spring/Fall	Grassy marshes, mudflats, sandy beaches, flooded fields, and shores of ponds and lakes	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Wilson's Snipe *Gallinago delicata*	SCDNR Highest	Non-breeding Resident	Wet meadows, flooded fields, bogs, swamps, moorlands, and marshy banks of rivers and lakes	N	Low - there are limited areas of potentially suitable habitat	"Streamhead Pocosin" Small Stream Forest
Wood Duck *Aix sponsa*	SCDNR Moderate	Year-round Resident	Quiet inland waters near woodland, such as wooded swamps, flooded forest, greentree reservoirs, ponds, marshes, and along streams.	N	Medium - Suitable habitat available	"Streamhead Pocosin" Small Stream Forest
Wood Thrush *Hylocichla mustelina*	SCDNR Highest & USFWS Bird of Conservation Concern BCR27 & BCR29	Breeding Resident	Deciduous or mixed forests with a dense tree canopy and a fairly well-developed deciduous understory, especially where moist. Bottomlands and other rich hardwood forests are prime habitats	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Yellow-crowned Night Heron *Nyctanassa violacea*	SCDNR Highest	Passage Migrant Spring/Fall	Marshes, swamps, lakes, lagoons, and mangroves; chiefly coastal	N	None - No suitable habiitat in project area	N/A
Yellow Rail *Coturnicops noveboracensis*	USFWS Bird of Conservation Concern BCR27	Non-breeding Resident Eastern Portion of State	Grain fields in winter and when migrating. Winters in both freshwater and brackish marshes, as well as in dense, deep grass	N	None - No suitable habiitat in project area	N/A
Mammals						
Rafinesque's Big-eared Bat *Corynorhinus rafinesquii*	SE SCDNR High	Year-round Resident; Colonial Cavity Roosting Species on Coastal Plain and Sandhills	Abandoned buildlings, cavity trees, caves or cave-like structures, and abanoned mines	Unknown	Low - there are limited areas of potentially suitable habitat. Acoustic bat software indicates some calls from the 2011 bat monitoring survey had characteristics of this species; cannot be verified from available data (not known to occur in Lancaster County)	Oak-Hickory Forest Xeric Sandhill Scrub
Eastern Fox Squirrel *Sciurus niger*	SCDNR Moderate	Year-round Resident	Open mixed hardwood forest or mixed pine-hardwood associations	Unknown	Medium - Suitable habitat available. Evidence of small rodents during 2011 small mammal survey (could not be identified to species level)	Oak-Hickory Forest Xeric Sandhill Scrub
Eastern Woodrat *Neotoma floridana*	SCDNR Moderate	Year-round Resident	Wooded areas, ravines, floodplain forest; swamps	N	Low - there are limited areas of potentially suitable habitat. No evidence of this species during the 2011 small mammal survey	"Streamhead Pocosin" Small Stream Forest
Meadow Vole *Microtus pennsylvanicus*	SCDNR High	Year-round Resident	Dry pastures and wooded swamps to marshes and orchards. Needs loose organic soils for tunneling	Unknown	Medium - Suitable habitat available. Evidence of voles during 2011 small mammal survey (could not be identified to species level)	"Streamhead Pocosin" Small Stream Forest
Mink *Neovison vison*	SCDNR High	Year-round Resident	Forested, permanent or semipermanent wetlands with abundant cover, marshes, and riparian zones	N	Low - there are limited areas of potentially suitable habitat. No evidence of this species during the 2011 small mammal survey	"Streamhead Pocosin" Small Stream Forest

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Star-nosed Mole *Condylura cristata*	SCDNR High	Year-round Resident	Seldom far from bodies of water. Prefers wet soils in flood plains, swamps, meadows, and other openings near water. Good swimmer and diver. May be active in water under ice in winter	Unknown	Low - there are limited areas of potentially suitable habitat. May be at the edge of range. Evidence of moles during the 2011 small mammal survey (could not be identified to species level)	"Streamhead Pocosin" Small Stream Forest
Southeastern Bat *Myotis austroriparius*	SCDNR High	Year-round Resident; Colonial Cavity Roosting Species on Coastal Plain and Sandhills	Caves, mines, abandoned buildlings, and large hollow trees used for roosting, maternity, and hibernation sites. Also prefers forested bottomlands, swamps, and mixed deciduous forests	Unknown	Low - there are limited areas of potentially suitable habitat. Acoustic bat software indicates some calls from the 2011 bat monitoring survey had characteristics of this species; cannot be verified from available data (not known to occur in Lancaster County). Species not observed during 1993 species-specific surveys	Oak-Hickory Forest Xeric Sandhill Scrub
Swamp Rabbit *Sylvilagus aquaticus*	SCDNR High	Year-round Resident	Usually restricted to floodplains, bottomlands, riparian areas. Prefers mature forests. Associated with dense, brushy thickets in wooded floodplains along borders of lakes, river, and swamps	Unknown	Low - there are limited areas of potentially suitable habitat. No evidence of this species during the 2011 small mammal survey	"Streamhead Pocosin" Small Stream Forest
Amphibians						
Pine Barrens Treefrog *Hyla andersonii*	ST SCDNR Highest	Year-round Resident	Shrub bogs in South Carolina are characterized by a sparse overstory of yellow poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), blackgum (*Nyssa sylvatica*), and pond pine (*Pinus serotina*); an understory of red maple, sweet bay, yellow poplar, swamp titi (*Cyrilla racemiflora*), pine, blackgum, and black alder (*Alnus serrulata*); and a shrub layer of sweet pepper bush (*Clethra alnifolia*), cinnamon fern (*Osmunda cinnamomea*), greenbriar (Amphibiaweb)	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Carolina Gopher Frog *Rana capito*	SCDNR Highest	Year-round Resident	Primary habitat is native xeric upland habitats, particularly longleaf pine-turkey oak sandhill associations; also xeric to mesic longleaf pine flatwoods, sand pine scrub, xeric oak hammocks	N	Low - there are limited areas of potentially suitable habitat.	Oak-Hickory Forest Xeric Sandhill Scrub
Tiger Salamander *Ambystoma tigrinum*	SCDNR Highest	Year-round Resident	Virtually any habitat, providing there is a terrestrial substrate suitable for burrowing and a body of water nearby suitable for breeding	N	Medium - Suitable habitat available	"Streamhead Pocosin" Small Stream Forest
Four-toed Salamander *Hemidactylium scutatum*	SCDNR High	Year-round Resident	Adults live under objects or among mosses in swamps, boggy streams, and wet, wooded or open areas near ponds or quiet, mossy or grassy/sedgy pools (the larval habitat). Sphagnum moss is commonly abundant in suitable habitat.	N	Medium - Suitable habitat available	"Streamhead Pocosin" Small Stream Forest
Pickerel Frog *Rana palustris*	SCDNR High	Year-round Resident	Various freshwater aquatic and wetland habitats in wooded regions, ranging from the vicinity of cool clear streams and ponds in the north to warm, turbid swamps in parts of the south	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Upland Chorus Frog *Pseudacris feriarum*	SCDNR High	Year-round Resident	Open and wooded areas such as meadows, moist forests, bottomland swamps, and the vicinity of ponds, bogs, and marshes	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Northern Cricket Frog *Acris crepitans*	SCDNR Moderate	Year-round Resident	Edges of sunny marshes, marshy ponds, and small slow-moving streams in open country	Y	High - species observed at the Site.	"Streamhead Pocosin" Small Stream Forest

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Southern Dusky Salamander *Desmognathus auriculatus*	SCDNR Moderate	Year-round Resident	Mucky areas near springs, swamps, cypress heads, mud-bottomed streams, floodplain pools, and ravine streams where pockets of organic debris collect; usually in or near moving water	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Reptiles						
Coral Snake *Micrurus fulvius*	SCDNR Highest	Year-round Resident	Hardwood forest, pine-oak woodland, pine flatwoods, and xerophytic scrub, often in areas with sandy soils, sometimes marsh edges and residential areas	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Southern Hognose Snake *Heterodon simus*	SCDNR Highest	Year-round Resident	Open, xeric habitats with well-drained, sandy or sandy-loam soils such as sand ridges, stabilized coastal sand dunes, pine flatwoods, mixed oak-pine woodlands and forests, scrub oak woods, and oak hammocks; also old fields and river floodplains	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Black Swamp Snake *Seminatrix pygaea*	SCDNR High	Year-round Resident	Swamps, bayheads, Carolina bays, ponds, marshes, grassy wet prairies, sphagnum bogs, sluggish streams, ditches, canals, and lakes with abundant floating or emergent vegetation	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Canebreak Rattlesnake *Crotalus horridus atricaudatus*	SCDNR High	Year-round Resident	Lowland cane thickets, high areas around swamps and river floodplains, hardwood and pine forests, mountainous areas, and rural habitats in farming areas	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Florida Cooter *Pseudemys floridana*	SCDNR High	Year-round Resident	Large ponds, lakes, spring runs, canals, sluggish rivers; areas with abundant aquatic vegetation, soft bottom, and basking sites	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Pine Snake *Pituophis melanoleucus*	SCDNR High	Year-round Resident	Xeric, pine-dominated or pine-oak (50 to 80% pine) woodland with an open, low understory established on sandy soils. Longleaf pine sandhills appear to represent critical habitat over much of the southeastern United States	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
River Cooter *Pseudemys concinna*	SCDNR High	Year-round Resident	Streams with moderate current, abundant aquatic vegetation, basking sites, and rocky bottom; also lakes, ponds, oxbows, swamps, large ditches, lagoons, brackish tidal marshes; leaves water only to nest or bask	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Spiny Softshell Turtle *Apalone spinifera*	SCDNR High	Year-round Resident	Large rivers, river impoundments, lakes, ponds along rivers, pools along intermittent streams, bayous, oxbows; usually in areas with open sandy or mud banks and soft bottom	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Striped Mud Turtle *Kinosternon baurii*	SCDNR High	Year-round Resident Primarily Southeast	Cypress swamps, sloughs, ponds, drainage canals, wet meadows, shallow marshes, and adjacent forest areas; wanders on dry land and enters brackish ponds	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Yellowbelly Turtle *Trachemys scripta*	SCDNR High	Year-round Resident	Usually in quiet water with abundant aquatic vegetation, soft bottom, and basking sites. Hibernates underwater or in protected places near waterline	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
American Alligator *Alligator mississippiensis*	SCDNR Moderate	Year-round Resident	Fresh and brackish marshes, ponds, lakes, rivers, swamps, bayous, canals, and large spring runs	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Common Snapping Turtle *Chelydra serpentina*	SCDNR Moderate	Year-round Resident	Freshwater habitats (streams, lakes, reservoirs, ponds, marshes, swamps), especially those with soft mud bottoms and abundant aquatic vegetation or submerged brush and logs	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest

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Slender Glass Lizard *Ophisaurus attenuatus*	SCDNR Moderate	Year-round Resident	Open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil	N	Medium - Suitable habitat available	Oak-Hickory Forest Xeric Sandhill Scrub
Spotted Turtle *Clemmys guttata*	SCDNR Moderate	Year-round Resident Southern Portion of State	Mostly unpolluted, shallow bodies of water with a soft bottom and aquatic vegetation, such as small marshes, marshy pastures, bogs, fens, woodland streams, swamps, small ponds, vernal pools, and lake margins	N	Low - there are limited areas of potentially suitable habitat.	"Streamhead Pocosin" Small Stream Forest
Fish						
American Eel *Anguilla rostrata*	SCDNR Highest	Year-round Resident	From big deep rivers to low gradient creeks	N	Low - there are limited areas of potentially suitable habitat. No migratory access.	Riverine
American Shad *Alosa sapidissima*	SCDNR Highest	Year-round Resident	Adults occur in marine waters except during the breeding season. Larvae summer in rivers, enter sea by fall; return to fresh water when mature	N	Low - there are limited areas of potentially suitable habitat. No migratory access.	Riverine
Blackbanded Sunfish *Enneacanthus chaetodon*	SCDNR High	Year-round Resident	Largely restricted to quiet, shallow, heavily vegetated, nonturbid, darkly stained, slightly to very acidic waters of sand- and mud-bottomed creeks, small to medium rivers, ponds, lakes, and roadside drainage ditches	N	Low - there are limited areas of potentially suitable habitat.	Riverine
Carolina Darter *Etheostoma collis*	SCDNR High	Year-round Resident	Typically occurs in small upland creeks and rivulets in wooded and deforested (pasture) areas, in areas of low current velocity (pools and very slow runs), usually on sand, gravel, and detritus in open and stick-littered areas, sometimes among brush and fallen tree limbs, and likely also among vegetation.	N	Low - there are limited areas of potentially suitable habitat.	Riverine
Greenfin Shiner *Cyprinella chloristia*	SCDNR Moderate	Year-round Resident	Montane and upper Piedmont streams above Fall Line (Lee et al. 1980). Rocky and sandy pools and runs of creeks and small to medium rivers	Y	High - observed during 2011 aquatic surveys	Riverine
Greenhead Shiner *Notropis chlorocephalus*	SCDNR High	Year-round Resident	Usually in small, clear headwater streams where often abundant. Rocky flowing pools of clear headwaters, creeks, and small rivers	Y	High - observed during 2011 aquatic surveys	Riverine
Highback Chub *Hybopsis hypsinotus*	SCDNR Moderate	Year-round Resident	Runs and pools of creeks and small to medium rivers with sandy and rocky bottoms and clear to turbid, warm water	N	Low - not reported in this drainage, based on historic range and distribution	Riverine
Sandhills Chub *Semotilus lumbee*	HTP Rare Lancaster	Year-round Resident	Slow-flowing headwaters, creeks, and small rivers with sand and gravel bottoms and sparse vegetation	Y	High - observed during 2011 aquatic surveys	Riverine
Carolina Pygmy Sunfish *Elassoma boehlkei*	ST	Year-round Resident	Shallow, quiet water (ponds, pools, streams, and roadside ditches, including tidal freshwater), with a soft detritus-rich substrate and abundant emergent and/or submerged aquatic vegetation	N	Low - not reported in this drainage, based on historic range and distribution. Additionally, some habitat constraints are evident in the majority of the streams	Riverine
Flat Bullhead *Ameiurus platycephalus*	SCDNR Moderate	Year-round Resident	Adults mostly in slow-water areas of large rivers with soft mud, muck, or sand bottom covered with organic detritus. Younger individuals tend to be in smaller clearer streams	Y	High - observed during 2011 aquatic surveys	Riverine

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Summary of Special Status Species Potentially Present in the Area and Likeliness of Occurrence at the Site

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Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Species	Status	Season and Range in South Carolina	Habitat Association	Observed in the HGM Project Boundary (Y/N)	Potential to Occur in the HGM Project Boundary (None/Low/Medium/High)	Habitat(s) that Species May Occupy in HGM Project Boundary Based on NCSC Vegetation Classification
Lowland Shiner *Pteronotropis stonei*	SCDNR Moderate	Year-round Resident	Small to intermediate (and sometimes large) streams with moderate to swift flow and sandy substrates; in headwater streams, this fish is found in pools in sections with alternating runs and pools; in larger streams it often occupies eddies behind debris or plants	N	Low - not reported in this portion of drainage, based on historic range and distribution	Riverine
Mud Sunfish *Acantharchus pomotis*	SCDNR Moderate	Year-round Resident	Primarily in darkly stained, sluggish, weedy lowland streams (including backwaters), ponds, lakes, and swamps, with mud, silt, or detritus substrates	Y	High - observed during 2011 aquatic surveys	Riverine
Piedmont Darter *Percina crassa*	SCDNR High	Year-round Resident	Riffles and fast raceways with gravel, rubble, an/or boulder substrates in small to medium rivers	Y	High - observed during 2011 aquatic surveys	Riverine
Seagreen Darter *Etheostoma thalassinum*	SCDNR High	Year-round Resident	Riffles of large creeks and small to medium rivers, usually among debris and associated obstacles or gravel and rubble where available; occurs in headwater streams stocked with trout and lowland streams where warm-water fishes thrive	N	Low - not reported in this drainage, based on historic range and distribution	Riverine
Snail Bullhead *Ameiurus brunneus*	SCDNR Moderate	Year-round Resident	Typically in streams with hard rocky bottom and moderate to swift current; in holes, flowing pools, and often in riffles.	Y	High - observed during 2011 aquatic surveys	Riverine
White Catfish *Ameiurus catus*	SCDNR Moderate	Year-round Resident	Sluggish lower reaches of coastal streams, sloughs, warmwater lakes, reservoirs, farm ponds, estuaries; requires water above 20 C in summer	N	Medium - historic observations have been made in the Little Lynches basin. May move throughout the system to the Little Lynches River	Riverine
Whitemouth Shiner *Notropis alborus*	SCDNR Moderate	Year-round Resident	Small (3 m) to medium-sized (10-20 m) warm streams (headwaters, creeks, and small rivers) having colorless to slightly stained, clear to turbid water, no vascular plants, a sand-rubble-bedrock substrate, and a swift current with alternating pools and riffles	N	Low - not reported in this drainage, based on historic range and distribution	Riverine
Mollusks						
Atlantic Spike *Elliptio producta*	SCDNR Moderate	Year-round Resident	Streams or rivers with sandy or rocky and muddy bottoms where the current is not too rapid	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Brook Floater *Alasmidonta varicosa*	HTP Rare Lancaster	Year-round Resident	Creeks and small rivers where it is found among rocks in gravel substrates and in sandy shoals, the brook floater inhabits flowing-water habitats only	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Carolina heelsplitter *Lasmigona decorata*	FE SE	Year-round Resident	Usually within 2 m of shorelines, throughout its known range. Its best populations are found in areas with significant woodland as a dominant land use. Substrates found in creek reaches associated with the species vary from clay to various combinations of coarse substrates	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Carolina Lance *Elliptio angustata*	SCDNR Moderate	Year-round Resident	Found almost exclusively in deep run habitats dominated by coarse sand/pea gravel, and fairly swift flow	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine

Table 5-1
Summary of Special Status Species Potentially Present in the Area and Likeliness of Occurrence at the Site

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

Species	Status	Season and Range in South Carolina	Habitat Association	Observed in the HGM Project Boundary (Y/N)	Potential to Occur in the HGM Project Boundary (None/Low/Medium/High)	Habitat(s) that Species May Occupy in HGM Project Boundary Based on NCSC Vegetation Classification
Creeper *Strophitus undulatus*	HTP Rare Lancaster	Year-round Resident	Habitat generalist, with a wide distribution. It is usually found in streams and rivers in a range of flow conditions (rarely in high-gradient streams of mountainous regions) but can tolerate lakes and ponds, particularly in outlets	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Eastern Creekshell *Villosa delumbis*	HTP Rare Lancaster	Year-round Resident	Mud or soft sand, rich in vegetation, in small creeks and rivers	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine

Table 5-1
Summary of Special Status Species Potentially Present in the Area and Likeliness of Occurrence at the Site

Haile Gold Mine, Inc.
Lancaster County, SC
Comprehensive Baseline Wildlife and Aquatic Resources Report for the Haile Gold Mine Site

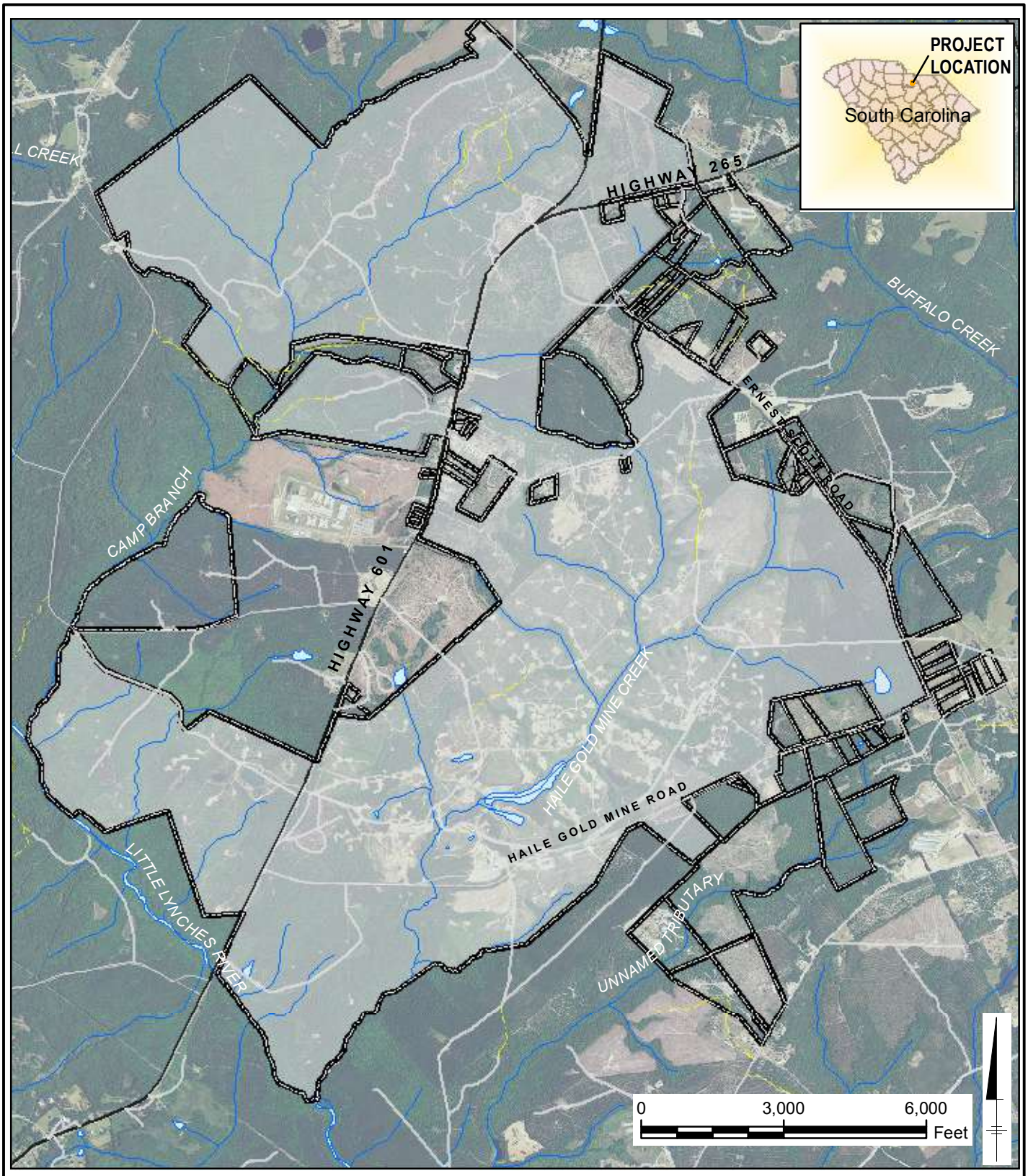
Species	Status	Season and Range in South Carolina	Habitat Association	Observed in the HGM Project Boundary (Y/N)	Potential to Occur in the HGM Project Boundary (None/Low/Medium/High)	Habitat(s) that Species May Occupy in HGM Project Boundary Based on NCSC Vegetation Classification
Eastern Elliptio *Elliptio complanata*	SCDNR Moderate	Year-round Resident	A habitat generalist including small streams, large rivers, freshwater tidal waters, and all types of ponds and lakes. It can also tolerate most substrates except deep semi-liquid silt and rocky bottoms	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Eastern Floater *Pyganodon cataracta*	HTP Rare Lancaster	Year-round Resident	Small streams, rivers, ponds, and lakes. It is usually confined to slow-moving portions of riverine environments, in sandy or muddy substrates	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Notched Rainbow *Villosa constricta*	HTP Rare Lancaster	Year-round Resident	Coarse substrates, including gravel, cobble, boulder, and bedrock, are found as macrohabitat features	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Pod Lance *Elliptio folliculata*	SCDNR High	Year-round Resident	Streams, creeks, rivers, and in Lake Waccamaw. Substrates range from silt/sand to coarse sand/gravel/cobble/boulder/bedrock	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Rayed Pink Fatmucket *Lampsilis splendida*	SCDNR High	Year-round Resident	Areas with little or no current, in sand to soft mud. It is particularly common in sloughs, oxbows, lakes, mouths of streams and backwater areas	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Yellow Lance *Elliptio lanceolata*	HTP Rare Lancaster	Year-round Resident	Sandy substrates, rocks and in mud, in slack water areas	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine
Variable Spike *Elliptio icterina*	SCDNR Moderate	Year-round Resident	Various substrates of lakes, ponds, reservoirs and streams with slight to moderate current	N	Low - multiple surveys in the area have confirmed this species is not present in the area.	Riverine

Abbreviations include:

BGEPA = Bald and Golden Eagle Protection Act
FE = Federally endangered
HTP Rare Lancaster = South Carolina Department of Natural Resources - Heritage Trust Program Rare Species
MBTA = Migratory Bird Treaty Act
SCDNR High =South Carolina Department of Natural Resources High Priority Species
SCDNR Highest =South Carolina Department of Natural Resources Highest Priority Species
SCDNR Moderate =South Carolina Department of Natural Resources Moderate Priority Species
SE = State endangered
ST = State threatened
USFWS Birds of Conservation Concern BCR 27 = Bird of Conservation Concern for Bird Conservation Region 27 (Southeastern Coastal Plain)
USFWS Birds of Conservation Concern BCR 29 = Bird of Conservation Concern for Bird Conservation Region 29 (Piedmont)

Other special status species were exluded from this table because they are not likely to occur in Lancaster County, South Carolina

Figures



Property Boundary
Permit Boundary
Primary Roads
Streets
Secondary Roads
Trails

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

HAILE GOLD MINE, INC.

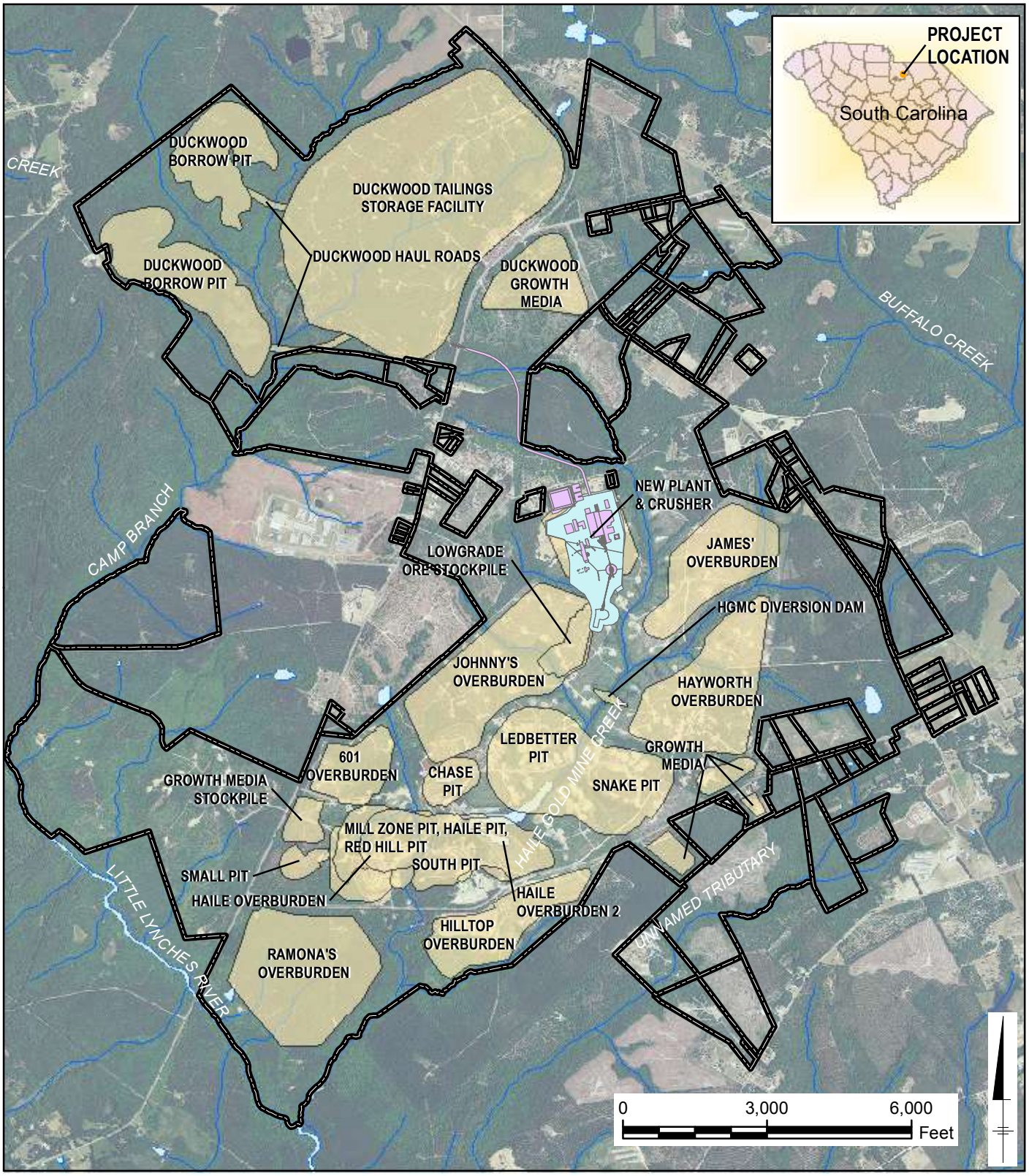
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

THE HAILE GOLD MINE SITE

ARCADIS

FIGURE 1-1

HGM: ENV0066.mxd 03/07/12, R01



Site Boundary

Haile Plant Site

Process Area Daylight

Haile Pits and Facilites

HAILE GOLD MINE, INC.

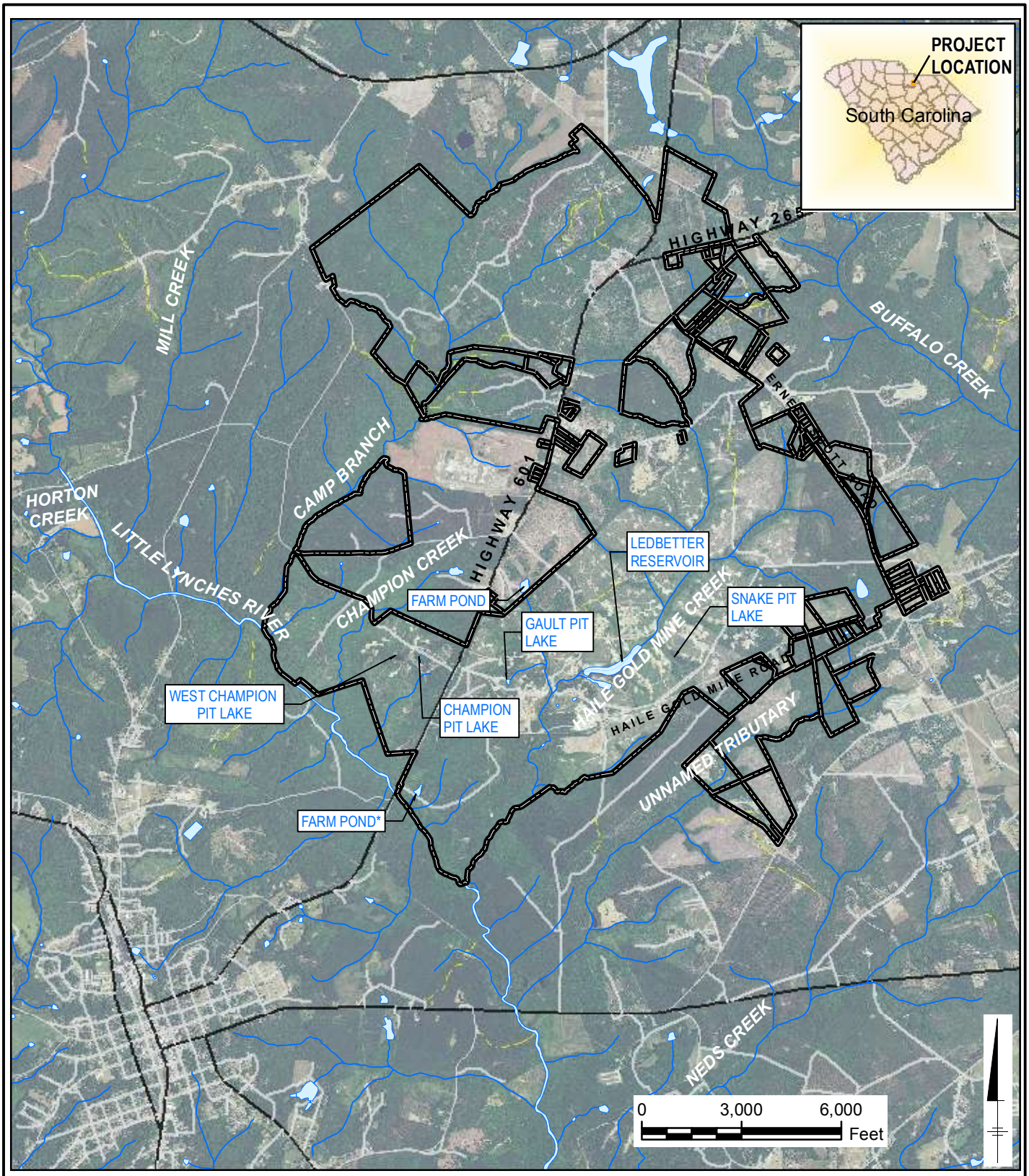
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

PROPOSED SITE FACILITIES

ARCADIS

FIGURE **2-1**

HGM: ENV0063.mxd 03/20/12, R02



Site Boundary
Primary Roads
Streets
Secondary Roads
Trails

* As referenced in NJA (1993)

HAILE GOLD MINE, INC.

BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

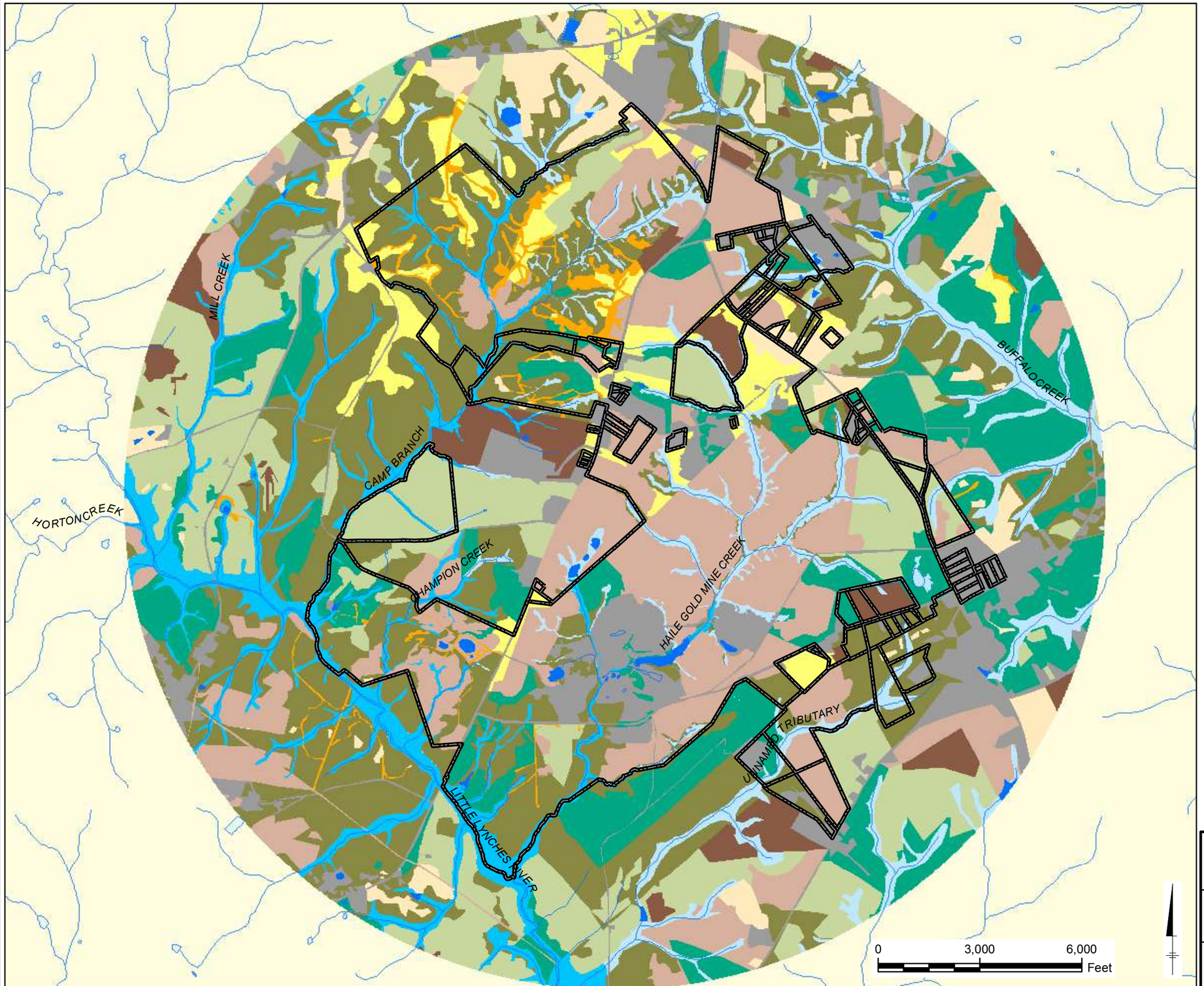
STREAMS, PIT LAKES AND RESERVOIRS IN AND NEAR THE SITE

ARCADIS

FIGURE **2-2**

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

HGM: ENV0075.mxd 03/27/12, R03



Site Boundary

Streams

Vegetation Classification

Natural Communities

- Oak-Hickory Forest (OHF)
- Streamhead Pocosin (SHP)
- Small Stream Forest (SSF)
- Xeric Sandhill Scrub (XSC)

Non-Natural Communities

- Agriculture (A)
- Developed (D)
- Managed Tree Plantation (MTP)
- Modified Managed Upland Vegetation-Naturalized (MVF)
- Modified Managed Vegetation-Scrub Regrowth (MVS)
- Open Water (OW)
- Recently Logged Timberland (RL)
- Temporary Access Roads (TAR)

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

HAILE GOLD MINE, INC.

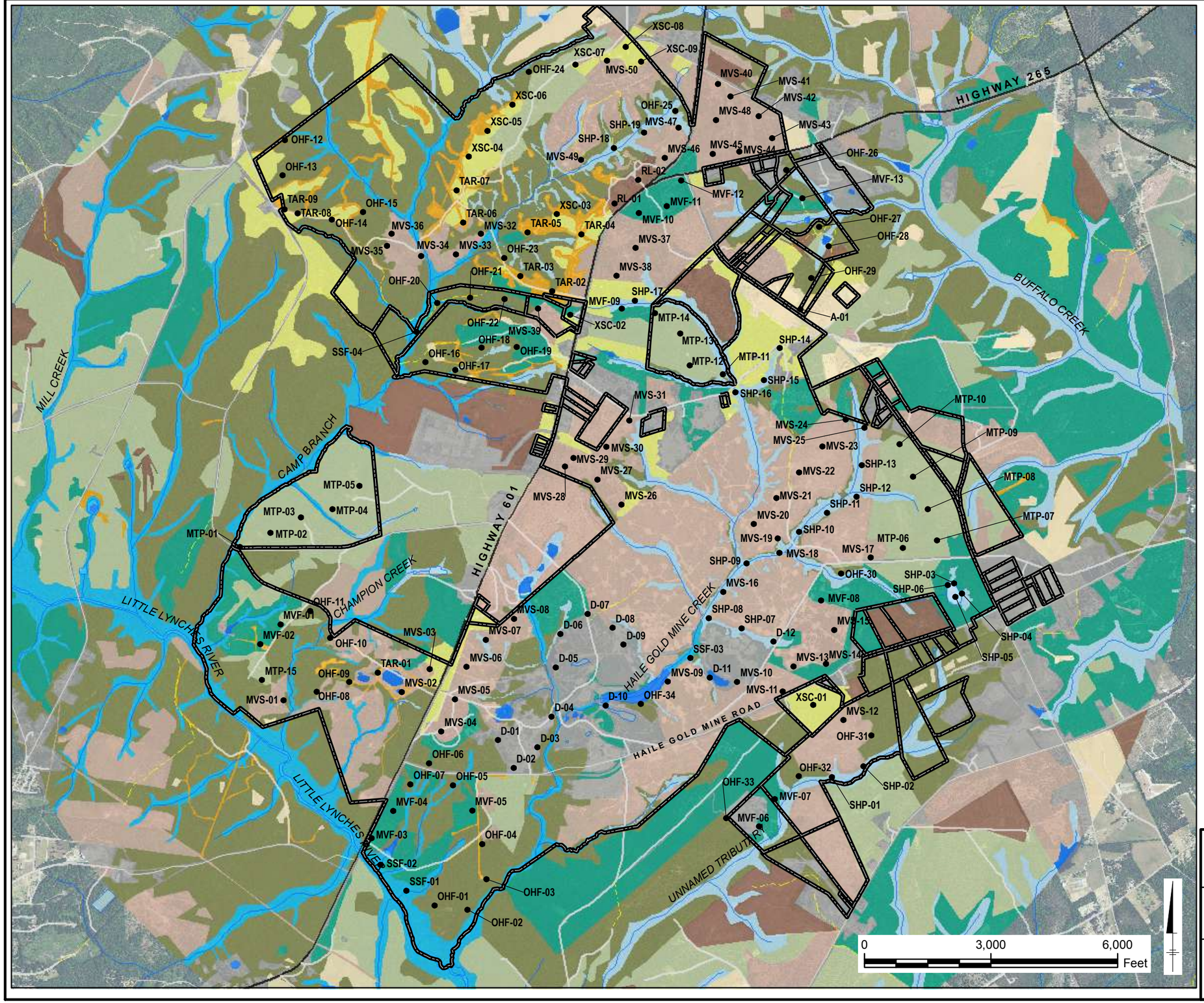
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

VEGETATION COMMUNITY TYPES

ARCADIS

FIGURE 2-3

HGM: ENV0062.mxd 03/22/12, R03



- Passerine Point-Count Survey Locations
- Site Boundary
- Streams

Roads

- Primary
- Road/Street
- Secondary Road
- Trail

Vegetation Classification

Natural Communities

- Oak-Hickory Forest (OHF)
- Streamhead Pocosin (SHP)
- Small Stream Forest (SSF)
- Xeric Sandhill Scrub (XSC)

Non-Natural Communities

- Agriculture (A)
- Developed (D)
- Managed Tree Plantation (MTP)
- Modified Managed Upland Vegetation-Naturalized (MVF)
- Modified Managed Vegetation-Scrub Regrowth (MVS)
- Open Water (OW)
- Recently Logged Timberland (RL)
- Temporary Access Roads (TAR)

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

HAILE GOLD MINE, INC.

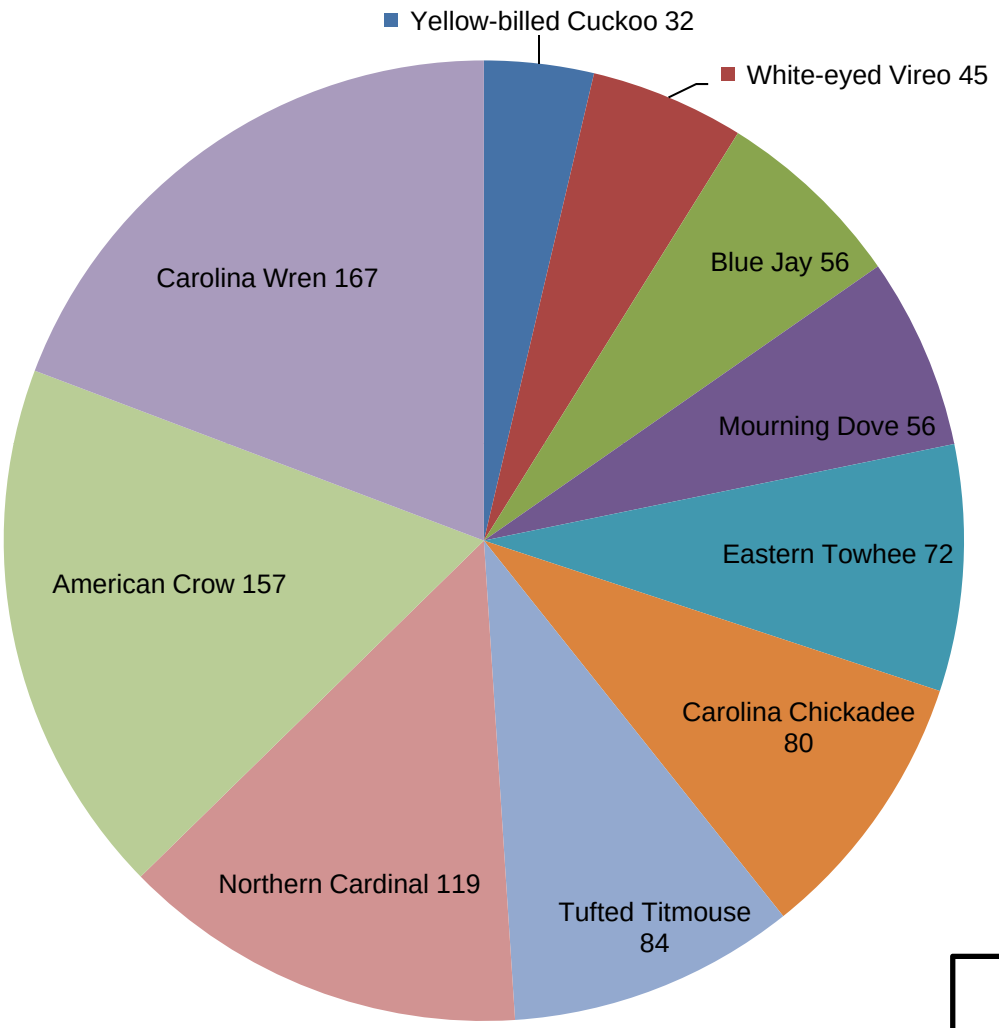
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

PASSERINE POINT-COUNT SURVEY LOCATIONS

ARCADIS

FIGURE **3-1**

HGM: ENV0061.mxd 03/20/12, R03



HAILE GOLD MINE, INC.

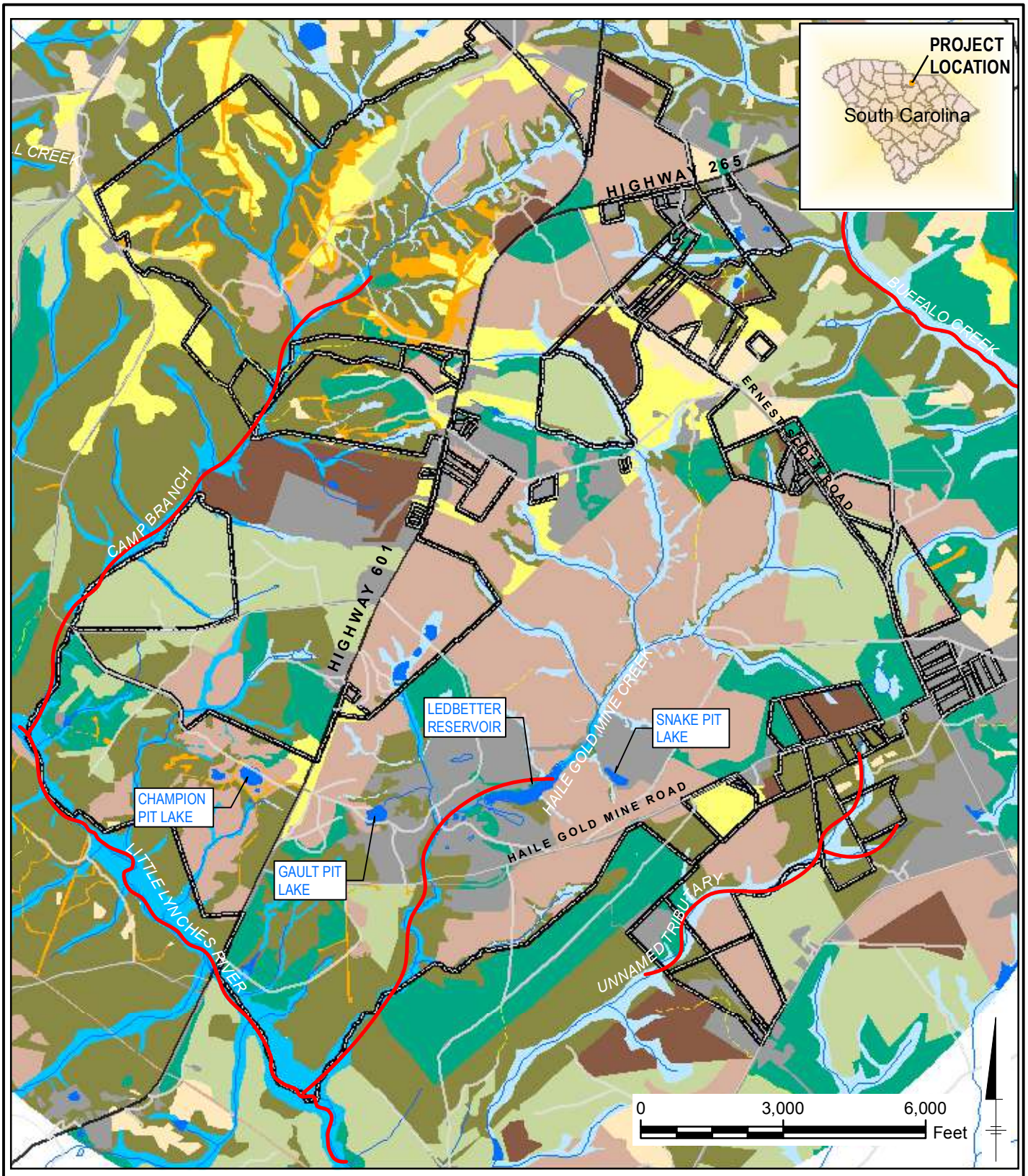
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

TOP TEN SPECIES OBSERVED DURING THE 2011 PASSERINE POINT-COUNT SURVEYS AND THE TOTAL NUMBER OF INDIVIDUALS OBSERVED

ARCADIS

FIGURE

3-2



Bald Eagle Survey Transects
Site Boundary
Primary Roads
Streets
Secondary Roads
Trails

NATURAL COMMUNITIES
OHF
SHP
SSF
XSC

NON-NATURAL COMMUNITIES
A
D
MTP
MVF
MVS
OW
RL
TAR

Projection: UTM Zone 17, NAD 83

HAILE GOLD MINE, INC.

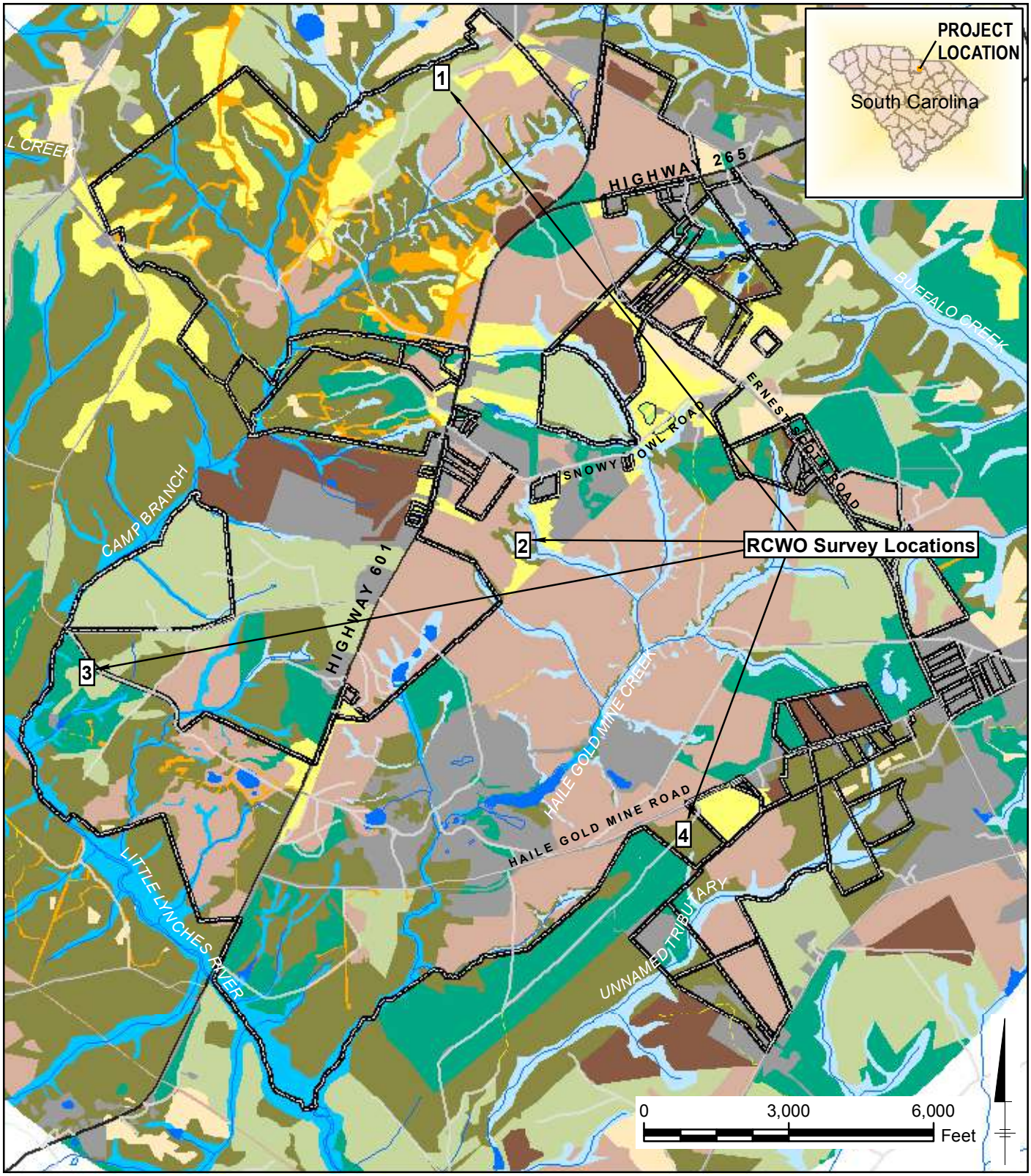
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

RAPTOR/LARGE BIRD AND BAEA SURVEY LOCATIONS

ARCADIS

FIGURE 3-3

HGM: ENV0058.mxd 03/21/12, R03



Site Boundary
Primary Roads
Streets
Secondary Roads
Trails
Longleaf Pine Woodland as described in ERC (2012c)

NATURAL COMMUNITIES
OHF
SHP
SSF
XSC

NON-NATURAL COMMUNITIES
A
D
MTP
MVF
MVS
OW
RL
TAR

Projection: UTM Zone 17, NAD 83

HAILE GOLD MINE, INC.

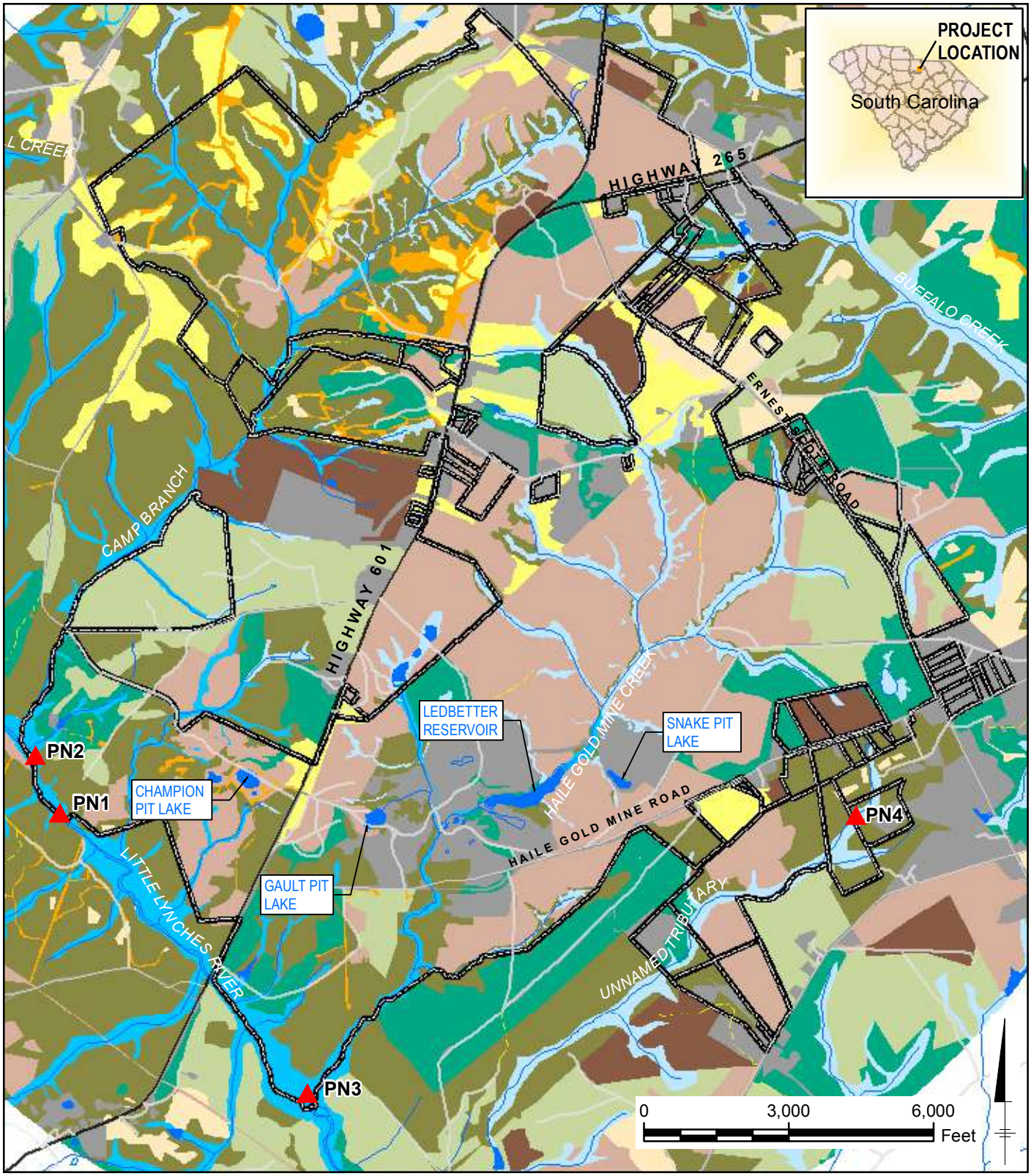
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

RED-COCKADED WOODPECKER SURVEY LOCATIONS

ARCADIS

FIGURE 3-4

HGM: ENV0057.mxd 03/27/12, R05



Potential Raptor Nests
Site Boundary
Primary Roads
Streets
Secondary Roads
Trails

NATURAL COMMUNITIES
OHF
SHP
SSF
XSC

NON-NATURAL COMMUNITIES
A
D
MTP
MVF
MVS
OW
RL
TAR

Projection: UTM Zone 17, NAD 83

HAILE GOLD MINE, INC.

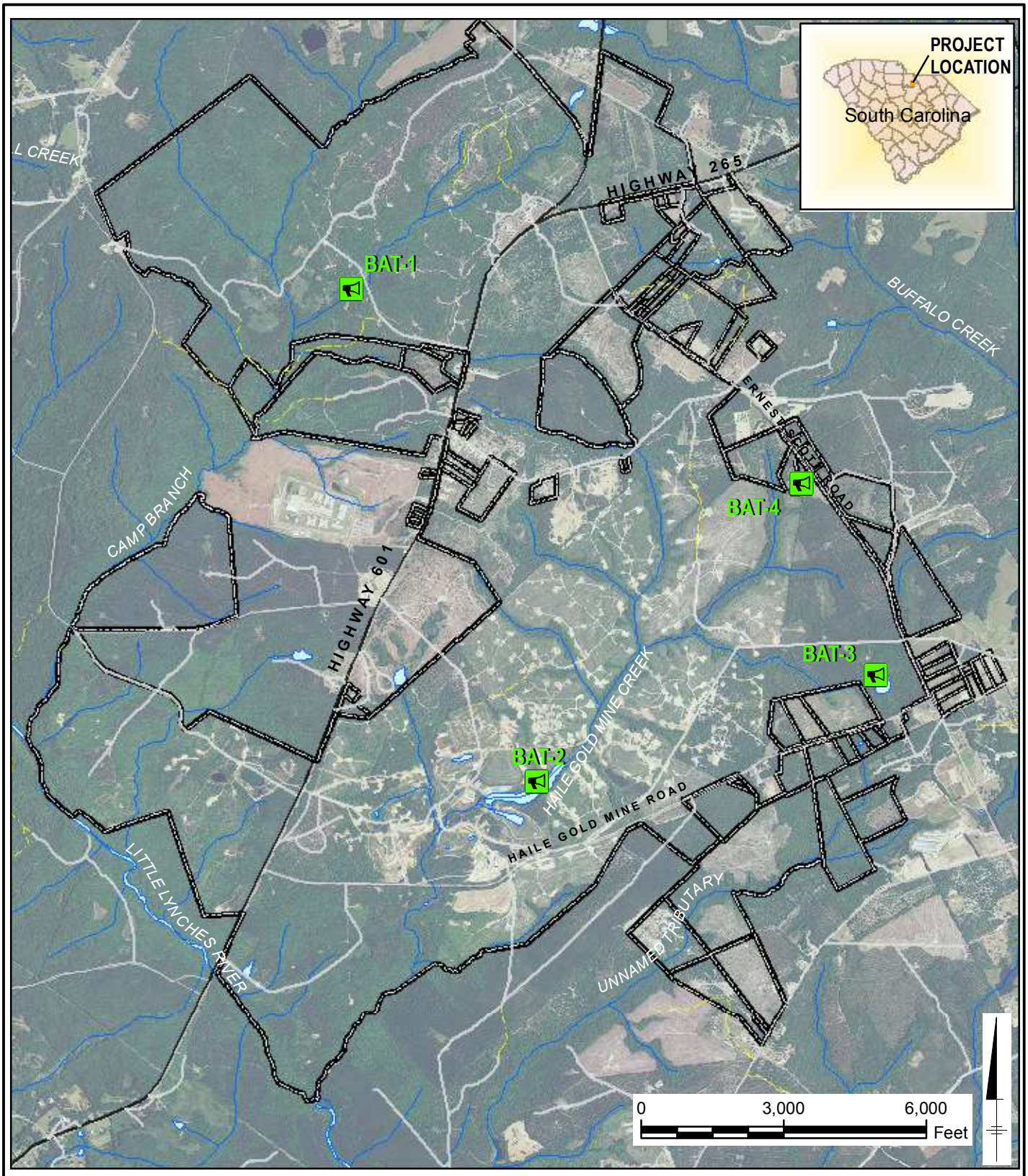
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

RAPTOR/LARGE BIRD NEST LOCATIONS

ARCADIS

FIGURE 3-5

HGM: ENV0070.mxd 03/21/12, R02



Site Boundary
Primary Roads
Streets
Secondary Roads
Trails
Bat Monitoring Stations

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

HAILE GOLD MINE, INC.

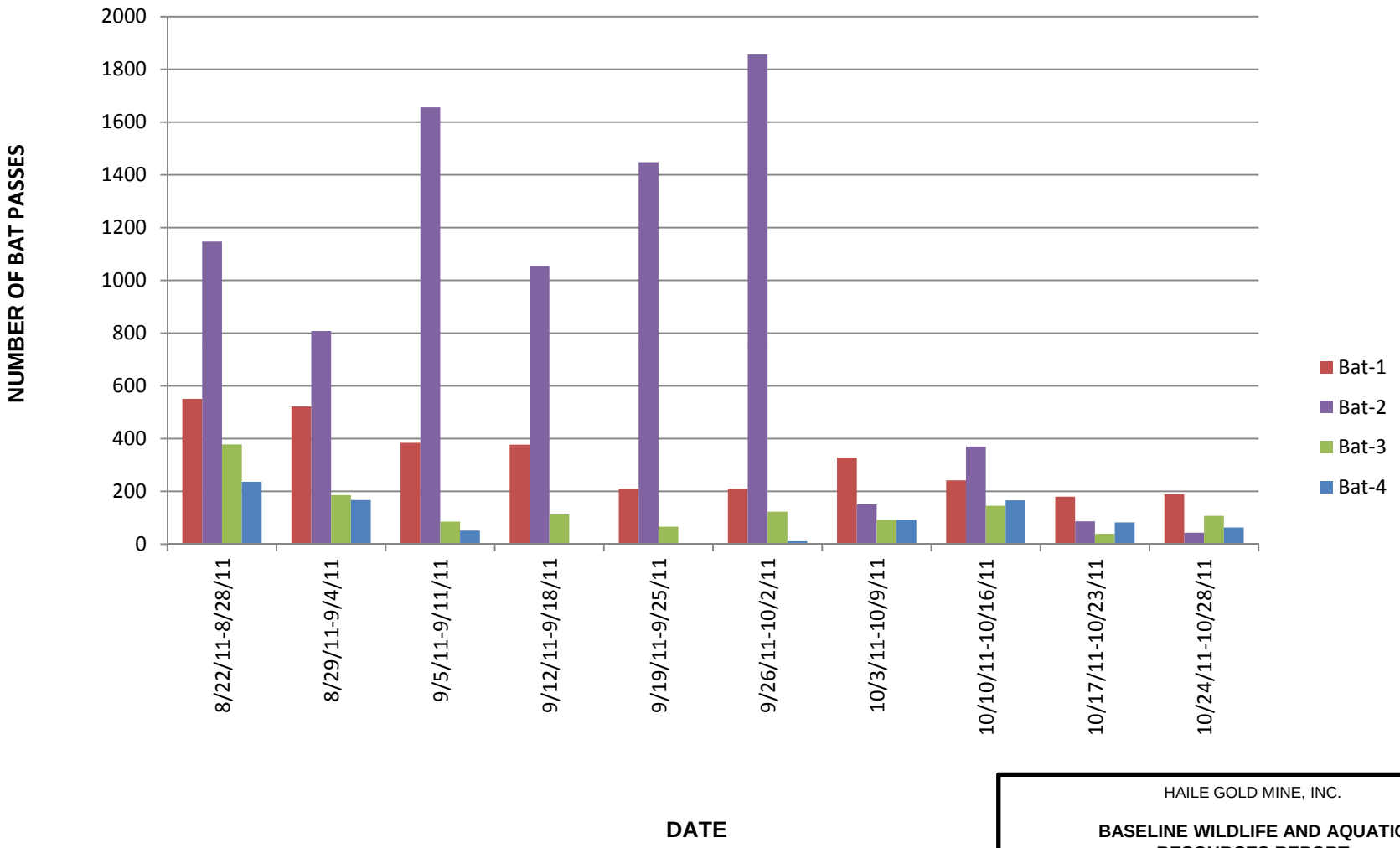
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

BAT MONITORING STATIONS

ARCADIS

FIGURE
3-6

HGM: ENV0059.mxd 03/20/12, R02



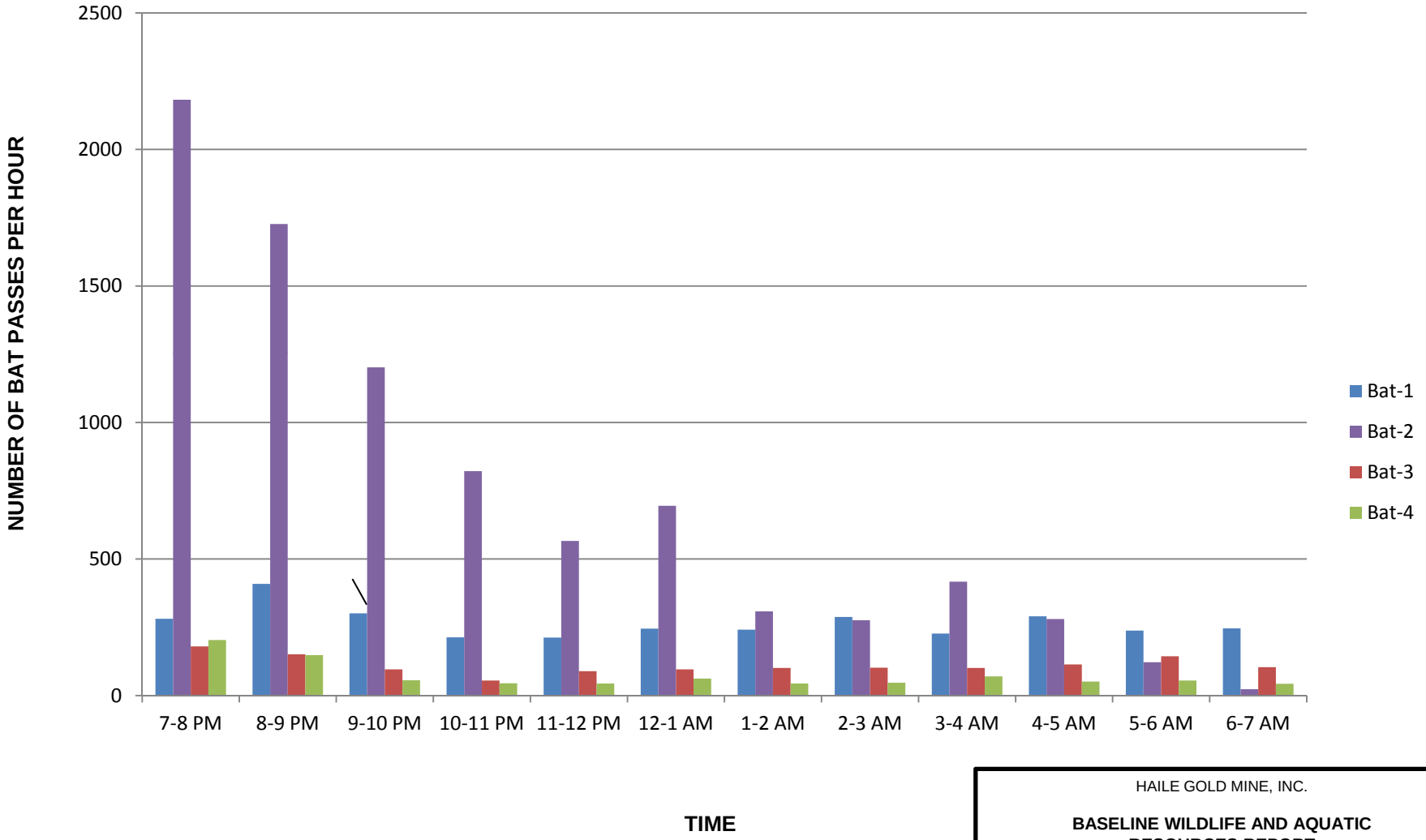
HAILE GOLD MINE, INC.

BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

NUMBER OF BAT PASSES PER WEEK 2011 MONITORING PERIOD

ARCADIS

FIGURE **3-7**



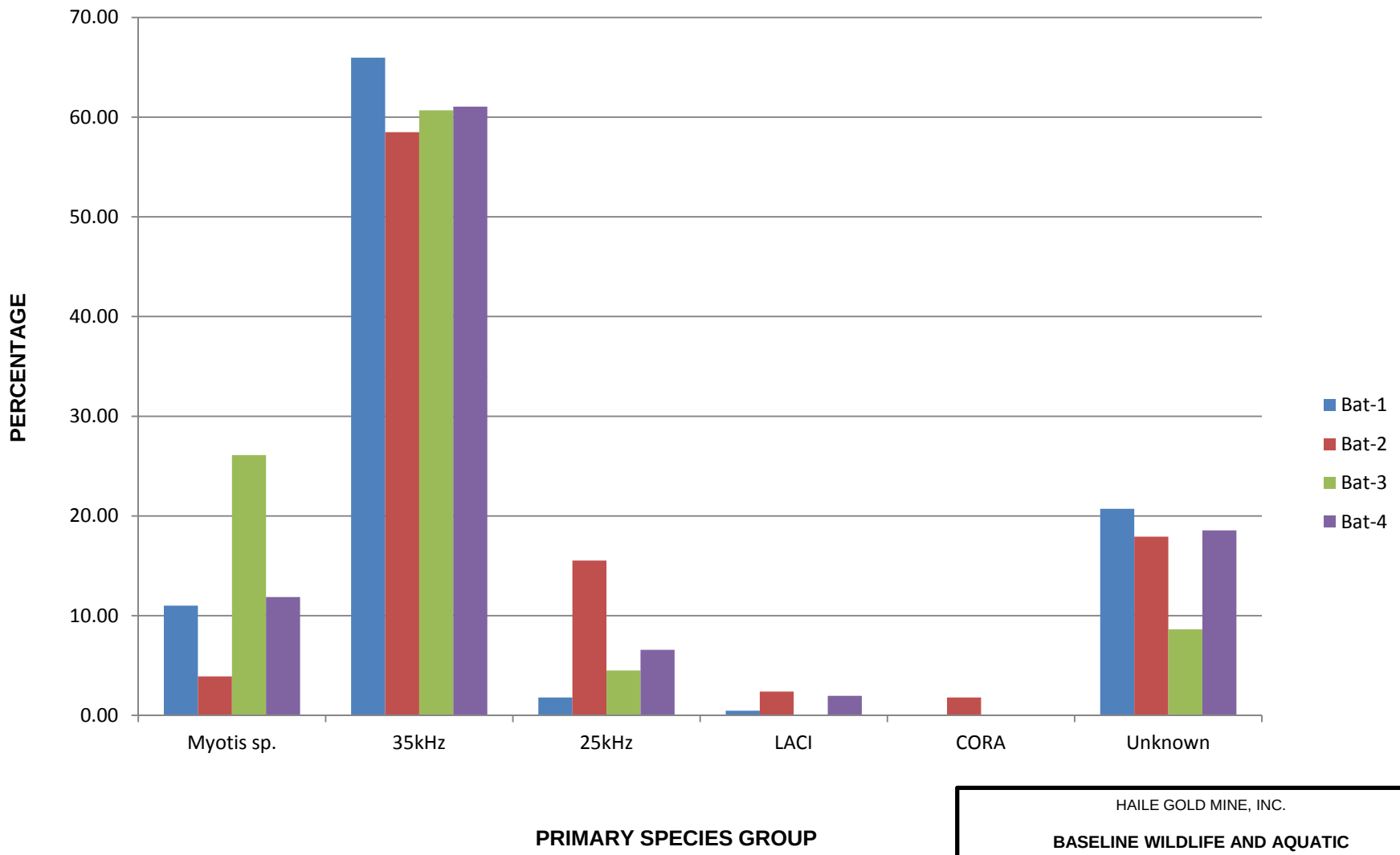
HAILE GOLD MINE, INC.

BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

NUMBER OF BAT PASSES PER HOUR
2011 MONITORING PERIOD

ARCADIS

FIGURE
3-8



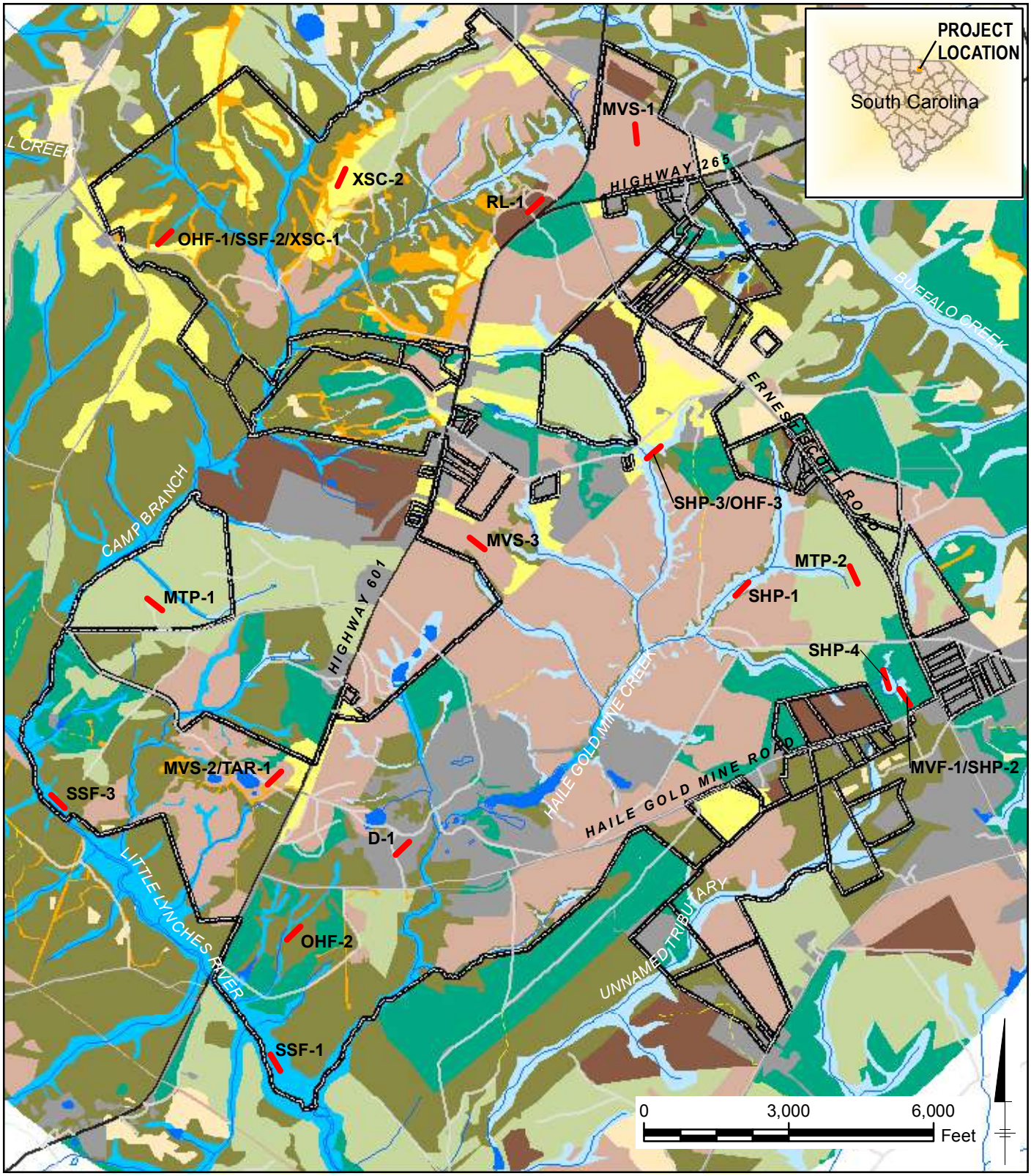
HAILE GOLD MINE, INC.

BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

PERCENTAGE OF IDENTIFIABLE BAT PASSES BY SPECIES GROUP 2011 MONITORING PERIOD

ARCADIS

FIGURE **3-9**



Site Boundary
Mammal Transects
Primary Roads
Streets
Secondary Roads
Trails

Natural Communities
OHF
SHP
SSF
XSC

Non-Natural Communities
A
D
MTP
MVF
MVS
OW
RL
TAR

Projection: UTM Zone 17, NAD 83

HAILE GOLD MINE, INC.

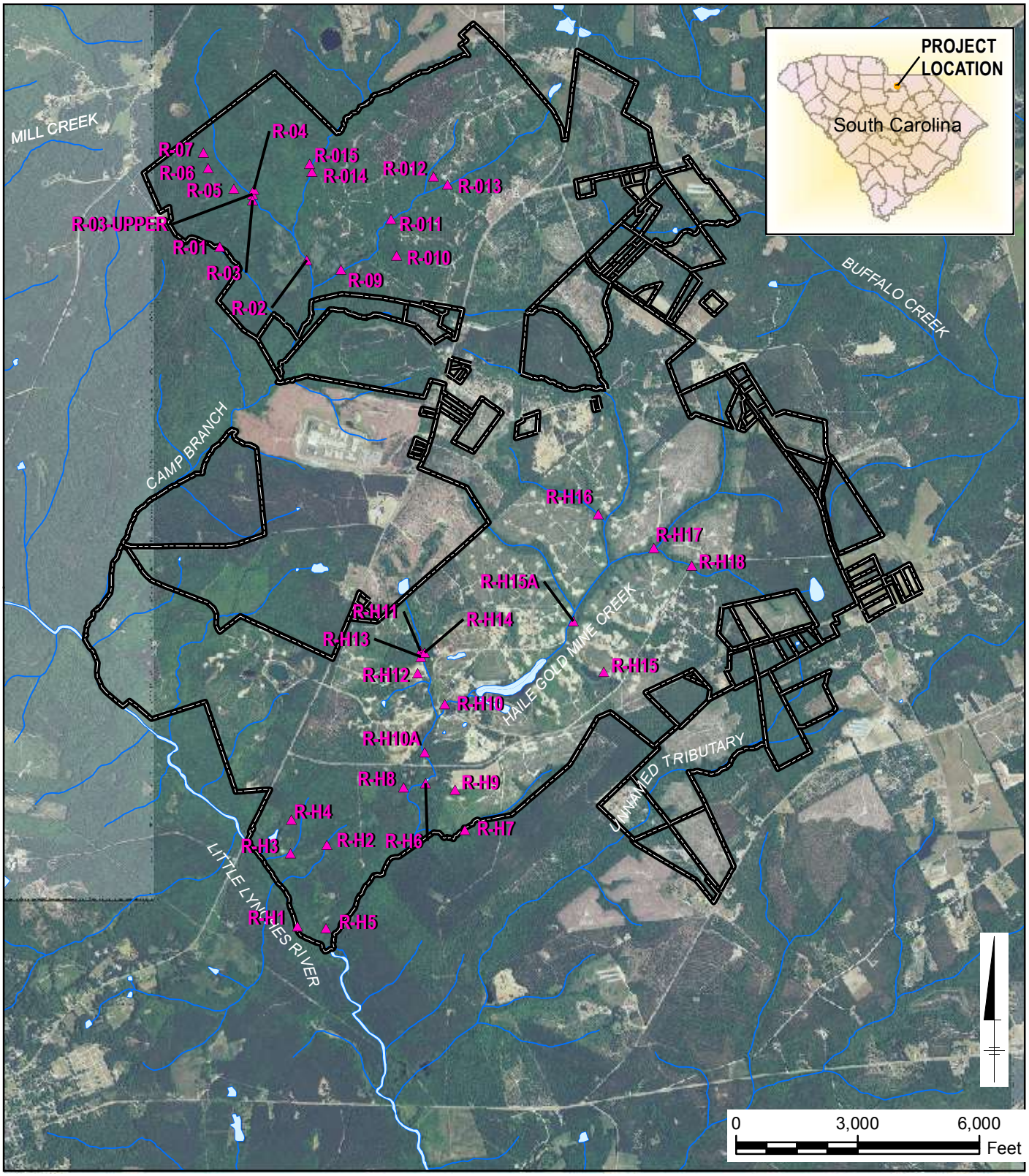
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

GROUND-DWELLING MAMMAL TRANSECT LOCATIONS

ARCADIS

FIGURE 3-10

HGM: ENV0056.mxd 03/28/12, R02



Aquatic Habitat Assessment Location

Site Boundary

BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River
UT = Unnamed Tributary

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

HAILE GOLD MINE, INC.

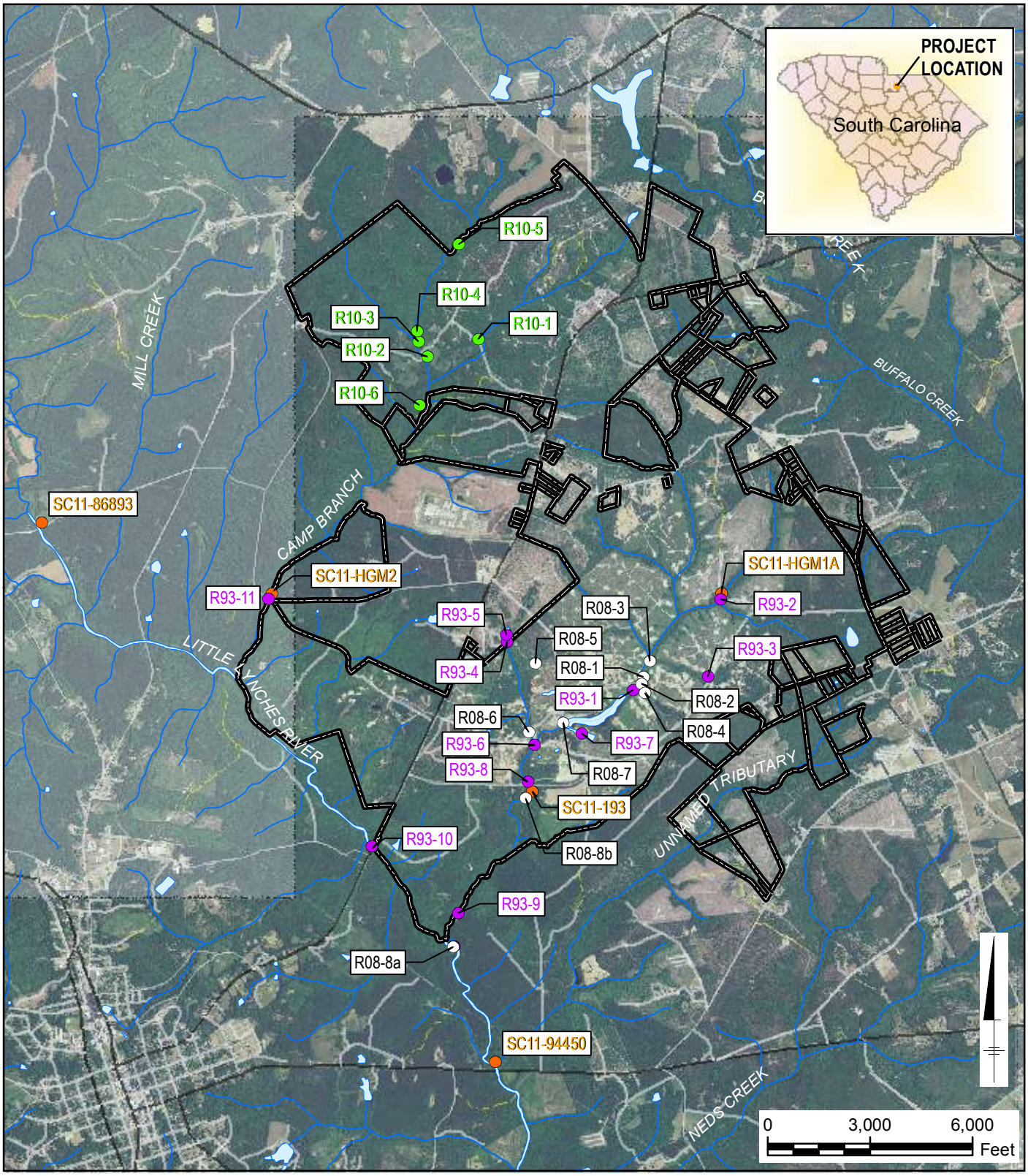
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

LOCATIONS OF AQUATIC HABITAT ASSESSMENTS CONDUCTED BY ERC (2010)

ARCADIS

FIGURE
4-1

HGM: ENV0067.mxd 03/22/12, R02



Site Boundary

Roads

Primary

Road/Street

Secondary Road

Trail

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

Rohde Sampling Locations (Year)

1993

2008

2010

DNR Sampling Locations (Year)

2011

HAILE GOLD MINE, INC.

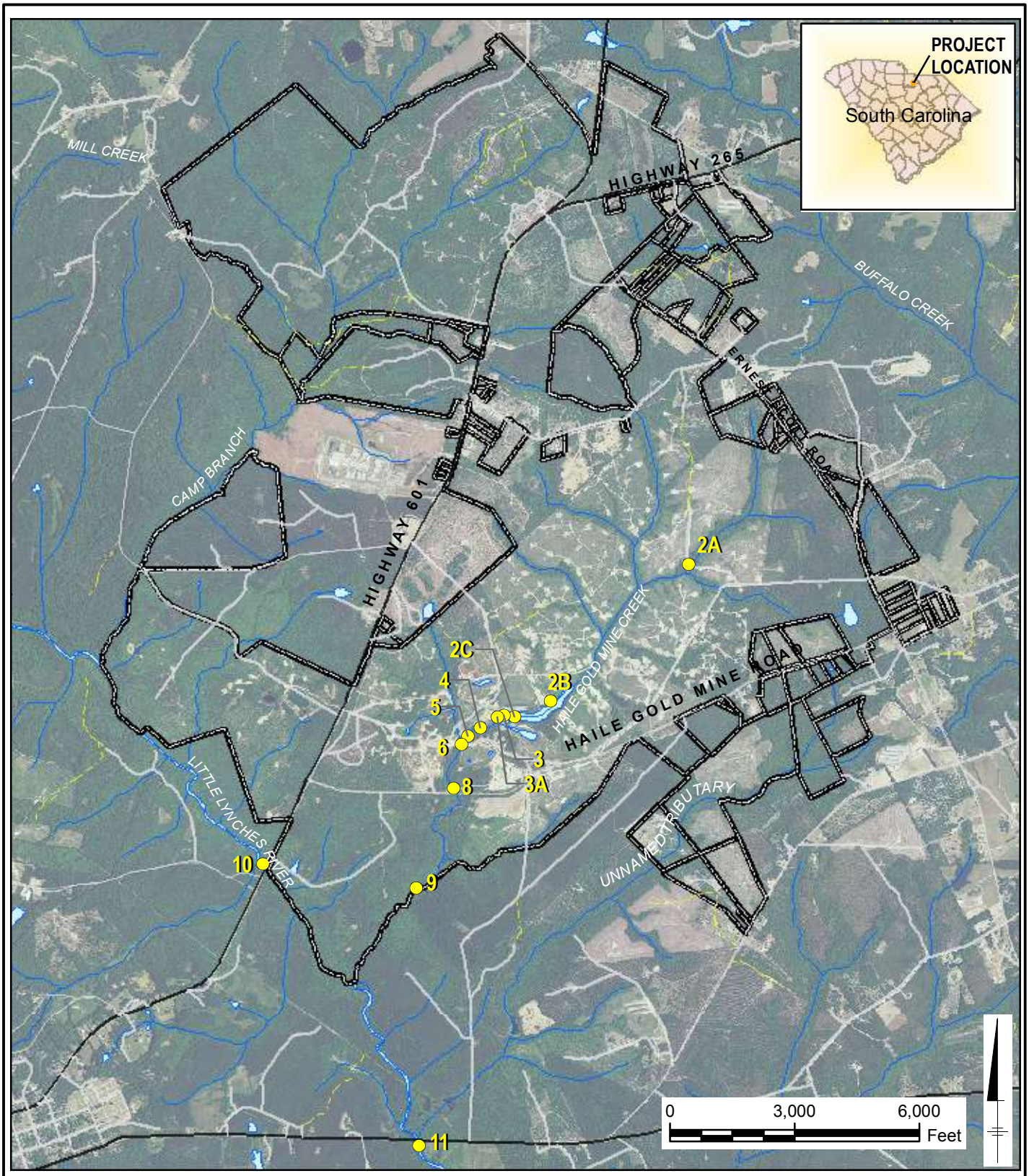
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

PREVIOUS SURVEY LOCATIONS FOR FISH

ARCADIS

FIGURE 4-2

HGM: ENV0068.mxd 03/22/12, R02



ETT Annual Macroinvertebrate Sampling Locations
Site Boundary
Primary Roads
Streets
Secondary Roads
Trails

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

HAILE GOLD MINE, INC.

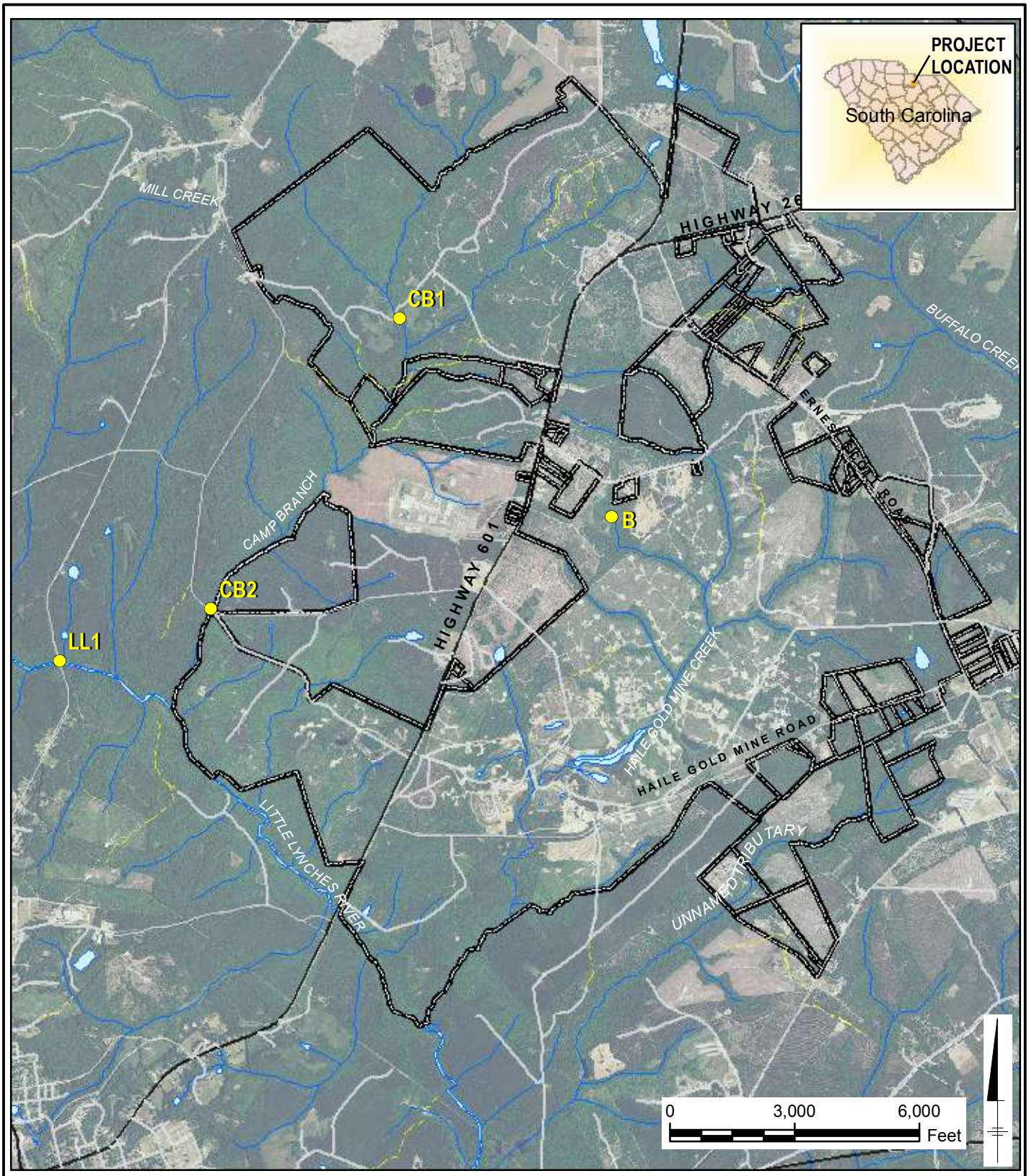
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

ANNUAL MACROINVERTEBRATE SAMPLING LOCATIONS BY ETT

ARCADIS

FIGURE 4-3

HGM: ENV0064.mxd 03/22/12, R03



ETT Macroinvertebrate Sampling Locations (April 2011)
Site Boundary
Primary Roads
Streets
Secondary Roads
Trails

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

HAILE GOLD MINE, INC.

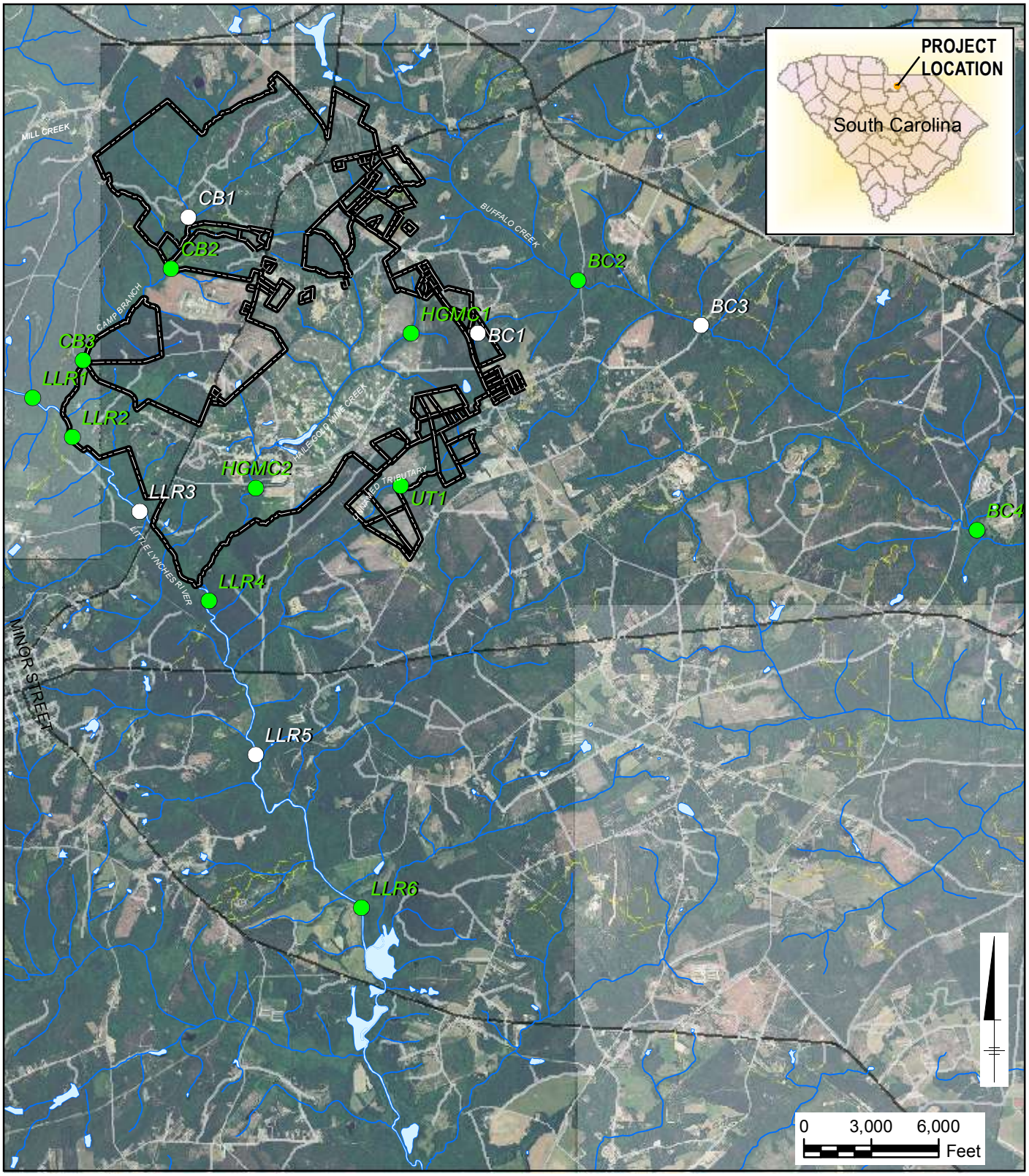
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

MACROINVERTEBRATE SURVEY LOCATIONS CONDUCTED BY ETT (APRIL 2011)

ARCADIS

FIGURE
4-4

HGM: ENV0065.mxd 03/22/12, R03



October 2011 Fish/Benthic Macro/Habitat Sampling Locations

October 2011 Habitat Only Sampling Locations

Site Boundary

Roads

Primary

Road/Street

Secondary Road

Trail

BC = Buffalo Creek
CB = Camp Branch
HGMC = Haile Gold Mine Creek
LLR = Little Lynches River
UT = Unnamed Tributary

Projection: UTM Zone 17, NAD 83
Orthophotography: NAIP 2011 1 Meter GSD

HAILE GOLD MINE, INC.

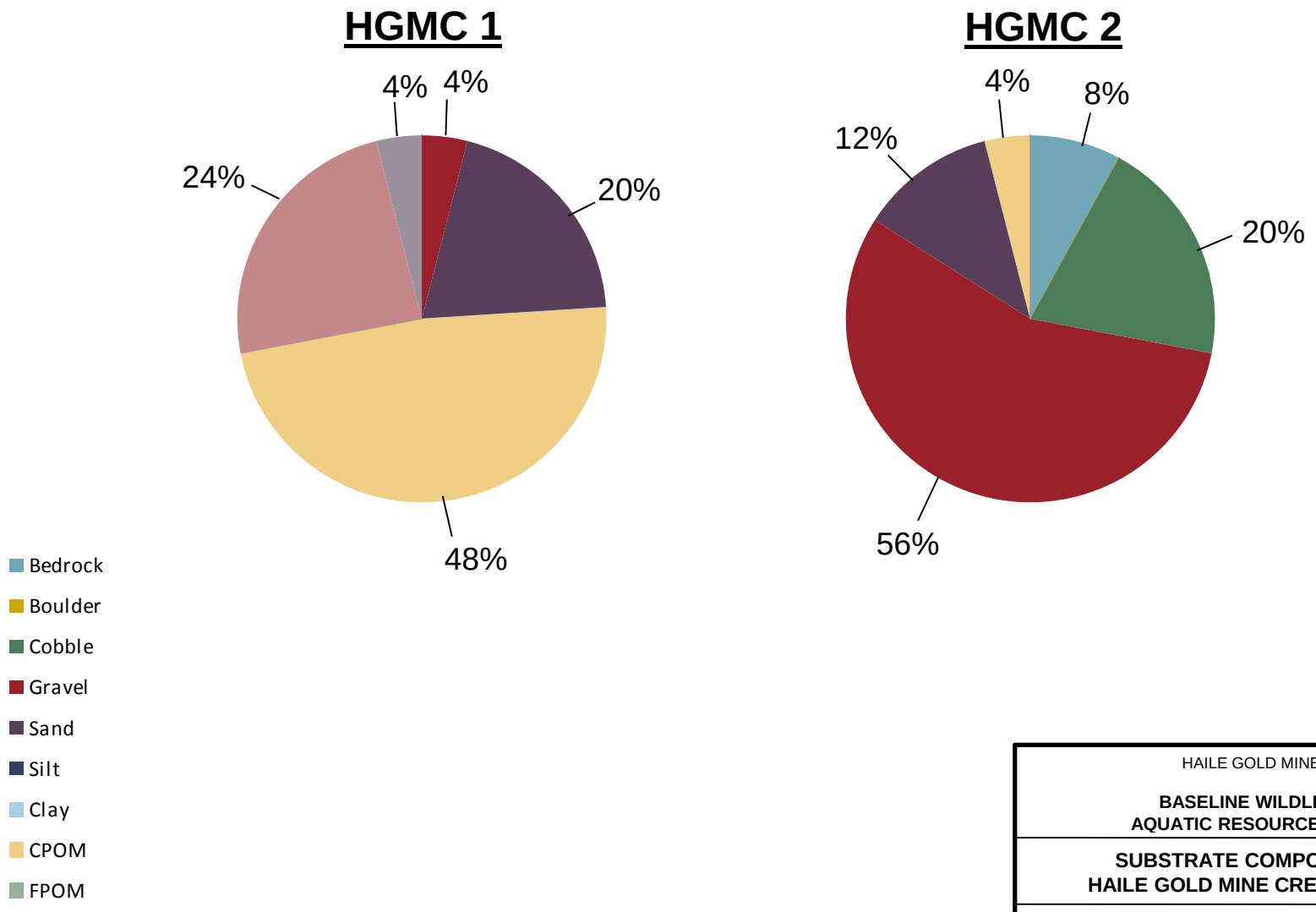
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

ARCADIS 2011 AQUATIC SAMPLING LOCATIONS

ARCADIS

FIGURE
4-5

HGM: ENV0069.mxd 03/22/12, R02



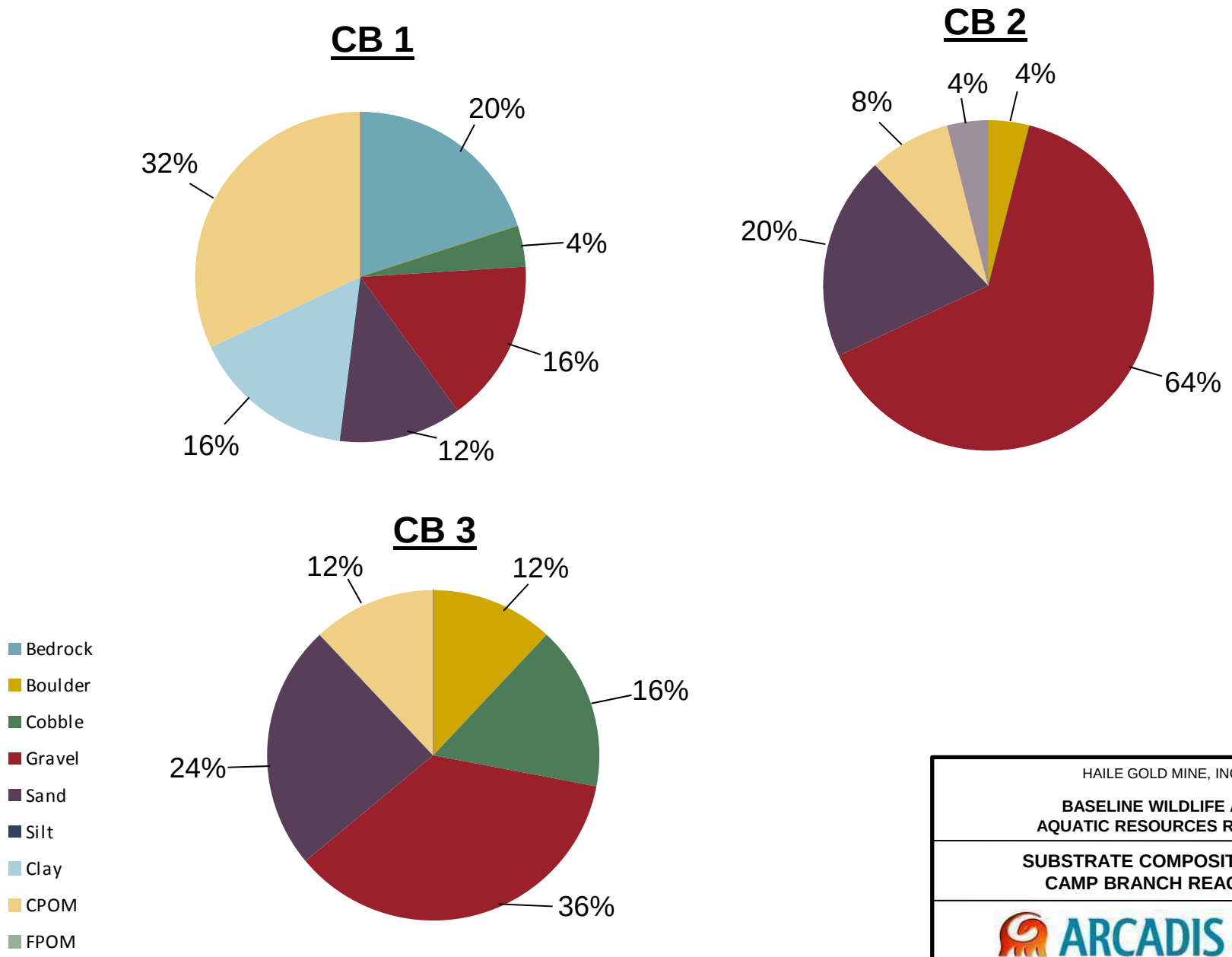
HAILE GOLD MINE, INC.

BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

SUBSTRATE COMPOSITION OF HAILE GOLD MINE CREEK REACHES

ARCADIS

FIGURE **4-6**



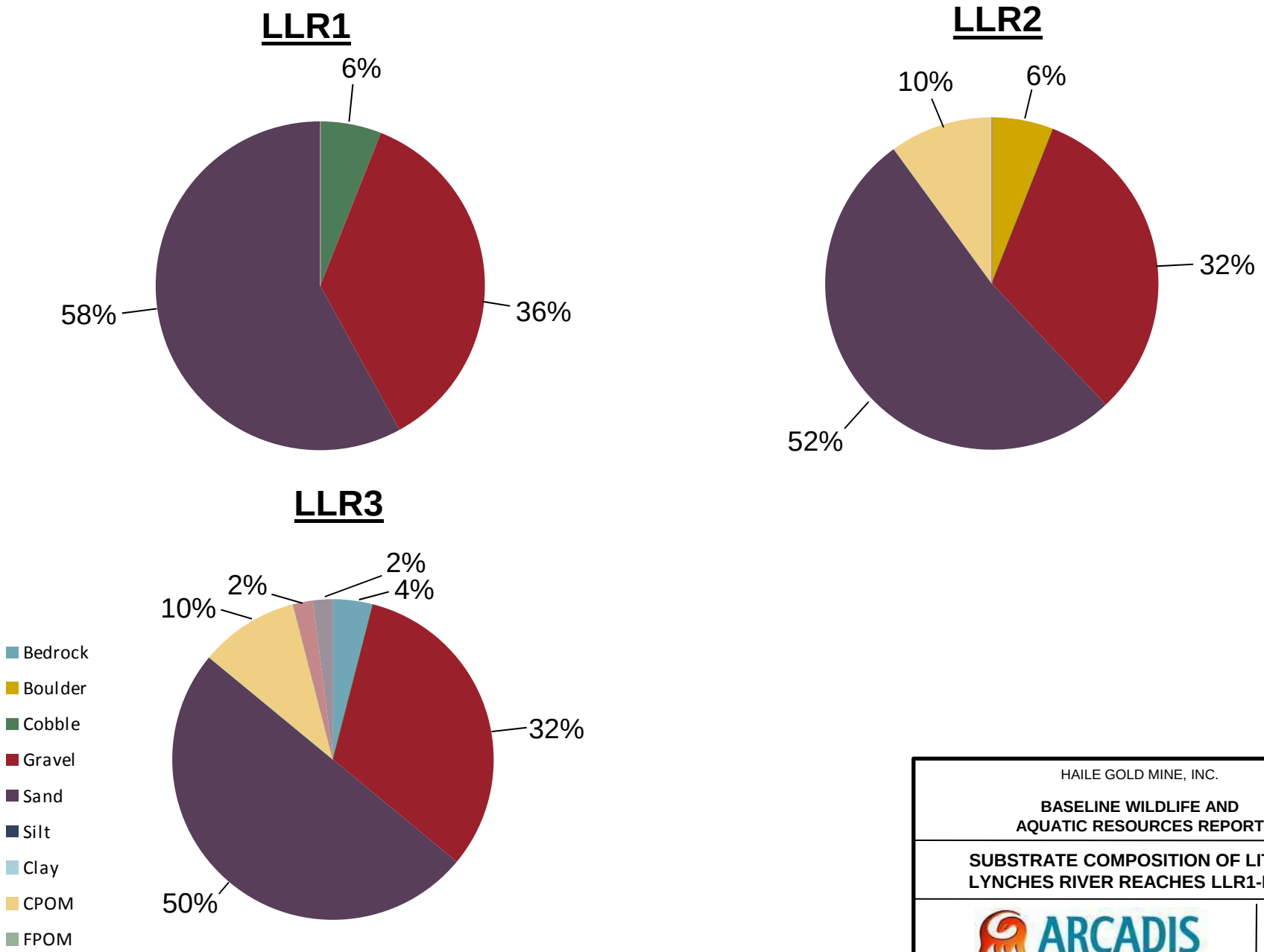
HAILE GOLD MINE, INC.

BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

SUBSTRATE COMPOSITION OF CAMP BRANCH REACHES

ARCADIS

FIGURE **4-7**



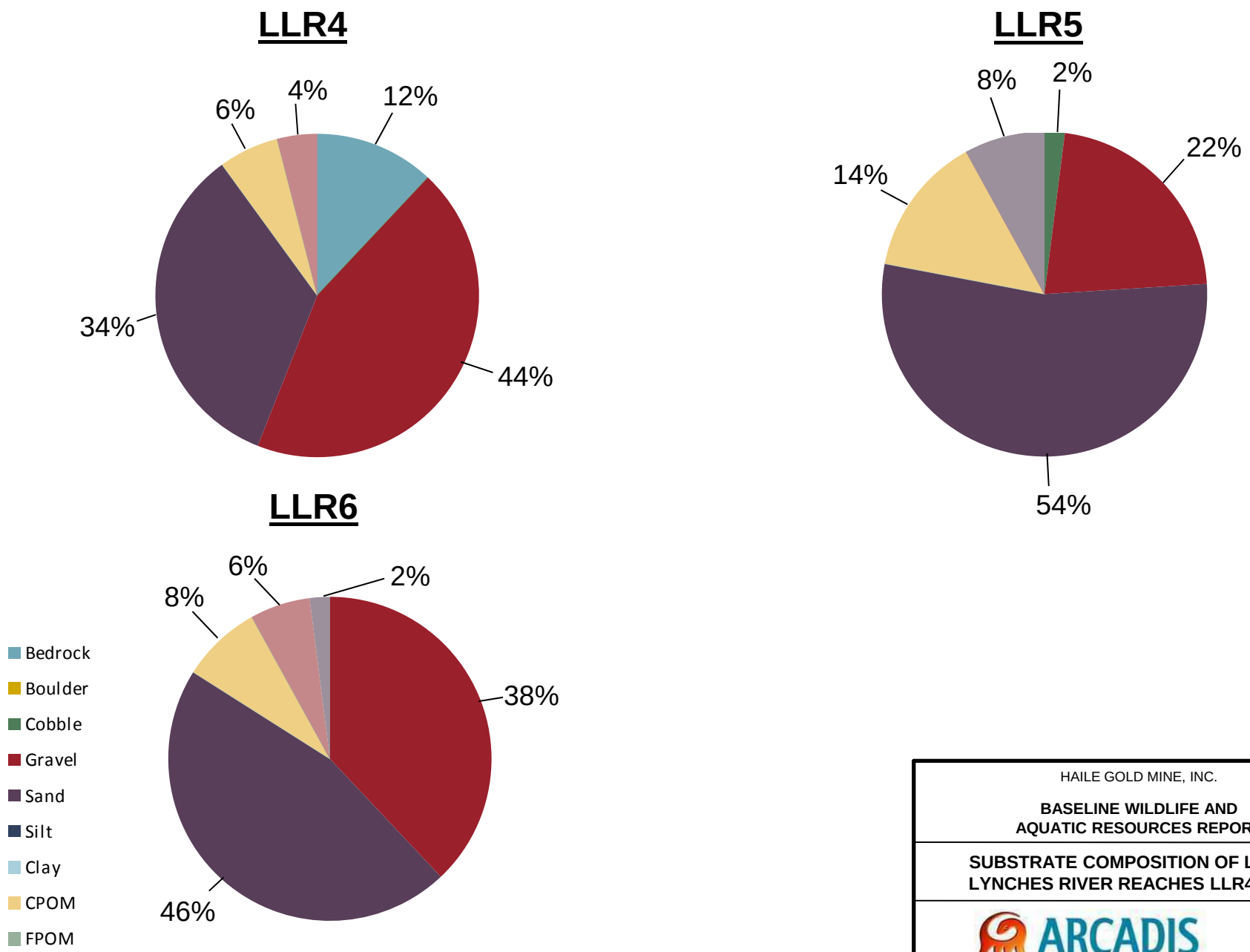
HAILE GOLD MINE, INC.

BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

SUBSTRATE COMPOSITION OF LITTLE LYNCHES RIVER REACHES LLR1-LLR3

ARCADIS

FIGURE **4-8**



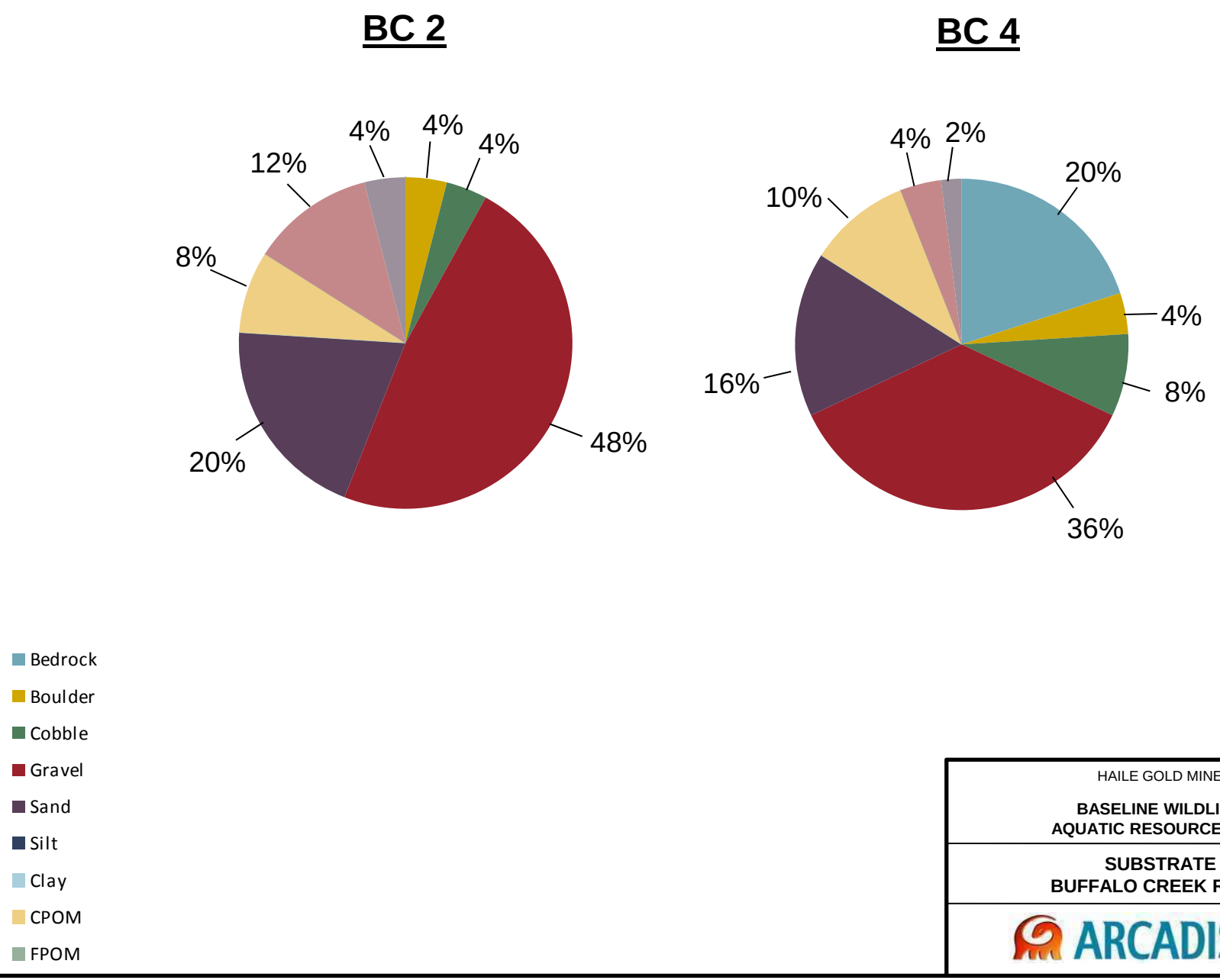
HAILE GOLD MINE, INC.

BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

SUBSTRATE COMPOSITION OF LITTLE LYNCHES RIVER REACHES LLR4-LLR6

ARCADIS

FIGURE **4-9**



HAILE GOLD MINE, INC.

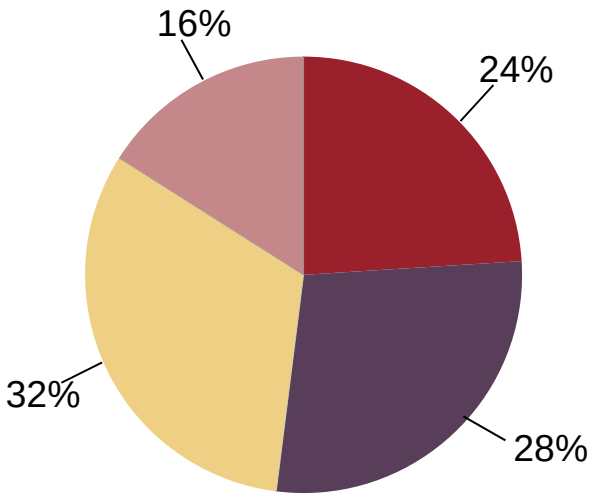
BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

SUBSTRATE OF BUFFALO CREEK REACHES

ARCADIS

FIGURE **4-10**

UT 1



- Bedrock
- Boulder
- Cobble
- Gravel
- Sand
- Silt
- Clay
- CPOM
- FPOM

HAILE GOLD MINE, INC.

BASELINE WILDLIFE AND AQUATIC RESOURCES REPORT

SUBSTRATE OF UNNAMED TRIBUTARY REACH

ARCADIS

FIGURE

4-11

Comprehensive Baseline Wildlife and Aquatic Resources Report

Haile Gold Mine, Inc.

Appendix A

Summary of Notes Taken During August 12 Meeting

Haile Gold Mine EIS

Meeting Notes

August 12, 2011, 10:00AM – 12:00PM

US FWS South Carolina Field Office

Attendees

Richard Darden (USACE)

Mark Caldwell (USFWS)

Morgan Wolf (USFWS)

Vivianne Vejdani (SCDNR via phone)

Johnny Pappas (Romarco)

Ramona Schneider (Haile)

Penny Hunter (ARCADIS)

Meeting Notes

Introductions were made.

ARCADIS stated that the purpose of the meeting was to discuss the current planned wildlife surveys at Haile in support of the EIS, and to solicit input from the agencies on the current plans, including survey methods, species of interest, and timing of the surveys.

ARCADIS described the current wildlife studies planned for the site. Those studies include:

1. Passerine & raptor (fall – Aug/Sep).
   USFWS notes to include a Bald Eagle survey in the October/November timeframe.
2. Bat (fall – Aug/Sep)
3. Mammal & game (fall – Oct)
4. Aquatic species (fall – Oct)
5. Aquatic habitat (fall – Oct)

<u>T&E Species Surveys</u>

USFWS distributed a list of threatened and endangered species in South Carolina by county, and information on species survey windows and species leads (see Attachment 1).

Survey and documentation methods for T&E species were discussed. Method of surveys for plants is flexible. Meandering and transect methods were discussed. Surveys should target suitable habitats for each species. The percent coverage of the survey per habitat should be identified (e.g., 10% coverage). FWS expressed interest in a phone consultation and/or review of study plans. Contact information for Burt Pitman, the DNR state botanist, was given for technical questions or study plan review.

USFWS requested documentation of T&E species surveys in individual technical memorandums or reports addressed to USACE. One report or memo per species if possible was requested to help streamline the clearance process. USFWS notes that they will accept multiple species within a single report as well, provided all relevant habitat and species information is included.

T&E species surveys should also be dedicated to one particular species at a time; study plans should not lump all the species surveys together. The report should include the following:

- dates of survey
- locations of survey
- descriptions of habitats surveyed
- species surveyed
- findings

Study plans and reports should be specific to the project area, not Haile's property boundary. USFWS notes that consideration may be needed downstream of creeks and rivers affected, even if they flow beyond property boundaries.

Documentation of habitats at the site was recommended to aid in identifying specific species survey needs based on habitat presence or absence.

<u>Aquatic & Wildlife Studies</u>

For the Carolina heelsplitter, the survey window is from May to September. October is too late because leaf fall can obscure habitats and the cooler temperatures result in the heelsplitter burrowing down deeper into the substrate. A permitted individual is required for Carolina heelsplitter surveys. John or Joe Alderman, or Mr. Savidge was recommended to contact.

A collection permit will be required for aquatic species surveys. Fish collection via seines might be required. Contact information for Barbara Hasty and Daryl Shipes was given in regards to obtaining collection permits.

Other permit requirements were discussed for wildlife or aquatic surveys; none were known (for T&E) other than the heelsplitter. Vivianne will check on other permit requirements.

Contact information for Mark Scott was given in reference to helping define the downstream survey extent for aquatic species. Foraging areas (e.g., the woodpecker foraging area is ~½ mile) should be considered when assessing boundary limits of wildlife surveys.

ARCADIS proposed to present results of the surveys after the data collection was complete and before reports were finalized.

Attachment 1

South Carolina List of Endangered, Threatened and Candidate Species
May 2011

E	Federally endangered
T	Federally threatened
P	Proposed in the Federal Register
CH	Critical Habitat
C	The U.S. Fish and Wildlife Service or the National Marine Fisheries Service has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species
S/A	Federally protected due to similarity of appearance to a listed species
*	Contact the National Marine Fisheries Service for more information on this species
**	The U.S. Fish and Wildlife Service and the National Marine Fisheries Service share jurisdiction of this species
BGEPA	Federally protected under the Bald and Golden Eagle Protection Act

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated continually and may be different from the following. **For a list of state endangered, threatened, and species of concern go to http://www.dnr.sc.gov/species/index.html.**

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Abbeville	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Carolina heelsplitter	*Lasmigona decorata*	E
	Georgia aster	*Aster georgianus*	C
Aiken	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Harperella	*Ptilimnium nodosum*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Relict trillium	*Trillium reliquum*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	Smooth coneflower	*Echinacea laevigata*	E
Allendale	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	Smooth coneflower	*Echinacea laevigata*	E
Anderson	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Smooth coneflower	*Echinacea laevigata*	E

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Bamberg	Canby's dropwort	*Oxypolis canbyi*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
Barnwell	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Harperella	*Ptilimnium nodosum*	E
	Pondberry	*Lindera melissifolia*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	Smooth coneflower	*Echinacea laevigata*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
Beaufort	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Finback whale*	*Balaenoptera physalus**	E
	Frosted flatwoods salamander	*Ambystoma cingulatum*	T
	Green sea turtle**	*Chelonia mydas***	T
	Humpback whale*	*Megaptera novaengliae**	E
	Kemp's ridley sea turtle**	*Lepidochelys kempii***	E
	Leatherback sea turtle**	*Dermochelys coriacea***	E
	Loggerhead sea turtle**	*Caretta caretta***	T
	Piping plover	*Charadrius melodus*	T, CH
	Pondberry	*Lindera melissifolia*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Red knot	*Calidris canutus rufa*	C
	Right whale*	*Balaena glacialis**	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	West Indian manatee	*Trichechus manatus*	E
	Wood stork	*Mycteria americana*	E
Berkeley	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Frosted flatwoods salamander	*Ambystoma cingulatum*	T, CH
	Pondberry	*Lindera melissifolia*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Berkeley	West Indian manatee	*Trichechus manatus*	E
Continued	Wood stork	*Mycteria americana*	E
Calhoun	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
Charleston	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Bachman's warbler	*Vermivora bachmanii*	E
	Canby's dropwort	*Oxypolis canbyi*	E
	Finback whale*	*Balaenoptera physalus**	E
	Frosted flatwoods salamander	*Ambystoma cingulatum*	T, CH
	Green sea turtle**	*Chelonia mydas***	T
	Humpback whale*	*Megaptera novaengliae**	E
	Kemp's ridley sea turtle**	*Lepidochelys kempii***	E
	Leatherback sea turtle**	*Dermochelys coriacea***	E
	Loggerhead sea turtle**	*Caretta caretta***	T
	Piping plover	*Charadrius melodus*	T, CH
	Pondberry	*Lindera melissifolia*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Red knot	*Calidris canutus rufa*	C
	Right whale*	*Balaena glacialis**	E
	Seabeach amaranth	*Amaranthus pumilus*	T
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	West Indian manatee	*Trichechus manatus*	E
	Wood stork	*Mycteria americana*	E
Cherokee	Dwarf-flowered heartleaf	*Hexastylis naniflora*	T
	Georgia aster	*Aster georgianus*	C
Chester	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Carolina heelsplitter	*Lasmigona decorata*	E
	Georgia aster	*Aster georgianus*	C
	Red-cockaded woodpecker	*Picoides borealis*	E

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Chesterfield	Carolina heelsplitter	*Lasmigona decorata*	E, CH
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
Clarendon	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
Colleton	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Finback whale*	*Balaenoptera physalus**	E
	Frosted flatwoods salamander	*Ambystoma cingulatum*	T
	Green sea turtle**	*Chelonia mydas***	T
	Humpback whale*	*Megaptera novaengliae**	E
	Kemp's ridley sea turtle**	*Lepidochelys kempii***	E
	Leatherback sea turtle**	*Dermochelys coriacea***	E
	Loggerhead sea turtle**	*Caretta caretta***	T
	Piping plover	*Charadrius melodus*	T, CH
	Pondberry	*Lindera melissifolia*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Red knot	*Calidris canutus rufa*	C
	Right whale*	*Balaena glacialis**	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	West Indian manatee	*Trichechus manatus*	E
	Wood stork	*Mycteria americana*	E
Darlington	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Red-cockaded woodpecker	*Picoides borealis*	E
	Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
Dillon	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Dorchester	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Bog asphodel	*Narthecium americanum*	C
	Canby's dropwort	*Oxypolis canbyi*	E
	Pondberry	*Lindera melissifolia*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
Edgefield	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Carolina heelsplitter	*Lasmigona decorata*	E, CH
	Georgia aster	*Aster georgianus*	C
	Miccosukee gooseberry	*Ribes echinellum*	T
	Red-cockaded woodpecker	*Picoides borealis*	E
	Relict trillium	*Trillium reliquum*	E
Fairfield	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Carolina heelsplitter	*Lasmigona decorata*	E
	Georgia aster	*Aster georgianus*	C
Florence	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
Georgetown	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Finback whale*	*Balaenoptera physalus**	E
	Green sea turtle**	*Chelonia mydas***	T
	Humpback whale*	*Megaptera novaengliae**	E
	Kemp's ridley sea turtle**	*Lepidochelys kempii***	E
	Leatherback sea turtle**	*Dermochelys coriacea***	E
	Loggerhead sea turtle**	*Caretta caretta***	T
	Piping plover	*Charadrius melodus*	T, CH
	Pondberry	*Lindera melissifolia*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Seabeach amaranth	*Amaranthus pumilus*	T

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Georgetown Continued	Right whale*	*Balaena glacialis**	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	West Indian manatee	*Trichechus manutus*	E
	Wood stork	*Mycteria americana*	E
Greenville	Bog turtle	*Clemmys muhlenbergii*	T S/A
	Bunched arrowhead	*Sagittaria fasciculata*	E
	Dwarf-flowered heartleaf	*Hexastylis naniflora*	T
	Mountain sweet pitcher-plant	*Sarracenia rubra ssp. jonesii*	E
	Rock gnome lichen	*Gymnoderma lineare*	E
	Small whorled pogonia	*Isotria medeoloides*	T
	Swamp Pink	*Helonias bullata*	T
	White irisette	*Sisyrinchium dichotomum*	E
	White fringeless orchid	*Platanthera integrilabia*	C
Greenwood	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Carolina heelsplitter	*Lasmigona decorata*	E, CH
Hampton	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	Wood stork	*Mycteria americana*	E
Horry	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Finback whale*	*Balaenoptera physalus**	E
	Green sea turtle**	*Chelonia mydas***	T
	Humpback whale*	*Megaptera novaengliae**	E
	Kemp's ridley sea turtle**	*Lepidochelys kempii***	E
	Leatherback sea turtle**	*Dermochelys coriacea***	E
	Loggerhead sea turtle**	*Caretta caretta***	T
	Piping plover	*Charadrius melodus*	T, CH
	Pondberry	*Lindera melissifolia*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Red knot	*Calidris canutus rufa*	C
	Right whale*	*Balaena glacialis**	E

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Horry Continued	Seabeach amaranth	*Amaranthus pumilus*	T
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	West Indian manatee	*Trichechus manatus*	E
	Wood stork	*Mycteria americana*	E
Jasper	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Finback whale*	*Balaenoptera physalus**	E
	Frosted flatwoods salamander	*Ambystoma cingulatum*	T, CH
	Green sea turtle**	*Chelonia mydas***	T
	Humpback whale*	*Megaptera novaengliae**	E
	Kemp's ridley sea turtle**	*Lepidochelys kempii***	E
	Leatherback sea turtle**	*Dermochelys coriacea***	E
	Loggerhead sea turtle**	*Caretta caretta***	T
	Piping plover	*Charadrius melodus*	T, CH
	Pondberry	*Lindera melissifolia*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Red knot	*Calidris canutus rufa*	C
	Right whale*	*Balaena glacialis**	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	West Indian manatee	*Trichechus manatus*	E
	Wood stork	*Mycteria americana*	E
Kershaw	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Carolina heelsplitter	*Lasmigona decorata*	E, CH
	Georgia aster	*Aster georgianus*	C
	Michaux's sumac	*Rhus michauxii*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
Lancaster	Black-spored quillwort	*Isoetes melanospora*	E
	Carolina heelsplitter	*Lasmigona decorata*	E, CH
	Little amphianthus	*Amphianthus pusillus*	T
	Schweinitz's sunflower	*Helianthus schweinitzii*	E
	Smooth coneflower	*Echinacea laevigata*	E

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Laurens	Carolina heelsplitter	*Lasmigona decorata*	E
	Georgia aster	*Aster georganus*	C
	Red-cockaded woodpecker	*Picoides borealis*	E
Lee	American chaffseed	*Schwalbea americana*	E
	Canby's dropwort	*Oxypolis canbyi*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
Lexington	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	Smooth coneflower	*Echinacea laevigata*	E
Marion	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Pondberry	*Lindera melissifolia*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
Marlboro	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
McCormick	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Carolina heelsplitter	*Lasmigona decorata*	E, CH
	Georgia aster	*Aster georgianus*	C
	Miccosukee gooseberry	*Ribes echinellum*	T
	Red-cockaded woodpecker	*Picoides borealis*	E
	Wood stork	*Mycteria americana*	E
Newberry	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
Oconee	Georgia aster	*Aster georgianus*	C
	Persistent trillium	*Trillium persistens*	E
	Small whorled pogonia	*Isotria medeoloides*	T
	Smooth coneflower	*Echinacea laevigata*	E

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Orangeburg	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Frosted flatwoods salamander	*Ambystoma cingulatum*	T
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	Wood stork	*Mycteria americana*	E
Pickens	Bog turtle	*Clemmys muhlenbergii*	T S/A
	Dwarf-flowered heartleaf	*Hexastylis naniflora*	T
	Georgia aster	*Aster georgianus*	C
	Mountain sweet pitcher-plant	*Sarracenia rubra ssp. jonesii*	E
	Smooth coneflower	*Echinacea laevigata*	E
Richland	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Georgia aster	*Aster georgianus*	C
	Red-cockaded woodpecker	*Picoides borealis*	E
	Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	Smooth coneflower	*Echinacea laevigata*	E
Saluda	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Carolina heelsplitter	*Lasmigona decorata*	E
	Harperella	*Ptilimnium nodosum*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
Spartanburg	Dwarf-flowered heartleaf	*Hexastylis naniflora*	T
Sumter	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Canby's dropwort	*Oxypolis canbyi*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
Union	Georgia aster	*Aster georgianus*	C
Williamsburg	American chaffseed	*Schwalbea americana*	E
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA

COUNTY	COMMON NAME	SCIENTIFIC NAME	STATUS
Williamsburg Continued	Canby's dropwort	*Oxypolis canbyi*	E
	Red-cockaded woodpecker	*Picoides borealis*	E
	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	Wood stork	*Mycteria americana*	E
York	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Carolina heelsplitter	*Lasmigona decorata*	E
	Dwarf-flowered heartleaf	*Hexastylis naniflora*	T
	Georgia aster	*Aster georgianus*	C
	Little amphianthus	*Amphianthus pusillus*	T
	Schweinitz' sunflower	*Helianthus schweinitzii*	E

OPTIMAL SURVEY WINDOWS FOR
SOUTH CAROLINA'S FEDERALLY THREATENED AND ENDANGERED PLANT SPECIES

SCIENTIFIC NAME	COMMON NAME	STATUS	SURVEY WINDOW
Amaranthus pumilus	Seabeach amaranth	Threatened	July–October
Amphianthus pusillus	Little amphianthus	Threatened	late March–April
Echinacea laevigata	Smooth coneflower	Endangered	late May–October
Gymnoderma lineare	Rock gnome lichen	Endangered	year round
Helianthus schweinitzii	Schweinitz's sunflower	Endangered	late August–October
Helonias bullata	Swamp pink	Threatened	April–May
Hexastylis naniflora	Dwarf-flowered heartleaf	Threatened	March–May
Isoetes melanospora	Black spored quillwort	Endangered	May–October
Isotria medeoloides	Small whorled pogonia	Threatened	mid May through early July
Lindera melissifolia	Pondberry	Endangered	February–March
Lysimachia asperulaefolia	Rough-leaved loosestrife	Endangered	mid May–June
Oxypolis canbyi	Canby's dropwort	Endangered	mid August–September
Ptilimnium nodosum	Harperella	Endangered	July–October in periods of low water
Rhus michauxii	Michaux's sumac	Endangered	May–October
Ribes echinellum	Miccosukee gooseberry	Threatened	year round, but most markedly June–September
Sagittaria fasciculata	Bunched arrowhead	Endangered	mid May–July
Sarracenia rubra ssp. jonesii	Mountain sweet pitcher-plant	Endangered	April–October
Schwalbea americana	American chaffseed	Endangered	May–August (1–2 months after a fire)
Sisyrinchium dichotomum	White irisette	Endangered	late May–July
Trillium persistens	Persistent trillium	Endangered	early March–mid April
Trillium reliquum	Relict trillium	Endangered	mid March–April

These recommended survey windows were determined from species recovery plans and field observations. For additional information about these species, please visit the U.S. Fish and Wildlife Service web page at http://endangered.fws.gov.

INFORMATION ON OCCURANCES OF FEDERALLY THREATENED AND ENDANGERED ANIMAL SPECIES IN SOUTH CAROLINA

SCIENTIFIC NAME	COMMON NAME	STATUS	TIME PERIOD	COMMENTS
Acipenser brevirostrum	Shortnose Sturgeon	Endangered	February 15- April 30	Spawning migration
*Ambystoma cingulatum**	Frosted Flatwoods Salamander	Threatened	January – April	Larvae present in breeding grounds
Caretta caretta	Loggerhead seaturtle	Threatened	May 1 – October 31	Nesting and hatching
*Charadrius melodusI**	Piping plover	Threatened	July 15 – May 1	Migration and wintering
Dermochelys coriacea	Leatherback seaturtle	Endangered	April 15 – September 30	Nesting and hatching
Drymarchon corais couperi	Eastern Indigo snake	Threatened	November - March	Breeding season
*Lasmigona decorada**	Carolina heelsplitter	Endangered	March – September	Optimal survey window
Mycteria americana	Wood stork	Endangered	February 15 – September 1	Nesting season
Myotis sodalis	Indiana bat	Endangered	August –March	Winter migration and hibernation
Picoides borealis	Red-cockaded woodpecker	Endangered	April – July	Nesting season
Trichechus manatus†	West Indian manatee	Endangered	May 15 – October 15	Coastal waters

*Critical Habitat in South Carolina has been designated for this species

†Summer resident of South Carolina estuarine and coastal waters

For additional information about these species, please visit the U.S. Fish and Wildlife Service web page at http://endangered.fws.gov.

Harperella	E	8	09-28-88	03-05-91	5	CHSC	Morgan Wolf	Morgan Wolf
Little ampianthus	T	13	02-05-88	07-07-93	4	ATGA	Jimmy Rickard	Morgan Wolf
Miccosukee gooseberry	T	14	07-18-85	exempt	4	PCFL	Vivian Negron Ortiz	Morgan Wolf
Michaux's sumac	E	2	09-28-89	04-30-93	4	RANC	Dale Suiter	Morgan Wolf
Mountain sweet pitcher plant	E	3	09-30-88	08-13-90	4	ASNC	Carolyn Wells	Morgan Wolf
Persistent trillium	E	8	04-26-78	03-27-84	4	ATGA	Jimmy Rickard	Morgan Wolf
Pondberry	E	8	07-31-86	09-23-93	4	JAMS	Cary Norquist	Paula Sisson
Relict trillium	E	8C	04-04-88	01-31-91	4	ATGA	Jimmy Rickard	Morgan Wolf
Rock gnome lichen	E	5	01-18-95	09-30-97	4	ASNC	Carolyn Wells	Morgan Wolf
Rough-leaved loosestrife	E	8	06-12-87	04-19-95	4	RANC	Dale Suiter	Morgan Wolf
Schweinitz's sunflower	E	5	05-07-91	04-22-94	4	ASNC	Carolyn Wells	Morgan Wolf
Seabeach amaranth	T	8C	04-07-93	11-12-96	4	RANC	Dale Suiter	Melissa Bimbi
Small whorled pogonia	E	14	09-09-82	11-13-92	5	ASNC	Carolyn Wells	Morgan Wolf
Smooth coneflower	E	5	10-08-92	04-18-95	4	RANC	Dale Suiter	Morgan Wolf
Swamp pink	E	1C	09-09-88	09-30-91	5	ASNC	Carolyn Wells	Morgan Wolf
White fringeless orchid	C				4	ASNC	Carolyn Wells	Morgan Wolf
White irisette	E	8	09-26-91	04-10-95	4	ASNC	Carolyn Wells	Morgan Wolf
	National Species Lead							
	Regional Species Lead							

CHARLESTON FO SPECIES LEADS

SPECIES	STATUS	PRIORITY	LISTING DATE	RECOVERY PLAN DATE	LEAD REGION	LEAD R4 FO	R4 SPECIES RECOVERY LEAD	CHSC FO LEAD
MAMMALS								
West Indian (Florida) Manatee	ECH	5C	03-11-67	10-30-01	4	JAFL	Jim Valade	Melissa Bimbi
BIRDS								
Bachman's warbler	E	5	03-11-67	exempt	4	CHSC	Paula Sisson	Paula Sisson
Piping plover	ECH, TCH	2C	12-11-85	05-02-96	5,3	CHSC, PCFL	Melissa Bimbi, Patty Kelly	Melissa Bimbi
Red-cockaded woodpecker	E	8C	10-13-70	03-20-03	4	RO	Will McDearman	Paula Sisson
Red knot	C				5	CHSC	Melissa Bimbi	Melissa Bimbi
Whooping crane	ECH, (XN)	2C	03-11-67	01-11-05	2	JAFL	Bill Brooks	Paula Sisson
Wood stork	E	5C	02-28-84	01-27-97	4	JAFL	Bill Brooks	Morgan Wolf
REPTILES								
Green sea turtle	E,T	1C	07-28-78	10-29-91	4	JAFL	Sandy MacPherson	Melissa Bimbi
Kemp's ridley (Atlantic) sea turtle	E	2C	12-02-70	08-21-92	2	JAFL	Sandy MacPherson	Melissa Bimbi
Leatherback sea turtle	E	1	06-02-70	04-06-92	4	JAFL	Sandy MacPherson	Melissa Bimbi
Loggerhead sea turtle	T	7C	07-28-78	12-31-08	4	JAFL	Sandy MacPherson	Melissa Bimbi
AMPHIBIANS								
Frosted flatwoods salamander	TCH	5	04-01-99		4	JAMS	Linda LaClaire	Paula Sisson
MUSSELS								
Carolina heelsplitter	ECH	5C	06-30-93	01-17-97	4	ASNC	John Fridell	Morgan Wolf
PLANTS								
American chaffseed	E	7	09-29-92	09-29-95	5	CHSC	Paula Sisson	Paula Sisson
Bog asphodel	C					ASNC	Carolyn Wells	Morgan Wolf
Bunched arrowhead	E	2C	07-25-79	09-08-83	4	ASNC	Carolyn Wells	Morgan Wolf
Canby's dropwort	E	5	02-25-86	04-10-90	4	CHSC	Paula Sisson	Paula Sisson
Dwarf-flowered heartleaf	T	14	04-14-89		4	ASNC	Carolyn Wells	Morgan Wolf
Georgia aster	C				4	ASNC	Carolyn Wells	Morgan Wolf

Comprehensive Baseline Wildlife and Aquatic Resources Report

Haile Gold Mine, Inc.

Appendix B

Passerine Survey Field Notes, Forms and Photos

ARCADIS

Appendix B
Passerine Surveys
Project Photographs
August 20-31, 2011

Photograph #1.
Oak-hickory forest habitat located on the west side of the property boundary.

Photograph #2.
Streamhead pocosin habitat located in the northeast corner of the property boundary.

ARCADIS

Appendix B
Passerine Surveys
Project Photographs
August 20-31, 2011

Photograph #3.
Small stream forest habitat (Camp Branch) located on the west side of the property boundary.

Photograph #4.
Xeric sandhill scrub habitat located on the east side of the property boundary.

ARCADIS

Appendix B
Passerine Surveys
Project Photographs
August 20-31, 2011

Photograph #5.
Agricultural pastureland habitat located south of the property boundary along the Little Lynches River.

Photograph #6.
Developed habitat located on the east side of the property boundary.

ARCADIS

Appendix B
Passerine Surveys
Project Photographs
August 20-31, 2011

Photograph #7.
Managed tree plantation habitat located on the northwest portion of the property boundary.

Photograph #8.
Modified managed upland vegetation – naturalized habitat located on the south central portion of the property boundary.

ARCADIS

Appendix B
Passerine Surveys
Project Photographs
August 20-31, 2011

Photograph #9.
Modified managed upland vegetation– scrub regrowth habitat located in the northeast portion of the property boundary.

Photograph #10.
Open water habitat (Ledbetter Reservoir) located on the central portion of the property boundary.

ARCADIS

Appendix B
Passerine Surveys
Project Photographs
August 20-31, 2011

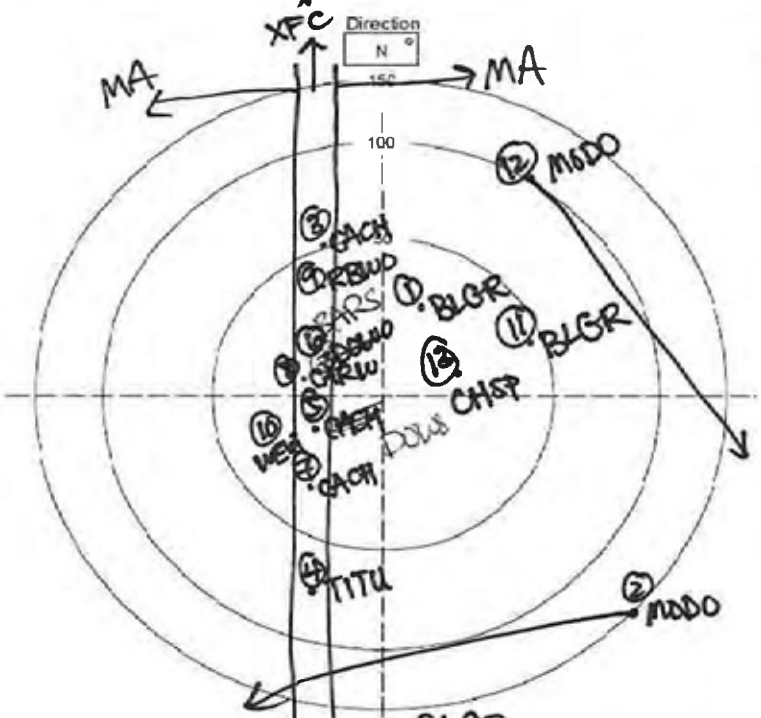
Photograph #11.
Recently logged timberland habitat located in the central portion of the property boundary.

Photograph #12.
Temporary access road habitat located on the west side of the property boundary.

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MA-4 D-07	Date	Time Start	Time End
Observer(s):	W. Medlin / W. Herrick	8.19.11	903	913
	NAD83	Temp (F)	Wind	Sky
Easting:	0542185	72 °	3 @ S	20 % (max)
Northing:	3827094			
Point-count Habitat Type:	Reclaimed Mining Area			
Comments:	XFC seperate 2 MA's (see drawing below)			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: BLGR

Non-landbird species present but not counted

Mammals:

Notes: Insect Noise

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	BLGR	903	1	V/pk	20	3m	MA
2	MODO	904	1	F	150	20m	MA
3	CACH	905	1	S	10		XFC
4	TITU	905	1	S	30		XFC
5	DOWO	905	1	C	20		XFC
6	BARS	906	1	F	10	20m	MA
7	CACH	907	1	S	36		XFC
8	CARW	908	1	S	20		XFC
9	RBWO	909	1	C	40		XFC
10	WEVI	909	1	S	20		XFC
11	BLGR	911	1	S	50		MA
12	MODO	911	3	F	100	10m	MA
13	CHSP	912	1	S	30		MA
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

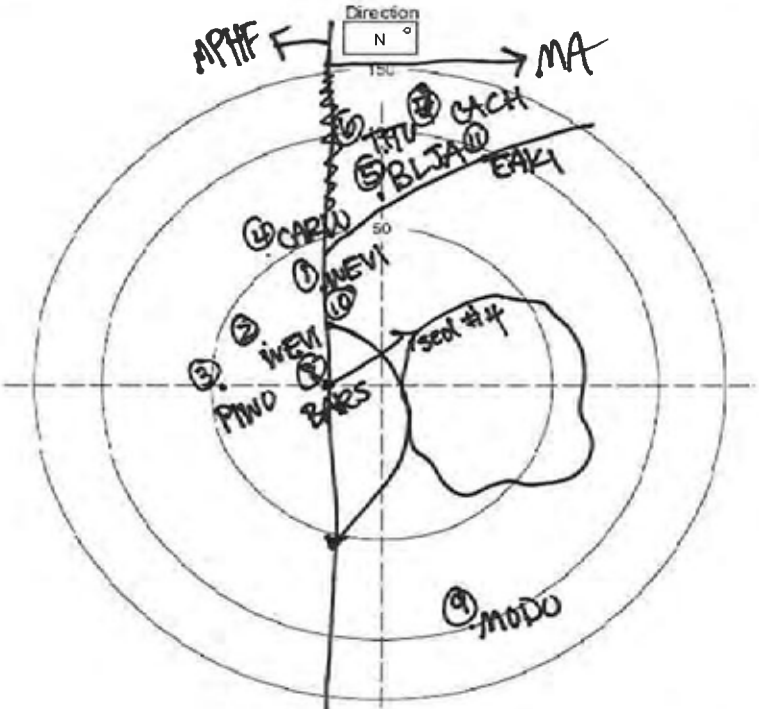
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MA-5 D-06	Date	Time Start	Time End
Observer(s):	W. Medlin / W. Herrick	8.19.11	8:36	8:46
	NAD83	Temp (F)	Wind	Sky
Easting:	0541929	72 °	ϕ @ NA	10 %
Northing:	3826949			
Point-count Habitat Type:	Reclaimed Road			
Comments:	Right next to Sediment Pond #4			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	WEVI	836	1	S	30		MPHF
2	WEVI	836	1	S	40		↓
3	PIWO	837	#1	C	40		
4	CARW	837	1	S	50		
5	BLJA	838	1	C	60		
6	TITU	838	1	S	70		
7	CACH	839	1	S	70		V
8	BARS	839	1	F	10	30m	MA
9	MODO	843	1	S	100		MA
10	BARS	845	1	F	5	10m	MA
11	EAKI	846	1	S	60		MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☑ Entered in Database ☐ QA/QC

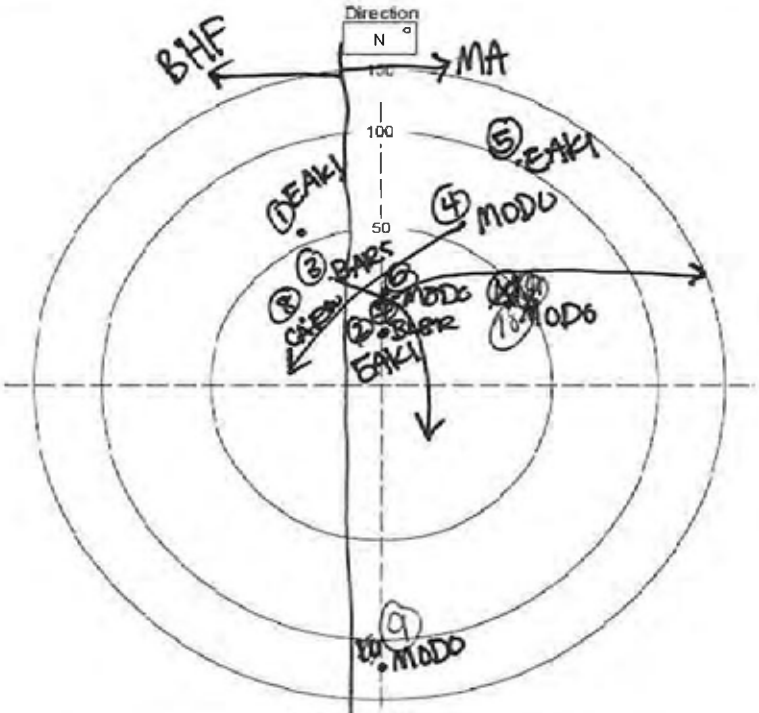
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MA-6 D-05	Date	Time Start	Time End
Observer(s):	W. Medlin / W. Harris	8.19.11	807	8:17
NAD83		Temp (F)	Wind	Sky
Easting: 0541896		72 °	Ø @ MA	10 (haze) %
Northing: 3826707				

Point-count Habitat Type: Reclaimed Mining Area

Comments: Adjacent to old pit w/ standing H_2O

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: #10 is perched on a telephone wire

	Species	Time	#	Beh	Dist	Height	Habitat
1	EAKI	807	21	S	50		BHF
2	EAKI	807	1	S	20		MA
3	BARS	809	1	V	0	10m	MA
4	MODO	809	3	VIS	10	5m	MA
5	EAKI	812	1	S	100		MA
6	MODO	814	1	F	30	10m	MA
7	BLGR	814	2	V/FS	20	5m	BHF
8	CARW	815	1	S	30		BHF
9	MODO	815	1	F	150	50m	MA
10	MODO	817	1	V	60	20	MA
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
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Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
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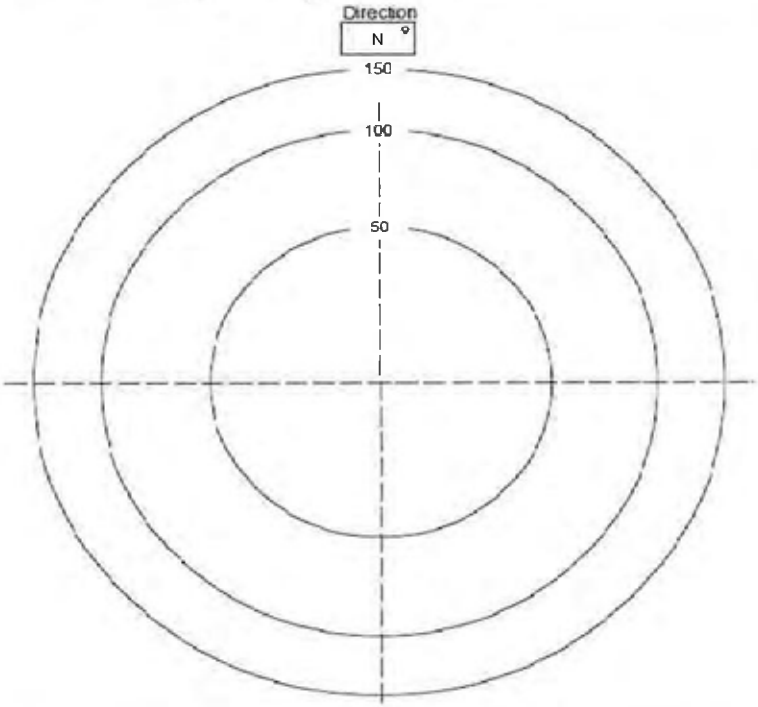
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MA-7 D-04	Date	Time Start	Time End
Observer(s):	Will Martin/Willow	8.19.11	530	540
	NAD83	Temp (F)	Wind	Sky
Easting:	0541865	68 °	Ø @ N/A	Ø %
Northing:	3826351			
Point-count Habitat Type:	Reclaimed Mining Area			
Comments:	Casia lespedesia & Vegetated Slope Loblolly Pine			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Site is btwn 2 roads close to the HGM office - can drive to it.

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1							
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

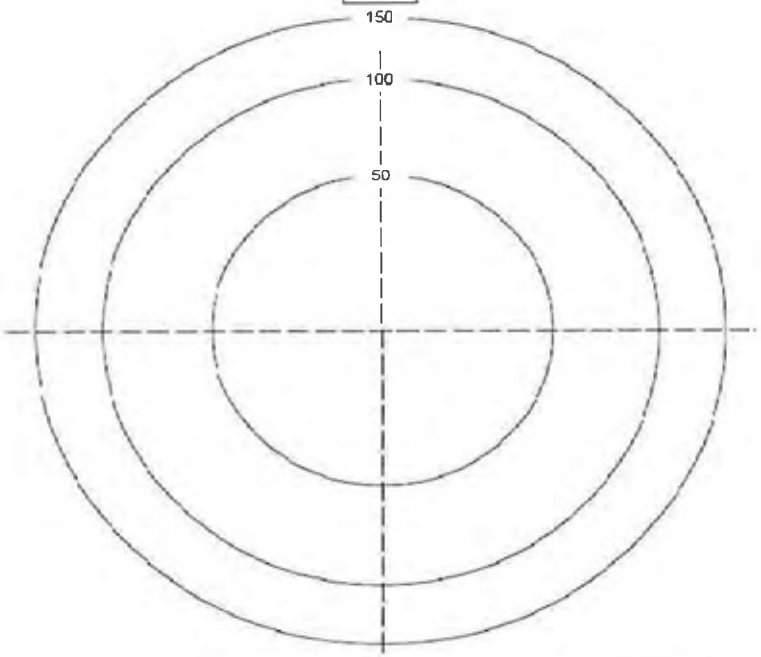
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MA-8~~ D-03	Date	Time Start	Time End
Observer(s):	Will M & Willow A	8-19-11	5:51	6:01
	NAD83	Temp (F)	Wind	Sky
Easting:	0541764	68 °	Ø @ N/A	Ø %
Northing:	3826131			
Point-count Habitat Type:	Reclaimed Mining Area			
Comments:				

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None

Direction
N °



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Small 2-track for access to point count

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

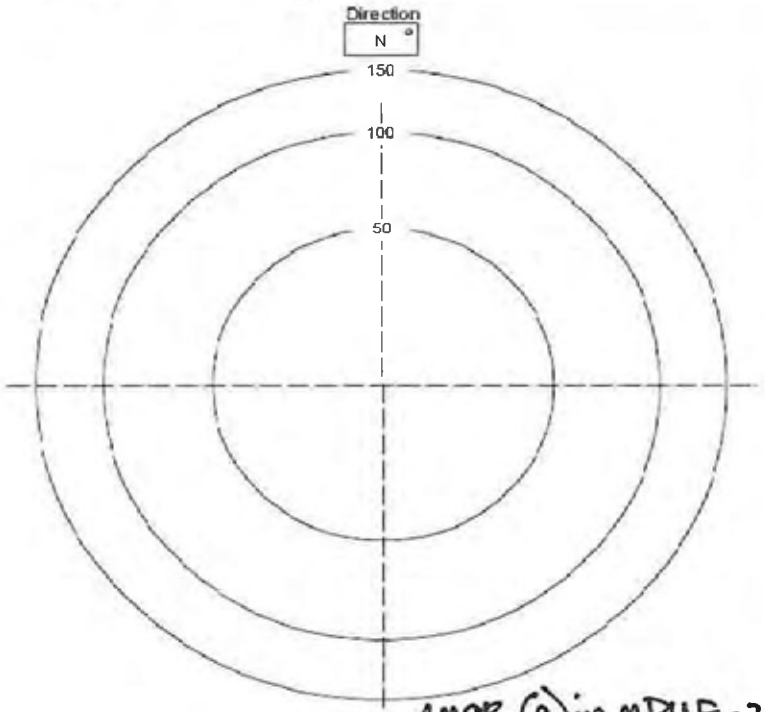
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MA-9 D-02	Date	Time Start	Time End
Observer(s):	W. Medlin & W. Hebb	8-19-11	6:08	6:18
	NAD83	Temp (F)	Wind	Sky
Easting:	0541592	69 °	Ø @ N/A	Ø %
Northing:	3825981			
Point-count Habitat Type	Reclaimed Mining Area			
Comments:	Site adjacent to previously excavated pit & Haile Gold Mine Road			

☐ Rain ☐ Wind X Anthropogenic Noise ☐ None



Species between this and previous point: AMCR (c) in MPHF x 2

Non-landbird species present but not counted:

Mammals:

Notes: Insect Noise. outside 150m

	Species	Time	#	Beh	Dist	Height	Habitat
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

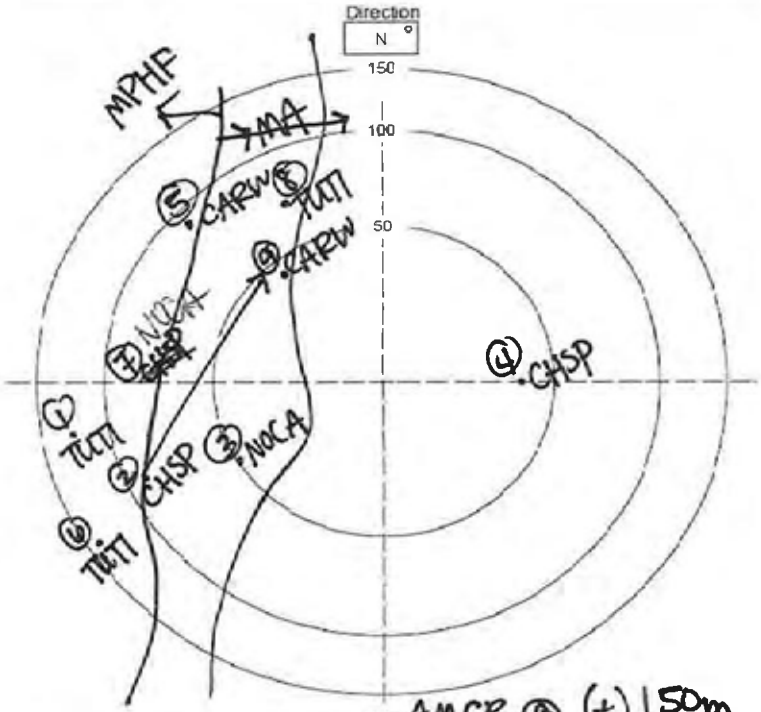
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MA-10 D-01	Date	Time Start	Time End
Observer(s):	W. Medlin & W. Helmick	8.19.11	6:27	6:37
	NAD83	Temp (F)	Wind	Sky
Easting:	0541478	70 °	Ø @ NA	Ø %
Northing:	3826183			
Point-count Habitat Type:	Reclaimed Mine Area			
Comments:	MPHF in plot			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None



Species between this and previous point: AMCR @ (+) 150m

Non-landbird species present but not counted:

Mammals:

Notes: Adjacent to access road. Insect Noise

	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	628	1	S	120		MPHF
2	CHSP	629	1	F/C	100	10m	MPHF
3	NOCA	631	1	C	50		MA
4	CHSP	632	1	S	40		MA
5	CARW	633	1	S	80		MPHF
6	TUTI	633	1	S	130		MPHF
7	NOCA	631	1	C	70		MPHF
8	TUTI	635	1	S	60		MPHF
9	CARW	636	1	S	40		MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
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Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
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Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
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Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

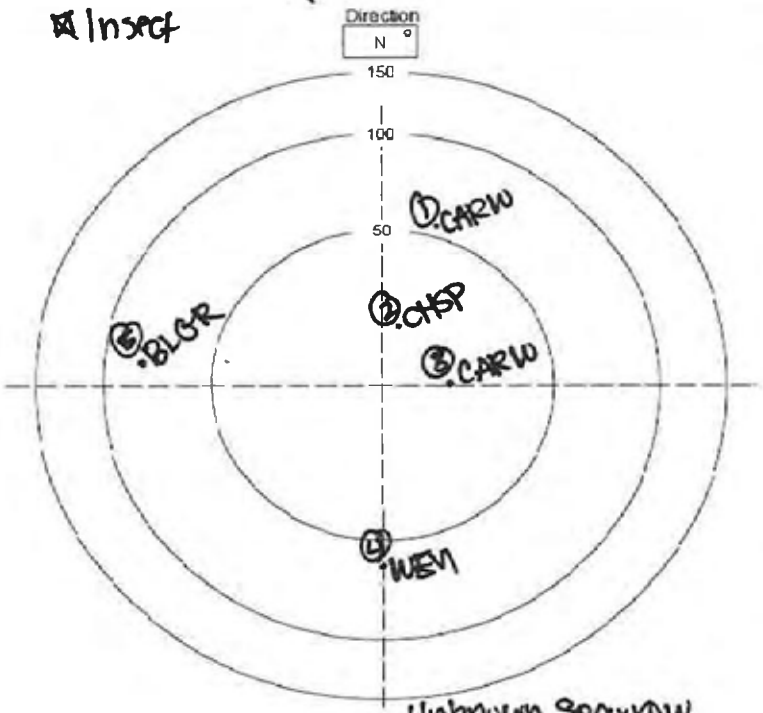
Station Id:	MA-11 D-10		Date	Time Start	Time End
Observer(s):	W. Medlin	W. Hebrd	8.19.11	10:31	10:41
	NAD83		Temp (F)	Wind	Sky
Easting:	0542256		77°	Ø @ NA	Ø %
Northing:	3826432				

Point-count Habitat Type: Mining Area

Comments:
Moved point b/c of drill rig (not operating)

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None

☒ Insect



Species between this and previous point: Unknown Sparrow

Non-landbird species present but not counted:

Mammals:

Notes: Reclaimed MA.

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	1033	1	S	100		MPHF
2	CHSP	1034	1	S	30		MA
3	CARW	1036	1	C	30		MA
4	WEVI	1039	1	S	60		MPHF
5	BLGR	1041	1	S	80		MPHF
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Four Letter Species Codes

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Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
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Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
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Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
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Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

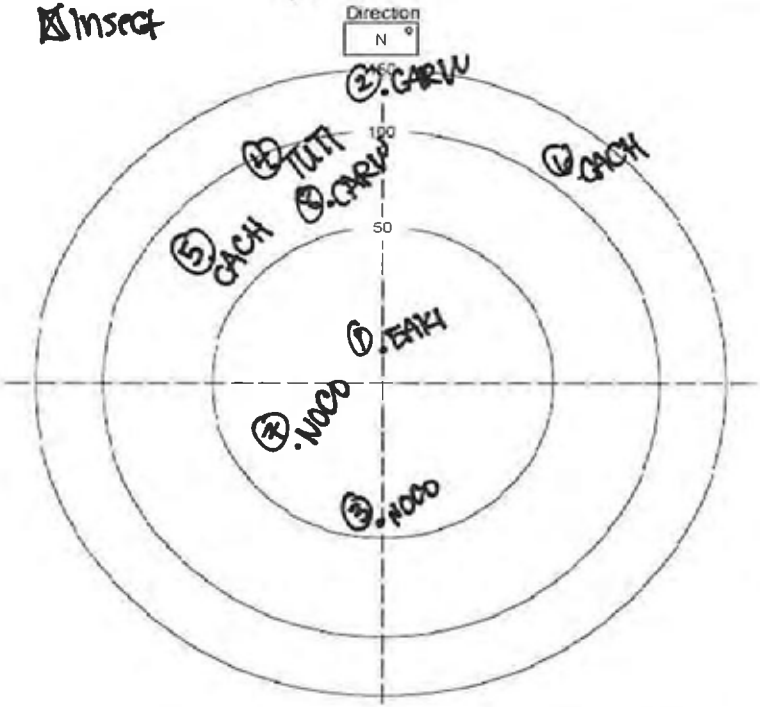
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MPHF-9 DHF-54	Date	Time Start	Time End
Observer(s):	W. Medlin / W. Herrick	8.19.21	10:51	11:01
	NAD83	Temp (F)	Wind	Sky
Easting:	0542510	78 °	Ø @ N/A	Ø %
Northing:	2826443			
Point-count Habitat Type: MPHF				
Comments: Close (can see) the reservoir.				

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None

☒ Insect



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	EAKI	1051	1	S	20		MPHF
2	CARW	1051	1	S	136		MPHF
3	NOCO	1054	1	C	40		MPHF
4	TUTI	1055	1	S	100		MPHF
5	CACH	1055	1	S	100		MPHF
6	CACH	1056	1	S	110		MPHF
7	NOCO	1057	1	C	30		MPHF
8	CARW	1058	1	S	60		MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM

Haile Mine Project - South Carolina

ΔMA-13

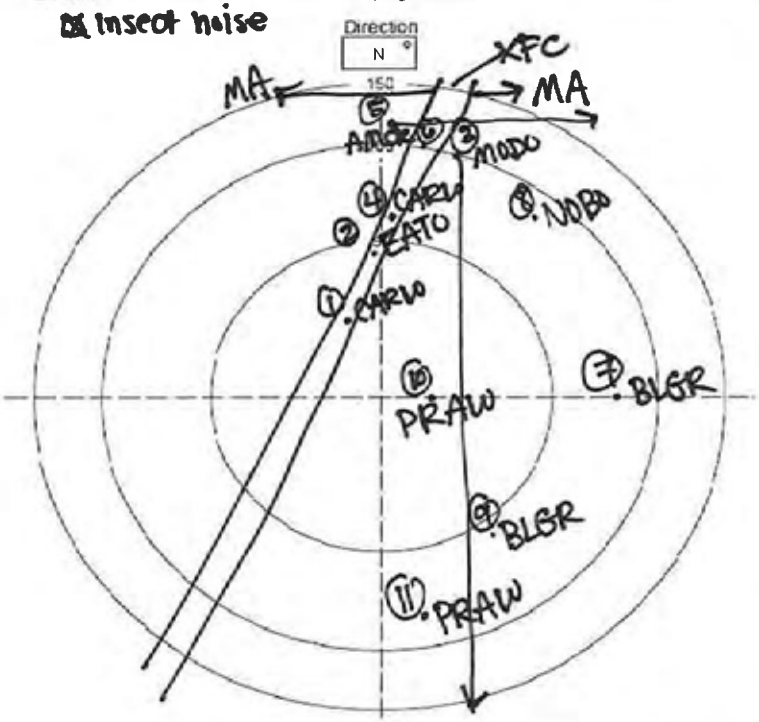
Station Id:	SA-13 D-08	Date	Time Start	Time End
Observer(s):	W. Medlin / W. Hetrick	8.19.11	927	937
	NAD83	Temp (F)	Wind	Sky
Easting:	0542306	73 °	Ø @ MA	40 %
Northing:	3826993			

Point-count Habitat Type: Reclaimed Mining area

Comments: small strip of Long-leaf pine running through point count.

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None

☒ Insect noise



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Change to MA-(#?). Surrounding mine reclamation area. Mining equipment. Area has been cleared.

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	927	1	S	20		XFC
2	EATO	930	1	S	56		XFC
3	MODO	931	1	F	5	10m	MA
4	CARW	931	1	C	50		XFC
5	AMCR	931	1	F	100	50m	MA
6	DOWO	932	1	C	100		XFC
7	BLGR	933	1	S	70		MA
8	NOBO	933	1	C	80		MA
9	BLGR	936	1	S	100		MA
10	PRAW	937	1	S	20		MA
11	PRAW	937	1	S	90		MA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

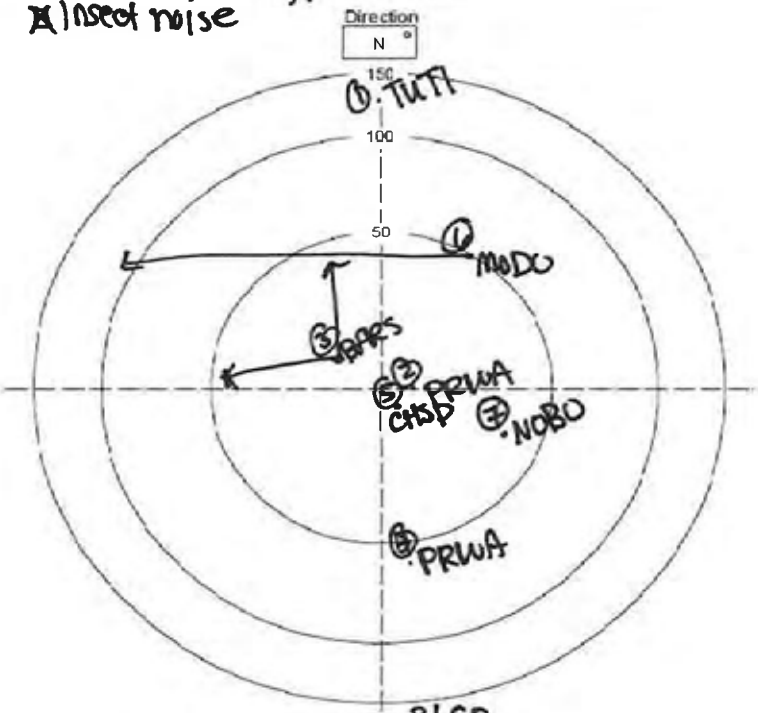
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA-12~~ D-09 → MA-14		Date	Time Start	Time End
Observer(s):	W. Medlin	W. Herrick	8.19.11	9:50	10:00
	NAD83		Temp (F)	Wind	Sky
Easting:	0542385		75 °	1 @ S	10 %
Northing:	3826842				
Point-count Habitat Type:	Mining Area.				
Comments:					

□ Rain □ Wind X Anthropogenic Noise (drilling) □ None

X Insect noise



Species between this and previous point: BLGR

Non-landbird species present but not counted:

Mammals:

Notes: Change → MA-(#?)
Poison Ivy on-site

	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	950	1	S	130		XFC
2	PRWA	950	1	S	26		MA
3	BARS	950	2	F	20	15m	MA
4	PRWA	952	1	S	100		MA
5	CHSP	955	1	F	10	2	MA
6	MODO	958	1	F	50	26	MA
7	NOBO	1000	1	C	40		MA
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

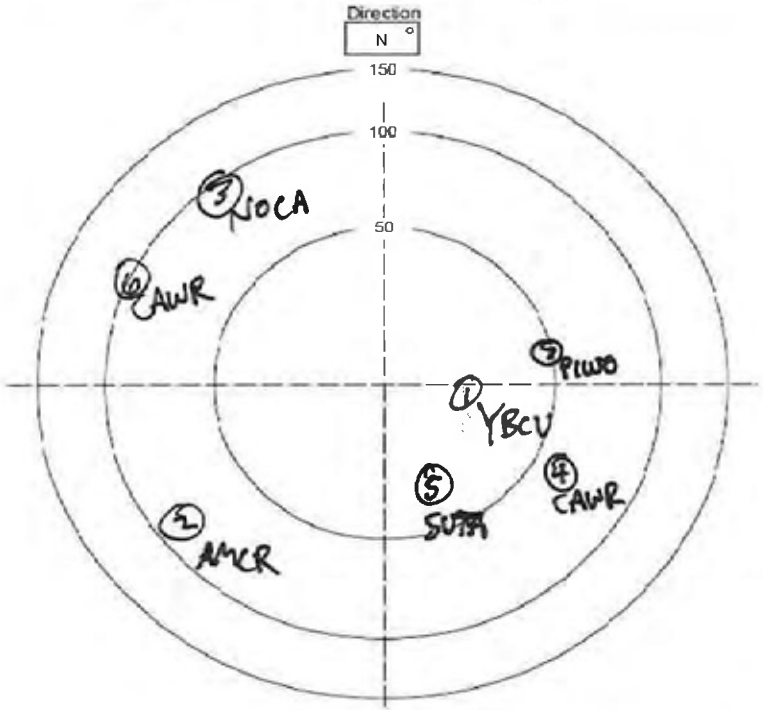
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

[✓] Entered in Database [ ] QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-1~~ SSF-01	Date	Time Start	Time End
Observer(s):	WLM, WMH	8/20/11	0845	0855
	NAD83	Temp (F)	Wind	Sky
Easting:	0540818	78 °	ø	100 %
Northing:	3825096			
Point-count Habitat Type:	Bottomland HW - Alluvial River Floodplain			
Comments:	Green ash, Red Maple, American Holly, Privet			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☒ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Pt count located adjacent to Little Lynches River

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	YBCU	0845	1	C	75	NA	BHF
2	AMCR	0845	1	C	70	NA	BHF
3	NOCA	0846	1	C	70	NA	BHF
4	CAWR	0846	1	C	65	NA	BHF
5	SUTA	0847	1	S	45	NA	BHF
6	CAWR	0852	2	S	80	NA	BHF
7	PIWO	0853	1	S	35	NA	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
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Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

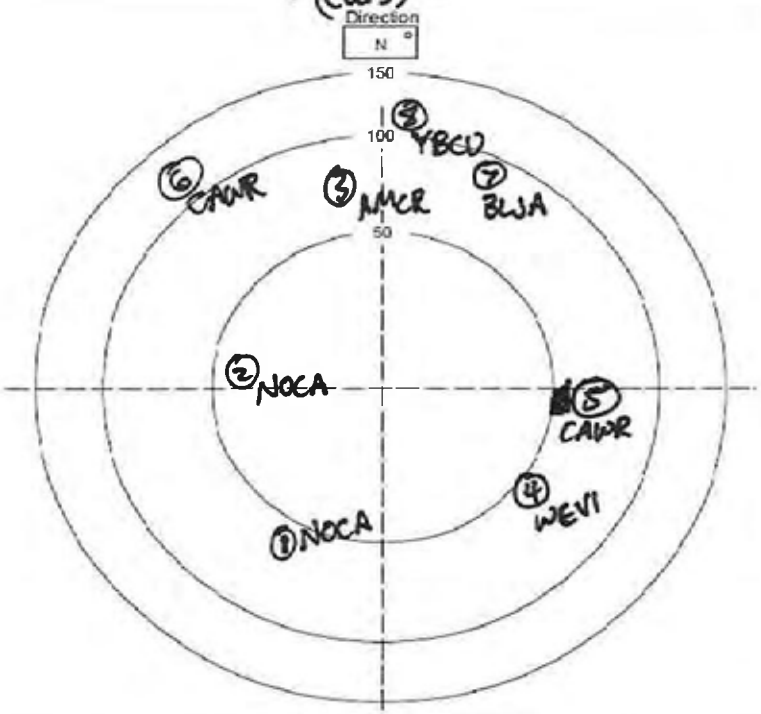
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-2~~ SSF-01	Date	Time Start	Time End
Observer(s):	WMH, WLM	8/20/11	0912	0922
	NAD83	Temp (F)	Wind	Sky
Easting:	0540629	76 °	@	100 %
Northing:	3825283			
Point-count Habitat Type:	BMW			
Comments:	Sycamore, Sweetgum, American elm, Dogwood, Holly			

□ Rain □ Wind X Anthropogenic Noise (cars) □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	0912	1	C	40	NA	BHF
2	NOCA	0913	1	C	30	NA	BHF
3	AMCR	0913	2	C	60	NA	BHF
4	WEVI	0914	1	S	60	NA	BHF
5	CAWR	0914	1	S	80	NA	BHF
6	CAWR	0915	2	C	60	NA	BHF
7	BLJA	0915	2	C	80	NA	BHF
8	YBCU	0917	1	S	100	N/A	BHF
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American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
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Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
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Carolina Wren	CARW	Pine Warbler	PIWA
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Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

[✓] Entered in Database [ ] QA/QC

BIRD SURVEY FORM

Haile Mine Project - South Carolina

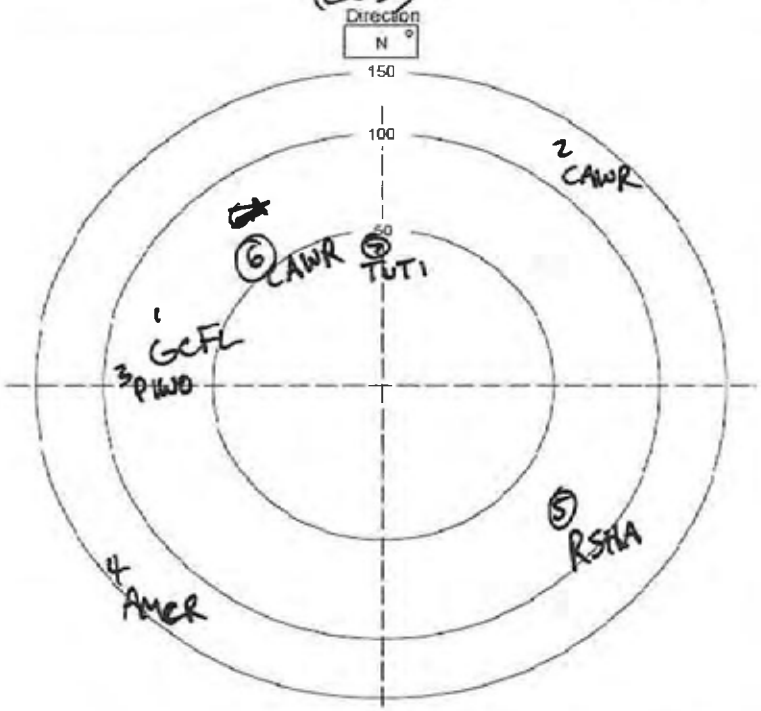
~~BHF-22~~ ~~BHF-14~~

Station Id:	~~FF-1~~ BHF-01	Date	Time Start	Time End
Observer(s):	WLM, WMH	8/20/11	0807	0817
	NAD83	Temp (F)	Wind	Sky
Easting:	0541020	75 °	~~@~~	100 %
Northing:	3824989			

Point-count Habitat Type: BHF

Comments: area is a wetland. Juncus effusus green ash, American elm, lycopodium sp., Panicum sp, chasmanthium

☐ Rain ☐ Wind ☒ Anthropogenic Noise (cars) ☐ None



Species between this and previous point:

Non-landbird species present but not counted:

Mammals: FF-1 habitat type is BHF

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	GCFL	0807	1	C	60	NA	BHF
2	CAWR	0809	2	C	130	NA	MPH
3	PIWO	0810	1	S	70	NA	BHF
4	AMCR	0811	1	C	150	NA	MPH
5	RSHA	0812	1	S	75	NA	MPH
6	CAWR	0815	1	C	50	NA	BHF
7	TUTI	0815	2	C	60	NA	MPH
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

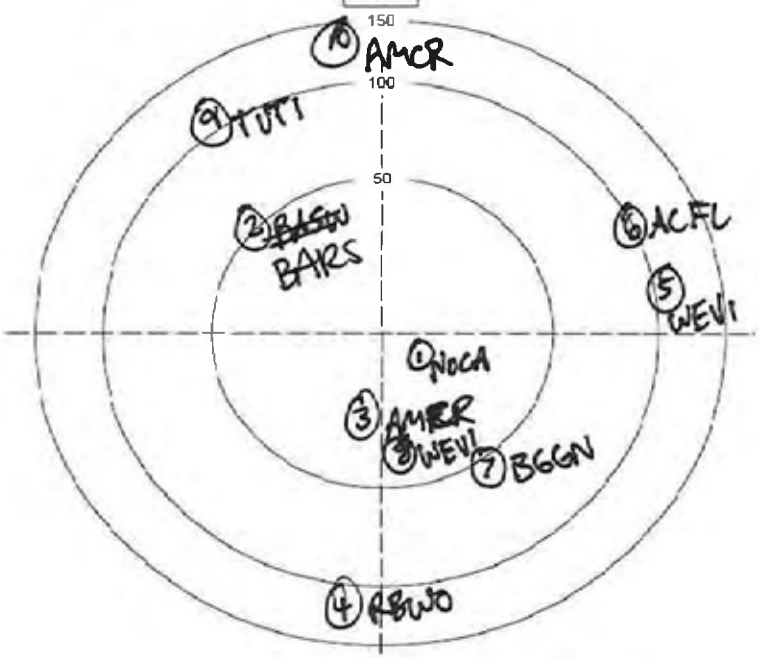
Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	FF-2 MVF-03	Date	Time Start	Time End
Observer(s):	WLM, WMH	8/20/11	0939	0949
	NAD83	Temp (F)	Wind	Sky
Easting:	0540566	80 °	@	85 %
Northing:	3825474			
Point-count Habitat Type:	fallow field			
Comments:	Old road/clearing early successional habitat			

☒ Rain drizzle ☐ Wind ☒ Anthropogenic Noise (Traffic) ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

BARS

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	0939	2	C	5	2 ~~NA~~	FF
2	~~BGGN~~	0940	3	~~FO~~	20	20	FF
3	AMCR	0941	2	C	~~120~~	NA	FF
4	RBWO	0942	1	C	100	NA	MPH
5	WEVI	0944	1	S	120	NA	MPH
6	ACFL	0945	1	C	60	NA	MPH
7	BGGN	0945	1	C	60	NA	MPH
8	WEVI	0947	1	S	40	NA	MPH
9	TUTI	0948	1	C	110	NA	MPH
10	AMCR	0948	1	C	80	NA	MPH
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

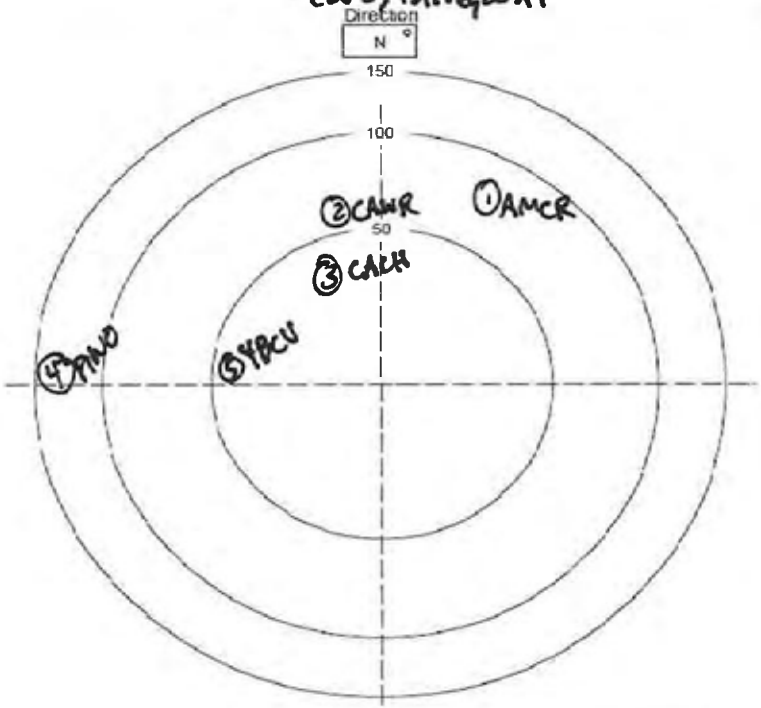
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF-1~~ OHF-05	Date	Time Start	Time End
Observer(s):	WLM, WMH	8/20/11	1056	1106
	NAD83	Temp (F)	Wind	Sky
Easting:	0541154	80 °	@	100 %
Northing:	3825856			
Point-count Habitat Type:	Mesic HW Slope forest			
Comments:	Small intermittent stream adjacent to pt count site.			

☐ Rain ☐ Wind ☒ Anthropogenic Noise cars, infrequent ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Insect (cicada) noise prevalent at this site

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1056	1	C	80	NA	MMHF
2	CAWR	1057	1	C	60	NA	MMHF
3	CACH	1059	1	S	40	NA	MMHF
4	PIWO	1100	1	S	135	NA	MMHF
5	YBCU	1100	1	S	40	NA	MMHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

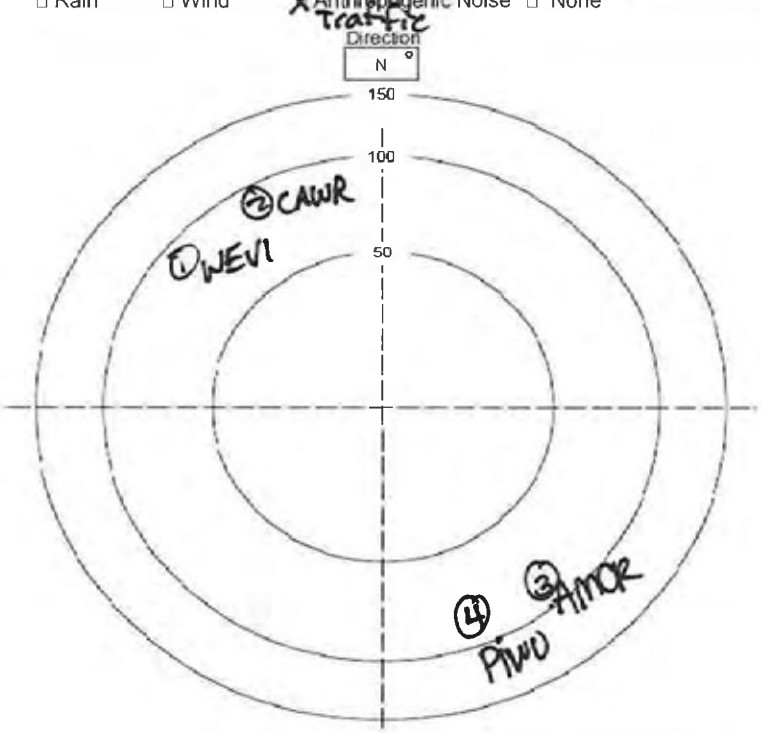
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

OHF-07

Station Id:	~~MMHF-2~~	Date	Time Start	Time End
Observer(s):	WLM, WMH	8/20/11	1029	1039
	NAD83	Temp (F)	Wind	Sky
Easting:	0540846	80 °	@	90 %
Northing:	3825864			
Point-count Habitat Type:	Mesic HW Forest			
Comments:	Point located adjacent a small seep.			

☐ Rain ☐ Wind ☒ Anthropogenic Noise Traffic ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	WEVI	1029	1	C	70	NA	MMHF
2	CAWR	1031	1	S	80	NA	MMHF
3	AMCR	1028	1	C	100	–	MMHF
4	PIWO	1038	1	C	100	–	MMHF
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
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Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
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Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
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Eastern Towhee	EATO	Tree Swallow	TRES
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Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

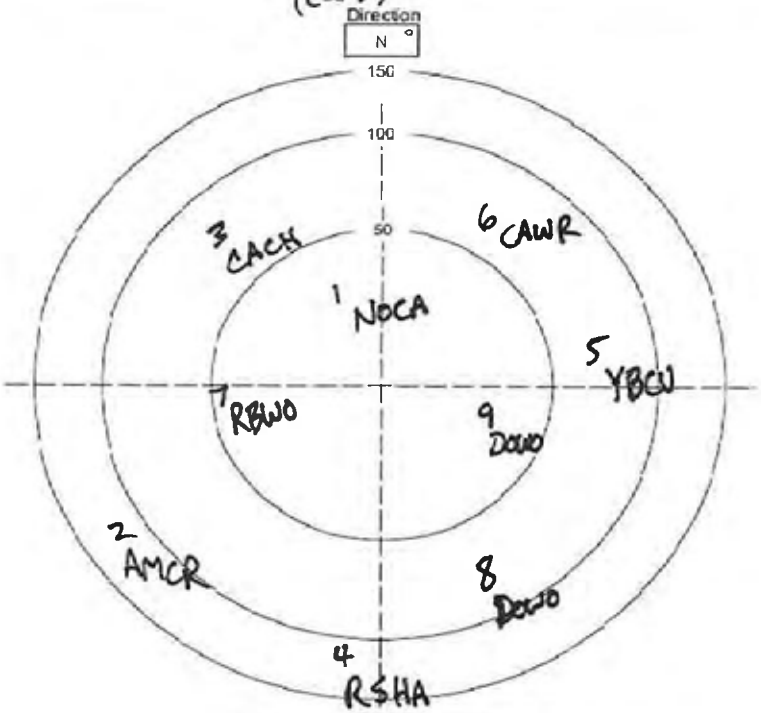
OHF-2

Station Id:	MPHF-1	Date	Time Start	Time End
Observer(s):	WMH, WLM	8/20/11	0738	0748
	NAD83	Temp (F)	Wind	Sky
Easting:	0541257	72 °	@	100 %
Northing:	3824957			

Point-count Habitat Type: Mixed Pine/HW

Comments: Pt count adjacent to small drainage feature willow oak, loblolly pine, water oak, black cherry

☐ Rain ☐ Wind ☒ Anthropogenic Noise (Cars) ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Photos Taken #101 - 6456 to 6459

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	0738	2	C	20	N/A	MPH
2	AMCR	0739	2	C	120	N/A	MPH
3	CACH	0740	1	C	60	N/A	MPH
4	RSHA	0741	1	C	150	N/A	MMHF
5	YBCU	0742	1	S	100	N/A	MPH
6	CAWR	0743	1	C	60	N/A	MPH
7	RBWO	0744	1	D	20	10	MPH
8	DOWO	0747	1	S	180	N/A	MPH
9	DOWO	0747	1	C	30	N/A	MPH
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

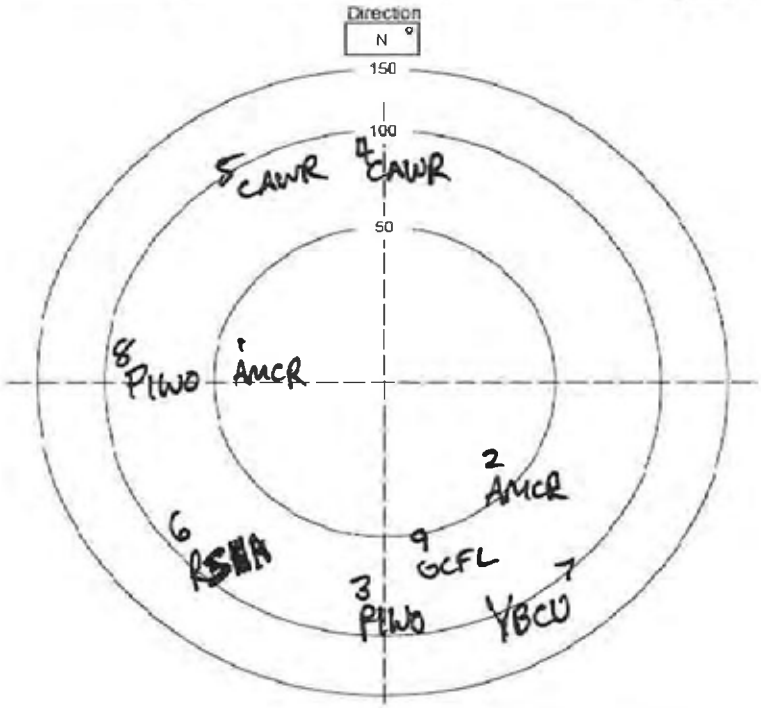
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-2~~ OHF-03	Date	Time Start	Time End
Observer(s):	WLM, WMH	8/20/11	0711	0721
	NAD83	Temp (F)	Wind	Sky
Easting:	0541396	72 °	@	100 %
Northing:	3825178			

Point-count Habitat Type: Mixed Pine/HW

Comments: White Oak, sweetgum, shortleaf pine, American Holly
★ Recently constructed drill pad adjacent (50M)

☐ Rain ☐ Wind ☐ Anthropogenic Noise ✓ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	0711	1	C	40	NA	MPH
2	AMCR	0711	2	C	40	N/A	MMHF
3	PIWO	0712	1	S	100	N/A	MMHF
4	CAWR	0713	1	C	75	N/A	MPH
5	CAWR	0713	1	C	75	N/A	MPH
6	RSHA	0716	1	C	100	N/A	MPH
7	YBCU	0717	1	S	115	NA	MMHF
8	PIWO	0719	1	C	75	NA	MPH
9	GCFL	0719	1	C	50	NA	MMHF
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

✓ Entered in Database ☐ QA/QC

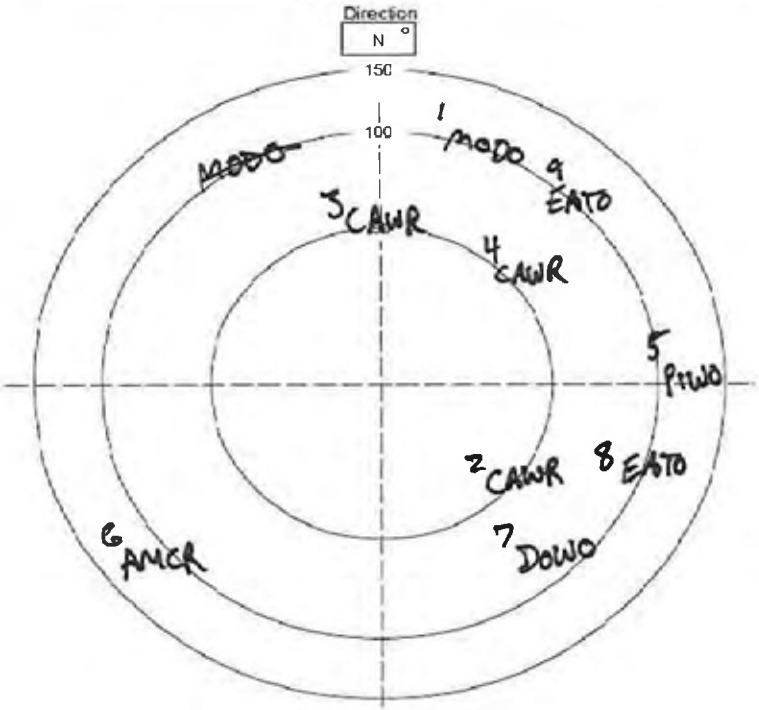
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-3~~ OHF-04	Date	Time Start	Time End
Observer(s):	WLM, WMH	8/20/11	0651	0701
	NAD83	Temp (F)	Wind	Sky
Easting:	0541364	72 °	S @	100 %
Northing:	3825431			

Point-count Habitat Type: Mixed Pine/HW

Comments: Adjacent to Woods/forestry road. Red Maple, Cedar, sweetgum, water oak

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted _____

Mammals: _____

Notes _____

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	MODO	0652	1	C	100	NA	MPH
2	CAWR	0652	1	S	40	NA	MPH
3	CAWR	0652	1	S	50	NA	MPH
4	CAWR	0654	1	S	40	NA	MPH
5	PIWO	0655	1	C	110	NA	MPH
6	AMCR	0656	1	C	125	NA	MPH
7	DOWO	0658	1	C	50	NA	MPH
8	EATO	0659	1	S	100	NA	MPH
9	EATO	0700	1	S	85	NA	MPH
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

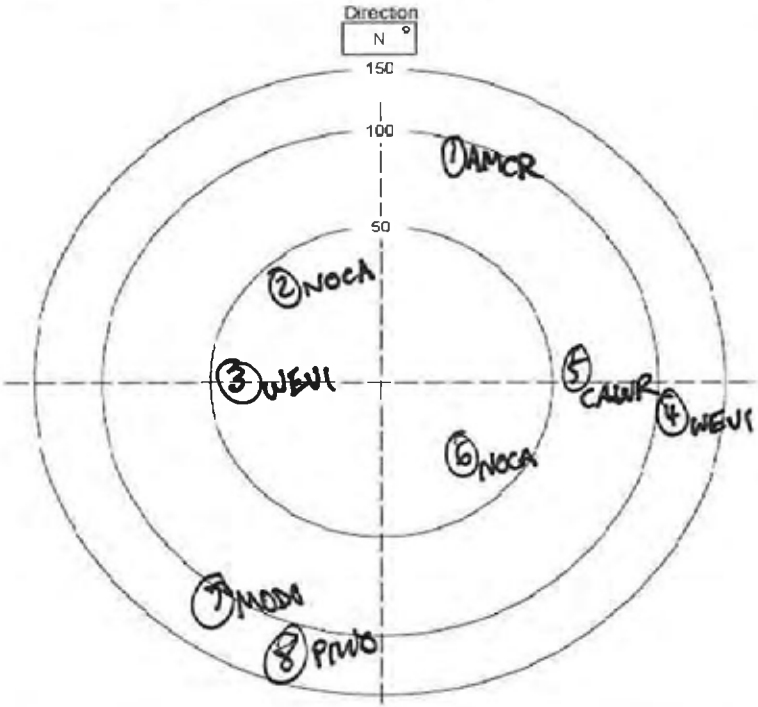
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MPHF-4 MVF-05	Date	Time Start	Time End
Observer(s):	WLM, WMH	8/20/11	1117	1127
	NAD83	Temp (F)	Wind	Sky
Easting:	0541293	82 °	@	100 %
Northing:	3825874			
Point-count Habitat Type:	Mixed Pine/HW			
Comments:	Ground cedar, loblolly pine, sweetgum dogwood			

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1117	1	C	90	NA	MPH
2	NOCA	1118	1	C	20	NA	MPH
3	WEVI	1118	1	S	20	NA	MPH
4	WEVI	1119	1	C	120	NA	MPH
5	CAWR	1120	1	S	80	NA	MPH
6	NOCA	1120	1	C	20	NA	MPH
7	MODO	1125	1	S	100	NA	MPH
8	PIWO	1126	1	S	100	NA	MPH
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

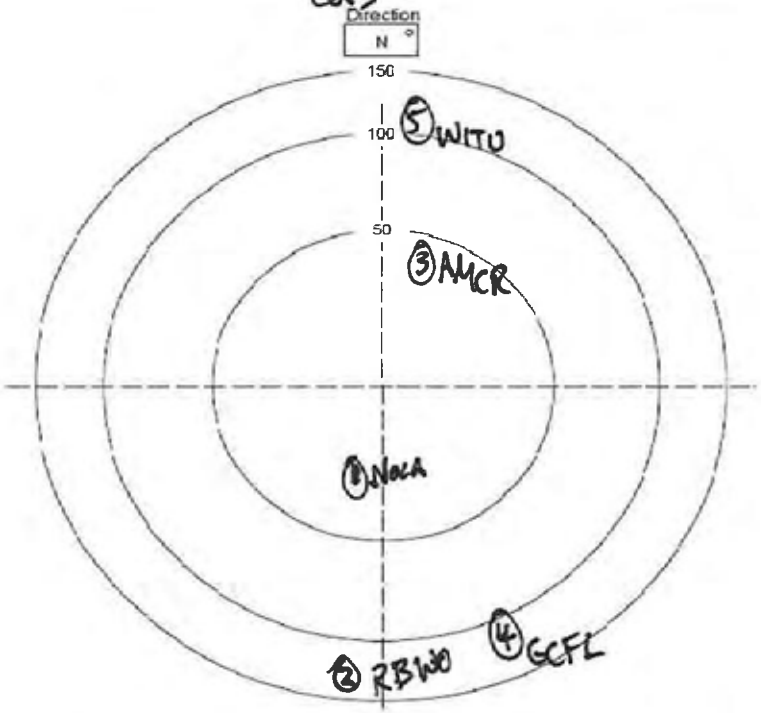
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVE-04

Station Id:	~~MPHF-5~~	Date	Time Start	Time End
Observer(s):	WMH, WLM	8/20/11	1002	1012
	NAD83	Temp (F)	Wind	Sky
Easting:	0540722	79 °	@	80 %
Northing:	3825671			
Point-count Habitat Type:	Mixed Pine/HW			
Comments:	Old loblolly pine plantation w/ HW encroachment. Trees approx. 30-40 yrs old.			

□ Rain □ Wind ☒ Anthropogenic Noise □ None
CORS



Species between this and previous point: _____
Non-landbird species present but not counted: _____
Mammals: _____
Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	1002	1	C	10	NA	MPH
2	RBWO	1005	1	C	125	NA	MPH
3	AMCR	1007	2	C	30	NA	MPH
4	GCFL	1011	1	C	130	NA	MPH
5	WITU	1011	1	C	105	NA	MPH
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

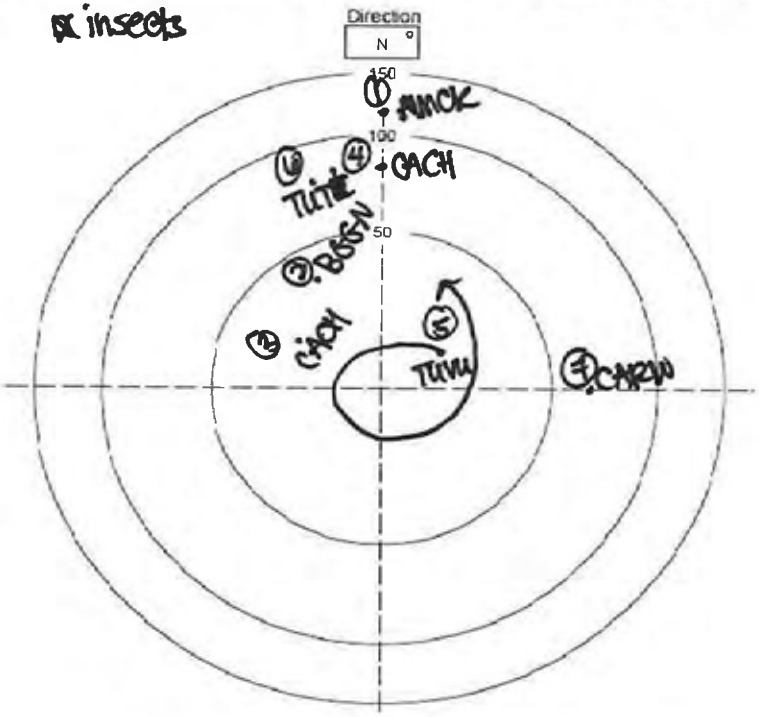
Station Id:	PFW-1 SHP-03	Date	Time Start	Time End
Observer(s):	WLM / W MM	8.21.11	1027	1037
	NAD83	Temp (F)	Wind	Sky
Easting:	0544772	86 °	Ø @ NA	Ø %
Northing:	3827314			

Point-count Habitat Type: Palustrine FW wetland boundary

Comments:

1 Rain 2 Wind 3 Anthropogenic Noise 4 None 5 Insects

x insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1027	1	C	120		MPHF
2	BGGN	1028	1	S	30		PFW
3	GACH	1028	1	C	20		PFW
4	CARW	1028	1	C	80		MPHF
5	TUVU	1030	1	F	20	100	MPHF
6	TUTI	1031	1	S	70		MPHF
7	CARW	1036	1		80		MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

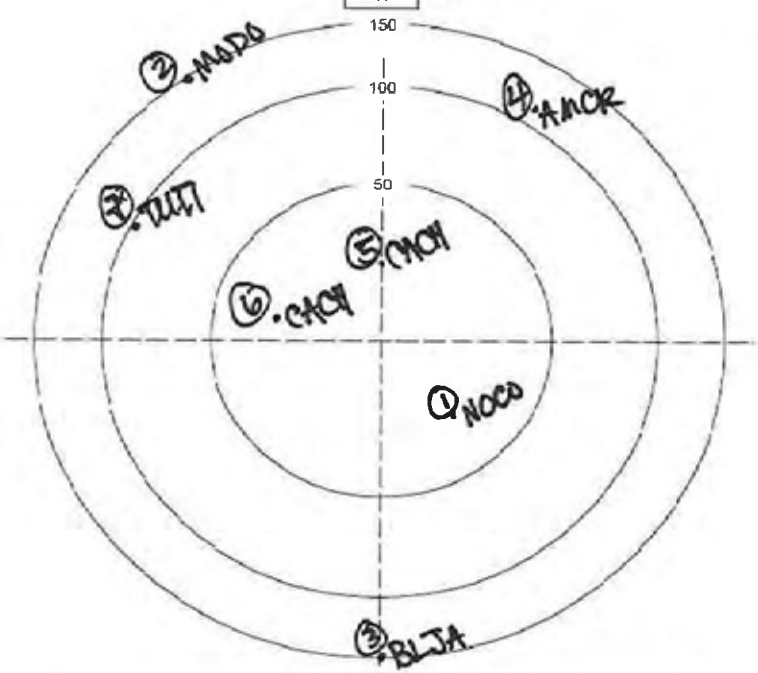
✓ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	PFW-2 SHP-04	Date	Time Start	Time End
Observer(s):	WLM / WMH	8.21.11	1010	1020
	NAD83	Temp (F)	Wind	Sky
Easting:	0544828	88 °	Ø 2 @ NW	Ø %
Northing:	3827240			
Point-count Habitat Type:				
Comments:	see habitat comments from PFW4 & 3.			

☐ Rain X Wind X Anthropogenic Noise ☐ None

X insect plane



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Tree stand in center of swamp. Bait deer w/ corn kernels.

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCO	1013	1	C	30		MPHF
2	MODO	1014	1	S	150		MPHF
3	BLJA	1014	1	C	150		MPHF
4	AMCR	1015	1	C	120		MPHF
5	CACH	1018	1	C	20		PFW
6	CACH	1018	1	C	30		PFW
7	TUTI	1018	1	S	100		MPHF
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Four Letter Species Codes

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American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

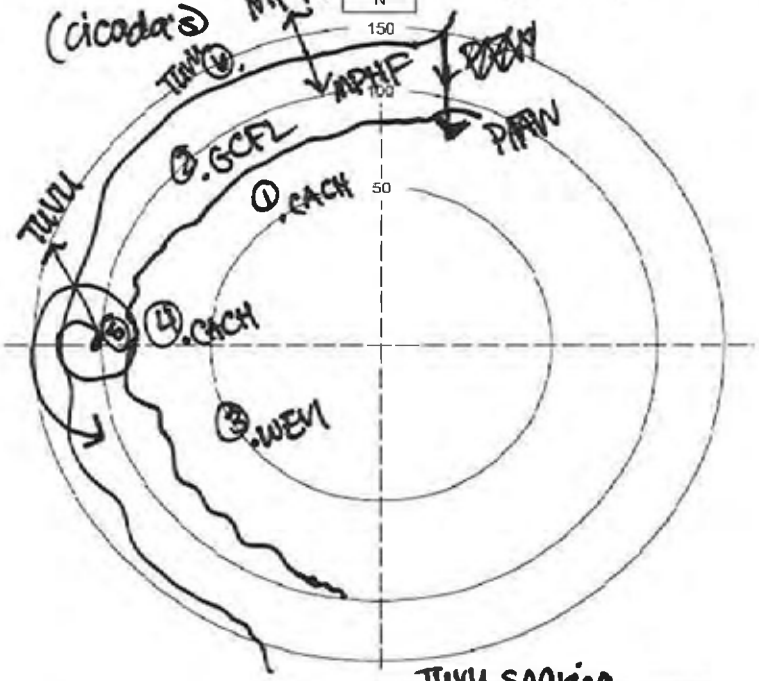
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	PFW-3 SHP-05	Date	Time Start	Time End
Observer(s):	WLM / WMH	8.21.11	9:55	10:05
	NAD83	Temp (F)	Wind	Sky
Easting:	0524782	85 °	Ø @ NA	Ø %
Northing:	3827216			
Point-count Habitat Type:	Palustrine FW wetland			
Comments:	w/in wetland adjacent to small ditch			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None

☒ insects (cicadas) drilling/equipment



Species between this and previous point: TUVU soaring

Non-landbird species present but not counted:

Mammals:

Notes: Moved point to encompass more habitat type

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	955	1	S	50		MPHF
2	GCFL	956	1	S	80		MPHF
3	WEVI	957	1	S	50		MPHF
4	CACH	957	1	S	60		MPHF
5	TUVU	1000	1	F	100	150	MPHF
6	TUVU	1001	1	F	150	100	MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

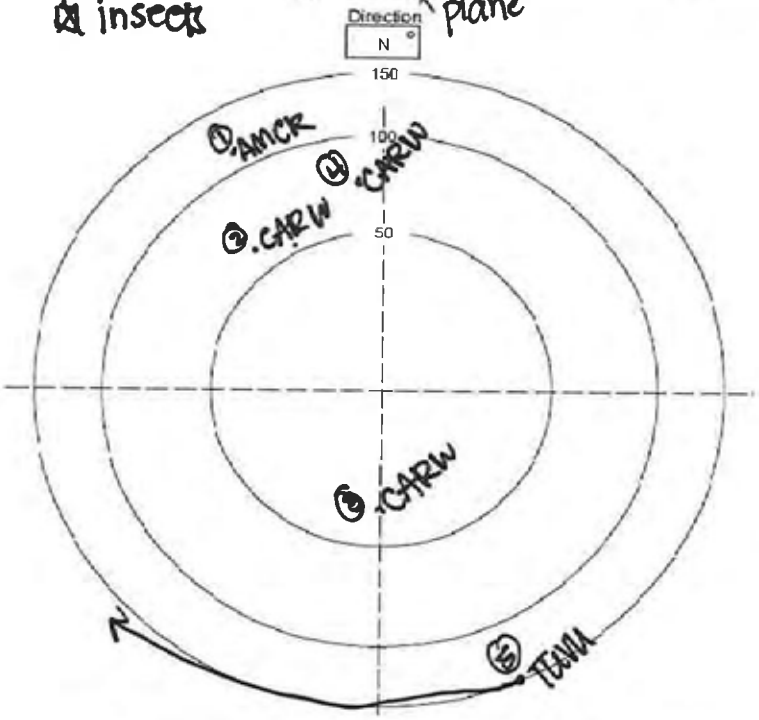
SHP-06

Station Id:	PFW-4	Date	Time Start	Time End
Observer(s):	WLM / WNH	8.21.11	939	949
	NAD83	Temp (F)	Wind	Sky
Easting:	0544727	85°	Ø @ NA	10 %
Northing:	3827303			
Point-count Habitat Type:				

Comments: wetland is currently dry. Tree strata dominated by sweet & swamp black gum

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None

☒ insects ↑ plane



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	939	1	C	120	MPHF	~~[illegible]~~
2	CARW	940	1	S	100	MPHF	~~[illegible]~~
3	CARW	942	1	S	40		PFW
4	CARW	945	1	S	70		MPHF
5	TUVU	948	1	F	150	100m	~~[illegible]~~
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
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Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
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Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
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Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

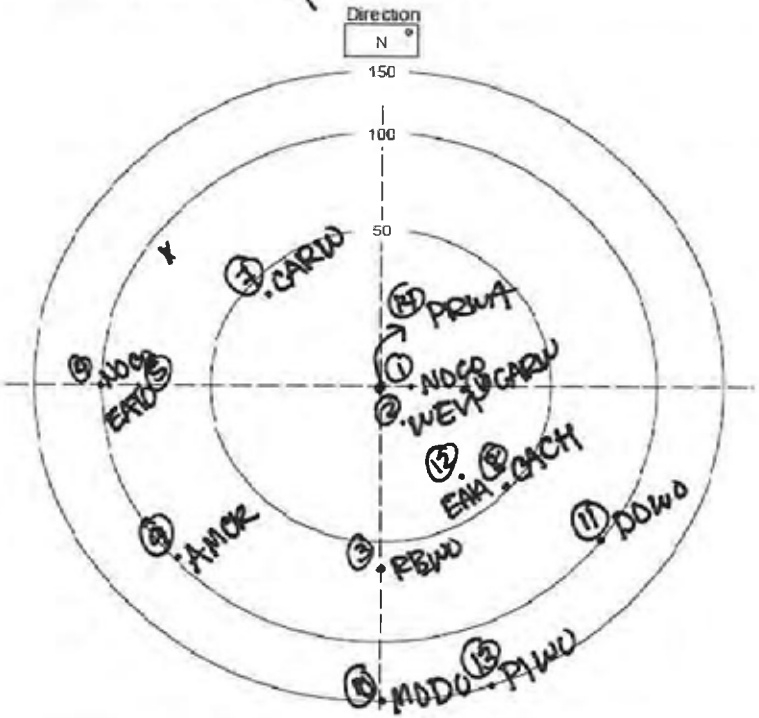
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA-20~~ MVS-17	Date	Time Start	Time End
Observer(s):	WLM / WMH	8-21-11	850	900
	NAD83	Temp (F)	Wind	Sky
Easting:	0544169	78 °	Ø @ N/A	5 %
Northing:	3827502			
Point-count Habitat Type:	Silvilculture			

Comments: Young loblolly pine plantation (~5yrs) Dirt piles & logging slash.

□ Rain □ Wind X Anthropogenic Noise □ None



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes: Flock (3) Unknown sparrows flew overhead at 902am.

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCO	856	2	C	10		SA
2	WEVI	856	1	S	15		
3	RBWO	851	1	C	60		
4	NOCO	851	1	C	100		
5	EATO	852	1	S	80		
6	CARW	853	1	S	20		
7	CARW	853	1	S	90		
8	CACH	854	1	S	50		
9	AMCR	854	1	C	100		
10	MODO	855	1	S	150		
11	DOWO	856	1	C	100		
12	EAKI	856	2	F/P	40	20	
13	PIWO	857	1	C	150		
14	PRWA	858	1	V/P	3	3	
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Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
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Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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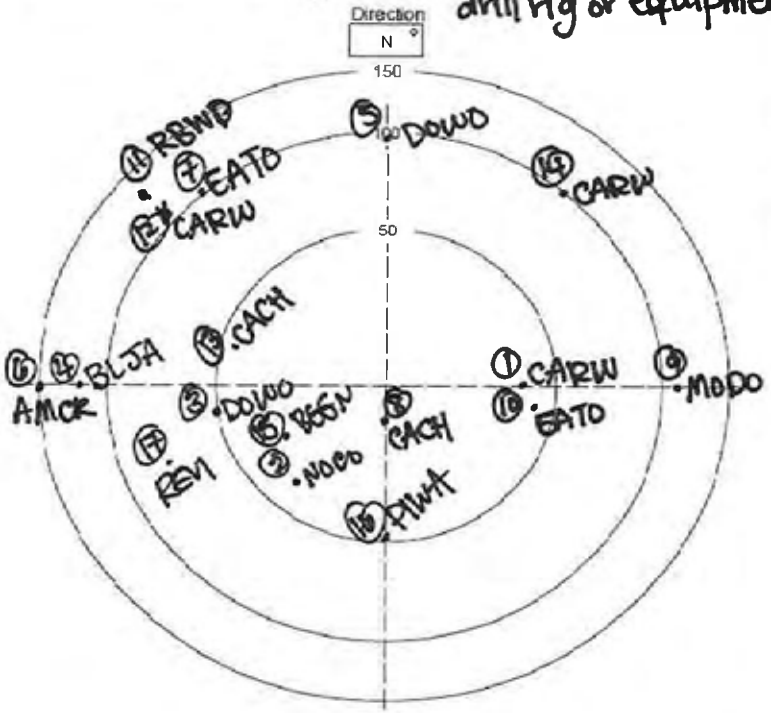
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA-27~~ MTP-06	Date	Time Start	Time End
Observer(s):	WLM / WMH	8.21.11	822	832
	NAD83	Temp (F)	Wind	Sky
Easting:	0544402	78 °	Ø @ N/A	0 %
Northing:	3827571			
Point-count Habitat Type:	Silviculture			
Comments:				

☐ Rain ☐ Wind X Anthropogenic Noise ☐ None drill rig or equipment



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	822	1	C	40		SA
2	NOCO	822	1	C	30		
3	DOWO	822	1	C	50		
4	BLJA	823	1	C	120		
5	DOWO	823	1	C	100		
6	AMCR	824	1	C	150		
7	EATO	824	1	S	100		
8	CACH	824	1	S	20		
9	MODO	825	1	S	120		
10	EATO	825	1	S	100		
11	RBWO	825	1	C	140		
12	CARW	826	1	S	100		
13	CACH	826	1	C	40		
14	CARW	827	2	S	100		
15	BGGN	828	1	S	30		
16	PIWA	832	1	S	50		
17	REVI	832	1	S	100		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

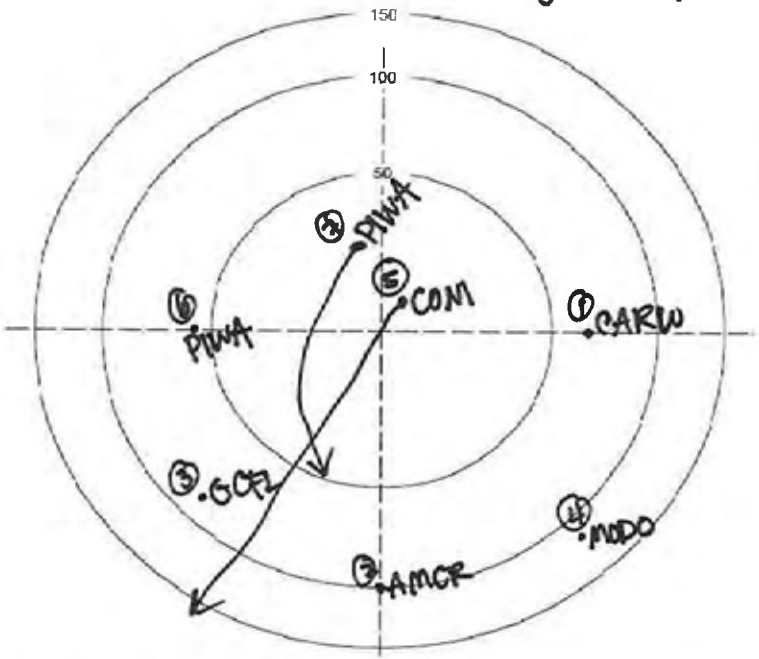
Station Id:	SA-28 MTP-07	Date	Time Start	Time End
Observer(s):	WLM / WMH	8.21.11	7:58	808
	NAD83	Temp (F)	Wind	Sky
Easting:	0544047	74 °	Ø @ NA	40 %
Northing:	3827624			
Point-count Habitat Type:	Silvilculture			
Comments:	see habitat description from SA-30			

☐ Rain ☐ Wind X Anthropogenic Noise ☐ None

☒ insect

Direction N °

plane drill rig or equipment



Species between this and previous point:

Non-landbird species present but not counted:

Mammals: squirell

Notes:

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	758	1	C	76		SA
2	AMCR	759	1	C	100		
3	GCFL	759	1	S	80		
4	MODO	802	1	S	120		
5	CONI	804	1	F	10	100	
6	PIWA	805	1	S	100		
7	PIWA	808	1	F/C	20	100	
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

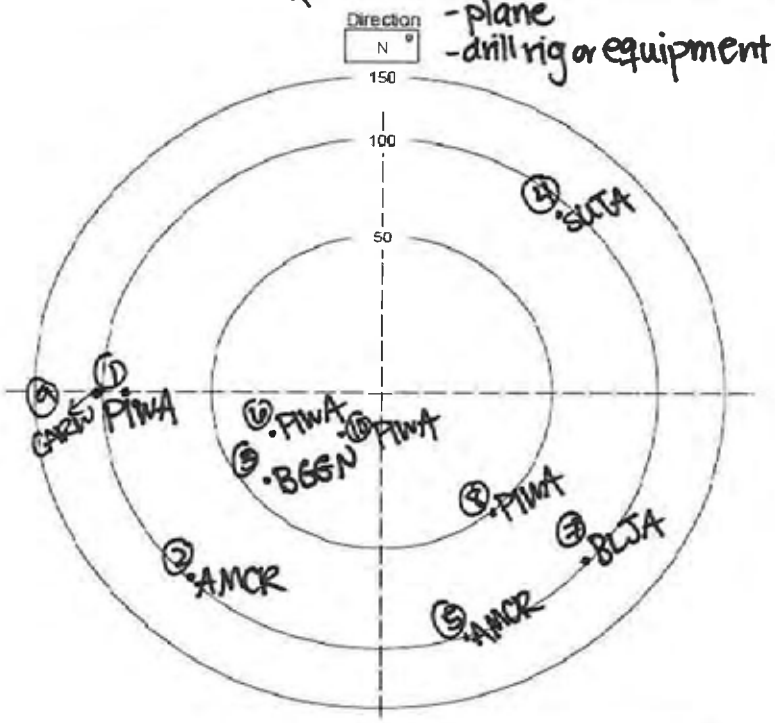
Station Id:	SA-29-MTP-08	Date	Time Start	Time End
Observer(s):	WLM / WMH	8.21.11	740	750
	NAD83	Temp (F)	Wind	Sky
Easting:	0544581	73 °	Ø @ N/A	20 % (haze)
Northing:	3827849			

Point-count Habitat Type: Silvilculture

Comments: See habitat description for SA-30

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None

- plane
- drill rig or equipment



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	PIWA	740	1	S	75		SA
2	AMCR	740	1	C	100		
3	BGGN	741	1	S	40		
4	SUTA	742	1	C	80		
5	AMCR	742	1	C	100		
6	PIWA	743	1	S	30		
7	BLJA	745	1	C	100		
8	PIWA	747	1	S	50		
9	CARW	748	1	S	100		
10	PIWA	749	1	VIF	15	40	
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	ORPR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

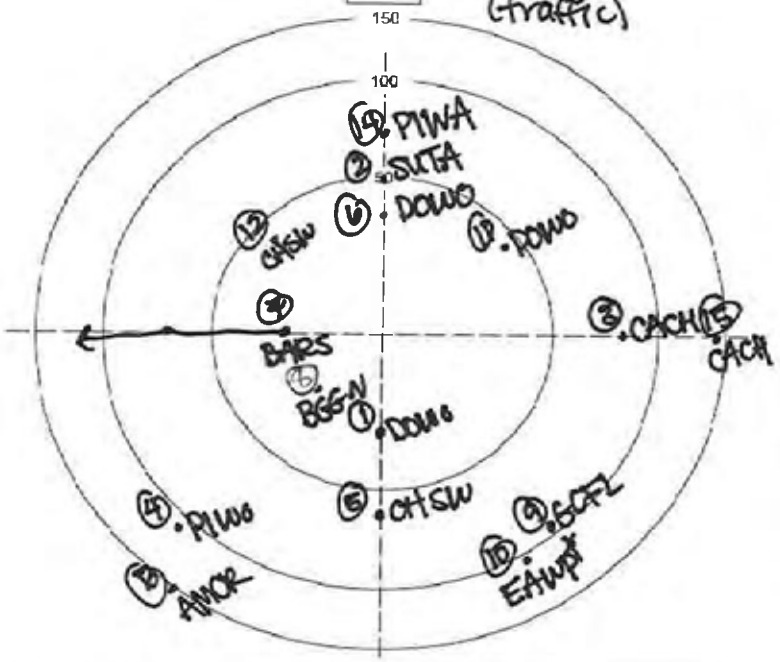
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id: SA-38 MTP-09		Date	Time Start	Time End
Observer(s): WLM | WMH		8.21.11	723	733
	NAD83	Temp (F)	Wind	Sky
Easting: 0544474		73 °	Ø @ NA	10 % (haze)
Northing: 3828084				

Point-count Habitat Type: Silvilculture

Comments: Woods road through loblolly pine plantation. Significant hardwood encroachment

☐ Rain ☐ Wind X Anthropogenic Noise ☐ None (drill rig?) (traffic)



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes: Rooster calling in distance (+150m)

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	DOWO	723	1	C	30		SA
2	SUTA	723	1	C	50		
3	CACH	724	1	S	75		
4	PIWO	725	1	C	75		
5	CHSW	726	1	S	80		
6	DOWO	727	1	C	40		
7	BARS	727	1	F	30	40	
8	BGGN	727	1	S	30		
9	BCFL	728	1	C	100		
10	EAWP	728	1	S	100		
11	DOWO	729	1	C	40		
12	CHSW	729	1	S	40		
13	AMCR	730	1	C	150		
14	PIWA	732	1	S	75		
15	CACH	732	1	C	150		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

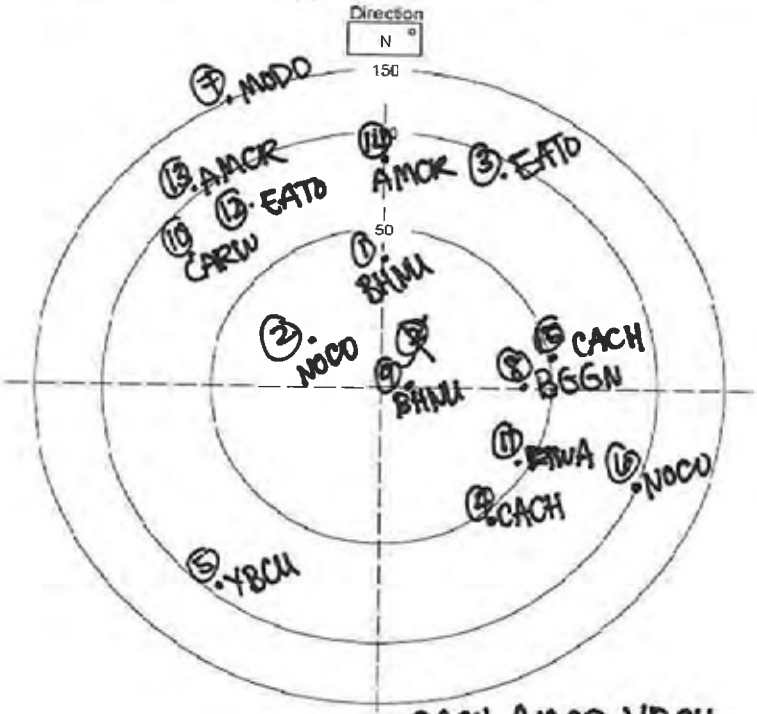
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	SA-3 MTP-10	Date	Time Start	Time End
Observer(s):	NMH & WLM	8·21·11	702	712
	NAD83	Temp (F)	Wind	Sky
Easting:	0544377	71 °	∅ @ NA	10 % (haze)
Northing:	3828320			

Point-count Habitat Type: Silvilculture

Comments: Loblolly Pine plantation interspersed by H_2O oak, white oak & persimmon.

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None



Species between this and previous point: CACH, AMCR, YBCU

Non-landbird species present but not counted:

Mammals: Squirrel

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	BHNU	702	1	S	40		SA
2	NOCO	702	1	C	20		
3	EATO	703	1	S	80		
4	CACH	704	1	S	100		
5	YBCU	704	1	S	80		
6	NOCO	705	1	C	160		
7	MODO	706	1	S	180		
8	BGGN	706	1	S	40		
9	BHNU	707	1	S/C	10	20	
10	CARW	708	1	S	100		
11	PIWA	709	1	S	40		
12	EATO	709	1	S	75		
13	AMCR	709	1	C	100		
14	AMCR	710	1	C	80		
15	CACH	711	1	S	50		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	ORO R
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

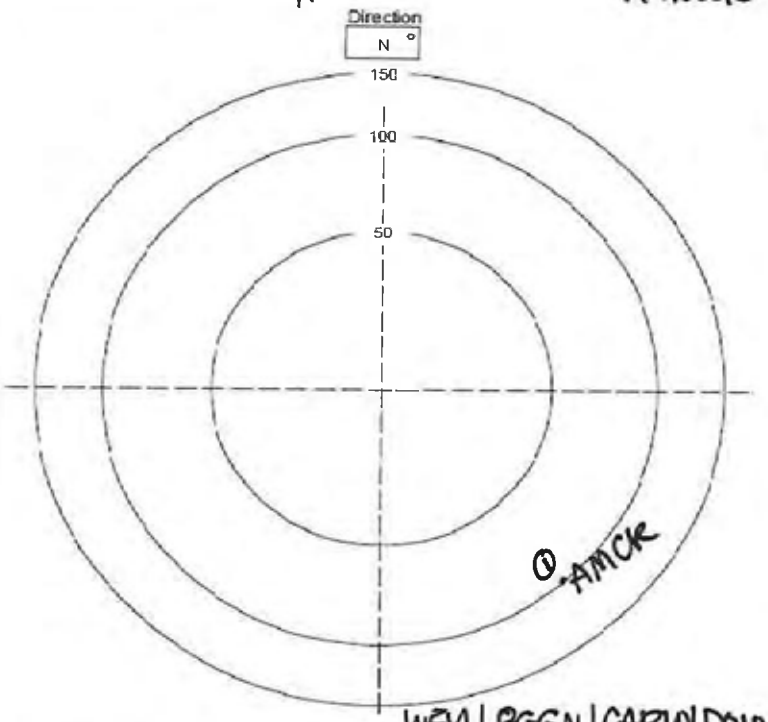
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-8~~ SSF-03	Date	Time Start	Time End
Observer(s):	MD, WM, WH, CL	8.22.11	818	828
	NAD83	Temp (F)	Wind	Sky
Easting:	0542816 7	75 °	Ø @ NA	100 %
Northing:	3821677 7			
Point-count Habitat Type:	Bottomland Hardwood			
Comments:	White oak, sweetgum & red maple			

□ Rain □ Wind X Anthropogenic Noise □ None X Insects



Species between this and previous point: WEVI | BGGN | CARWI | DOWO

Non-landbird species present but not counted:

Mammals:

Notes: Close to Ledbetter Reservoir & operating drill rigs (loud)

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	820	1	C	100	BHP	[illegible]
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

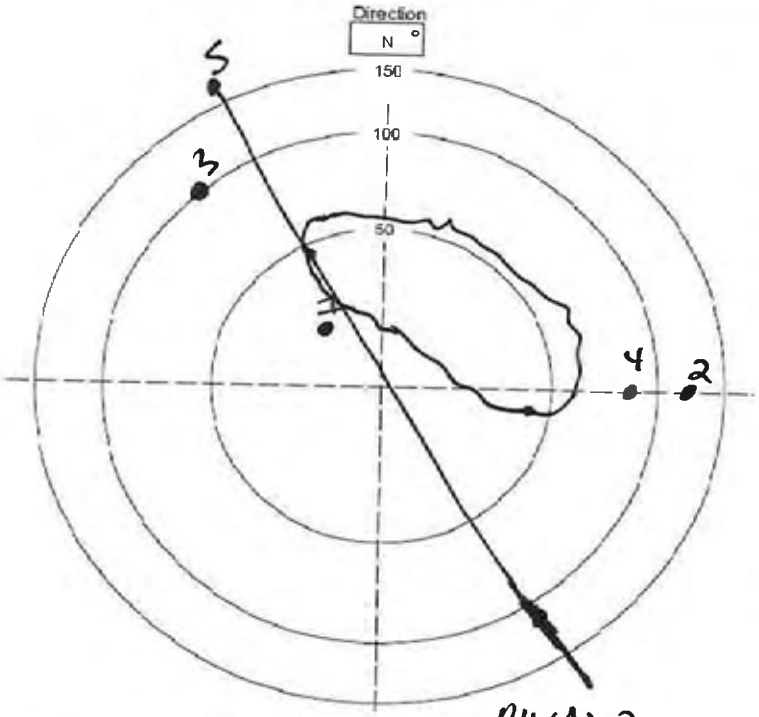
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

[X] Entered in Database [ ] QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MA12~~ D-11	Date	Time Start	Time End
Observer(s):	MD, WH, WM, CW	5/22/11	0750	0800
	NAD83	Temp (F)	Wind	Sky
Easting:	0543008	74 °	0 @	100 %
Northing:	3826634			
Point-count Habitat Type:				
Comments:	Foggy hazy, very limiting			

☐ Rain ☐ Wind ✓ Anthropogenic Noise ☐ None



Species between this and previous point: PIWA x 2

Non-landbird species present but not counted:

Mammals:

Notes: Adj to mining pit open water pond

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	750	1	C	20		MA
2	CHSP	751	1	S	120		MA
3	PRAW	751	1	S	100		MPHF
4	PRAW	752	1	S	80		MPHF
5	BARS	756	2	FO	0	15	FA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	ORORO
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

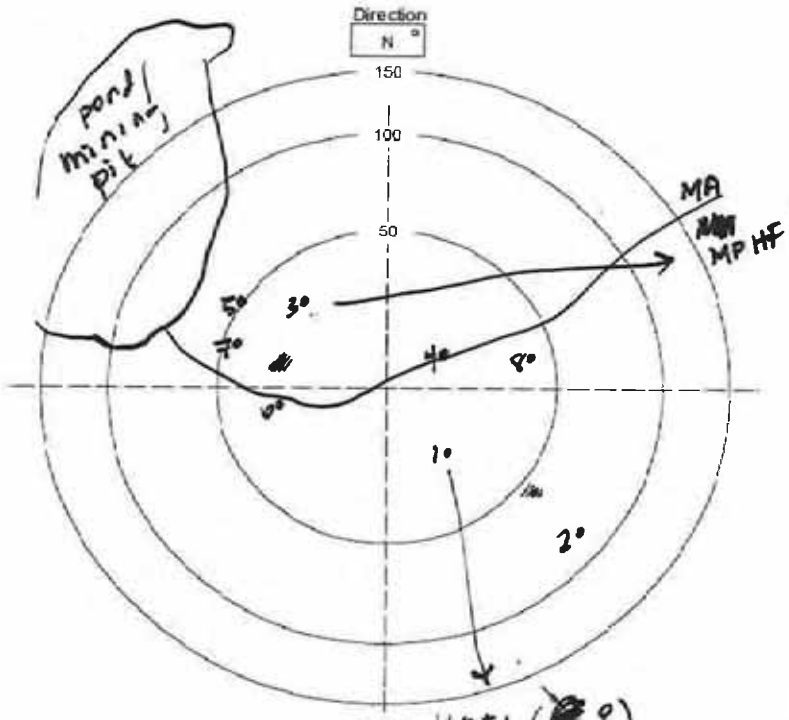
☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Δ from SA16 - MVS-10

Station Id:	to MA-15	Date	Time Start	Time End
Observer(s):	MB, WH, WM, CL	8/22/11	0720	0730
	NAD83	Temp (F)	Wind	Sky
Easting:	0543205	74 °	0 @	100 %
Northing:	3826603			
Point-count Habitat Type:				
Comments:	Fog Heavy, very limiting			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point: HOFI (♂ ?)

Non-landbird species present but not counted:

Mammals:

Notes: change from SA to MA

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	MODO	721	1	FO	30	40	MPHF
2	CARW	722	1	S	80	–	MPHF
3	MODO	723	1	FO	10	30	MA
4	CHSP	724	1	P/C	10	–	MPHF
5	CHSP	725	1	S	10	–	MA
6	PRAW	727	1	S	30	–	MPHF
7	NBCR	728	1	S	50	–	MA
8	PRAW	730	1	S	40	–	MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM

Haile Mine Project - South Carolina

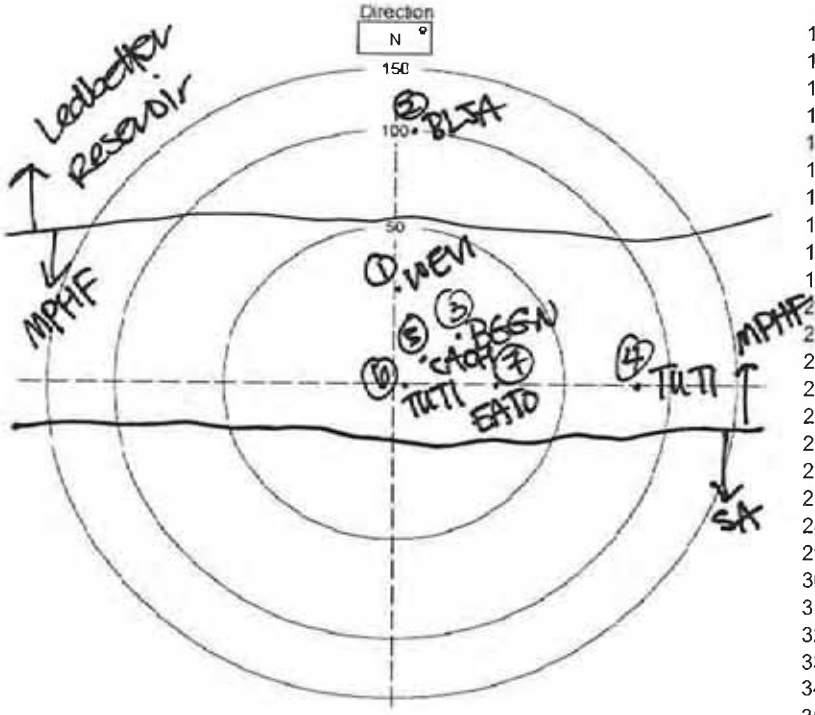
Δ MPHF-11

Station Id:	~~SA-15~~ MVS-07	Date	Time Start	Time End
Observer(s):	WM, MH, MB, C	8.22.11	1021	1031
	NAD83	Temp (F)	Wind	Sky
Easting:	0542705	89 °	Ø @ NA	5 %
Northing:	3826604			

Point-count Habitat Type: Mixed pine hardwood forest

Comments: Fog burned away by this point count

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: change to MPHF instead of SA

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	WEVI	1021	1	S	30		MPHF
2	BLJA	1021	1	C	100		↓
3	BGGN	1022	1	S	20		
4	TUTI	1022	2	S	80		
5	CACH	1023	1	S	20		
6	TUTI	1023	1	S	20		
7	EATO	1026	1	S	25		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

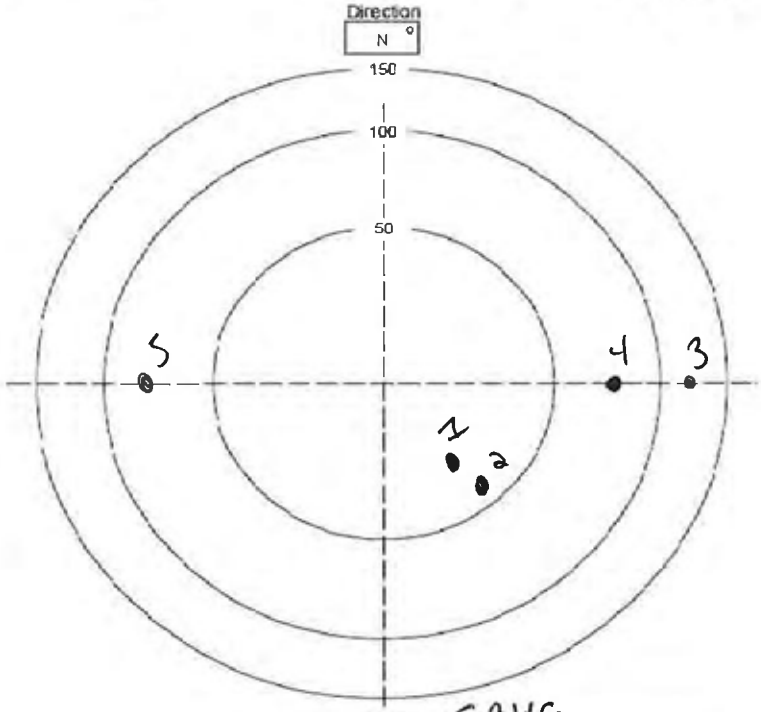
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MA-1~~ TAR-01	Date	Time Start	Time End
Observer(s):	WLM, CAL	08/23/11	746	756
	NAD83	Temp (F)	Wind	Sky
Easting:	0540611	72 °	S @ 3	50 %
Northing:	3826669			
Point-count Habitat Type:	MA			
Comments:	Dirt Road Adj MPH			

(4) ☐ Rain (2) ☐ Wind (8) ☑ Anthropogenic Noise (18) ☐ None (5) ✓ Insects



Species between this and previous point: GBHE

Non-landbird species present but not counted:

Mammals:

Notes:

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	746	2	C	30	—	MA
2	CHSP	748	1	S	40	—	MA
3	AMCR	748	1	C	120	—	MA
4	BLGR	753	1	S	80	—	MA
5	CARW	756	1	C	80	—	MMHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
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American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
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Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

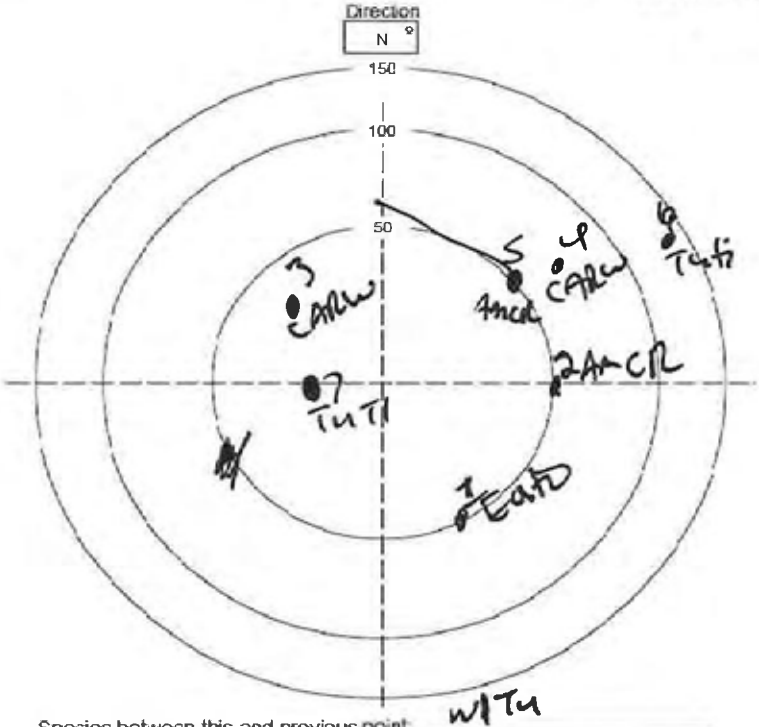
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF 15~~ TAR-02	Date	Time Start	Time End
Observer(s):	MLM, CAL	8/25/11	932	938
	NAD83	Temp (F)	Wind	Sky
Easting:	0541870	83 °	0 @	100 %
Northing:	3825425			
Point-count Habitat Type:	MPHF			
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: WITU

Non-landbird species present but not counted:

Mammals:

Notes:

	Birds Detected During Survey							Four Letter Species Codes			
	Species	Time	#	Beh	Dist	Height	Habitat				
1	~~BHCO~~	932	1	S	50	—	MPHF	Acadian Flycatcher	ACFL	House Sparrow	HOSP
2	AMCR	932	1	S	50	—	MPHF	American Goldfinch	AMGO	Indigo Bunting	INBU
3	CARW	933	1	S	30	—	MPHF	American Redstart	AMRE	Kentucky Warbler	KEWA
4	CARW	934	1	S	70	—	MPHF	American Robin	AMRO	Killdeer	KILL
5	AMCR	935	1	V	50	—	MPHF	American Woodcock	AMWO	Loggerhead Shrike	LOSH
6	TuTi	937	1	S	120	—	MPHF	Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
7	TuTi	938	8	V/S	30	—	MPHF	Barn Swallow	BARS	Mourning Dove	MODO
8								Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
9								Blue Grosbeak	BLGR	Northern Cardinal	NOCA
10								Blue Jay	BLJA	Northern Flicker	NOFL
11								Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
12								Blue-headed Vireo	BHVI	Northern Parula	NOPA
13								Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
14								Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
15								Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
16								Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
17								Carolina Wren	CARW	Pine Warbler	PIWA
18								Chimney Swift	CHSW	Prairie Warbler	PRAW
19								Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
20								Chuck-will's-widow	CWWI	Purple Martin	PUMA
21								Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
22								Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
23								Common Nighthawk	CONI	Red-eyed Vireo	REVI
24								Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
25								Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
26								Eastern Bluebird	EABL	Rock Pigeon	ROPI
27								Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
28								Eastern Meadowlark	EAME	Summer Tanager	SUTA
29								Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
30								Eastern Towhee	EATO	Tree Swallow	TRES
31								Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
32								Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
33								European Starling	EUST	White-breasted Nuthatch	WBNU
34								Field Sparrow	FISP	White-eyed Vireo	WEVI
35								Grasshopper Sparrow	GRSP	Wild Turkey	WITU
36								Gray Catbird	GRCA	Wood Thrush	WOTH
37								Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
38								Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
39								Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
								Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

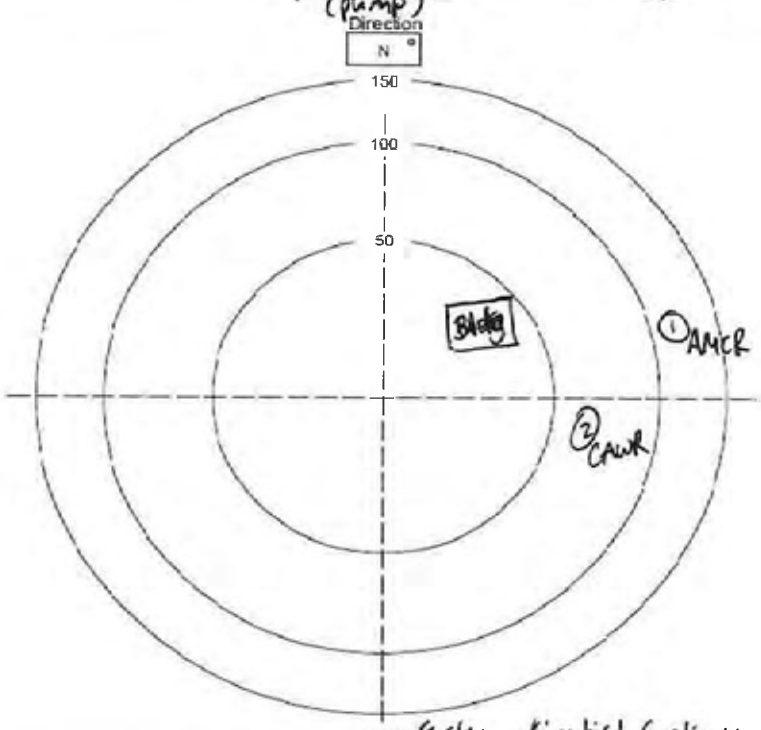
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MA-2~~ MVS-02	Date	Time Start	Time End
Observer(s):	CAL, WLM	8/23/11	0723	0733
	NAD83	Temp (F)	Wind	Sky
Easting:	0540784	70 °	@	0 %
Northing:	3826529			
Point-count Habitat Type:	Reclaimed Mining Area			
Comments:	point count is adjacent to small pit/wetland and building			

☐ Rain ☐ Wind ☒ Anthropogenic Noise (pump) ☐ None ☒ INSECTS



Species between this and previous point: Eastern Kingbird, Carolina Wren

Non-landbird species present but not counted: N/A

Mammals: N/A

Notes: Loblolly pine, Eastern Red Cedar, Sweetgum, Blackberry, Weeping love grass, broomsedge

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	0729	1	C	130	NA	~~MPHF~~ MA
2	CAWR	0731	1	S	75	NA	MPHF
3							
4							
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39							

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

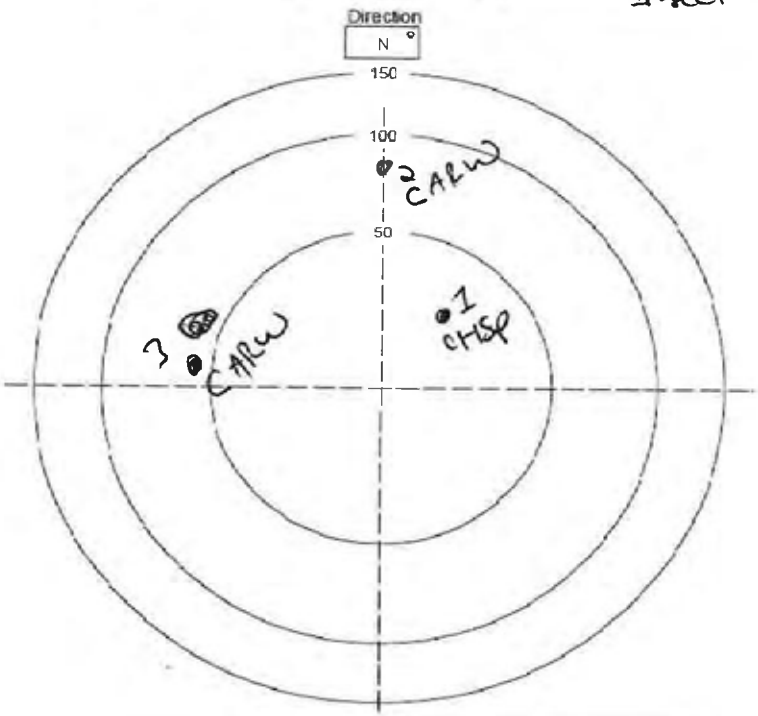
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	AA-3 MVS-03	Date	Time Start	Time End
Observer(s):	CAL, WLM	08/23/11	1143	1153
	NAD83	Temp (F)	Wind	Sky
Easting:	0540985	°	@	%
Northing:	3626695			
Point-count Habitat Type:	MA			

Comments: Plot pt count done on edge of corn food plot adj to loblolly pine reclaimed area

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None Insect



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CHSP	1144	2	S	25	—	MA
2	CARW	1146	1	S	80	—	MA
3	CARW	1147	1	C	60	1	MA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

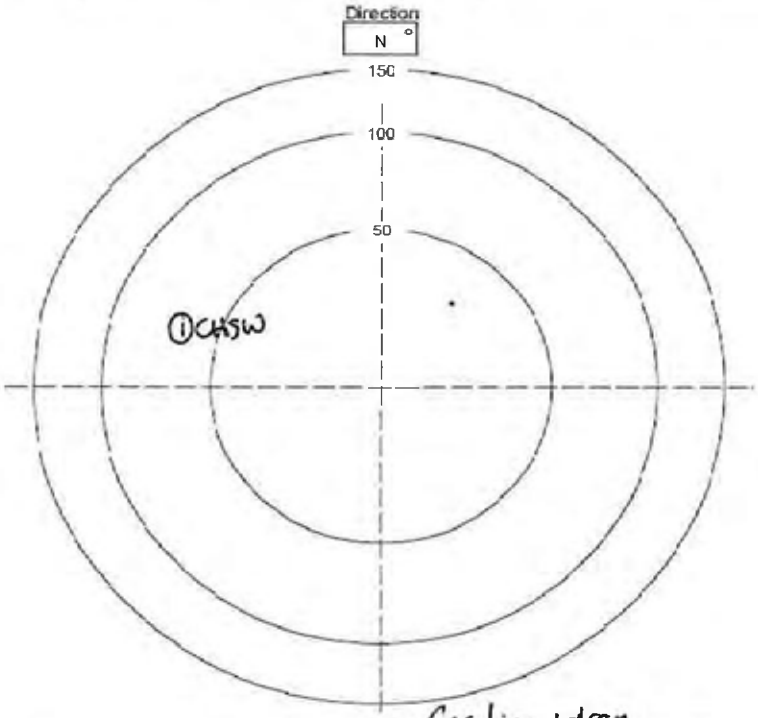
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF-3~~ OHF-10	Date	Time Start	Time End
Observer(s):	CAL, WLM	8/23/11	1115	1125
	NAD83	Temp (F)	Wind	Sky
Easting:	0540267	83 °	5 @ W	40 %
Northing:	3826920			
Point-count Habitat Type:	MMHF			
Comments:	Slope ~ 8% Sourwood, Maple, Beech, white oak			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None ☒ Insects



Species between this and previous point: Carolina Wren

Non-landbird species present but not counted:

Mammals:

Notes:

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	CHSW	1122	1	S	60	NA	MPHF
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

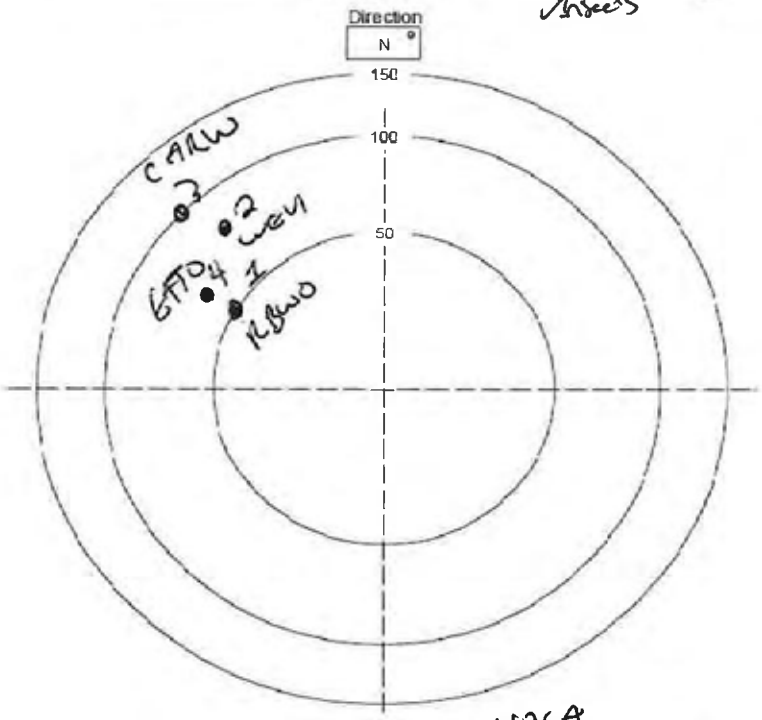
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF-4~~ OHE-11	Date	Time Start	Time End
Observer(s):	WLM, CAL	06/23/11	1045	1055
	NAD83	Temp (F)	Wind	Sky
Easting:	0540123	84 °	@0	90 %
Northing:	3827116			
Point-count Habitat Type:	2			
Comments:	MMHF, Blk walnut, honey locust w/ wing stem dominating herb. layer slope ≈5%.			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None Insects



Species between this and previous point: NOCA

Non-landbird species present but not counted:

Mammals:

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	RBWO	1050	1	S	50	/	MMHF
2	WEVI	1055	1	S	70	/	MMHF
3	CARW	1051	1	S	100	/	MMHF
4	EATO	1057	1	S	60	/	MMHF
5							
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

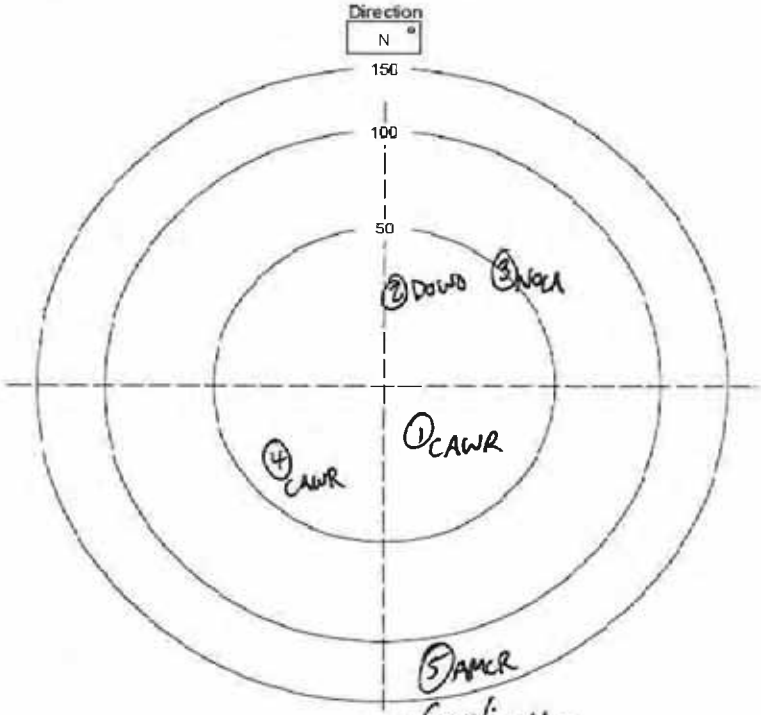
☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM changed to ~~SA-13~~

Haile Mine Project - South Carolina

Station Id:	~~MMHF-5~~ MVF-01	Date	Time Start	Time End
Observer(s):	CAL, WLM	8/23/11	1020	1030
	NAD83	Temp (F)	Wind	Sky
Easting:	0539908	79 °	W @ 3-5	80 %
Northing:	3827088			
Point-count Habitat Type:	SA			
Comments:	Loblolly Pine plantation (MMHF is not correct Habitat type) HW encroachment is prevalent			

☐ Rain ☒ Wind ☒ Anthropogenic Noise ☐ None



Species between this and previous point: Carolina Wren

Non-landbird species present but not counted:

Mammals:

Notes: Sweet gum, water oak, broomsedge, yellow jessamine, American Holly, winged elm

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CAWR	1020	2	C	10	NA	SA
2	DOWO	1021	1	C	20	NA	SA
3	NOCA	1022	2	C	40	NA	SA
4	CAWR	1024	1	S	30	NA	SA
5	AMCR	1029	1	S	140	NA	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

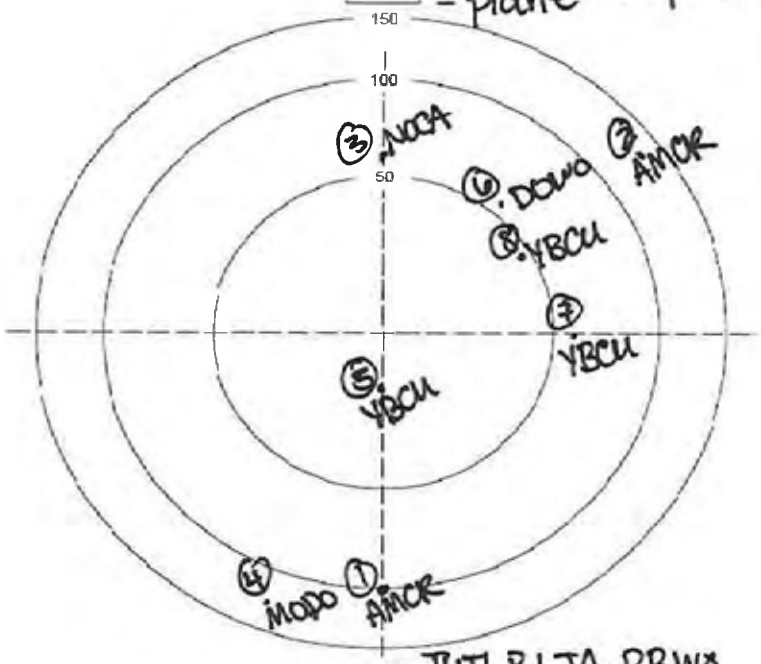
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF-6~~ OHF-17	Date	Time Start	Time End
Observer(s):	WH & MB	8.23.11	818	828
	NAD83	Temp (F)	Wind	Sky
Easting:	6541171	67 °	Ø @NA	100 %
Northing:	3828856			
Point-count Habitat Type:	Mixed pine & hardwoods			
Comments:	Adjacent to intermitent stream channel			

□ Rain □ Wind X Anthropogenic Noise □ None

Direction N °

- road
- plane
- prison speakers



Species between this and previous point: TUTI, BLJA, RBWO

Non-landbird species present but not counted:

Mammals:

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	819	1	C	100		MMHF
2	AMCR	820	1	C	120		
3	NOCA	820	1	C	60		
4	MODO	823	1	S	120		
5	YBCU	824	1	S	30		
6	DOWO	824	1	C	60		
7	YBCU	825	1	S	60		
8	YBCU	825	1	S	40		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

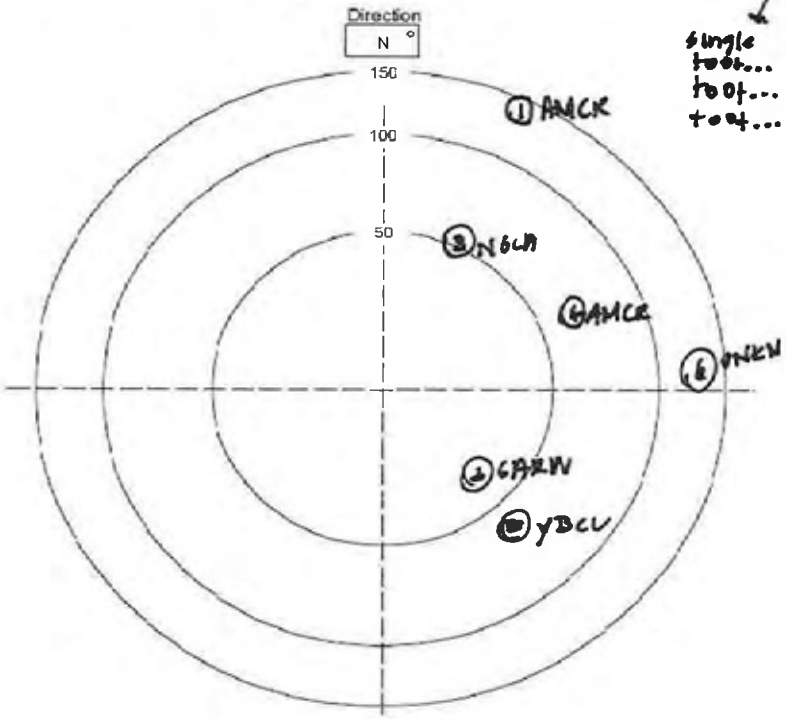
X Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

OHF-18

Station Id:	~~MMHF-7~~	Date	Time Start	Time End
Observer(s):	MB & WH	8.23.11	750	800
	NAD83	Temp (F)	Wind	Sky
Easting:	0541361	68 °	0 @	0 %
Northing:	3829016			
Point-count Habitat Type:				
Comments:	road noise from highway			

☐ Rain ☐ Wind ✓ Anthropogenic Noise ☐ None



single toot... toot... toot...

Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	750	1	C	150		MMHF
2	CARW	751	1	C	30		
3	NOCA	752	1	S	50		
4	AMCR	754	1	C	75		
5	YBCU	755	1	S	60		
6	VNKN	759	1	S	120		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

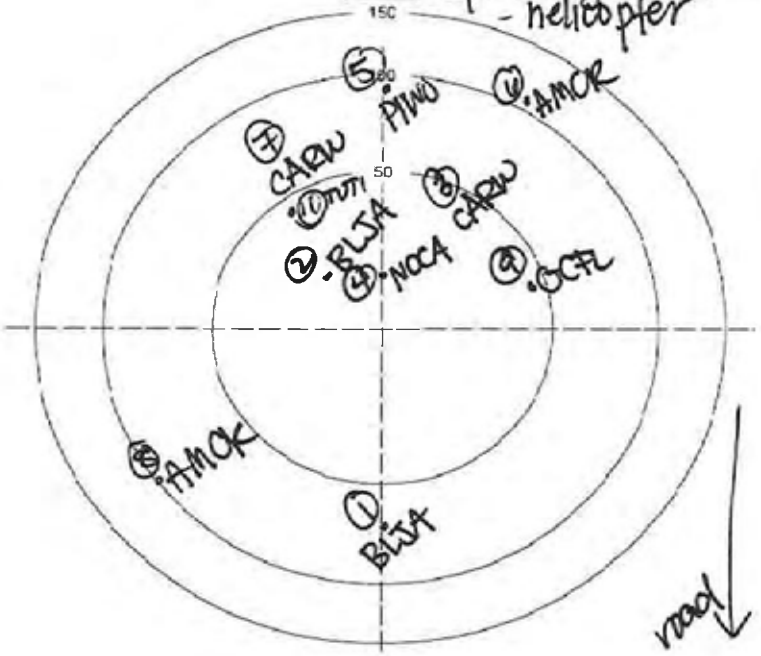
☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF8~~ OHF-19	Date	Time Start	Time End
Observer(s):	WH & MB	8.23.11	716	726
	NAD83	Temp (F)	Wind	Sky
Easting:	0541613	67 °	Ø @ NA	Ø %
Northing:	3829020			
Point-count Habitat Type:				
Comments:	Mixed BL & pine			

☐ Rain ☐ Wind X Anthropogenic Noise ☐ None

- road
- speaker system @ prism
- helicopter



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	BLJA	716	1	C/V	75	20	MMHF
2	BLJA	716	1	C	25		↓
3	CARW	717	1	S	50		
4	NOCA	718	1	C	25		
5	PIWO	721	1	D	100		
6	AMCR	720	1	C	120		
7	CARW	721	1	S	75		
8	AMCR	725	1	C	100		
9	GCFL	726	1	S	60		
10	TUTI	726	1	S	40		↓
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
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Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

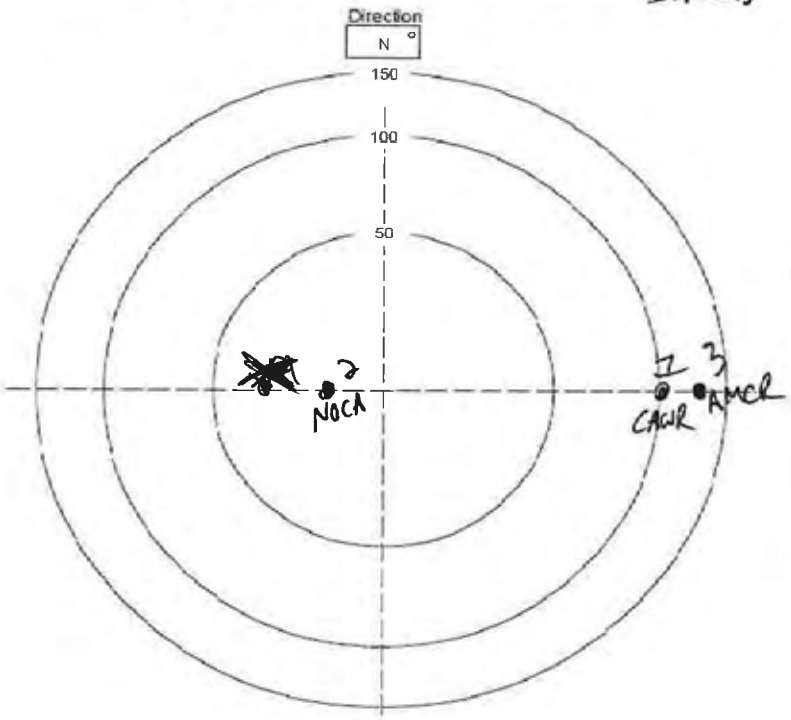
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-07~~ OHF-09	Date	Time Start	Time End
Observer(s):	WCM CAR	08/23/11	812	822
	NAD83	Temp (F)	Wind	Sky
Easting:	0540409	72 °	S @ 5	50 %
Northing:	3826602			
Point-count Habitat Type:	MPHF			
Comments:	Crossroads 2 dirt roads Semi-mature hardwood trees Small Clearing			

□ Rain ✓Wind ✓Anthropogenic Noise □ None ✓Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	CAWR	812	1	S	100	–	MPHF
2	NOCA	813	1	C	20		MPHF
3	AMCR	816	1	C	120		MPHF
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
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Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

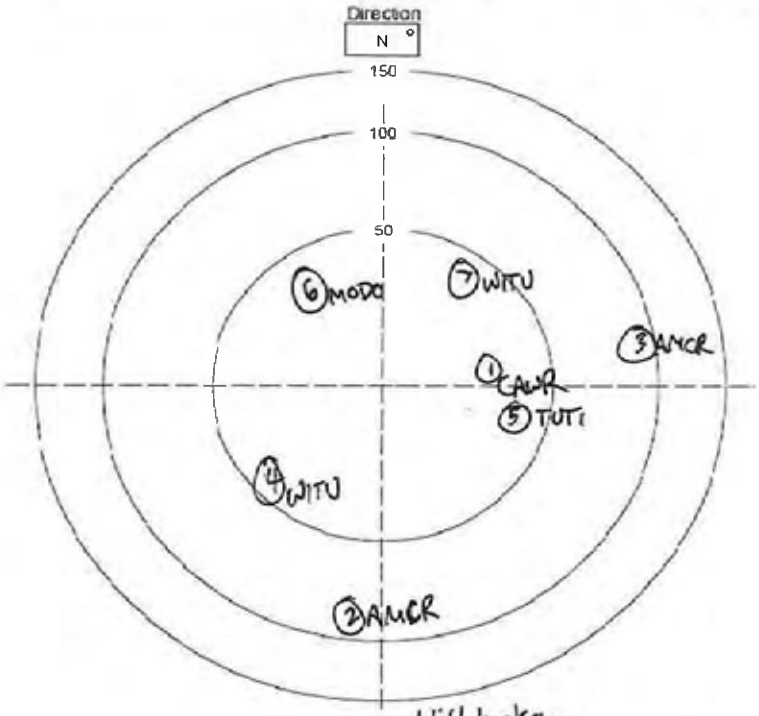
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-8~~ OHF-08	Date	Time Start	Time End
Observer(s):	CAL, WLM	8.23.11	0837	0847
	NAD83	Temp (F)	Wind	Sky
Easting:	0540170	75 °	@	%
Northing:	3826531			
Point-count Habitat Type:	MPHF			
Comments:	Loblolly pine, sourwood, sweetgum, blackjack oak blueberry, mountain laurel			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None ☒ Insects



Species between this and previous point: Wild turkey

Non-landbird species present but not counted:

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CAWR	0837	3	C	30	NA	MPHF
2	AMCR	0838	1	C	90	NA	MPHF
3	AMCR	0840	2	C	100	NA	MPHF
4	WITU	0842	1	C	40	NA	MPHF
5	TUTI	0842	1	C	30	NA	MPHF
6	MODO	0845	2	FO	20	30	MPHF
7	WITU	0847	1	C	30	NA	MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

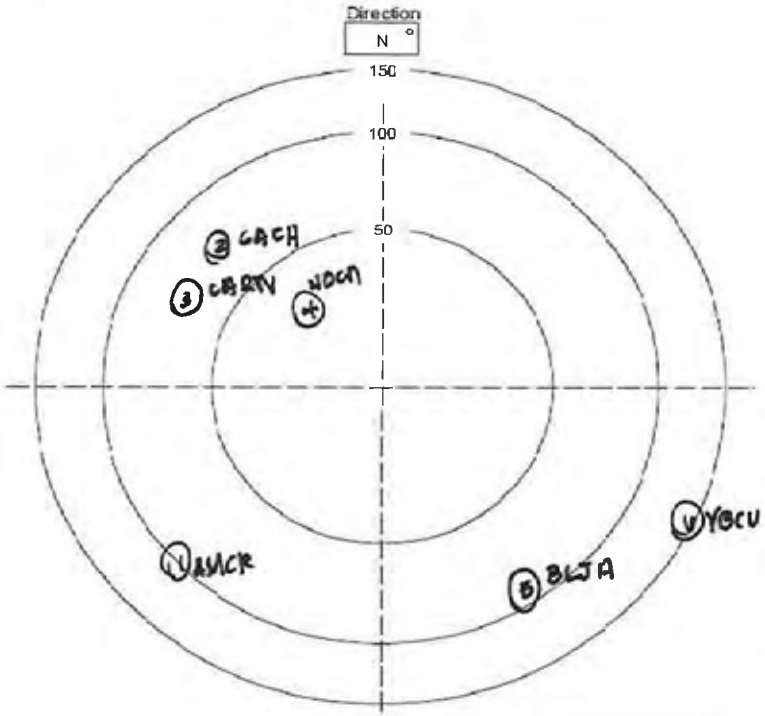
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-10~~ OHF-16	Date	Time Start	Time End
Observer(s):	MB & WH	8.23.11	842	852
	NAD83	Temp (F)	Wind	Sky
Easting:	0540955	70 °	0 @	100 %
Northing:	3828911			
Point-count Habitat Type:				
Comments:	overcast			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: could hear speakers at prison and noise from highway

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	843	1	C	100		MPHF
2	CACH	844	1	S	75		
3	CARW	844	1	S	75		
4	NOCA	847	1	S	25		
5	BLJA	851	1	C	100		
6	YBCU	852	1	S	150		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM

Haile Mine Project - South Carolina

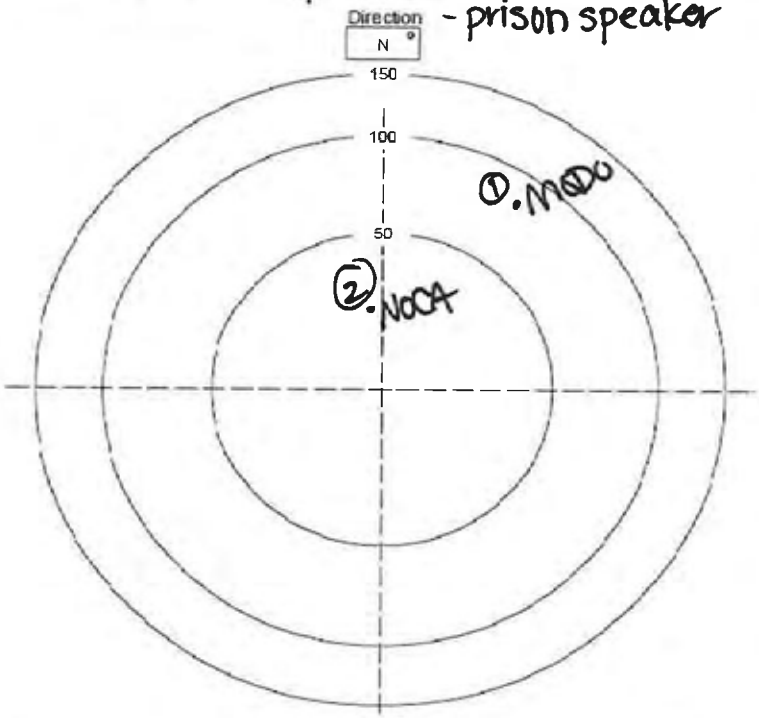
Δ MMHF-14

Station Id:	~~MPHF-11~~ SSF-04	Date	Time Start	Time End
Observer(s):	WH & MB	8.23.11	901	911
	NAD83	Temp (F)	Wind	Sky
Easting:	0540891	72 °	Ø @ N/A	100 %
Northing:	3829129			

Point-count Habitat Type: Mixed (mesic) hardwood

Comments: Adjacent to stream → Camp Branch w/ standing H2O but barely flowing.

☐ Rain ☐ Wind X Anthropogenic Noise ☐ None - prison speaker



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes: Change to MMHF instead

	Species	Time	#	Beh	Dist	Height	Habitat
1	MODO	904	1	S	80		MMHF
2	NOCA	908	1	S	40		MMHF
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Birds Detected During Survey

Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

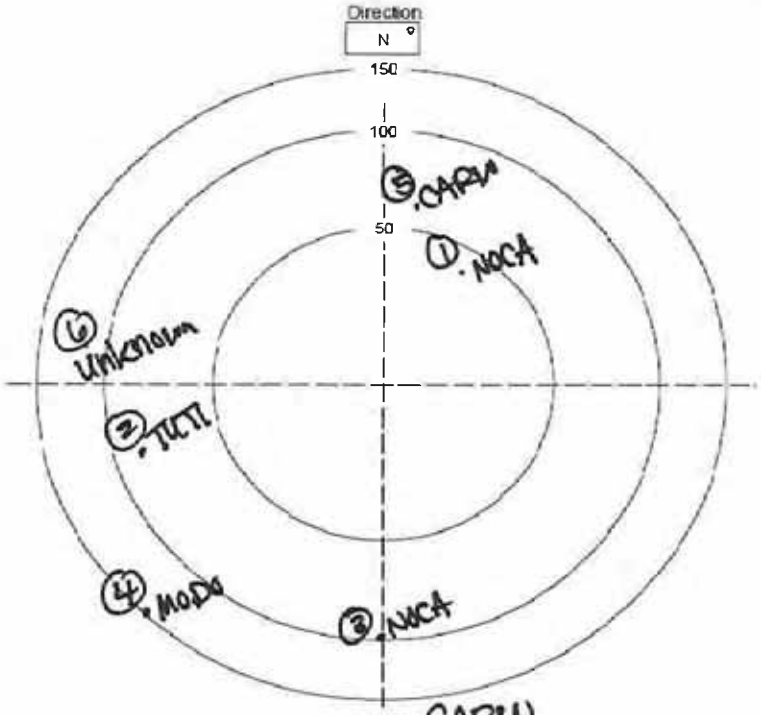
BIRD SURVEY FORM

Haile Mine Project - South Carolina

ΔMMHF-15

Station Id:	~~MPHF-12~~ OHF-20	Date	Time Start	Time End
Observer(s):	MD & WH	6.23.11	920	930
	NAD83	Temp (F)	Wind	Sky
Easting:	0541640	70 °	Ø @ NA	100 %
Northing:	3829338			
Point-count Habitat Type:	Mesic Mixed Hardwood Forest			
Comments:				

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: CARW

Non-landbird species present but not counted:

Mammals:

Notes: Change to MMHF instead

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	924	1	S	40		MMHF
2	TUTI	928	1	S	100		MMHF
3	NOCA	926	1	S	100		MMHF
4	MODO	926	1	S	150		MMHF
5	CARW	928	1	S	100		MMHF
6	UNKN	930	1	C	120		MMHF
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

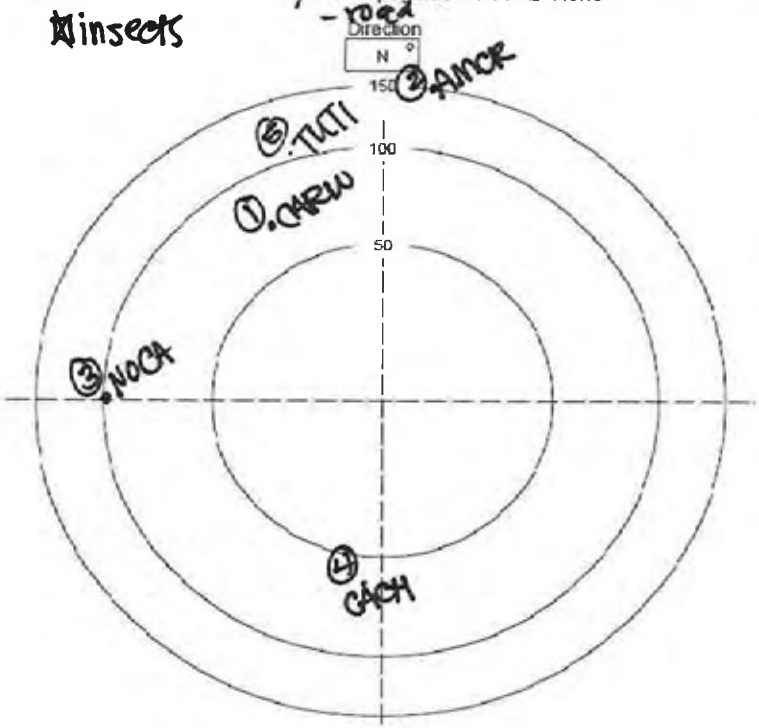
☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MPHF-13 OHF-21	Date	Time Start	Time End
Observer(s):	MB & WH	8.23.11	943	953
	NAD83	Temp (F)	Wind	Sky
Easting:	0541278	73 °	5 @SW	100 %
Northing:	3829376			
Point-count Habitat Type:	Hardwood & pine			
Comments:				

☐ Rain ☐ Wind ☒ Anthropogenic Noise - road ☐ None

☒ insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	944	1	C	70		MPHF
2	AMCR	944	1	C	150		MPHF
3	NOCA	949	1	S	100		MPHF
4	CACH	951	1	S	60		MPHF
5	TUTI	952	1	S	100		MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

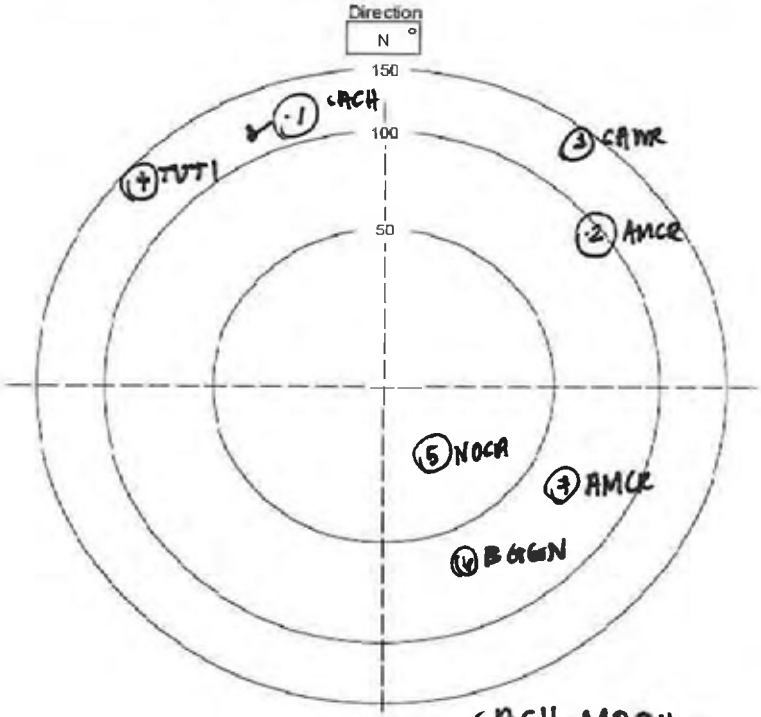
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPH-14~~ OHF-22	Date	Time Start	Time End
Observer(s):	MB & WH	8.23.11	1004	1014
	NAD83	Temp (F)	Wind	Sky
Easting:	0541525	74 °	0 @	90 %
Northing:	3829366			
Point-count Habitat Type:				
Comments:	pine trees, sweet gum			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: CACH, MODU

Non-landbird species present but not counted:

Mammals:

Notes: Trash (glass bottles, light bulbs)

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	1005	2	FO,P	120	25	MPHF
2	AMCR	1005	1	C	100		↓
3	CARW	1005	1	C	180		
4	TUTI	1010	1	S	150		
5	NOCA	1010	1	S	30		
6	BGGN	1011	1	S	70		
7	AMCR	1014	1	C	70		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

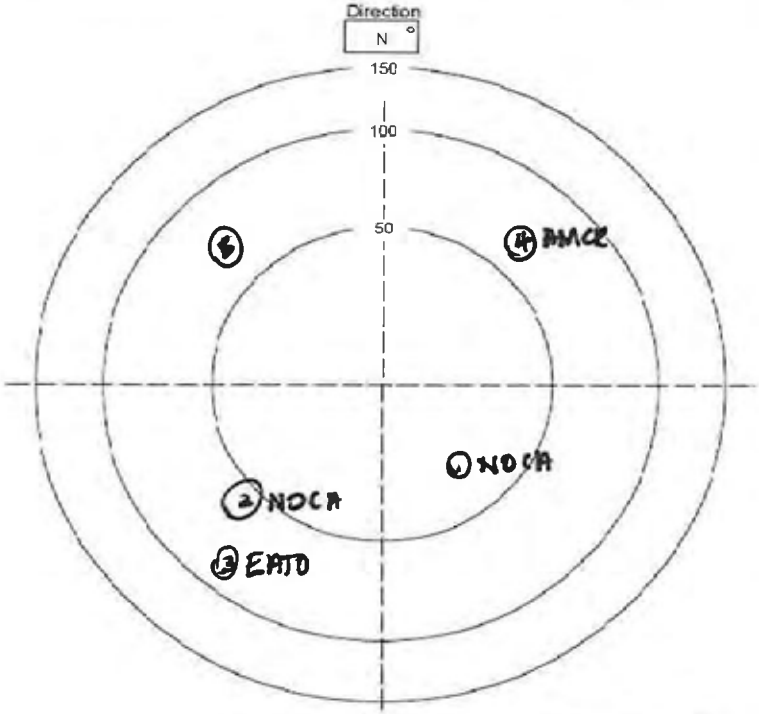
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MPH-15 MVS-39	Date	Time Start	Time End
Observer(s):	WH & MB	8.23.11	1025	1035
	NAD83	Temp (F)	Wind	Sky
Easting:	0541767	78 °	0 @	80 %
Northing:	3829298			
Point-count Habitat Type:				
Comments:	predominantly open pine			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes: Noise from road traffic

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	1026	1	S	30		MPH
2	NOCA	1027	1	S	60		
3	EATO	1028	1	S	120		
4	AMCR	1029	12	C	70		
5	NOCA	1032	1	S	70		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

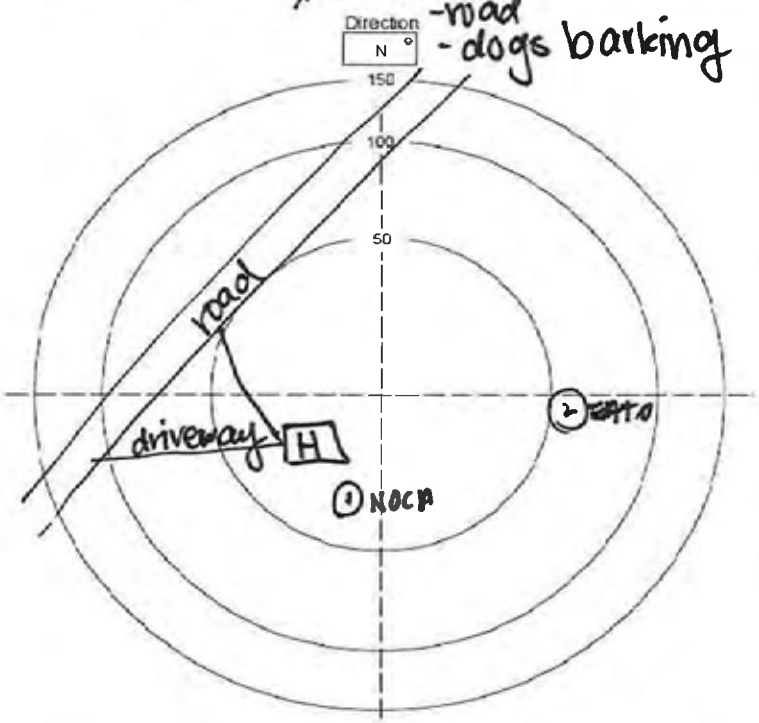
BIRD SURVEY FORM
Haile Mine Project - South Carolina

XSC-02

Station Id:	~~MPHF-10~~	Date	Time Start	Time End
Observer(s):	MD & KH	8.23.11	1052	1102
	NAD83	Temp (F)	Wind	Sky
Easting:	0542061	85 °	2 @SE	80 %
Northing:	3829254			
Point-count Habitat Type:				
Comments:	Some mixed mesic on the backside of the house			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None

- road
- dogs barking



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: ~~change to DA instead.~~ Highly residential. Be careful for dogs. decided to leave as MPHF, no DA habitat type

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	1057	1	S	20		MPHF
2	EATO	1101	1	S	60		
3							
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

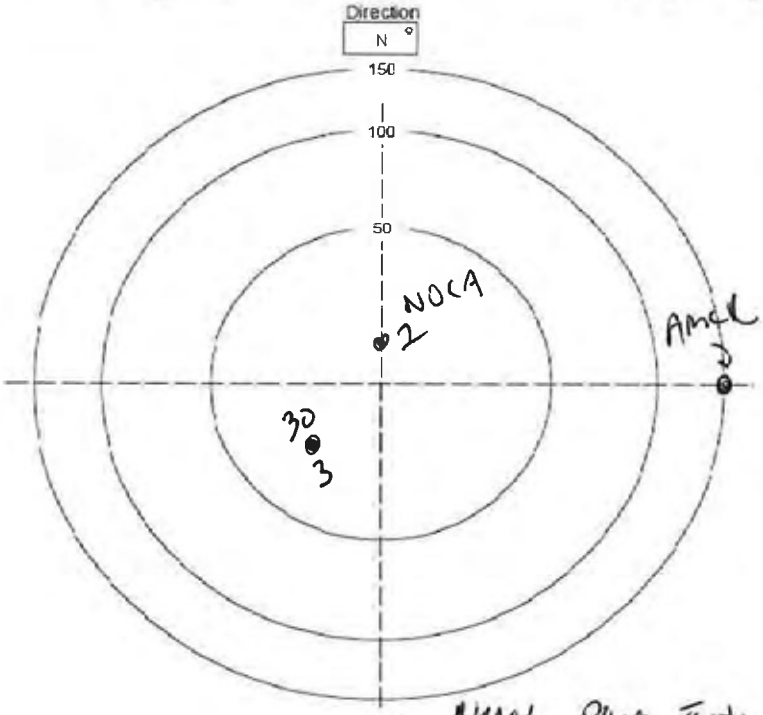
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA10~~ MVF-02	Date	Time Start	Time End
Observer(s):	MWLM CAL	08/23/11	957	1007
	NAD83	Temp (F)	Wind	Sky
Easting:	0539762	78 °	@ 5	75 %
Northing:	3826876			
Point-count Habitat Type:	SA			
Comments:	Young pine, pt taken blk berry thicket on edge of pine plantation adj to			

☐ Rain ☑ Wind ☐ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: BHW, PIWA, TUTI, CACH

Non-landbird species present but not counted:

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	957	1	C	10	/	SA
2	AMCR	1003	1	S	150	/	SA
3	CARW	1003	2	C	30	/	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

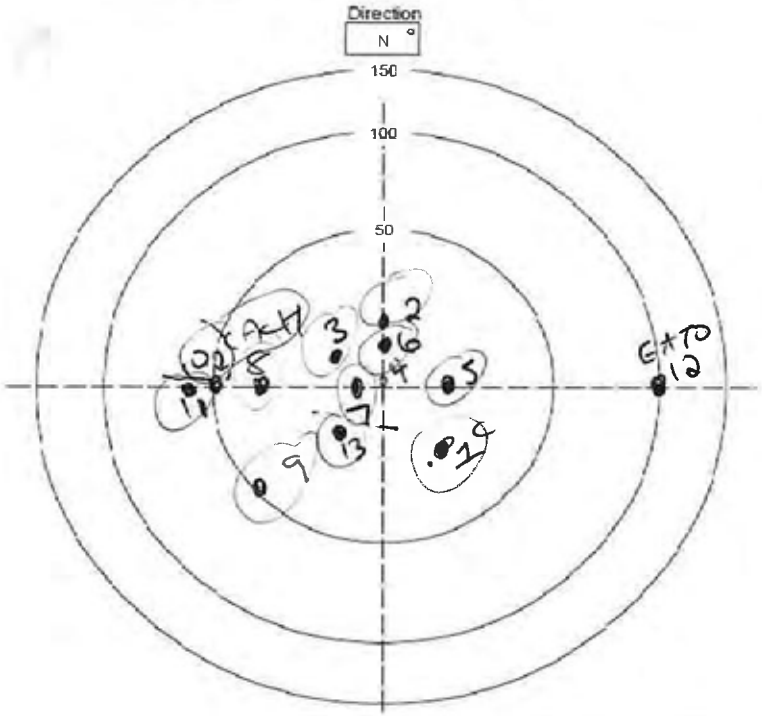
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	SA7 MTP-15	Date	Time Start	Time End
Observer(s):	WCM, CAL	05/23/11	934	944
	NAD83	Temp (F)	Wind	Sky
Easting:	0539774	77 °	SE@ 5	60 %
Northing:	3826617			
Point-count Habitat Type:	SA			
Comments:	Loblolly pine plantation ~30-40 yr old stand, hardwood encroachment on edges, poss. RCW foraging habitat			

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	934	2	C	20	/	SA
2	BHNU	935	3	C	15		SA
3	DOWO	935	1	C	15	/	SA
4	RTHU	935	2	F	/	1	SA
5	PIWA	936	4	S	20	/	SA
6	YTWA	937	1	V	20	W	SA
7	BAWW	939	1	S	10	/	SA
8	CACH	940	2	C	40	/	SA
9	PRAW	940	1	C	50	/	SA
10	TUTI	940	1	C	50	/	SA
11	PIWA	941	1	S	50	/	SA
12	EATO	942	1	S	100	/	MMHF
13	NOCA	943	1	C	15	/	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

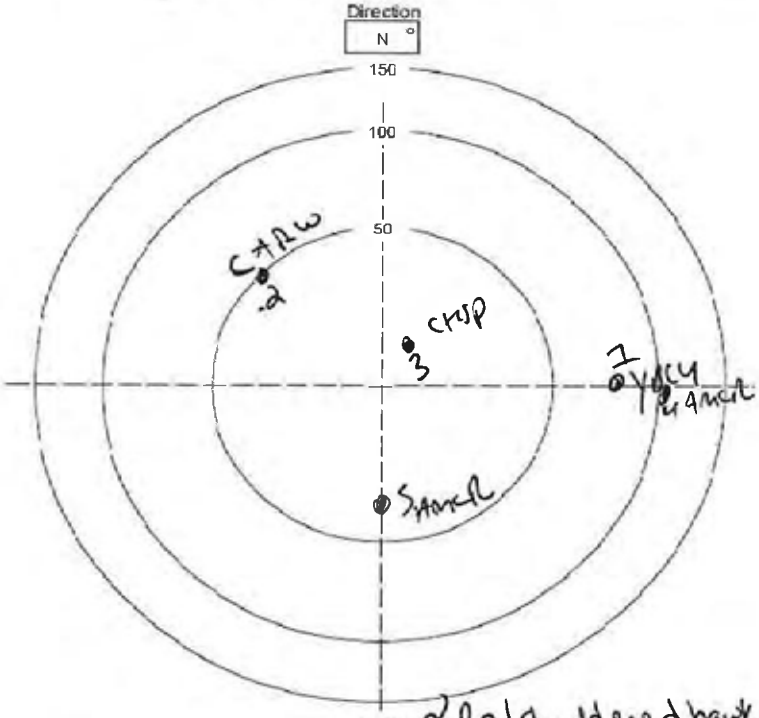
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

[X] Entered in Database [ ] QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA-8~~ MVS-01	Date	Time Start	Time End
Observer(s):	WLM, CAL	08/23/11	906	916
	NAD83	Temp (F)	Wind	Sky
Easting:	529930	75 °	SE @ 5	75 %
Northing:	3326409			
Point-count Habitat Type:	SA			
Comments:	Recently clear cut strip area adj. to perm. stream			

□ Rain ☑ Wind ☑ Anthropogenic Noise □ None



Species between this and previous point: 2 Red shouldered hawk, mourning dove

Non-landbird species present but not counted:

Mammals:

Notes: Area has been cleared bedded in low portions in bed wetland plants present

	Species	Time	#	Beh	Dist	Height	Habitat
1	YBCY	906	1	S	75	–	MHF
2	CARW	907	1	S	55	–	MMHF
3	CHSP	908	1	S	15	–	SA
4	AMCR	913	1	C	100	–	MPH
5	AMCR	913	1	C	70		SA/F
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

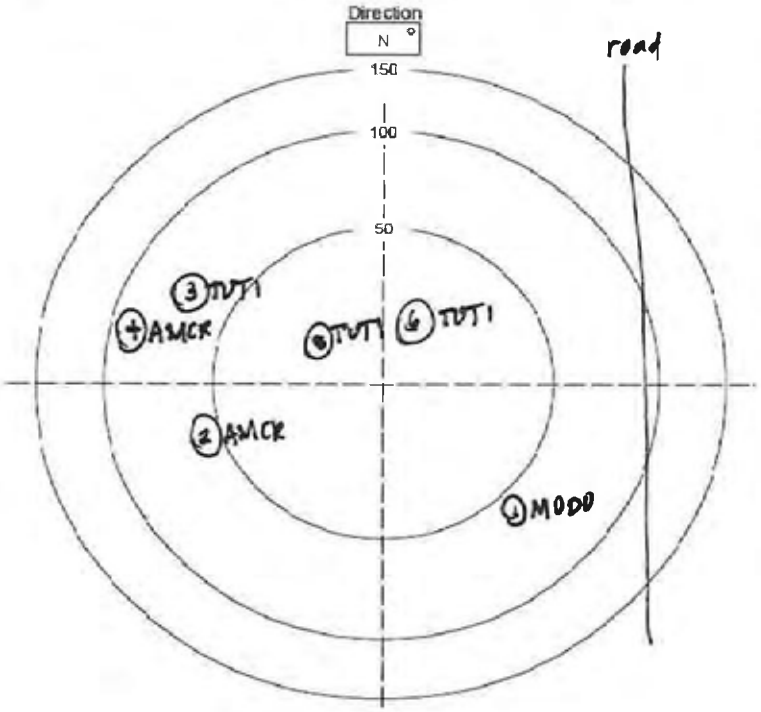
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHP-5~~ D-12	Date	Time Start	Time End
Observer(s):	MB & NH	8.24.11	926	936
	NAD83	Temp (F)	Wind	Sky
Easting:	0543467	85 °	0 @	0 %
Northing:	3826894			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: MCR very vocal entire time

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	MODO	926	1	S	60		BHF
2	AMCR	927	2	C	60		BHF
3	TUTI	929	1	S	70		BHF
4	AMCR	931	5	C	80		BHF
5	TUTI	933	1	P, C	10	20	BHF
6	TUTI	936	3	P, S	10	20	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

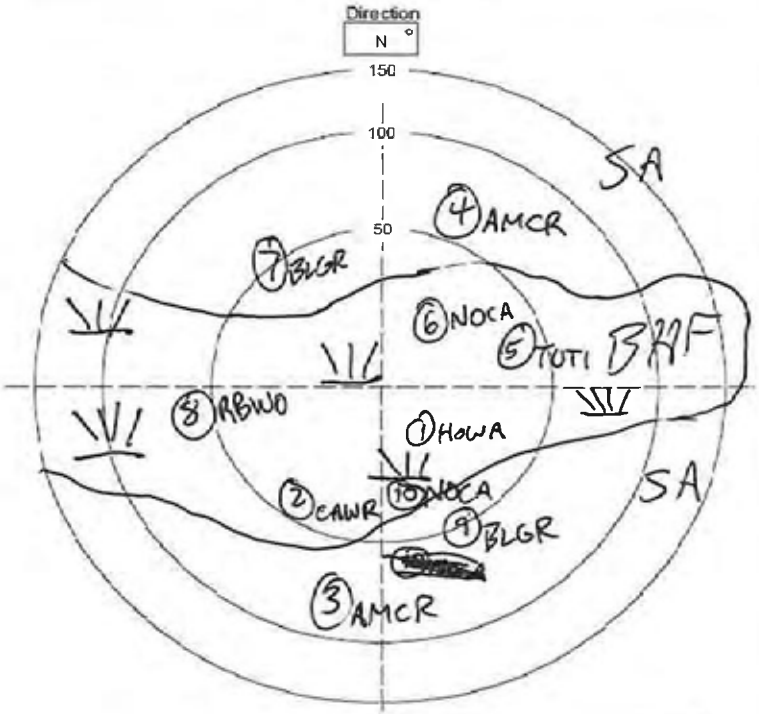
☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-6~~ SHP-07	Date	Time Start	Time End
Observer(s):	MLB, WLM	8/24/11	0900	0910
	NAD83	Temp (F)	Wind	Sky
Easting:	0543237	84 °	@	0 %
Northing:	3826989			
Point-count Habitat Type:	BHF			

Comments: Bottomland is dominated by ferns and laurel ~~the~~ greenbrier, Nyssa biflora, Sweet bay, American Holly

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	HOWA	0900	1	V	10	NA	BHF
2	CAWR	0900	1	S	25	NA	BHF
3	AMCR	0901	2	C	60	NA	SA
4	AMCR	0901	2	C	70	NA	SA
5	TUTI	0903	1	S	40	NA	BHF
6	NOCA	0903	1	S	15	NA	BHF
7	BLGR	0905	1	S	50	NA	SA
8	RBWO	0905	1	C	60	NA	BHF
9	BLGR	0906	1	S	70	NA	SA
10	NOCA	0907	1	S	30	NA	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

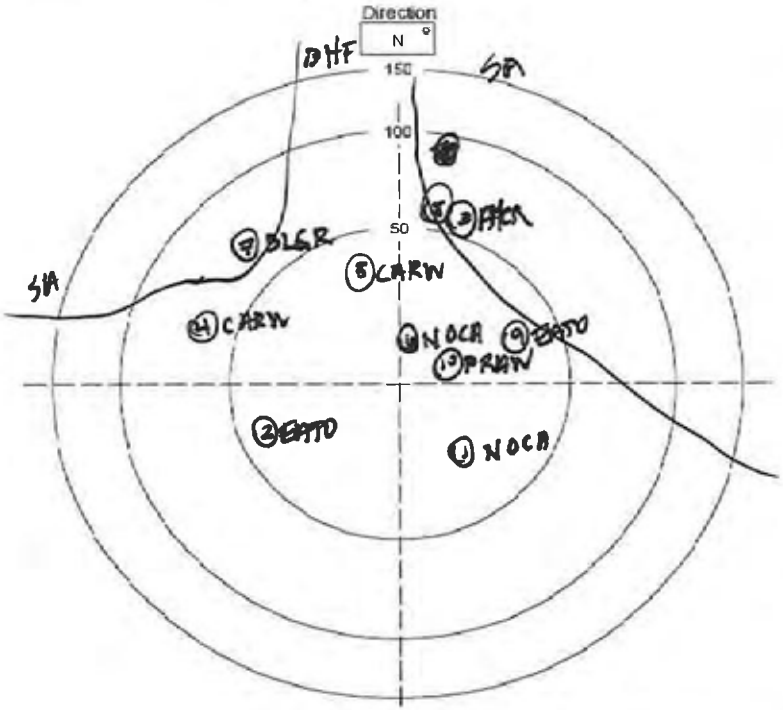
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

[X] Entered in Database [ ] QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-1~~ SHF-08	Date	Time Start	Time End
Observer(s):	MB + MM	8.24.11	833	843
	NAD83	Temp (F)	Wind	Sky
Easting:	0543001	83 °	0 @	0 %
Northing:	3827062			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ✓ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	833	1	S	15		BHF
2	EATO	833	1	S	20		BHF
3	AMCR	833	1	C	60		~~BHF~~ SA
4	CARW	833	1	S	105		BHF
5	CARW	833	1	S	20		BHF
6	NOCA	834	1	S	10		BHF
7	BLGR	834	1	S	60		SA
8	BLGR	836	1	S	50		SA
9	EATO	836	1	S	20		BHF
10	PRAW	840	1	S	15		BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

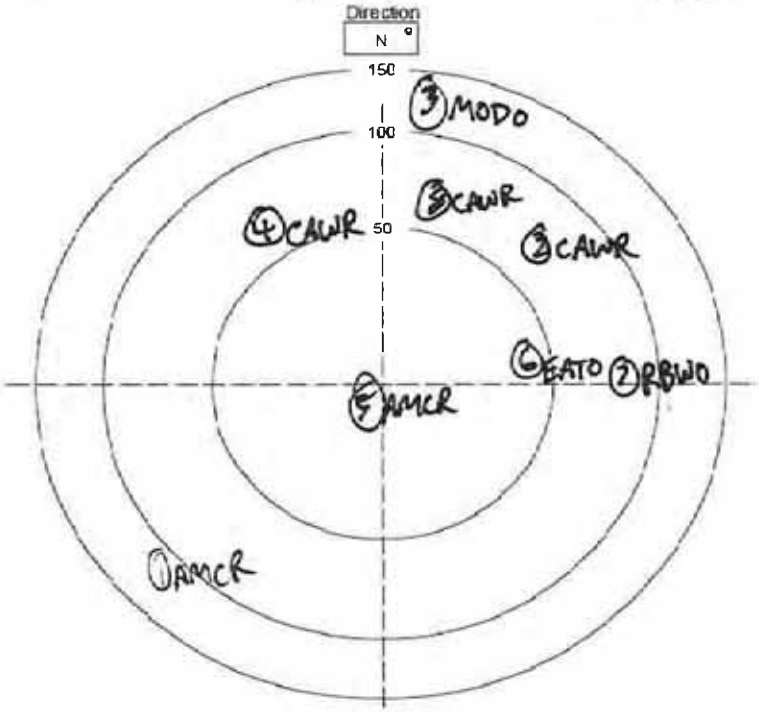
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-9~~ SHP-09	Date	Time Start	Time End
Observer(s):	MLB, WLM	8/24/11	0741	0751
	NAD83	Temp (F)	Wind	Sky
Easting:	0543272	76 °	@	50 %
Northing:	3827458			
Point-count Habitat Type:	BHF			
Comments:	Point count taken adjacent to black water stream. Typical sandhills bottomland			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None ☒ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Dense river cane in herb layer

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	0741	3	C	120	NA	~~XFC~~ SA
2	CAWR	0742	1	S	75	NA	BHF
3	MODO	0742	1	C	120	NA	SA
4	CAWR	0743	1	S	60	NA	BHF
5	AMCR	0746	3	FO	100	NA	BHF
6	EATO	0747	1	C	50	NA	BHF
7	RBWO	0748	1	S	80	NA	BHF
8	CAWR	0750	1	S	65	NA	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

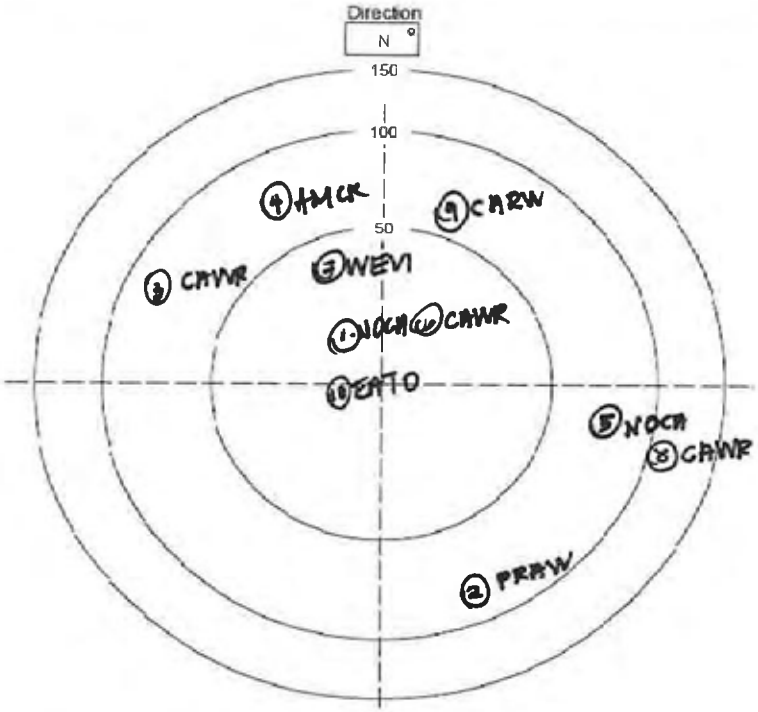
Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-10~~ MVS-18	Date	Time Start	Time End
Observer(s):	MB & WM	8.24.11	708	718
	NAD83	Temp (F)	Wind	Sky
Easting:	0543511	69 °	0 @	50 %
Northing:	3827535			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	708	1	S	10	-	BHF
2	PRAW	709	1	S	80		↓
3	CAWR	709	2	S	75		
4	AMCR	710	1	C	60		
5	NOCA	711	1	S	70		
6	CAWR	711	1	C	20		
7	WEVI	713	1	S	25		
8	CARW	714	1	S	110		
9	CARW	715	1	S	60		
10	EATO	718	1	S	10		↓
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

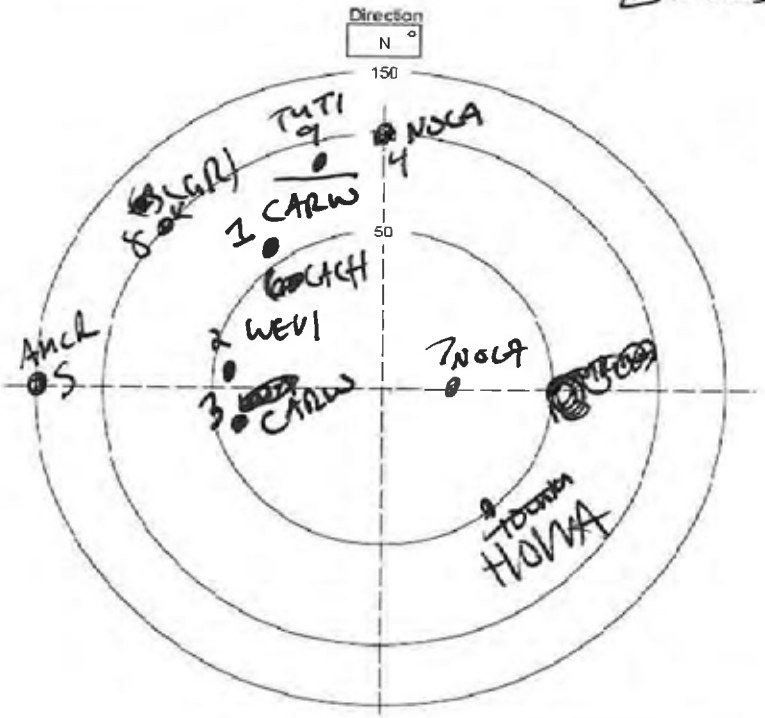
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-11~~ SHP-10	Date	Time Start	Time End
Observer(s):	CAL, WWMH	08/24/11	713	723
	NAD83	Temp (F)	Wind	Sky
Easting:	0543653	69 °	@ 0	0 %
Northing:	3823686			
Point-count Habitat Type:	BHF			
Comments:	Adj to small creek			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	714	1	S	60	—	BHF
2	WEVI	715	1	S	100	—	BHF
3	CARW	716	1	S	40	—	BHF
4	NOCA	717	1	S	100	—	BHF
5	AMCR	718	1	S	150	—	BHF
6	CACH	718	1	S	50	—	BHF
7	NOCA	718	1	S	30	—	BHF
8	BLGR	720	1	S	100	—	BHF
9	TUTI	721	1	S	50	—	BHF
10	HOWA	722	1	S	50	—	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

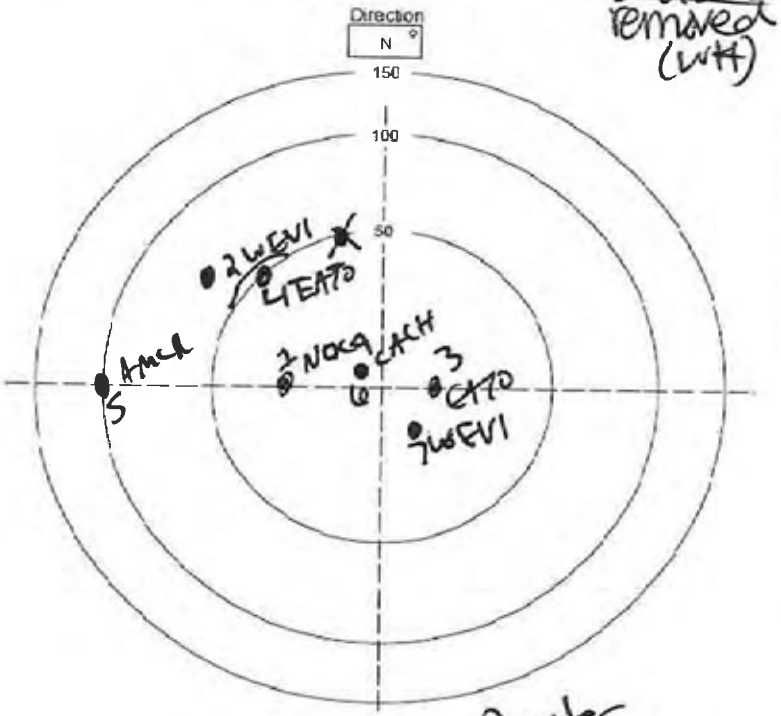
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	BHF-12 SHP-11	Date	Time Start	Time End
Observer(s):	WMH, CAL	8/24/11	746	856
	NAD83	Temp (F)	Wind	Sky
Easting:	0543855	72°	@ 0	0 %
Northing:	3821844			
Point-count Habitat Type:	BHF			
Comments:	Thick understory			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ~~Traffic~~ removed (WH)



Species between this and previous point: Rooster

Non-landbird species present but not counted:

Mammals:

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	747	1	S	30	–	BHF
2	WEVI	748	1	S	70	–	BHF
3	EATO	749	1	S	30	–	BHF
4	EATO	750	1	S	50	–	BHF
5	AMCR	752	1	S	100	–	BHF
6	CACH	755	1	S	10		BHF
7	WEVI	756	1	S	20		BHF
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

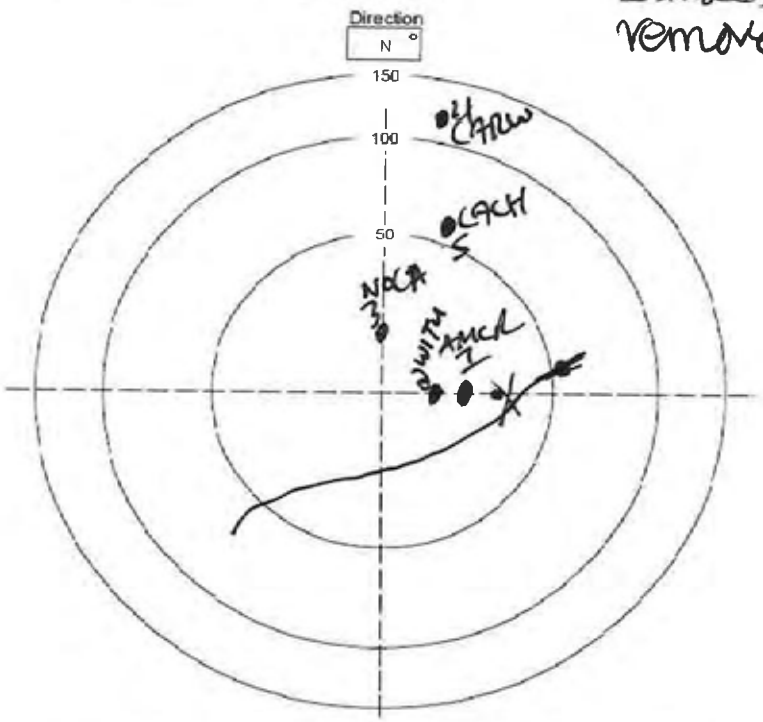
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-13~~ SHP-12	Date	Time Start	Time End
Observer(s):	WMH, CAL	06/24/11	818	828
	NAD83	Temp (F)	Wind	Sky
Easting:	0544067	76 °	@ 0	0 %
Northing:	3627939			
Point-count Habitat Type:	BHF			
Comments:	Reclaimed mining area behind us			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ~~☑ Insects~~ remove



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	819	2	C	30	—	MA
2	WITU	819	1	S	20	—	MA
3	NOCA	821	1	S	20	—	BHF
4	CARW	822	1	S	120	—	BHF
5	CACH	824	1	S	60	—	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

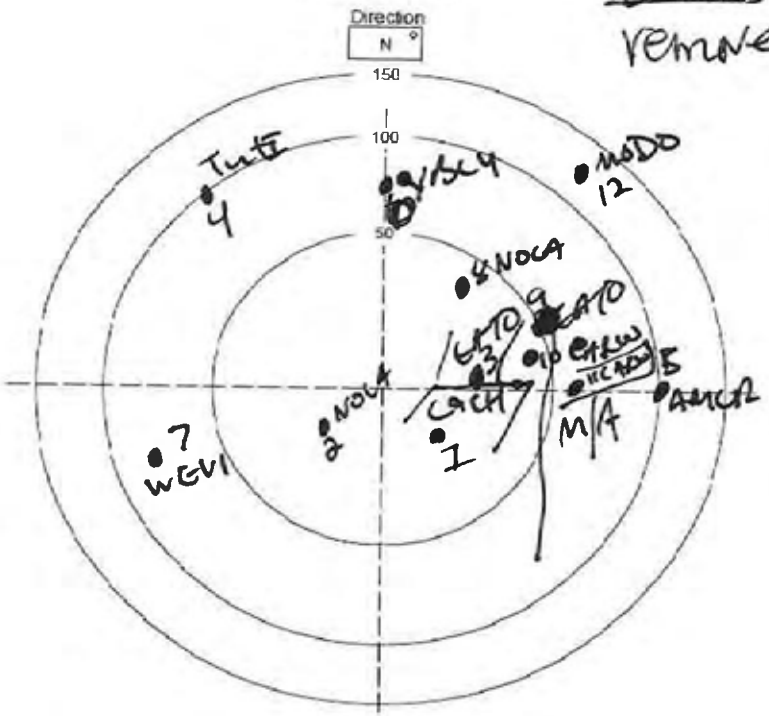
☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	SHP-13 ~~[illegible]~~ BHF-15	Date	Time Start	Time End
Observer(s):	WM, CAL	05/24/11	857	907
	NAD83	Temp (F)	Wind	Sky
Easting:	0544106	75 °	@ 0	0 %
Northing:	3428168			
Point-count Habitat Type:	BHF			
Comments:	Mining area to east			

□ Rain □ Wind ☑ Anthropogenic Noise □ None ~~[illegible]~~

remove



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	858	1	S	20	/	BHF
2	VIGA	858	1	S	20	/	BHF
3	EATO	859	1	S	30	/	BHF
4	TUTI	900	1	S	100	/	BHF
5	AMCR	900	1	S	100	/	BHF
6	YBCH	901	1	S	70	/	BHF
7	WEVI	902	1	S	70	/	BHF
8	NOCA	904	1	S	40	/	BHF
9	EATO	906	1	S	50	/	BHF
10	CHSW	906	1	S	40	/	BHF
11	CHSW	907	1	S	60	/	BHF
12	NODO	907	1	S	120	/	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☒ Entered in Database ☐ QA/QC

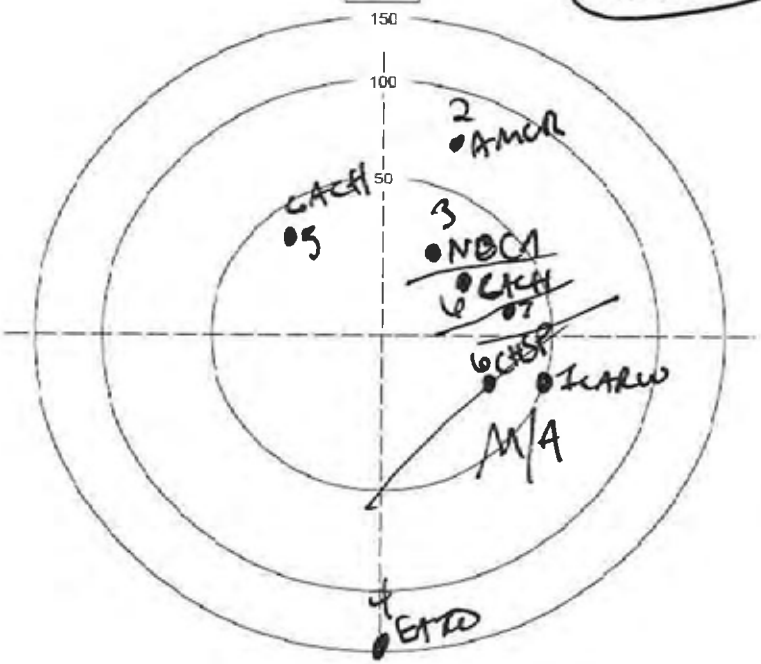
BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVS-25

Station Id:	BHF-16	Date	Time Start	Time End
Observer(s):	WMH, CAL	8/24/11	926	936
	NAD83	Temp (F)	Wind	Sky
Easting:	0594125	80 °	@ 0	0 %
Northing:	3828438			
Point-count Habitat Type:	BHF			
Comments:	Adj to MA			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None ~~☐ Other~~ remove

Direction N °



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	926	1	S	50	—	MA
2	AMCR	926	1	C	80	—	MA
3	NOCA	923	1	S	30	—	BHF
4	EATO	926	1	S	150	—	MA
5	CACH	929	1	S	40	—	BHF
6	CHSP	934	1	S	30	—	MA
7	CARW	934	1	S	40	—	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

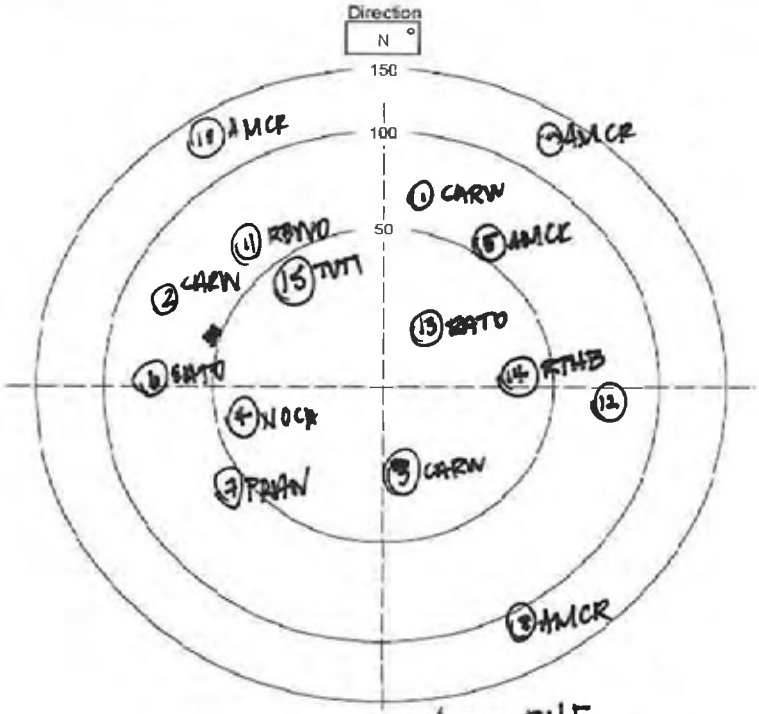
☒ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

~~BHF-23~~

Station Id:	~~SA-14~~ MVS-16	Date	Time Start	Time End
Observer(s):	MB & NM	8.24.11	807	817
	NAD83	Temp (F)	Wind	Sky
Easting:	0543185	80 °	0 @	40 %
Northing:	3827252			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: Δ to BHF

Non-landbird species present but not *counted*:

Mammals:

Notes:

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	807	1	S	60		BHF
2	CARW	807	1	S	80		
3	CARW	807	1	S	20		
4	NOCA	808	1	S	20		
5	AMCR	808	1	C	60		
6	EATO	808	1	S	70		
7	PRAW	809	1	S	90		
8	AMCR	809	1	C	110		
9	AMCR	811	1	C	130		
10	AMCR	812	1	C	130		
11	RBWO	813	1	S	60		
12	MODO	814	1	S	80		
13	EATO	814	1	S	10		
14	RTHB	815	1	S	40		
15	TUTI	815	1	S	40		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

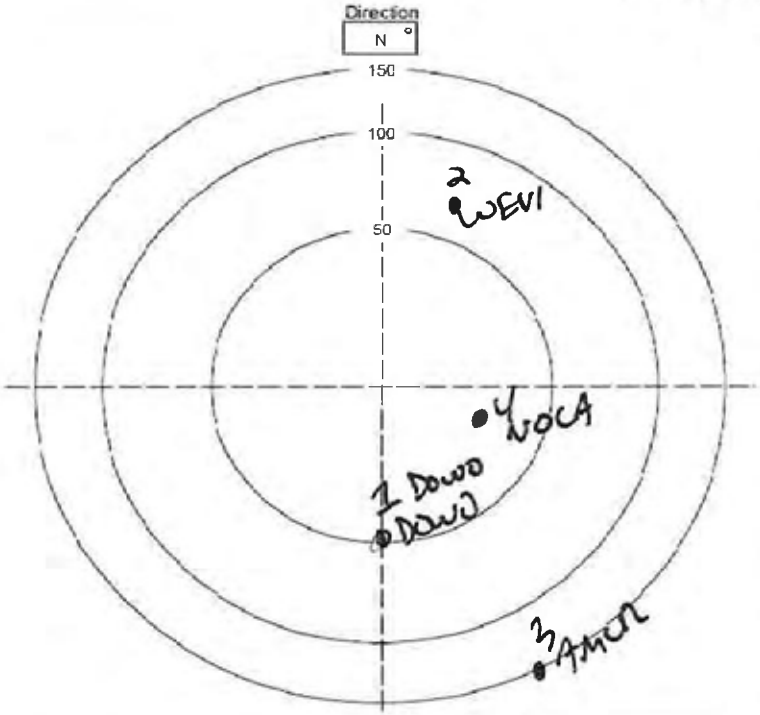
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA20~~ MVS-19	Date	Time Start	Time End
Observer(s):	WMH, CPL	06/24	1134	1144
	NAD83	Temp (F)	Wind	Sky
Easting:	0543499	90 °	@ 0	60 %
Northing:	3827639			
Point-count Habitat Type:	SA			
Comments:	BHF to East			

□ Rain □ Wind □ Anthropogenic Noise □ None ☑ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	DOWO	1136	1	C	50	—	BHF
2	WEVI	1138	1	[illegible]	70	—	BHF
3	AMRO	1140	1	C	150	—	BHF
4	NOCA	1141	1	Sho	30	—	[illegible]
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

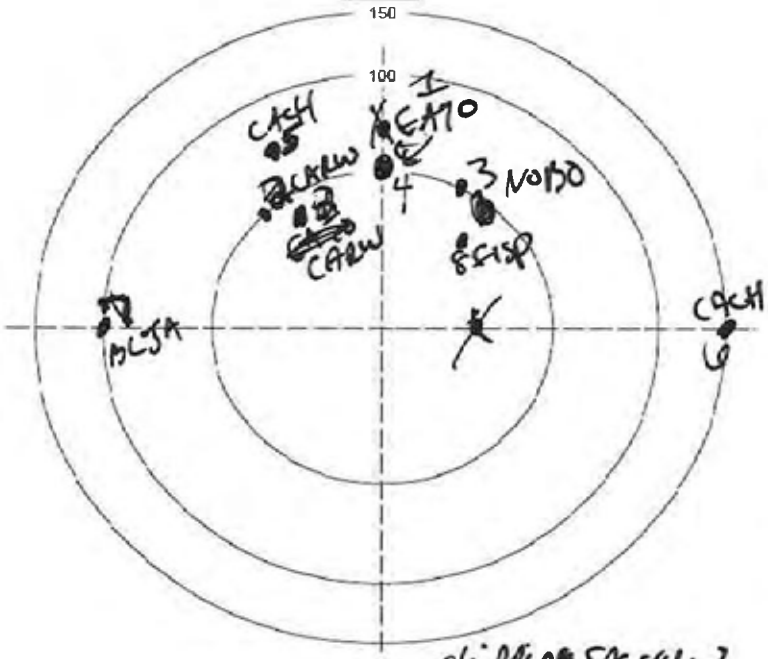
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~S4 21~~ MVS-20	Date	Time Start	Time End
Observer(s):	CWH, CAC	08/24/11	1117	1127
	NAD83	Temp (F)	Wind	Sky
Easting:	0543326	95 °	@0	75 %
Northing:	3827342			
Point-count Habitat Type:	S4			
Comments:	Young pine			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None Insects

Direction N °



Species between this and previous point: chipping sparrow

Non-landbird species present but not counted:

Mammals:

Notes:

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

120

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	EATO	1117	2	S	~~30~~	—	BHF
2	CARW	1118	1	S	40	~~20~~	DA/F
3	NOBO	1120	1	S	80	—	SA
4	EATO	1121	1	S	~~50~~	—	BHF
5	CACH	1123	1	S	70	—	DA/F
6	CACH	1124	1	S	120	—	BHF
7	BLJA	1125	1	S	100	—	BHF
8	FISP	1126	1	S	40		~~SA~~
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

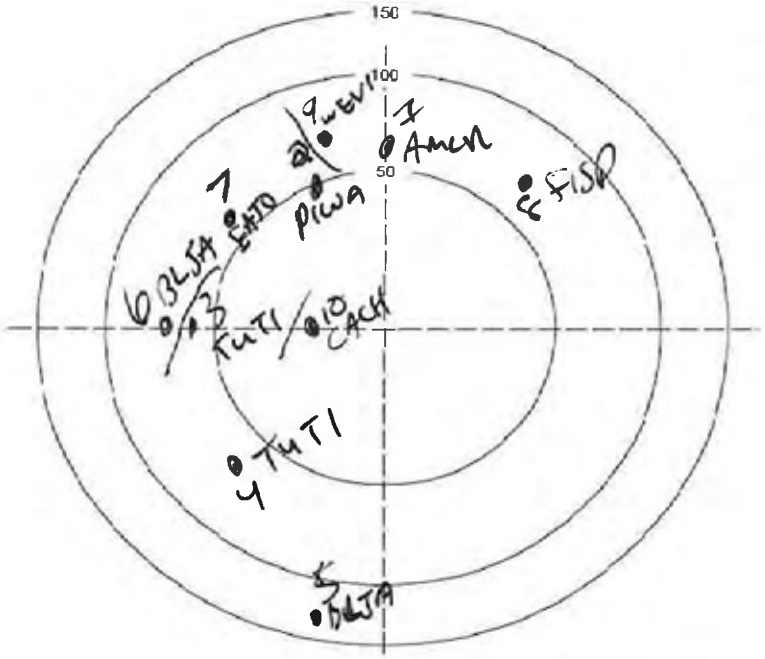
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id: MVS-31		Date	Time Start	Time End
Observer(s): WMH, CAL		08/24/11	1100	1110
NAD83		Temp (F)	Wind	Sky
Easting: 0543490		91 °	E @ 0	Ø %
Northing: 3827930				
Point-count Habitat Type: SA				
Comments:				

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None

Direction N °



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes:

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1100	2	C	100		BHF
2	PIWA	1101	1	S	50		BHF
3	TUTI	1102	1	C	70		BHF
4	TUTI	1103	1	S	70		BHF
5	BLJA	1104	1	C	120		BHF
6	BLJA	1105	1	C	60		BHF
7	EATO	1106	1	S	60		BHF
8	FISP	1107	1	S	70		FA
9	WEVI	1108	1	S	70		BHF
10	CACH	1109	1	S	70		BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

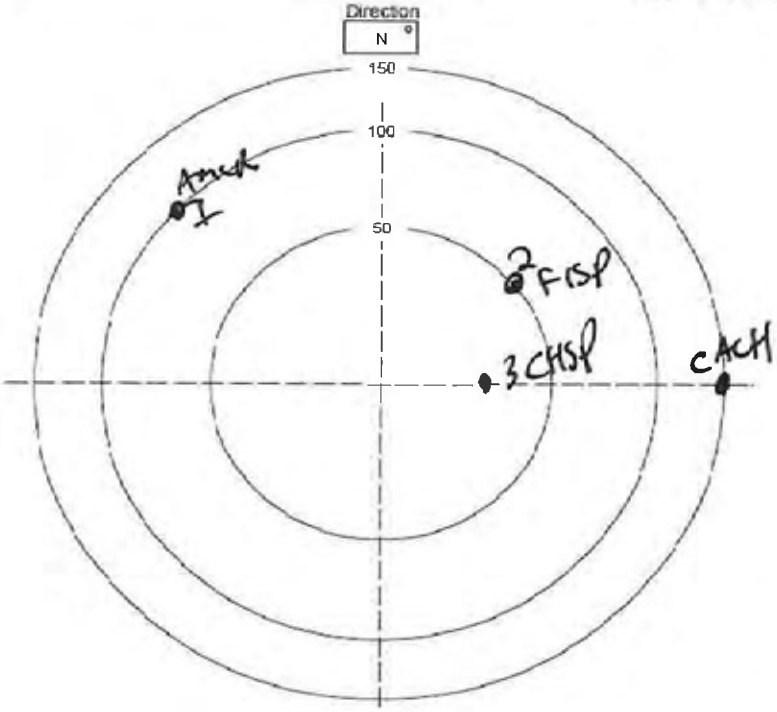
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA23~~ MVS-22	Date	Time Start	Time End
Observer(s):	WMH, CAL	06/24/11	1040	1050
	NAD83	Temp (F)	Wind	Sky
Easting:	0543605	88 °	@ 0	40 %
Northing:	3828116			
Point-count Habitat Type:	SA			
Comments:	Logged area young pine and oak			

☐ Rain ☐ Wind ✓ Anthropogenic Noise ☐ None ✓ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1040	1	C	100	—	SA
2	FISP	1041	1	S	50	—	SA
3	CHSP	1042	1	S	30	—	SA
4	CACH	1045	1	S	150	-	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

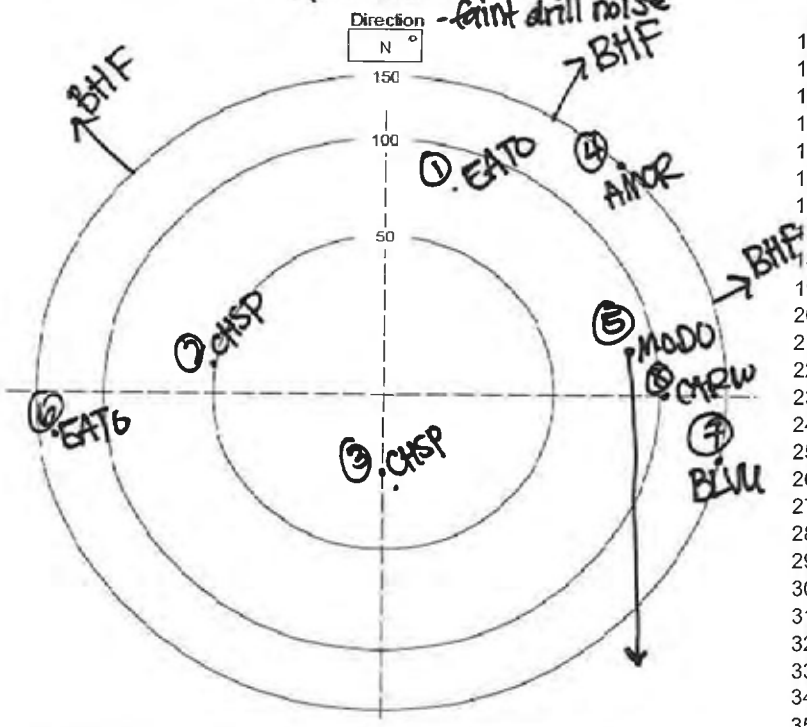
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture/Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA-24~~ MVS-23	Date	Time Start	Time End
Observer(s):	CL & WH	8.24.11	1014	1024
	NAD83	Temp (F)	Wind	Sky
Easting:	0584 3820	91 °	0 @ N/A	5 %
Northing:	3828 302			
Point-count Habitat Type:				
Comments:	Open logged field surrounded by BHF			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None - faint drill noise



Species between this and previous point:
Non-landbird species present but not counted:
Mammals:
Notes: Rooster + East calling

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	EATO	1014	2	S	80		SA
2	CHSP	1016	1	S	50		SA
3	CHSP	1017	1	S	30		SA
4	AMCR	1019	1	C	150		SA
5	MODO	1020	2	F	70	20	SA
6	EATO	1021	1	S	100		SA
7	BLJU	1022	1	F	150	100	SA
8	CARW	1024	1	S	100		SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

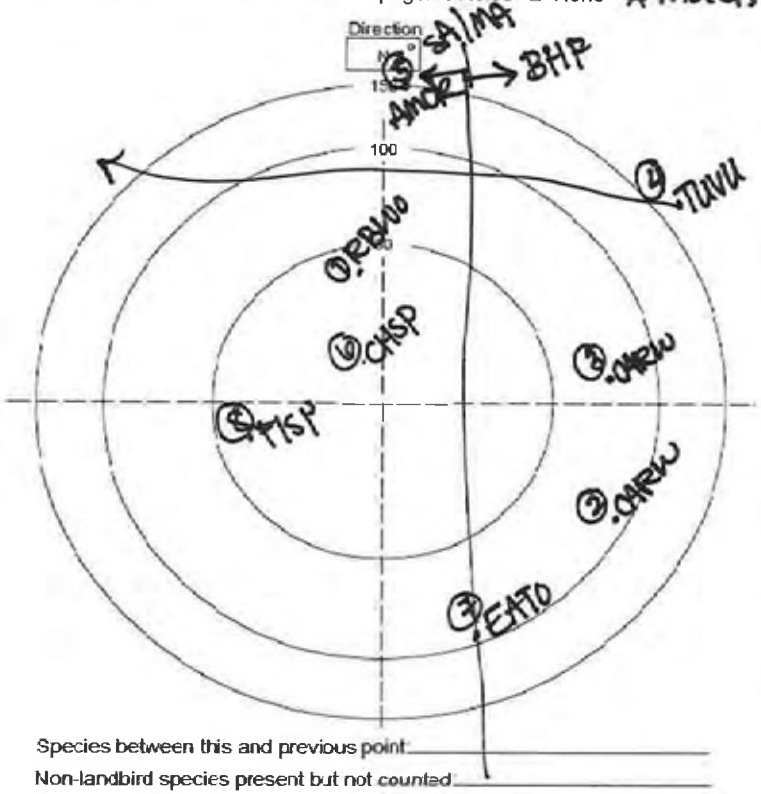
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	SA-25 MVS-24	Date	Time Start	Time End
Observer(s):	CL & WH	8.24.11	955	1005
	NAD83	Temp (F)	Wind	Sky
Easting:	0543990	84 °	0 @ N/A	Ø %
Northing:	3828497			
Point-count Habitat Type:				
Comments:	No pine planted, may be reclaimed mine area			

□ Rain □ Wind □ Anthropogenic Noise □ None ☒ insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	RBWO	955	1	C	40		BHP
2	CARW	957	1	S	80		BHP
3	CARW	959	1	S	70		BHP
4	TUVU	958	1	F	80	100	MA
5	AMCR	959	1	C	150		SA
6	CHSP	1000	1	C	20		SA
7	EATO	1002	1	S	100		BHF
8	FISP	1004	1	S	40		SA
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

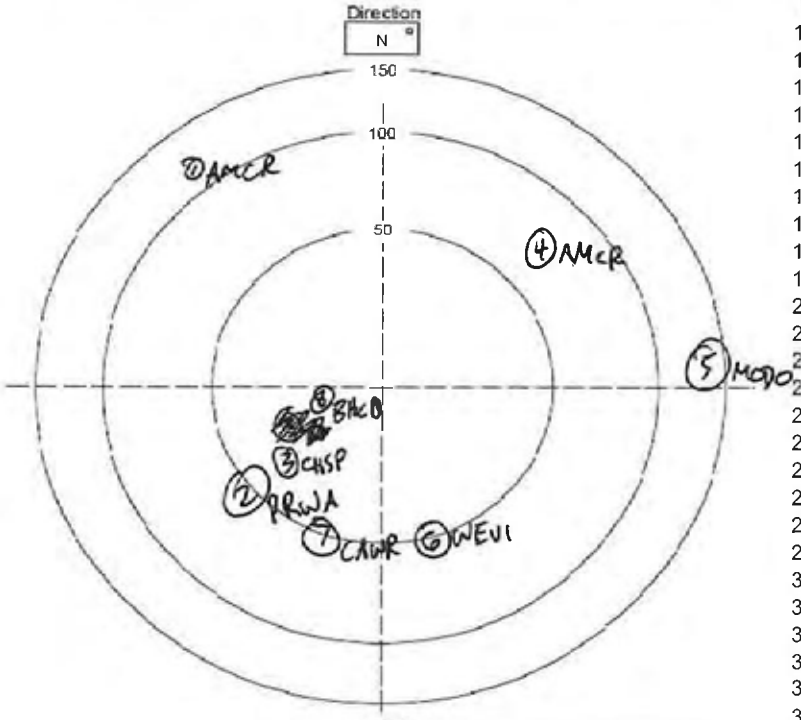
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVS - 13

Station Id:	~~XFC-7~~	Date	Time Start	Time End
Observer(s):	MLB, WLM	8/24/11	0950	1000
	NAD83	Temp (F)	Wind	Sky
Easting:	0543613	83 °	E @ 0-5	5 %
Northing:	3826715			
Point-count Habitat Type:	XFC			
Comments:	Long leaf pine - turkey oak sandhill			

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	0950	2	C	130	NA	XFC
2	PRWA	0951	1	S	50	NA	XFC
3	CHSP	0955	1	S	25	NA	XFC
4	AMCR	0957	1	C	70	NA	XFC
5	MODO	0957	1	S	130	NA	XFC
6	WEVI	0959	1	C	55	NA	XFC
7	CAWR	0959	3	S	40	NA	XFC
8	BHCO	0951	20	V	10	NA	XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

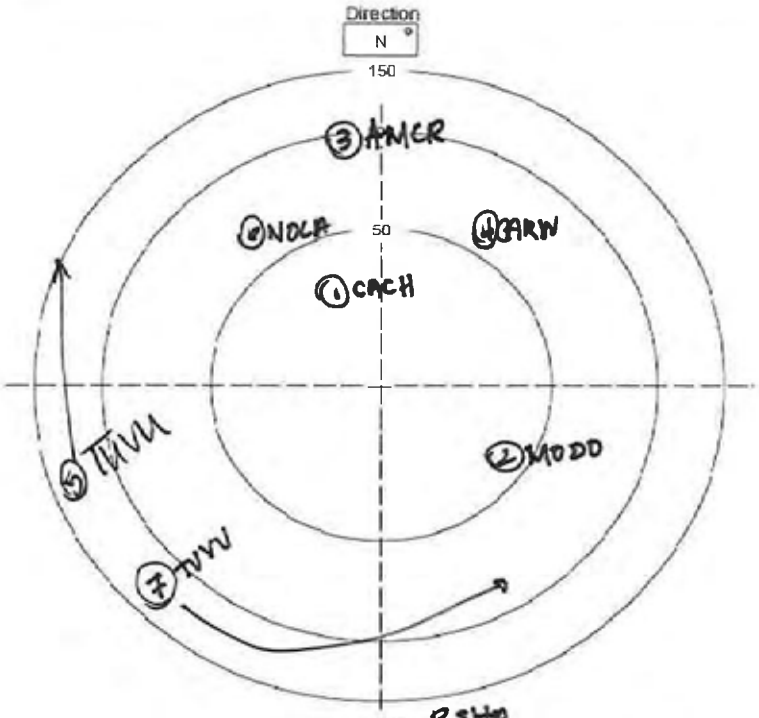
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~XFC-8~~ MVS-14	Date	Time Start	Time End
Observer(s):	MB & WM	8-24-11	1017	1027
	NAD83	Temp (F)	Wind	Sky
Easting:	0543846	84 °	0 @	20 %
Northing:	3920734			
Point-count Habitat Type:				
Comments:				

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: RSHA

Non-landbird species present but not counted:

Mammals:

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	1017	2	S	30		XFC
2	MODO	1017	1	S	40		
3	AMCR	1017	1	C	100		
4	CARW	1018	1	S	60		
5	TUVU	1020	1	F	130	50	
6	NOCA	1023	1	S	70		
7	TUVU	1025	2	F	130	50	
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

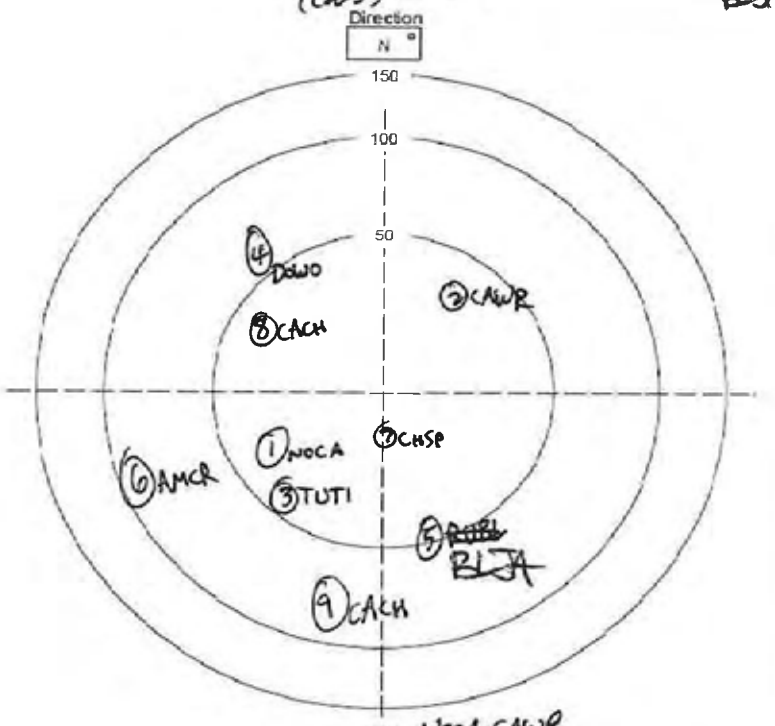
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	XFC-4 MVS-15	Date	Time Start	Time End
Observer(s):	MLB, WLM	8/24/14	1040	1050
	NAD83	Temp (F)	Wind	Sky
Easting:	0543906	84 °	E @ 0-5	25 %
Northing:	3826978			
Point-count Habitat Type:	XFC			
Comments:	Southern Red oak, water oak, black cherry, post oak Reindeer moss, sparkleberry, Smilax glauca			

☐ Rain ☐ Wind ☒ Anthropogenic Noise (Cars) ☐ None



Species between this and previous point: NOCA, CAWR,

Non-landbird species present but not counted

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	1040	3	C	10	NA	XFC
2	CAWR	1042	2	S	20	NA	XFC
3	TUTI	1043	2	C	20	NA	XFC
4	DOWO	1043	1	S	50	NA	XFC
5	~~RWBL~~	1044	1	S	60	NA	XFC
6	AMCR	1044	2	C	80	NA	XFC
7	CHSP	1045	1	S	5	NA	XFC
8	CACH	1046	1	S	30	NA	XFC
9	CACH	1050	1	C	80	NA	XFC
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BLJA

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

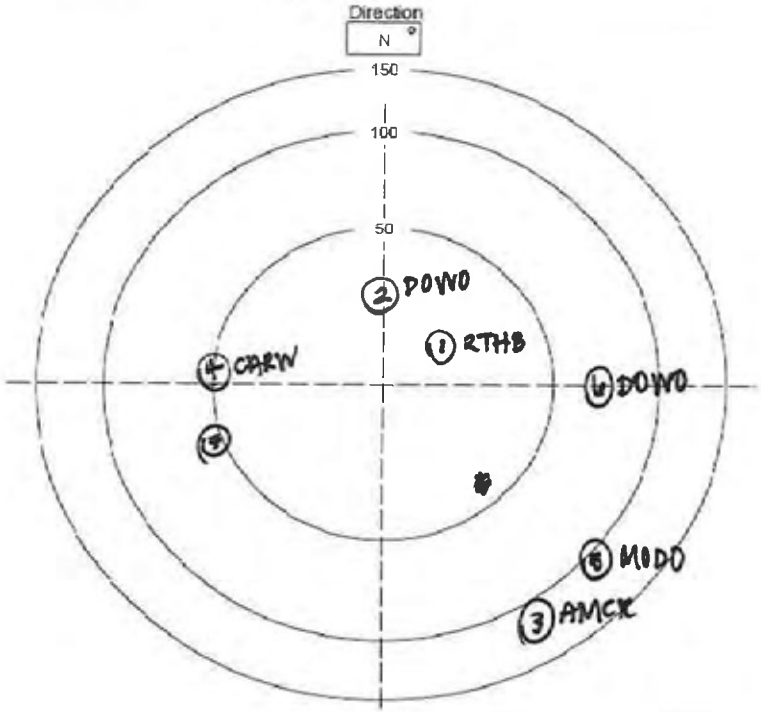
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVF-08

Station Id:	~~XFC-10~~	Date	Time Start	Time End
Observer(s):	MB & [redacted]WM	8-24-11	1059	1109
	NAD83	Temp (F)	Wind	Sky
Easting:	0543811	87 °	0-5@ E	60 %
Northing:	3827190			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ✓ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	RTHB	1059	1	S	10		XFC
2	DOWO	1059	1	S	20		↓
3	AMCR	1059	1	C	125		↓
4	CARW	1100	1	S	50		↓
5	MODO	1102	1	C	120		↓
6	DOWO	1102	1	S	75		↓
7	EATO	1107	1	S	50		↓
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

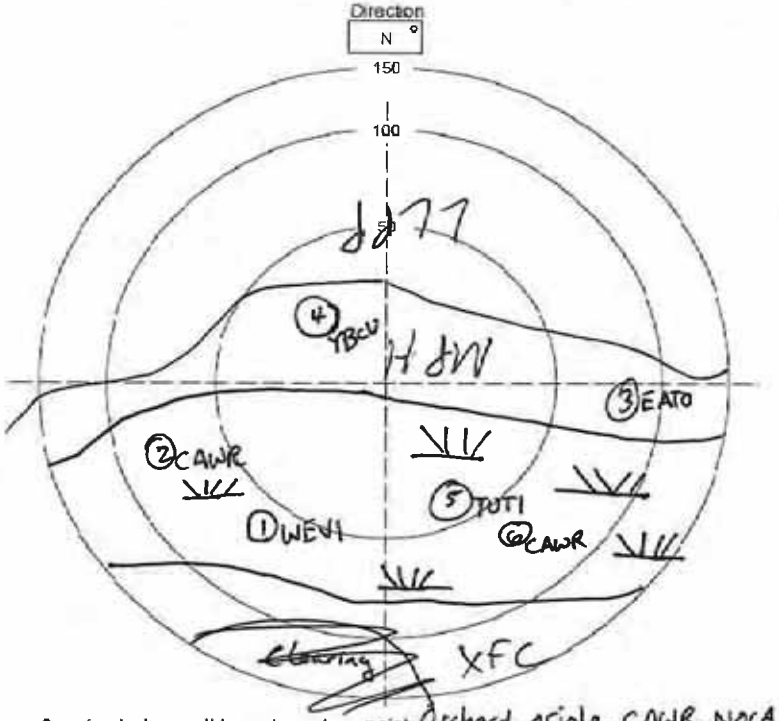
AMPHF-31

Station Id:	~~XFC-11~~ OHF-30	Date	Time Start	Time End
Observer(s):	MLB, WLM	8/24/11	1128	1135
	NAD83	Temp (F)	Wind	Sky
Easting:	0543985	85 °	E @ 0-5	50 %
Northing:	3827385			

Point-count Habitat Type: Mixed Pine/HW (MPH)

Comments: Edge of loblolly pine plantation adjacent to bottomland hw drainage. Water oak, loblolly pine, blackjack oak, bracken fern, sourwood, sweetgum, white oak, sassafras

☐ Rain ☐ Wind X Anthropogenic Noise ☐ None Insect



Species between this and previous point: Orchard oriole, CAWR, NOCA, BLJA

Non-landbird species present but not counted:

Mammals:

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	WEVI	1128	1	S	60	NA	BHW
2	CAWR	1131	1	S	75	NA	BHW
3	EATO	1132	1	C	90	NA	MPH
4	YBCU	1134	1	S	25	NA	MPH
5	TUTI	1134	1	S	40	NA	BHW
6	CAWR	1134	1	S	40	NA	BHW
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
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Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
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Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
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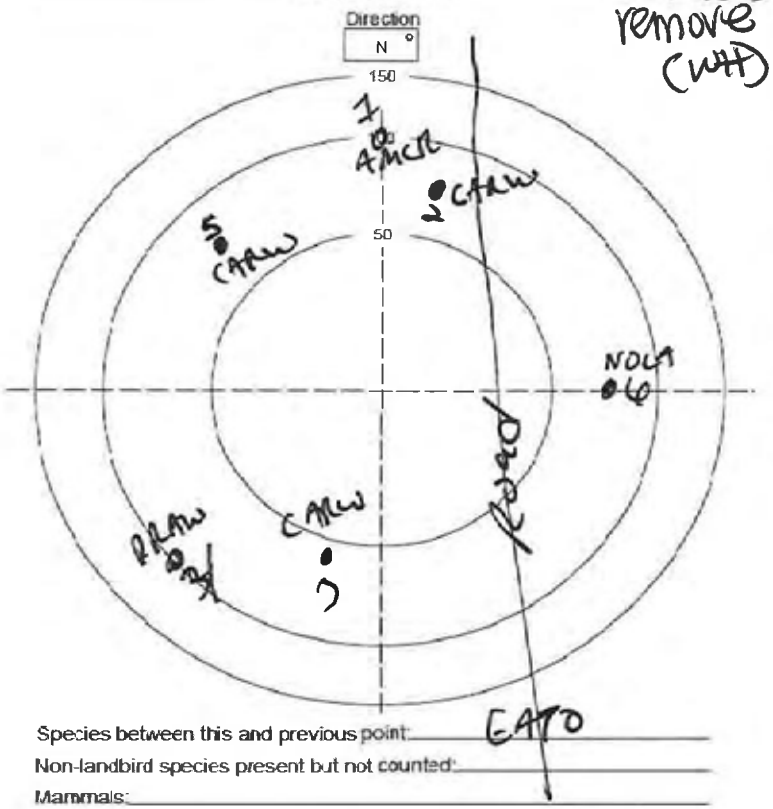
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF8~~ RL-01	Date	Time Start	Time End
Observer(s):	CL, MB	08/25/11	723	733
	NAD83	Temp (F)	Wind	Sky
Easting:	0542320	73 °	@ 0	100 %
Northing:	3830057			
Point-count Habitat Type:	FF			
Comments:	Next to road			

□ Rain □ Wind ☑ Anthropogenic Noise □ None ~~☑ Insects~~ remove (WH)



Species between this and previous point: EATO
Non-landbird species present but not counted:
Mammals:
Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	723	1	C	100	–	FF
2	CARW	724	1	S	70	–	FF
3	CARW	724	1	S	60		FF
4	PRAW	725	1	S	100	–	[illegible]
5	CARW	727	1	S	80	–	[illegible]
6	NOCA	732	1	S	70	–	FF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

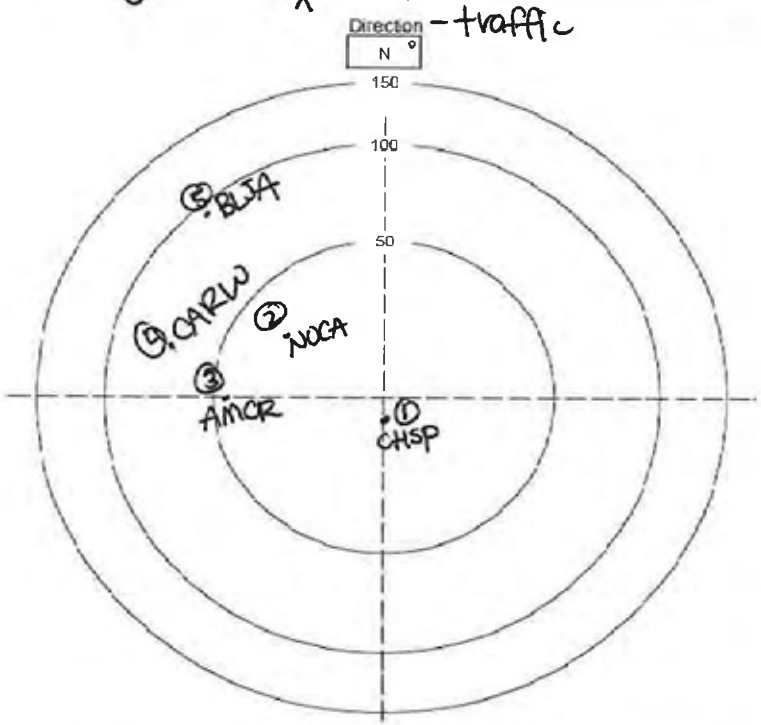
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	FF-9 RL-02	Date	Time Start	Time End
Observer(s):	WMH & WLM	8.25.11	707	717
	NAD83	Temp (F)	Wind	Sky
Easting:	0542491	68 °	Ø @ N/A	100 fog %
Northing:	3830228			

Point-count Habitat Type: fallow-field

Comments: open-field, intermitent loblolly pine. Very sandy.

□ Rain □ Wind ☒ Anthropogenic Noise □ None - traffic



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CHSP	707	2	C	5	5	FF
2	NOCA	708	1	S	20		FF
3	AMCR	709	1	C	40		FF
4	CARW	710	1	C	60		FF
5	BLJA	712	1	C	80		FF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

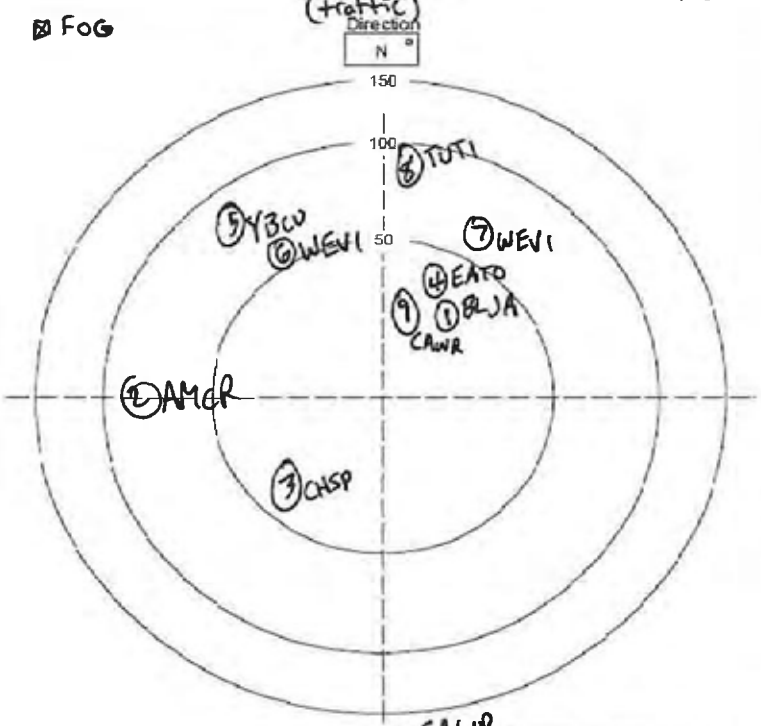
Station Id:	~~FF-10~~ MVS-46	Date	Time Start	Time End
Observer(s):	WMH, WLM	8/25/11	0727	0737
	NAD83	Temp (F)	Wind	Sky
Easting:	0542682	75 °	⊘	100 %
Northing:	3830386			

Point-count Habitat Type: FF/MPH

Comments: Fallow field surrounding a small area of pines and oaks where pt count is located

☐ Rain ☐ Wind ☒ Anthropogenic Noise (traffic) ☐ None ☒ Insect

☒ FOG



Species between this and previous point: CAWR

Non-landbird species present but not counted:

Mammals:

Notes: persimmon, winged sumac, water oak, dog fennel dominate veg → several stumps and logging debris in area

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	BLJA	0727	1	C	40	NA	FF
2	AMCR	0729	1	S	30	NA	FF
3	CHSP	0730	1	S	30	NA	FF
4	EATO	0730	1	S	40	NA	FF
5	YBCU	0731	1	S	100	NA	FF
6	WEVI	0732	1	S	50	NA	FF
7	WEVI	0732	1	C	60	NA	FF
8	TUTI	0733	1	S	100	NA	FF
9	CAWR	0735	2	C	20	NA	FF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☑ Entered in Database ☐ QA/QC

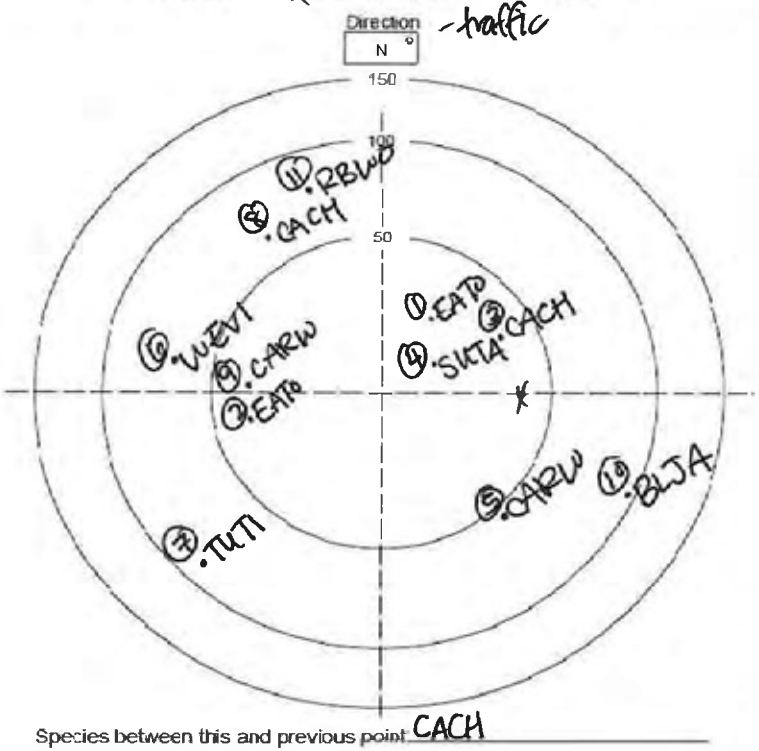
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF-11~~ MVS-47	Date	Time Start	Time End
Observer(s):	WLM & WMH	8.25.11	744	754
	NAD83	Temp (F)	Wind	Sky
Easting:	0542782	68 °	Ø @ NA	100 fog %
Northing:	3830605			

Point-count Habitat Type: Fallow field

Comments: Recently cleared area, several stumps. River cane present. One large oak in plot.

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None - traffic



Species between this and previous point: CACH

Non-landbird species present but not counted:

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	EATO	744	1	S	20		FF
2	EATO	745	1	S	20		FF
3	CACH	747	1	C	30		FF
4	SUTA	747	1	C	20		BHF
5	CARW	748	1	S	60		FF
6	WEVI	749	1	S	70		FF
7	TUTI	749	1	S	80		FF
8	CACH	751	1	C	60		FF
9	CARW	751	1	S	40		FF
10	BLJA	752	1	C	80		FF
11	RBWO	753	1	C	70		BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

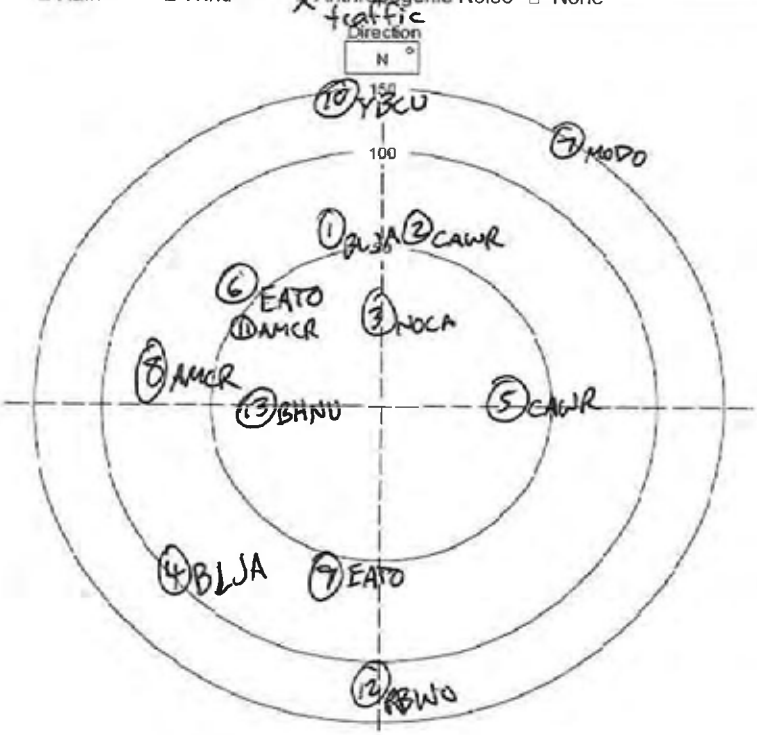
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF-12~~ MVS-40	Date	Time Start	Time End
Observer(s):	WMH, WLM	8/25/11	0852	0902
	NAD83	Temp (F)	Wind	Sky
Easting:	0543066	74 °	~~@~~	0 %
Northing:	3830920			
Point-count Habitat Type:	FF			

Comments: Sparse loblolly pines in a sandy field
Southern red oak, laurel oak, reindeer moss, broom sedge
post oak

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None
traffic



Species between this and previous point: _____
Non-landbird species present but not counted: _____
Mammals: _____
Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	BLJA	0852	1	S	50	NA	FF
2	CAWR	0852	1	S	45	NA	FF
3	NOCA	0853	1	C	10	NA	FF
4	BLJA	0854	1	C	100	NA	FF
5	CAWR	0854	1	S	40	NA	FF
6	EATO	0855	1	S	60	NA	FF
7	MODO	0857	1	S	150	NA	FF
8	AMCR	0857	1	C	80	NA	FF
9	EATO	0857	1	S	70	NA	FF
10	YBCU	0858	1	S	150	NA	FF
11	AMCR	0900	1	F	40	NA	FF
12	RBWO	0900	1	S	130	NA	FF
13	BHNU	0901	1	S	30	NA	FF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
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Carolina Wren	CARW	Pine Warbler	PIWA
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Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
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Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

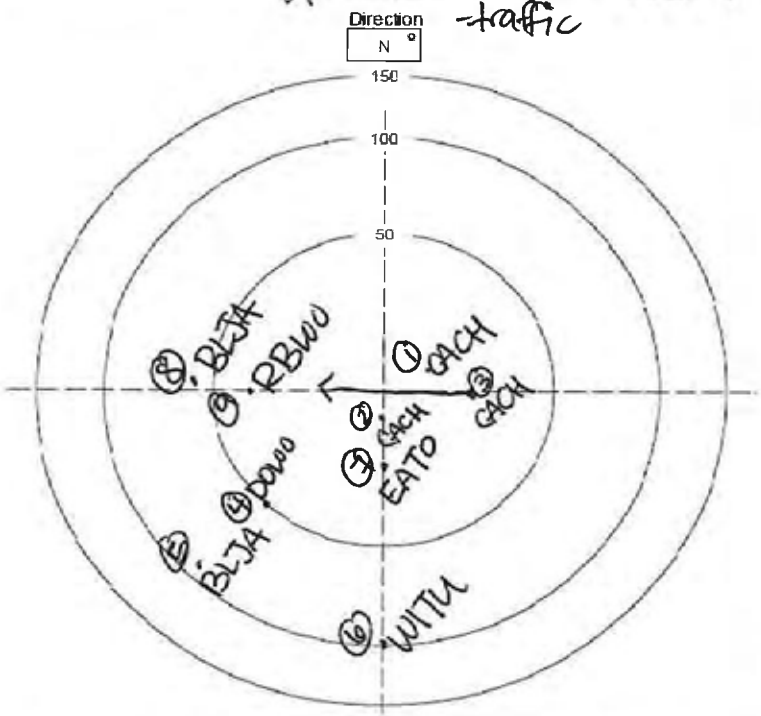
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF-13~~ MVS-41	Date	Time Start	Time End
Observer(s):	WLM & WMH	8.25.11	908	918
	NAD83	Temp (F)	Wind	Sky
Easting:	0543158	78 °	Ø @	Ø %
Northing:	3830830			

Point-count Habitat Type: Fallow field

Comments: point is bordered by silviculture area- predominantly pine

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None ☒ insects -traffic



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Repositioned point count to represent true fallow field.

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	909	1	C	20		FF
2	CACH	909	1	C	10		FF
3	CACH	910	23	F	20	10	FF
4	DOWO	910	1	S	50		FF
5	BLJA	910	1	C	80		FF
6	WITU	912	1	C	100		FF
7	EATO	913	1	S	30		FF
8	BLJA	910	1	C	100		FF
9	RBWO	918	1	C	46		MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

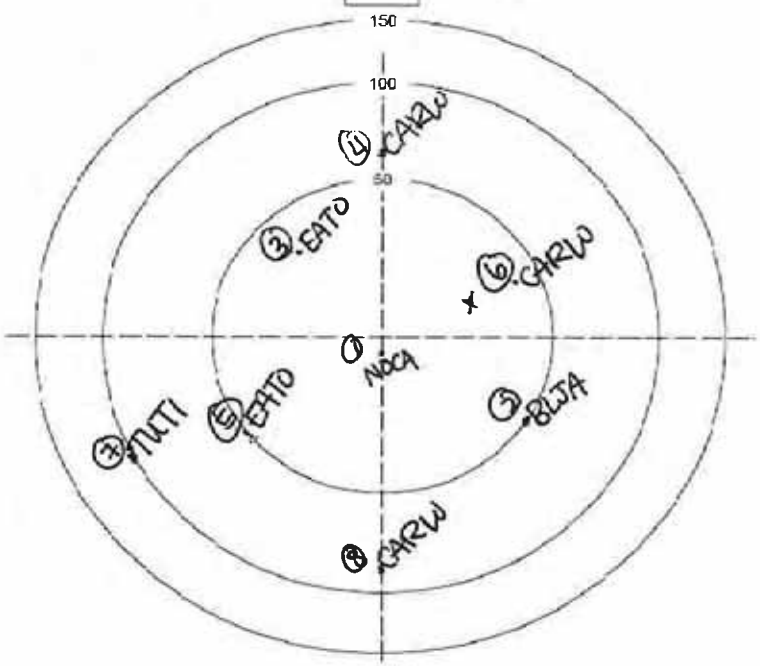
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina
ASA-14

Station Id:	~~FF-14~~ MVS-48	Date	Time Start	Time End
Observer(s):	WMH & WLM	8.25.11	831	841
	NAD83	Temp (F)	Wind	Sky
Easting:	0543052	72 °	S @ NA	10 %
Northing:	3830660			
Point-count Habitat Type:	Silviculture			
Comments:	10 year old pines (loblolly)			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None

Direction N °



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: change to SA habitat type

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	831	1	S	10		SA
2	BLJA	832	2	C	50		SA
3	EATO	832	1	S	30		SA
4	CARW	834	1	S	100		SA
5	EATO	834	1	S	50		SA
6	CARW	835	1	S	40		SA
7	TUTI	837	1	S	100		SA
8	CARW	839	1	S	80		SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

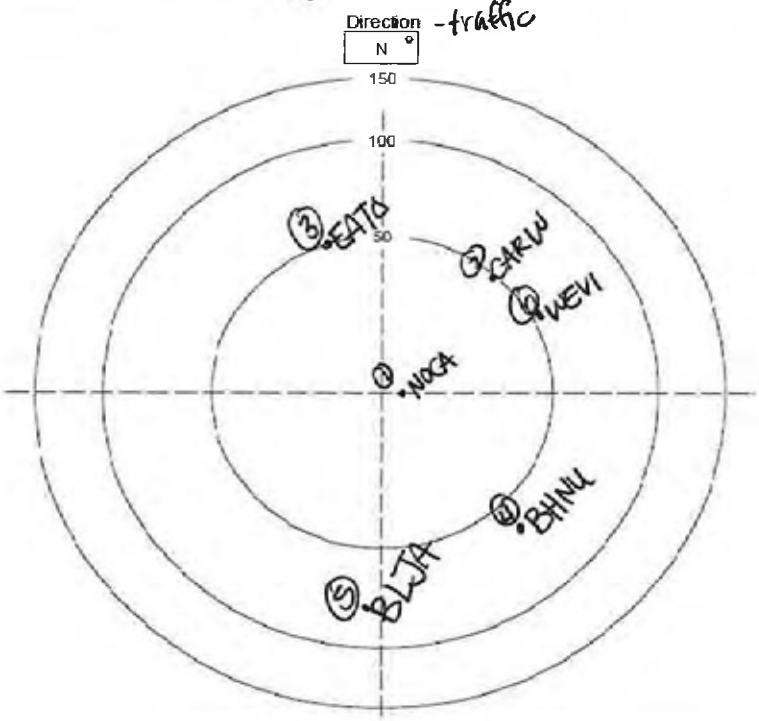
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF-15~~ MVS-45	Date	Time Start	Time End
Observer(s):	WLM & WMH	8.25.11	1037	1047
	NAD83	Temp (F)	Wind	Sky
Easting:	0543029	80 °	Ø @	10 %
Northing:	3830416			
Point-count Habitat Type:	Fallow Field			
Comments:	Scattered pinestands			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None - traffic



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	1037	1	S	15		FF
2	CARW	1037	1	S	50		
3	EATO	1037	1	S	50		
4	BHNU	1039	1	S	70		
5	BLJA	1039	1	C	80		
6	WEVI	1042	1	S	60		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

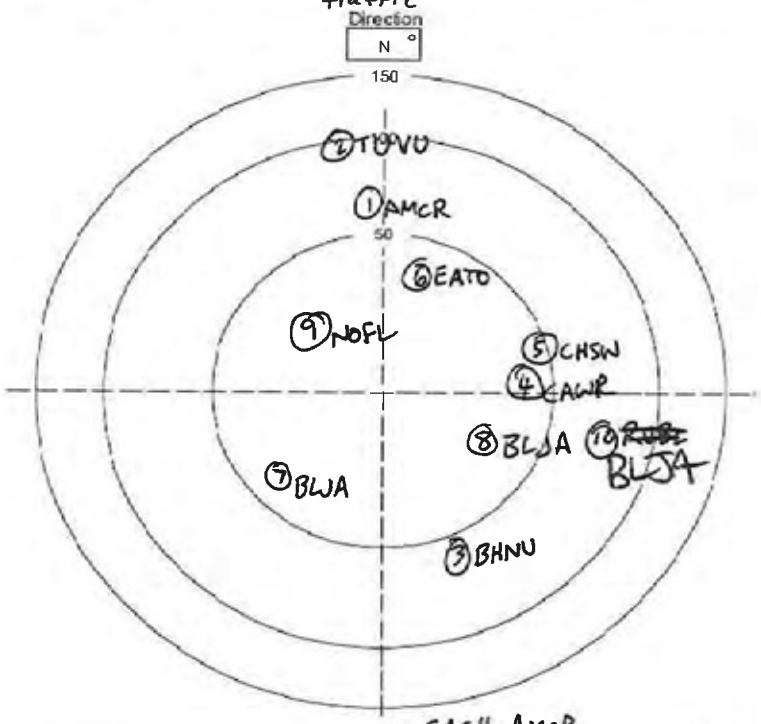
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF-16~~ MVS-44	Date	Time Start	Time End
Observer(s):	WMH, WCM	8/25/11	1010	1020
	NAD83	Temp (F)	Wind	Sky
Easting:	0543222	80 °	@	5 %
Northing:	3830432			
Point-count Habitat Type:	FF			

Comments: old road, early successional habitat blackberry, loblolly pines, broomsedge, chickasaw plum, winged sumac

□ Rain □ Wind ☒ Anthropogenic Noise traffic □ None



Species between this and previous point: CACH, AMCR

Non-landbird species present but not counted

Mammals

Notes:

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1010	1	C	60	NA	FF
2	TUVU	1012	1	FO	100	100	FF
3	BHNU	1013	1	S	60	NA	~~FF~~ XF
4	CAWR	1014	1	S	40	NA	FF
5	CHSW	1015	1	S	50	NA	FF
6	EATO	1016	1	C	40	NA	FF
7	BLJA	1017	1	C	50	NA	FF
8	BLJA	1018	1	C,	30	NA	FF
9	NOFL	1019	1	C/V	20	NA	FF
10	~~RUBE~~	1019	1	C	80	NA	FF
11	BLJA						
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

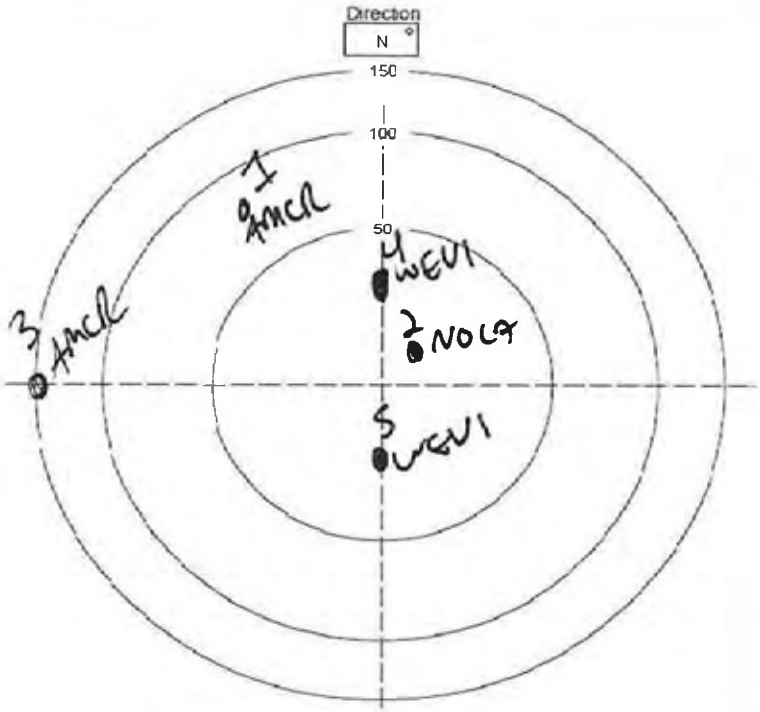
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF9~~ MVS-38	Date	Time Start	Time End
Observer(s):	MLB, CPL	8/25/11	1051	1101
	NAD83	Temp (F)	Wind	Sky
Easting:	0542334	86 °	0@	30 %
Northing:	3829536			
Point-count Habitat Type:	MMHF			
Comments:				

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1051	1	C	70	/	MMHF
2	NOCA	1052	1	C	10		MMHF
3	AMCR	1053	1	C	150	/	MMHF
4	WEVI	1000	1	S	30		MMHF
5	WEVI	1101	1	S	25		MMHF
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
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Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

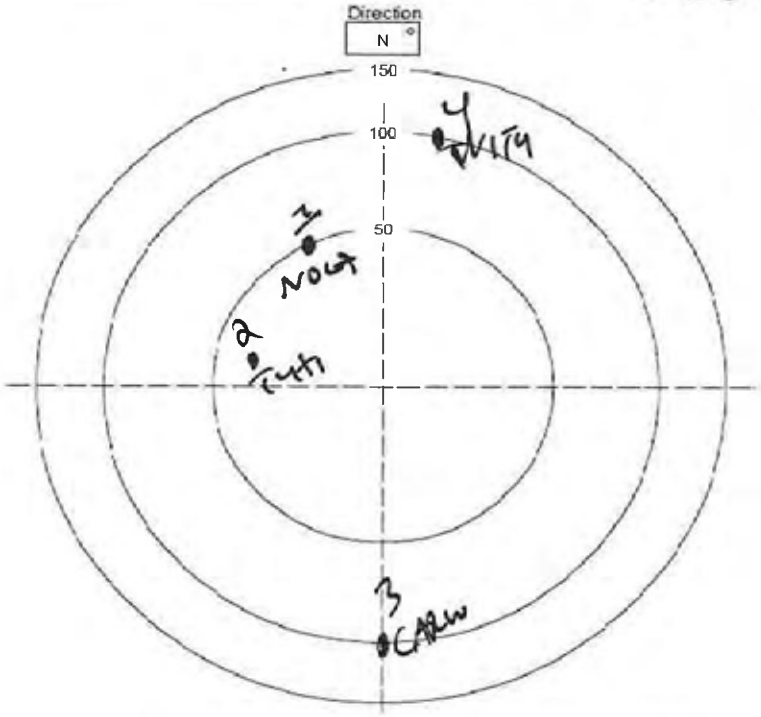
BIRD SURVEY FORM

~~Haile Mine Project~~ - South Carolina

~~MMHF-10~~ OHF-23

Station Id:	MCS, CAC	Date	Time Start	Time End
Observer(s):		8/25/11	856	906
	NAD83	Temp (F)	Wind	Sky
Easting:	0541533	75 °	@ 0	0 %
Northing:	3529664			
Point-count Habitat Type:				
Comments:	MMHF			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	856	1	S	50	/	MMHF
2	TUTI	857	2	S	40		MMHF
3	CARW	903	1	S	100		MMHF
4	WITH	907	1	S	100		MMHF
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

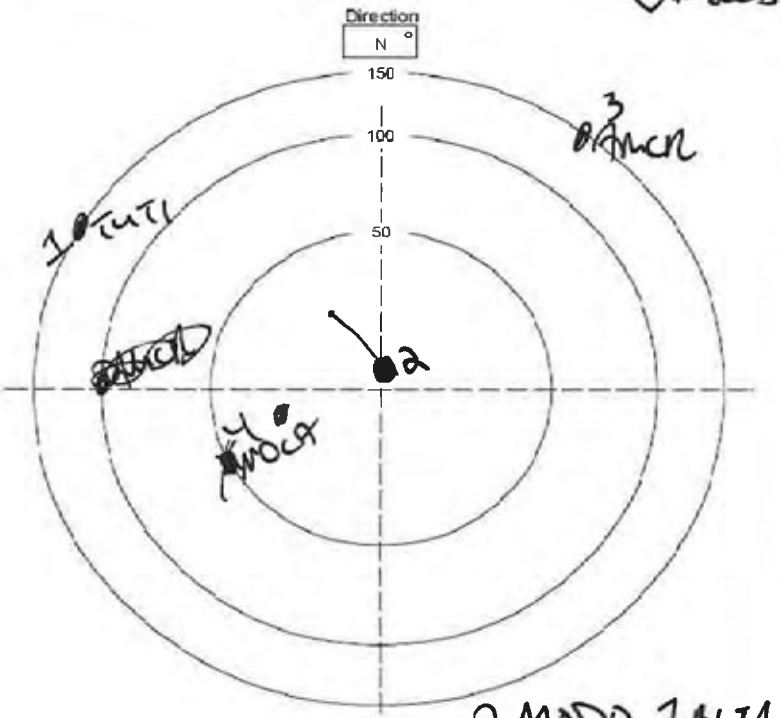
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM

Haile Mine Project - South Carolina

Station Id:	~~MMHF-17~~ MVF-10	Date 6/25/11	Time Start	Time End 1135
Observer(s):	MLB, CAL			1140
	NAD83	Temp (F)	Wind	Sky
Easting:	0542496	91 °	0@0	40 %
Northing:	3829988			
Point-count Habitat Type:	MMHF			
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: 2 MODO, 1 BLJA

Non-landbird species present but not counted:

Mammals:

Notes:

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	1138	1	S	150	—	MMHF
2	ATHY	1140	2	C	—	1	MMHF
3	AMCR	1143	1	C	150	+	MMHF
4	NOCA	1145	1	C	30	—	MMHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

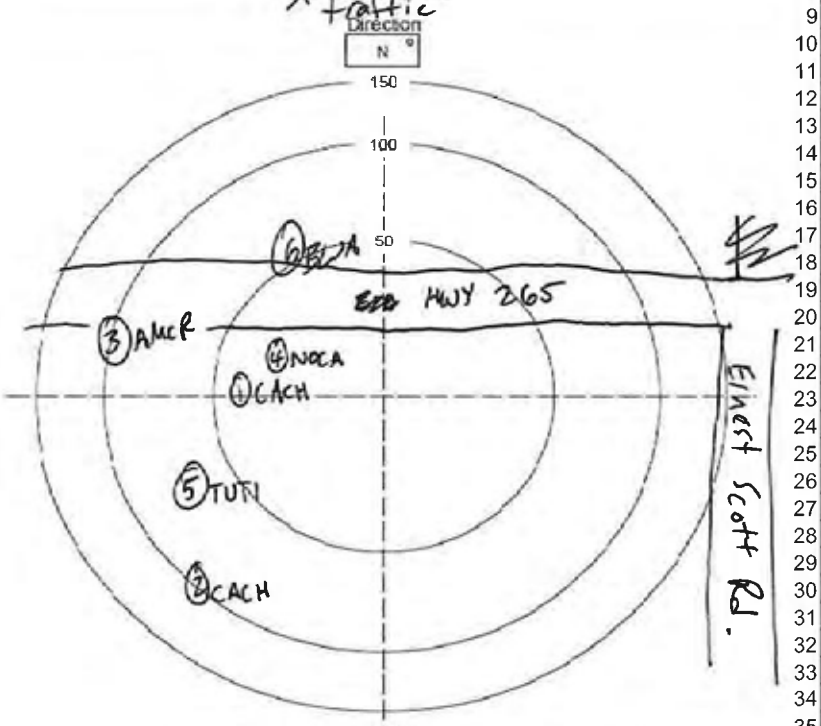
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF-19~~ MVF-12	Date	Time Start	Time End
Observer(s):	WMH, WLM	8/25/11	1100	1110
	NAD83	Temp (F)	Wind	Sky
Easting:	0542801	84°	@	40 %
Northing:	3830223			
Point-count Habitat Type:	MMHF			
Comments:	Water oak, sassafras, sparkleberry, post oak, turkey oak, persimmon, Cretagus sp.			

□ Rain □ Wind X Anthropogenic Noise traffic □ None ☒ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	1100	1	C	40	NA	MMHF
2	CACH	1101	1	C	100	NA	MMHF
3	AMCR	1101	1	C	100	NA	FF
4	NOCA	1103	1	S	20	NA	MMHF
5	TUTI	1104	1	S	60	NA	MMHF
6	BLJA	1106	1	S	50	NA	MMHF
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☑ Entered in Database ☐ QA/QC

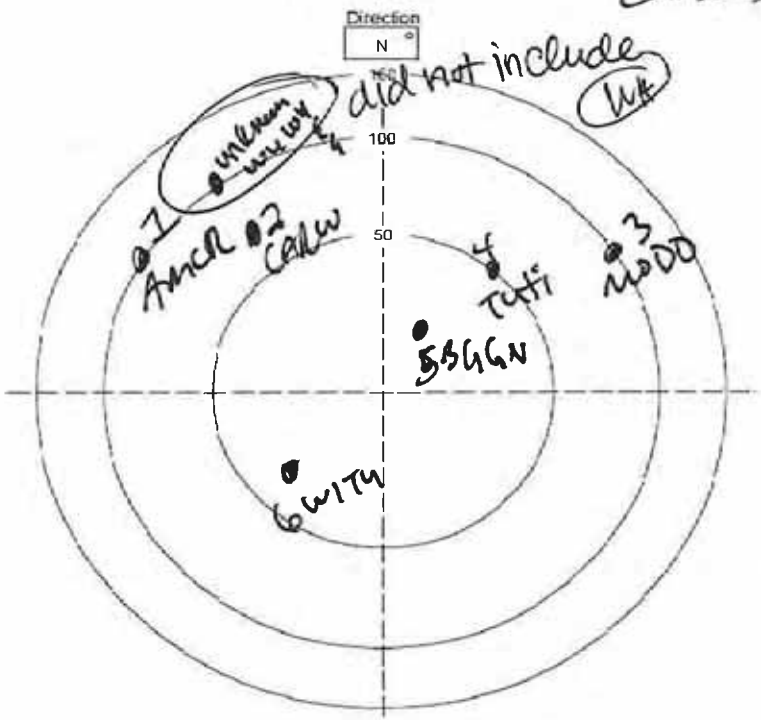
BIRD SURVEY FORM

Haile Mine Project - South Carolina

~~MPHF 15~~ ~~DSA-15~~ MVF-09

Station Id:	[illegible]	Date	Time Start	Time End
Observer(s):	MCB, CAH	8/25/11	1022	1032
	NAD83	Temp (F)	Wind	Sky
Easting:	0542377	69 °	@0	20 %
Northing:	3829258			
Point-count Habitat Type:	SA			
Comments:	change to SA			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1022	1	C	100	—	MMHF
2	CARW	1025	1	S	60	—	MMHF
3	MODO	1026	2	S	100	—	MMHF
4	TUTI	1027	1	S	50	—	MMHF
5	BGGN	1028	1	V	20	—	MMHF
6	WITU	1030	1	S	30	—	~~[illegible]~~ SA
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

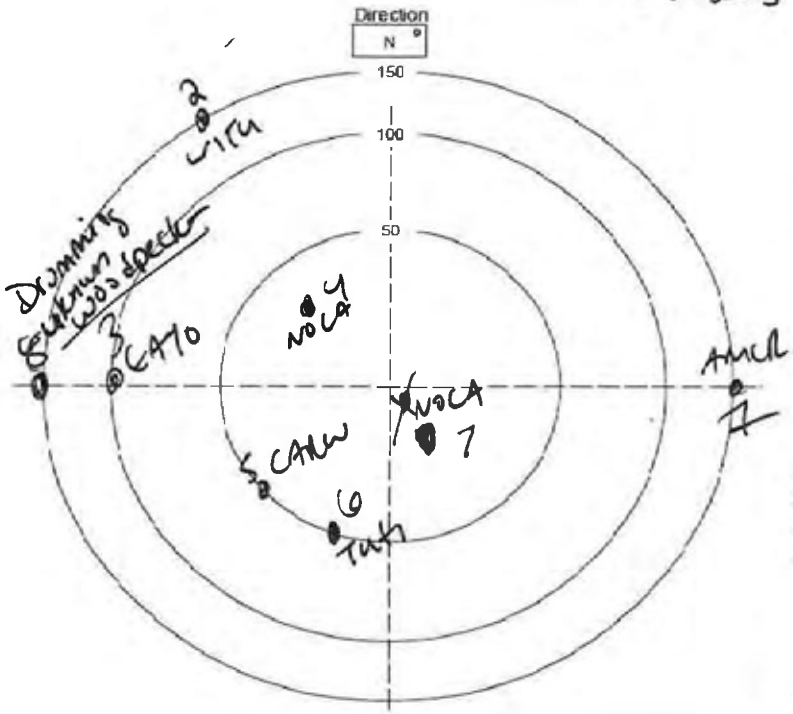
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-19~~ TAR-03	Date	Time Start	Time End
Observer(s):	MCB, CAL	6/15/11	912	922
	NAD83	Temp (F)	Wind	Sky
Easting:	0591640	77 °	C@	0 %
Northing:	3829534			
Point-count Habitat Type:	MPHF			
Comments:				

□ Rain □ Wind □ Anthropogenic Noise □ None ☑ Insects



Species between this and previous point _____
Non-landbird species present but not counted _____
Mammals: _____
Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	912	1	S	150		MPHF
2	WIFU	914	1	S	150		MPHF
3	CATO	915	1	S	100		MPHF
4	NOCA	916	1	S	15		MPHF
5	CARW	918	1	S	50		MPHF
6	TUTI	920	1	S	50		MPHF
7	NOCA	920	1	S	25		MPHF
8	WOKI	921	1	D	150		MPHF
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
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Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
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Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If flight, approximate height above ground in meters

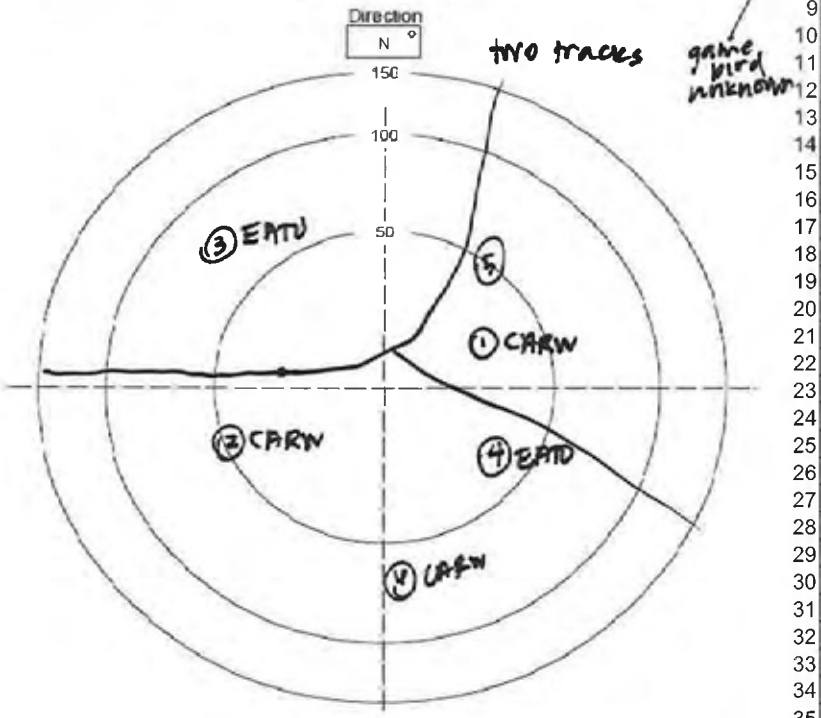
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

TAR-04

Station Id:	MPHF-20	Date	Time Start	Time End
Observer(s):	CL and MB	8.25.11	746	756
	NAD83	Temp (F)	Wind	Sky
Easting:	0542081	72 °	0 @	100 %
Northing:	3829835			
Point-count Habitat Type:				
Comments:				

□ Rain □ Wind ✓Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Road traffic

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	746	1	S	30		MPHF
2	CARW	746	1	S	50		MPHF
3	EATO	748	1	S	40		MPHF
4	EATO	749	1	S	40		MPHF
5		752	1	S	50		MPHF
6	CARW	753	1	S	70		MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

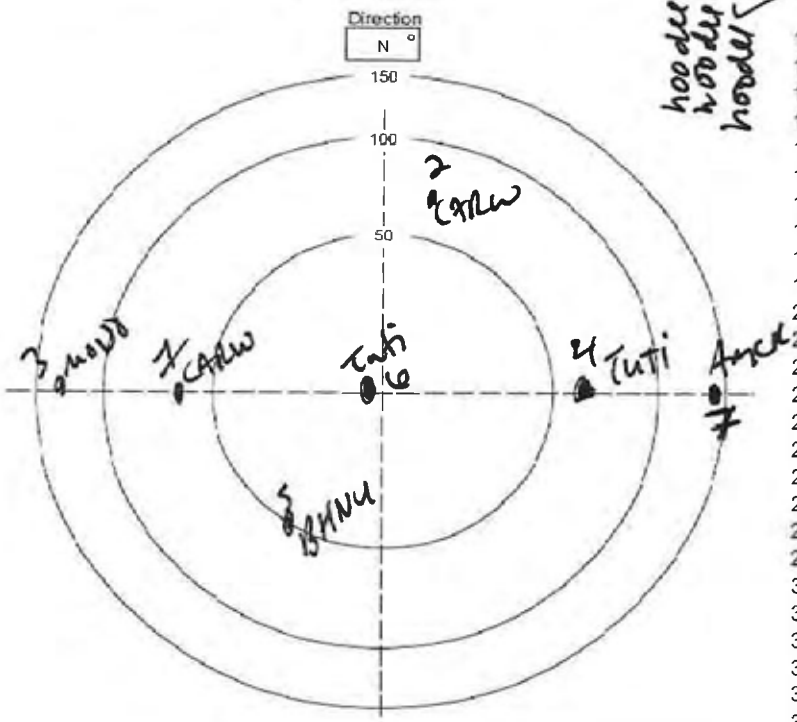
✓ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

XSC-03 XXXX

Station Id:	MPHF-21	Date	Time Start	Time End
Observer(s):	MLB, CAL	08/25/11	810	820
	NAD83	Temp (F)	Wind	Sky
Easting:	0594903	73 °	@0	70 %
Northing:	3829980			
Point-count Habitat Type:	MPHF			
Comments:				

□ Rain □ Wind □ Anthropogenic Noise □ None



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Species between this and previous point _____
Non-landbird species present but not counted _____
Mammals _____
Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	810	1	S	70		MPHF
2	CARW	811	1	S	70		MPHF
3	MODO	814	1	S	120		MPHF
4	Tuti	814	1	S	70		MPHF
5	BHNU	817	1	S	50		MPHF
6	Tuti	820	1	V	15		MPHF
7	Amcr	820	1	C	140		MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

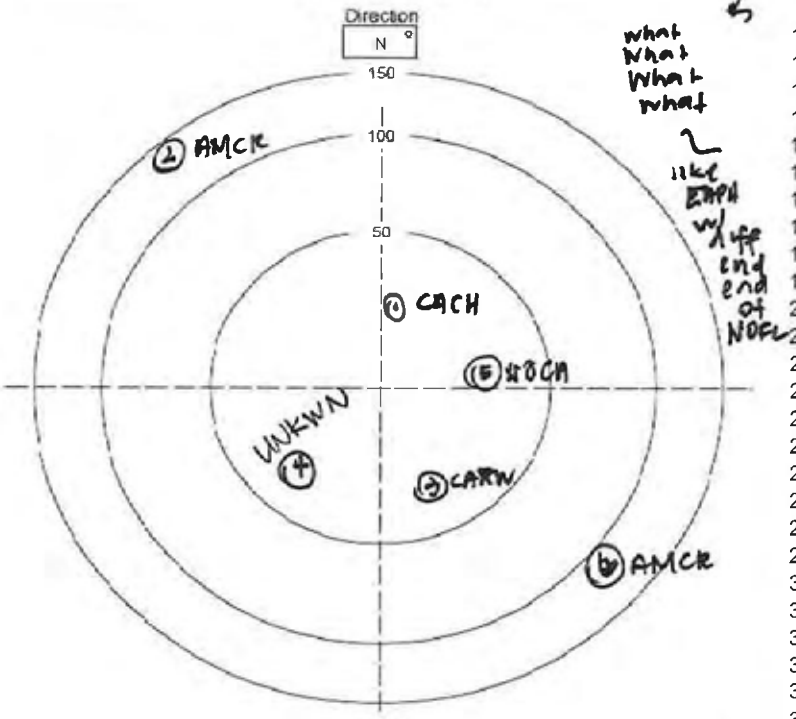
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-22~~ TAR-05	Date	Time Start	Time End
Observer(s):	MB & CL	8.25.11	833	843
	NAD83	Temp (F)	Wind	Sky
Easting:	0541692	75 °	0 @	0 %
Northing:	3829849			
Point-count Habitat Type:				
Comments:				

□ Rain □ Wind ✓ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: prison spearows

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	833	1	S	20		MPHF
2	AMCR	835	1	G	140		
3	CARW	836	1	S	40		
4	UNKWN	838	1	S	30		
5	NOCA	840	1	S	30		
6	AMCR	841	1	C	110		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

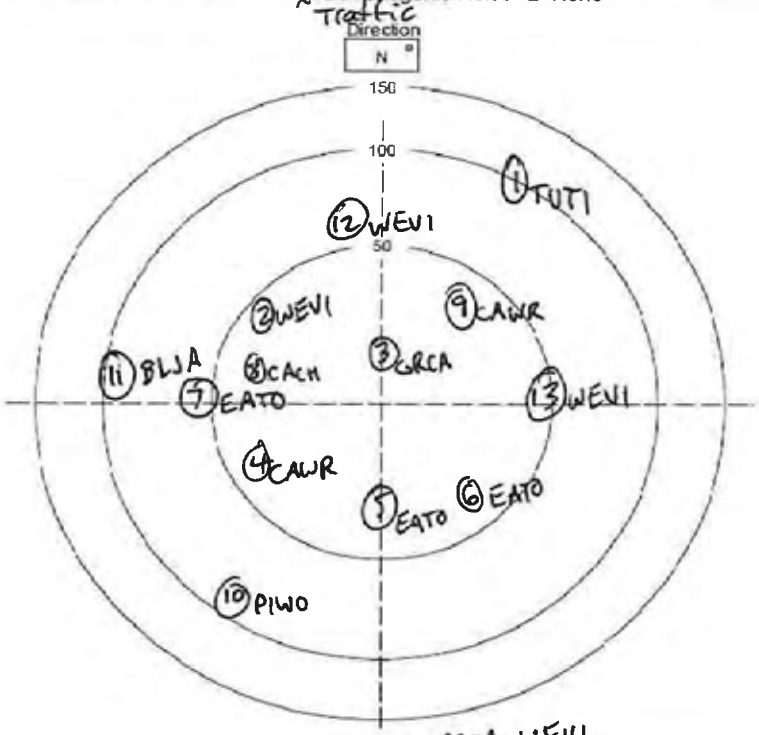
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-24~~ OHF-25	Date: 8/25/11	Time Start	Time End
Observer(s):	WLM, WMH	~~0804~~	~~0814~~	0814
	NAD83	Temp (F)	~~Wind~~	Sky
Easting:	0542759	77 °	@	0 %
Northing:	3830725			
Point-count Habitat Type:	Pocosin (PSS) wetland			
Comments:	Scrub wetland area on the edge of BHF. Sweet bay, Holly, cane, Clethra alnifolia, water oak, cinnamon fern, red maple,			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None
Traffic



Species between this and previous point: NOCA, WEVI
Non-landbird species present but not counted:
Mammals:
Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat (MPHF)
1	TUTI	0804	1	S	100	NA	~~Pocosin~~
2	WEVI	0805	1	S	20	NA	~~Pocosin~~
3	GRCA	0805	2	S	10	NA	MPHF
4	CAWR	0805	1	S	40	NA	"
5	EATO	0806	1	C	30	NA	"
6	EATO	0806	1	S	40	NA	"
7	EATO	0806	1	C	40	NA	"
8	CACH	0808	1	S	25	NA	"
9	CAWR	0809	1	C	30	NA	"
10	PIWO	0810	1	S	80	NA	BHF
11	BLJA	0811	1	S	80	NA	~~Pocosin~~
12	WEVI	0813	1	S	60	NA	MPHF
13	WEVI	0814	1	S	50	NA	~~Pocosin~~
14							MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

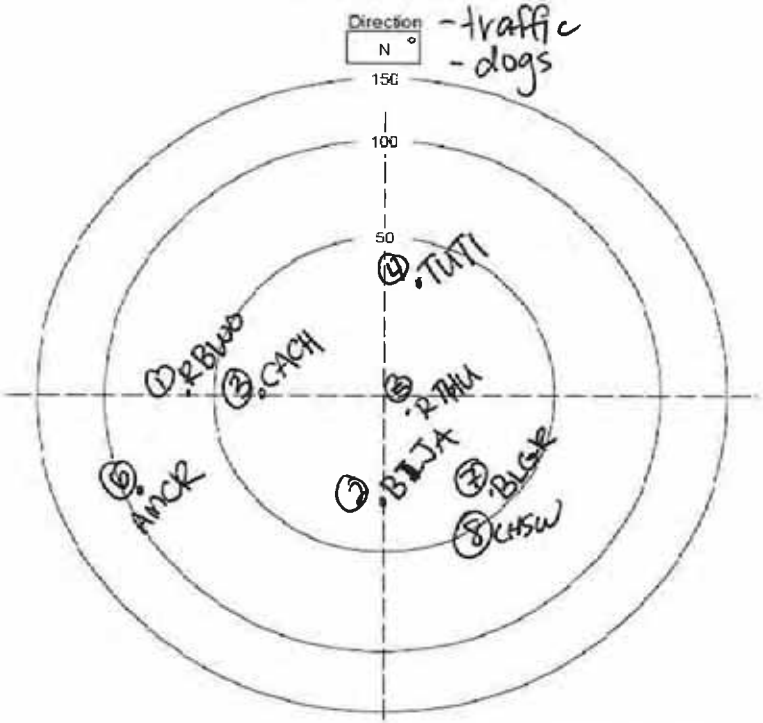
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVS-43 ~~MPHF-25~~ ΔXFC-3

Station Id:	~~MPHF-25~~	Date	Time Start	Time End
Observer(s):	WLM & WMH	8.25.11	949	959
	NAD83	Temp (F)	Wind	Sky
Easting:	0542459	78 °	Ø @	Ø %
Northing:	3830528			
Point-count Habitat Type: XFC				
Comments: change to XFC.				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	RBWO	949	1	C	60	NA	XFC
2	BLJA	951	1	C	30	NA	XFC
3	CACH	951	1	S	40	NA	XFC
4	TUTI	953	1	C	30	NA	XFC
5	RTHU	953	1	S	10	NA	XFC
6	AMCR	955	1	C	80	NA	XFC
7	BLGR	956	1	S	40	NA	XFC
8	CHSW	0859	1	FO	40	20	XFC
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

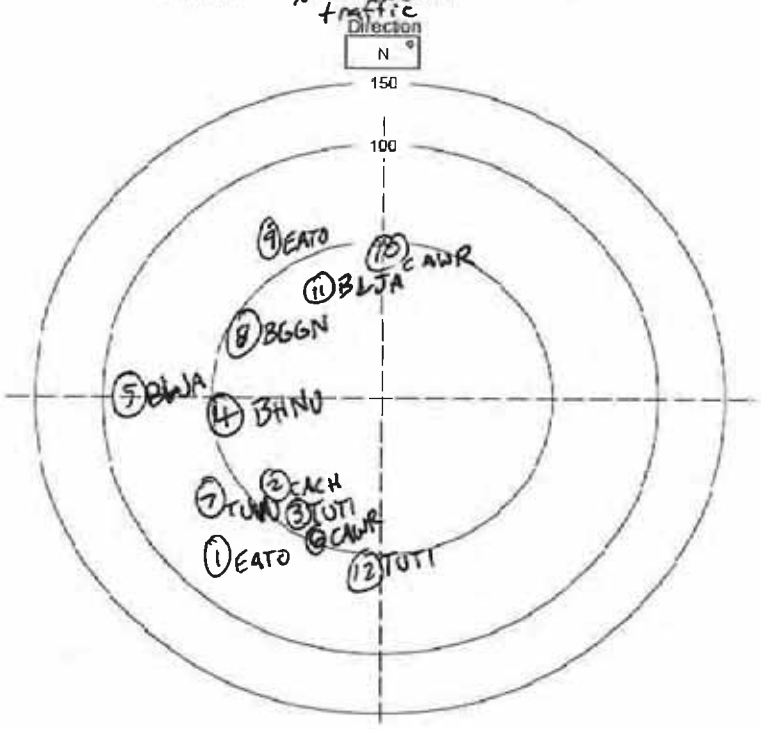
BIRD SURVEY FORM

Haile Mine Project - South Carolina

Station Id:	~~MPHF-26~~ MVS-42A XFC-4	Date	Time Start	Time End
Observer(s):	WMH, WLM	8/25/11	0932	0942
	NAD83	Temp (F)	Wind	Sky
Easting:	0543361	80 °	@	0 %
Northing:	3830678			
Point-count Habitat Type:	XFC			

Comments: Very dry sandy soil area w/ loblolly pine, turkey oak, post oak, blackjack oak, reindeer moss, broomsedge, prickly pear cactus, chickasaw plum

☐ Rain ☐ Wind ☒ Anthropogenic Noise traffic ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	EATO	0932	1	C	70	NA	XFC
2	CACH	0932	1	S	40	NA	XFC
3	TUTI	0933	1	S	40	NA	XFC
4	BHNU	0933	1	S	30	NA	XFC
5	BLJA	0934	1	C	80	NA	FF
6	CAWR	0936	1	S	40	NA	XFC
7	TUVI	0937	2	FO	60	100	XFC
8	BGGN	0940	1	C	30	NA	XFC
9	EATO	0940	1	S	60	NA	XFC
10	CAWR	0941	1	S	50	NA	XFC
11	BLJA	0941	1	S	40	NA	XFC
12	TUTI	0941	2	C	60	NA	XFC
13							
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

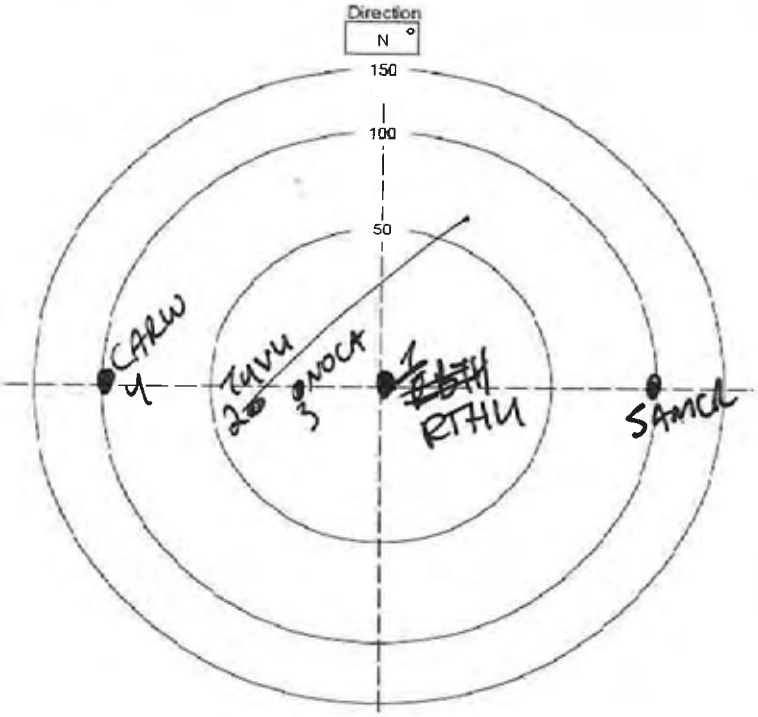
☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

SHP-17 ~~AMPHF-26~~

Station Id:	~~SA36~~	Date	Time Start	Time End
Observer(s):	ML, CAL	06/25/11	954	1004
	NAD83	Temp (F)	Wind	Sky
Easting:	0542166	89 °	@ 0	0 %
Northing:	3829355			
Point-count Habitat Type:	MPHF			
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes:

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

RTHU

Sutton

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	~~RTHU~~	954	1	FO	1	1	MPHF
2	TUVU	955	1	V	–	50	MMHF
3	NOCA	956	1	S	1	20	MPHF
4	CARW	959	1	S	1	100	MPHF
5	AMCR	1003	1	S	1	100	MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

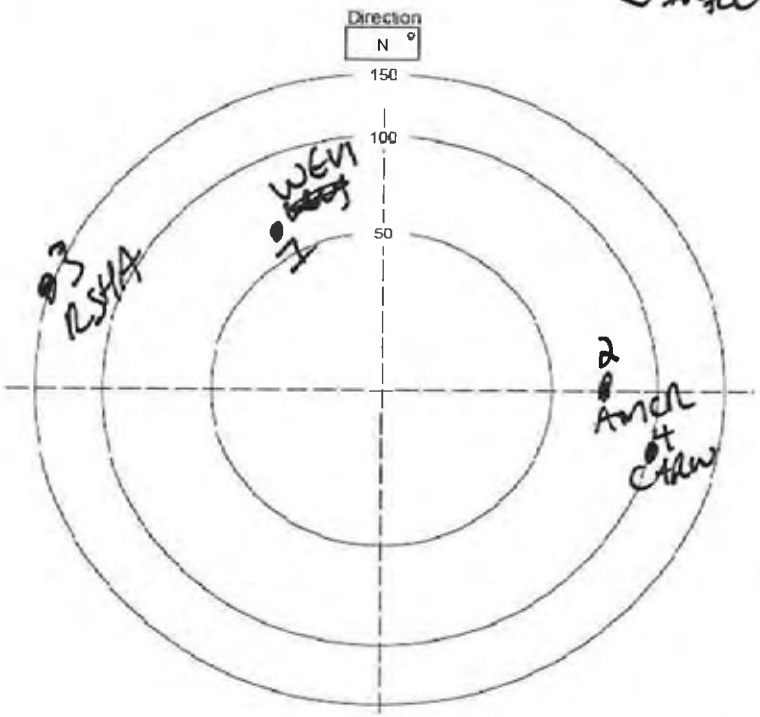
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA37~~ MVS-37	Date	Time Start	Time End
Observer(s):	MCB, CAL	8/25/11	1114	1124
	NAD83	Temp (F)	Wind	Sky
Easting:	0542472	88 °	@ 0	20 %
Northing:	3529336			
Point-count Habitat Type:				
Comments:	SA			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	WEVI	1117	1	S	60	/	SA
2	AMCR	1118	1	S	80	/	SA
3	RSHA	1121	1	C	150	/	[illegible]
4	CARW	1124	1	S	100	[illegible]	[illegible]
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

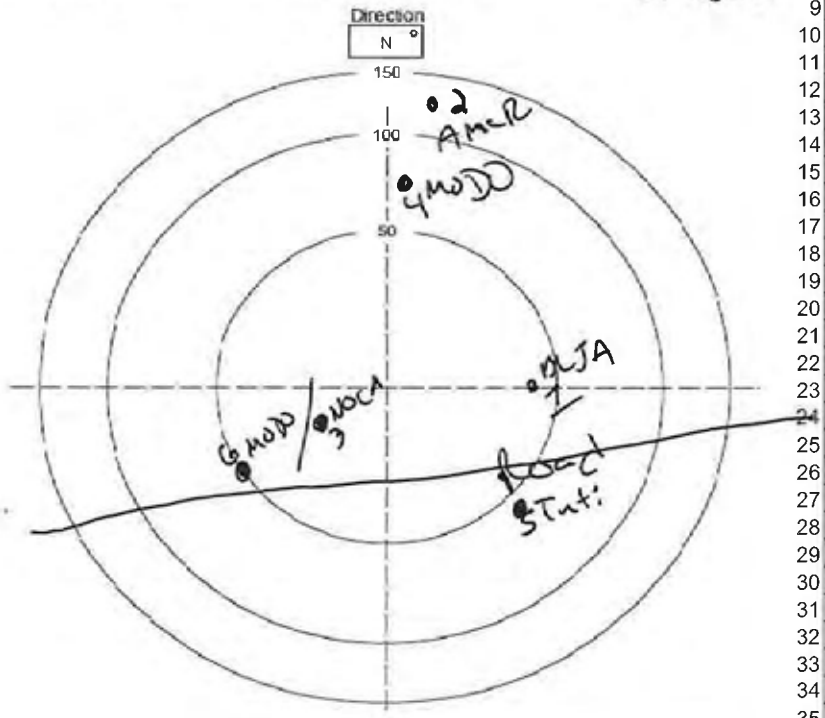
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☑ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF-11~~ A-01	Date	Time Start	Time End
Observer(s):	WLM, CAL	6/26/11	730	740
	NAD83	Temp (F)	Wind	Sky
Easting:	0543661	77 °	@ 0	100 %
Northing:	3829293			
Point-count Habitat Type:	MMHF			
Comments:	Point taken adj. to old wooden house. Bamboo found around house			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None ☑ Insect



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	BLJA	731	1	C	40	—	MMHF
2	AMCR	732	1	C	20	—	MMHF
3	NOCA	737	1	C	30	—	MMHF
4	MODO	736	1	S	80	—	MMHF
5	Tuti	737	1	S	60	—	MMHF
6	MODO	738	1	S	50	—	MMHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
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Common Nighthawk	CONI	Red-eyed Vireo	REVI
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Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
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Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
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#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

OHF-29

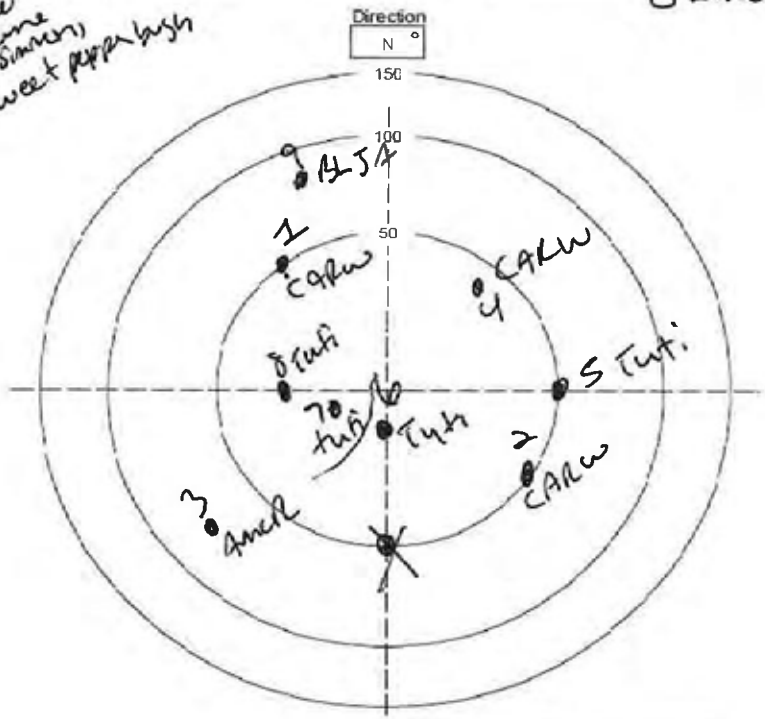
Station Id:	~~MMHF-12~~	Date	Time Start	Time End
Observer(s):	WCH, CAL	8/26/11	751	801
	NAD83	Temp (F)	Wind	Sky
Easting:	0593741	75 °	@ 0	100 %
Northing:	3829520			
Point-count Habitat Type:	~~[illegible]~~ MMHF			

Comments: point count taken on edge of a BH swamp

veg: OK Jack oak, Ark hickory, River cane, persimmon, sweet pepperbush

Slope is ≈ 3% - 5%

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None ☐ Insect



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	751	1	S	1	50	MMHF
2	CARW	751	1	S	1	50	MMHF
3	Amcr	752	1	S	1	75	MMHF
4	CARW	753	1	S	1	40	MMHF
5	Tuti	754	1	S	1	50	MMHF
6	Tuti	754	1	S	1	20	MMHF
7	Tuti	754	1	S	1	10	MMHF
8	Tuti	755	1	S	1	20	MMHF
9	BLJA	800	1	S	1	80	MMHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☐ Entered in Database ☐ QA/QC

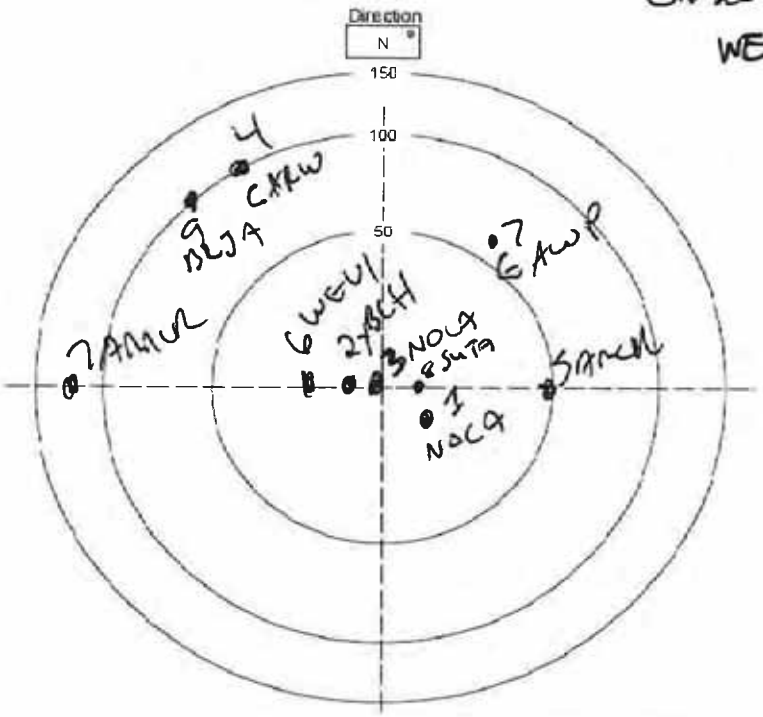
BIRD SURVEY FORM

Haile Mine Project - South Carolina

OHF-28 ~~MMHF-12~~ MPHF-12

Station Id:	~~MMHF 12~~	Date	Time Start	Time End
Observer(s):	~~[illegible]~~ WCM, CAL	8/24	825	835
	NAD83	Temp (F)	Wind	Sky
Easting:	0543866	77 °	@ 0	100 %
Northing:	3829749			
Point-count Habitat Type:	MPHF			
Comments:	on edge of open area pond + field			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	825	3	S	10	/	MMHF
2	VBCH	826	1	S	10	—	MMHF
3	ROBA	826	2	S	10	—	MMHF
4	~~[illegible]~~ CARW	827	2	S	100	/	MMH
5	AMCR	828	1	S	50		MMH
6	WEVI	828	1	S	15		MMH
7	EAWP	830	1	S	60		MMHF
8	SUTA	832	1	S	20		MMHF
9	BLJA	834	1	C	100	/	MMHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM OHF-27

Haile Mine Project - South Carolina

MMHF14 ΔMPHF-17

Station Id:	[redacted]	Date	Time Start	Time End
Observer(s):	WM, CAL	8/26/14	849	859
	NAD83	Temp (F)	Wind	Sky
Easting:	0543796	78 °	@ 0	100 %
Northing:	3829889			
Point-count Habitat Type:	[redacted]			

Comments: S. red oak, MPHF, pecan, Hro Oak (5) loblolly pine, longleaf pine

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insect

Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	WCU	849	1	S	20	—	MPHF
2	AMCR	849	1	S	75	—	MPHF
3	CARW	850	1	S	20	—	MPHF
4	GRCA	851	1	S	15	—	MPHF
5	PIWO	851	2	C	60	—	MPHF
6	YBCH	851	1	S	20	—	MPHF
7	NOCA	852	1	S	20	—	MPHF
8	SUTA	853	1	V	40	—	MPHF
9	BGGN	854	1	V	40	—	MPHF
10	EAWP	855	1	V	50	—	MPHF
11	EAPH	857	1	V	5	—	MPHF
12	CARW	858	2	C	5	—	MPHF
13	TUTI	857	2	S	30	—	MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

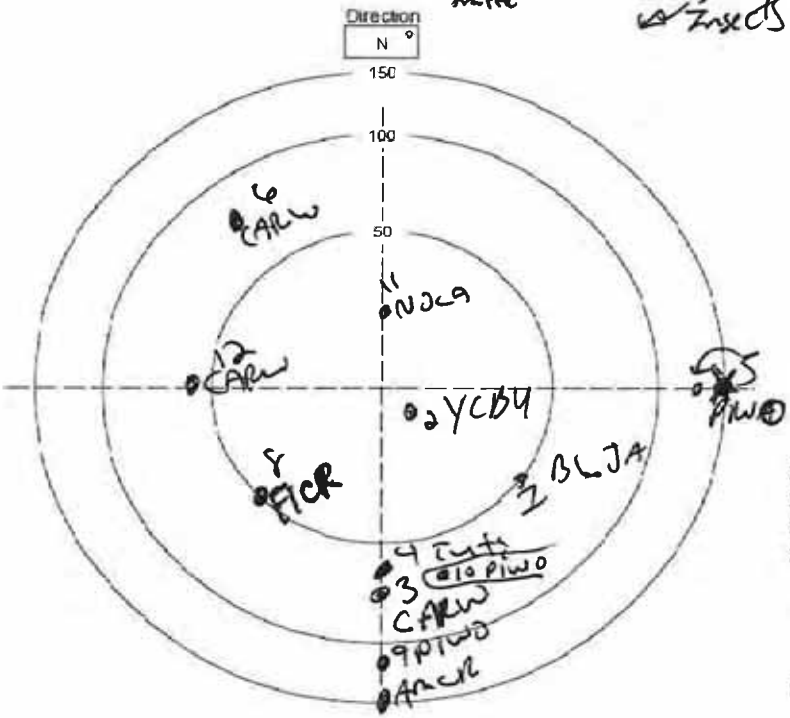
BIRD SURVEY FORM MVF-13

Haile Mine Project - South Carolina

~~MMHF15~~ ~~AMPHF-25~~

Station Id:		Date	Time Start	Time End
Observer(s):	WCM, CAL	8/26	921	931
	NAD83	Temp (F)	Wind	Sky
Easting:	0547676	82 °	0 @	85 %
Northing:	3830095			
Point-count Habitat Type:	MPHF			
Comments:				

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None ☒ Dog ☒ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	BLJA	928	1	C	50	–	MPHF
2	YCBY	923	1	S	10	/	MPHF
3	CARW	923	2	S	40	–	MPHF
4	Tuti	925	1	S	20	–	MPHF
5	PIWO	924	1	D	100	/	MPHF
6	CARW	926	1	S	80	–	MPHF
7	AMCR	927	1	C	150	/	MPHF
8	FICR	928	1	C	50	/	MPHF
9	PIWO	929	1	C	100	/	MPHF
10	PIWO	927	1	C	100	/	MPHF
11	NOCA	928	1	S	70	/	MPHF
12	CARW	931	2	S	60	–	MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM

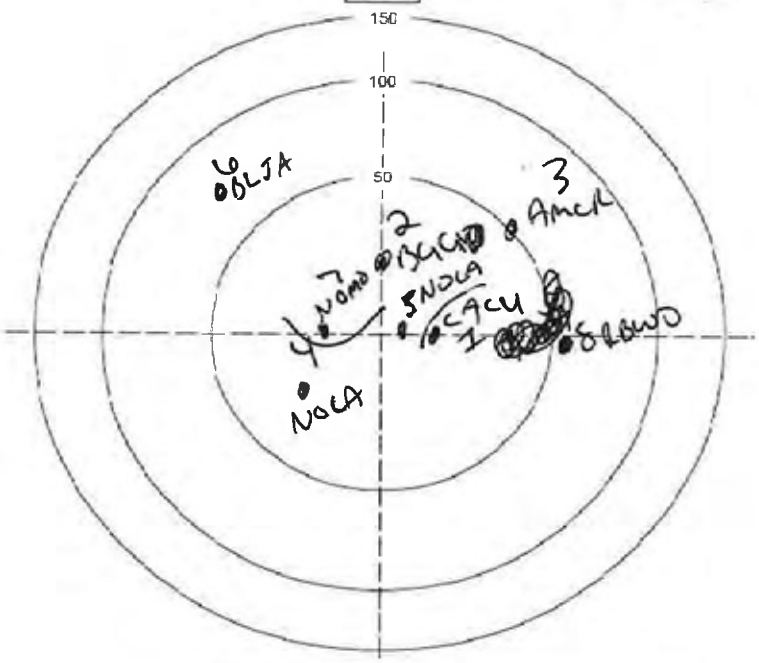
Haile Mine Project - South Carolina

OHF-26

Station Id:	~~MMHF-16~~	Date	Time Start	Time End
Observer(s):	MM, CAL	8/26/11	945	955
	NAD83	Temp (F)	Wind	Sky
Easting:	0543560	80 °	@ 0	50 %
Northing:	3830219			
Point-count Habitat Type:				
Comments:	Pocosin			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects ☑ Dogs

Direction N °



Species between this and previous point: _____

Non-landbird species present but not counted _____

Mammals _____

Notes _____

All should be OHF MMHF

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	945	1	S	20	4	~~BHF~~
2	BGGN	945	1	S	20	/	~~BHF~~
3	AMCR	946	1	S	50	/	~~BHF~~
4	NOCA	946	1	S	15	/	~~BHF~~
5	NOCA	947	1	S	15	/	~~BHF~~
6	BLJA	950	1	S	70	/	~~BHF~~
7	[redacted]	951	1	S	20	/	~~BHF~~
8	~~RBWO~~ NOMO	952	1	S	60		~~BHF~~
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

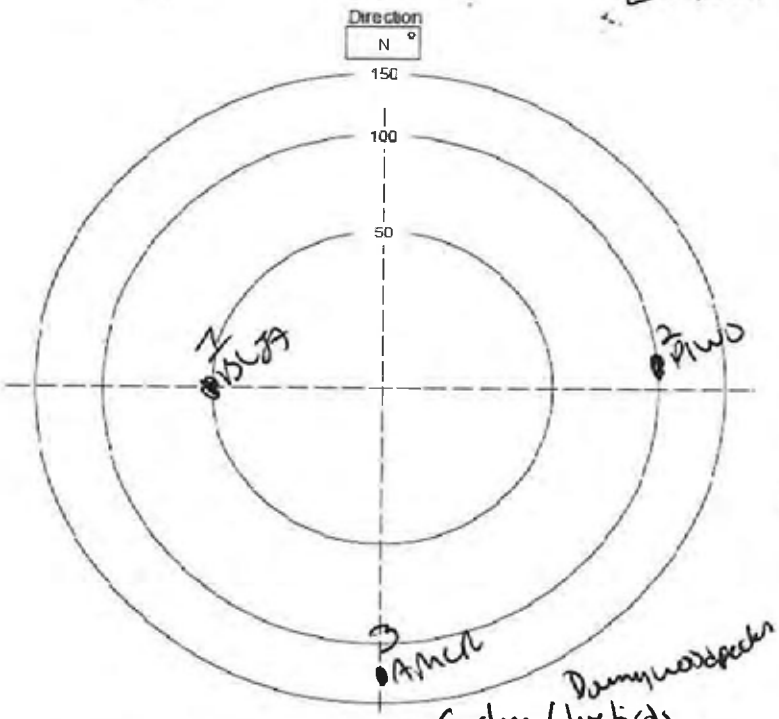
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM

Haile Mine Project - South Carolina

Station Id:	~~MMHF-18~~ MVF-18	Date	Time Start	Time End
Observer(s):	WLM, CAL	8/26/11	1019	1029
	NAD83	Temp (F)	Wind	Sky
Easting:	0542698	84 °	SW @ 3	30 %
Northing:	3830039			
Point-count Habitat Type:				
Comments:	MMHF			

☐ Rain ☑ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: Eastern Bluebirds, Downy Woodpecker

Non-landbird species present but not counted: ~~Carolina Chickadee~~

Mammals:

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	BLJA	1021	1	C	50	–	MMHF
2	PIWO	1022	1	C	100	–	MMHF
3	AMCR	1024	1	C	120	–	MMHF
4							
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

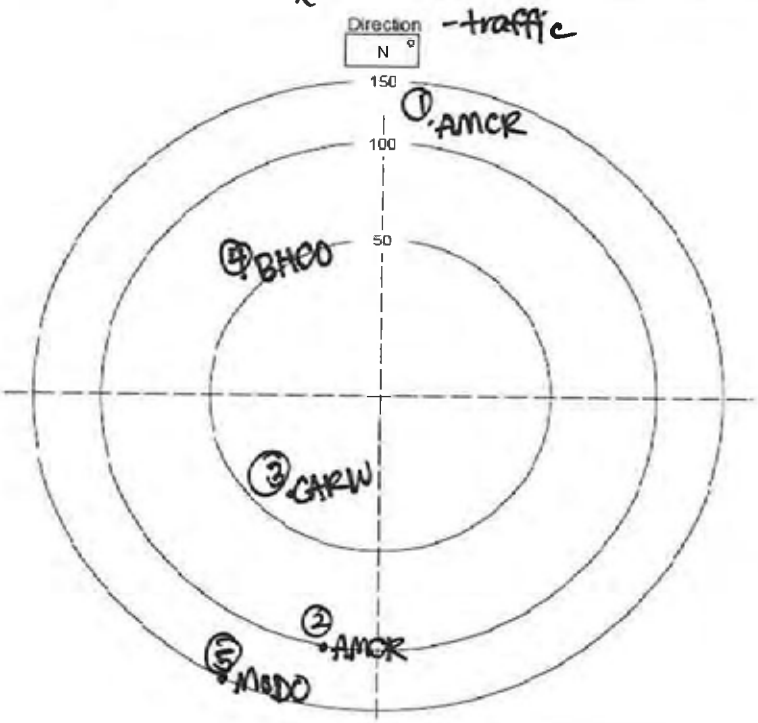
Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~PFW-11~~ SHP-14	Date	Time Start	Time End
Observer(s):	WH & MB	8.26.11	944	954
	NAD83	Temp (F)	Wind	Sky
Easting:	0543512	85 °	Ø @ NA	80 %
Northing:	3829013			
Point-count Habitat Type:	Wetland			
Comments:	Large herbaceous trees. No water at the moment.			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None -traffic



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	944	1	C	80		PFW
2	AMCR	945	1	C	100		
3	CARW	950	1	C	40		
4	BHCO	953	1	C	60		
5	MODO	953	1	S	150		
6							
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

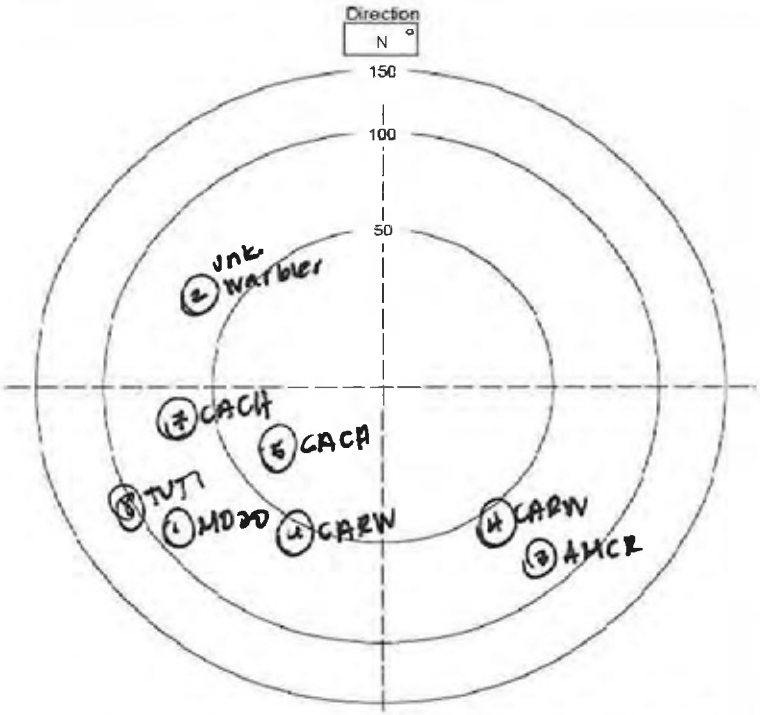
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

SHP-15

Station Id:	~~PFW-21~~	Date	Time Start	Time End
Observer(s):	WHG MB	8.26.11	922	932
	NAD83	Temp (F)	Wind	Sky
Easting:	0543398	80 °	0-5 @ SE	60 %
Northing:	3828781			
Point-count Habitat Type:				
Comments:				

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not *counted*: _____

Mammals: _____

Notes: _____

unknown warbler

	Species	Time	#	Beh	Dist	Height	Habitat
1	MODO	922	1	S	90		PFW
2		923	1	S	60		
3	AMCR	923	1	C	80		
4	CARW	924	1	S	60		
5	CACH	925	1	S	30		
6	CARW	926	1	S	85		
7	CACH	928	1	S	60		
8	TUTI	929	1	S	100		
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

[ ] Entered in Database [ ] QA/QC

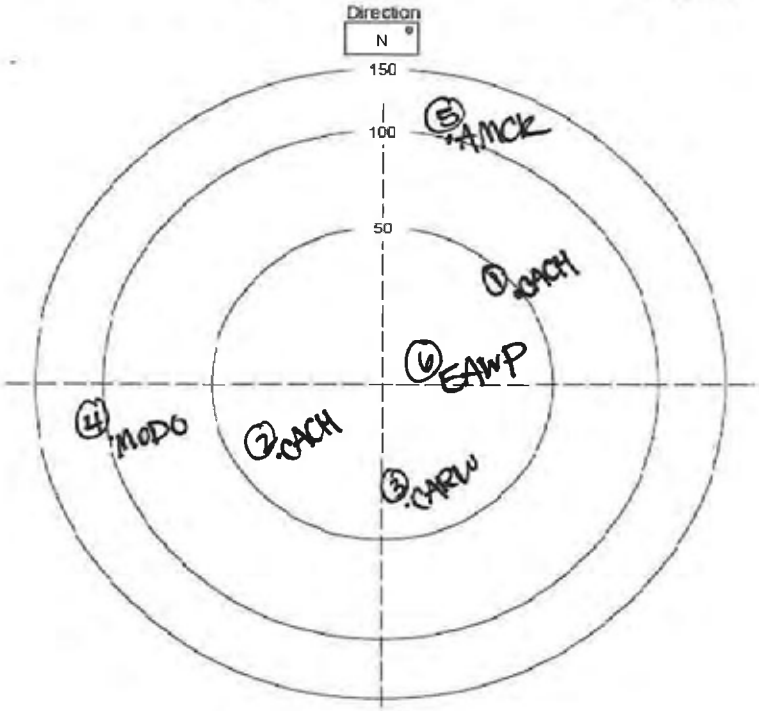
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	PFW-31 SHP-16	Date	Time Start	Time End
Observer(s):	WH & MB	8.26.11	854	904
	NAD83	Temp (F)	Wind	Sky
Easting:	0543192	85 °	Ø @ N/A	100 % fog
Northing:	3828694			

Point-count Habitat Type: wetland area surrounding an intermittent stream.

Comments: Close to Snowy Owl Rd.

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None ☒ insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	855	1	C	50		PFW
2	CACH	856	1	C	40		
3	CARW	857	1	C	30		
4	MODO	902	1	S	70		
5	AMCR	903	1	C	100		
6	EAWP	904	1	S	20		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

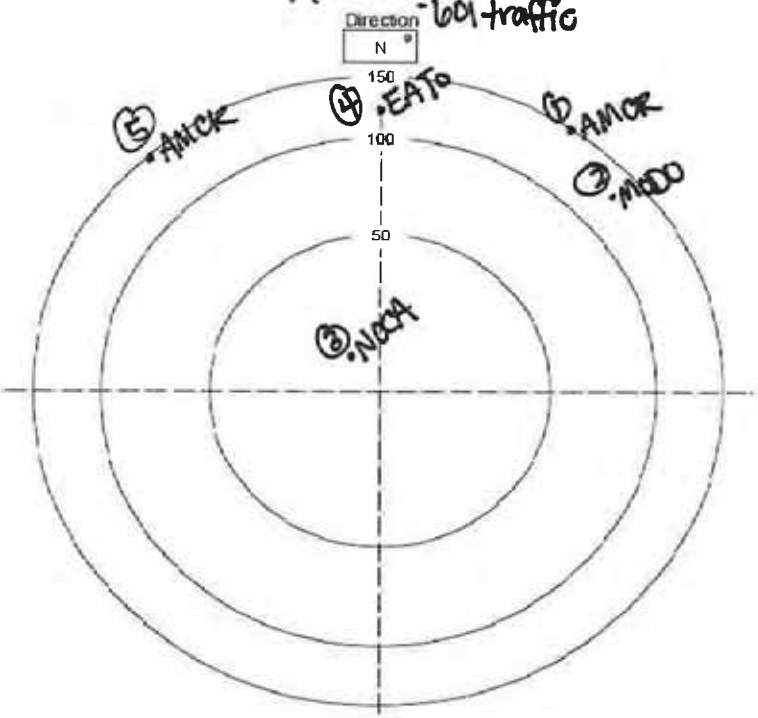
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id: ~~SA-25~~ ~~A SA-35~~ MT2-14		Date	Time Start	Time End
Observer(s): MD & WH		8.26.11	721	731
	NAD83	Temp (F)	Wind	Sky
Easting:	0542612	77 °	Ø @ N/A	100 % fog
Northing:	3829264			
Point-count Habitat Type: Silviculture				
Comments: young (>10yr old) pine plantation				

□ Rain □ Wind X Anthropogenic Noise □ None
- 601 traffic



Species between this and previous point: _____
Non-landbird species present but not counted: _____
Mammals: _____
Notes: _____

	Birds Detected During Survey							Four Letter Species Codes			
	Species	Time	#	Beh	Dist	Height	Habitat				
1	AMCR	721	2	C	150		SA	Acadian Flycatcher	ACFL	House Sparrow	HOSP
2	MODO	723	1	S	120		SA	American Goldfinch	AMGO	Indigo Bunting	INBU
3	NOCA	724	1	S	25		SA	American Redstart	AMRE	Kentucky Warbler	KEWA
4	EATO	728	1	S	130		SA	American Robin	AMRO	Killdeer	KILL
5	AMCR	730	1	C	150		SA	American Woodcock	AMWO	Loggerhead Shrike	LOSH
6								Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
7								Barn Swallow	BARS	Mourning Dove	MODO
8								Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
9								Blue Grosbeak	BLGR	Northern Cardinal	NOCA
10								Blue Jay	BLJA	Northern Flicker	NOFL
11								Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
12								Blue-headed Vireo	BHVI	Northern Parula	NOPA
13								Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
14								Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
15								Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
16								Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
17								Carolina Wren	CARW	Pine Warbler	PIWA
18								Chimney Swift	CHSW	Prairie Warbler	PRAW
19								Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
20								Chuck-will's-widow	CWWI	Purple Martin	PUMA
21								Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
22								Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
23								Common Nighthawk	CONI	Red-eyed Vireo	REVI
24								Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
25								Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
26								Eastern Bluebird	EABL	Rock Pigeon	ROPI
27								Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
28								Eastern Meadowlark	EAME	Summer Tanager	SUTA
29								Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
30								Eastern Towhee	EATO	Tree Swallow	TRES
31								Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
32								Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
33								European Starling	EUST	White-breasted Nuthatch	WBNU
34								Field Sparrow	FISP	White-eyed Vireo	WEVI
35								Grasshopper Sparrow	GRSP	Wild Turkey	WITU
36								Gray Catbird	GRCA	Wood Thrush	WOTH
37								Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
38								Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
39								Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
								Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

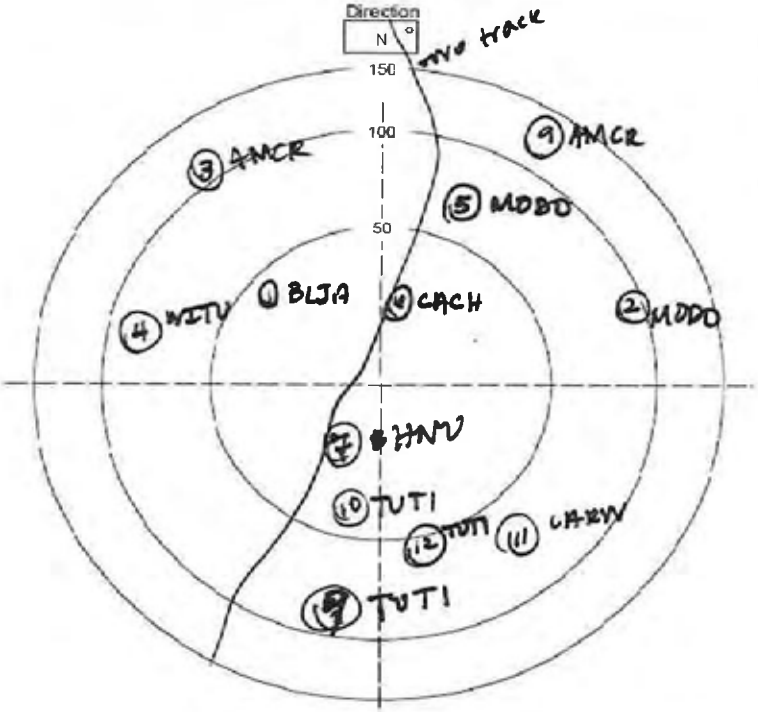
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~OA 32~~ MTP-11	Date	Time Start	Time End
Observer(s):	MB & WH	8.26.11	833	843
	NAD83	Temp (F)	Wind	Sky
Easting:	0543103	80 °	0 @	100 %
Northing:	3818825			
Point-count Habitat Type:				
Comments:				

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Birds Detected During Survey							
	Species	Time	#	Beh	Dist	Height	Habitat	
1	BLJA	833	1	C	40		SA	
2	MODO	833	1	S	100			
3	AMCR	833	1	C	100			
4	WITU	834	1	C	80			
5	MODO	835	1	S	75			
6	CACH	836	1	C	20			
7	BHNU	839	1	S	20			
8	TUTI	839	1	S	80			
9	AMCR	842	1	C	130			
10	TUTI	842	1	S	40			
11	CARW	842	1	S	70			
12	TUTI	842	1	S	60			
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

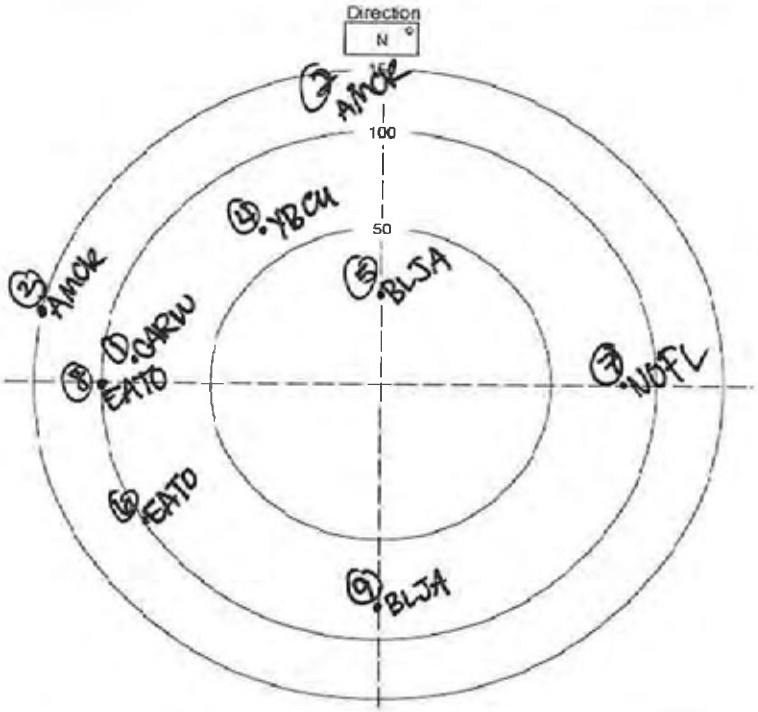
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id: SA-33 MTF-12		Date	Time Start	Time End
Observer(s): MB & WH		8.26.11	807	817
	NAD83	Temp (F)	Wind	Sky
Easting:	0542864	79 °	Ø @NA	100 % fog
Northing:	3828889			
Point-count Habitat Type: Silviculture				
Comments: pine plantation w/ thick understory of broadleaf/ deciduous trees.				

□ Rain □ Wind X Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	807	1	S	80		SA
2	AMCR	807	2	C	140		SA
3	AMCR	808	1	C	150		SA
4	YBCU	808	1	S	60		SA
5	BLJA	808	1	C	40		SA
6	EATO	809	1	S	100		SA
7	NOFL	810	1	C	70		SA
8	EATO	815	1	S	100		SA
9	BLJA	816	1	C	76		SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

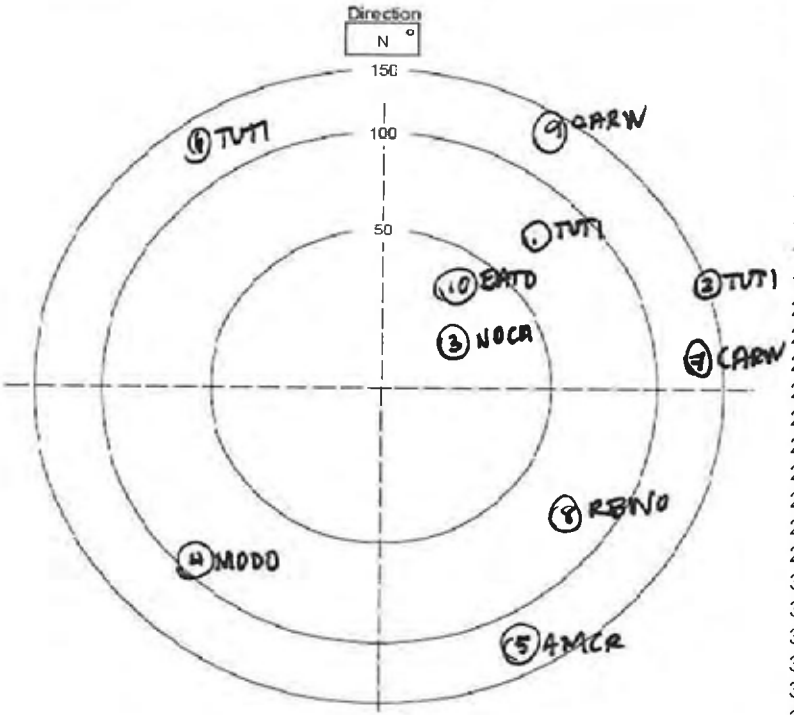
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~A34~~ MTP-13	Date	Time Start	Time End
Observer(s):	WH & MB	8-26-11	0745	0755
	NAD83	Temp (F)	Wind	Sky
Easting:	0542794	77 °	0 @	0 %
Northing:	3829119			
Point-count Habitat Type:				
Comments:				

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	745	1	S	60		SA
2	TUTI	745	1	S	150		SA
3	NOCA	745	1	S	25		SA
4	MODO	747	1	S	100		SA
5	AMCR	748	12	C	130		SA
6	TUTI	749	1	S	130		SA
7	CARW	750	1	S	130		SA
8	RBNO	752	1	S	80		SA
9	CARW	754	1	S	140		SA
10	EATO	754	1	S	40		SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

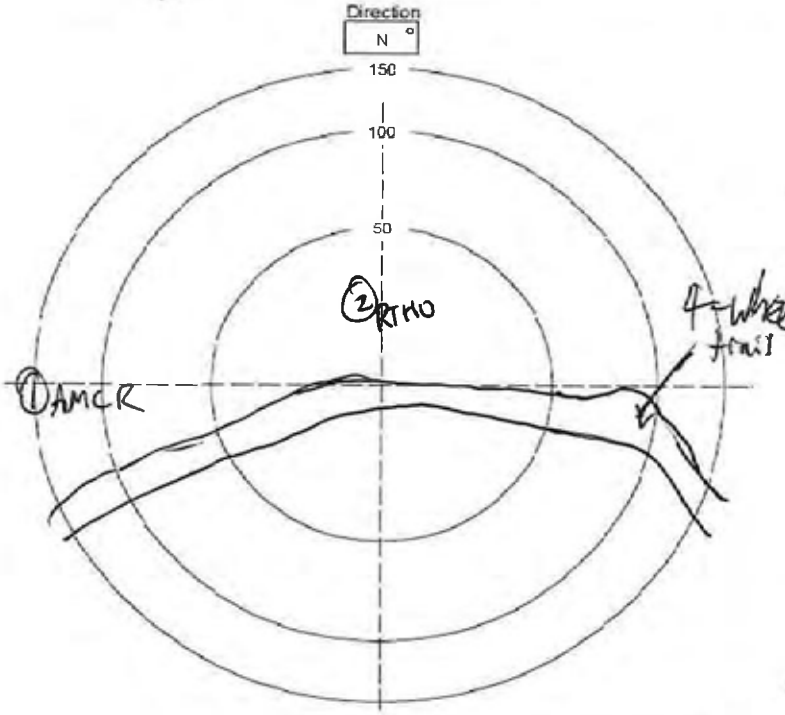
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF-3~~ MVS-32	Date	Time Start	Time End
Observer(s):	WLM, MLB	8/27/11	1103	1113
	NAD83	Temp (F)	Wind	Sky
Easting:	0541356	81 °	W @ 1-5	60 %
Northing:	3829839			
Point-count Habitat Type:	FF			
Comments:	Kudzu patch (adjacent to trail)			

□ Rain X Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1104	1	C	150	NA	FF
2	RTHU	1110	1	S	10	NA	FF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

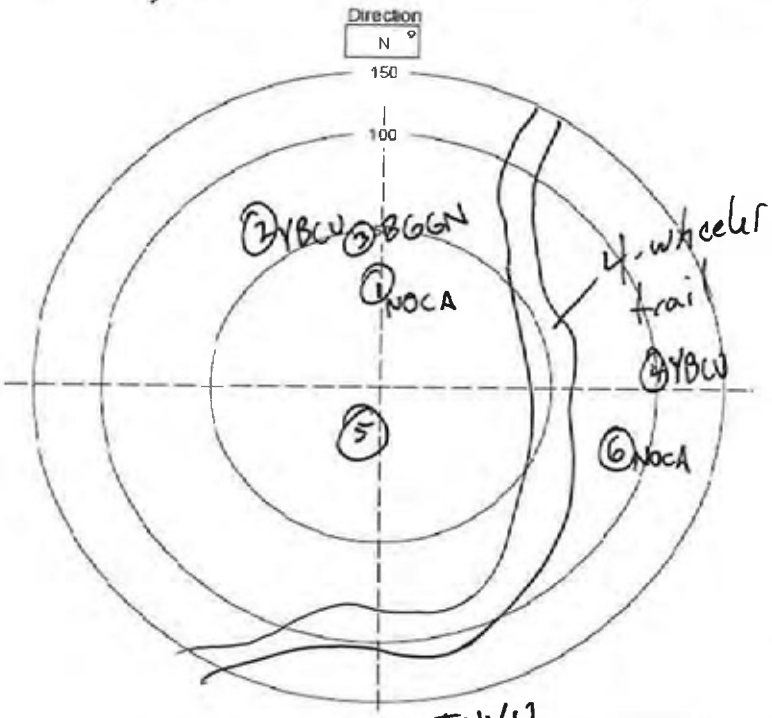
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF-4~~ MVS-33	Date	Time Start	Time End
Observer(s):	WM/MB	8/27/11	1047	1057
	NAD83	Temp (F)	Wind	Sky
Easting:	0541176	78 °	E @ 5	50 %
Northing:	3829690			
Point-count Habitat Type:	FF			
Comments:	Kudzu patch adjacent 4-wheeler trail			

☐ Rain ☒ Wind ☐ Anthropogenic Noise ☐ None ☒ insects



Species between this and previous point: TUVU

Non-landbird species present but not counted:

Mammals:

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	1048	1	C	30	NA	FF
2	YBCU	1053	1	S	70	NA	FF
3	BGGN	1053	1	C	50	NA	MPH
4	YBCU	1055	1	S	100	NA	BHF
5	PIWO	1056	1	FO	20	20	FF
6	NOCA	1056	1	C	60	NA	FF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

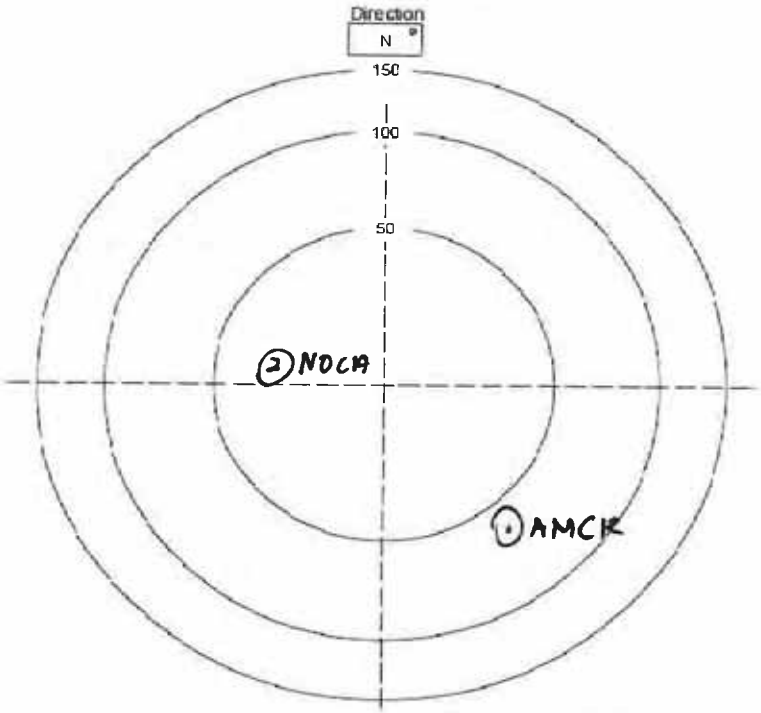
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MVS-34 ~~FF-5~~	Date	Time Start	Time End
Observer(s):	MB + WM	8.27.11	1018	1028
	NAD83	Temp (F)	Wind	Sky
Easting:	0540923	78 °	0-5 @ E	50 %
Northing:	3829677			
Point-count Habitat Type:				
Comments:	Kudzu adjacent to woodlands			

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1018	1	C	60		FF
2	NOCA	1016	1	S	30		↓
3							
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

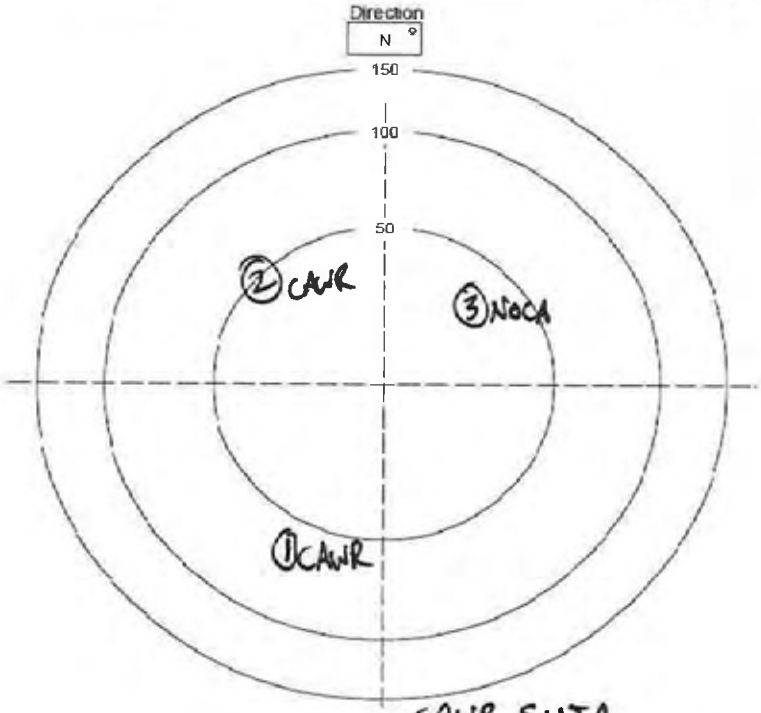
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

[ ] Entered in Database [ ] QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF-6~~ MVS-35	Date	Time Start	Time End
Observer(s):	MLB, WLM	8/27/11	0942	0952
	NAD83	Temp (F)	Wind	Sky
Easting:	0540677	76 °	— @	85 %
Northing:	3829750			
Point-count Habitat Type:	Fallow field (Kudzu patch)			
Comments:	Dense Kudzu field			

☐ Rain ☒ Wind ☐ Anthropogenic Noise ☐ None ☒ insects



Species between this and previous point: CAWR, SUTA

Non-landbird species present but not counted:

Mammals:

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	CAWR	0951	1	S	60	NA	FF
2	CAWR	0951	1	C	30	NA	MPH
3	NOCA	0951	1	S	20	NA	FF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

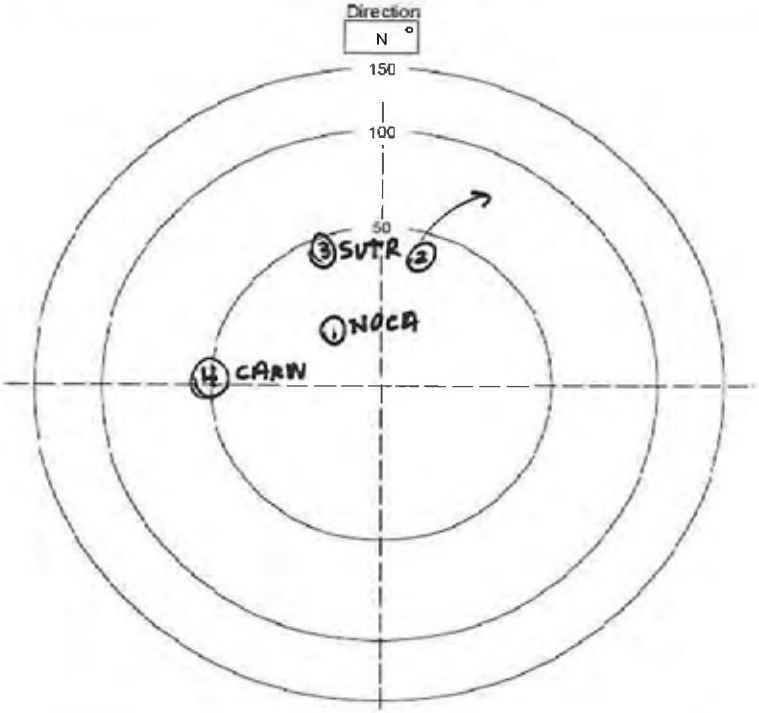
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~FF-7~~ MVS-36	Date	Time Start	Time End
Observer(s):	MB and WM	8.27.11	921	931
	NAD83	Temp (F)	Wind	Sky
Easting:	0540711	75 °	0 @	95 %
Northing:	3829839			
Point-count Habitat Type:				
Comments:	kudzu			

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	921	1	S	20		FF
2	BLGR	923	1	FO	30	5	↓
3	SUTR	929	1	S	40		
4	CARW	931	1	S	50		↓
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

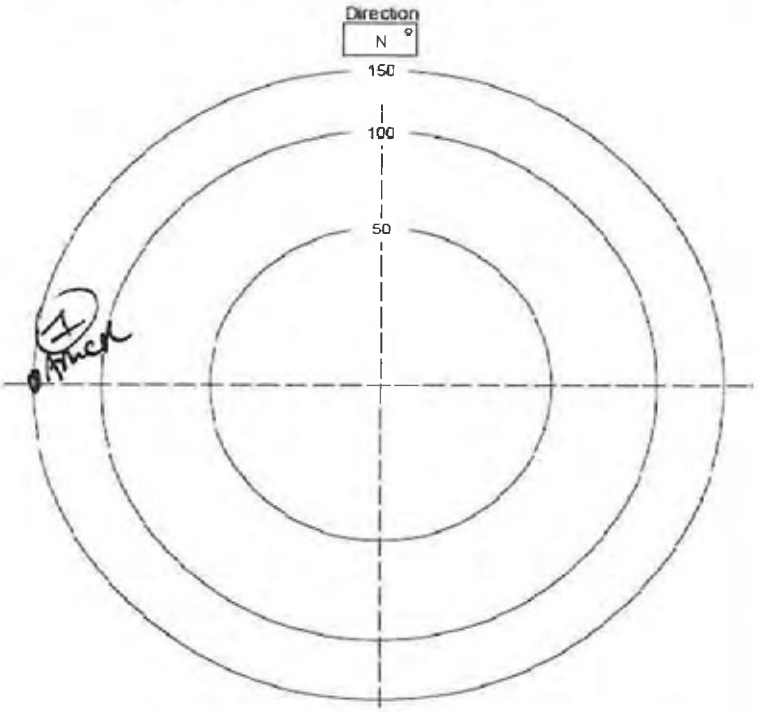
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF 20~~ XSC-09	Date	Time Start	Time End
Observer(s):	WMH, CAC	8/27/11	1034	1044
	NAD83	Temp (F)	Wind	Sky
Easting:	0542511	84 °	NW @ 5-15	90 %
Northing:	3831080			
Point-count Habitat Type:	MMHF			
Comments:				

□ Rain ☑ Wind ☑ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	Amcr	[illegible]	042	C	150	–	MMHF
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

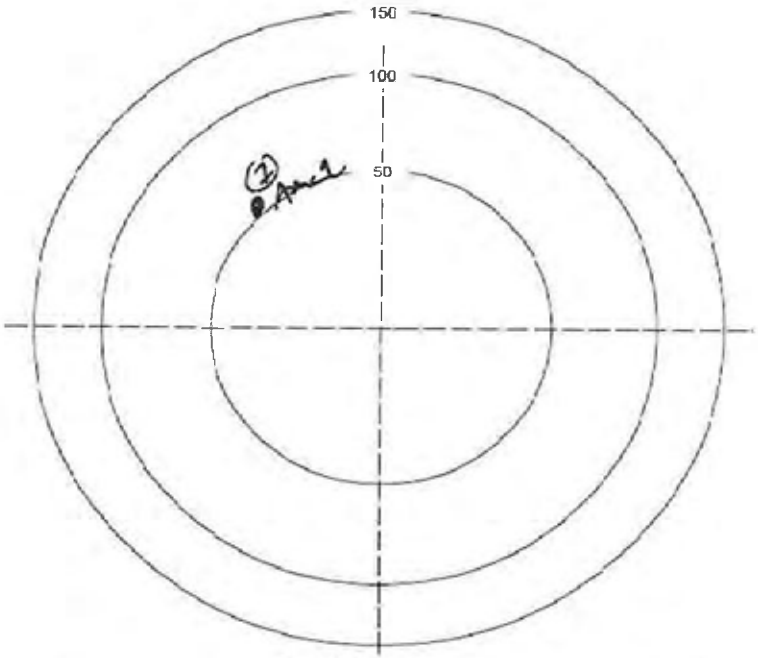
[ ] Entered in Database [ ] QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	XSC-08 ~~[illegible]~~	Date	Time Start	Time End
Observer(s):	WNH, CRL	8/27/11	1016	1020
	NAD83	Temp (F)	Wind	Sky
Easting:	0542401	85 °	NW @ 10	80 %
Northing:	3831185			
Point-count Habitat Type:	MMHF			
Comments:				

☐ Rain ☑ Wind ☑ Anthropogenic Noise cars passing ☐ None

Direction
N °



Species between this and previous point: _____
Non-landbird species present but not counted: _____
Mammals: _____
Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMRO	1016	2	C	40		MMHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

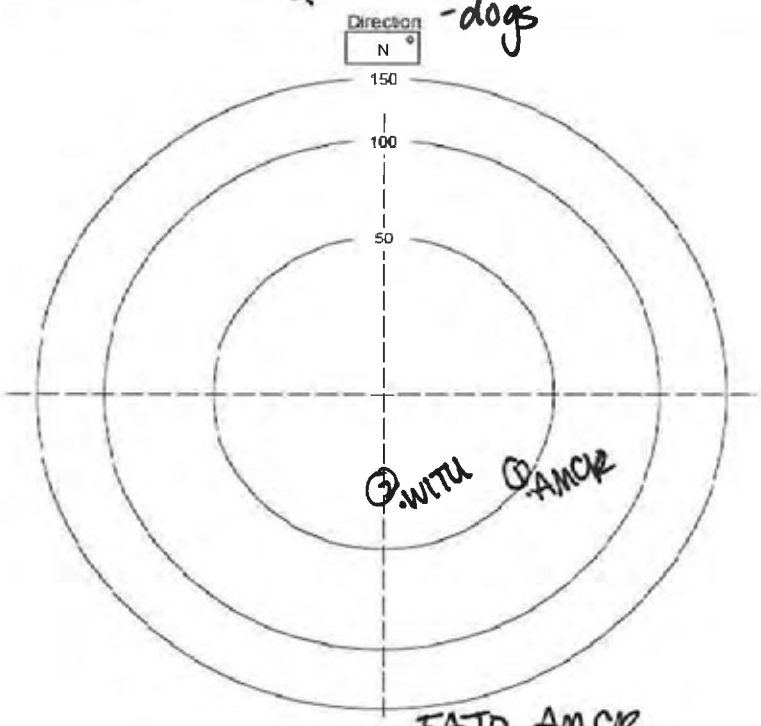
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MMHF-22~~ MVS-50	Date	Time Start	Time End
Observer(s):	WMH & CAL	8.27.11	958	1003
	NAD83	Temp (F)	Wind	Sky
Easting:	0542266	82 °	5 @ NW	80 %
Northing:	3831089			
Point-count Habitat Type:	Mixed hardwoods			
Comments:	scattered pine in point count			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None -dogs



Species between this and previous point: EATO, AMCR

Non-landbird species present but not counted:

Mammals:

Notes:

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	953	1	C	100		MMHF
2	WITU	957	1	C	40		↓
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

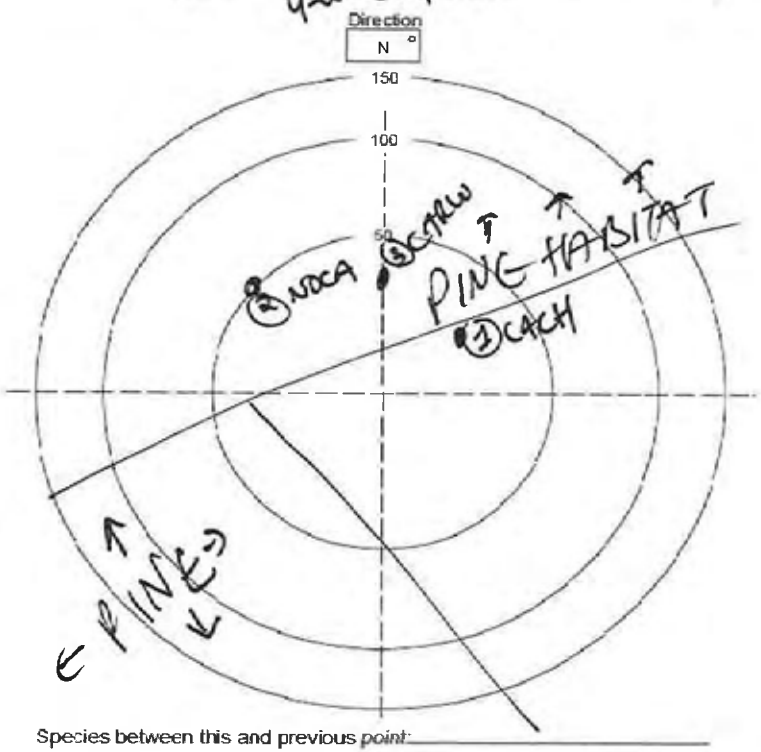
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	MMHF-23 XSC-07	Date	Time Start	Time End
Observer(s):	WMH, CFL	8/27/11	933	945
	NAD83	Temp (F)	Wind	Sky
Easting:	0542039	81 °	NW@5-10	100 %
Northing:	3831061			
Point-count Habitat Type:	MMHF			
Comments:	surrounded by pine forest to N and SW			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	934	1	S	20	—	MMHF
2	NOCA	936	1	S	50	—	SA
3	CARW	941	1	C	30	—	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

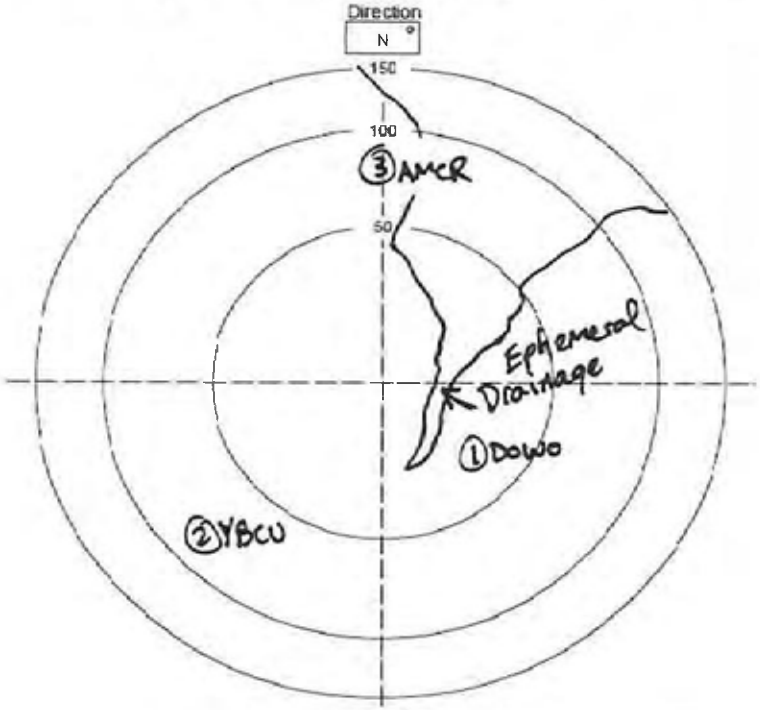
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF - 27~~ OHF-15	Date	Time Start	Time End
Observer(s):	MLB, WLM	8/27/11	0855	0905
	NAD83	Temp (F)	Wind	Sky
Easting:	0540504	75 °	W @5-10	90 %
Northing:	3829995			
Point-count Habitat Type:	MPHF			

Comments: Mixed pine / HW slope adjacent to ephemeral drainage feature. Loblolly pine, black oak, red maple, hickory, Euonymous sp., Vitis, cedar, white oak

□ Rain X Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	DOWO	0856	1	C	30	NA	MPHF
2	YBCU	0856	1	C	80	NA	MPHF
3	AMCR	0902	1	S	90	NA	MPHF
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

[ ] Entered in Database [ ] QA/QC

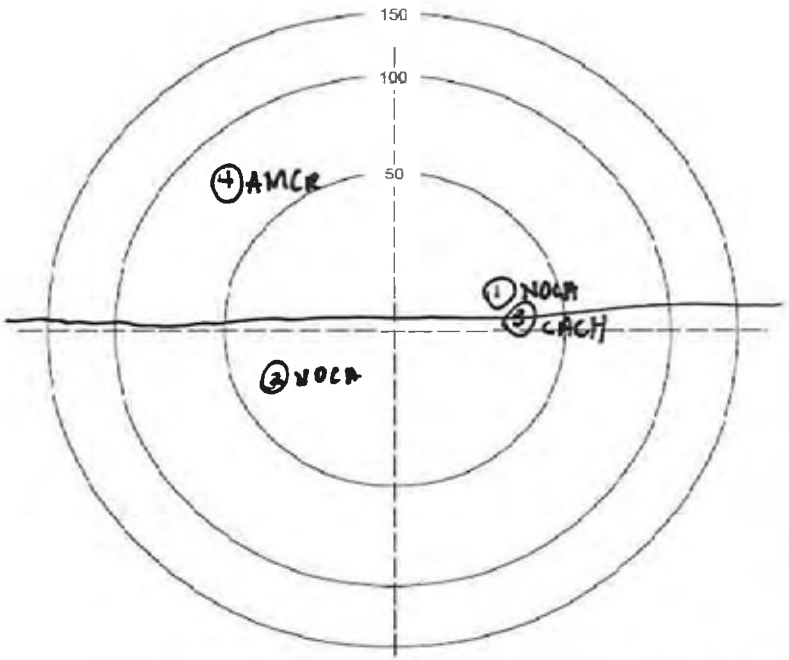
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-28~~ OHF-14	Date	Time Start	Time End
Observer(s):	MB & NM	8.27.11	833	843
	NAD83	Temp (F)	Wind	Sky
Easting:	0540278	75 °	0-5 @ W	100 %
Northing:	3829942			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None

faint road noise

Direction N °



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	833	1	S	30		MPHF
2	NOCA	836	1	S	40		↓
3	CACH	837	1	S	40		
4	AMCR	842	1	C	75		↓
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

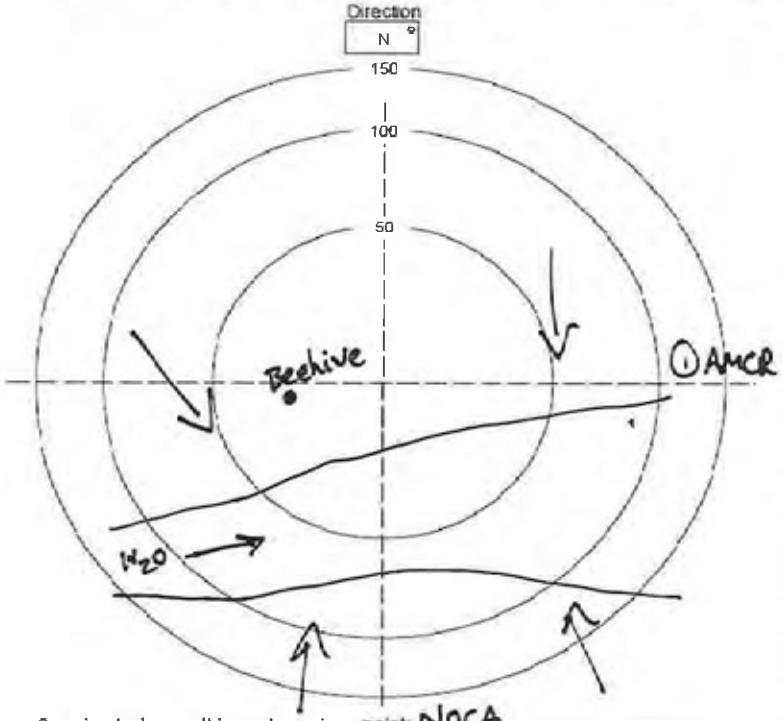
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-29~~ DHF-13	Date	Time Start	Time End
Observer(s):	WM & MB	8.27.11	730	740
	NAD83	Temp (F)	Wind	Sky
Easting:	0539923	70 °	0-5 @ W	100 %
Northing:	3830260			
Point-count Habitat Type:	Mixed pine\HW			
Comments:	Water oak, loblolly pine, sourwood, tulip poplar, white oak, sweetgum, vaccinium sp. black gum, virginia creeper (lowbush blueberry),			

☐ Rain ☒ Wind ☐ Anthropogenic Noise ☐ None ☒ insects



Species between this and previous point: NOCA

Non-landbird species present but not *counted*:

Mammals: Eastern gray squirrel

Notes: point count taken on the side of an upland draw (no stream/no wetlands)

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	0732	1	C	130	NA	MPH
2							
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

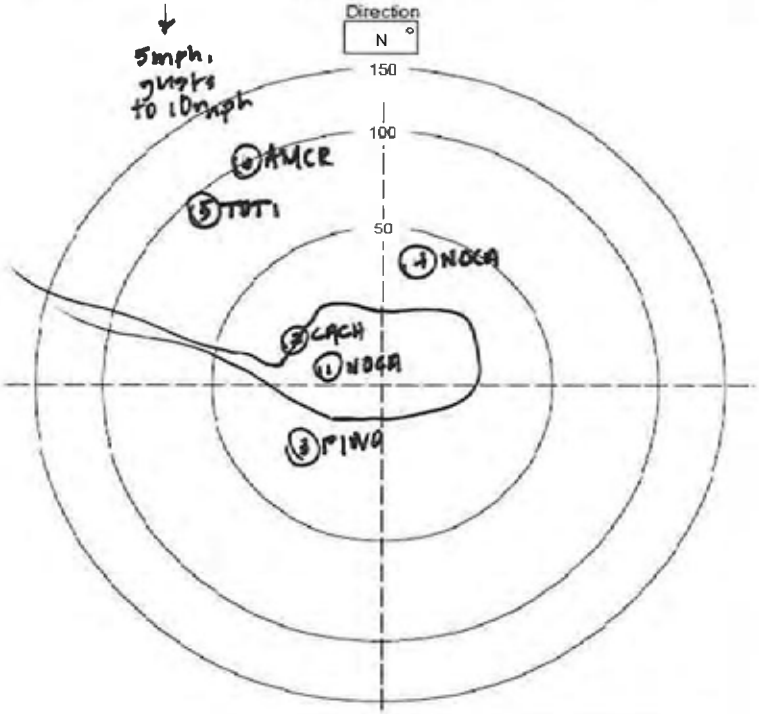
BIRD SURVEY FORM
Haile Mine Project - South Carolina

OHF-12

Station Id:	~~MPHF-30~~	Date	Time Start	Time End
Observer(s):	WM and MB	8.27.11	713	723
	NAD83	Temp (F)	Wind	Sky
Easting:	0539940	70 °	5 @ SE	100 %
Northing:	3830515			
Point-count Habitat Type:				
Comments:	call station in small field opening of MPHF			

☐ Rain ☑ Wind ☑ Anthropogenic Noise ☐ None

5mph, gusts to 10mph



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	713	1	S	10		MPHF
2	CACH	713	1	S	25		↓
3	PIWO	714	1	S	30		↓
4	NOCA	717	2	S	40		↓
5	TUTI	721	1	S	80		↓
6	AMCR	721	2	C	100		↓
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

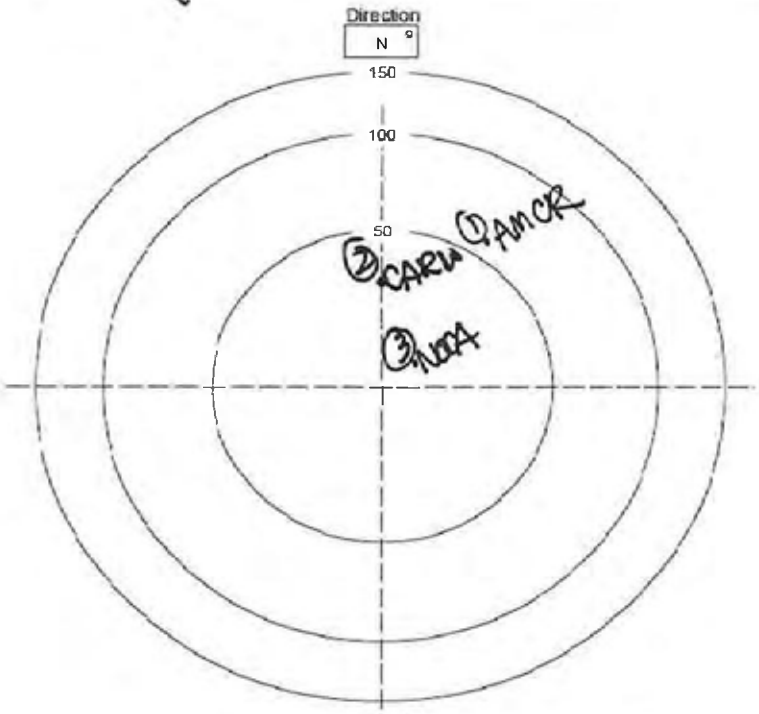
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~XFC-18~~ TAR-06	Date	Time Start	Time End
Observer(s):	CAL & WMH	8.27.11	730	740
	NAD83	Temp (F)	Wind	Sky
Easting:	0541228	77 °	10 @ NW	100 %
Northing:	3829920			
Point-count Habitat Type:	Xerophytic			
Comments:	Closest Bat 4. Pretty open from drilling.			

☐ Rain ☑ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	730	1	C	60		XFC
2	CARW	722	1	S	40		XFC
3	NOCA	735	1	C	20		XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

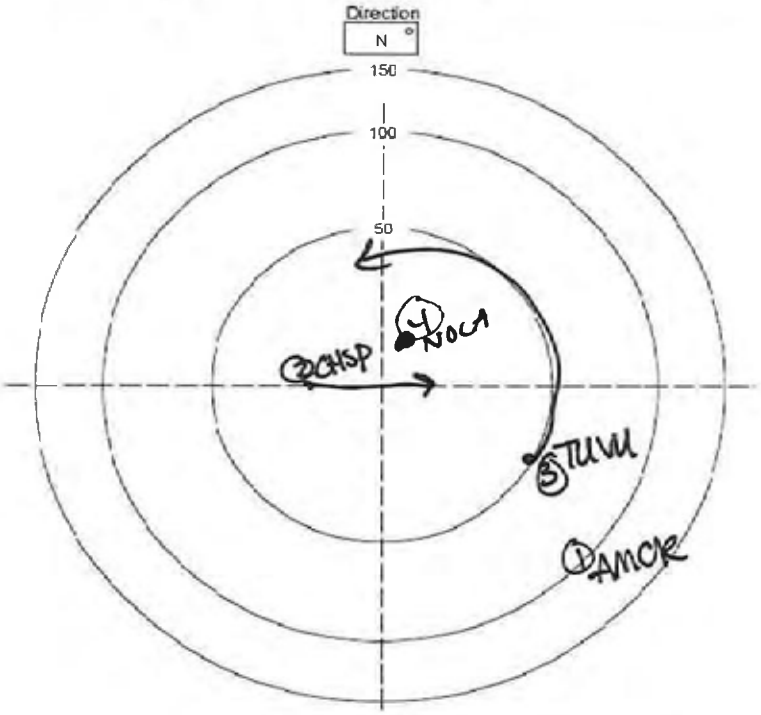
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	XFC-19-TAR-07	Date	Time Start	Time End
Observer(s):	CL & WH	8.27.11	750	810
	NAD83	Temp (F)	Wind	Sky
Easting:	0541179	75 °	5-10 @SE	90 %
Northing:	3830153			
Point-count Habitat Type:	Xerophytic			
Comments:	point is near an old drill pad road.			

☐ Rain ☑ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	750	2	C	120		XFC
2	CHSP	751	1	F	2	10	XFC
3	TUMI	752	1	F	40	20	XFC
4	NOCA	759	1	S		20	XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

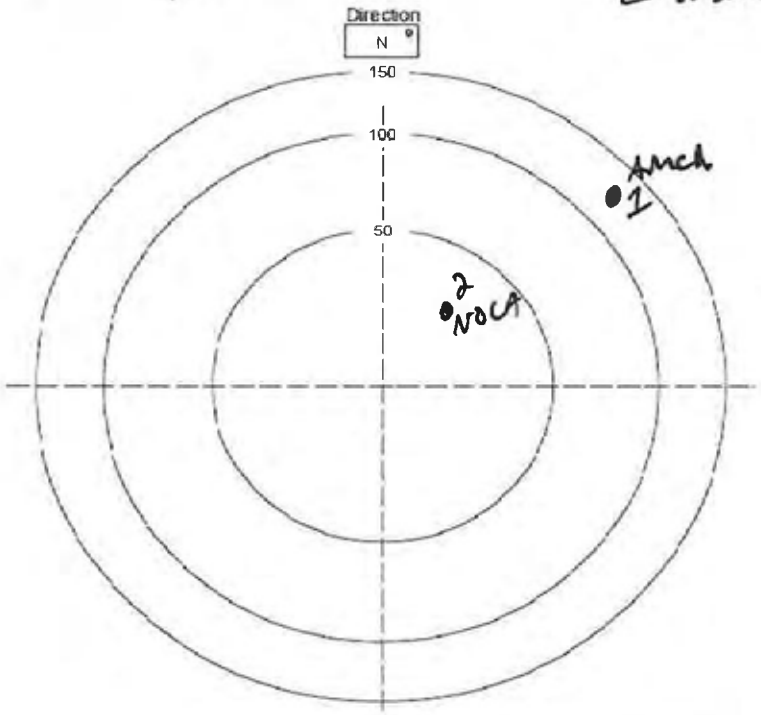
Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~XFC-20~~ XSC-04	Date	Time Start	Time End
Observer(s):	WMH, CAL	08/27/11	813	823
	NAD83	Temp (F)	Wind	Sky
Easting:	0241268	80 °	S @ 10	95 %
Northing:	3830395			
Point-count Habitat Type:	XFC			
Comments:				

☐ Rain ☑ Wind ☐ Anthropogenic Noise ☐ None ☑ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: photos 2118, 2119

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	817	1	C	120	–	XFC
2	NOCA	814	1	C	30	–	XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10. 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

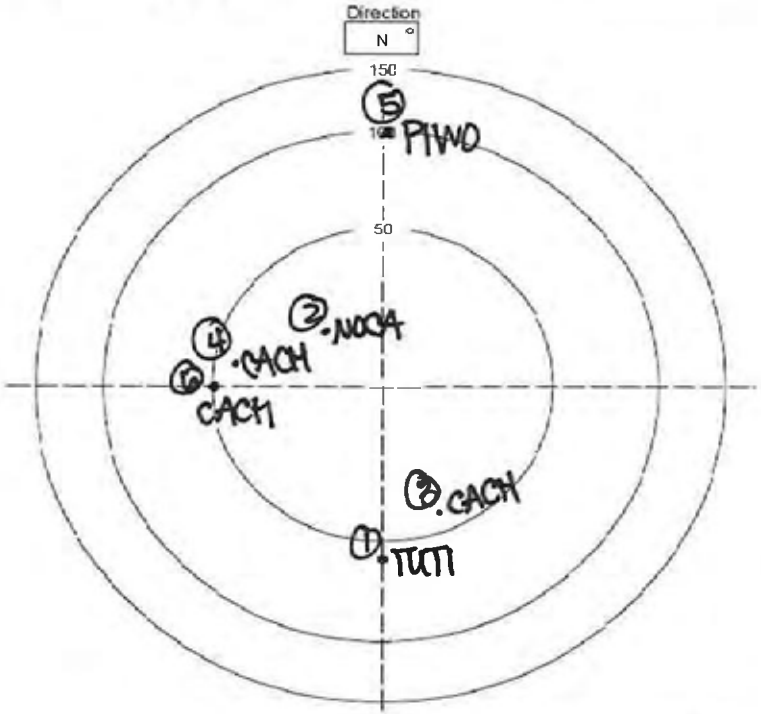
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~XFC-21~~ XSC-05	Date	Time Start	Time End
Observer(s):	CAL & WMH	8.27.11	832	842
	NAD83	Temp (F)	Wind	Sky
Easting:	0541463	80 °	5-10@ NW	100 %
Northing:	3830587			
Point-count Habitat Type:	Xerophytic			
Comments:	Drill pads scattered around			

☐ Rain ☒ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	833	1	S	100		XFC
2	NOCA	833	1	S	20		XFC
3	CACH	834	1	C	40		XFC
4	CACH	835	1	C	40		XFC
5	PIWO	838	1	C	100		XFC
6	CACH	840	1	C	50		XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

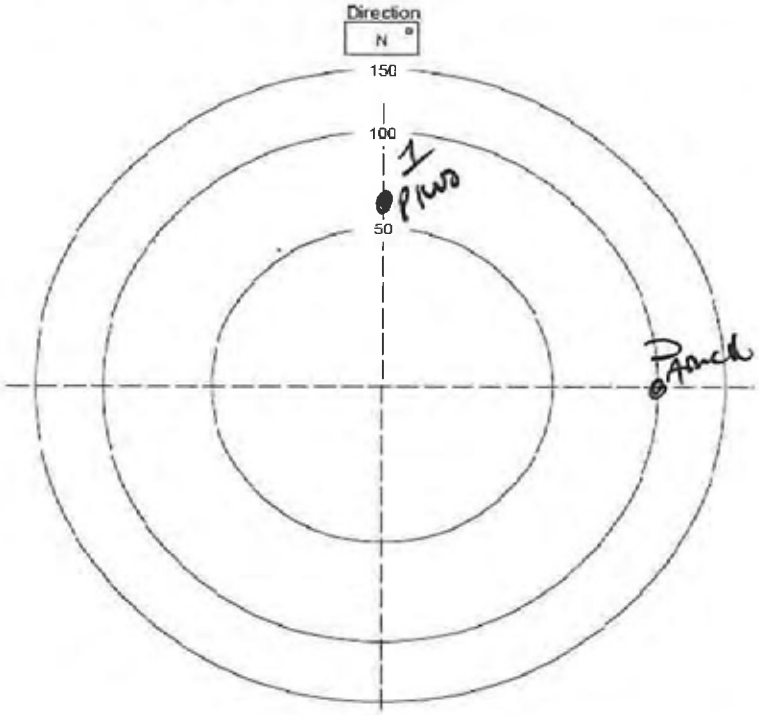
BIRD SURVEY FORM

Haile Mine Project - South Carolina

XFC-22 XSC-06

Station Id:	~~[illegible]~~	Date	Time Start	Time End
Observer(s):	WMH, CAL	8/27/11	852	902
	NAD83	Temp (F)	Wind	Sky
Easting:	0541583	80 °	NW@ 5-10	100 %
Northing:	3830720			
Point-count Habitat Type:	XFC			
Comments:				

☐ Rain ☑ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	PIWO	852	1	C	60	/	XFC
2	AWCL	858	1	C	100	–	XFC
3							
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

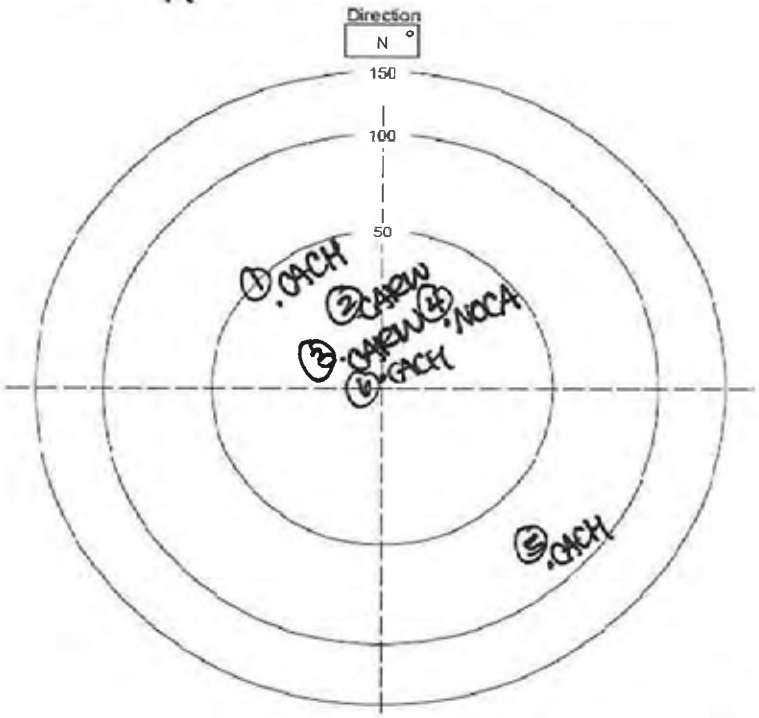
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~XFC-23~~ OHF-24	Date	Time Start	Time End
Observer(s):	CAL & WMH	8.27.11	910	920
	NAD83	Temp (F)	Wind	Sky
Easting:	0541701	80 °	5-15 @ NW	90 %
Northing:	3831008			
Point-count Habitat Type:	Xerophytic			
Comments:	On the edge of pine plantation (SA) habitat type			

☐ Rain ☒ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point:
Non-landbird species present but not counted:
Mammals:
Notes: Photo 2120

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	912	1	C	20		XFC
2	CARW	913	1	S	20		XFC
3	CARW	913	1	C	20		XFC
4	NOCA	914	1	S	20		XFC
5	CACH	914	1	S	80		XFC
6	CACH	919	1	S	10		XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

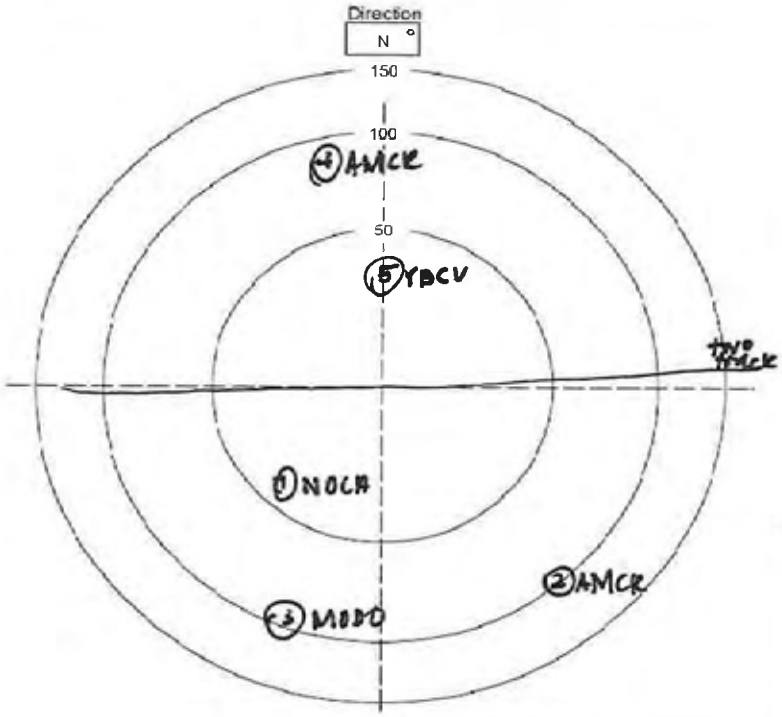
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

TAR-08

Station Id:	~~XFC-24~~	Date	Time Start	Time End
Observer(s):	NM and MB	8.27.11	754	804
	NAD83	Temp (F)	Wind	Sky
Easting:	0540033	70 °	0-5 @ W	100 %
Northing:	3829987			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	756	1	S	40		XFC
2	AMCR	757	1	C	100		
3	MODO	800	1	S	30		
4	AMCR	800	1	C	100		
5	YBCU	801	1	S	30		✓
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

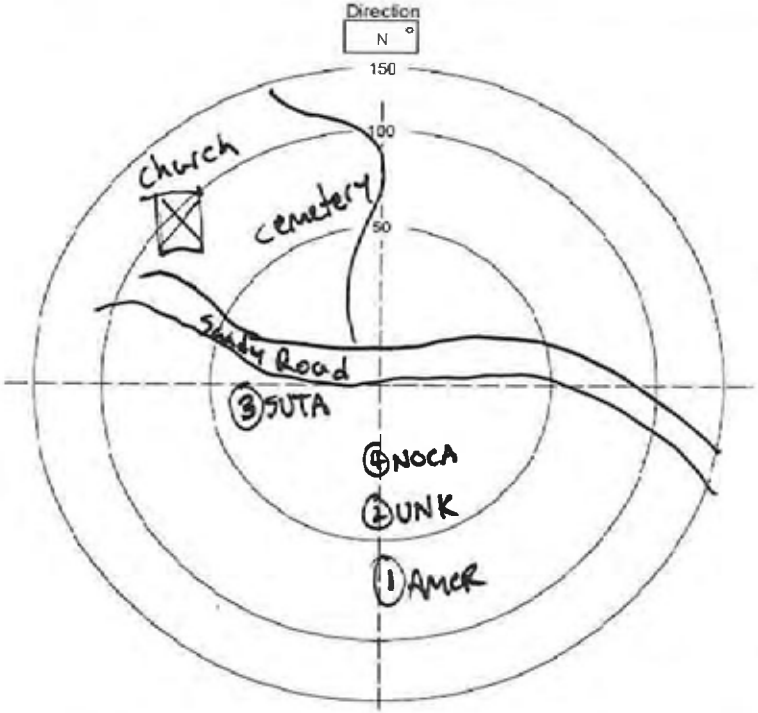
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

TAR-09

Station Id:	XFC-25	Date	Time Start	Time End
Observer(s):	WLM, MLB	8/27/11	0813	0823
	NAD83	Temp (F)	Wind	Sky
Easting:	0539937	72 °	W @ 5	100 %
Northing:	3930015			
Point-count Habitat Type:	XFC			
Comments:	Point count taken along dirt/sandy road adjacent to church cemetery.			

☐ Rain ☒ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes: post oak, persimmon, cherry bark oak, hickory, loblolly pines
* several strong gusts of wind

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	0813	1	C	70	NA	XFC
2	UNK	0814	1	C	40	NA	XFC
3	SUTA	0820	1	S	30	NA	XFC
4	NOCA	0823	1	C	20	NA	XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

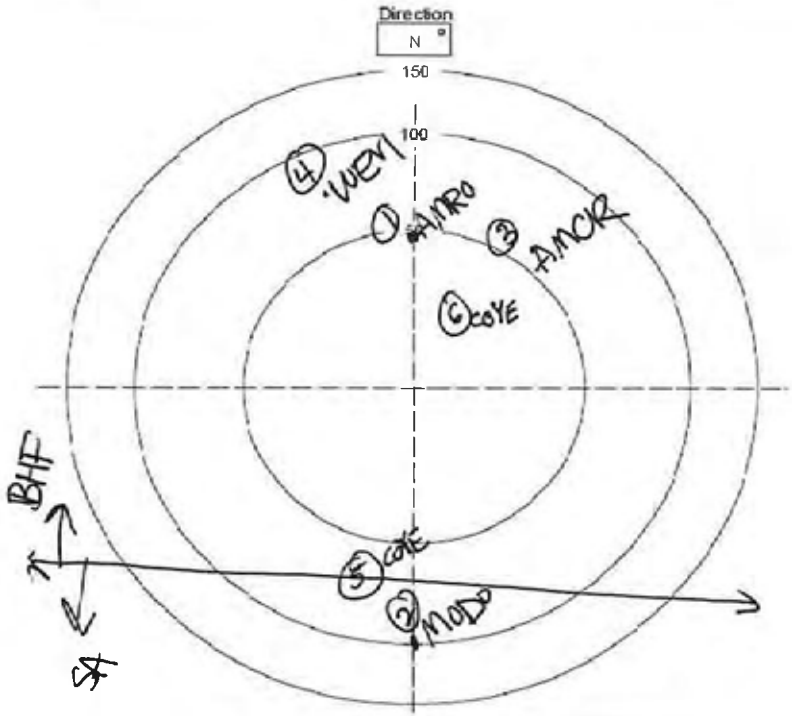
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-3~~ MVF-06	Date	Time Start	Time End
Observer(s):	WMH & WLM	8.28.11	1104	1114
	NAD83	Temp (F)	Wind	Sky
Easting:	0543364	85 °	D @ NA	B %
Northing:	3825360			
Point-count Habitat Type:				
Comments:	pocosin (very dense)			

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMRO	1104	1	C	50	NA	BHF
2	MODO	1105	1	S	100	NA	SA
3	AMCR	1106	1	C	60	NA	BHF
4	WEVI	1108	1	S	70	NA	BHF
5	COYE	1111	1	C	55	NA	SA/BHF
6	COYE	1113	1	C	10	NA	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

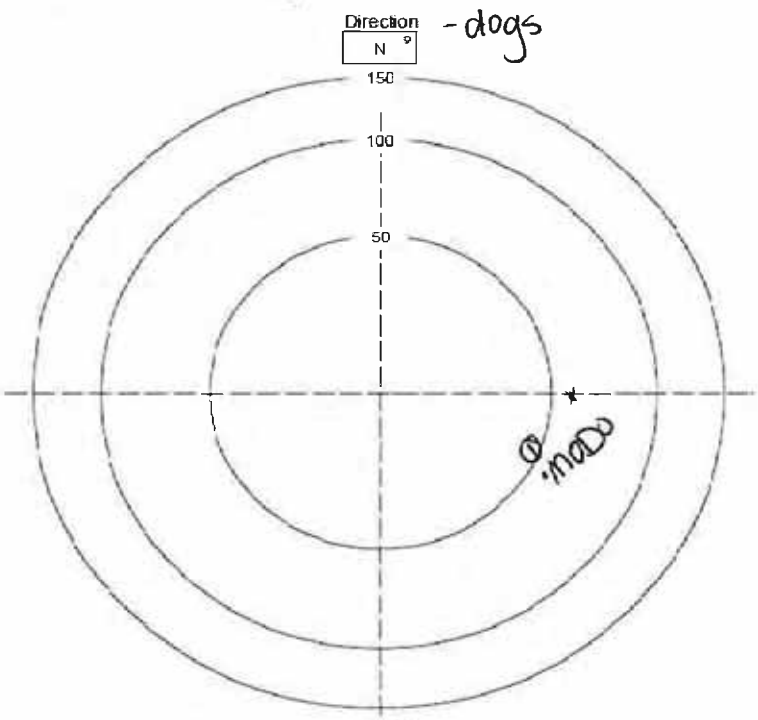
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~BHF-4~~ ~~XFC-1~~ OHF-33	Date	Time Start	Time End
Observer(s):	WLM & WMH	8.28.11	1128	1138
	NAD83	Temp (F)	Wind	Sky
Easting:	0543127	85 °	0-2 @ SW	Ø %
Northing:	3825619			
Point-count Habitat Type:	Xerophytic			
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes: Charge from BHF + XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	MODO	1129	1	S	160		~~BHF~~ XFC
2							
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

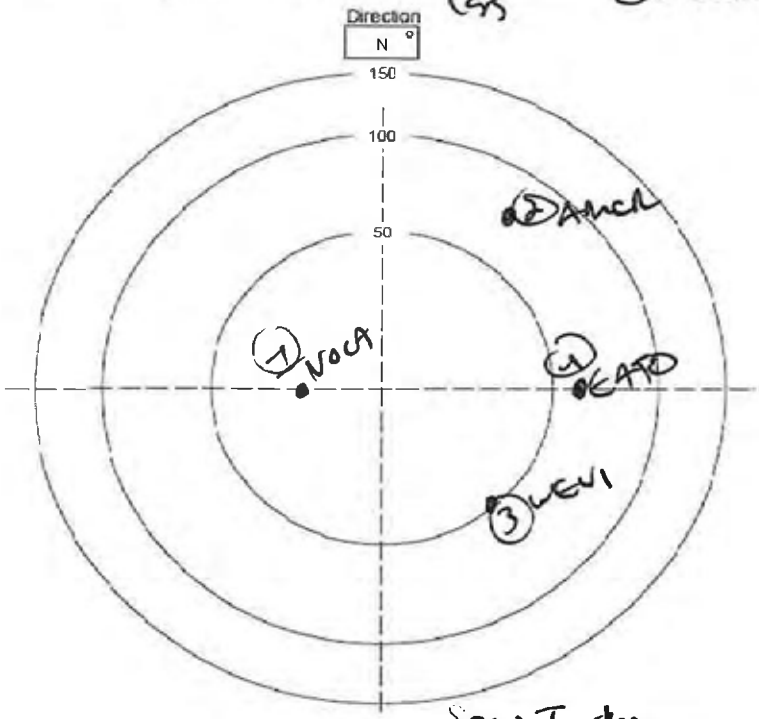
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	SHP-18	Date	Time Start	Time End
Observer(s):	MCB, CAC	8/28/11	1018	10
	NAD83	Temp (F)	Wind	Sky
Easting:	0542316	80 °	E @ 3	0 %
Northing:	3830458			
Point-count Habitat Type:	BHF			
Comments:				

☐ Rain ☑ Wind ☐ Anthropogenic Noise (CAS) ☐ None ☑ Insects



Species between this and previous point: Saw Turkey

Non-landbird species present but not counted:

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	1019	1	C	15	—	BHF
2	AMCR	1020	1	C	80	—	BHF
3	WEVI	1021	1	C	50	—	BHF
4	EATO	1022	1	C	60	—	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

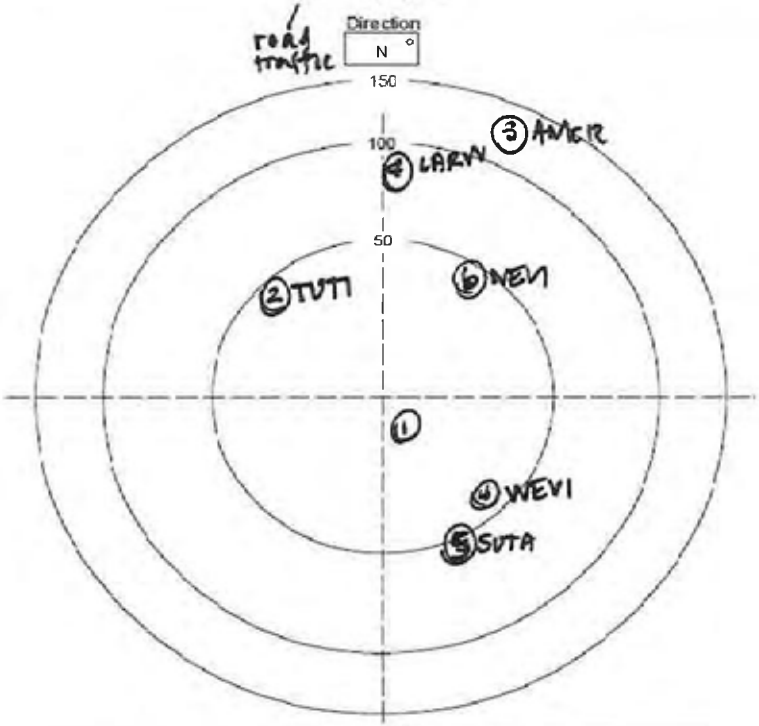
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

SHP-19

Station Id:	~~BHP-18~~	Date	Time Start	Time End
Observer(s):	MB and CL	8.28.11	1046	1056
	NAD83	Temp (F)	Wind	Sky
Easting:	0542534	80 °	0~~5~~ @	0 %
Northing:	3830564			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	SUTA	1047	1	S	5		BHF
2	TUTI	1049	1	S	40		
3	AMCR	1048	1	S	130		
4	WEVI	1049	1	S	40		
5	SUTA	1050	1	S	50		
6	NEVI	1052	1	S	40		
7	CARW	1053	1	S	80		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM

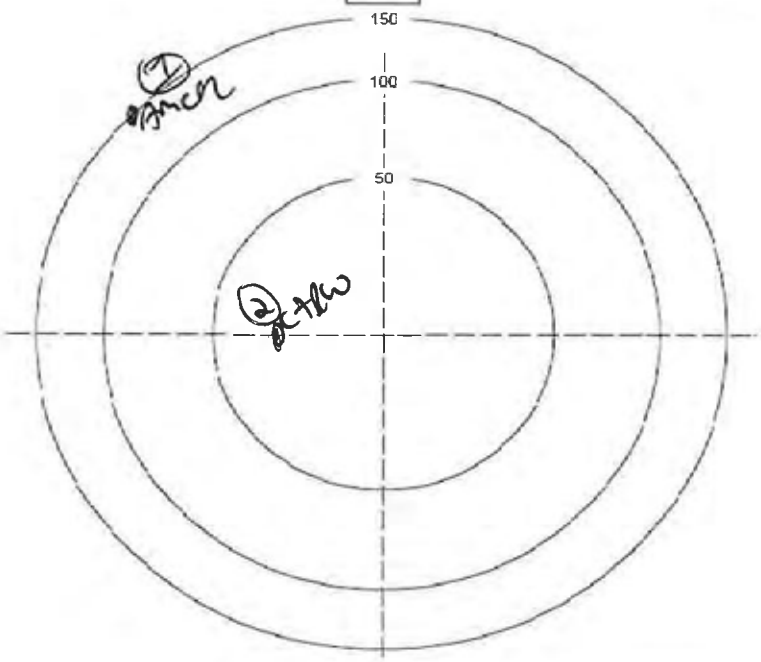
Haile Mine Project - South Carolina

MVS-07

Station Id:	[illegible]	Date	Time Start	Time End
Observer(s):	MVS, GAL	5/28/11	848	
	NAD83	Temp (F)	Wind	Sky
Easting:	0541300	78 °	@ 0	0 %
Northing:	3826906			
Point-count Habitat Type:	BHF			
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects

Direction N °



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	844	1	C	150	/	BHF
2	AMRO	855	1	C	30	/	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

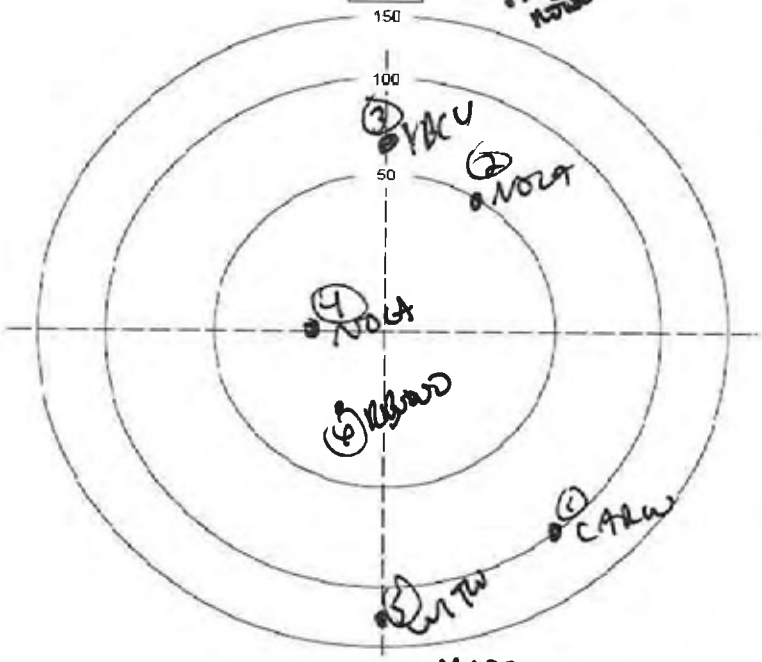
BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-6~~ OHF-06	Date,	Time Start	Time End
Observer(s):	MLD, EAL	8/28/11	713	723
	NAD83	Temp (°F)	Wind	Sky
Easting:	0540581	72 °	@ 0	0 %
Northing:	3826015			
Point-count Habitat Type:	MPHF			
Comments:				

□ Rain □ Wind ✓ Anthropogenic Noise □ None

Direction N °

150 100 50



Species between this and previous point: MODO

Non-landbird species present but not counted:

Mammals:

Notes:

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	713	2	S	100	—	MMHF
2	NOCA	714	1	C	50	—	MMHF
3	YBCU	714	1	S	60	—	MMHF
4	NOCA	716	1	S	5		MPHF
5	WITU	717	1	S	120	—	MPHF
6	RBWO	722	1	C	40	—	MPHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

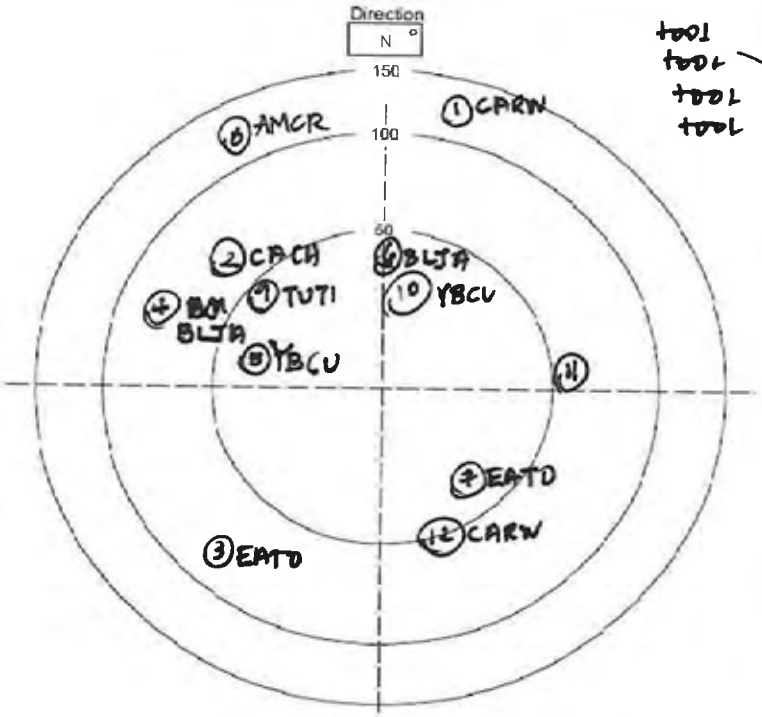
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~MPHF-23~~ MVS-49	Date	Time Start	Time End
Observer(s):	MB & CL	8.28.11	954	1004
	NAD83	Temp (F)	Wind	Sky
Easting:	0542078	80 °	0 @	0 %
Northing:	3830373			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



tool
tool
tool
tool

Species between this and previous point: CACH

Non-landbird species present but not counted:

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CARW	955	1	S	130		MPHF
2	CACH	956	1	S	60		
3	EATO	957	1	S	80		
4	BLJA	957	1	C	80		
5	YBCU	957	1	S	40		
6	BLJA	959	1	C	40		
7	EATO	959	1	S	40		
8	AMCR	1000	1	C	130		
9	TUTI	1000	1	S	40		
10	YBCU	1001	1	S	30		
11	YBCU	1003	1	S	60		
12	CARW	1003	1	S	50		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

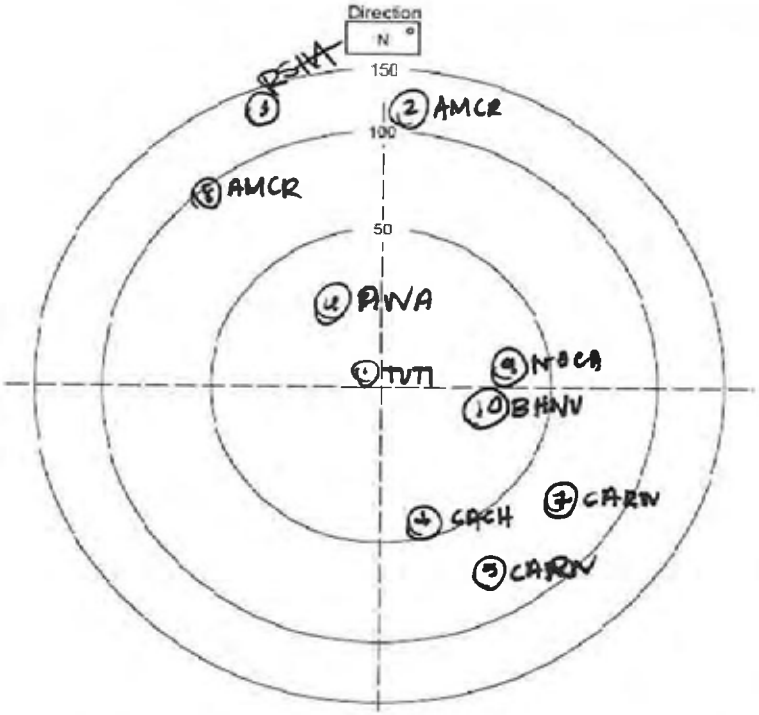
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVS-04

Station Id:	~~SA-9~~	Date	Time Start	Time End
Observer(s):	MB & CL	8.28.11	0730	0740
	NAD83	Temp (F)	Wind	Sky
Easting:	0541069	73 °	0 @	0 %
Northing:	3826245			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

sounds like cat, but not catbird
distressed, maybe RSHA?
squirrel

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	730	1	S	5		SA
2	AMCR	732	1	C	120		
3	RSHA	733	1	C	130		
4	CACH	734	1	S	40		
5	CARW	734	1	S	70		
6	PIWA	735	1	S	20		
7	CARW	736	1	S	40		
8	AMCR	737	1	C	100		
9	NOCA	737	1	S	40		
10	BHNU	740	1	S	40		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

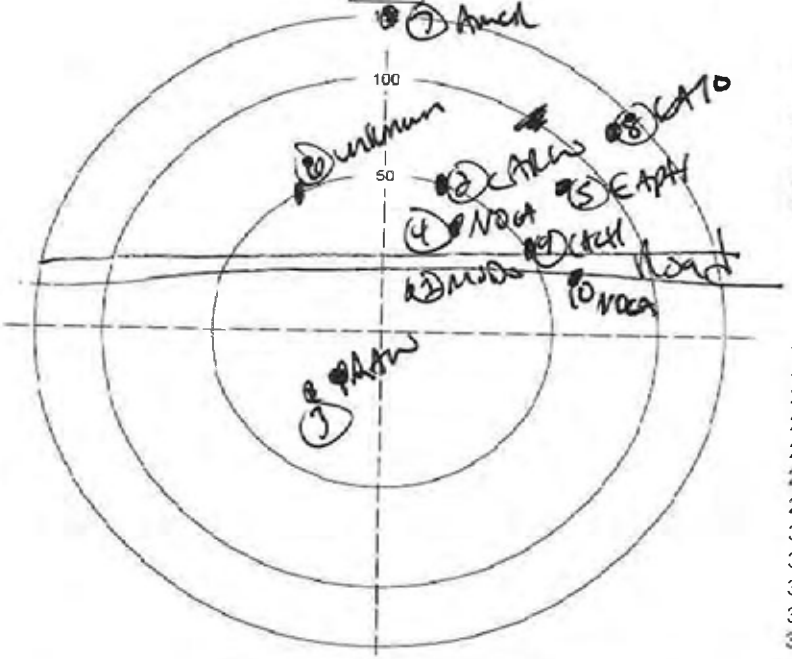
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	SA10 MVS-05	Date	Time Start	Time End
Observer(s):	MCB, LCR	8/28/11	751	
	NAD83	Temp (F)	Wind	Sky
Easting:	0541167	74 °	@0	0 %
Northing:	3826477			
Point-count Habitat Type:	SA11			
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise roads ☐ None

Direction N °



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes:

no height

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	MODO	751	1	D	5	~~5~~	SA
2	CARW	751	1	S	50	~~5~~	SA
3	PRAW	752	1	S	50	—	SA
4	NOCA	753	1	S	80	—	SA
5	EAPH	754	1	S	70	—	SA
6	WBNU	756	1	D	60	—	SA
7	AMCR	756	1	C	150	—	SA
8	EATO	759	1	S	80	—	SA
9	CACH	700	1	S	50	—	SA
10	NOCA	800	1	S	60	—	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

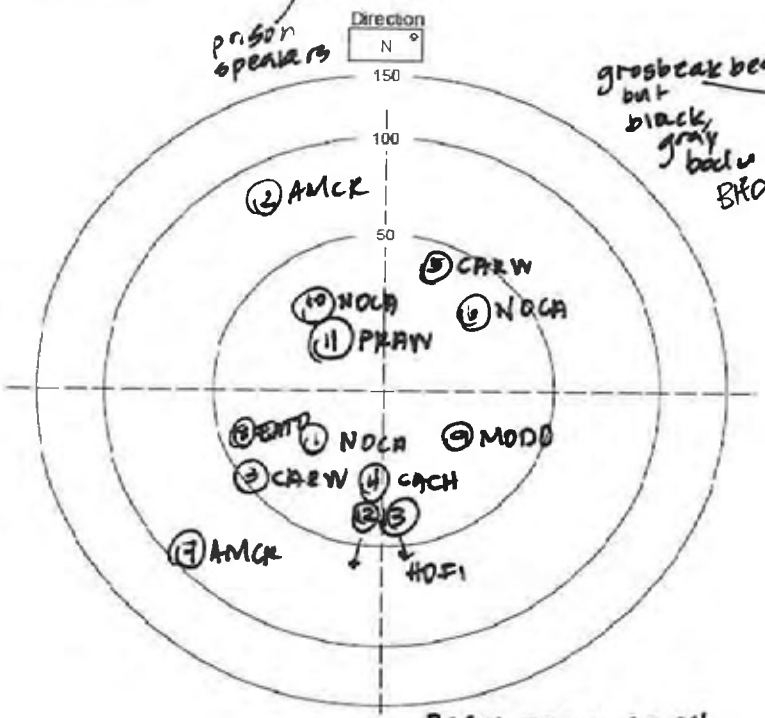
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	SA-11- MVS-06	Date	Time Start	Time End
Observer(s):	MB & CL	8.28.11	812	822
	NAD83	Temp (F)	Wind	Sky
Easting:	0541252	78 °	0 @	0 %
Northing:	3826712			
Point-count Habitat Type:				
Comments:	open clearing in SA field			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None

prison speakers



grosbeak beak but black, gray back w BHCO

Species between this and previous point: BGGN, EATO, CACH MODO NEVI

Non-landbird species present but not counted:

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	812	1	S	15		SA
2	AMCR	812	1	C	20		
3	CARW	813	1	S	40		
4	CACH	813	4	S	25		
5	CARW	814	1	S	40		
6	NOCA	817	1	S	30		
7	AMCR	818	1	C	80		
8	EATO	819	1	S	40		
9	MODO	821	1	P	15		
10	NOCA	821	1	S	25		
11	PRAW	822	1	P, S	20		
12	BHCO	822	1	P	40		
13	HOFI	822	1	P	40		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
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Developed Areas	DA
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Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

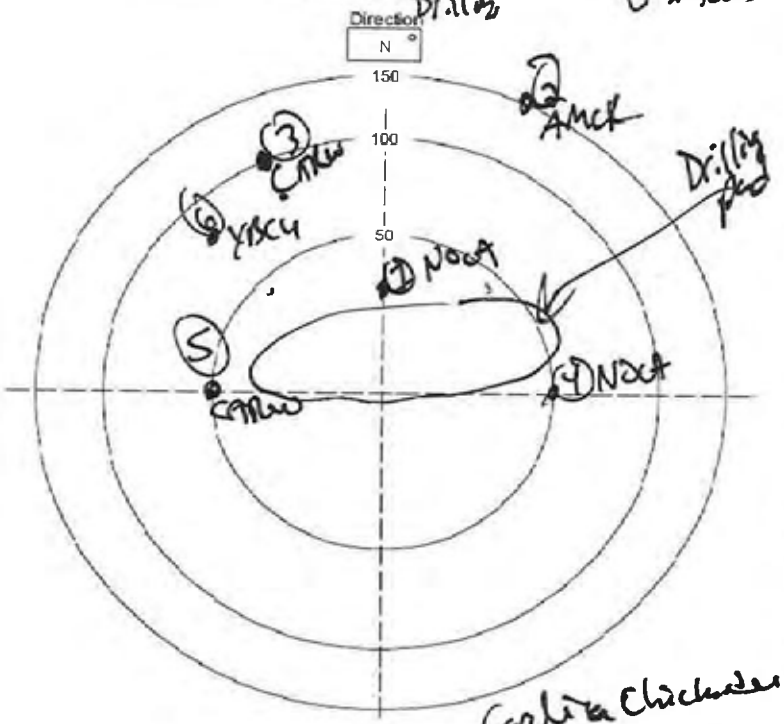
BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVS-OB

Station Id:	SA	Date	Time Start	Time End
Observer(s):	MLB, CAC	8/28/11	910	920
	NAD83, SCY	Temp (F)	Wind	Sky
Easting:	0541302	80 °	0 @ 0	0 %
Northing:	3822058			
Point-count Habitat Type:	SA			
Comments:	by drill pad			

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None ☑ Insects

Drilling



Carolina Chickadee

Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	910	1	G	30	—	SA
2	AMCR	913	1	C	150	/	SA
3	CARW	914	2	S	100	—	SA
4	NOCA	915	1	S	50	/	SA
5	CARW	917	1	S	50	/	SA
6	YBCH	917	1	S	80	/	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
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Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
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Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
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Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
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Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
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Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

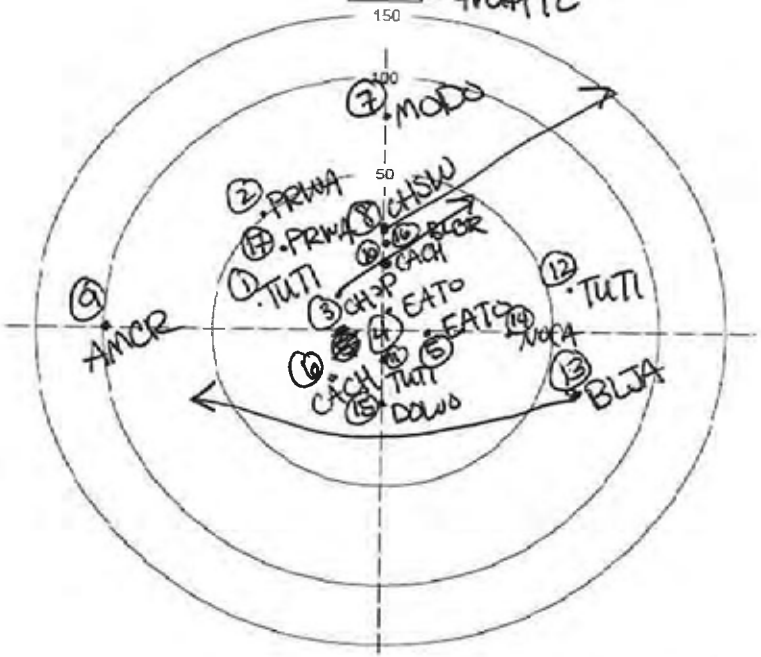
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA-17~~ MVS-11	Date	Time Start	Time End
Observer(s):	WLM & MMH	8.28.11	744	754
	NAD83	Temp (F)	Wind	Sky
Easting:	0543533	78 °	Ø @ N/A	Ø %
Northing:	3826534			
Point-count Habitat Type:	clear cut silviculture			
Comments:	adjacent to Haile Gold Mine road			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None

Direction - drilling
N ° - traffic



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	744	1	S	30		SA
2	PRWA	744	1	S	50		SA
3	CHSP	744	3	P	30	10	SA
4	EATO	745	1	S	15		SA
5	EATO	746	1	S	10		SA
6	CACH	746	2	V	20		SA
7	MODO	747	1	V	75		SA
8	CHSW	747	3	V/F	40	20	SA
9	AMCR	748	1	C	100		SA
10	CACH	748	1	C	20		SA
11	TUTI	748	2	V	5	5	SA
12	TUTI	749	1	S	60		SA
13	BLJA	751	1	C	75		SA
14	NOCA	752	1	S	30		SA
15	DOWO	752	1	C	15		SA
16	BLGR	753	1	S	40		SA
17	PRWA	753	1	S	30		SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

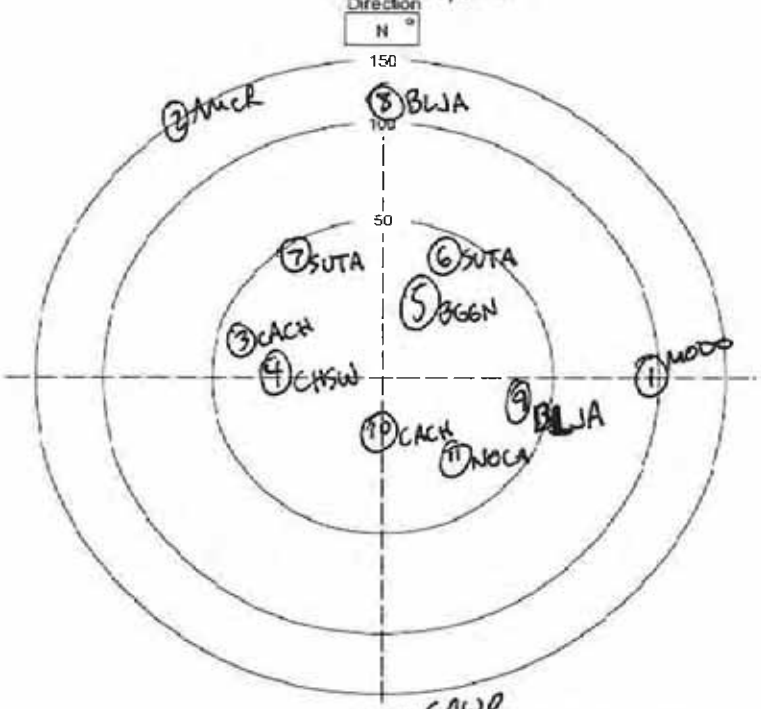
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

~~ΔXFC-2~~ XSC-01

Station Id:	SA-18	Date	Time Start	Time End
Observer(s):	WLM & WMH	8.28.11	0805	0815
	NAD83	Temp (F)	Wind	Sky
Easting:	0543755	75 °	@	0 %
Northing:	3826437			
Point-count Habitat Type:	XFC			
Comments:	Longleaf pine / turkey oak scrub persimmon, loblolly pine, vaccinium spp.			

□ Rain □ Wind X Anthropogenic Noise Machinery/road □ None



Species between this and previous point: CAWR

Non-landbird species present but not counted:

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	MODO	0805	1	S	100	NA	XFC
2	AMCR	0805	2	C	150	NA	XFC
3	CACH	0806	1	C	40	NA	XFC
4	CHSW	0806	1	S	20	NA	XFC
5	BGGN	0808	1	S	10	NA	XFC
6	SUTA	0809	1	C	20	NA	XFC
7	SUTA	0810	1	C	20	NA	XFC
8	BLJA	0811	1	C	120	NA	XFC
9	BLJA	0813	1	C	50	NA	XFC
10	CACH	0813	2	S	5	NA	XFC
11	NOCA	0814	1	S	20	NA	XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

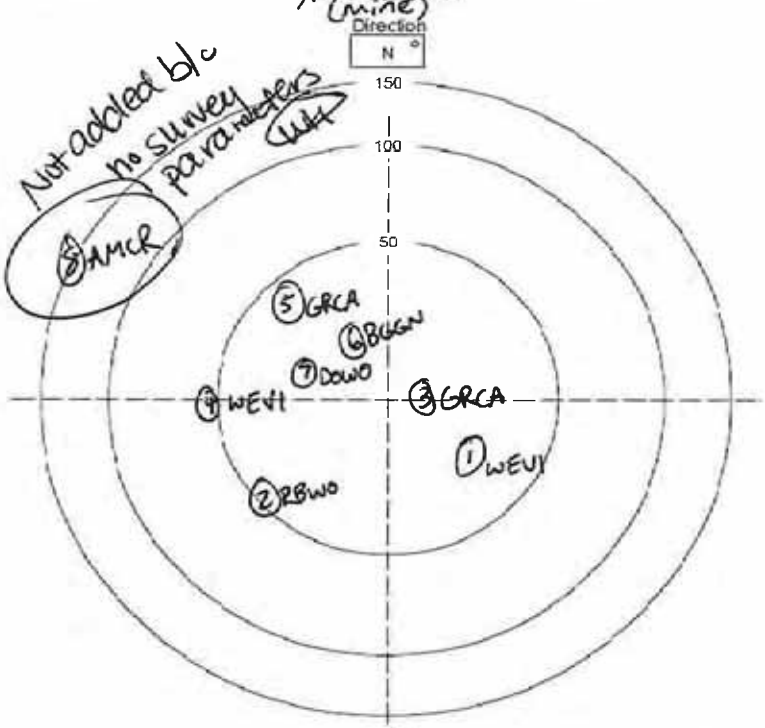
□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

ΔBHF-4 / MVF-07

Station Id:	~~XFC-1~~	8/25/11	Time Start	Time End
Observer(s):	WLM / WMH	~~1035~~	1038	1048
	NAD83	Temp (F)	Wind	Sky
Easting:	0543477	81 °	SW @ 0-3	0 %
Northing:	3825756			
Point-count Habitat Type:	BHF (on edge of XFC)			
Comments:	Pocosin (very dense shrub layer)			

□ Rain □ Wind X Anthropogenic Noise (mine) □ None



Not added b/c no survey parameters

Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	WEVI	1038	1	S	20	NA	BHF
2	RBWO	1038	1	C	50	NA	BHF
3	GRCA	1040	1	C	5	NA	BHF
4	WEVI	1040	1	S	50	NA	BHF
5	GRCA	1042	1	S	40	NA	BHF
6	BGGN	1043	1	S	15	NA	BHF
7	DOWO	1043	2	V	10	20	BHF
~~8~~	~~AMCR~~						
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Birds Detected During Survey

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM

Haile Mine Project - South Carolina

ΔBHF-20 OHF-20

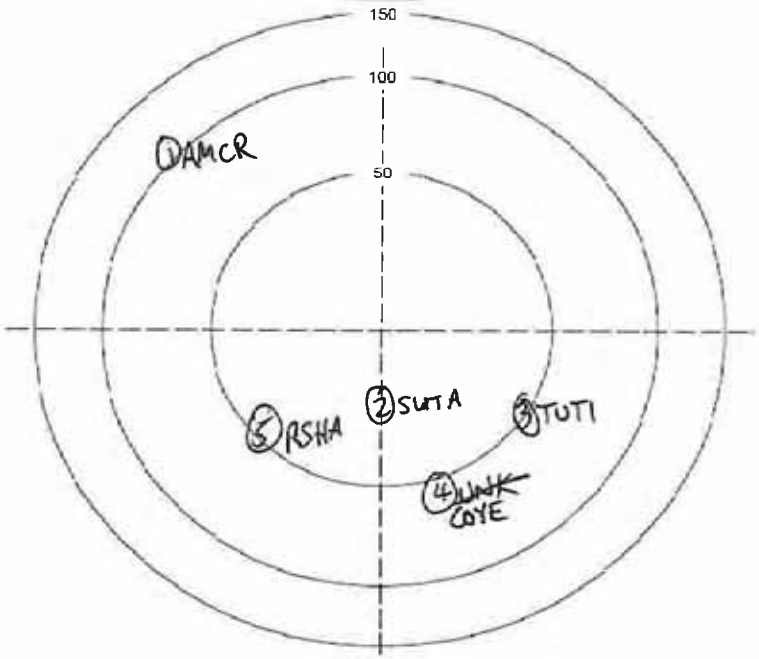
Station Id:	~~XFC-2~~	Date	Time Start	Time End
Observer(s):		8/28/11	1007	1017
	NAD83	Temp (F)	Wind	Sky
Easting:	0543651	83 °	E 0-3	0 %
Northing:	3825923			
Point-count Habitat Type:	BHF			

Comments: Streamhead pocosin (black gum, red maple, Ilex glabra, Ilex coriacea, Myrica cerifera, titi, sweet bay, red bay, laurel leaf greenbrier, tulip poplar)

☐ Rain ☒ Wind ☒ Anthropogenic Noise ☐ None

COYE

Direction N °



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1007	1	C	100	NA	BHF
2	SUTA	1007	1	S	10	NA	BHF
3	TUTI	1016	1	S	60	NA	BHF
4	~~UNK~~	1016	1	C	70	NA	BHF
5	RSHA	1016	1	S	40	NA	BHF
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
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Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

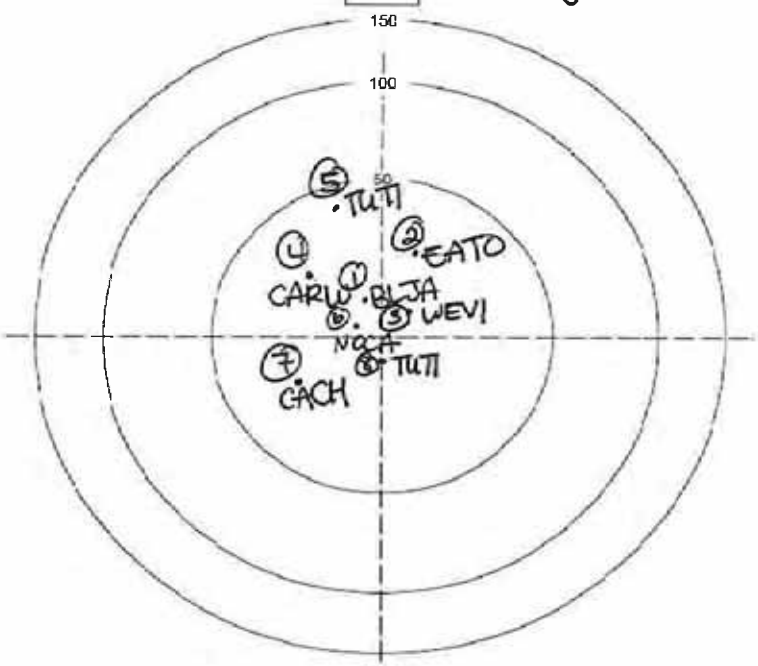
BIRD SURVEY FORM
Haile Mine Project - South Carolina

~~BHF-21~~ SHP-01

Station Id:	~~XFC-3~~	Date	Time Start	Time End
Observer(s):	WLM & WMH	8.28.11	940	950
	NAD83	Temp (F)	Wind	Sky
Easting:	0543890	80 °	Ø @ NA	Ø %
Northing:	3825916			
Point-count Habitat Type:	BHF			
Comments:	shape 100ft from perennial stream			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None -drill rig

Direction N °



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Change from XFC to BHF

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	BLJA	940	2	C	20		BHF
2	EATO	940	1	S	30		
3	WEVI	941	1	S	20		
4	CARW	941	1	S	30		
5	TUTI	942	1	S	40		
6	NOCA	944	1	S	10		
7	CACH	945	1	S	30		
8	TUTI	948	2	V/C	5	2	
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
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Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
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Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

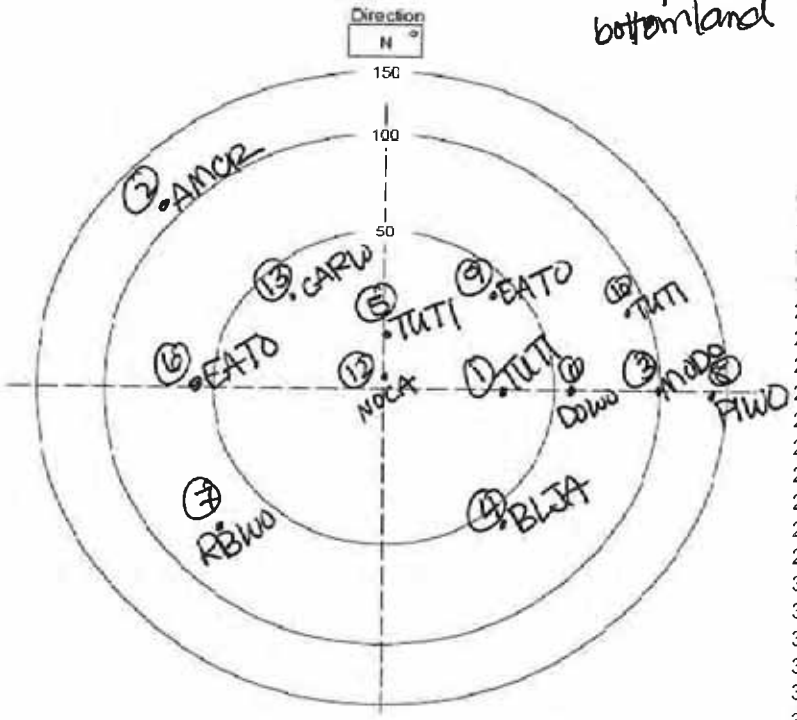
BIRD SURVEY FORM

Haile Mine Project - South Carolina

ΔBHF-22 SHP-02

Station Id:	~~XFC-4~~	Date	Time Start	Time End
Observer(s):	WMH & WLM	8.28.11	911	921
	NAD83	Temp (F)	Wind	Sky
Easting:	0544117	80 °	Ø @ N/A	Ø %
Northing:	3825994			
Point-count Habitat Type:	Bottomland hardwood forest			
Comments:	Dominated by tulip poplar, black gum, & ferns. Seepage slope off sandhill leads to bottomland			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: Change from XFC to BHF

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	911	1	S	30		BHF
2	AMCR	912	1	C	120		
3	MODO	913	1	S	100		
4	BLJA	913	1	C	100		
5	TUTI	915	1	S	20		
6	EATO	915	1	S	60		
7	RBWO	917	1	C	75		
8	PIWO	918	1	D	120		
9	EATO	919	1	S	40		
10	TUTI	920	1	S	80		
11	DOWO	928	1	S	60		
12	NOCA	920	1	S	10		
13	CARW	921	1	S	40		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

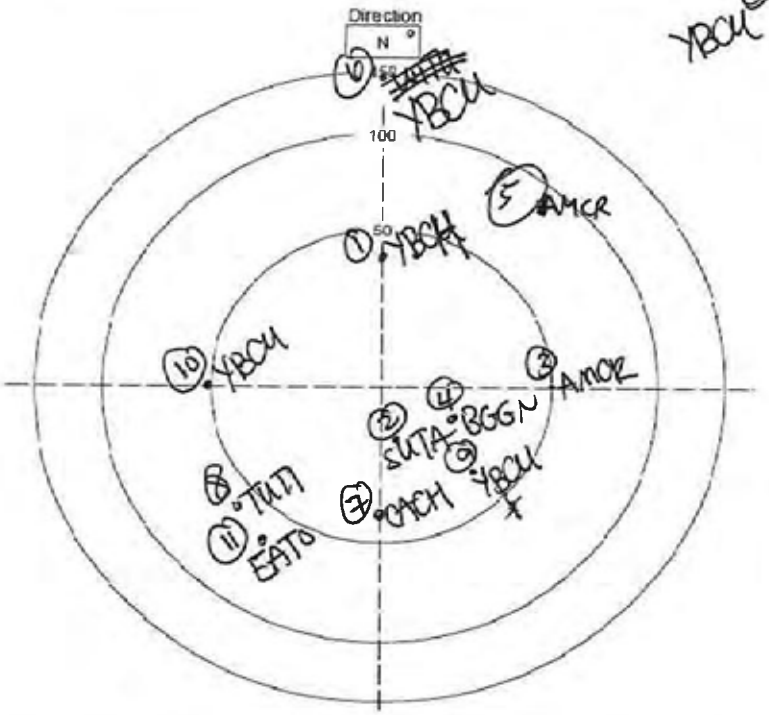
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

OHF-31

Station Id:	~~XFC-5~~	Date	Time Start	Time End
Observer(s):	WLM & WMH	8.28.11	848	858
	NAD83	Temp (F)	Wind	Sky
Easting:	0544175	78 °	@	Ø %
Northing:	3826217			
Point-count Habitat Type:	Xerophytic			
Comments:	On the edge of ~~[illegible]~~ a clear cut field			

□ Rain □ Wind □ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: ~~photos~~ photos 101-6592 & 6591

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	YBCH	848	1	S	40		XFC
2	SUTA	~~848~~	1	C	20		
3	AMCR	848	1	C	50		
4	BGGN	850	1	S	20		
5	AMCR	0852	2	C	80		
6	~~[illegible]~~	853	1	S	150		
7	CACH	853	1	S	40		
8	TUTI	853	1	S	60		
9	YBCU	854	1	S	30		
10	YBCU	854	1	S	50		
11	EATO	857	1	S	100		
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YBCU

Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

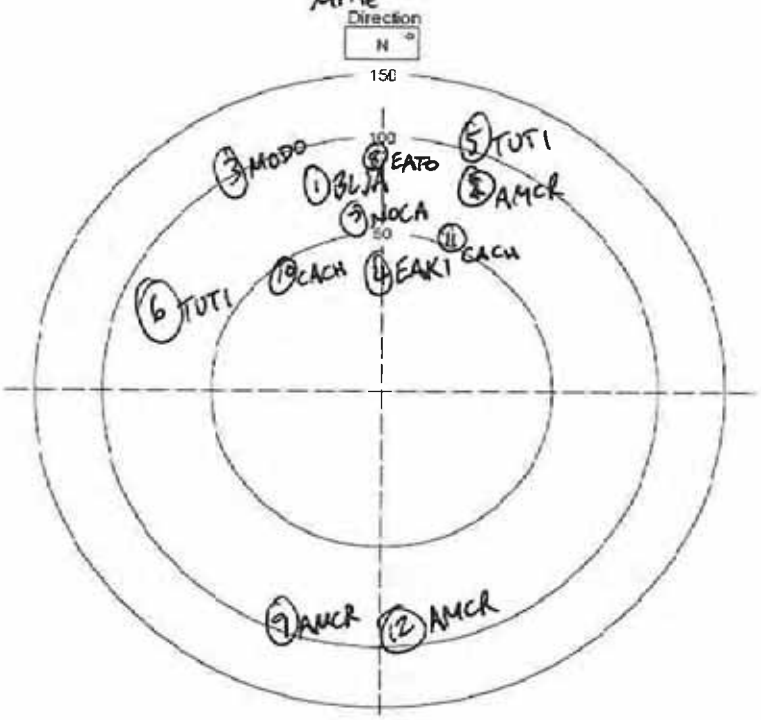
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina
ASA-18

Station Id:	XFC-6 MVS-12	Date,	Time Start	Time End
Observer(s):	WMH, WLM	8/28/11	0828	0838
	NAD83	Temp (F)	Wind	Sky
Easting:	0543972	76 °	@	0 %
Northing:	3826327			
Point-count Habitat Type:	SA			
Comments:	old xeric habitat that has been recently clear-cut, some shrubby veg is coming up			

□ Rain □ Wind X Anthropogenic Noise Mine □ None



Species between this and previous point: _____
Non-landbird species present but not counted: _____
Mammals: _____
Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	BLJA	0828	1	C	60	NA	SA
2	AMCR	0828	1	C	80	NA	SA
3	MODO	0829	1	S	100	NA	SA
4	EAKI	0830	1	S	30	NA	SA
5	TUTI	0830	2	S	90	NA	SA
6	TUTI	0830	1	S	70	NA	SA
7	NOCA	0830	1	C	50	NA	SA
8	EATO	0831	1	S	70	NA	SA
9	AMCR	0832	1	C	100	NA	SA
10	CACH	0832	1	C	40	NA	SA
11	CACH	0833	1	S	50	NA	SA
12	AMCR	0835	2	FO	100	30	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

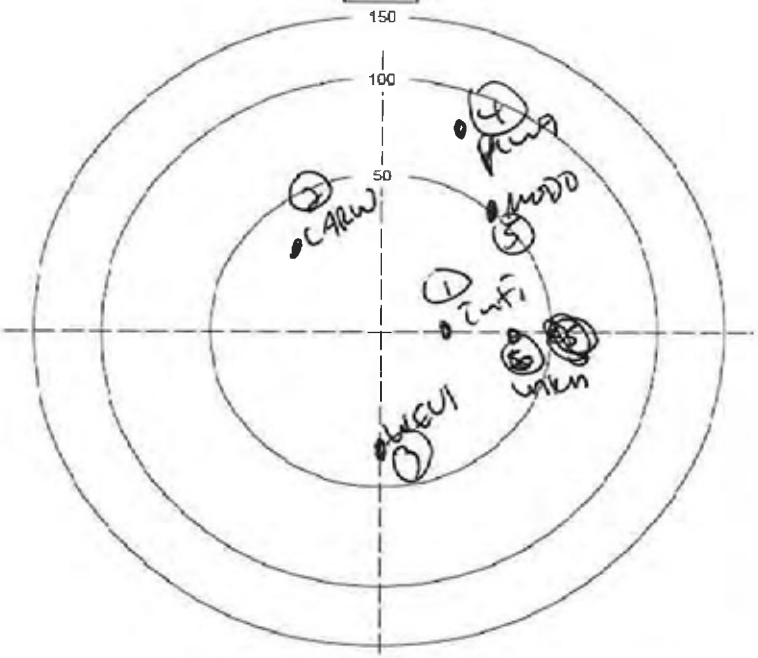
BIRD SURVEY FORM
Haile Mine Project - South Carolina

MTP-01

Station Id:		Date 25	Time Start	Time End
Observer(s):	WCM, CAL	8/30	1019	1029
	NAD83	Temp (F)	Wind	Sky
Easting:	0539614	78 °	0@	0 %
Northing:	3827558			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None ☑ Insects

Direction
N °



Species between this and previous point:

Non-landbird species present but not counted:

Mammals:

Notes:

	Birds Detected During Survey						
	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	1019	1	S	15	/	SA
2	CARW	1020	1	S	30	/	SA
3	WEVI	1021	1	S	40	/	SA
4	PIWA	1022	1	S	80	/	SA
5	MODO	1023	1	S	50	/	SA
6	UNKW	1025	1	S	50	/	SA
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Four Letter Species Codes			
Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
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Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
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Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
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Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA2~~ MTP-02	Date	Time Start	Time End
Observer(s):	WLM, CAL	8/29/11	958	1008
	NAD83	Temp (F)	Wind	Sky
Easting:	0539836	76 °	W @ 1-2	0 %
Northing:	3827679			
Point-count Habitat Type:	SA			
Comments:	Stand of pines ≈ 25-35 yrs old. Sign. hardwood encroachment.			

☐ Rain ☐ Wind ☑ Anthropogenic Noise (load) ☐ None ☑ Insects

	Species	Time	#	Beh	Dist	Height	Habitat
1	CHSP	958	1	S	10	—	SA
2	PIWA	958	1	S	40	—	SA
3	PIWA	1000	1	S	30	—	SA
4	TUTI	959	1	S	55	—	SA
5	PIWA	1000	2	S	20	—	SA
6	RBWO	1000	1	S	100	—	SA
7	YBCU	1002	1	S	[illegible]	[illegible]	SA
8	NOCA	1005	1	S	30	—	SA
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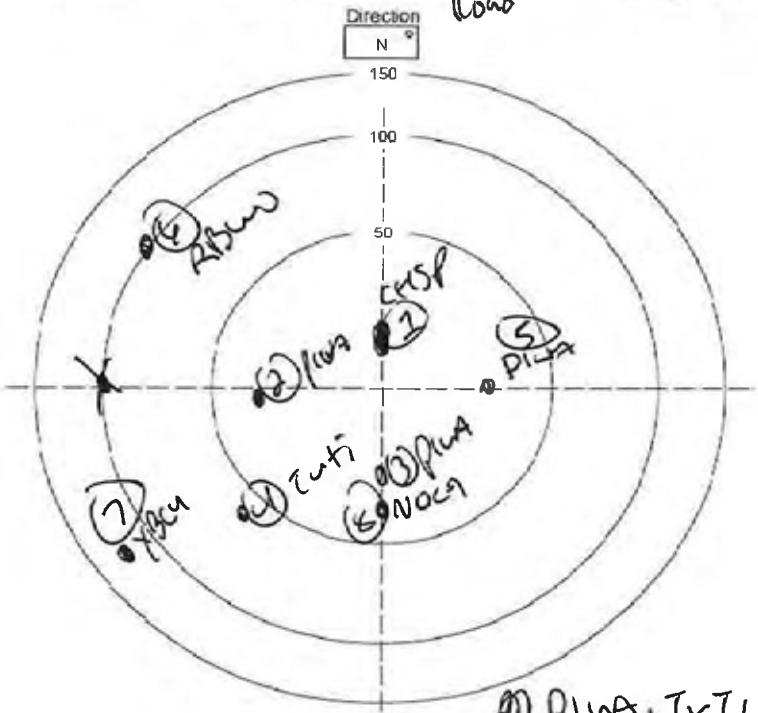
Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI



Species between this and previous point: PIWA, TUTI

Non-landbird species present but not counted:

Mammals:

Notes:

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

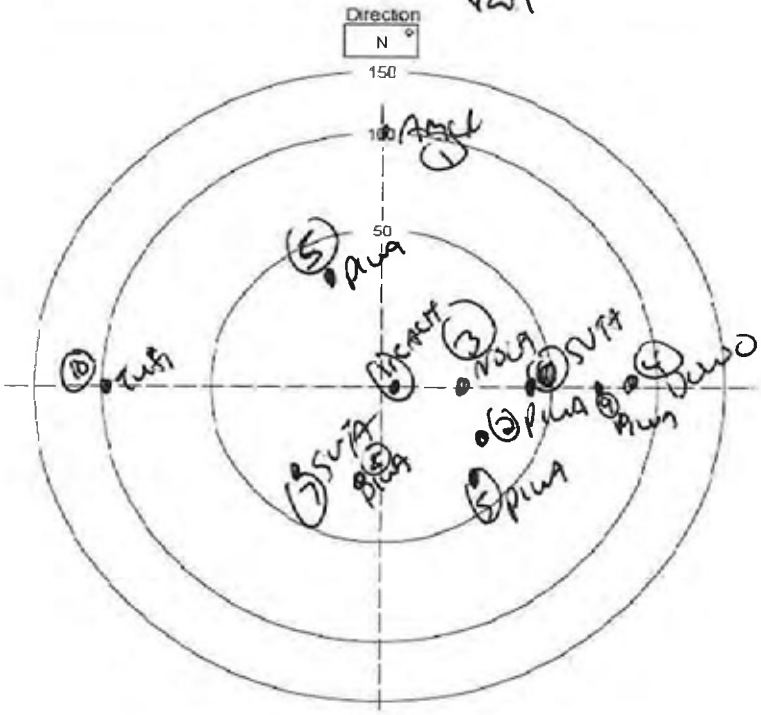
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA3~~ MTP-03	Date	Time Start	Time End
Observer(s):	[illegible]	8/29/11	938	948
	NAD83	Temp (F)	Wind	Sky
Easting:	0540057	76 °	0 @	0 %
Northing:	3827 7931			
Point-count Habitat Type:	SA			
Comments:				

□ Rain □ Wind ✓ Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMGL	938	1	[illegible]	100	/	SA
2	PIWA	938	2	S	30	/	SA
3	NOLA	939	1	S	20	/	SA
4	DOWO	939	1	S	75	/	SA
5	PIWA	940	1	S	40	/	SA
6	SUTA	941	1	S	30	/	SA
7	SUTA	941	1	S	40	/	SA
8	PIWA	942	1	S	30	/	SA
9	PIWA	943	1	S	80	/	SA
10	TUTI	944	1	S	100	/	SA
11	CACH	946	1	S	5	/	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

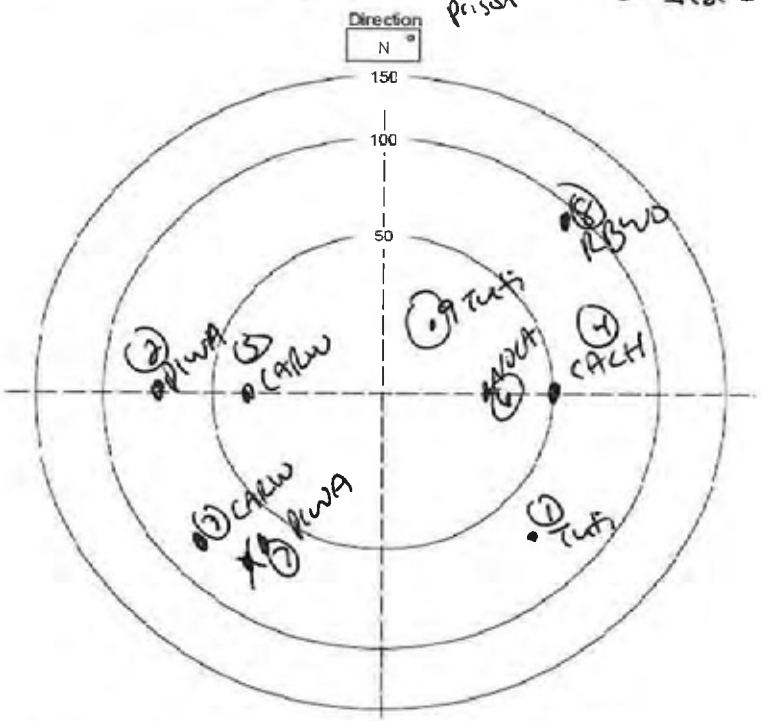
□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MTP-04

Station Id:	SA 4	Date	Time Start	Time End
Observer(s):	WLM, CAC	8/29/11	917	927
	NAD83	Temp (F)	Wind	Sky
Easting:	0540284	73 °	@ 0	0 %
Northing:	3527851			
Point-count Habitat Type:	SA			
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise (prison) ☐ None ☑ Insects



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	TUTI	917	1	S	80	—	SA
2	PIWA	920	1	S	75	—	SA
3	CARW	921	1	S	50	—	SA
4	CACH	921	1	S	50	—	SA
5	CARW	921	1	S	40	—	SA
6	NOCA	923	1	S	70	—	SA
7	PIWA	923	1	S	60	—	SA
8	RBWO	925	1	S	90	—	SA
9	TUTI	925	2	S	40	—	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

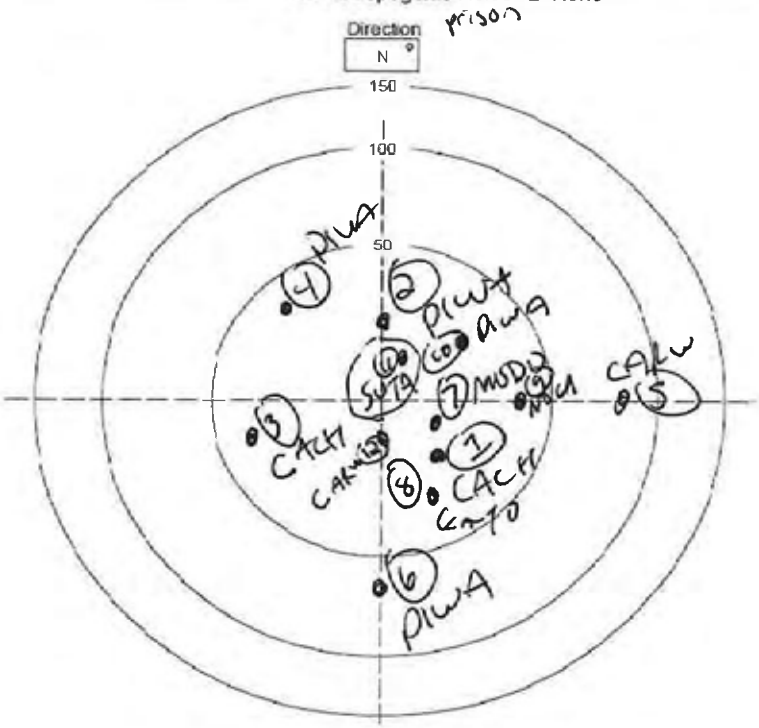
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~SA5~~ MTP-05	Date	Time Start	Time End
Observer(s):	WLM, CAL	8/29/14	858	908
	NAD83	Temp (F)	Wind	Sky
Easting:	0540478	72 °	0 @	0 %
Northing:	3828019			
Point-count Habitat Type:	SA			
Comments:				

☐ Rain ☐ Wind ☑ Anthropogenic Noise ☐ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	CACH	858	3	S	30	/	SA
2	PIWA	858	1	S	30	/	SA
3	CACH	858	1	S	30	/	SA
4	PIWA	859	1	S	40	/	SA
5	CALW	859	1	S	75	/	SA
6	PIWA	900	1	S	60	/	SA
7	MUDO	901	1	S	30	/	SA
8	CACH	901	1	S	30	/	SA
9	NOCA	901	1	S	15	/	SA
10	PIWA	902	2	S	30	/	SA
11	SUTA	902	1	S	30	/	SA
12	CALW	903	1	V	15	/	SA
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

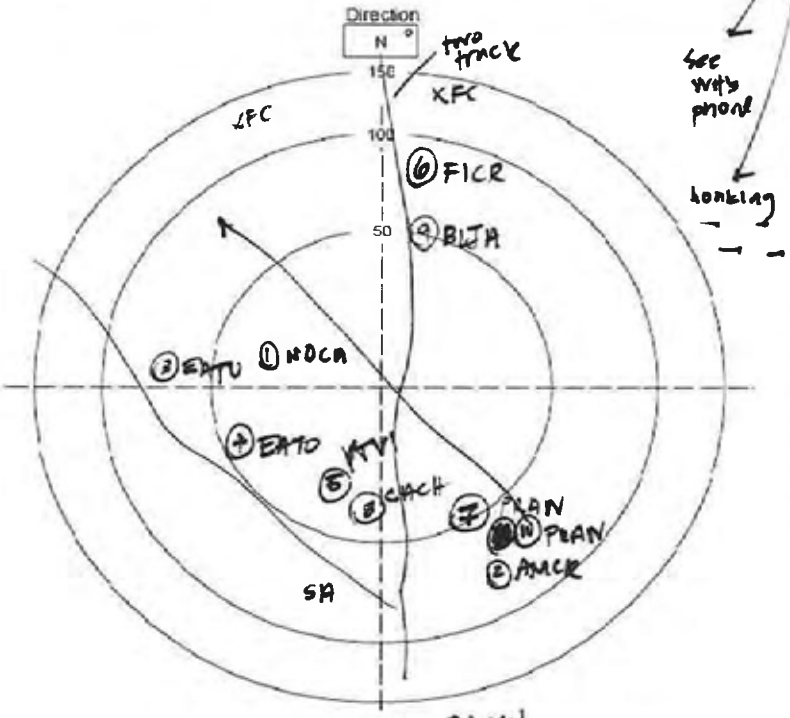
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVS-26

Station Id:	~~XFC-12~~	Date	Time Start	Time End
Observer(s):	MB and WH	8.29.11	941	951
	NAD83	Temp (F)	Wind	Sky
Easting:	0542371	80 °	0-5 @ SE	0 %
Northing:	3827883			
Point-count Habitat Type:				
Comments:	field opening on edge of XFC habitat			

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: BLVU

Non-landbird species present but not counted:

Mammals:

Notes:

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	941	38	S	30		XFC
2	AMCR	941	1	C	80		
3	EATO	942	1	S	70		
4	EATO	943	1	S	50		
5	YTVI	946	1	S			
6	FICR	947	1	C	80		
7	PRAN	949	1	S	50		
8	CACH	949	1	S	40		
9	BLJA	949	1	C	50		
10	PRAN	951	1	FO	30		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

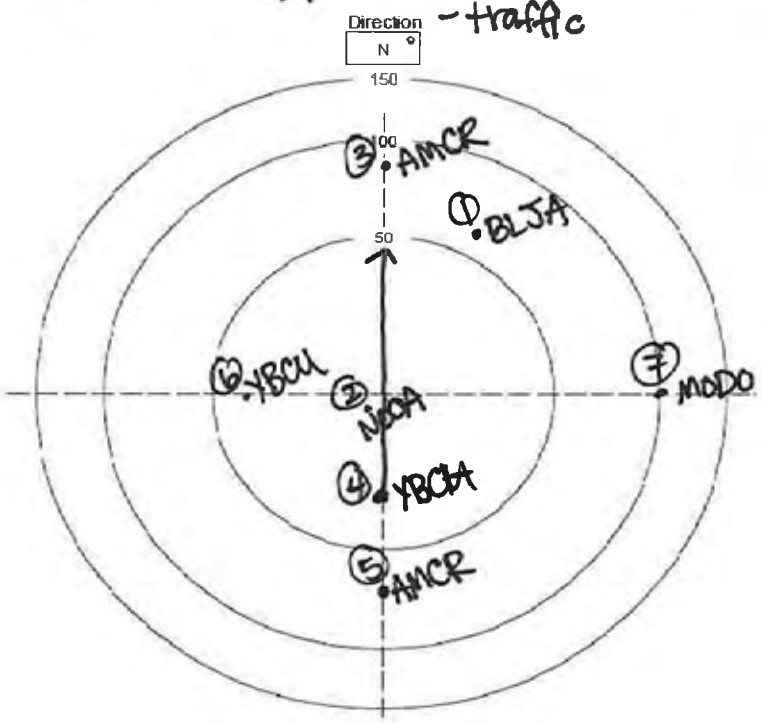
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVS-27

Station Id:	XFC-13	Date	Time Start	Time End
Observer(s):	WMH & MB	5.29.11	1007	1017
	NAD83	Temp (F)	Wind	Sky
Easting:	0542196	85 °	Ø @	Ø %
Northing:	3828064			
Point-count Habitat Type:	Xerophytic			
Comments:	Thicker, perhaps planted, pine stand 1-3 dbh & 5-8 ft tall			

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None - traffic



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

BLJA

	Species	Time	#	Beh	Dist	Height	Habitat
1	~~YBCH~~	1008	1	C	~~80~~		XFC
2	NOCA	1008	1	S	15		XFC
3	AMCR	1009	1	C	80		XFC
4	YBCH	1012	3	F/C	2	10	XFC
5	AMCR	1015	1	C	70		XFC
6	YBCU	1016	1	S	40		XFC
7	MODO	1017	1	S	100		XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

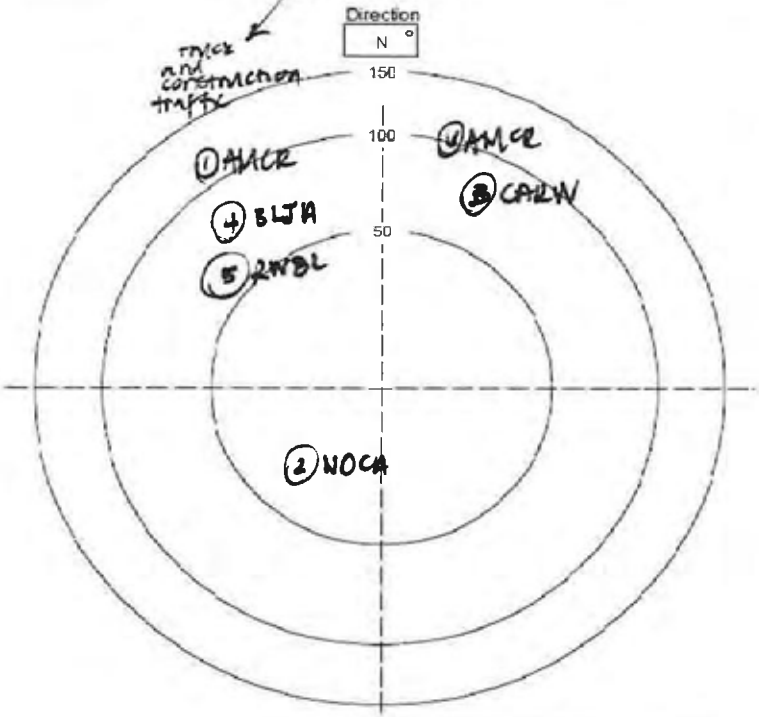
☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVS-28

Station Id:	~~XFC-14~~	Date	Time Start	Time End
Observer(s):	MDH WH	8.29.11	1027	1037
	NAD83	Temp (F)	Wind	Sky
Easting:	0541962	85 °	0 @	0 %
Northing:	3828159			
Point-count Habitat Type:				
Comments:				

□ Rain □ Wind X Anthropogenic Noise □ None



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	AMCR	1027	2	C	100		XFC
2	NOCA	1028	1	S	20		
3	CARW	1029	1	S	70		
4	BLJA	1031	1	C	70		
5	RWBL	1033	1	C	60		
6	AMCR	1034	1	C	100		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
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Time: Record Specific Time (10 minutes total at each location)
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Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

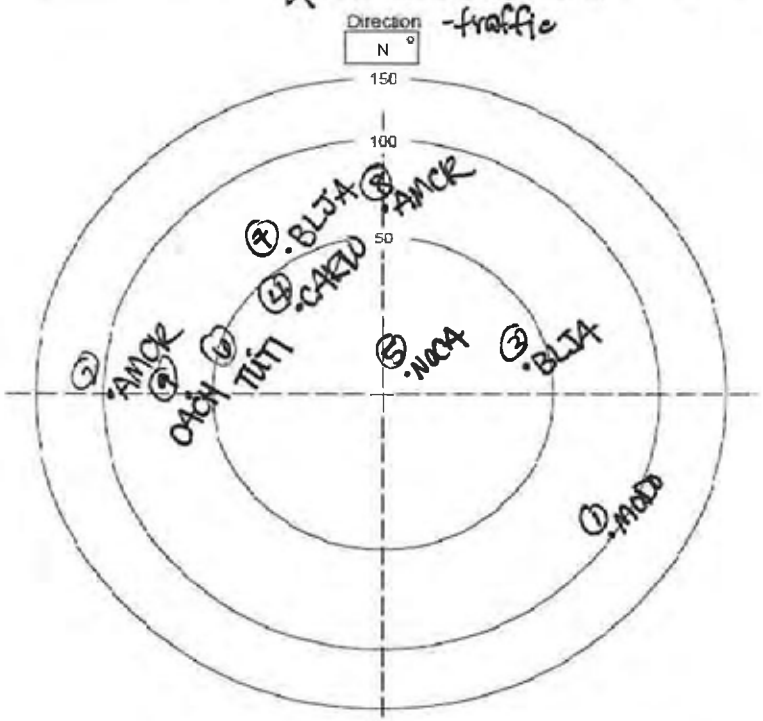
Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	XFC-15 MVS-29	Date	Time Start	Time End
Observer(s):	WMH & MLB	8.29.11	8:35	8:47
	NAD83	Temp (F)	Wind	Sky
Easting:	0542024	79 °	0-2@NE	Ø %
Northing:	3828219			
Point-count Habitat Type:	Xerophytic			
Comments:	close to Hwy 601. Young pine stands 3-4 in. dbh & 10-15 ft high.			

□ Rain □ Wind X Anthropogenic Noise □ None -traffic



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

	Species	Time	#	Beh	Dist	Height	Habitat
1	MODO	837	1	S	100		XFC
2	AMCR	838	1	C	100		XFC
3	BLJA	838	1	C	40		XFC
4	CARW	839	2	S	40		XFC
5	NOCA	840	1	S	15		XFC
6	TUTI	841	1	S	30		XFC
7	BLJA	843	1	C	100		XFC
8	AMCR	843	1	O	70		XFC
9	CACH	845	1	S	70		XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
Time: Record Specific Time (10 minutes total at each location)
#: Number Observed or Heard
Dist: Distance in Meters
Beh: S=Singing C=Calling V=Visual FO=Flyover B=Booming D=Drumming
Height: If in flight, approximate height above ground in meters

Habitat: Habitat birds observed in:

Bottomland Hardwood Forest	BHF
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

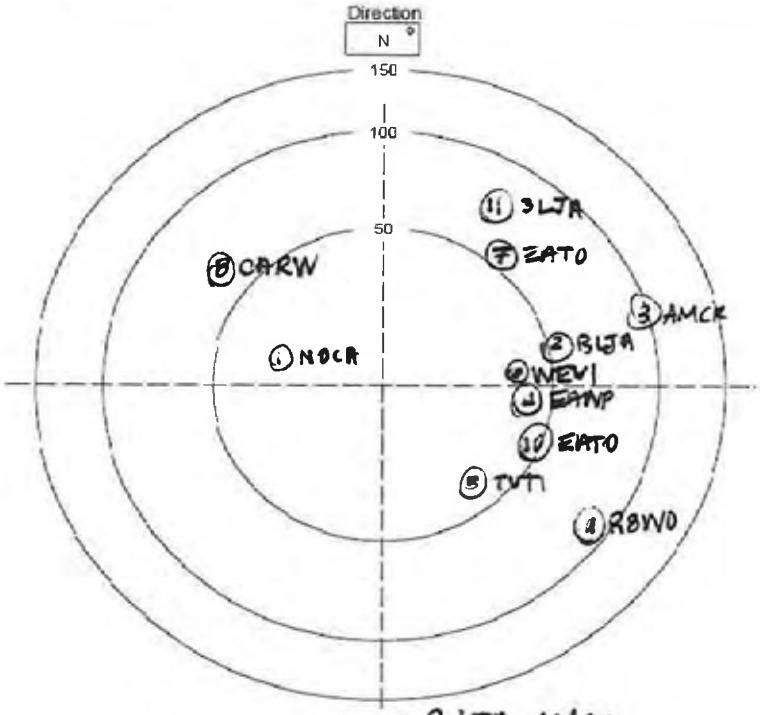
□ Entered in Database □ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

MVS-30

Station Id:	XFC-10	Date	Time Start	Time End
Observer(s):	MB & WH	8.29.11	856	906
	NAD83	Temp (F)	Wind	Sky
Easting:	0542261	79 °	0-5 @ NE	0 %
Northing:	3828301			
Point-count Habitat Type:				
Comments:				

☐ Rain ☐ Wind ☐ Anthropogenic Noise ☐ None



Species between this and previous point: BLJA, AMCR

Non-landbird species present but not counted:

Mammals:

Notes:

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOCA	856	1	S,P	10	5	XFC
2	BLJA	856	2	C	60		
3	AMCR	857	1	C	100		
4	EAWP	858	1	S	40		
5	TUTI	858	1	S	40		
6	WEVI	859	1	S	40		
7	EATO	900	1	S	60		
8	CARW	901	1	S	60		
9	RBWO	903	1	C	100		
10	EATO	904	1	S	50		
11	BLJA	906	1	C	75		
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
American Robin	AMRO	Killdeer	KILL
American Woodcock	AMWO	Loggerhead Shrike	LOSH
Bachman's Sparrow	BACS	Louisiana Waterthrush	LOWA
Barn Swallow	BARS	Mourning Dove	MODO
Black-and-white Warbler	BAWW	Northern Bobwhite	NOBO
Blue Grosbeak	BLGR	Northern Cardinal	NOCA
Blue Jay	BLJA	Northern Flicker	NOFL
Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
Blue-headed Vireo	BHVI	Northern Parula	NOPA
Brown Thrasher	BRTH	N. Rough-Winged Swallow	NRWS
Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
Brown-headed Nuthatch	BHNU	Ovenbird	OVEN
Carolina Chickadee	CACH	Pileated Woodpecker	PIWO
Carolina Wren	CARW	Pine Warbler	PIWA
Chimney Swift	CHSW	Prairie Warbler	PRAW
Chipping Sparrow	CHSP	Prothonotary Warbler	PROW
Chuck-will's-widow	CWWI	Purple Martin	PUMA
Cliff Swallow	CLSW	Red-bellied Woodpecker	RBWO
Common Grackle	COGR	Red-cockaded Woodpecke	RCWO
Common Nighthawk	CONI	Red-eyed Vireo	REVI
Common Yellowthroat	COYE	Red-headed Woodpecker	RHWO
Downy Woodpecker	DOWO	Red-winged Blackbird	RWBL
Eastern Bluebird	EABL	Rock Pigeon	ROPI
Eastern Kingbird	EAKI	Scarlet Tanager	SCTA
Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
Eastern Wood-Pewee	EAWP	Tufted Titmouse	TUTI
Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
Sky: % Cloud Cover: 0-10, 10-20, 20-30, etc.
Species: Four Letter Code
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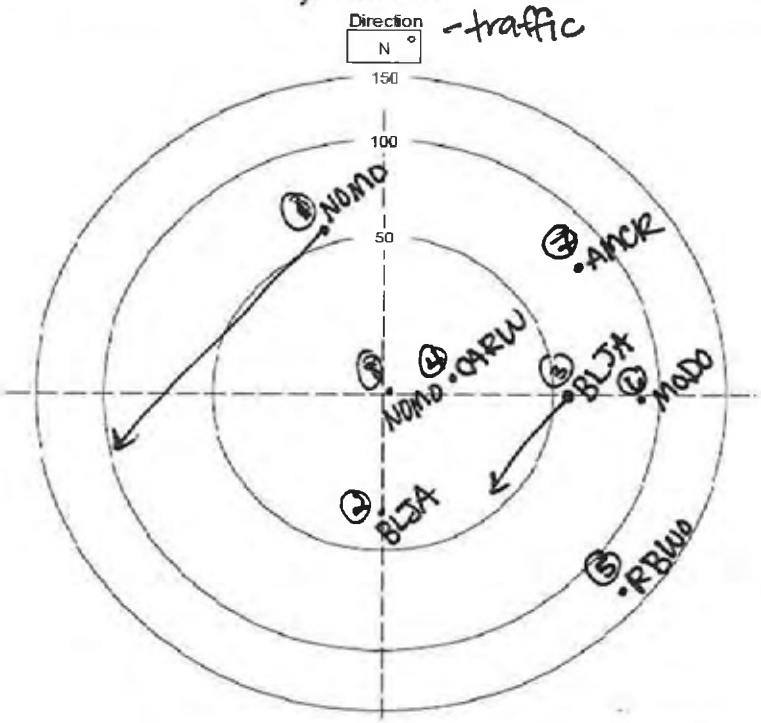
Developed Areas	DA
Fallow Fields	FF
Mesic Mixed Hardwood Forest	MMHF
Mining Areas	MA
Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

BIRD SURVEY FORM
Haile Mine Project - South Carolina

Station Id:	~~XFC-17~~ MVS-31	Date	Time Start	Time End
Observer(s):	MLB & WMH	8.29.11	913	923
	NAD83	Temp (F)	Wind	Sky
Easting:	0542427	77 °	0-2@NE	Ø %
Northing:	3828489			
Point-count Habitat Type:	Xerophytic			
Comments:				

☐ Rain ☐ Wind ☒ Anthropogenic Noise ☐ None -traffic



Species between this and previous point: _____

Non-landbird species present but not counted: _____

Mammals: _____

Notes: _____

Birds Detected During Survey

	Species	Time	#	Beh	Dist	Height	Habitat
1	NOMO	914	2	F	100	10	XFC
2	BLJA	914	4	C	30		XFC
3	BLJA	915	1	F	100	20	XFC
4	CARW	915	1	S	30		XFC
5	RBWO	916	1	D	70	MPHF	~~XFC~~
6	MODO	916	1	S	80		XFC
7	AMCR	922	2	C	90		XFC
8	NOMO	923	1	V	5	5	XFC
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Four Letter Species Codes

Acadian Flycatcher	ACFL	House Sparrow	HOSP
American Goldfinch	AMGO	Indigo Bunting	INBU
American Redstart	AMRE	Kentucky Warbler	KEWA
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Barn Swallow	BARS	Mourning Dove	MODO
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Blue Grosbeak	BLGR	Northern Cardinal	NOCA
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Blue-gray Gnatcatcher	BGGN	Northern Mockingbird	NOMO
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Brown-headed Cowbird	BHCO	Orchard Oriole	OROR
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Eastern Meadowlark	EAME	Summer Tanager	SUTA
Eastern Phoebe	EAPH	Swainson's Warbler	SWWA
Eastern Towhee	EATO	Tree Swallow	TRES
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Eurasian Collared-Dove	EUCD	Whip-poor-will	EWPW
European Starling	EUST	White-breasted Nuthatch	WBNU
Field Sparrow	FISP	White-eyed Vireo	WEVI
Grasshopper Sparrow	GRSP	Wild Turkey	WITU
Gray Catbird	GRCA	Wood Thrush	WOTH
Great Crested Flycatcher	GCFL	Worm-eating Warbler	WEWA
Hairy Woodpecker	HAWO	Yellow-billed Cuckoo	YBCU
Hooded Warbler	HOWA	Yellow-breasted Chat	YBCH
Horned Lark	HOLA	Yellow-throated Vireo	YTVI

Start & Stop Time: 24 Hour Time (e.g. 0820)
Wind: Compass Direction @ Speed (e.g. N @ 10-15)
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Time: Record Specific Time (10 minutes total at each location)
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Mixed Pine/Hardwood Forest	MPHF
Palustrine Freshwater Wetlands	PFW
Silvilculture Areas	SA
Xerophytic Forest Community	XFC

☐ Entered in Database ☐ QA/QC

ARCADIS Project No. B0016630 Willow Hetrick, WCM

HGM Avian Surveys 8/18/11

- Willow took GPS pt "Bat 1" @ a small tulip poplar near emergent wetland and next to woodpecker cavity tree
  ★ (2) Photos taken
- GPS Pt "Bat 2" taken adjacent to Pt #91
  ★ (3) Photos taken
  ★ Noticeably pine tree is potential tower
- GPS Pt "Bat 3" taken on East side of Ledbetter Reservoir
  ★ (3) Photos taken
  ★ Several Carolina wrens observed
- GPS Pt "Bat 4" taken in emergent wetland @ Nyssa biflora tree.
  ★ Several Photos taken
- GPS Pt "Bat 5" taken @ old homesite located in fallow field → Receiver can be put on Bradford pear tree in yard.
  ★ Photos taken

HGM Telephone # 803-475-1220
Bill Clem cell # 803-246-0785
Lock combo: 1220 (GATE)
Lock Combo: 446 (HGM) → Anabat Locks

ARCADIS Project No. B0016630 Willow Hetrick, Will Medlin

HGM Avian Surveys / Bat Surveys 8/18/11

★ 1430 - 1700 set up and assembled Four Anabat Recording devices.

1700 - Depart Haile Gold Mine Site
1735 - Arrive @ Jameson Inn Lancaster, SC

1805 - 1900 Dinner
1915 - 2000 Home Depot / Wal-Mart

END of DAY

Will Medlin

Romarco - HGM
WM, WH
Avian Surveys / Bat Surveys
8/19/2011
0500 - Arrived at Haile Gold Mine Site

1st Point Count location MA-7 (0530)
Time Start 0531
Time End 0541
☆ Crickets / Insects / Mine noise prevalent
- Species
No species observed visually / aurally

2nd Pt Count location MA-8 (0550)
Time Start 0551
Time End 0601
Species
No species observed
- Mine Noise / insect noise prevalent

3rd Pt Count location MA-9 (0608)
Time Start 0608
Time End 0618
☆ Mine / Road Noise / insect noise
Species
☆ No Species observed
(American crow)

Romarco - HGM
WCM, WH
Avian / Bat Survey
8/19/11

4th Point Count Location MA-10
Time Start 0627
Time End 0637
☆ Mine noise / insect noise
Species
American Crow II
Tufted titmouse III
Chipping Sparrow II
Northern Cardinal II
Carolina wren II

5th Point Count Location MA-6 (0759)
Time Start 0807
Time End 0817
☆ See ~~notes~~ Datasheet for species

6th Point Count Site MA-5 (0835)
Time Start 0836
Time End 0846
☆ Adjacent to Sediment Pond #4
Species
White-eyed vireo II
Carolina wren
Pileated woodpecker
Barn Swallow II
Blue Jay
Tufted titmouse
Carolina Chickadee
Mourning dove
Eastern Kingbird

Romarco - HGM
ARCADIS Proj. No B0016630
HGM - Avian Surveys

WLM, WMH

8/19/2011

7th Point Count Location MA-4

Time Start 0903

Time End 0913

Species

Blue Grosbeak II
Mourning dove III
Carolina chickadee II
Tufted titmouse
Downey woodpecker
Barn swallow
Red bellied woodpecker
white eyed vireo

8th Point Count Location SA-13 → MA-~~3~~#

☆ Area has been cleared and contains mine trucks and equipment. Groundwater well (DMW4) located adjacent to point count site.

Time Start 0927

Time END 0937

Species

Carolina Wren I
Blue grosbeak II
Eastern Towhee
Northern Bobwhite
Downy woodpecker
American crow
Mourning dove
Praire warbler

ARCADIS Project No. B0016630 Task 4

WLM, WMH

Romarco - HGM Avian Surveys

8/19/11

9th Point Count Location SA-14 → MA #

☆ Mining Area w/ anthropogenic noise

Time start 0950

Time End 1000

Species

Prairie warbler II
Tufted titmouse
Barn swallow II
Chipping sparrow
Northern bobwhite
Mourning dove

10th Point Count location MA-11

☆ Insect and mine operation noise in background

Time Start 1031

Time End 1041

Species

Carolina wren II
Chipping sparrow
Blue grosbeak

11th Point Count Location MPHF-9

☆ Some mine noise in area
☆ Adjacent to Ledbetter Reservoir

Time Start 1051

Time End 1101

Species

Eastern Kingbird
Carolina wren II
Carolina Chickadee II
Tufted titmouse
Northern cardinal II

END of Day
[signature]

☆ Attempted to set up AnnBat station "Bat 1" but failed due to band clamps - Arrived @ Hotel 1630

ARCADIS Project No. B0016630 WCM, WMH

HGM - Avian Surveys 8/20/2011

- Arrive @ Site @ 0620

Point Count
Sites completed

MPHF - 3
MPHF - 2
MPHF - 1 * Photos taken
FF - 1 * Area is not a fallow field, but is a small forested wetland depression. changed habitat to BHF.
BHF - 1
BHF - 2
FF - 2
MPHF - 5
MMHF - 2
MMHF - 1
MPHF - 4

1200 - 1300 Setup and installed AnaBat #1 @ beaver
* Spoke to HGM Security guard (Mr. Morgan) regarding some Kids on 4-wheelers that were trespassing on Haile property near Bat #1
* Set up and installed AnaBat Unit @ Bat #2 adjacent to Ledbetter Reservoir 1400 - 1605

ARCADIS Project No. B0016630 WCM, WMH

HGM - Avian Surveys 8/20/2011

1615 - 1735 Setup and installed AnaBat Unit @ Bat #4 in field @ old homesite. Bradford Pear is tree that AnaBat is in.

1815 - Arrive back @ Hotel Lancaster, SC
1915 - 200 - Home Depot and Mapping discussion

END of DAY

Will Mark

ARCADIS Project No. B0016630 WLM, WMH

Romaco/HGM - Avian Survey 8/21/2011

- Arrived @ Site 0615

- Began Pt Count @ SA-31 (Loblolly Pine Plantation)

Completed Pt Counts

SA-31
SA-30
SA-29
SA-28
SA-27
SA-26
PFW-4
PFW-3
PFW-2
PFW-1

☆ Went to Charlotte for Afternoon/Evening to Pick up other ARCADIS biologists from Airport, and to get supplies

2300 - Arrive back @ Hotel in Lancaster, SC

END of Day

Will

ARCADIS Project No. B0016630 WLM, WMH, CL, MB

8/22/2011

- Arrived @ site at approx 0655
☆ Weather is foggy w/ slight west breeze
- Started Point Count @ SA-16 (MA is habitat)

Point Counts Completed

SA-16 (changed to Mining Area)
MA-12 (adjacent to open water pit)
BHF-8
SA-15 (adjacent to Ledbetter Reservoir) ☆ Photos taken of Bat 1 from across Reservoir
0900 - Participated in Safety MTG and Site orientation w/ Mr. Ott Jackson
☆ MSHA 5000-23 only form of acceptable training @ HGM

☆ When Erasing bat data make sure that CFC Storage.exe says "Disk erased to Sector 1" → Run a check card to be sure that card will record data the next night

☆ Downloaded AnaBat data from All four Bat Monitoring stations and replaced clean memory card in Units.

☆ Red-tailed Hawk observed flying overhead at Bat #4 1230-1300

Romarco/HGM Avian Surveys WMH, WLM, CAL, MB
ARCADIS Project No. B0016630 8/22/11

1345 - 1600 WLM/WMH coordinated with Buba/Pam (Haile) and removed tree limbs via chainsaw from Bat #1 monitoring station. WLM/WMH repositioned the solar panel @ Bat #1 so that it now faces to the south (Ledbetter Reservoir).

1630 Arrive back @ Hotel Lancaster, SC

END of DAY

Romarco/HGM Avian Surveys CAL, WLM
ARCADIS Project No. B0016630 8/23/11

0650 - Arrived @ HGM
0700 - Signed in @ HGM
0715 - Began Avian Surveys

Survey points completed
MA-2
MA-1
MPHF-7
MPHF-8
SA-8
SA-7 (loblolly pine plantation ~ 30-40 yrs)
SA-6 (Blackberry thicket on edge of clearing)
MHF-5 (loblolly pine plantation ~ SA [30-40 yrs])
MMHF-4
MMHF-3
MA-3

1205 - Met up @ Bat #3 (PEM wetland) for coordination of afternoon

1300 - 1600 Scouted two Longleaf Pine stands that David Dumond had indicated were mature longleaf for RCWs. No RCWs were observed. Further, habitat for RCWs to nest in was not observed. Too much hardwood understory, not enough native grasses (no Aristida sp.). * WLM took photos of both LLP habitats. * WMH took GPS tracks/pts in both LLP habitats.

END of Day

Romarco / HGM Avian Surveys — WLM, MB
ARCADIS Project No. B0016630 — 8/24/11

- Arrive @ Haile Gold Mine @ approx. 0630 and signed in.
- Began point counts @ 0700

Point Count Surveys completed

BHF - 10
BHF - 9
SA - 19 (Incorrectly Marked; should be BHF)
BHF - 7
~~BHF - 6~~ BHF - 6 (Hooded warbler observed here)
BHF - 5 (near gene lewellyn rd.)
XFC - 7 (large flock of unknown birds about size of blue grosbeak/brown headed cowbird were observed w/in a dead loblolly pine approx. 10 m SW of XFC - 7)
↳ Brown headed cowbirds

XFC - 8
XFC - 9
XFC - 10
XFC - 11

1200 - 1415 WLM/WMH looked for Bald Eagle habitat and nests (including other raptor nest) along the Little Lynches River. Red shouldered Hawk(2) observed

1500 - 1600 Installed Microphones on AnaBat units
1615 - 1630 - Coordinated w/Ramona and signed out of HGM
1700 - Arrive back in Lancaster, SC Hotel
END of Day [signature]

Romarco / HGM Avian Surveys — WLM/WMH
ARCADIS Project No. B0016630 — 8/25/11

- Arrived @ Haile office @ 0640 and signed in.
- Drove out to Northeastern area of site and began point count surveys

Point counts completed

FF - 9
FF - 10
FF - 11
MPHF - 24 (Habitat is actually Pocosin Scrub on edge of upland mixed pine/HW)
FF - 14 (Habitat should be Silvicultural Area) ~10 yr old loblolly pine stand
FF - 12 (sandy field w/ sparse pines)
FF - 13
MpHF - 26 (change to XFC)
MPHF - 25 (change to XFC)
FF - 16
FF - 15
MMHF - 19

1300 - 1315 Dropped WMH/LAL off for Bald Eagle surveys

Bat files for call
1st 3 #'s are date — L8241700
2nd 4 #'s are time

Romarco / HGM Avian surveys — WLM, MLB
ARCADIS Project No. B0016630 — 8/25/11

Myotis - typically above 40 K
* USE BCID to ID the most general species on a site (Free to Download)

→ BCID will read your data file and generate an excel spreadsheet list of species.

→ Reporting => Romarco will be concerned w/ species located on Duckwood Tailings/Storage facility because that is where chemicals in tailings pond will affect more bats.

* Ask Romarco about temperature data for mine site (NOAA Kershaw, SC ?)

Websites for determining species:
Bat Call Library

* Spectrograph is ANALook format

1530-1600 Downloaded bat data and talked w/ Jay Pino from ARCADIS IT.

1600-1745 Talked about the Haile Gold Mine Avian studies / Bat studies and general permitting requirements with Johnny Pappas.

1745-1830 Re-installed SD cards into AnaBat units and drove back to Lancaster, SC

END of Day

Romarco / HGM Avian Survey — WLM, WMH, CAL, MLB
ARCADIS Project No. B0016630 — 8/26/11

- Signed in @ Haile Gold Mine 0645
- Dropped cars for point count surveys and left WH/MB out @ SA-35

Point Count Surveys completed

MMHF - 11 (old house w/ lots of Bambusa vulgaris surrounding, large post oak) * Photos taken (3)

MMHF - 12 (dry, sandy slope forest on edge of pocosin/BHF)
* (5) Photos taken

MMHF - 13 (changed habitat type to MPHF)
- point located on edge of open water impoundment, and on edge of open field.
* Photos (4) taken

* (2) Photos taken along dam of pond looking @ pond/open water (Xyris sp observed along pond edge)

MMHF - 14 (changed to MPHF - edge of field and hardwood forest) * Very good bird diversity/abundance at this site.
* (4) Photos taken

* (3) Photos taken of representative BHF (Fall line sandhills) stream forest

* (1) Photo taken of mixed mesic HW slope on northern side of aforementioned drainage.

Romarco / HGM Avian Surveys — CAL, WLM

ARCADIS Project No. B0016630 — 8/26/11

Point counts completed

MMHF-15 (changed habitat to MPHF)

★ (4) Photos taken in mixed pine/HW adjacent to woods road

MMHF-16 (Habitat changed to Pocosin/BHF)

★ Very dense wetland w/ many laurel leaf greenbrier vines and shrubs (titi, sweet bay, red maple, American holly) Canopy dominated by tulip poplar / loblolly pine / Nyssa biflora)

★ Sphagnum moss and sedges present in herb layer. Also river cane present.

★ Photos (3) taken in wetland.

MMHF-18 (Water oak, Persimmon, Grape vine, Vaccinium sp.)

★ Photos (4) taken in water oak grove

1100-1130 Gathered AnaBat Cards for data download ★ Ledbetter (Bat 2) did not have any bat calls recorded

★ Remember ★

- when changing the time period that the AnaBat will record, you must format the card and re-initialise CF ★ But remember to be sure to download all data prior to formatting!

1446 - Began Bald Eagle search along Little Lynches River w/in floodplain

Romarco / HGM Avian Survey — CAL, WMH, WLM

ARCADIS Project No. B0016630 — 8/26/2011

Bald Eagle Investigation

Vegetation:

Green Ash
American Elm
American Sycamore
Sweet gum
American Holly
Flowering dogwood
Huckleberry
Ironwood
White oak
American Beech
Tulip poplar
Mountain laurel

L. Lynches River

★ Mature forested Alluvial river bottom w/ some trees having DBH >2.5 ft

★ GPS Pt BAEA pt 5 (2) Photos taken upstream/downstream

★ GPS Pt ⇒ BAEA pt 6 (2) photo taken

★ Signs of wild boar, raccoon observed (tracks, droppings)

★ GPS Pt ⇒ BAEA 7 (@ confluence of perennial stream w/ Little Lynches River (★ Photo taken)

★ Several representative photos taken of Piedmont Alluvial River Bottom habitat.

★ GPS Pt ⇒ BAEA 8 taken @ large loblolly pine approx. 3 ft DBH, (2) Photos taken

★ GPS pt ⇒ BAEA 9 taken @ 2nd large loblolly pine approx. 2.5 ft DBH (approx. 60 ft E of tree 1)

★ (2) Photos taken along camp branch - perennial stream (~25 ft wide / 6-7 ft deep)

- Belted Kingfisher heard w/in L. Lynches River

★ GPS Pt ⇒ BAEA 10 is located west/NW of end of permit boundary

Romarco / HGM Avian Surveys WLM, WMH, CAL

ARCADIS Project No. B0016630 8/26/11

- Sign out of Haile Mine site @ 1625
- debriefed Ramona Schnieder on Bald Eagle survey along Little Lynches River
  - → No Eagles or Eagle nests were observed
  - ★ No other raptors/nests were observed

1715 - Arrive back @ Hotel Lancaster, SC

END of DAY

Will Mo[illegible]

Romarco / HGM Avian Surveys MLB, WLM

ARCADIS Project No B0016630 8/27/11

- Signed in @ Haile Gold Mine 0640
- Began pt counts @ NE side of Duckwood TSF area

Point Count Surveys Completed

MPHF-30 (small clearing in MPH forest; some mature long leaf observed along woods road)

MPHF-29 (Very quiet site; Mixed pine/HW on side of slope/draw ★ No wetlands/stream)

XFC-24 (along sandy woods road)
★(2) photos taken in XFC habitat

XFC-25 (along sandy road near church/cemetery)

MPHF-28 (Mixed pine/HW slope forest)
★(2) photos taken facing SW/SE
Veg: white oak, loblolly pine, blackjack oak, mockernut hickory, southern red oak, sparkleberry, grapevine tulip poplar
★Red-tail hawk observed along way to MPHF-27

MPHF-27 (MPH along side a ephemeral drainage)

FF-7 (Kudzu patch/field - very dense) ★(2) photos taken

FF-6 (Kudzu patch/field " ")

FF-5 (Kudzu patch on edge of open field)

FF-4 (Kudzu field/patch adjacent to 4 wheeler trail)

FF-3 (" " " ")

1130-1200 Download data from Bat 1

1245-1400 Download data from Bat 3, 2, 4

1530 - Arrived back @ Hotel Lancaster, SC

Romarco / HGM Avian Surveys — MLB, WLM

ARCADIS Project No. B0016630 — 8/27/11

1700 - 1800 WLM/WMH QA/QC our bald eagle search map document and GPS pts. Also QA/QC RCW Longleaf Pine GPS Pts.

★ (3) GPS Pts taken by CAL/WMH on lower river tract were:
- BAEA ~~Bae~~ 11
- BAEA 3
- BAEA 4 (nearest to US Hwy 601)

★ RCW / Long Leaf Pine GPS Pts:
- RCW-LLP-1 ⇒
- LLP-TO-SH ⇒ Longleaf Pine - turkey oak Sandhill
- RCW-LLP-EAST
- Mature LLP 1
- Mature LLP 2

Track: "RCW-LLP Track" (Eastern portion)
- RCW-LLP-West (in between dendritic drainge)

END of DAY

Will Mark

Romarco / HGM Avian Surveys — WLM/WMH

ARCADIS Project No. B0016630 — 8/28/2011

- Arrive @ 0640
- Signed in @ Haile Gold Mine office
- Dropped MLB/CAL off @ HGM Road 0700
- ★ Champion Gate [2156] ⇒ Lock combination

Point counts completed

SA-17 (Moved point count from middle of Haile Gold Mine Rd. to the north into a clear-cut silvicultural area).
★ Representative photos taken (3)
★ Good bird diversity @ this site.

SA-18 (changed habitat type to XFC; longleaf pine / turkey oak scrub forest)

XFC-6 (changed habitat to SA; clear cut area)

XFC-5 (xeric slope forest; good bird diversity)
★ (2) Photos taken @ Pt count site

XFC-4 (changed habitat to BHF; sandhills follow drainage)

XFC-3 (changed habitat to BHF)

XFC-2 " " " "

XFC-1 " " " "

BHF-3

BHF-4 (changed to XFC)
★ Willard/Will were shot @ by a man w/ two different guns. He was staying in the dilapidated house to the S/SE of point count.

★ See following Page for more details ★

Romarco / HGM Avian Survey — WLM / WMH

ARCADIS Project No. B0016630 — 8/28/2011

- At approx 1125-1130 Willow Hetrick and Will Medlin were walking to Avian Point count BHF-4 from BHF-3. After crossing behind a dilapidated house and causing dogs (~7) to bark, WMH/WLM entered Longleaf Pine/Turkey oak scrub forest. At this point, someone exited the dilapidated house and screamed/yelled. There was some commotion and WLM/WMH stopped and stayed quiet. 1 gunshot was fired directly into the woods where WLM/WMH were standing. WLM/WMH remained quiet. A 2nd gunshot was fired much closer (approx. 10 ft over WLM head) and WLM immediately shouted "Hello!", ID'd himself as a worker for HGM. A man was observed standing in his underwear holding a rifle on the porch of the dilapidated house. He said that he did not mean to shoot at Haile employees, but that some people had been trying to steal things (4 wheeler) from him although no 4-wheeler was observed @ his old property (now HGM property). Subsequently, WLM/WMH finished point count and walked out the driveway. The man ("Frank") then pulled up and gave WLM/WMH a ride to the ARCADIS truck. WLM/WMH filed statements w/ HGM Security. The Lancaster Police Dept was not called while ARCADIS talked to Security.

Romarco / HGM Avian Surveys — WLM / WMH / CAL / MLB

ARCADIS Project No. B0016630 — 8/28/11

1400 - Departed Haile Mine site after briefing Security guards (Jeff Jackson)

1500 - 1700 ARCADIS Field crew drove to Carolina Sandhills National Wildlife Refuge to observe Red-Cockaded Woodpecker nesting and foraging habitat to use as a reference based on habitats observed on Haile Gold Mine site. Several RCW trees (painted w/ white stripes) were observed - sap running down the trunk and obvious cavity seen.
- Photos taken of Nesting / foraging habitat and of dry pond.

1745 - Arrive back @ Hotel Lancaster, SC
1745-1900 Spoke w/ Bonnie Bynum regarding earlier shooting incident.

1915 - 2100 Planning / coordination / Safety discussions
2200 - closed up field notes and downloaded Project photos

END OF DAY

[signature]

Romarco / HGM Avian Surveys — CAL / WLM

ARCADIS project No. B0016630 — 8/29/11

- Arrive @ Haile Gold Mine @ 0655 and signed in.
- Met w/ Johnny Poppas / OTT Jackson to discuss previous days shooting incident (WLM/WMH)

Point Count Surveys Completed

SA-5 (silvicultural area (loblolly pine) approx. 25-35 yr old stand)
- ☆ Photos taken (4) @ point count location
- ☆ Bill Clem spoke w/ OTT Jackson on the telephone during the point count.

SA-4 (silvicultural area confirmed)

SA-3 " " "

SA-2 " " "

SA-1 (edge of silvicultural area / along roadside on North Side of paved road)
- ☆ Point Count near Camp Branch

1100-1200 Downloaded data from Bat 4, Bat 3 and talked w/ Willow about Ledbetter Rd. (Bat 2) that did not collect bat data. Bat 3 also did not collect data. Error message: "CFC card has been erased, do you want to retrieve data?" Yes → makes batfile.dat

☆ MLB suggested updating the firmware on the CF card from 4055g to 4056g

Romarco / HGM Avian Surveys & Bat Monitoring — WLM, MLB

ARCADIS Project No. B0016630 — 8/29/11

Pg. 81 in AnaBat SD Manual shows refers to cf card.

Pg. 89 upgrade firmware
- copy Firmware.hex program
- save in same directory as Data.Dat (whatever the drive of the CF card is)
- to upgrade AnaBat
  1) insert card into unit
  2) hold down "Save" button continuously
  3) Press "power" while holding "Save" down
  4) 3 lights come on
  5) when you hear a "beep" then you can release "Save" button.
  6) After the three-tone "beep", the AnaBat Unit has accepted the firmware upgrade.

☆ SD2 AnaBat unit latest firmware => 4056g

☆ SD1 " " " " => 4079g

1630-1715 Met and talked with Mr. David DuMont about birds and plants seen during his and our field work on HGM

Bat 3 in wetland grass => Maidencane (Panicum hemitomon)

1730-1830 Worked on Bat 2 CF card connection

1840-1920 Drove to Camden, SC to get a Serial-USB cable (9 prong) for the AnaBat unit.

Romarco / HGM Avian Survey
+ Bat Monitoring
ARCADIS Project No. B0016630

CAL / MLB /
WMH / WLM
8/29/11

1930 - 2045 worked with AnuBat units @ Haile Gold Mine to try to fix problem with Bat 2 and Bat 3 skipping nights recording.
* Didn't fix problem → just re-inserted card into both units.

2100 - 2230 Drove to hotel (Sheraton) Charlotte, NC

END of Day

Will Mat

Romarco / HGM Bat Monitoring

ARCADIS Project No. B0016630

9/30/11

0730 - received call from HGM security
0830 - spoke to Lancaster County Sheriff's deputy and gave verbal statement.
0900 - Met @ Hotel lobby
0945 - Drove to Haile Gold Mine (Kershaw, SC)
* Stopped to get a serial port connector from Radioshack.
1130 - 1300 Downloaded all AnuBat data (Bat 1 - Bat 4) * Bat 2 did not record data

Note:
Bat will be divided up by Station and by species → each station will have BCID run on it and then one master spreadsheet for data will be created and each site will have its own tab

1305 - 1400 WMH/WLM gave written statements to Lancaster Sheriff's deputy (Josh Usher)

1400 - 1530 Analyzed AnuBat (Bat 2) Firmware and tried again to connect AnuBat unit to computer via serial cable → Computer would not recognize AnuBat.

1600 - 1700 Drove to ARCADIS Charlotte office
1700 - 1800 Worked on Xcell spreadsheets and input some Avian point count data.

END of DAY

WLM

Romarco / HGM Bat Monitoring — MLB/WLM

ARCADIS Project No. B0016630 — 8/31/4

0700 - Depart Hotel Charlotte, NC

0845 - Arrive Haile Gold Mine and signed in

0900 - 1030 Downloaded AnaBat Data

- ★ Bat 2 - did not record data
- ★ Bat 3 - ✓
- ★ Bat 4 - ✓ (4055y firmware still on AnaBat Unit) ↳ 4056g is newest firmware version.
- ★ Bat 1 -

★ Checked all CF cards and they are 4GB SanDisk 30 mb/sec Ultra

★ writing speed = (should be 200x)

1045 - 1130 Worked w/ Titley Scientific to order a new AnaBat SD2 unit to replace SD1 @ Bat 2 (Steve? Kim Lovingood)

Bat 1, Firm 4056g, div 16
Bat 2, Firm 4019g, div 16
Bat 3, Firm 4056g, div 8
Bat 4, Firm 4055y, div 8
★ Reset all units to division ratio (8)

1130 - 1200 Removed Bat 2 AnaBat unit and went to meet w/ Buba and Pam

dterry@romarco.com
plewis@romarco.com

1240 - 1305 Showed Buba / Pam how to install the new AnaBat unit once it arrives.

Romarco / HGM Bat Monitoring — MLB, WLM

ARCADIS Project No. B0016630 — 8/31/4

1330 - Depart Haile Gold Mine

1900 - Arrive @ ARCADIS Atlanta, GA office

ARCADIS Truck Mileage

Start 8/17 100927

END 8/31 102689

★ Fix headlight driver's side

★ Oil change needed

END of DAY

[illegible]

Comprehensive Baseline Wildlife and Aquatic Resources Report

Haile Gold Mine, Inc.

Appendix C

Raptor/Large Bird and Special Status Avian Species Survey Field Notes and Photos

ARCADIS

Appendix C
Project Photographs
August 20-31, 2011 &
October 27-30, 2011

Photographs of Potential Raptor/Large Bird Nests

Photograph 1.
American beech tree within a small grove of holly in small stream forest habitat along the Little Lynches River. Potential Raptor Nest 2 (PN2) was located approximately 35 feet above ground level in mid-story portion of this tree.

Photograph 2.
Close-up of PN2. Nest was constructed primarily of leaves and small sticks. No raptor observed.

Note: Could not clearly discern Potential Raptor Nest 1 (PN1) from digital photographs taken on October 28, 2011.

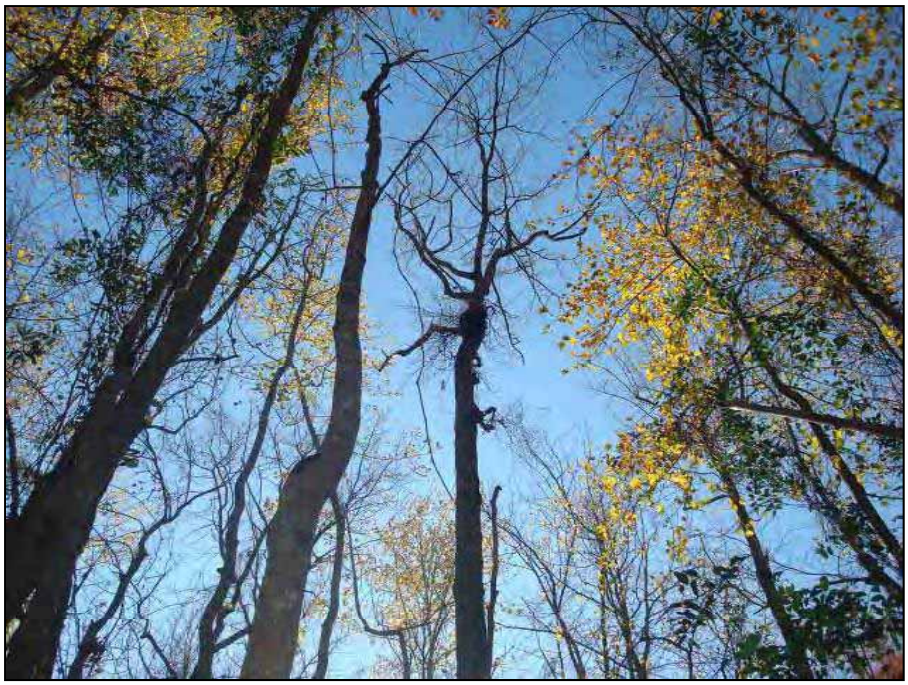
Abbreviations: PN1 = Potential Raptor Nest 1 (0539531, 3826410); PN2 = Potential raptor nest 2 (0539376, 3726776); PN3 = Potential Raptor Nest 3 (0541095, 3824639); PN4 = Potential Raptor Nest 4 (0544548, 3826193).

ARCADIS

Appendix C
Project Photographs
August 20-31, 2011 &
October 27-30, 2011

Photographs of Potential Raptor/Large Bird Nests

Photograph 3.
Potential raptor nest 3 (PN3) was located approximately 30 feet above ground level. Nest located in small stream forest habitat near confluence of Haile Gold Mine Creek and Little Lynches River.



Photograph 4.
Swamp tupelo tree in streamhead pocosin habitat along the Unnamed Tributary. Potential raptor nest 4 (PN4) was located about 50 feet above ground level.

Note: Could not clearly discern Potential Raptor Nest 1 (PN1) from digital photographs taken on October 28, 2011.

Abbreviations: PN1 = Potential Raptor Nest 1 (0539531, 3826410); PN2 = Potential raptor nest 2 (0539376, 3726776); PN3 = Potential Raptor Nest 3 (0541095, 3824639); PN4 = Potential Raptor Nest 4 (0544548, 3826193).

ARCADIS

Appendix C
Project Photographs
August 20-31, 2011 &
October 27-30, 2011

Photographs of Red-Cockaded Woodpecker Survey Areas

Photograph 5.
Managed tree plantation habitat (active loblolly pine plantation) located in the north-northwest portion of the property boundary. This photo was taken within **Area 1** during the Red-cockaded Woodpecker (RCWO) survey.

Photograph 6.
Xeric sandhill scrub community habitat (pine-scrub oak sandhill) located in the central portion of the property boundary. This photo was taken within **Area 2** during the RCWO survey.

Abbreviation: RCWO = Red-cockaded Woodpecker.

ARCADIS

Appendix C
Project Photographs
August 20-31, 2011 &
October 27-30, 2011

Photographs of Red-Cockaded Woodpecker Survey Areas

Photograph 7.
Managed tree plantation habitat (active loblolly pine plantation) located in the western side of the property boundary. This photo was taken within **Area 3** during the RCWO survey.

Photograph 8.
Xeric sandhill scrub community habitat (pine-scrub oak sandhill) located on the east-southeast side of the property boundary. This photo was taken within **Area 4** during the RCWO survey.

Abbreviation: RCWO = Red-cockaded Woodpecker.

ARCADIS

Appendix C
Project Photographs
August 20-31, 2011 &
October 27-30, 2011

Photographs of
Bald Eagle Survey Areas

Photograph 9.
Little Lynches River located on the southwest side of the property boundary near the confluence with Camp Branch. Bald Eagle (BAEA) surveys were conducted along the portion Little Lynches River adjacent to and beyond the property boundary.

Photograph 10.
Little Lynches River located downstream of the property boundary .

Abbreviation: BAEA = Bald Eagle.

ARCADIS

Appendix C
Project Photographs
August 20-31, 2011 &
October 27-30, 2011

Photographs of
Bald Eagle Survey Areas

Photograph 11.
Streamhead pocosin habitat and open water habitat (Ledbetter Reservoir) located on the central portion of the property boundary . Mature trees surrounding Ledbetter Reservoir were surveyed for BAEA and suitable habitat presence .

Photograph 12.
Streamhead pocosin habitat (impoundment) and former mining pit located on the northeast portion of the property boundary .

Abbreviation: BAEA = Bald Eagle.

ARCADIS

Appendix C
Project Photographs
August 20-31, 2011 &
October 27-30, 2011

Photographs of
Bald Eagle Survey Areas

Photograph 13.
Small stream forest habitat found along Camp Branch in the property boundary (Camp Branch is not pictured).

Photograph 14.
Small stream forest habitat found along Haile Gold Mine Creek with the creek in the foreground.

ARCADIS

Appendix C
Project Photographs
August 20-31, 2011 &
October 27-30, 2011

Photographs of
Bald Eagle Survey Areas

Photograph 15.
Small stream forest habitat found along Unnamed Tributary. Tributary not pictured.

Photograph 16.
Small stream forest habitat found along Buffalo Creek.

ARCADIS Project No. B0016630 Willow Hetrick, WCM

HGM Avian Surveys 8/18/11

- Willow took GPS pt "Bat 1" @ a small tulip poplar near emergent wetland and next to woodpecker cavity tree
  ★ (2) Photos taken
- GPS Pt "Bat 2" taken adjacent to Pt #91
  ★ (3) Photos taken
  ★ Noticeably pine tree is potential tower
- GPS Pt "Bat 3" taken on East side of Ledbetter Reservoir
  ★ (3) Photos taken
  ★ Several Carolina wrens observed
- GPS Pt "Bat 4" taken in emergent wetland @ Nyssa biflora tree.
  ★ Several Photos taken
- GPS Pt "Bat 5" taken @ old homesite located in fallow field → Receiver can be put on Bradford pear tree in yard.
  ★ Photos taken

HGM Telephone # 803-475-1220
Bill Clem cell # 803-246-0785
Lock combo: 1220 (GATE)
Lock Combo: 446 (HGM) → Anabat Locks

ARCADIS Project No. B0016630 Willow Hetrick, Will Medlin

HGM Avian Surveys / Bat Surveys 8/18/11

★ 1430 - 1700 set up and assembled Four Anabat Recording devices.

1700 - Depart Haile Gold Mine Site
1735 - Arrive @ Jameson Inn Lancaster, SC

1805 - 1900 Dinner
1915 - 2000 Home Depot / Wal-Mart

END of DAY

Will Medlin

Romarco - HGM
WM, WH
Avian Surveys / Bat Surveys
8/19/2011
0500 - Arrived at Haile Gold Mine Site

1st Point Count location MA-7 (0530)
Time Start 0531
Time End 0541
☆ Crickets / Insects / Mine noise prevalent
- Species
No species observed visually / aurally

2nd Pt Count location MA-8 (0550)
Time Start 0551
Time End 0601
Species
No species observed
- Mine Noise / insect noise prevalent

3rd Pt Count location MA-9 (0608)
Time Start 0608
Time End 0618
☆ Mine / Road Noise / insect noise
Species
☆ No Species observed
(American crow)

Romarco - HGM
WCM, WH
Avian / Bat Survey
8/19/11

4th Point Count Location MA-10
Time Start 0627
Time End 0637
☆ Mine noise / insect noise
Species
American Crow II
Tufted titmouse III
Chipping Sparrow II
Northern Cardinal II
Carolina wren II

5th Point Count Location MA-6 (0759)
Time Start 0807
Time End 0817
☆ See ~~notes~~ Datasheet for species

6th Point Count Site MA-5 (0835)
Time Start 0836
Time End 0846
☆ Adjacent to Sediment Pond #4
Species
White-eyed vireo II
Carolina wren
Pileated woodpecker
Barn Swallow II
Blue Jay
Tufted titmouse
Carolina Chickadee
Mourning dove
Eastern Kingbird

Romarco - HGM
ARCADIS Proj. No B0016630
HGM - Avian Surveys

WLM, WMH

8/19/2011

7th Point Count Location MA-4

Time Start 0903

Time End 0913

Species

Blue Grosbeak II
Mourning dove III
Carolina chickadee II
Tufted titmouse
Downey woodpecker
Barn swallow
Red bellied woodpecker
white eyed vireo

8th Point Count Location SA-13 → MA-~~3~~#

☆ Area has been cleared and contains mine trucks and equipment. Groundwater well (DMW4) located adjacent to point count site.

Time Start 0927

Time END 0937

Species

Carolina Wren I
Blue grosbeak II
Eastern Towhee
Northern Bobwhite
Downy woodpecker
American crow
Mourning dove
Praire warbler

ARCADIS Project No. B0016630 Task 4

WLM, WMH

Romarco - HGM Avian Surveys

8/19/11

9th Point Count Location SA-14 → MA #

☆ Mining Area w/ anthropogenic noise

Time start 0950

Time End 1000

Species

Prairie warbler II
Tufted titmouse
Barn swallow II
Chipping sparrow
Northern bobwhite
Mourning dove

10th Point Count location MA-11

☆ Insect and mine operation noise in background

Time Start 1031

Time End 1041

Species

Carolina wren II
Chipping sparrow
Blue grosbeak

11th Point Count Location MPHF-9

☆ Some mine noise in area
☆ Adjacent to Ledbetter Reservoir

Time Start 1051

Time End 1101

Species

Eastern Kingbird
Carolina wren II
Carolina Chickadee II
Tufted titmouse
Northern cardinal II

END of Day
[signature]

☆ Attempted to set up AnnBat station "Bat 1" but failed due to band clamps - Arrived @ Hotel 1630

ARCADIS Project No. B0016630 WCM, WMH

HGM - Avian Surveys 8/20/2011

- Arrive @ Site @ 0620

Point Count
Sites completed

MPHF - 3
MPHF - 2
MPHF - 1 * Photos taken
FF - 1 * Area is not a fallow field, but is a small forested wetland depression. changed habitat to BHF.
BHF - 1
BHF - 2
FF - 2
MPHF - 5
MMHF - 2
MMHF - 1
MPHF - 4

1200 - 1300 Setup and installed AnaBat #1 @ beaver
* Spoke to HGM Security guard (Mr. Morgan) regarding some Kids on 4-wheelers that were trespassing on Haile property near Bat #1
* Set up and installed AnaBat Unit @ Bat #2 adjacent to Ledbetter Reservoir 1400 - 1605

ARCADIS Project No. B0016630 WCM, WMH

HGM - Avian Surveys 8/20/2011

1615 - 1735 Setup and installed AnaBat Unit @ Bat #4 in field @ old homesite. Bradford Pear is tree that AnaBat is in.

1815 - Arrive back @ Hotel Lancaster, SC
1915 - 200 - Home Depot and Mapping discussion

END of DAY

Will Mark

ARCADIS Project No. B0016630 WLM, WMH

Romaco/HGM - Avian Survey 8/21/2011

- Arrived @ Site 0615

- Began Pt Count @ SA-31 (Loblolly Pine Plantation)

Completed Pt Counts

SA-31
SA-30
SA-29
SA-28
SA-27
SA-26
PFW-4
PFW-3
PFW-2
PFW-1

☆ Went to Charlotte for Afternoon/Evening to Pick up other ARCADIS biologists from Airport, and to get supplies

2300 - Arrive back @ Hotel in Lancaster, SC

END of Day

Will

ARCADIS Project No. B0016630 WLM, WMH, CL, MB

8/22/2011

- Arrived @ site at approx 0655
☆ Weather is foggy w/ slight west breeze
- Started Point Count @ SA-16 (MA is habitat)

Point Counts Completed

SA-16 (changed to Mining Area)
MA-12 (adjacent to open water pit)
BHF-8
SA-15 (adjacent to Ledbetter Reservoir) ☆ Photos taken of Bat 1 from across Reservoir
0900 - Participated in Safety MTG and Site orientation w/ Mr. Ott Jackson
☆ MSHA 5000-23 only form of acceptable training @ HGM

☆ When Erasing bat data make sure that CFC Storage.exe says "Disk erased to Sector 1" → Run a check card to be sure that card will record data the next night

☆ Downloaded AnaBat data from All four Bat Monitoring stations and replaced clean memory card in Units.

☆ Red-tailed Hawk observed flying overhead at Bat #4 1230-1300

Romarco/HGM Avian Surveys WMH, WLM, CAL, MB
ARCADIS Project No. B0016630 8/22/11

1345 - 1600 WLM/WMH coordinated with Buba/Pam (Haile) and removed tree limbs via chainsaw from Bat #1 monitoring station. WLM/WMH repositioned the solar panel @ Bat #1 so that it now faces to the south (Ledbetter Reservoir).

1630 Arrive back @ Hotel Lancaster, SC

END of DAY

Romarco/HGM Avian Surveys CAL, WLM
ARCADIS Project No. B0016630 8/23/11

0650 - Arrived @ HGM
0700 - Signed in @ HGM
0715 - Began Avian Surveys

Survey points completed
MA-2
MA-1
MPHF-7
MPHF-8
SA-8
SA-7 (loblolly pine plantation ~ 30-40 yrs)
SA-6 (Blackberry thicket on edge of clearing)
MHF-5 (loblolly pine plantation ~ SA [30-40 yrs])
MMHF-4
MMHF-3
MA-3

1205 - Met up @ Bat #3 (PEM wetland) for coordination of afternoon

1300 - 1600 Scouted two Longleaf Pine stands that David Dumond had indicated were mature longleaf for RCWs. No RCWs were observed. Further, habitat for RCWs to nest in was not observed. Too much hardwood understory, not enough native grasses (no Aristida sp.). * WLM took photos of both LLP habitats. * WMH took GPS tracks/pts in both LLP habitats.

END of Day

Romarco / HGM Avian Surveys — WLM, MB
ARCADIS Project No. B0016630 — 8/24/11

- Arrive @ Haile Gold Mine @ approx. 0630 and signed in.
- Began point counts @ 0700

Point Count Surveys completed

BHF - 10
BHF - 9
SA - 19 (Incorrectly Marked; should be BHF)
BHF - 7
~~BHF - 6~~ BHF - 6 (Hooded warbler observed here)
BHF - 5 (near gene lewellyn rd.)
XFC - 7 (large flock of unknown birds about size of blue grosbeak/brown headed cowbird were observed w/in a dead loblolly pine approx. 10 m SW of XFC - 7)
↳ Brown headed cowbirds

XFC - 8
XFC - 9
XFC - 10
XFC - 11

1200 - 1415 WLM/WMH looked for Bald Eagle habitat and nests (including other raptor nest) along the Little Lynches River. Red shouldered Hawk(2) observed

1500 - 1600 Installed Microphones on AnaBat units
1615 - 1630 - Coordinated w/Ramona and signed out of HGM
1700 - Arrive back in Lancaster, SC Hotel
END of Day [signature]

Romarco / HGM Avian Surveys — WLM/WMH
ARCADIS Project No. B0016630 — 8/25/11

- Arrived @ Haile office @ 0640 and signed in.
- Drove out to Northeastern area of site and began point count surveys

Point counts completed

FF - 9
FF - 10
FF - 11
MPHF - 24 (Habitat is actually Pocosin Scrub on edge of upland mixed pine/HW)
FF - 14 (Habitat should be Silvicultural Area) ~10 yr old loblolly pine stand
FF - 12 (sandy field w/ sparse pines)
FF - 13
MpHF - 26 (change to XFC)
MPHF - 25 (change to XFC)
FF - 16
FF - 15
MMHF - 19

1300 - 1315 Dropped WMH/LAL off for Bald Eagle surveys

Bat files for call
1st 3 #'s are date — L8241700
2nd 4 #'s are time

Romarco / HGM Avian surveys — WLM, MLB
ARCADIS Project No. B0016630 — 8/25/11

Myotis - typically above 40 K
* USE BCID to ID the most general species on a site (Free to Download)

→ BCID will read your data file and generate an excel spreadsheet list of species.

→ Reporting => Romarco will be concerned w/ species located on Duckwood Tailings/Storage facility because that is where chemicals in tailings pond will affect more bats.

* Ask Romarco about temperature data for mine site (NOAA Kershaw, SC ?)

Websites for determining species:
Bat Call Library

* Spectrograph is ANALook format

1530-1600 Downloaded bat data and talked w/ Jay Pino from ARCADIS IT.

1600-1745 Talked about the Haile Gold Mine Avian studies / Bat studies and general permitting requirements with Johnny Pappas.

1745-1830 Re-installed SD cards into AnaBat units and drove back to Lancaster, SC

END of Day

Romarco / HGM Avian Survey — WLM, WMH, CAL, MLB
ARCADIS Project No. B0016630 — 8/26/11

- Signed in @ Haile Gold Mine 0645
- Dropped cars for point count surveys and left WH/MB out @ SA-35

Point Count Surveys completed

MMHF - 11 (old house w/ lots of Bambusa vulgaris surrounding, large post oak) * Photos taken (3)

MMHF - 12 (dry, sandy slope forest on edge of pocosin/BHF)
* (5) Photos taken

MMHF - 13 (changed habitat type to MPHF)
- point located on edge of open water impoundment, and on edge of open field.
* Photos (4) taken

* (2) Photos taken along dam of pond looking @ pond/open water (Xyris sp observed along pond edge)

MMHF - 14 (changed to MPHF - edge of field and hardwood forest) * Very good bird diversity/abundance at this site.
* (4) Photos taken

* (3) Photos taken of representative BHF (Fall line sandhills) stream forest

* (1) Photo taken of mixed mesic HW slope on northern side of aforementioned drainage.

Romarco / HGM Avian Surveys — CAL, WLM

ARCADIS Project No. B0016630 — 8/26/11

Point counts completed

MMHF-15 (changed habitat to MPHF)

★ (4) Photos taken in mixed pine/HW adjacent to woods road

MMHF-16 (Habitat changed to Pocosin/BHF)

★ Very dense wetland w/ many laurel leaf greenbrier vines and shrubs (titi, sweet bay, red maple, American holly) Canopy dominated by tulip poplar / loblolly pine / Nyssa biflora)

★ Sphagnum moss and sedges present in herb layer. Also river cane present.

★ Photos (3) taken in wetland.

MMHF-18 (Water oak, Persimmon, Grape vine, Vaccinium sp.)

★ Photos (4) taken in water oak grove

1100-1130 Gathered AnaBat Cards for data download ★ Ledbetter (Bat 2) did not have any bat calls recorded

★ Remember ★

- when changing the time period that the AnaBat will record, you must format the card and re-initialise CF ★ But remember to be sure to download all data prior to formatting!

1446 - Began Bald Eagle search along Little Lynches River w/in floodplain

Romarco / HGM Avian Survey — CAL, WMH, WLM

ARCADIS Project No. B0016630 — 8/26/2011

Bald Eagle Investigation

Vegetation:

Green Ash
American Elm
American Sycamore
Sweet gum
American Holly
Flowering dogwood
Huckleberry
Ironwood
White oak
American Beech
Tulip poplar
Mountain laurel

L. Lynches River

★ Mature forested Alluvial river bottom w/ some trees having DBH >2.5 ft

★ GPS Pt BAEA pt 5 (2) Photos taken upstream/downstream

★ GPS Pt ⇒ BAEA pt 6 (2) photo taken

★ Signs of wild boar, raccoon observed (tracks, droppings)

★ GPS Pt ⇒ BAEA 7 (@ confluence of perennial stream w/ Little Lynches River (★ Photo taken)

★ Several representative photos taken of Piedmont Alluvial River Bottom habitat.

★ GPS Pt ⇒ BAEA 8 taken @ large loblolly pine approx. 3 ft DBH, (2) Photos taken

★ GPS pt ⇒ BAEA 9 taken @ 2nd large loblolly pine approx. 2.5 ft DBH (approx. 60 ft E of tree 1)

★ (2) Photos taken along camp branch - perennial stream (~25 ft wide / 6-7 ft deep)

- Belted Kingfisher heard w/in L. Lynches River

★ GPS Pt ⇒ BAEA 10 is located west/NW of end of permit boundary

Romarco / HGM Avian Surveys WLM, WMH, CAL

ARCADIS Project No. B0016630 8/26/11

- Sign out of Haile Mine site @ 1625
- debriefed Ramona Schnieder on Bald Eagle survey along Little Lynches River
  - → No Eagles or Eagle nests were observed
  - ★ No other raptors/nests were observed

1715 - Arrive back @ Hotel Lancaster, SC

END of DAY

Will Mo[illegible]

Romarco / HGM Avian Surveys MLB, WLM

ARCADIS Project No B0016630 8/27/11

- Signed in @ Haile Gold Mine 0640
- Began pt counts @ NE side of Duckwood TSF area

Point Count Surveys Completed

MPHF-30 (small clearing in MPH forest; some mature long leaf observed along woods road)

MPHF-29 (Very quiet site; Mixed pine/HW on side of slope/draw ★ No wetlands/stream)

XFC-24 (along sandy woods road)
★(2) photos taken in XFC habitat

XFC-25 (along sandy road near church/cemetery)

MPHF-28 (Mixed pine/HW slope forest)
★(2) photos taken facing SW/SE
Veg: white oak, loblolly pine, blackjack oak, mockernut hickory, southern red oak, sparkleberry, grapevine tulip poplar
★Red-tail hawk observed along way to MPHF-27

MPHF-27 (MPH along side a ephemeral drainage)

FF-7 (Kudzu patch/field - very dense) ★(2) photos taken

FF-6 (Kudzu patch/field " ")

FF-5 (Kudzu patch on edge of open field)

FF-4 (Kudzu field/patch adjacent to 4 wheeler trail)

FF-3 (" " " ")

1130-1200 Download data from Bat 1

1245-1400 Download data from Bat 3, 2, 4

1530 - Arrived back @ Hotel Lancaster, SC

Romarco / HGM Avian Surveys — MLB, WLM

ARCADIS Project No. B0016630 — 8/27/11

1700 - 1800 WLM/WMH QA/QC our bald eagle search map document and GPS pts. Also QA/QC RCW Longleaf Pine GPS Pts.

★ (3) GPS Pts taken by CAL/WMH on lower river tract were:
- BAEA ~~Bae~~ 11
- BAEA 3
- BAEA 4 (nearest to US Hwy 601)

★ RCW / Long Leaf Pine GPS Pts:
- RCW-LLP-1 ⇒
- LLP-TO-SH ⇒ Longleaf Pine - turkey oak Sandhill
- RCW-LLP-EAST
- Mature LLP 1
- Mature LLP 2

Track: "RCW-LLP Track" (Eastern portion)
- RCW-LLP-West (in between dendritic drainge)

END of DAY

Will Mark

Romarco / HGM Avian Surveys — WLM/WMH

ARCADIS Project No. B0016630 — 8/28/2011

- Arrive @ 0640
- Signed in @ Haile Gold Mine office
- Dropped MLB/CAL off @ HGM Road 0700
- ★ Champion Gate [2156] ⇒ Lock combination

Point counts completed

SA-17 (Moved point count from middle of Haile Gold Mine Rd. to the north into a clear-cut silvicultural area).
★ Representative photos taken (3)
★ Good bird diversity @ this site.

SA-18 (changed habitat type to XFC; longleaf pine / turkey oak scrub forest)

XFC-6 (changed habitat to SA; clear cut area)

XFC-5 (xeric slope forest; good bird diversity)
★ (2) Photos taken @ Pt count site

XFC-4 (changed habitat to BHF; sandhills follow drainage)

XFC-3 (changed habitat to BHF)

XFC-2 " " " "

XFC-1 " " " "

BHF-3

BHF-4 (changed to XFC)
★ Willard/Will were shot @ by a man w/ two different guns. He was staying in the dilapidated house to the S/SE of point count.

★ See following Page for more details ★

Romarco / HGM Avian Survey — WLM / WMH

ARCADIS Project No. B0016630 — 8/28/2011

- At approx 1125-1130 Willow Hetrick and Will Medlin were walking to Avian Point count BHF-4 from BHF-3. After crossing behind a dilapidated house and causing dogs (~7) to bark, WMH/WLM entered Longleaf Pine/Turkey oak scrub forest. At this point, someone exited the dilapidated house and screamed/yelled. There was some commotion and WLM/WMH stopped and stayed quiet. 1 gunshot was fired directly into the woods where WLM/WMH were standing. WLM/WMH remained quiet. A 2nd gunshot was fired much closer (approx. 10 ft over WLM head) and WLM immediately shouted "Hello!", ID'd himself as a worker for HGM. A man was observed standing in his underwear holding a rifle on the porch of the dilapidated house. He said that he did not mean to shoot at Haile employees, but that some people had been trying to steal things (4 wheeler) from him although no 4-wheeler was observed @ his old property (now HGM property). Subsequently, WLM/WMH finished point count and walked out the driveway. The man ("Frank") then pulled up and gave WLM/WMH a ride to the ARCADIS truck. WLM/WMH filed statements w/ HGM Security. The Lancaster Police Dept was not called while ARCADIS talked to Security.

Romarco / HGM Avian Surveys — WLM / WMH / CAL / MLB

ARCADIS Project No. B0016630 — 8/28/11

1400 - Departed Haile Mine site after briefing Security guards (Jeff Jackson)

1500 - 1700 ARCADIS Field crew drove to Carolina Sandhills National Wildlife Refuge to observe Red-Cockaded Woodpecker nesting and foraging habitat to use as a reference based on habitats observed on Haile Gold Mine site. Several RCW trees (painted w/ white stripes) were observed - sap running down the trunk and obvious cavity seen.
- Photos taken of Nesting / foraging habitat and of dry pond.

1745 - Arrive back @ Hotel Lancaster, SC
1745-1900 Spoke w/ Bonnie Bynum regarding earlier shooting incident.

1915 - 2100 Planning / coordination / Safety discussions
2200 - closed up field notes and downloaded Project photos

END OF DAY

[signature]

Romarco / HGM Avian Surveys — CAL / WLM

ARCADIS project No. B0016630 — 8/29/11

- Arrive @ Haile Gold Mine @ 0655 and signed in.
- Met w/ Johnny Poppas / OTT Jackson to discuss previous days shooting incident (WLM/WMH)

Point Count Surveys Completed

SA-5 (silvicultural area (loblolly pine) approx. 25-35 yr old stand)
- ☆ Photos taken (4) @ point count location
- ☆ Bill Clem spoke w/ OTT Jackson on the telephone during the point count.

SA-4 (silvicultural area confirmed)

SA-3 " " "

SA-2 " " "

SA-1 (edge of silvicultural area / along roadside on North Side of paved road)
- ☆ Point Count near Camp Branch

1100-1200 Downloaded data from Bat 4, Bat 3 and talked w/ Willow about Ledbetter Rd. (Bat 2) that did not collect bat data. Bat 3 also did not collect data. Error message: "CFC card has been erased, do you want to retrieve data?" Yes → makes batfile.dat

☆ MLB suggested updating the firmware on the CF card from 4055g to 4056g

Romarco / HGM Avian Surveys & Bat Monitoring — WLM, MLB

ARCADIS Project No. B0016630 — 8/29/11

Pg. 81 in AnaBat SD Manual shows refers to cf card.

Pg. 89 upgrade firmware
- copy Firmware.hex program
- save in same directory as Data.Dat (whatever the drive of the CF card is)
- to upgrade AnaBat
  1) insert card into unit
  2) hold down "Save" button continuously
  3) Press "power" while holding "Save" down
  4) 3 lights come on
  5) when you hear a "beep" then you can release "Save" button.
  6) After the three-tone "beep", the AnaBat Unit has accepted the firmware upgrade.

☆ SD2 AnaBat unit latest firmware => 4056g

☆ SD1 " " " " => 4079g

1630-1715 Met and talked with Mr. David DuMont about birds and plants seen during his and our field work on HGM

Bat 3 in wetland grass => Maidencane (Panicum hemitomon)

1730-1830 Worked on Bat 2 CF card connection

1840-1920 Drove to Camden, SC to get a Serial-USB cable (9 prong) for the AnaBat unit.

Romarco / HGM Avian Survey
+ Bat Monitoring
ARCADIS Project No. B0016630

CAL / MLB /
WMH / WLM
8/29/11

1930 - 2045 worked with AnuBat units @ Haile Gold Mine to try to fix problem with Bat 2 and Bat 3 skipping nights recording.
* Didn't fix problem → just re-inserted card into both units.

2100 - 2230 Drove to hotel (Sheraton) Charlotte, NC

END of Day

Will Mat

Romarco / HGM Bat Monitoring

ARCADIS Project No. B0016630

9/30/11

0730 - received call from HGM security
0830 - spoke to Lancaster County Sheriff's deputy and gave verbal statement.
0900 - Met @ Hotel lobby
0945 - Drove to Haile Gold Mine (Kershaw, SC)
* Stopped to get a serial port connector from Radioshack.
1130 - 1300 Downloaded all AnuBat data (Bat 1 - Bat 4) * Bat 2 did not record data

Note:
Bat will be divided up by Station and by species → each station will have BCID run on it and then one master spreadsheet for data will be created and each site will have its own tab

1305 - 1400 WMH/WLM gave written statements to Lancaster Sheriff's deputy (Josh Usher)

1400 - 1530 Analyzed AnuBat (Bat 2) Firmware and tried again to connect AnuBat unit to computer via serial cable → Computer would not recognize AnuBat.

1600 - 1700 Drove to ARCADIS Charlotte office
1700 - 1800 Worked on Xcell spreadsheets and input some Avian point count data.

END of DAY

WLM

Romarco / HGM Bat Monitoring — MLB/WLM

ARCADIS Project No. B0016630 — 8/31/4

0700 - Depart Hotel Charlotte, NC

0845 - Arrive Haile Gold Mine and signed in

0900 - 1030 Downloaded AnaBat Data

- ★ Bat 2 - did not record data
- ★ Bat 3 - ✓
- ★ Bat 4 - ✓ (4055y firmware still on AnaBat Unit) ↳ 4056g is newest firmware version.
- ★ Bat 1 -

★ Checked all CF cards and they are 4GB SanDisk 30 mb/sec Ultra

★ writing speed = (should be 200x)

1045 - 1130 Worked w/ Titley Scientific to order a new AnaBat SD2 unit to replace SD1 @ Bat 2 (Steve? Kim Lovingood)

Bat 1, Firm 4056g, div 16
Bat 2, Firm 4019g, div 16
Bat 3, Firm 4056g, div 8
Bat 4, Firm 4055y, div 8
★ Reset all units to division ratio (8)

1130 - 1200 Removed Bat 2 AnaBat unit and went to meet w/ Buba and Pam

dterry@romarco.com
plewis@romarco.com

1240 - 1305 Showed Buba / Pam how to install the new AnaBat unit once it arrives.

Romarco / HGM Bat Monitoring — MLB, WLM

ARCADIS Project No. B0016630 — 8/31/4

1330 - Depart Haile Gold Mine

1900 - Arrive @ ARCADIS Atlanta, GA office

ARCADIS Truck Mileage

Start 8/17 100927

END 8/31 102689

★ Fix headlight driver's side

★ Oil change needed

END of DAY

[illegible]

ARCADIS
Romarco - HGM Additional Wetlands
Determination (Bugberry Tract)

W. Medlin
10/19/2011

Time: 1000

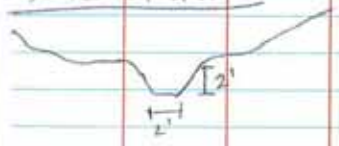
Weather: Overcast, drizzling ~65°F

* Significant Rainfall event on 10/18/11 according to B. Clem 1.85 inches

* WLM sampled soils in thalweg of possible ephemeral drainage
0-6" 10YR 5/3 no mottles
6-18+" 10YR 6/6 w/ 10YR 5/8 mottles 5-10%

* Photos taken of soil matrix colors and along reach * Photo #s (101-6757 to 101-6787)

X-Section Sketch



* channel dry @ time of inspection

Riparian Vegetation — data recorded @ NC Stream form evaluation location

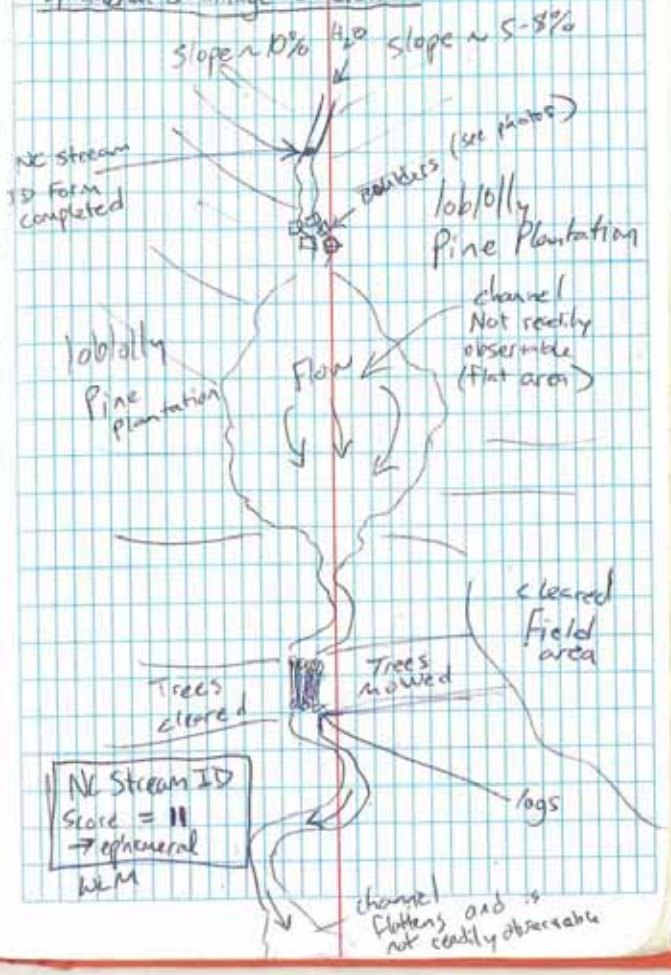
Trees
Pinus taeda
Oxydendrum arboreum
Liquidambar styraciflua
Acer rubrum
* Quercus alba
* Quercus falcata
Cornus florida

Shrubs/Saplings
Ilex opaca
Cornus florida
Quercus velutina
Juniperus virginiana
Liriodendron tulipifera
Vaccinium sp.

Herbaceous (sparse)
Chasmanthium sessiliflorum
Polystichum acrostichoides
Pipsissewa
Hexastylis heterophylla

Bugberry Tract Wetland/Stream Determination
Romarco - HGM
WLM
10/19/2011

(Potential) Ephemeral drainage Sketch



ARCADIS Project No. B0016630 J. Vogel, E. Ungberg, M. Frackleton, W. Mellin, J. Alderman, Joe Z 10/24/11

Fish Survey (Electrofishing)

- Completed site LLR5
  - ★ 3 electrofishing backpacks used
  - ★ more sandy substrate than gravel/cobble

- Completed site LLR1
  - ★ J. Vogel took additional pictures for habitat
  - ★ 2 electrofishing backpack units used

- Left site @ 1800

END of Day

ARCADIS Project No. B0016630

HGM - Romarco Fish Survey 10/25/11

LLR4

List of fish captured

Red breasted Sunfish
Blue head chub
Notropis procne
Notropis altipinnis
Tesselated darter
Pumpkinseed
Pirate perch
Gambusia sp.
Notropis cummingsae
Creek chubsucker (Erimyzon sp.)
Creek chub (Semotilus sp.)
Tadpole Madtom
Cyprinella chloristia
Redfin pickerel
Rosyside dace
Warmouth

- Completed LLR4, LLR2, BC2 + CB3 reaches today
  - ★ Semotilus lumbee (Sandhills chub) found in BC2 reach

END of Day

APCADIS Project No. B0016630 WM, JV, EU, MF
John/Joe Alderman
Weather: 10/26/11
Sunny, clear low 50s

See Jason

Vogel

Notes

END of Day

ARCADIS Project No. B0016630 Crew: Cecily Foo
Will Medlin
HGM - Romanco Raptor Survey 10/27/11

- Weather: Clear Skies, Breezy ~low 70s

- 0900 - 1230 Spent time @ 40 Acre Rock HP showing CF SC Piedmont ecoregion flora/fauna

- Started Raptor Survey @ 1350 on champion property near L. Lynches River.

- Approx. 0.3 mile from planted footplot (parking area) a small to medium size nest made of mostly leaves was observed in an American Beech tree w/in a small grove of Holly. Nest located approx. 35 ft above ground level in mid-story portion of tree. Nest constructed primarily of leaves/small sticks. No Raptors observed.
★ (4) Photos taken 101-7242 to 101-7245
★ 1 other small nes observed along trail just west of footplot/parking area. No Raptors observed.

- CF/WM traversed LLR area to Western property line.
- Potential Raptor Nest located in large White oak east along LLR from dirt road split. No Raptors observed.

ARCADIS Job No. B0016630

HGM - Romanco Raptor Survey
on Champion/Lecky Property

Raptor 4 - small, potential raptor nest located along dirt road past 3rd Raptor nest observed (previous pg). * nest constructed of mainly sticks, small twigs (loblolly pine)
- CF hung pink flag labled "Raptor 4" on tree w/ nest

BC1 Investigation of habitat (flagged w/ pink flagging tape)

★ No Stream channel present @ BC1 at all ★
- Drainage is a forested wetland swamp that contains saturated soils and semi mature trees. The wetland was dry @ time of inspection
- WLM entered the swamp/wetland from a dirt road just off Ernest Scott Rd. and west of the BC1 site location. WLM walked perpendicularly across the wetland area in a transect and reached the upland area on the east side without encountering a stream channel. ★ This, no H2O data was taken.

Vegetation: Trees (Nyssa biflora, Liriodendron tulipifera)
Saplings/Shrubs: (Acer rubrum, Magnolia virginiana, Ilex opaca, Liquidambar styraciflua)
Herbs: Woodwardia areolata, Carex spp., Arundinaria gigantea
Vines: Smilax laurifolia, Smilax rotundifolia, Berchemia scandens

★ ( ) photos taken
101-7246 to 101-7251

ARCADIS Project No. B0016630 CF, WH, MB, WM

HGM - Romarco Raptors/Mammal Survey 10/28/11

Weather: Clear, Calm low 60s

- Began survey along Little Lynches River (Corky's property)

Evidence of Mammals

- Beaver-chew * Photo (WH) 102-2278
- Wild Boar - Hog wallow/rooting
- Several (3) piles of scat observed @ confluence of Camp Branch/LLR* (4) photos taken 102-2299 to 102-2302
- White tail deer (tracks observed) along camp branch east side
- Raccoon tracks (photo 102-2303)
- Mole tunnel observed (photo 102-2304 and 2305)

* Southern Flying squirrel observed along LLR to Camp Branch

GPS Pt FS1
E 0541145
N 3827575

Nest 1

- Nest observed in large sweetgum on east bank LLR

* GPS Pt N01
E 0539531
N 3826410

- No feathers observed

Nest 2

GPS Pt N02
E 0539576
N 3826776

* Nest observed yesterday by WM/CF and appears to have additional material built

ARCADIS Project No. B0016630 WM, WH, CF, MB

HGM - Romarco Raptor/Mammal Survey 10/28/

Nest 3

- West side of Camp Branch, just north of Tom Gregory Road WPA Bridge.

* GPS Pt N03
E 0539583
N 3827644

- Possible raptor nest, but not confident
- 60 Ft up in American Elm

Mammal Notes (continued)

- Raccoon tracks observed in channel of Camp Branch (Photos 102-2310 to 102-2312)

* Red Tail Hawk observed @ 1700 @ Camp Branch

- Concluded survey of Camp Branch drainage @ 1800
- Arrived @ Hotel @ 1830

END of Day

Will Mark

ARKCADIS Project No. B0016630 MB/WCM

HLM - Remarco Raptor/Mammal Survey 10/29/11

MB/WM started on Champion Tract at GOL/LLR and walked east along the river.

Weather: Overcast, cool low 50s

- Red Shouldered Hawk heard calling @ 0945 along South side of LLR

Birds
Downy Woodpecker
Northern cardinal
Red bellied woodpecker
Carolina wren
Carolina Chickadee
American crow
Pileated woodpecker
Northern Flicker
Hermit thrush

Trucks started @ 1000 Weather: Partly cloudy Temp: Mid 50s; Wind: 0-5mph

MPHF 2

* Actual habitat is Bottomland Hardwood Forest - Alluvial floodplain
* Dense thicket of Chinese; no mammals observed (live or traces)

END TIME: 1008

- Across the Little Lynches River on South side from the end of transect MPHF 2, there is a potential raptor nest; ~60 ft off ground level

ARCADIS Project No. B0016630 WM, MB

HLM - Remarco 10/27/11

Mammals observed (Tracks, scat, call, etc)

White tail deer
Wild boar
Raccoon
Beaver
Coyote/fox? Scat photo

PFW 2 (near Bat)

* Changed habitat type to MPHF (2)

Time: 1132

Weather: Sunny, 50°F
chilly breeze

END TIME: 1138

* (4) Photos taken in habitat 101-7252 to 101-7255
* Dense smilax thicket in understory
* No mammals observed in transect

along the way out of transect were 2 different scat piles were observed (photo 101-7256)

- Possible fox/coyote scat and white tail deer
* Seeds observed ?

ARCADIS Project No. B0016630 WM, MB

HGM - Romarco Raptor / Mammal Surveys 10/29/11

- PFW 2 was relocated in order to better capture the palustrine freshwater habitat near Bat 3.
- MLB took new gps track for relocated PFW 2

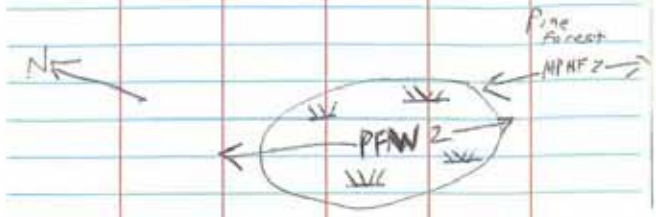
★ (2) Photos taken of PFW 2 (101-7257 and 7258)

★ No mammals observed

Time start: 1153

Time: End: 1200

Sketch



UT 1

Potential Nest 1

GPS Pt PN1

E 0544548

N 3826193

★ (2) Photos taken

~50 ft agl → Nyssa biflora

★ small mammal observed near beginning of UT1 on HGM property → Near Craft property (photos taken)

★ Raccoon scat observed and photo taken

END of Day

ARCADIS Project No. B0016630 Cecily Foo, Will Mellin

HGM - Romarco Mammal / Raptor / RCW 10/30/11

TIME: 0915

Weather: Sunny, Clear 30-40°F

- Started RCW investigation @ woods road of Duckwood Road in loblolly pine plantation just north of dirt road

★ GPS track taken

★ (4) photos taken @ East end of transect

- Avg DBH of pines is approx. 12" 101-7271 to 101-7274

★ GPS Pt taken in potential RCW foraging habitat

E 0541847 "RCW1"

N 3830965

★ (4) photos taken @ GPS pt 101-7275 to 101-7278

- Red-shouldered Hawk heard calling @ gps pt

★ GPS Pt taken "RCW2"

E 0541895

N 3830868

★ (3) photos taken @ gps pt 101-7279 to 101-7281

Mammal observations

White tail deer (scat)

Raccoon (tracks)

ARCADIS Project No. B0016630 CF, WM

HGM - Romuco Mammal/Raptor Survey 10/30/11

XFC -1

Weather: Sunny, Clear low 50s

Time Start: 1032

Time End: 1037

GPS Coordinates

Start E 0541287
N 3830367

END E 0541355
N 3830461

Observations along XFC-1

- Eastern Cottontail Rabbit observed along transect (no pictures)

☆(4) Photos taken of XFC-1 habitat
101-7282 to 101-7285

MMHF-1

Weather: Same as above

Time Start: 1126

Time End:

GPS coordinates

Start E 0540147
N 3830003

END E 0540247
N 3830072

☆( ) photos taken of MMHF-1 habitat
101-7286 to 101-7289

☆ No mammals or signs of mammals observed
- Very large amount of new leaf litter on forest floor

ARCADIS Project No. B0016630 WLM, MLB CF, WH

HGM - Romuco Mammal/Raptor Surveys 10/31/11

0730 - Depart Hotel Charlotte, NC

0915 - Drop Cecily Foo off @ Greyhound Station

1030 - Timesheets completed

1045 - 1130 Fed Ex Anabat equipment and Horiba Water quality meter

1200 - 1700 Travel to Atlanta, GA

Ecology Truck Mileage

Start: 103265

END: 105588

END of Day

Will Mert

Comprehensive Baseline Wildlife and Aquatic Resources Report

Haile Gold Mine, Inc.

Appendix D

Bat Survey Field Notes and Photos

ARCADIS

Appendix D
Bat Survey
Project Photographs
August 20-31, 2011

Photograph #1.
Installation of **Bat Monitoring Station #1 (Bat #1; 0541329, 3829672)**.

Photograph #2.
Bat #1 in small stream forest habitat.

ARCADIS

Appendix D
Bat Survey
Project Photographs
August 20-31, 2011

Photograph #3.
Pond and wetland vegetation adjacent to **Bat #1**. Visual evidence of beaver activity.

Photograph #4.
Removal of tree branches during installation of **Bat Monitoring Station #2 (Bat #2; 0544679, 3827399)**.

ARCADIS

Appendix D
Bat Survey
Project Photographs
August 20-31, 2011

Photograph #5.
Bat # 2 in modified managed upland vegetation-naturalized habitat, adjacent to open water habitat (Ledbetter Reservoir) and developed habitat (mining area).

Photograph #6.
Bat # 2 in modified managed upland vegetation-naturalized habitat, adjacent to open water habitat (Ledbetter Reservoir) and developed habitat (mining area).

ARCADIS

Appendix D
Bat Survey
Project Photographs
August 20-31, 2011

Photograph #7.
Location for **Bat Monitoring Station #3 (Bat #3; 0542484, 3826554)** in streamhead pocosin habitat.

Photograph #8.
Weatherproof casing for SD2 AnaBat echolocation detector, associated equipment, and solar panel at **Bat #3**.

ARCADIS

Appendix D
Bat Survey
Project Photographs
August 20-31, 2011

Photograph #9.
Bat Hat ® and coaxial cable for **Bat #3**.

Photograph #10.
Bat #3. Orange arrow in the photograph points to Bat Hat ® at **Bat #3**.

ARCADIS

Appendix D
Bat Survey
Project Photographs
August 20-31, 2011

Photograph #11.
Bradford pear tree (*Pyrus calleryana*) used to install **Bat Monitoring Station #4 (Bat #4; 0540446, 3826622)** in developed habitat (residential area). Evidence of Yellow-bellied Sucker (*Sphyrapicus varius*) feeding on tree.

Photograph #12.
Bat #4 in Bradford pear tree.

ARCADIS

Appendix D
Bat Survey
Project Photographs
August 20-31, 2011

Photograph #13.
Old barn/house in open grassy field adjacent to **Bat #4**.

Photograph #14.
Old barn/pigeon coop in open grassy field adjacent to **Bat #4**.

ARCADIS Project No. B0016630 Willow Hetrick, WCM

HGM Avian Surveys 8/18/11

- Willow took GPS pt "Bat 1" @ a small tulip poplar near emergent wetland and next to woodpecker cavity tree
  ★ (2) Photos taken
- GPS Pt "Bat 2" taken adjacent to Pt #91
  ★ (3) Photos taken
  ★ Noticeably pine tree is potential tower
- GPS Pt "Bat 3" taken on East side of Ledbetter Reservoir
  ★ (3) Photos taken
  ★ Several Carolina wrens observed
- GPS Pt "Bat 4" taken in emergent wetland @ Nyssa biflora tree.
  ★ Several Photos taken
- GPS Pt "Bat 5" taken @ old homesite located in fallow field → Receiver can be put on Bradford pear tree in yard.
  ★ Photos taken

HGM Telephone # 803-475-1220
Bill Clem cell # 803-246-0785
Lock combo: 1220 (GATE)
Lock Combo: 446 (HGM) → Anabat Locks

ARCADIS Project No. B0016630 Willow Hetrick, Will Medlin

HGM Avian Surveys / Bat Surveys 8/18/11

★ 1430 - 1700 set up and assembled Four Anabat Recording devices.

1700 - Depart Haile Gold Mine Site
1735 - Arrive @ Jameson Inn Lancaster, SC

1805 - 1900 Dinner
1915 - 2000 Home Depot / Wal-Mart

END of DAY

Will Medlin

Romarco - HGM
WM, WH
Avian Surveys / Bat Surveys
8/19/2011
0500 - Arrived at Haile Gold Mine Site

1st Point Count location MA-7 (0530)
Time Start 0531
Time End 0541
☆ Crickets / Insects / Mine noise prevalent
- Species
No species observed visually / aurally

2nd Pt Count location MA-8 (0550)
Time Start 0551
Time End 0601
Species
No species observed
- Mine Noise / insect noise prevalent

3rd Pt Count location MA-9 (0608)
Time Start 0608
Time End 0618
☆ Mine / Road Noise / insect noise
Species
☆ No Species observed
(American crow)

Romarco - HGM
WCM, WH
Avian / Bat Survey
8/19/11

4th Point Count Location MA-10
Time Start 0627
Time End 0637
☆ Mine noise / insect noise
Species
American Crow II
Tufted titmouse III
Chipping Sparrow II
Northern Cardinal II
Carolina wren II

5th Point Count Location MA-6 (0759)
Time Start 0807
Time End 0817
☆ See ~~notes~~ Datasheet for species

6th Point Count Site MA-5 (0835)
Time Start 0836
Time End 0846
☆ Adjacent to Sediment Pond #4
Species
White-eyed vireo II
Carolina wren
Pileated woodpecker
Barn Swallow II
Blue Jay
Tufted titmouse
Carolina Chickadee
Mourning dove
Eastern Kingbird

Romarco - HGM
ARCADIS Proj. No B0016630
HGM - Avian Surveys

WLM, WMH

8/19/2011

7th Point Count Location MA-4

Time Start 0903

Time End 0913

Species

Blue Grosbeak II
Mourning dove III
Carolina chickadee II
Tufted titmouse
Downey woodpecker
Barn swallow
Red bellied woodpecker
white eyed vireo

8th Point Count Location SA-13 → MA-~~3~~#

☆ Area has been cleared and contains mine trucks and equipment. Groundwater well (DMW4) located adjacent to point count site.

Time Start 0927

Time END 0937

Species

Carolina Wren I
Blue grosbeak II
Eastern Towhee
Northern Bobwhite
Downy woodpecker
American crow
Mourning dove
Praire warbler

ARCADIS Project No. B0016630 Task 4

WLM, WMH

Romarco - HGM Avian Surveys

8/19/11

9th Point Count Location SA-14 → MA #

☆ Mining Area w/ anthropogenic noise

Time start 0950

Time End 1000

Species

Prairie warbler II
Tufted titmouse
Barn swallow II
Chipping sparrow
Northern bobwhite
Mourning dove

10th Point Count location MA-11

☆ Insect and mine operation noise in background

Time Start 1031

Time End 1041

Species

Carolina wren II
Chipping sparrow
Blue grosbeak

11th Point Count Location MPHF-9

☆ Some mine noise in area
☆ Adjacent to Ledbetter Reservoir

Time Start 1051

Time End 1101

Species

Eastern Kingbird
Carolina wren II
Carolina Chickadee II
Tufted titmouse
Northern cardinal II

END of Day
[signature]

☆ Attempted to set up AnnBat station "Bat 1" but failed due to band clamps - Arrived @ Hotel 1630

ARCADIS Project No. B0016630 WCM, WMH

HGM - Avian Surveys 8/20/2011

- Arrive @ Site @ 0620

Point Count
Sites completed

MPHF - 3
MPHF - 2
MPHF - 1 * Photos taken
FF - 1 * Area is not a fallow field, but is a small forested wetland depression. changed habitat to BHF.
BHF - 1
BHF - 2
FF - 2
MPHF - 5
MMHF - 2
MMHF - 1
MPHF - 4

1200 - 1300 Setup and installed AnaBat #1 @ beaver
* Spoke to HGM Security guard (Mr. Morgan) regarding some Kids on 4-wheelers that were trespassing on Haile property near Bat #1
* Set up and installed AnaBat Unit @ Bat #2 adjacent to Ledbetter Reservoir 1400 - 1605

ARCADIS Project No. B0016630 WCM, WMH

HGM - Avian Surveys 8/20/2011

1615 - 1735 Setup and installed AnaBat Unit @ Bat #4 in field @ old homesite. Bradford Pear is tree that AnaBat is in.

1815 - Arrive back @ Hotel Lancaster, SC
1915 - 200 - Home Depot and Mapping discussion

END of DAY

Will Mark

ARCADIS Project No. B0016630 WLM, WMH

Romaco/HGM - Avian Survey 8/21/2011

- Arrived @ Site 0615

- Began Pt Count @ SA-31 (Loblolly Pine Plantation)

Completed Pt Counts

SA-31
SA-30
SA-29
SA-28
SA-27
SA-26
PFW-4
PFW-3
PFW-2
PFW-1

☆ Went to Charlotte for Afternoon/Evening to Pick up other ARCADIS biologists from Airport, and to get supplies

2300 - Arrive back @ Hotel in Lancaster, SC

END of Day

Will

ARCADIS Project No. B0016630 WLM, WMH, CL, MB

8/22/2011

- Arrived @ site at approx 0655
☆ Weather is foggy w/ slight west breeze
- Started Point Count @ SA-16 (MA is habitat)

Point Counts Completed

SA-16 (changed to Mining Area)
MA-12 (adjacent to open water pit)
BHF-8
SA-15 (adjacent to Ledbetter Reservoir) ☆ Photos taken of Bat 1 from across Reservoir
0900 - Participated in Safety MTG and Site orientation w/ Mr. Ott Jackson
☆ MSHA 5000-23 only form of acceptable training @ HGM

☆ When Erasing bat data make sure that CFC Storage.exe says "Disk erased to Sector 1" → Run a check card to be sure that card will record data the next night

☆ Downloaded AnaBat data from All four Bat Monitoring stations and replaced clean memory card in Units.

☆ Red-tailed Hawk observed flying overhead at Bat #4 1230-1300

Romarco/HGM Avian Surveys WMH, WLM, CAL, MB
ARCADIS Project No. B0016630 8/22/11

1345 - 1600 WLM/WMH coordinated with Buba/Pam (Haile) and removed tree limbs via chainsaw from Bat #1 monitoring station. WLM/WMH repositioned the solar panel @ Bat #1 so that it now faces to the south (Ledbetter Reservoir).

1630 Arrive back @ Hotel Lancaster, SC

END of DAY

Romarco/HGM Avian Surveys CAL, WLM
ARCADIS Project No. B0016630 8/23/11

0650 - Arrived @ HGM
0700 - Signed in @ HGM
0715 - Began Avian Surveys

Survey points completed
MA-2
MA-1
MPHF-7
MPHF-8
SA-8
SA-7 (loblolly pine plantation ~ 30-40 yrs)
SA-6 (Blackberry thicket on edge of clearing)
MHF-5 (loblolly pine plantation ~ SA [30-40 yrs])
MMHF-4
MMHF-3
MA-3

1205 - Met up @ Bat #3 (PEM wetland) for coordination of afternoon

1300 - 1600 Scouted two Longleaf Pine stands that David Dumond had indicated were mature longleaf for RCWs. No RCWs were observed. Further, habitat for RCWs to nest in was not observed. Too much hardwood understory, not enough native grasses (no Aristida sp.). * WLM took photos of both LLP habitats. * WMH took GPS tracks/pts in both LLP habitats.

END of Day

Romarco / HGM Avian Surveys — WLM, MB
ARCADIS Project No. B0016630 — 8/24/11

- Arrive @ Haile Gold Mine @ approx. 0630 and signed in.
- Began point counts @ 0700

Point Count Surveys completed

BHF - 10
BHF - 9
SA - 19 (Incorrectly Marked; should be BHF)
BHF - 7
~~BHF - 6~~ BHF - 6 (Hooded warbler observed here)
BHF - 5 (near gene lewellyn rd.)
XFC - 7 (large flock of unknown birds about size of blue grosbeak/brown headed cowbird were observed w/in a dead loblolly pine approx. 10 m SW of XFC - 7)
↳ Brown headed cowbirds

XFC - 8
XFC - 9
XFC - 10
XFC - 11

1200 - 1415 WLM/WMH looked for Bald Eagle habitat and nests (including other raptor nest) along the Little Lynches River. Red shouldered Hawk(2) observed

1500 - 1600 Installed Microphones on AnaBat units
1615 - 1630 - Coordinated w/Ramona and signed out of HGM
1700 - Arrive back in Lancaster, SC Hotel
END of Day [signature]

Romarco / HGM Avian Surveys — WLM/WMH
ARCADIS Project No. B0016630 — 8/25/11

- Arrived @ Haile office @ 0640 and signed in.
- Drove out to Northeastern area of site and began point count surveys

Point counts completed

FF - 9
FF - 10
FF - 11
MPHF - 24 (Habitat is actually Pocosin Scrub on edge of upland mixed pine/HW)
FF - 14 (Habitat should be Silvicultural Area) ~10 yr old loblolly pine stand
FF - 12 (sandy field w/ sparse pines)
FF - 13
MpHF - 26 (change to XFC)
MPHF - 25 (change to XFC)
FF - 16
FF - 15
MMHF - 19

1300 - 1315 Dropped WMH/LAL off for Bald Eagle surveys

Bat files for call
1st 3 #'s are date — L8241700
2nd 4 #'s are time

Romarco / HGM Avian surveys — WLM, MLB
ARCADIS Project No. B0016630 — 8/25/11

Myotis - typically above 40 K
* USE BCID to ID the most general species on a site (Free to Download)

→ BCID will read your data file and generate an excel spreadsheet list of species.

→ Reporting => Romarco will be concerned w/ species located on Duckwood Tailings/Storage facility because that is where chemicals in tailings pond will affect more bats.

* Ask Romarco about temperature data for mine site (NOAA Kershaw, SC ?)

Websites for determining species:
Bat Call Library

* Spectrograph is ANALook format

1530-1600 Downloaded bat data and talked w/ Jay Pino from ARCADIS IT.

1600-1745 Talked about the Haile Gold Mine Avian studies / Bat studies and general permitting requirements with Johnny Pappas.

1745-1830 Re-installed SD cards into AnaBat units and drove back to Lancaster, SC

END of Day

Romarco / HGM Avian Survey — WLM, WMH, CAL, MLB
ARCADIS Project No. B0016630 — 8/26/11

- Signed in @ Haile Gold Mine 0645
- Dropped cars for point count surveys and left WH/MB out @ SA-35

Point Count Surveys completed

MMHF - 11 (old house w/ lots of Bambusa vulgaris surrounding, large post oak) * Photos taken (3)

MMHF - 12 (dry, sandy slope forest on edge of pocosin/BHF)
* (5) Photos taken

MMHF - 13 (changed habitat type to MPHF)
- point located on edge of open water impoundment, and on edge of open field.
* Photos (4) taken

* (2) Photos taken along dam of pond looking @ pond/open water (Xyris sp observed along pond edge)

MMHF - 14 (changed to MPHF - edge of field and hardwood forest) * Very good bird diversity/abundance at this site.
* (4) Photos taken

* (3) Photos taken of representative BHF (Fall line sandhills) stream forest

* (1) Photo taken of mixed mesic HW slope on northern side of aforementioned drainage.

Romarco / HGM Avian Surveys — CAL, WLM

ARCADIS Project No. B0016630 — 8/26/11

Point counts completed

MMHF-15 (changed habitat to MPHF)

★ (4) Photos taken in mixed pine/HW adjacent to woods road

MMHF-16 (Habitat changed to Pocosin/BHF)

★ Very dense wetland w/ many laurel leaf greenbrier vines and shrubs (titi, sweet bay, red maple, American holly) Canopy dominated by tulip poplar / loblolly pine / Nyssa biflora)

★ Sphagnum moss and sedges present in herb layer. Also river cane present.

★ Photos (3) taken in wetland.

MMHF-18 (Water oak, Persimmon, Grape vine, Vaccinium sp.)

★ Photos (4) taken in water oak grove

1100-1130 Gathered AnaBat Cards for data download ★ Ledbetter (Bat 2) did not have any bat calls recorded

★ Remember ★

- when changing the time period that the AnaBat will record, you must format the card and re-initialise CF ★ But remember to be sure to download all data prior to formatting!

1446 - Began Bald Eagle search along Little Lynches River w/in floodplain

Romarco / HGM Avian Survey — CAL, WMH, WLM

ARCADIS Project No. B0016630 — 8/26/2011

Bald Eagle Investigation

Vegetation:

Green Ash
American Elm
American Sycamore
Sweet gum
American Holly
Flowering dogwood
Huckleberry
Ironwood
White oak
American Beech
Tulip poplar
Mountain laurel

L. Lynches River

★ Mature forested Alluvial river bottom w/ some trees having DBH >2.5 ft

★ GPS Pt BAEA pt 5 (2) Photos taken upstream/downstream

★ GPS Pt ⇒ BAEA pt 6 (2) photo taken

★ Signs of wild boar, raccoon observed (tracks, droppings)

★ GPS Pt ⇒ BAEA 7 (@ confluence of perennial stream w/ Little Lynches River (★ Photo taken)

★ Several representative photos taken of Piedmont Alluvial River Bottom habitat.

★ GPS Pt ⇒ BAEA 8 taken @ large loblolly pine approx. 3 ft DBH, (2) Photos taken

★ GPS pt ⇒ BAEA 9 taken @ 2nd large loblolly pine approx. 2.5 ft DBH (approx. 60 ft E of tree 1)

★ (2) Photos taken along camp branch - perennial stream (~25 ft wide / 6-7 ft deep)

- Belted Kingfisher heard w/in L. Lynches River

★ GPS Pt ⇒ BAEA 10 is located west/NW of end of permit boundary

Romarco / HGM Avian Surveys WLM, WMH, CAL

ARCADIS Project No. B0016630 8/26/11

- Sign out of Haile Mine site @ 1625
- debriefed Ramona Schnieder on Bald Eagle survey along Little Lynches River
  - → No Eagles or Eagle nests were observed
  - ★ No other raptors/nests were observed

1715 - Arrive back @ Hotel Lancaster, SC

END of DAY

Will Mo[illegible]

Romarco / HGM Avian Surveys MLB, WLM

ARCADIS Project No B0016630 8/27/11

- Signed in @ Haile Gold Mine 0640
- Began pt counts @ NE side of Duckwood TSF area

Point Count Surveys Completed

MPHF-30 (small clearing in MPH forest; some mature long leaf observed along woods road)

MPHF-29 (Very quiet site; Mixed pine/HW on side of slope/draw ★ No wetlands/stream)

XFC-24 (along sandy woods road)
★(2) photos taken in XFC habitat

XFC-25 (along sandy road near church/cemetery)

MPHF-28 (Mixed pine/HW slope forest)
★(2) photos taken facing SW/SE
Veg: white oak, loblolly pine, blackjack oak, mockernut hickory, southern red oak, sparkleberry, grapevine tulip poplar
★Red-tail hawk observed along way to MPHF-27

MPHF-27 (MPH along side a ephemeral drainage)

FF-7 (Kudzu patch/field - very dense) ★(2) photos taken

FF-6 (Kudzu patch/field " ")

FF-5 (Kudzu patch on edge of open field)

FF-4 (Kudzu field/patch adjacent to 4 wheeler trail)

FF-3 (" " " ")

1130-1200 Download data from Bat 1

1245-1400 Download data from Bat 3, 2, 4

1530 - Arrived back @ Hotel Lancaster, SC

Romarco / HGM Avian Surveys — MLB, WLM

ARCADIS Project No. B0016630 — 8/27/11

1700 - 1800 WLM/WMH QA/QC our bald eagle search map document and GPS pts. Also QA/QC RCW Longleaf Pine GPS Pts.

★ (3) GPS Pts taken by CAL/WMH on lower river tract were:
- BAEA ~~Bae~~ 11
- BAEA 3
- BAEA 4 (nearest to US Hwy 601)

★ RCW / Long Leaf Pine GPS Pts:
- RCW-LLP-1 ⇒
- LLP-TO-SH ⇒ Longleaf Pine - turkey oak Sandhill
- RCW-LLP-EAST
- Mature LLP 1
- Mature LLP 2

Track: "RCW-LLP Track" (Eastern portion)
- RCW-LLP-West (in between dendritic drainge)

END of DAY

Will Mark

Romarco / HGM Avian Surveys — WLM/WMH

ARCADIS Project No. B0016630 — 8/28/2011

- Arrive @ 0640
- Signed in @ Haile Gold Mine office
- Dropped MLB/CAL off @ HGM Road 0700
- ★ Champion Gate [2156] ⇒ Lock combination

Point counts completed

SA-17 (Moved point count from middle of Haile Gold Mine Rd. to the north into a clear-cut silvicultural area).
★ Representative photos taken (3)
★ Good bird diversity @ this site.

SA-18 (changed habitat type to XFC; longleaf pine / turkey oak scrub forest)

XFC-6 (changed habitat to SA; clear cut area)

XFC-5 (xeric slope forest; good bird diversity)
★ (2) Photos taken @ Pt count site

XFC-4 (changed habitat to BHF; sandhills follow drainage)

XFC-3 (changed habitat to BHF)

XFC-2 " " " "

XFC-1 " " " "

BHF-3

BHF-4 (changed to XFC)
★ Willard/Will were shot @ by a man w/ two different guns. He was staying in the dilapidated house to the S/SE of point count.

★ See following Page for more details ★

Romarco / HGM Avian Survey — WLM / WMH

ARCADIS Project No. B0016630 — 8/28/2011

- At approx 1125-1130 Willow Hetrick and Will Medlin were walking to Avian Point count BHF-4 from BHF-3. After crossing behind a dilapidated house and causing dogs (~7) to bark, WMH/WLM entered Longleaf Pine/Turkey oak scrub forest. At this point, someone exited the dilapidated house and screamed/yelled. There was some commotion and WLM/WMH stopped and stayed quiet. 1 gunshot was fired directly into the woods where WLM/WMH were standing. WLM/WMH remained quiet. A 2nd gunshot was fired much closer (approx. 10 ft over WLM head) and WLM immediately shouted "Hello!", ID'd himself as a worker for HGM. A man was observed standing in his underwear holding a rifle on the porch of the dilapidated house. He said that he did not mean to shoot at Haile employees, but that some people had been trying to steal things (4 wheeler) from him although no 4-wheeler was observed @ his old property (now HGM property). Subsequently, WLM/WMH finished point count and walked out the driveway. The man ("Frank") then pulled up and gave WLM/WMH a ride to the ARCADIS truck. WLM/WMH filed statements w/ HGM Security. The Lancaster Police Dept was not called while ARCADIS talked to Security.

Romarco / HGM Avian Surveys — WLM / WMH / CAL / MLB

ARCADIS Project No. B0016630 — 8/28/11

1400 - Departed Haile Mine site after briefing Security guards (Jeff Jackson)

1500 - 1700 ARCADIS Field crew drove to Carolina Sandhills National Wildlife Refuge to observe Red-Cockaded Woodpecker nesting and foraging habitat to use as a reference based on habitats observed on Haile Gold Mine site. Several RCW trees (painted w/ white stripes) were observed - sap running down the trunk and obvious cavity seen.
- Photos taken of Nesting / foraging habitat and of dry pond.

1745 - Arrive back @ Hotel Lancaster, SC
1745-1900 Spoke w/ Bonnie Bynum regarding earlier shooting incident.

1915 - 2100 Planning / coordination / Safety discussions
2200 - closed up field notes and downloaded Project photos

END OF DAY

[signature]

Romarco / HGM Avian Surveys — CAL / WLM

ARCADIS project No. B0016630 — 8/29/11

- Arrive @ Haile Gold Mine @ 0655 and signed in.
- Met w/ Johnny Poppas / OTT Jackson to discuss previous days shooting incident (WLM/WMH)

Point Count Surveys Completed

SA-5 (silvicultural area (loblolly pine) approx. 25-35 yr old stand)
- ☆ Photos taken (4) @ point count location
- ☆ Bill Clem spoke w/ OTT Jackson on the telephone during the point count.

SA-4 (silvicultural area confirmed)

SA-3 " " "

SA-2 " " "

SA-1 (edge of silvicultural area / along roadside on North Side of paved road)
- ☆ Point Count near Camp Branch

1100-1200 Downloaded data from Bat 4, Bat 3 and talked w/ Willow about Ledbetter Rd. (Bat 2) that did not collect bat data. Bat 3 also did not collect data. Error message: "CFC card has been erased, do you want to retrieve data?" Yes → makes batfile.dat

☆ MLB suggested updating the firmware on the CF card from 4055g to 4056g

Romarco / HGM Avian Surveys & Bat Monitoring — WLM, MLB

ARCADIS Project No. B0016630 — 8/29/11

Pg. 81 in AnaBat SD Manual shows refers to cf card.

Pg. 89 upgrade firmware
- copy Firmware.hex program
- save in same directory as Data.Dat (whatever the drive of the CF card is)
- to upgrade AnaBat
  1) insert card into unit
  2) hold down "Save" button continuously
  3) Press "power" while holding "Save" down
  4) 3 lights come on
  5) when you hear a "beep" then you can release "Save" button.
  6) After the three-tone "beep", the AnaBat Unit has accepted the firmware upgrade.

☆ SD2 AnaBat unit latest firmware => 4056g

☆ SD1 " " " " => 4079g

1630-1715 Met and talked with Mr. David DuMont about birds and plants seen during his and our field work on HGM

Bat 3 in wetland grass => Maidencane (Panicum hemitomon)

1730-1830 Worked on Bat 2 CF card connection

1840-1920 Drove to Camden, SC to get a Serial-USB cable (9 prong) for the AnaBat unit.

Romarco / HGM Avian Survey
+ Bat Monitoring
ARCADIS Project No. B0016630

CAL / MLB /
WMH / WLM
8/29/11

1930 - 2045 worked with AnuBat units @ Haile Gold Mine to try to fix problem with Bat 2 and Bat 3 skipping nights recording.
* Didn't fix problem → just re-inserted card into both units.

2100 - 2230 Drove to hotel (Sheraton) Charlotte, NC

END of Day

Will Mat

Romarco / HGM Bat Monitoring

ARCADIS Project No. B0016630

9/30/11

0730 - received call from HGM security
0830 - spoke to Lancaster County Sheriff's deputy and gave verbal statement.
0900 - Met @ Hotel lobby
0945 - Drove to Haile Gold Mine (Kershaw, SC)
* Stopped to get a serial port connector from Radioshack.
1130 - 1300 Downloaded all AnuBat data (Bat 1 - Bat 4) * Bat 2 did not record data

Note:
Bat will be divided up by Station and by species → each station will have BCID run on it and then one master spreadsheet for data will be created and each site will have its own tab

1305 - 1400 WMH/WLM gave written statements to Lancaster Sheriff's deputy (Josh Usher)

1400 - 1530 Analyzed AnuBat (Bat 2) Firmware and tried again to connect AnuBat unit to computer via serial cable → Computer would not recognize AnuBat.

1600 - 1700 Drove to ARCADIS Charlotte office
1700 - 1800 Worked on Xcell spreadsheets and input some Avian point count data.

END of DAY

WLM

Romarco / HGM Bat Monitoring — MLB/WLM

ARCADIS Project No. B0016630 — 8/31/4

0700 - Depart Hotel Charlotte, NC

0845 - Arrive Haile Gold Mine and signed in

0900 - 1030 Downloaded AnaBat Data

- ★ Bat 2 - did not record data
- ★ Bat 3 - ✓
- ★ Bat 4 - ✓ (4055y firmware still on AnaBat Unit) ↳ 4056g is newest firmware version.
- ★ Bat 1 -

★ Checked all CF cards and they are 4GB SanDisk 30 mb/sec Ultra

★ writing speed = (should be 200x)

1045 - 1130 Worked w/ Titley Scientific to order a new AnaBat SD2 unit to replace SD1 @ Bat 2 (Steve? Kim Lovingood)

Bat 1, Firm 4056g, div 16
Bat 2, Firm 4019g, div 16
Bat 3, Firm 4056g, div 8
Bat 4, Firm 4055y, div 8
★ Reset all units to division ratio (8)

1130 - 1200 Removed Bat 2 AnaBat unit and went to meet w/ Buba and Pam

dterry@romarco.com
plewis@romarco.com

1240 - 1305 Showed Buba / Pam how to install the new AnaBat unit once it arrives.

Romarco / HGM Bat Monitoring — MLB, WLM

ARCADIS Project No. B0016630 — 8/31/4

1330 - Depart Haile Gold Mine

1900 - Arrive @ ARCADIS Atlanta, GA office

ARCADIS Truck Mileage

Start 8/17 100927

END 8/31 102689

★ Fix headlight driver's side

★ Oil change needed

END of DAY

[illegible]

Comprehensive Baseline Wildlife and Aquatic Resources Report

Haile Gold Mine, Inc.

Appendix E

Ground-dwelling Mammal and Game Survey Field Notes and Photos

ARCADIS

Appendix E
Ground-dwelling Mammal and Game Species Survey
Project Photographs
October 28-30, 2011

Photograph #1.
Two different scat piles (fox/coyote and white-tailed deer) observed opportunistically near, but outside of MVF-1/SHP-2.

Photograph #2.
Feral hog scat observed at MVS-3.

ARCADIS

Appendix E
Ground-dwelling Mammal and Game Species Survey
Project Photographs
October 28-30, 2011

Photograph #3.
Eastern cottontail rabbit scat observed at MVS-3.

Photograph #4.
Scat of unknown mammal observed at SHP-3/OHF-3.

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Appendix E
Ground-dwelling Mammal and Game Species Survey
Project Photographs
October 28-30, 2011

Photograph #5.
Raccoon tracks observed adjacent to Camp Branch.

Photograph #6.
Mole burrow observed adjacent to Camp Branch.

ARCADIS

Appendix E
Ground-dwelling Mammal and Game Species Survey
Project Photographs
October 28-30, 2011

Photograph #7.
Bobcat scat observed adjacent to Haile Gold Mine Creek.

Photograph #8.
Raccoon scat observed adjacent to Little Lynches River.

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Appendix E
Ground-dwelling Mammal and Game Species Survey
Project Photographs
October 28-30, 2011

Photograph #9.
Bobcat scat observed adjacent to Little Lynches River.

ARCADIS
Romarco - HGM Additional Wetlands
Determination (Bugberry Tract)

W. Medlin
10/19/2011

Time: 1000

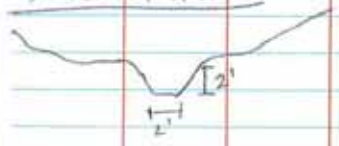
Weather: Overcast, drizzling ~65°F

* Significant Rainfall event on 10/18/11 according to B. Clem 1.85 inches

* WLM sampled soils in thalweg of possible ephemeral drainage
0-6" 10YR 5/3 no mottles
6-18+" 10YR 6/6 w/ 10YR 5/8 mottles 5-10%

* Photos taken of soil matrix colors and along reach * Photo #s (101-6757 to 101-6787)

X-Section Sketch



* channel dry @ time of inspection

Riparian Vegetation — data recorded @ NC Stream form evaluation location

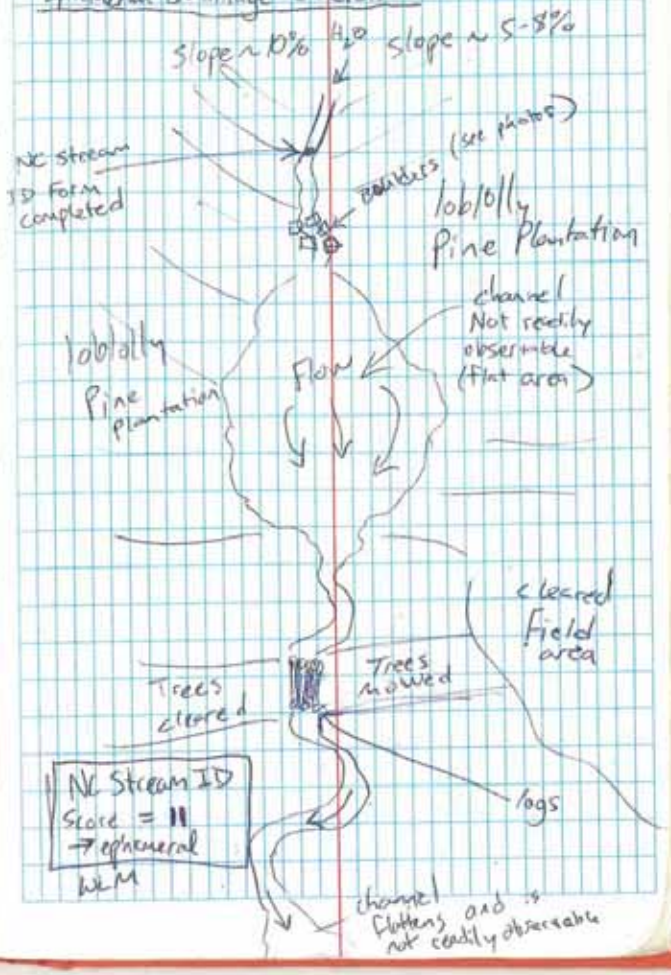
Trees
Pinus taeda
Oxydendrum arboreum
Liquidambar styraciflua
Acer rubrum
* Quercus alba
* Quercus falcata
Cornus florida

Shrubs/Saplings
Ilex opaca
Cornus florida
Quercus velutina
Juniperus virginiana
Liriodendron tulipifera
Vaccinium sp.

Herbaceous (sparse)
Chasmanthium sessiliflorum
Polystichum acrostichoides
Pipsissewa
Hexastylis heterophylla

Bugberry Tract Wetland/Stream Determination
Romarco - HGM
WLM
10/19/2011

(Potential) Ephemeral drainage Sketch



ARCADIS Project No. B0016630 J. Vogel, E. Ungberg, M. Frackleton, W. Mellin, J. Alderman, Joe Z 10/24/11

Fish Survey (Electrofishing)

- Completed site LLR5
  - ★ 3 electrofishing backpacks used
  - ★ more sandy substrate than gravel/cobble

- Completed site LLR1
  - ★ J. Vogel took additional pictures for habitat
  - ★ 2 electrofishing backpack units used

- Left site @ 1800

END of Day

ARCADIS Project No. B0016630

HGM - Romarco Fish Survey 10/25/11

LLR4

List of fish captured

Red breasted Sunfish
Blue head chub
Notropis procne
Notropis altipinnis
Tesselated darter
Pumpkinseed
Pirate perch
Gambusia sp.
Notropis cummingsae
Creek chubsucker (Erimyzon sp.)
Creek chub (Semotilus sp.)
Tadpole Madtom
Cyprinella chloristia
Redfin pickerel
Rosyside dace
Warmouth

- Completed LLR4, LLR2, BC2 + CB3 reaches today
  - ★ Semotilus lumbee (Sandhills chub) found in BC2 reach

END of Day

APCADIS Project No. B0016630 WM, JV, EU, MF
John/Joe Alderman
Weather: 10/26/11
Sunny, clear low 50s

See Jason

Vogel

Notes

END of Day

ARCADIS Project No. B0016630 Crew: Cecily Foo
Will Medlin
HGM - Romanco Raptor Survey 10/27/11

- Weather: Clear Skies, Breezy ~low 70s

- 0900 - 1230 Spent time @ 40 Acre Rock HP showing CF SC Piedmont ecoregion flora/fauna

- Started Raptor Survey @ 1350 on champion property near L. Lynches River.

- Approx. 0.3 mile from planted footplot (parking area) a small to medium size nest made of mostly leaves was observed in an American Beech tree w/in a small grove of Holly. Nest located approx. 35 ft above ground level in mid-story portion of tree. Nest constructed primarily of leaves/small sticks. No Raptors observed.
★ (4) Photos taken 101-7242 to 101-7245
★ 1 other small nes observed along trail just west of footplot/parking area. No Raptors observed.

- CF/WM traversed LLR area to Western property line.
- Potential Raptor Nest located in large White oak east along LLR from dirt road split. No Raptors observed.

ARCADIS Job No. B0016630

HGM - Romanco Raptor Survey
on Champion/Lecky Property

Raptor 4 - small, potential raptor nest located along dirt road past 3rd Raptor nest observed (previous pg). * nest constructed of mainly sticks, small twigs (loblolly pine)
- CF hung pink flag labled "Raptor 4" on tree w/ nest

BC1 Investigation of habitat (flagged w/ pink flagging tape)

★ No Stream channel present @ BC1 at all ★
- Drainage is a forested wetland swamp that contains saturated soils and semi mature trees. The wetland was dry @ time of inspection
- WLM entered the swamp/wetland from a dirt road just off Ernest Scott Rd. and west of the BC1 site location. WLM walked perpendicularly across the wetland area in a transect and reached the upland area on the east side without encountering a stream channel. ★ This, no H2O data was taken.

Vegetation: Trees (Nyssa biflora, Liriodendron tulipifera)
Saplings/Shrubs: (Acer rubrum, Magnolia virginiana, Ilex opaca, Liquidambar styraciflua)
Herbs: Woodwardia areolata, Carex spp., Arundinaria gigantea
Vines: Smilax laurifolia, Smilax rotundifolia, Berchemia scandens

★ ( ) photos taken
101-7246 to 101-7251

ARCADIS Project No. B0016630 CF, WH, MB, WM

HGM - Romarco Raptors/Mammal Survey 10/28/11

Weather: Clear, Calm low 60s

- Began survey along Little Lynches River (Corky's property)

Evidence of Mammals

- Beaver-chew * Photo (WH) 102-2278
- Wild Boar - Hog wallow/rooting
- Several (3) piles of scat observed @ confluence of Camp Branch/LLR* (4) photos taken 102-2299 to 102-2302
- White tail deer (tracks observed) along camp branch east side
- Raccoon tracks (photo 102-2303)
- Mole tunnel observed (photo 102-2304 and 2305)

* Southern Flying squirrel observed along LLR to Camp Branch

GPS Pt FS1
E 0541145
N 3827575

Nest 1

- Nest observed in large sweetgum on east bank LLR

* GPS Pt N01
E 0539531
N 3826410

- No feathers observed

Nest 2

GPS Pt N02
E 0539576
N 3826776

* Nest observed yesterday by WM/CF and appears to have additional material built

ARCADIS Project No. B0016630 WM, WH, CF, MB

HGM - Romarco Raptor/Mammal Survey 10/28/

Nest 3

- West side of Camp Branch, just north of Tom Gregory Road WPA Bridge.

* GPS Pt N03
E 0539583
N 3827644

- Possible raptor nest, but not confident
- 60 Ft up in American Elm

Mammal Notes (continued)

- Raccoon tracks observed in channel of Camp Branch (Photos 102-2310 to 102-2312)

* Red Tail Hawk observed @ 1700 @ Camp Branch

- Concluded survey of Camp Branch drainage @ 1800
- Arrived @ Hotel @ 1830

END of Day

Will Mark

ARKCADIS Project No. B0016630 MB/WCM

HLM - Remarco Raptor/Mammal Survey 10/29/11

MB/WM started on Champion Tract at GOL/LLR and walked east along the river.

Weather: Overcast, cool low 50s

- Red Shouldered Hawk heard calling @ 0945 along South side of LLR

Birds
Downy Woodpecker
Northern cardinal
Red bellied woodpecker
Carolina wren
Carolina Chickadee
American crow
Pileated woodpecker
Northern Flicker
Hermit thrush

Trucks started @ 1000 Weather: Partly cloudy Temp: Mid 50s; Wind: 0-5mph

MPHF 2

* Actual habitat is Bottomland Hardwood Forest - Alluvial floodplain
* Dense thicket of Chinese; no mammals observed (live or traces)

END TIME: 1008

- Across the Little Lynches River on South side from the end of transect MPHF 2, there is a potential raptor nest; ~60 ft off ground level

ARCADIS Project No. B0016630 WM, MB

HLM - Remarco 10/27/11

Mammals observed (Tracks, scat, call, etc)

White tail deer
Wild boar
Raccoon
Beaver
Coyote/fox? Scat photo

PFW 2 (near Bat)

* Changed habitat type to MPHF (2)

Time: 1132

Weather: Sunny, 50°F
chilly breeze

END TIME: 1138

* (4) Photos taken in habitat 101-7252 to 101-7255
* Dense smilax thicket in understory
* No mammals observed in transect

along the way out of transect were 2 different scat piles were observed (photo 101-7256)

- Possible fox/coyote scat and white tail deer
* Seeds observed ?

ARCADIS Project No. B0016630 WM, MB

HGM - Romarco Raptor / Mammal Surveys 10/29/11

- PFW 2 was relocated in order to better capture the palustrine freshwater habitat near Bat 3.
- MLB took new gps track for relocated PFW 2

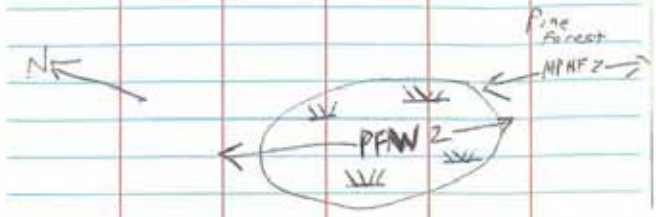
★ (2) Photos taken of PFW 2 (101-7257 and 7258)

★ No mammals observed

Time start: 1153

Time: End: 1200

Sketch



UT 1

Potential Nest 1

GPS Pt PN1

E 0544548

N 3826193

★ (2) Photos taken

~50 ft agl → Nyssa biflora

★ small mammal observed near beginning of UT1 on HGM property → Near Craft property (photos taken)

★ Raccoon scat observed and photo taken

END of Day

ARCADIS Project No. B0016630 Cecily Foo, Will Mellin

HGM - Romarco Mammal / Raptor / RCW 10/30/11

TIME: 0915

Weather: Sunny, Clear 30-40°F

- Started RCW investigation @ woods road of Duckwood Road in loblolly pine plantation just north of dirt road

★ GPS track taken

★ (4) photos taken @ East end of transect

- Avg DBH of pines is approx. 12" 101-7271 to 101-7274

★ GPS Pt taken in potential RCW foraging habitat

E 0541847 "RCW1"

N 3830965

★ (4) photos taken @ GPS pt 101-7275 to 101-7278

- Red-shouldered Hawk heard calling @ gps pt

★ GPS Pt taken "RCW2"

E 0541895

N 3830868

★ (3) photos taken @ gps pt 101-7279 to 101-7281

Mammal observations

White tail deer (scat)

Raccoon (tracks)

ARCADIS Project No. B0016630 CF, WM

HGM - Romuco Mammal/Raptor Survey 10/30/11

XFC -1

Weather: Sunny, Clear low 50s

Time Start: 1032

Time End: 1037

GPS Coordinates

Start E 0541287
N 3830367

END E 0541355
N 3830461

Observations along XFC-1

- Eastern Cottontail Rabbit observed along transect (no pictures)

☆(4) Photos taken of XFC-1 habitat
101-7282 to 101-7285

MMHF-1

Weather: Same as above

Time Start: 1126

Time End:

GPS coordinates

Start E 0540147
N 3830003

END E 0540247
N 3830072

☆( ) photos taken of MMHF-1 habitat
101-7286 to 101-7289

☆ No mammals or signs of mammals observed
- Very large amount of new leaf litter on forest floor

ARCADIS Project No. B0016630 WLM, MLB CF, WH

HGM - Romuco Mammal/Raptor Surveys 10/31/11

0730 - Depart Hotel Charlotte, NC

0915 - Drop Cecily Foo off @ Greyhound Station

1030 - Timesheets completed

1045 - 1130 Fed Ex Anabat equipment and Horiba Water quality meter

1200 - 1700 Travel to Atlanta, GA

Ecology Truck Mileage

Start: 103265

END: 105588

END of Day

Will Mert

Comprehensive Baseline Wildlife and Aquatic Resources Report

Haile Gold Mine, Inc.

Appendix F

Aquatic Habitat Assessment Field Notes, Forms and Photos

ARCADIS

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #1.
Haile Gold Mine Creek (HGMC1) – Looking upstream within the sample reach.

Photograph #2.
Haile Gold Mine Creek (HGMC1) – Looking downstream within the sample reach.

ARCAD

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #3.
Haile Gold Mine Creek (HGMC2) – Looking upstream within the sample reach.

Photograph #4.
Haile Gold Mine Creek (HGMC2) – Looking downstream within the sample reach.

ARCADIS

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #5.
Camp Branch (CB1) – Looking upstream within the sample reach.

Photograph #6.
Camp Branch (CB1) – Looking downstream within the sample reach.

ARCADIS

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #7.
Camp Branch (CB2) – Looking upstream within the sample reach.

Photograph #8.
Camp Branch (CB2) – Looking downstream within the sample reach.

ARCADIS

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #9.
Camp Branch (CB3) – Looking upstream within the sample reach.

Photograph #10.
Camp Branch (CB3) – Looking downstream within the sample reach.

ARCADIS

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #11.
Little Lynches River (LLR1) – Looking upstream within the sample reach.

Photograph #12.
Little Lynches River (LLR1) – Looking downstream within the sample reach

ARCADIS

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #13.
Little Lynches River (LLR2) – Looking upstream within the sample reach.

Photograph #14.
Little Lynches River (LLR2) – Looking downstream within the sample reach.

ARCADIS

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #15.
Little Lynches River (LLR3) – Looking upstream within the sample reach.

Photograph #16.
Little Lynches River (LLR3) – Looking downstream within the sample reach.

ARCADIS

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #17.
Little Lynches River (LLR4) – Looking upstream within the sample reach.

Photograph #18.
Little Lynches River (LLR4) – Looking downstream within the sample reach.

ARCADIS

Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #19.
Little Lynches River (LLR5) – Looking upstream within the sample reach.

Photograph #20.
Little Lynches River (LLR5) – Looking downstream within the sample reach.

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Appendix F
Aquatic Habitat Assessment
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Photograph #21.
Little Lynches River (LLR6) – Looking upstream within the sample reach.

Photograph #22.
Little Lynches River (LLR6) – Looking downstream within the sample reach.

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Appendix F
Aquatic Habitat Assessment
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Photograph #23.
Buffalo Creek (BC1) – No stream channel was identified in this area. Area consisted of wetlands with no defined flow path.

Photograph #24.
Buffalo Creek (BC1) – No stream channel was identified in this area. Area consisted of wetlands with no defined flow path.

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Appendix F
Aquatic Habitat Assessment
Project Photographs
October 14-18, 2011

Photograph #25.
Buffalo Creek (BC2) – Looking upstream within sample reach.

Photograph #26.
Buffalo Creek (BC2) – Looking downstream within sample reach.

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Appendix F
Aquatic Habitat Assessment
Project Photographs
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Photograph #27.
Buffalo Creek (BC3) – Looking upstream at a large scrub-shrub wetland which was flooded at the time of the field survey. No Rapid Bioassessment Protocol (RBP) habitat assessment was conducted because of inundation at proposed sample location.

Photograph #28.
Buffalo Creek (BC3) – Looking downstream south of road crossing. No RBP habitat assessment was conducted because of inundation at proposed sample location.

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Appendix F
Aquatic Habitat Assessment
Project Photographs
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Photograph #29.
Buffalo Creek (BC4) – Looking upstream within the sample reach.

Photograph #30.
Buffalo Creek (BC4) – Looking downstream within the sample reach.

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Appendix F
Aquatic Habitat Assessment
Project Photographs
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Photograph #31.
Unnamed Tributary (UT1)– Looking upstream within the sample reach.

Photograph #32.
Unnamed Tributary (UT1)– Looking downstream within the sample reach.

CONTENTS		
PAGE NO.	REFERENCE	DATE

ARCADIS Project No. B0016630 W. Medlin

Haile Gold Mine / Romarco Minerals 10/14/11

SCDNR Methodology

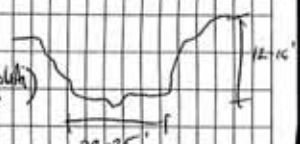
Average stream width = (wetted width) X @ the bottom of the sample reach and then @ ~~each~~ every 25 M to the upstream limit of the reach.

Average stream depth = measure H_2O depth @ three positions where X was measured.

- Arrived @ site 0800
- Signed in and grabbed gear from Lawrence's office; Spoke w/ Dave Thomas

★ 1st investigation pt LLR 1
- parked @ bridge crossing off Pleasant Plains Road.

LLR 1 ★ Pink flags observed
Bankfull width ~ 32' (10.6 m)
Wetted width ~ 22' (7.3 m)
★(5) Photos taken along reach
OHWM ~ 4'
- 1 dead fish observed in Little Lynches R. (Jason - Smallmouth Bass)



Waypoint 001
Downstream extent of LLR 1
N 34.58522
W -80.57716

ARCADIS Project No. B0016630 J. Vogel, B. Fulton, W. Medlin

Romarco - HGM Stream Surveys 10/14/11

Waypoint 002 - Upstream extent of LLR 1
N 34.58577
W -80.57960

001 to 002 = 0.14 mile

Waypoint 003 - Accidental

Waypoint 004 - (impoundment/Sheetpile)
N 34.57740
W - 80.56706

Waypoint 005 - confluence of Camp Branch/LLR
N 34.58287
W -80.57170

☆ Large fallen tree and root mass → resulting in deep pool

LLR 2

Waypoint 006 - upstream extent of LLR 2
N 34.58177
W -80.57068

☆(5) Photos taken along reach LLR 2

Waypoint 007 - downstream extent LLR 2
N 34.57973
W -80.57031

006 → 007 = 0.14 miles apart

ARCADIS Project No. B0016630 JV, BF, WM

Romarco-HGM Stream Surveys 10/14/11

Waypoint 008 - upstream extent of LLR 4
N 34.55965
W -80.55068

☆(2) Photos taken upstream of LLR 4 @ LWD
☆(2) Photos taken @ upstream end of LLR 4

Waypoint 009 - potential LLR 6 site
N 34.51578 - Large agricultural field/pasture
W -80.52724 on west side of LLR 6

☆(4) Photos taken of reach and 341 Bridge area
☆(3) Photos taken of pasture (cattle observed grazing)

END of Day

ARCADIS Project No. B0016630 | B. Fulton, W. Medlin

Romarco - HGM Stream Surveys 10/15/11

LLR1 Data Sonde Measurements (upper end of reach)

Temp. 14.87°C
Spec. cond. 0.138 mS/cm²
DO% 60.3%
DO mg/L 6.09
DO charge 50.2
pH 7.45
pH mV -31.9
ORP 234.1
Turbidity 14.0 NTU

Stream width measurements

#1 Wetted width = 6.3 m
#2 WW = 10.5 m
#3 WW = 1.2 m
#4 WW = 9.5 m
#5 WW = 3.0 m (5 Photos taken @ this location) ~70 m downstream from OC2
#6 WW = 4.25 m

Average wetted width = 5.8 m
Stream Reach Length = ~~232 m~~ 177 m

Waypoint 010 - small, unnamed trib @ downstream extent of LLR1
N 34.58525
W -80.57701

ARCADIS Project No. B0016630

Romarco - HGM Stream Surveys @ 10/15/11

Photo 101-6570 } sediment deposition & constriction
6571 }
6572 }

Large Woody Debris: 5.6 m x 0.5; 3.2 m x 0.2; 0.5 m x 0.1; 1x0.5; 1.5x0.5; 6x0.8; 8x0.4; 1x0.5; 3x0.5; 7x0.5; 30x0.5; 12x0.5; 3.5x0.3

Photo 6573 - large woody debris
6575 - Cobble, small boulders in channel (road)

Waypoint 011 N 34.58569 } Upstream extent of
W 80.57917 } LLR2 (Length Measured)

LLR2 1317 10/15/11 ~75°F Clear

~~In-Situ Water Quality~~

Waypoint 007 downstream extent of LLR2
N 34.57973
W -80.57088
Temp - 15.66°C
Sp. Cond - 0.114 mS/cm²
DO% 68.0%
DO mg/L - 6.76
DO charge - 51.2
pH - 7.71
pH mV - -42.5
ORP - 178.3
Turb - 4.1 NTU

Stream Width (m)	
#1	9.5
#2	4.1
#3	11.8
#4	6.6
#5	10.3
#6	6.3
#7	2.3

Mean Width = 7.3
Mean Reach length = 218

LLR2

LWD Estimates

0.5x0.2; 10x0.3; 14x0.25; 21x0.3;
8x0.3; 6x0.3; 0.5x0.2; 10x0.4;
4x0.9; 15x0.4; 7x0.2; 12x0.8

LLR2 photos 6876 - looking downstream } @ top downstream extent of sample reach
6877 - looking upstream
6878 - left bank incised, undercut root bed
6879 - right bank incised
6880 - looking downstream
6881 - dense leaf ~~deposit~~ deposit
6882 - Point bar development (sand deposit)
6883 - LWD w/ CPOM
↳ Stable / Colonized

Waypoint 012 - unnamed tributary below LLR3
N 34.56994
W -80.55898

LLR3

In-Situ:

Temp - 16.75	DO charge 50.7
Sp - 0.115 mS/cm²	pH - 7.57
DO - 66.1%	pH mV - -34.8
DO - 6.44 mg/L	ORP - 207.5
	Turb - 4.5 NTU

Waypoint 013: N 34.57099, W 80.55994 } downstream extent of LLR3

Stream Widths:

#1	1.4 m
#2	5.4 m
#3	8.3 m
#4	8.6
#5	4.0

Reach length = 166.2 m

Mean Width = 5.54

LWD estimates

13x0.8; 4x0.2; 4x.3; 3.5x0.25;
3x0.4; 15x0.5; 1.5x0.4; 1x0.5;
8x0.2; 2.5x0.2;

Waypoint - 14 N 34.57161, W -80.56122 } Small tributary

LLR3 photos: 6884 - downstream } downstream extent of sample reach
6885 - upstream
6886 - Undercut root bank (unstable)
6887 - Large Sandbar
6888 - Deeply incised RB
6889 LB @
6890 Riffle

ARCADIS Project No. B0016630 BF, WM

LLR3 Photos Cont'd 10/15/11

~~6891~~ 6890 - CBM / Little

~~6892~~ 6891 -

ARCADIS Project No. B0016630 B. Fulton, W. Mullin

Romarco - HGM Stream Surveys 10/16/11

LLR 4

Waypoint 015 - Downstream extent of LLR4

N 34.55715

W -80.54955

* Hunting blind w/in Little Lynches River channel approx. 100 m downstream

Wetted Width Measurements

#1 (downstream extent) = 6.4 m / #2 = 7.2 / #3 = 4.1 / #4 = 24; 10.2; 7.9; 12.6; 11.9 Mean = 7.8 x 30

Photos - Nikon Camera = After Raccoon pics, Reach length = 234

1 - looking downstream

2 - Exposed root mat / undercut

3 - Deeply incised

4 - LWD

Sony Camera 6896 - 6899 (up / downstream, undercut bank)

Nikon 5 - looking upstream, sandbar > lower extent of reach

6 - " - downstream

7 - Incised LB

8 - Sand Bar LB

9 - Close up of undercut bank / root mat

10 - Riffle #2 13 - Partly Shaded Canopy

11 - LWD 14 - Point Bar Feed. / Riffle

12 - Sand Bar 15 - LWD - New fall

16 - "

LLR4 LWD Estimates (m)

10x0.25; 4x0.8; 6x0.5; 2x0.3; 1.5x0.5
10x0.3; 12.5x0.4; 5x0.4; 10x0.4; 1x0.25
11x0.3; 2x0.5; 6x0.25; 8x0.3; 6x0.2
2x0.7; 0.9x0.6; 12x0.3; 6x0.6; 9x0.3
0.5x0.2; 2.5; 5x0.4; 1.5x0.25; 6x0.3
2x0.35; 0.5x0.5; 2x0.3;

Waypoint 16 - Upper extent of LLR4
N 34.55925
W -80.55063

LLR5 - Accessed from SC-157 bridge, and hiked downstream
10/16/11 - 1250

Waypoint 17 - Downstream extent of LLR5 - moved upstream ~~≈500~~ ≈300 meters from pre-determined point for access.
N - 34.54351
W - -80.54463
Just upstream of small tributary → Waypoint 17

In-situ
Temp - 14.40
Sp Cond - 0.147 ms/cm²
DO% - 89.5
DO - 9.10 mg/L
DO chg - 51.2
pH - 7.92
pH mV - 53.6
ORP - 162.0
Turb - 5.3 NTU

Stream Widths
#1 - 11.9
#2 - 4.2
#3 - 2.8
#4 - 9.8
#5 - 10.3
#6 - 7.7
#7 - 6.8

Photos
#1 - Looking D/S
#2 - " U/S
@ d/s extent of reach
#3 - looking upstream w/ sand bar
#4 - Small riffle
#5 - Bank failure (LB) w/ re-vegetation
#6 - Partly shaded canopy cover
#7 - RB - Eroded w/ only patches of veg.
#8 - Sand bar w/ water filling ≈10% of available channel
#9 - Example undercut bank
#10 - LWD - creating pool
#11 - Looking U/S
#12 - Veg Bank

Mean Width = 7.6 x 30 = 229.2 Reach Length

LLRS LWD Estimates

8x0.4; 2.5x0.15; 0.75x0.8; 0.75x0.5
11x0.4; 7x0.3; 7.5x0.4; 4x0.7;
8x0.3; 3x0.8; 9x0.5; 11.5x0.6
9.5x0.3; 8.5x0.4; 7.5x0.3; 7.0x0.4

LLRS Photo's Cont'd

#13 - Looking d/s
#14 Looking u/s
} upper extent of reach

Waypoint 18 =
N 34.59565
W -80.54360
} upstream extent of LLRS

~~LWD Estimates~~

~~END of Day~~

LLR6 10/16/11 1522

Photos 1-7 - Cattle Ramp to River showing evidence of local NPS source erosion/pollution

Waypoint 019 N 34.51508 W -80.52705 > Location of photos & downstream of sample reach

Waypoint 020 N 34.51578 W -80.52715 > downstream extent of LLR6

In-Situ

Temp = 17.31
Sp Cond = 0.122 ms/cm²
pH = 7.38
pH mV = -25.5
DO% = 93.2
DO mg/L = 9.00
DO chg = 52.3
ORP = 54.8
Turbidity = 2.0

Notes: Right Bank has large agriculture field
- Cattle ramp into River downstream of reach
- Loose unstable LWD, but not as much stable LWD compared to upstream LLR

LLR6 LWD Estimates

5×0.2; 0.5×0.5; 2.5×0.2; 0.2×0.4
0.7×0.4; 0.5×0.25; ~~0.33×0~~ 0.2×0.3
1×0.4; 5×0.4; 2.5×0.3; 4.5×0.3
8×0.2;

Notes: Dark red/brown periphyton observed in upper reach of LLR6

Stream Widths

#1 = 2.3 #4 = 9.4
#2 = 7.8 #5 = 2.5
#3 = 5.3 #6 = 6.4

Mean Width = 5.6 m
Reach Length 168 m

LLR6 photos (after downstream shots of pasture)

#8 - upstream
#9 - downstream > downstream extent of sample reach
#10 - LB (incised - bare spots)
#11 - RB
#12 RB w/ sand bar
#13 Upstream
#14 Upstream (sand bar - small riffle)
#15 LWD
#16 Partly shaded canopy
#17-19 = Upstream section of pasture (note - fenced off) → horses & cattle
#20 - Water filling ≈25% of channel
#21 - will taking flow measurement @ Riffle (#8 4)

Waypoint 22
N 34.51765
W -80.52734

Tributary into sample reach - not shown on map

Waypoint 23
N 34.51830
W -80.52759

Upper extent of CB6

END of DAY

ARCADIS Project No. B0016630 WLM, BF

Romaco - HGM Stream Surveys 10/17/11

Camp Branch Stream segments

CB3, 2, 1 - begin @ CB3; parked at crossing of Tom Gregory Rd.

Weather: clear, sunny 50°F (0830)

CB3

Waypoint 024 on datasheet (Tom Gregory Rd crossing)

Waypoint 025 - downstream extent CB3

N 34.59021
W -80.56815

Stream Width	CB3 Photos
#1 2.6	1 - Upstream @ bdk extent of reach
#2 3.3	2 - Downstream
#3 3.3	3 - Notchak
#4 2.0	4 - Incised LB
#5 4.9	5 - " RB
Mean Width = 3.22 m	6 - looking upstream cobble
	7 - RB incision (w/ will for scale)
Reach = 96.6' 100m	8 - Upstream about 50m upstream from waypt #25
	9 - Downstream
	10 - Canopy Cover ≈60% shade
	11 - Upstream upstream extent
Will's Camera = 101-6904 - 6911	12 - downstream
	13 - Canopy Cover - ≈90%

CB3 In-Situ

downstream		mid-point
Temp	12.20 C	12.26
Sp Cond	0.074	0.074
DO%	109.4	105.0
DO mg/L	11.21	11.24
DO chg	51.2	51.2
pH	7.57	7.26
pH mV	-36.1	-20.3
ORP	132.8	120.6
Turb	2.5 NTU	3.1

CB1	Stream width (m)
#1	0.75
#2	1.5
#3	1.2
#4	0.42
#5	0.35

10/17/11 CB1

Waypoint 026 N 34.60679 W -80.55286 } downstream extent of CB1

In-Situ

Temp	13.62
Sp Cond	0.060
DO%	93.3
DO mg/L	9.74
DO chg	52.3
pH	7.10
pH mV	-10.7
ORP	161.5
Turb	11.9 NTU

Photos - CB1

#1 - downstream
#2 - upstream
3 - Canopy
4 - Veg Banks
5 - Incised bare bank (LB)
6 - Channel - 95% full
7 - Periphyton
8 - Bedrock
9 - downstream (~30% full channel)
10 - Aq. Veg
11 - Small beaver dam

CWD

0.4x0.25 ; 3x0.3 ; 7x0.25 ; 4x0.25

12 - Aquatic Veg
13 - LB } upper extent of reach
14 - RB

Waypoint 27

N 34.60785 W -80.55294 } 2 upstream extent of reach

10/17/11 HGMC2

Waypoint 031

N 34.57375 } Upstream extent
W -80.54306 } of Reach

In-Situ		HGMC2 Photos
Temp	18.81	#1: looking upstream } @ upstream extent
Sp Cond	0.184	#2: looking downstream } of single reach
DO%	124.3	3 - Veg Bank
DO mg/L	11.57	4 - Small Riffle
DO chg	58.4	5 - } Periphyton } dominant
pH	4.98	6 - } on cobble }
pH mV	108.4	7 } Full channel
ORP	183.5	8 }
Turb	9.4	9 - Clearing on RB

Stream Widths

#1	1.5	10 - Small point Bar
#2	1.7	11 } Exposed Substrate
#3	1.2	12 } in riffle
#4	1.8	13 - Newfall LWD
#5	~~0.66~~ 2.3	14 - Point Bar
		15 - Upstream } 60 m d/s from
		16 - Downstream } start

LWD

0.25 x 0.25 ; 0.25 x 0.3 ;

End of Day BF

Waypoint 032

N 34.57306 } downstream
W 80.54369 } extent of HGMC2

10/18/11 HGMC1

In-Situ		Photos
Temp	15.51	1 - upstream } upstream extent of
Sp Cond	0.071	2 - downstream } HGMC1
DO%		DO membrane/o-ring came off
DO mg/L		probe so unable to record value
DO chg		
pH	4.76	3 - ~~Dry~~ channel - sandy rock, loamy sand
pH mV	120.5	4 - Mostly shaded canopy
ORP	182.6	5 - Standing pool
Turbidity	0.0	6 - " " w/ LWD
		7 - Leaf-filled channel

Waypoint 33 N 34.59241 } Upstream extent of
W -80.51999 } HGMC1

LWD - Abundant, but only counting LWD in contact w/ water

3.5 x 0.8 ; 0.5 x 0.25 ; 1 x 0.25 ; 0.25 x 0.25
0.25 x 0.25 ; 0.25 x 0.25 ; 0.25 x 0.25 ; 0.25 x 0.25
0.4 x 0.25 ; 0.75 x 0.25 ; 0.3 x 0.3 ; 2.2 x 0.3

CB2 10/17/11

Waypoint 29 N 34.59933 } downstream extent of sample reach
W -80.55665

In-Situ

Temp	17.55
Sp Cond	0.065
DO%	100.6
DO mg/L	9.64
DO chg	55.3
pH	7.39 ~~7.79~~
pHmV	-45.7
ORP	257.9
Turb	5.5

Photos

#1 - Evidence of Bank failure
#2 } Clearing LB
#3 } from prison
#4 Mostly open canopy
#5 - downstream } lower extent
6 upstream
7 - Veg Bank
8 - Unstable, unveg bank
9 - LWD - newfall
10 - Small point bar development, undercut bank, ~25% of channel fill
11 } undercut root bank
12 }
13 - Unstable, eroded bank
14 Downstream
15 Upstream
16 - Riffle
17 - Bank failure
18 - Point bar development
19 - LWD
20 - Flow measurement
21 - Leaf pack - LWD

22 - Mostly shaded canopy

CB2 LWD Estimates

1.5x0.25; 0.75x0.3; 0.8x0.2; 0.5x0.25
0.5x0.25; 0.25x0.3; 2x0.4; 4x0.2;

Waypoint #30 N 34.60025 } downstream extent of CB1
W -80.55577

Stream Widths:
#1 = 2.2
#2 = 3.9
#3 = 1.9
#4 - 0.9
#5 - 0.3

8 - Right overbank
9 - Left overbank
10 - Undercut Root Mat/Bank
11 - Mostly Shaded Canopy cover
12 - Upstream } at downstream
13 - Downstream } extent of sample reach

Waypoint 34
N 34.59182 } downstream extent
W 80.52085 } of HomC1

HomC1 Stream Widths

#1 - 1m
#2 - 0.75
#3 - 0.55
#4 - 1.8
#5 0.075

UT 1 - 10/18/11

Waypoint 35
N 34.57389 } upstream extent of
W 80.52170 } UT 1

In-Situ

Temp	15.83
DO%	69.8
DO mg/L	6.93
DO chg	56.3
pH	4.60
pH mV	125.8
ORP	278.9
Turbidity	1.8
Sp Cond	0.050

Stream Widths

#1 1.5
#2 1.3
#3 - 0.75
#4 - 0.93
#5 - 2.3 - Widest point shown

UT1 Photos

1 - Upstream } upstream extent of
2 - Downstream } sample reach
3 - Canopy
4 - Notebook
5 - Full channel
6 - LWD
7 - Downstream
8 - Canopy
9 - Upstream
10 - "
11 - Undercut not bank
Cs common throughout
12 - Pooled water
13 - Riffles - (Common)
14 - Point Bar
15 - "
16 - Upstream } @ d/s extent
17 - Downstream } of reach

Waypoint 36
N 34.57382 } downstream extent
W 80.52272 } of sample reach

UT1 LWD Estimates

0.25x0.25 (x6 pieces); 0.3x0.25; 0.5x2
0.5x1; 2x0.25; 0.25x0.25; 2x0.5;
~~0.25x0.25~~ = 0.25x1; 0.25x1; 0.25x0.25
~~0.5x0.25~~ = 0.25x0.25; 1.5x0.25;
~~0.5x1~~ = 1x0.25 (0.25x0.25x5)
2x0.3; 0.75x0.3; 1.0x0.4; 0.75x
0.75; 1x0.25; (0.25x0.25x16)
0.75x0.3;

BC3 - 10/18/11

Notes: Original (pre-determined) BC3 point located upstream @ Catawba Road crossing. No bridge but culvert is too small to properly drain creek below road, resulting in very significant impondment changing channel morphology - more pond-like!
↳ Wetland

Photos - BC3

#1 - } heavy erosion
#2 - } from fill material
#3 - }
-4 } impondment wetland area
-5 }
6 - Undersized culvert
7 - Just upstream of culvert
8 - Outflow of culvert
9 } Channel downstream of culvert } No flow, thick vegetation
10 }

* Abundant debris/sediment ~~in~~ in upstream culvert

In-Situ - BC-3 (downstream of road crossing)

Temp	15.67
DO%	50.1
DO mg/L	4.99
DO chg	55.3
pH	5.53
pH mV	78.2
ORP	187.5
Turb	2.0
Sp Cond	0.062

Additional Notes: Embedded substrate (5-20cm)
- periphyton downstream of crossing
- Trash dumped in stream

91052 LWD Estimates

2x0.3; 0.25x3; 4.5x0.4; 2.5x0.25
1.5x0.25; 1x0.3; 3x0.3; 3x0.3;
2.5x0.25; 0.5x0.3; 0.6x0.25;
2.2x0.25; 3.8x0.25; 3x0.25; 2.5x0.35
2.5x0.4; 6.5x0.5;

Stream Assessment Site 91052

Stream Widths

1 3.0m
2 4.9m
3 4.3m
4 5.8
5 5.2
6 ~~18~~ 6.3

Waypoint 37
N 34.56739
W -80.43503
→ Downstream extent of 91052

Mean = 4.91 x 30 = 147.5

91052 Photos

1 - Downstream
2 - Upstream
3 - Canopy
} downstream extent of reach
4 - Point Bar enlargement (gravel/sand)
5 - Bank Failure (Re-vegetated)
6 - Point Bar enlargement
7 } Riffle
8
9
10 - Point Bars
11 - Undercut, unstable Bank
12 - downstream
13 - upstream
14 - ~75% full channel
15 - Bank full
16 - Canopy
17 - Point Bar
18 - "
19 - Aquatic Veg
20 - Upstream
21 - LB
22 - RB
23 - D/S
24 - US
} Upper extent of reach

9/052 In-Situ

Temp -	16.49
Sp Cond -	0.050
pH -	5.89
pH mV -	57.9
DO %	90.4
DO mg/L -	8.83
DO chg -	57.4
ORP -	367.9
Turb -	6.7

Waypoint 38

N 34.56815
W -80.43639

Upper extent of 9/052

BC2 In-Situ

Temp	15.80
Sp Cond	0.057
pH	5.30
pH mV	77.1
DO %	74.6
DO mg/L	7.41
DO chg	56.3
ORP	263.9
Turb	0.9

BC2

Way Point 39 N 34.59938 W -80.49707 } upper extent of BC2

8 ~4 photos taken before notebook shot

LWD
2×0.5 ; 0.2×0.25 ; 0.5×3.5 ;
3.5×0.4 ; 0.25×0.25 ; 4×0.3
0.25×0.25 ; 0.25×0.25 ; 0.3×0.2
0.75×0.25 ; 2×0.25 ; 2.5×0.3
0.3×0.3 ; 0.4×1 ; 1×0.2

widths = 3.3 ; 5.0, 1.9,
3.0, 2.9, 2.4

Waypoint 40
N 34.59885
W 80.49597 } downstream extent of BC2

Depth	Velocity	Substrate
0.08	0.05	Sand
1.1	0	12
0.8	0	Sand
0.4	0.08	9
0.45	0	LWD
0.2	1.1	6
0.4	0.26	9
0.45	0.28	LWD/FWD
1.1	0.09	4
0.75	0.02	Sand
0.5	0.20	13
0.45	0.48	7
0.5	0	Sand
0.65	0	Leaf
0.3	0.11	FWD
0.2	0.44	9
0.3	0.55	Sand
0.4	0.11	Leaf
0.3	0.32	3
0.3	0.22	41
0.2	0.02	Leaf
0.3	0.26	374
0.25	0.44	8
0.25	1.29	14
0.38	0.60	LWD

CONTENTS		
PAGE NO.	REFERENCE	DATE

ARCADIS Project No. B0016630 W. Medlin

Haile Gold Mine / Romarco Minerals 10/14/11

SCDNR Methodology

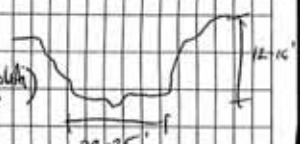
Average stream width = (wetted width) X @ the bottom of the sample reach and then @ ~~each~~ every 25 M to the upstream limit of the reach.

Average stream depth = measure H_2O depth @ three positions where X was measured.

- Arrived @ site 0800
- Signed in and grabbed gear from Lawrence's office; Spoke w/ Dave Thomas

★ 1st investigation pt LLR 1
- parked @ bridge crossing off Pleasant Plains Road.

LLR 1 ★ Pink flags observed
Bankfull width ~ 32' (10.6 m)
Wetted width ~ 22' (7.3 m)
★(5) Photos taken along reach
OHWM ~ 4'
- 1 dead fish observed in Little Lynches R. (Jason - Smallmouth Bass)



Waypoint 001
Downstream extent of LLR 1
N 34.58522
W -80.57716

ARCADIS Project No. B0016630 J. Vogel, B. Fulton, W. Medlin

Romarco - HGM Stream Surveys 10/14/11

Waypoint 002 - Upstream extent of LLR 1
N 34.58577
W -80.57960

001 to 002 = 0.14 mile

Waypoint 003 - Accidental

Waypoint 004 - (impoundment/Sheetpile)
N 34.57740
W - 80.56706

Waypoint 005 - confluence of Camp Branch/LLR
N 34.58287
W -80.57170

☆ Large fallen tree and root mass → resulting in deep pool

LLR 2

Waypoint 006 - upstream extent of LLR 2
N 34.58177
W -80.57068

☆(5) Photos taken along reach LLR 2

Waypoint 007 - downstream extent LLR 2
N 34.57973
W -80.57031

006 → 007 = 0.14 miles apart

ARCADIS Project No. B0016630 JV, BF, WM

Romarco-HGM Stream Surveys 10/14/11

Waypoint 008 - upstream extent of LLR 4
N 34.55965
W -80.55068

☆(2) Photos taken upstream of LLR 4 @ LWD
☆(2) Photos taken @ upstream end of LLR 4

Waypoint 009 - potential LLR 6 site
N 34.51578 - Large agricultural field/pasture
W -80.52724 on west side of LLR 6

☆(4) Photos taken of reach and 341 Bridge area
☆(3) Photos taken of pasture (cattle observed grazing)

END of Day

ARCADIS Project No. B0016630 | B. Fulton, W. Medlin

Romarco - HGM Stream Surveys 10/15/11

LLR1 Data Sonde Measurements (upper end of reach)

Temp. 14.87°C
Spec. cond. 0.138 mS/cm²
DO% 60.3%
DO mg/L 6.09
DO charge 50.2
pH 7.45
pH mV -31.9
ORP 234.1
Turbidity 14.0 NTU

Stream width measurements

#1 Wetted width = 6.3 m
#2 WW = 10.5 m
#3 WW = 1.2 m
#4 WW = 9.5 m
#5 WW = 3.0 m (5 Photos taken @ this location) ~70 m downstream from OC2
#6 WW = 4.25 m

Average wetted width = 5.8 m
Stream Reach Length = ~~232 m~~ 177 m

Waypoint 010 - small, unnamed trib @ downstream extent of LLR1
N 34.58525
W -80.57701

ARCADIS Project No. B0016630

Romarco - HGM Stream Surveys @ 10/15/11

Photo 101-6570 } sediment deposition & constriction
6571 }
6572 }

Large Woody Debris: 5.6 m x 0.5; 3.2 m x 0.2; 0.5 m x 0.1; 1x0.5; 1.5x0.5; 6x0.8; 8x0.4; 1x0.5; 3x0.5; 7x0.5; 30x0.5; 12x0.5; 3.5x0.3

Photo 6573 - large woody debris
6575 - Cobble, small boulders in channel (road)

Waypoint 011 N 34.58569 } Upstream extent of
W 80.57917 } LLR2 (Length Measured)

LLR2 1317 10/15/11 ~75°F Clear

~~In-Situ Water Quality~~

Waypoint 007 downstream extent of LLR2
N 34.57973
W -80.57088
Temp - 15.66°C
Sp. Cond - 0.114 mS/cm²
DO% 68.0%
DO mg/L - 6.76
DO charge - 51.2
pH - 7.71
pH mV - -42.5
ORP - 178.3
Turb - 4.1 NTU

Stream Width (m)	
#1	9.5
#2	4.1
#3	11.8
#4	6.6
#5	10.3
#6	6.3
#7	2.3

Mean Width = 7.3
Mean Reach length = 218

LLR2

LWD Estimates

0.5x0.2; 10x0.3; 14x0.25; 21x0.3;
8x0.3; 6x0.3; 0.5x0.2; 10x0.4;
4x0.9; 15x0.4; 7x0.2; 12x0.8

LLR2 photos 6876 - looking downstream } @ top downstream extent of sample reach
6877 - looking upstream
6878 - left bank incised, undercut root bed
6879 - right bank incised
6880 - looking downstream
6881 - dense leaf ~~deposit~~ deposit
6882 - Point bar development (sand deposit)
6883 - LWD w/ CPOM
↳ Stable / Colonized

Waypoint 012 - unnamed tributary below LLR3
N 34.56994
W -80.55898

LLR3

In-Situ:

Temp - 16.75	DO charge 50.7
Sp - 0.115 mS/cm²	pH - 7.57
DO - 66.1%	pH mV - -34.8
DO - 6.44 mg/L	ORP - 207.5
	Turb - 4.5 NTU

Waypoint 013: N 34.57099, W 80.55994 } downstream extent of LLR3

Stream Widths:

#1	1.4 m
#2	5.4 m
#3	8.3 m
#4	8.6
#5	4.0

Reach length = 166.2 m

Mean Width = 5.54

LWD estimates

13x0.8; 4x0.2; 4x.3; 3.5x0.25;
3x0.4; 15x0.5; 1.5x0.4; 1x0.5;
8x0.2; 2.5x0.2;

Waypoint - 14 N 34.57161, W -80.56122 } Small tributary

LLR3 photos: 6884 - downstream } downstream extent of sample reach
6885 - upstream
6886 - Undercut root bank (unstable)
6887 - Large Sandbar
6888 - Deeply incised RB
6889 LB @
6890 Riffle

ARCADIS Project No. B0016630 BF, WM

LLR3 Photos Cont'd 10/15/11

~~6891~~ 6890 - CBM / Little

~~6892~~ 6891 -

ARCADIS Project No. B0016630 B. Fulton, W. Mullin

Romarco - HGM Stream Surveys 10/16/11

LLR 4

Waypoint 015 - Downstream extent of LLR4

N 34.55715

W -80.54955

* Hunting blind w/in Little Lynches River channel approx. 100 m downstream

Wetted Width Measurements

#1 (downstream extent) = 6.4 m / #2 = 7.2 / #3 = 4.1 / #4 = 24; 10.2; 7.9; 12.6; 11.9 Mean = 7.8 x 30

Photos - Nikon Camera = After Raccoon pics, Reach length = 234

1 - looking downstream

2 - Exposed root mat / undercut

3 - Deeply incised

4 - LWD

Sony Camera 6896 - 6899 (up / downstream, undercut bank)

Nikon 5 - looking upstream, sandbar > lower extent of reach

6 - " - downstream

7 - Incised LB

8 - Sand Bar LB

9 - Close up of undercut bank / root mat

10 - Riffle #2 13 - Partly Shaded Canopy

11 - LWD 14 - Point Bar Feed. / Riffle

12 - Sand Bar 15 - LWD - New fall

16 - "

LLR4 LWD Estimates (m)

10x0.25; 4x0.8; 6x0.5; 2x0.3; 1.5x0.5
10x0.3; 12.5x0.4; 5x0.4; 10x0.4; 1x0.25
11x0.3; 2x0.5; 6x0.25; 8x0.3; 6x0.2
2x0.7; 0.9x0.6; 12x0.3; 6x0.6; 9x0.3
0.5x0.2; 2.5; 5x0.4; 1.5x0.25; 6x0.3
2x0.35; 0.5x0.5; 2x0.3;

Waypoint 16 - Upper extent of LLR4
N 34.55925
W -80.55063

LLR5 - Accessed from SC-157 bridge, and hiked downstream
10/16/11 - 1250

Waypoint 17 - Downstream extent of LLR5 - moved upstream ~~≈500~~ ≈300 meters from pre-determined point for access.
N - 34.54351
W - -80.54463
Just upstream of small tributary → Waypoint 17

In-situ
Temp - 14.40
Sp Cond - 0.147 ms/cm²
DO% - 89.5
DO - 9.10 mg/L
DO dry - 51.2
pH - 7.92
pH mV - 53.6
ORP - 162.0
Turb - 5.3 NTU

Stream Widths
#1 - 11.9
#2 - 4.2
#3 - 2.8
#4 - 9.8
#5 - 10.3
#6 - 7.7
#7 - 6.8

Photos
#1 - Looking D/S
#2 - " U/S
@ d/s extent of reach
#3 - looking upstream w/ sand bar
#4 - Small riffle
#5 - Bank failure (LB) w/ re-vegetation
#6 - Partly shaded canopy cover
#7 - RB - Eroded w/ only patches of veg.
#8 - Sand bar w/ water filling ≈10% of available channel
#9 - Example undercut bank
#10 - LWD - creating pool
#11 - Looking U/S
#12 - Veg Bank

Mean Width = 7.6 x 30 = 229.2 Reach Length

LLRS LWD Estimates

8x0.4; 2.5x0.15; 0.75x0.8; 0.75x0.5
11x0.4; 7x0.3; 7.5x0.4; 4x0.7;
8x0.3; 3x0.8; 9x0.5; 11.5x0.6
9.5x0.3; 8.5x0.4; 7.5x0.3; 7.0x0.4

LLRS Photo's Cont'd

#13 - Looking d/s
#14 Looking u/s
} upper extent of reach

Waypoint 18 =
N 34.59565
W -80.54360
} upstream extent of LLRS

~~LWD Estimates~~

~~END of Day~~

LLR6 10/16/11 1522

Photos 1-7 - Cattle Ramp to River showing evidence of local NPS source erosion/pollution

Waypoint 019 N 34.51508 W -80.52705 > Location of photos & downstream of sample reach

Waypoint 020 N 34.51578 W -80.52715 > downstream extent of LLR6

In-Situ

Temp = 17.31
Sp Cond = 0.122 ms/cm²
pH = 7.38
pH mV = -25.5
DO% = 93.2
DO mg/L = 9.00
DO chg = 52.3
ORP = 54.8
Turbidity = 2.0

Notes: Right Bank has large agriculture field
- Cattle ramp into River downstream of reach
- Loose unstable LWD, but not as much stable LWD compared to upstream LLR

LLR6 LWD Estimates

5×0.2; 0.5×0.5; 2.5×0.2; 0.2×0.4
0.7×0.4; 0.5×0.25; ~~0.33×0~~ 0.2×0.3
1×0.4; 5×0.4; 2.5×0.3; 4.5×0.3
8×0.2;

Notes: Dark red/brown periphyton observed in upper reach of LLR6

Stream Widths

#1 = 2.3 #4 = 9.4
#2 = 7.8 #5 = 2.5
#3 = 5.3 #6 = 6.4

Mean Width = 5.6 m
Reach Length 168 m

LLR6 photos (after downstream shots of pasture)

#8 - upstream
#9 - downstream > downstream extent of sample reach
#10 - LB (incised - bare spots)
#11 - RB
#12 RB w/ sand bar
#13 Upstream
#14 Upstream (sand bar - small riffle)
#15 LWD
#16 Partly shaded canopy
#17-19 = Upstream section of pasture (note - fenced off) → horses & cattle
#20 - Water filling ≈25% of channel
#21 - will taking flow measurement @ Riffle (#8 4)

Waypoint 22
N 34.51765
W -80.52734

Tributary into sample reach - not shown on map

Waypoint 23
N 34.51830
W -80.52759

Upper extent of CB6

END of DAY

ARCADIS Project No. B0016630 WLM, BF

Romaco - HGM Stream Surveys 10/17/11

Camp Branch Stream segments

CB3, 2, 1 - begin @ CB3; parked at crossing of Tom Gregory Rd.

Weather: clear, sunny 50°F (0830)

CB3

Waypoint 024 on datasheet (Tom Gregory Rd crossing)

Waypoint 025 - downstream extent CB3

N 34.59021
W -80.56815

Stream Width	CB3 Photos
#1 2.6	1 - Upstream @ bdk extent of reach
#2 3.3	2 - Downstream
#3 3.3	3 - Notchak
#4 2.0	4 - Incised LB
#5 4.9	5 - " RB
Mean Width = 3.22 m	6 - looking upstream cobble
	7 - RB incision (w/ will for scale)
Reach = 96.6' 100m	8 - Upstream about 50m upstream from waypt #25
	9 - Downstream
	10 - Canopy Cover ≈60% shade
	11 - Upstream upstream extent
Will's Camera = 101-6904 - 6911	12 - downstream
	13 - Canopy Cover - ≈90%

CB3 In-Situ

downstream		mid-point
Temp	12.20 C	12.26
Sp Cond	0.074	0.074
DO%	109.4	105.0
DO mg/L	11.21	11.24
DO chg	51.2	51.2
pH	7.57	7.26
pH mV	-36.1	-20.3
ORP	132.8	120.6
Turb	2.5 NTU	3.1

CB1	Stream width (m)
#1	0.75
#2	1.5
#3	1.2
#4	0.42
#5	0.35

10/17/11 CB1

Waypoint 026 N 34.60679 W -80.55286 } downstream extent of CB1

In-Situ

Temp	13.62
Sp Cond	0.060
DO%	93.3
DO mg/L	9.74
DO chg	52.3
pH	7.10
pH mV	-10.7
ORP	161.5
Turb	11.9 NTU

Photos - CB1

#1 - downstream
#2 - upstream
3 - Canopy
4 - Veg Banks
5 - Incised bare bank (LB)
6 - Channel - 95% full
7 - Periphyton
8 - Bedrock
9 - downstream (~30% full channel)
10 - Aq. Veg
11 - Small beaver dam

CWD

0.4x0.25 ; 3x0.3 ; 7x0.25 ; 4x0.25

12 - Aquatic Veg
13 - LB } upper extent of reach
14 - RB

Waypoint 27

N 34.60785 W -80.55294 } 2 upstream extent of reach

10/17/11 HGMC2

Waypoint 031

N 34.57375 } Upstream extent
W -80.54306 } of Reach

In-Situ		HGMC2 Photos
Temp	18.81	#1: looking upstream } @ upstream extent
Sp Cond	0.184	#2: looking downstream } of single reach
DO%	124.3	3 - Veg Bank
DO mg/L	11.57	4 - Small Riffle
DO chg	58.4	5 - } Periphyton } dominant
pH	4.98	6 - } on cobble }
pH mV	108.4	7 } Full channel
ORP	183.5	8 }
Turb	9.4	9 - Clearing on RB

Stream Widths

#1	1.5	10 - Small point Bar
#2	1.7	11 } Exposed Substrate
#3	1.2	12 } in riffle
#4	1.8	13 - Newfall LWD
#5	~~0.66~~ 2.3	14 - Point Bar
		15 - Upstream } 60 m d/s from
		16 - Downstream } start

LWD

0.25 x 0.25 ; 0.25 x 0.3 ;

End of Day BF

Waypoint 032

N 34.57306 } downstream
W 80.54369 } extent of HGMC2

10/18/11 HGMC1

In-Situ		Photos
Temp	15.51	1 - upstream } upstream extent of
Sp Cond	0.071	2 - downstream } HGMC1
DO%		DO membrane/o-ring came off
DO mg/L		probe so unable to record value
DO chg		
pH	4.76	3 - ~~Dry~~ channel - sandy rock, loamy sand
pH mV	120.5	4 - Mostly shaded canopy
ORP	182.6	5 - Standing pool
Turbidity	0.0	6 - " " w/ LWD
		7 - Leaf-filled channel

Waypoint 33 N 34.59241 } Upstream extent of
W -80.51999 } HGMC1

LWD - Abundant, but only counting LWD in contact w/ water

3.5 x 0.8 ; 0.5 x 0.25 ; 1 x 0.25 ; 0.25 x 0.25
0.25 x 0.25 ; 0.25 x 0.25 ; 0.25 x 0.25 ; 0.25 x 0.25
0.4 x 0.25 ; 0.75 x 0.25 ; 0.3 x 0.3 ; 2.2 x 0.3

CB2 10/17/11

Waypoint 29 N 34.59933 } downstream extent of sample reach
W -80.55665

In-Situ	
Temp	17.55
Sp Cond	0.065
DO%	100.6
DO mg/L	9.64
DO chg	55.3
pH	7.39 ~~7.79~~
pHmV	-45.7
ORP	257.9
Turb	5.5

Photos
#1 - Evidence of Bank failure
#2 } Clearing LB
#3 } from prison
#4 Mostly open canopy
#5 - downstream } lower extent
6 upstream
7 - Veg Bank
8 - Unstable, unveg bank
9 - LWD - newfall
10 - Small point bar development, undercut bank, ~25% of channel fill
11 } undercut root bank
12 }
13 - Unstable, eroded bank
14 Downstream
15 Upstream
16 - Riffle
17 - Bank failure
18 - Point bar development
19 - LWD
20 - Flow measurement
21 - Leaf pack - LWD

22 - Mostly shaded canopy

CB2 LWD Estimates

1.5x0.25; 0.75x0.3; 0.8x0.2; 0.5x0.25
0.5x0.25; 0.25x0.3; 2x0.4; 4x0.2;

Waypoint #30 N 34.60025 } downstream extent of CB1
W -80.55577

Stream Widths:
#1 = 2.2
#2 = 3.9
#3 = 1.9
#4 - 0.9
#5 - 0.3

8 - Right overbank
9 - Left overbank
10 - Undercut Root Mat/Bank
11 - Mostly Shaded Canopy cover
12 - Upstream } at downstream
13 - Downstream } extent of sample reach

Waypoint 34
N 34.59182 } downstream extent
W 80.52085 } of HomC1

HomC1 Stream Widths

#1 - 1m
#2 - 0.75
#3 - 0.55
#4 - 1.8
#5 0.075

UT 1 - 10/18/11

Waypoint 35
N 34.57389 } upstream extent of
W 80.52170 } UT 1

In-Situ

Temp	15.83
DO%	69.8
DO mg/L	6.93
DO chg	56.3
pH	4.60
pH mV	125.8
ORP	278.9
Turbidity	1.8
Sp Cond	0.050

Stream Widths

#1 1.5
#2 1.3
#3 - 0.75
#4 - 0.93
#5 - 2.3 - Widest point shown

UT1 Photos

1 - Upstream } upstream extent of
2 - Downstream } sample reach
3 - Canopy
4 - Notebook
5 - Full channel
6 - LWD
7 - Downstream
8 - Canopy
9 - Upstream
10 - "
11 - Undercut not bank
Cs common throughout
12 - Pooled water
13 - Riffles - (Common)
14 - Point Bar
15 - "
16 - Upstream } @ d/s extent
17 - Downstream } of reach

Waypoint 36
N 34.57382 } downstream extent
W 80.52272 } of sample reach

UT1 LWD Estimates

0.25x0.25 (x6 pieces); 0.3x0.25; 0.5x2
0.5x1; 2x0.25; 0.25x0.25; 2x0.5;
~~0.25x0.25~~ = 0.25x1; 0.25x1; 0.25x0.25
~~0.5x0.25~~ = 0.25x0.25; 1.5x0.25;
~~0.5x1~~ = 1x0.25 (0.25x0.25x5)
2x0.3; 0.75x0.3; 1.0x0.4; 0.75x
0.75; 1x0.25; (0.25x0.25x16)
0.75x0.3;

BC3 - 10/18/11

Notes: Original (pre-determined) BC3 point located upstream @ Catawba Road crossing. No bridge but culvert is too small to properly drain creek below road, resulting in very significant impondment changing channel morphology - more pond-like!
↳ Wetland

Photos - BC3

#1 - } heavy erosion
#2 - } from fill material
#3 - }
-4 } impondment wetland area
-5 }
6 - Undersized culvert
7 - Just upstream of culvert
8 - Outflow of culvert
9 } Channel downstream of culvert } No flow, thick vegetation
10 }

* Abundant debris/sediment ~~in~~ in upstream culvert

In-Situ - BC-3 (downstream of road crossing)

Temp	15.67
DO%	50.1
DO mg/L	4.99
DO chg	55.3
pH	5.53
pH mV	78.2
ORP	187.5
Turb	2.0
Sp Cond	0.062

Additional Notes: Embedded substrate (5-20cm)
- periphyton downstream of crossing
- Trash dumped in stream

91052 LWD Estimates

2x0.3; 0.25x3; 4.5x0.4; 2.5x0.25
1.5x0.25; 1x0.3; 3x0.3; 3x0.3;
2.5x0.25; 0.5x0.3; 0.6x0.25;
2.2x0.25; 3.8x0.25; 3x0.25; 2.5x0.35
2.5x0.4; 6.5x0.5;

Stream Assessment Site 91052

Stream Widths

1 3.0m
2 4.9m
3 4.3m
4 5.8
5 5.2
6 ~~18~~ 6.3

Waypoint 37
N 34.56739
W -80.43503
→ Downstream extent of 91052

Mean = 4.91 x 30 = 147.5

91052 Photos

1 - Downstream
2 - Upstream
3 - Canopy
} downstream extent of reach
4 - Point Bar enlargement (gravel/sand)
5 - Bank Failure (Re-vegetated)
6 - Point Bar enlargement
7 } Riffle
8
9
10 - Point Bars
11 - Undercut, unstable Bank
12 - downstream
13 - upstream
14 - ~75% full channel
15 - Bank full
16 - Canopy
17 - Point Bar
18 - "
19 - Aquatic Veg
20 - Upstream
21 - LB
22 - RB
23 - D/S
24 - US
} Upper extent of reach

9/052 In-Situ

Temp -	16.49
Sp Cond -	0.050
pH -	5.89
pH mV -	57.9
DO %	90.4
DO mg/L -	8.83
DO chg -	57.4
ORP -	367.9
Turb -	6.7

Waypoint 38

N 34.56815
W -80.43639

Upper extent of 9/052

BC2 In-Situ

Temp	15.80
Sp Cond	0.057
pH	5.30
pH mV	77.1
DO %	74.6
DO mg/L	7.41
DO chg	56.3
ORP	263.9
Turb	0.9

BC2

Way Point 39 N 34.59938 W -80.49707 } upper extent of BC2

8 ~4 photos taken before notebook shot

LWD
2×0.5 ; 0.2×0.25 ; 0.5×3.5 ;
3.5×0.4 ; 0.25×0.25 ; 4×0.3
0.25×0.25 ; 0.25×0.25 ; 0.3×0.2
0.75×0.25 ; 2×0.25 ; 2.5×0.3
0.3×0.3 ; 0.4×1 ; 1×0.2

widths = 3.3 ; 5.0, 1.9,
3.0, 2.9, 2.4

Waypoint 40
N 34.59885
W 80.49597 } downstream extent of BC2

Depth	Velocity	Substrate
0.08	0.05	Sand
1.1	0	12
0.8	0	Sand
0.4	0.08	9
0.45	0	LWD
0.2	1.1	6
0.4	0.26	9
0.45	0.28	LWD/FWD
1.1	0.09	4
0.75	0.02	Sand
0.5	0.20	13
0.45	0.48	7
0.5	0	Sand
0.65	0	Leaf
0.3	0.11	FWD
0.2	0.44	9
0.3	0.55	Sand
0.4	0.11	Leaf
0.3	0.32	3
0.3	0.22	41
0.2	0.02	Leaf
0.3	0.26	374
0.25	0.44	8
0.25	1.29	14
0.38	0.60	LWD

Comprehensive Baseline Wildlife and Aquatic Resources Report

Haile Gold Mine, Inc.

Appendix G

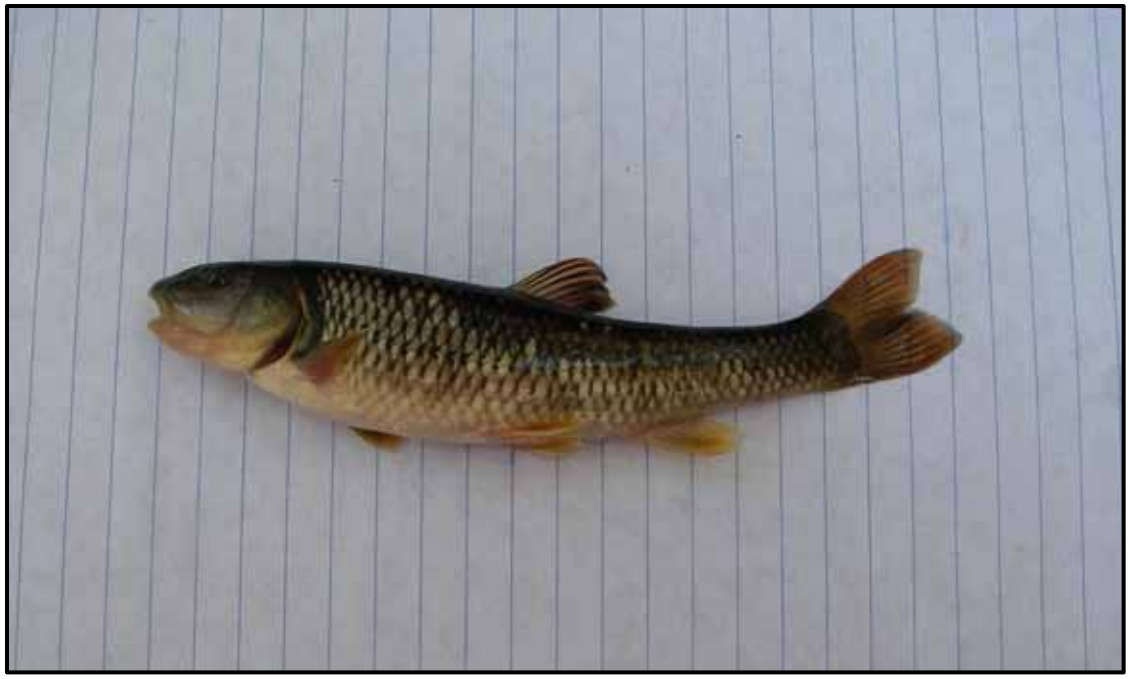
Fish Survey Field Notes and Photos

ARCADIS

Appendix G
Fish Survey
Project Photographs
October 24-27, 2011

Bluegill (*Lepomis macrochirus*)

1



Bluehead Chub (*Nocomis leptocephalus*)

2

Bluespotted Sunfish (*Enneacanthus gloriosus*)

3

Creek Chub (*Semotilus lumbee*)

4

5

Creek Chubsucker (*Erimyzon oblongus*)

6

Dollar Sunfish (*Lepomis marginatus*)

Dusky Shiner (*Notropis cummingsae*)

7

Eastern Mosquitofish (*Gambusia holbrooki*)

8

Flat Bullhead (*Ameiurus platycephalus*)

9

Flier (*Centrarchus macropterus*)

10

11

Green Sunfish (*Lepomis cyanellus*)

12

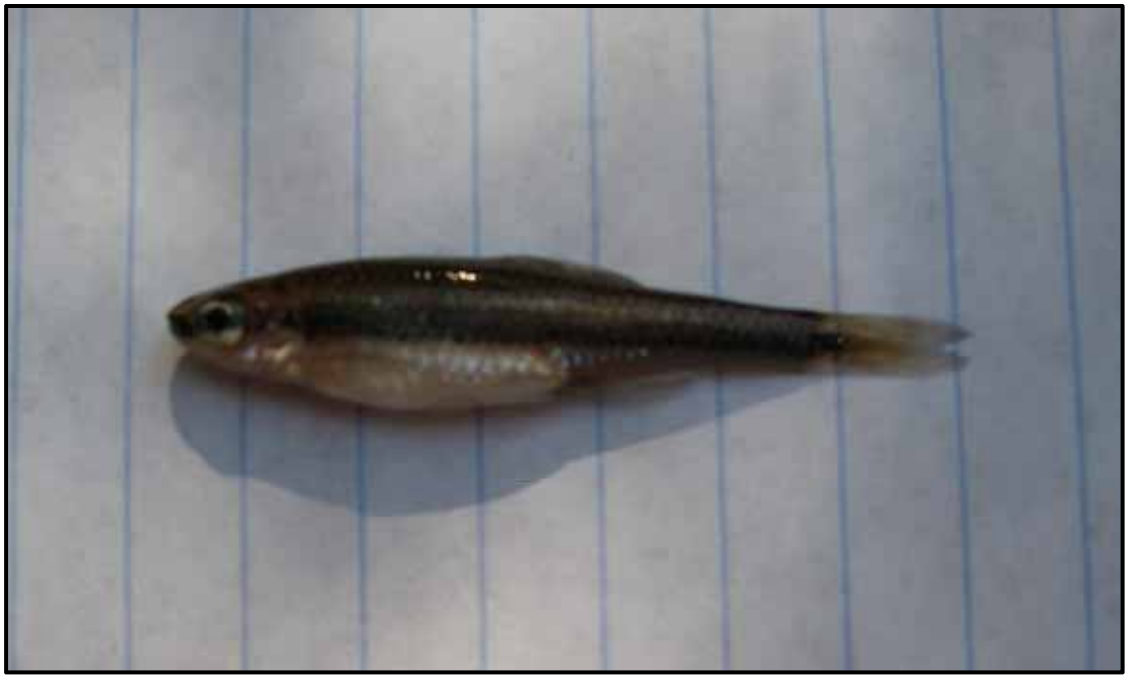
Greenfin Shiner (*Cyprinella chloristia*)

13

Greenhead Shiner (*Notropis chlorocephalus*)

14

Golden Shiner (*Notemigonus crysoleucas*)



15

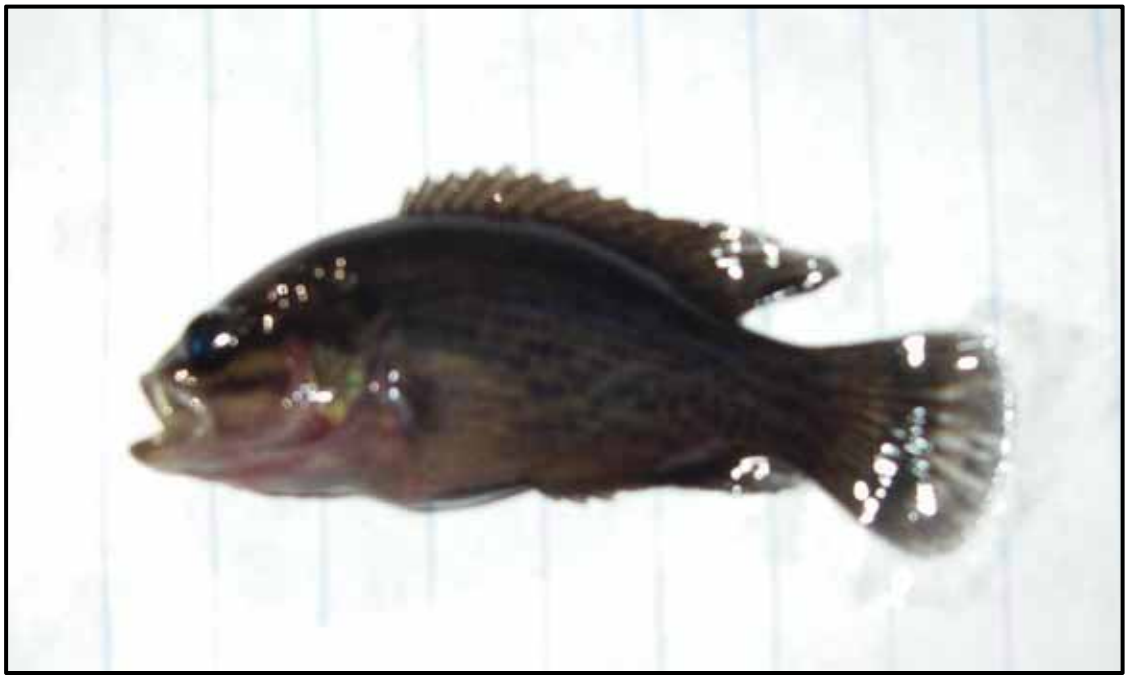
Highfin Shiner (*Notropis altipinnis*)

16

Largemouth Bass (*Micropterus salmoides*)

17

Margined Madtom (*Noturus insignis*)



18

Mud Sunfish (*Acantharchus pomotis*)

19

Piedmont Darter (*Percina crassa*)

20

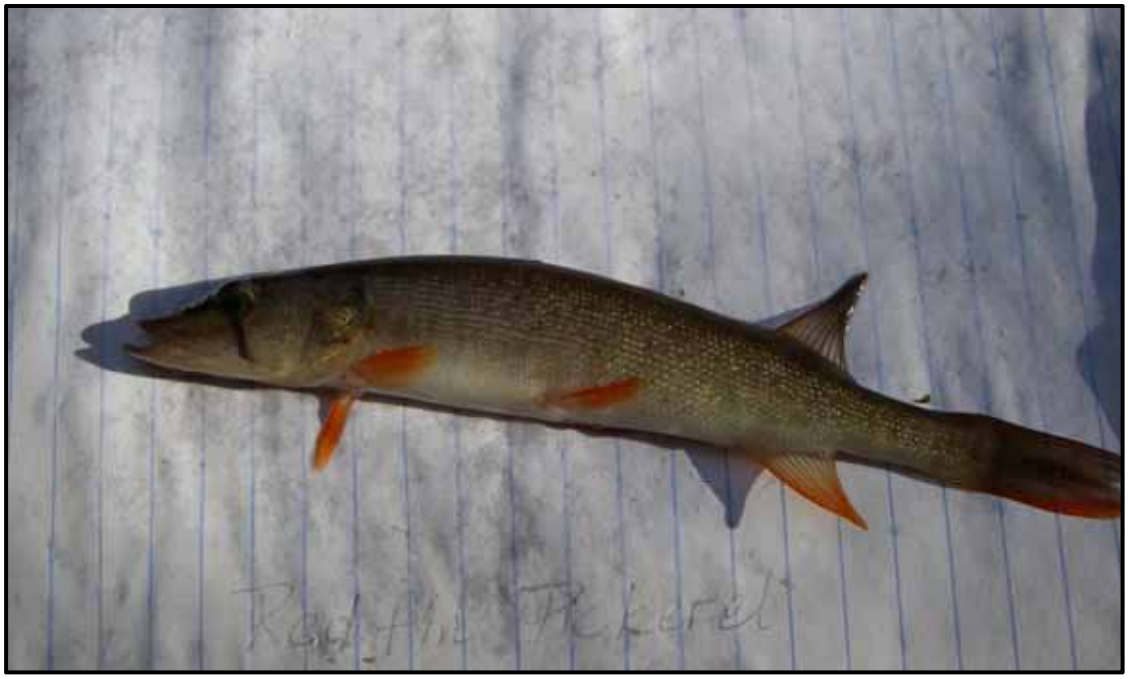
Pirate Perch (*Aphredoderus sayanus*)

21

Pumpkinseed (*Lepomis gibbosus*)

22

Redbreast Sunfish (*Lepomis auritus*)



23

Redfin Pickerel (*Esox americana*)

24

Rosyside Dace (*Clinostomus funduloides*)

25

Sandbar Shiner *(Notropis scepticus*)

26

Sandhills Chub (*Semotilus lumbee*)

27

Sawcheek Darter (*Etheostoma serrifer*)

28

Spotted Sucker (*Minytrema melanops*)

29

Swallowtail Shiner (*Notropis procne*)

30

Tadpole Madtom (*Noturus gyrinus*)

31

Tesselated Darter (*Etheostoma olmstedi*)

32

Warmouth (*Lepomis gulosus*)

33

Yellow Bullhead (*Ameiurus natalis*)

34

Yellow Perch (*Perca flavescens*)

UT 1

WP: 258
LAT: 34.57382

Stream: ~~W~~ L. Lynches R.
LONG: 80.52158

Scientific Name	Common Name					
Ameiurus brunneus	Snail bullhead					
Ameiurus natalis	Yellow Bullhead					
Ameiurus platycephalus	Flat bullhead					
Aphredoderus sayanus	Pirate perch					
Clinostomus funduloides	Rosyside dace					
Cyprinella chloristia	Greenfin shiner					
Cyprinella nivea	Whitefin Shiner					
Cyprinella pyrrhomelas	Fieryblack Shiner					
Erimyzon oblongus	Creek chubsucker					
Esox americanus	Redfin pickerel					
Esox niger	Chain pickerel					
Etheostoma olmstedi	Tessellated darter					
Gambusia holbrooki	Eastern Mosquitofish					
Lepomis auritus	Redbreast sunfish					
Lepomis cyanellus	Green sunfish					
Lepomis gibbosus	Pumpkinseed					
Lepomis macrochirus	Bluegill					
Lepomis marginatus	Dollar Sunfish					
Lepomis microlophus	Redear sunfish					
Micropterus salmoides	Largemouth Bass					
Nocomis leptocephalus	Bluehead chub					
Notemigonus crysoleucas	Golden shiner					
Notropis altipinnis	Highfin shiner					
Notropis chlorocephalus	Greenhead shiner					
Notropis cummingsae	Dusky shiner					
Notropis petersoni	Coastal shiner					
Notropis procne	Swallowtail shiner					
Notropis scepticus	Sandbar shiner					
Noturus gyrinus	Tadpole madtom					
Noturus insignis	Margined madtom					
Percina crassa	Piedmont darter					
Moxostoma sp.	Brassy jumprock					
Semotilus atromaculatus	Creek chub					
Semotilus lumbee	Sandhills chub					
Umbra pygmaea	Eastern mudminnow					

WP: 257 Stream: Buffalo Cr.

LAT: 34.56739 LONG: 80.43501

Scientific Name	Common Name					
Ameiurus brunneus	Snail bullhead					
Ameiurus natalis	Yellow Bullhead					
Ameiurus platycephalus	Flat bullhead					
Aphredoderus sayanus	Pirate perch					
Clinostomus funduloides	Rosyside dace					
Cyprinella chloristia	Greenfin shiner					
Cyprinella nivea	Whitefin Shiner					
Cyprinella pyrrhomelas	Fieryblack Shiner					
Erimyzon oblongus	Creek chubsucker					
Esox americanus	Redfin pickerel					
Esox niger	Chain pickerel					
Etheostoma olmstedi	Tessellated darter					
Gambusia holbrooki	Eastern Mosquitofish					
Lepomis auritus	Redbreast sunfish					
Lepomis cyanellus	Green sunfish					
Lepomis gibbosus	Pumpkinseed					
Lepomis macrochirus	Bluegill					
Lepomis marginatus	Dollar Sunfish					
Lepomis microlophus	Redear sunfish					
Micropterus salmoides	Largemouth Bass					
Nocomis leptocephalus	Bluehead chub					
Notemigonus crysoleucas	Golden shiner					
Notropis altipinnis	Highfin shiner					
Notropis chlorocephalus	Greenhead shiner					
Notropis cummingsae	Dusky shiner					
Notropis petersoni	Coastal shiner					
Notropis procne	Swallowtail shiner					
Notropis scepticus	Sandbar shiner					
Noturus gyrinus	Tadpole madtom					
Noturus insignis	Margined madtom					
Percina crassa	Piedmont darter					
Moxostoma sp.	Brassy jumprock					
Semotilus atromaculatus	Creek chub					
Semotilus lumbee	Sandhills chub					
Umbra pygmaea	Eastern mudminnow					

Etheostoma Serrifer Sawcheek Darter.

Enneacanthus inglorious Blue-spotted Sunfish.

2nd pass

3rd pass

WP: WP 256 Stream: Camp Br. 2

LAT: 34.60024 LONG: 80.55590

Scientific Name	Common Name					
Ameiurus brunneus	Snail bullhead					
Ameiurus natalis	Yellow Bullhead					
Ameiurus platycephalus	Flat bullhead					
Aphredoderus sayanus	Pirate perch	☒				
Clinostomus funduloides	Rosyside dace	☒☒☒☒	☒☒☒☒	☒☒☒☒	☒☒☒☒	☒
Cyprinella chloristia	Greenfin shiner					
Cyprinella nivea	Whitefin Shiner					
Cyprinella pyrrhomelas	Fieryblack Shiner					
Erimyzon oblongus	Creek chubsucker	☒				
Esox americanus	Redfin pickerel					
Esox niger	Chain pickerel					
Etheostoma olmstedi	Tessellated darter	☒☒☒	☒			
Gambusia holbrooki	Eastern Mosquitofish					
Lepomis auritus	Redbreast sunfish	☒☒☐				
Lepomis cyanellus	Green sunfish					
Lepomis gibbosus	Pumpkinseed					
Lepomis macrochirus	Bluegill	☐				
Lepomis marginatus	Dollar Sunfish					
Lepomis microlophus	Redear sunfish					
Micropterus salmoides	Largemouth Bass					
Nocomis leptocephalus	Bluehead chub	☒☒☒☒	☒☒☒☒	☒☒☒☒	☒☒☒☒	☒☒☒☒
Notemigonus crysoleucas	Golden shiner					
Notropis altipinnis	Highfin shiner					
Notropis chlorocephalus	Greenhead shiner	☒☒☒☒	☒☒☒☒	☒☐		
Notropis cummingsae	Dusky shiner					
Notropis petersoni	Coastal shiner					
Notropis procne	Swallowtail shiner					
Notropis scepticus	Sandbar shiner					
Noturus gyrinus	Tadpole madtom					
Noturus insignis	Margined madtom	☒				
Percina crassa	Piedmont darter					
Moxostoma sp.	Brassy jumprock					
Semotilus atromaculatus	Creek chub	☒☒☒☒	☒☒☐			
Semotilus lumbee	Sandhills chub					
Umbra pygmaea	Eastern mudminnow					

CB3

WP: 255 Stream: Camp Br

LAT: 34.59101 LONG: 80.526950

Scientific Name	Common Name					
Ameiurus brunneus	Snail bullhead					
Ameiurus natalis	Yellow Bullhead					
Ameiurus platycephalus	Flat bullhead					
Aphredoderus sayanus	Pirate perch					
Clinostomus funduloides	Rosyside dace					
Cyprinella chloristia	Greenfin shiner					
Cyprinella nivea	Whitefin Shiner					
Cyprinella pyrrhomelas	Fieryblack Shiner					
Erimyzon oblongus	Creek chubsucker					
Esox americanus	Redfin pickerel					
Esox niger	Chain pickerel					
Etheostoma olmstedi	Tessellated darter					
Gambusia holbrooki	Eastern Mosquitofish					
Lepomis auritus	Redbreast sunfish					
Lepomis cyanellus	Green sunfish					
Lepomis gibbosus	Pumpkinseed					
Lepomis macrochirus	Bluegill					
Lepomis marginatus	Dollar Sunfish					
Lepomis microlophus	Redear sunfish					
Micropterus salmoides	Largemouth Bass					
Nocomis leptocephalus	Bluehead chub					
Notemigonus crysoleucas	Golden shiner					
Notropis altipinnis	Highfin shiner					
Notropis chlorocephalus	Greenhead shiner					
Notropis cummingsae	Dusky shiner					
Notropis petersoni	Coastal shiner					
Notropis procne	Swallowtail shiner					
Notropis scepticus	Sandbar shiner					
Noturus gyrinus	Tadpole madtom					
Noturus insignis	Margined madtom					
Percina crassa	Piedmont darter					
Moxostoma sp.	Brassy jumprock					
Semotilus atromaculatus	Creek chub					
Semotilus lumbee	Sandhills chub					
Umbra pygmaea	Eastern mudminnow					

BC 2

WP: 254 Stream: Buffalo Cr.

LAT: 34.59910 LONG: 80.49711

Scientific Name	Common Name					
Ameiurus brunneus	Snail bullhead					
Ameiurus natalis	Yellow Bullhead					
Ameiurus platycephalus	Flat bullhead					
Aphredoderus sayanus	Pirate perch	☐				
Clinostomus funduloides	Rosyside dace					
Cyprinella chloristia	Greenfin shiner					
Cyprinella nivea	Whitefin Shiner					
Cyprinella pyrrhomelas	Fieryblack Shiner					
Erimyzon oblongus	Creek chubsucker					
Esox americanus	Redfin pickerel					
Esox niger	Chain pickerel					
Etheostoma olmstedi	Tessellated darter					
Gambusia holbrooki	Eastern Mosquitofish					
Lepomis auritus	Redbreast sunfish					
Lepomis cyanellus	Green sunfish					
Lepomis gibbosus	Pumpkinseed					
Lepomis macrochirus	Bluegill					
Lepomis marginatus	Dollar Sunfish					
Lepomis microlophus	Redear sunfish					
Micropterus salmoides	Largemouth Bass					
Nocomis leptocephalus	Bluehead chub					
Notemigonus crysoleucas	Golden shiner					
Notropis altipinnis	Highfin shiner					
Notropis chlorocephalus	Greenhead shiner					
Notropis cummingsae	Dusky shiner					
Notropis petersoni	Coastal shiner					
Notropis procne	Swallowtail shiner					
Notropis scepticus	Sandbar shiner					
Noturus gyrinus	Tadpole madtom					
Noturus insignis	Margined madtom					
Percina crassa	Piedmont darter					
Moxostoma sp.	Brassy jumprock					
Semotilus atromaculatus	Creek chub					
Semotilus lumbee	Sandhills chub	☑				
Umbra pygmaea	Eastern mudminnow					

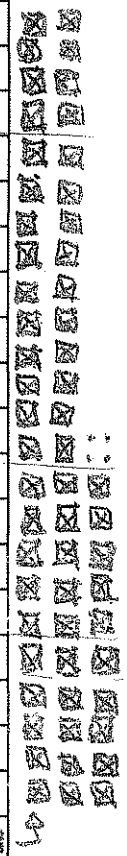
Acanthrarchus pomotus Mud Sunfish

LLR 2

WP: 253
LAT: 34.58161

Stream: L. Lynches R.
LONG: 80.57072

Scientific Name	Common Name					
Ameiurus brunneus	Snail bullhead					
Ameiurus natalis	Yellow Bullhead					
Ameiurus platycephalus	Flat bullhead					
Aphredoderus sayanus	Pirate perch					
Clinostomus funduloides	Rosyside dace					
Cyprinella chloristia	Greenfin shiner					
Cyprinella nivea	Whitefin Shiner					
Cyprinella pyrrhomelas	Fieryblack Shiner					
Erimyzon oblongus	Creek chubsucker					
Esox americanus	Redfin pickerel					
Esox niger	Chain pickerel					
Etheostoma olmstedi	Tessellated darter					
Gambusia holbrooki	Eastern Mosquitofish					
Lepomis auritus	Redbreast sunfish					
Lepomis cyanellus	Green sunfish					
Lepomis gibbosus	Pumpkinseed					
Lepomis macrochirus	Bluegill					
Lepomis marginatus	Dollar Sunfish					
Lepomis microlophus	Redear sunfish					
Micropterus salmoides	Largemouth Bass					
Nocomis leptocephalus	Bluehead chub					
Notemigonus crysoleucas	Golden shiner					
Notropis altipinnis	Highfin shiner					
Notropis chlorocephalus	Greenhead shiner					
Notropis cummingsae	Dusky shiner					
Notropis petersoni	Coastal shiner					
Notropis procne	Swallowtail shiner					
Notropis scepticus	Sandbar shiner					
Noturus gyrinus	Tadpole madtom					
Noturus insignis	Margined madtom					
Percina crassa	Piedmont darter					
Moxostoma sp.	Brassy jumprock					
Semotilus atromaculatus	Creek chub					
Semotilus lumbee	Sandhills chub					
Umbra pygmaea	Eastern mudminnow					



11 w/ blackspot
1 w/ fungal infection

LLR4

WP: 252 Stream: L. Lynches R.

LAT: 34.55909 LONG: 80.55065

Scientific Name	Common Name					
Ameiurus brunneus	Snail bullhead					
Ameiurus natalis	Yellow Bullhead					
Ameiurus platycephalus	Flat bullhead					
Aphredoderus sayanus	Pirate perch	☒☒☒	☐			
Clinostomus funduloides	Rosyside dace	☒				
Cyprinella chloristia	Greenfin shiner					
Cyprinella nivea	Whitefin Shiner					
Cyprinella pyrrhomelas	Fieryblack Shiner					
Erimyzon oblongus	Creek chubsucker	☒				
Esox americanus	Redfin pickerel					
Esox niger	Chain pickerel					
Etheostoma olmstedi	Tessellated darter	☒☒☒	☒			
Gambusia holbrooki	Eastern Mosquitofish					
Lepomis auritus	Redbreast sunfish	☒☒☒	☒☒☒			
Lepomis cyanellus	Green sunfish					
Lepomis gibbosus	Pumpkinseed					
Lepomis macrochirus	Bluegill	☒				
Lepomis marginatus	Dollar Sunfish					
Lepomis microlophus	Redear sunfish					
Micropterus salmoides	Largemouth Bass					
Nocomis leptocephalus	Bluehead chub	☒☒☒	☒☒☒	☒		
Notemigonus crysoleucas	Golden shiner					
Notropis altipinnis	Highfin shiner	☒☒☒				
Notropis chlorocephalus	Greenhead shiner					
Notropis cummingsae	Dusky shiner					
Notropis petersoni	Coastal shiner					
Notropis procne	Swallowtail shiner	☒☒☒	☒			
Notropis scepticus	Sandbar shiner					
Noturus gyrinus	Tadpole madtom					
Noturus insignis	Margined madtom					
Percina crassa	Piedmont darter					
Moxostoma sp.	Brassy jumprock					
Semotilus atromaculatus	Creek chub					
Semotilus lumbee	Sandhills chub					
Umbra pygmaea	Eastern mudminnow					

Lepomis gulosus Warmouth

1 w/ blackspot

1 w/ blackspot

LLR1

WP: 251

LAT: 34.58563

Stream: L. Lynches R.

LONG: 80.57897

Scientific Name	Common Name					
Ameiurus brunneus	Snail bullhead					
Ameiurus natalis	Yellow Bullhead					
Ameiurus platycephalus	Flat bullhead					
Aphredoderus sayanus	Pirate perch					
Clinostomus funduloides	Rosyside dace					
Cyprinella chloristia	Greenfin shiner					
Cyprinella nivea	Whitefin Shiner					
Cyprinella pyrrhomelas	Fieryblack Shiner					
Erimyzon oblongus	Creek chubsucker					
Esox americanus	Redfin pickerel					
Esox niger	Chain pickerel					
Etheostoma olmstedi	Tessellated darter					
Gambusia holbrooki	Eastern Mosquitofish					
Lepomis auritus	Redbreast sunfish					
Lepomis cyanellus	Green sunfish					
Lepomis gibbosus	Pumpkinseed					
Lepomis macrochirus	Bluegill					
Lepomis marginatus	Dollar Sunfish					
Lepomis microlophus	Redear sunfish					
Micropterus salmoides	Largemouth Bass					
Nocomis leptocephalus	Bluehead chub					
Notemigonus crysoleucas	Golden shiner					
Notropis altipinnis	Highfin shiner					
Notropis chlorocephalus	Greenhead shiner					
Notropis cummingsae	Dusky shiner					
Notropis petersoni	Coastal shiner					
Notropis procne	Swallowtail shiner					
Notropis scepticus	Sandbar shiner					
Noturus gyrinus	Tadpole madtom					
Noturus insignis	Margined madtom					
Percina crassa	Piedmont darter					
Moxostoma sp.	Brassy jumprock					
Semotilus atromaculatus	Creek chub					
Semotilus lumbee	Sandhills chub					
Umbra pygmaea	Eastern mudminnow					

1 2 3

each LLR5

WP: 250 Stream: L. Lynches R.

LAT: 34.54562 LONG: 80.54356

Total	Scientific Name	Common Name					
	Ameiurus brunneus	Snail bullhead					
	Ameiurus natalis	Yellow Bullhead					
	Ameiurus platycephalus	Flat bullhead					
27	*Aphredoderus sayanus*	Pirate perch	16 + 11				
1	*Clinostomus funduloides*	Rosyside dace	1				
72	*Cyprinella chloristia*	Greenfin shiner	11				★ Many are YOY
	Cyprinella nivea	Whitefin Shiner					
	Cyprinella pyrrhomelas	Fieryblack Shiner					
5	*Erimyzon oblongus*	Creek chubsucker	5 (1)				
	Esox americanus	Redfin pickerel					
	Esox niger	Chain pickerel					
78	*Etheostoma olmstedi*	Tessellated darter	39 + 1 + 34 + 11				
17	*Gambusia holbrooki*	Eastern Mosquitofish	1 + 10 + 11				
43	*Lepomis auritus*	Redbreast sunfish	15 + 11 + 23				
	Lepomis cyanellus	Green sunfish					
16	*Lepomis gibbosus*	Pumpkinseed	5 + 11				
28	*Lepomis macrochirus*	Bluegill	13	6 + 11			
1	*Lepomis marginatus*	Dollar Sunfish	1				
	Lepomis microlophus	Redear sunfish					
3	*Micropterus salmoides*	Largemouth Bass	3				
150	*Nocomis leptocephalus*	Bluehead chub	2	2 + 11		+ 24 +	11
3	*Notemigonus crysoleucas*	Golden shiner	111		1		(1)
209	*Notropis altipinnis*	Highfin shiner	11				
	Notropis chlorocephalus	Greenhead shiner					
9	*Notropis cummingsae*	Dusky shiner	11				
	Notropis petersoni	Coastal shiner					
116	*Notropis procne*	Swallowtail shiner	11				
11	*Notropis scepticus*	Sandbar shiner	11	1		1	
	Noturus gyrinus	Tadpole madtom					
6	*Noturus insignis*	Margined madtom	2 + 11				
1	*Percina crassa*	Piedmont darter	1				
	Moxostoma sp.	Brassy jumprock					
4	*Semotilus atromaculatus*	Creek chub	11				
	Semotilus lumbee	Sandhills chub					
	Umbra pygmaea	Eastern mudminnow					

(1) Yellow Perch 1

(1) Green Sunfish 1

(1) Flier 1

(25) Lepomis sp. (YOY) 8 + 11

(2) Spotted Sucker 11

CONTENTS

PAGE REFERENCE DATE

Weather: Sunny mid 50s, Oversight: none October 24, 2011

8:00 - 9:00 am

MHF, EU, JCV - meet up at Haile office and sign in and have HRS meeting with Ott Jackson. Set up gear and pack truck

9:00am - 10:00cm - meet up with John and Joseph Alderman and Will Medlin. Conduct tailgate H&S meeting.

10:00am - 11:30 am - Crew mobilizes to LLRS and begins fish community survey. Crew backpack electrofishes (3 units). Single pass.

11:30 am - 2:10 pm Taxonomic identification and enumeration

Water quality:		Backpack Settings:	
Temp (°C):	12.74		
pH:	9.35	200 - 400	V
Cond (ms/cm):	0.099	60	Hz
Turbidity (NTU):	4.7	120	PPS
DO (mg/L):	10.98		
TDS (g/L):	0.064		

Rite in the Rain

Species Photo Log

1 Bluehead chub
2 Bluegill
3 Redbreast sunfish
4 Green sunfish
5 Pumpkinseed
6 Flier
7 Yellow perch
8 Pirate perch
9 Margined madtom
10 Creek chub
11 ~~Whitefin shiner~~
12 Largemouth bass
13 Creek chubsucker
14 Spotted sucker
15 Dollar sunfish
16 Sandbar shiner
17 Piedmont darter
18 Highfin shiner
19 Swallowtail shiner
20 Rosyside dace
21 Tesselated darter
22 Greenfin shiner
23 Dusky shiner
23 Eastern mosquitofish
24 Redfin pickerel
25 Tadpole madtom
26 Warmouth
27 Sandhills chub
28 Greenhead shiner
29 Mud sunfish
30 Sawcheek darter
31 Yellow bullhead
32 Bluespotted sunfish

Habitat Photo Log

#1272 - Looking downstream top of LLR5
1271 - Functional rootwad/undercut LLR5
1270 - Sandbar LLR5
1269 - Embedded LWD @ LLR5
1268 - Riffle/glide section @ LLR5
1267 - Pool at top of LLR5
1255 - Riffle section @ LLR1
1254 - Large cobble @ LLR1
1253 - Pool and functional rootwad @ LLR1
1252 - Run and sand bar @ LLR1
1251 - Large slowdown @ LLR4
1250 - Functional rootwad/undercut @ LLR4
1249 - Riffle sequence @ LLR4
1245 - Functional rootwad/undercut @ LLR2
1244 - Boulder habitat @ LLR2
1243 - Run @ LLR2

Rite in the Rain

October 24, 2011

3:30 pm - 4:15 pm Crew mobilizes and backpack electrofishes (2 units) at LLR1
Single pass.

4:15 pm - 5:10 pm
Taxonomic identification and enumeration

5:10 pm ~ 5:30 pm - Crew demobilizes

Water Quality

Temp (°C) : 14.75
pH : 8.05
Cond (mS/cm) : 0.106
Turbidity (NTU) : 8.6
DO (mg/L) : 9.29
TDS (g/L) : 0.069

October 25, 2011

Crew: JCV, MHF, EU, WM John & Joe Alderman
Weather: Cool low 50s, sunny
Oversight: None

8:15 am - 9:15 am
Crew mobilizes to LLR4 to start electrofishing.

9:15 am - 10:15 am
Crew uses 3 backpack units to perform fish community survey. Single pass.

10:15 am - 11:15 am
Taxonomic identification and enumeration.

Water Quality

Temp (°C) : 13.05
pH : 7.58
Cond (mS/cm) : 0.178
Turbidity (NTU) : 4.2
DO (mg/L) : 8.11
TDS (g/L) : 0.116

Rite in the Rain

October 25, 2011

12:00 pm - 12:30 pm
Crew mobilizes to LLRZ to begin fish community survey

12:30 pm - 1:00 pm Single pass.
Crew backpack electrofishes (3 units) at LLRZ.

1:00 pm - 1:40 pm
Taxonomic identification and enumeration.

1:40 pm - 2:00 pm - Demobilize from LLRZ.

Water Quality

Temp (°C): 13.50
pH : 7.74
Cond (mS/cm): 0.089
Turbidity (NTU): 5.4
DO (mg/L): 9.86
TDS (g/L): 0.058

October 25, 2011

3:00 - 3:15 pm
Crew backpack electrofishes (2 units) at BCZ. Single pass.

3:15 - 3:30 pm
Taxonomic identification and enumeration.

3:30 - 3:45 pm - Demobilize

Water Quality

Temp (°C) : 13.91°C
pH : 5.66
Cond (mS/cm) : 0.030
Turbidity (NTU) : 2.9
DO (mg/L) : 9.55
TDS (g/L) : 0.019

October 25, 2011

4:00 pm - 4:15 pm
Crew mobilizes to CB3.

4:15 pm - 4:40 pm
Crew backpack electrofishes (2 units) in CB3. Single pass

4:40 pm - 5:00 pm
Taxonomic identification and enumeration

5:00 pm - 5:10 pm Crew demobilizes

Water Quality

Temp (°C) : 15.14
pH : 6.85
Cond (mS/cm) : 0.036
Turbidity (NTU) : 14.6
DO (mg/L) : 9.90
TDS (g/L) : 0.023

October 26, 2011

Crew: JCV, MHF, EV, WM John & Joe Alderman
Weather: Sunny mid 50's morning, mid 70's afternoon
Oversight: None

8:15 am - 8:40 am
Crew checks in and mobilizes to CB2.

8:40 am - 9:15 am
Crew hikes into CB2 and sets up gear.

9:15 am - 10:30 am Single pass
Crew uses one backpack unit to conduct fish community at CB2.

10:30 am - 11:00 am
Taxonomic identification and enumeration

11:00 am - 11:15 am - Demobilize
Water Quality

Temp (°C) : 12.86
pH : 7.23
Cond (mS/cm) : 0.029
Turbidity (NTU) : 4.3
DO (mg/L) : 9.25
TDS (g/L) : 0.019

October 26, 2011

11:35 - 11:45 am - Crew mobilizes to HGMC1
11:45 - 12:15 pm - Crew hikes in to HGMC1
12:15 - 12:30 pm - Find reach and set block nets
12:30 - 1:00 pm - Crew backpack electrofishes HGMC1 (1 unit). Single pass. No fish observed. Active sweep netting of channel performed. Crayfish observed.

Water Quality

Temp (°C) :	18.06
pH :	5.31
Cond (mS/cm) :	0.053
Turbidity (NTU) :	1.0
DO (mg/L) :	5.74
TDS (g/L) :	0.034

1:00 pm - 1:30 pm Demobilize

HGMC 1 Downstream waypoint

N 34.59192°
W 080.52058°

October 26, 2011

3:00 - 3:20 pm - Crew mobilizes to HGMC2
3:20 - 3:45 pm - Single Pass
Crew uses backpack electrofishing (1 unit) to conduct fish community survey.

results: 1 creek chubsucker
1 bluegill
1 green sunfish

3:45 pm - 3:50 pm - Demobilize from site.

Water Quality

Temp (°C) :	16.77
pH :	4.75
Cond (mS/cm) :	0.135
Turbidity (NTU) :	3.3
DO (mg/L) :	10.54
TDS (g/L) :	0.088

Rite in the Rain

October 27, 2011

Crew: JCV, MHF, EV John & Joe Alderman
Weather: Sunny mid 50's morning, mid 70's afternoon
Oversight: None

8:30 - 9:00 am Crew mobilizes to BC4 off of Mt. Pisgah Rd.

9:00 - 9:35 am
Crew mobilize to sample reach.

9:35 - 10:30
Crew uses backpack electrofishing (2 units) to perform fish community survey.
Conduct 1st pass.

10:40 - 11:20 am
Taxonomic identification and enumeration.

11:20 am - 11:50 am 2nd Pass conducted

11:50 am - 12:10 pm
Taxonomic identification and enumeration.

12:10 pm - 12:40 pm 3rd Pass conducted

12:50 pm - 1:00 pm
Taxonomic identification and enumeration.

1:00 pm - 1:15 pm Demobilize

Water Quality
Temp (°C): 13.83 pH: 6.12 Cond (mS/cm): 0.025
DO (mg/L): 8.82 Turbidity (NTU): 0.1 TDS (g/L): 0.016

October 27, 2011

2:30 pm - 2:45 pm
Crew mobilizes to UT1

2:45 pm - 3:40 pm
Crew conducts fish community survey with backpack electrofishing unit (1 unit). Single pass.

3:40 pm - 3:50 pm
Taxonomic identification and enumeration

3:50 pm - 4:00 pm Demobilize from site.

Water Quality

Temp (°C): 17.74
pH: 4.43
Cond (mS/cm): 0.024
Turbidity (NTU): 0.0
DO (mg/L): 6.97
TDS (g/L): 0.015

Rite in the Rain

Comprehensive Baseline Wildlife and Aquatic Resources Report

Haile Gold Mine, Inc.

Appendix H

Macroinvertebrate and Herptile Survey Field Notes and Photos

HAILE GOLD MINE Oct-Nov 2012
SITE BC2: SITE PICTURES

Site picture

Site picture

HAILE GOLD MINE Oct-Nov 2012
SITE BC4: REPTILES AND AMPHIBIANS

Anolis carolinensis

Anolis carolinensis

HAILE GOLD MINE Oct-Nov 2012
SITE CB1: SITE PICTURES

Site picture

Site picture

HAILE GOLD MINE Oct-Nov 2012
SITE HGMC1: SITE PICTURES

Site picture

Site picture

HAILE GOLD MINE Oct-Nov 2012
SITE LLR1 : REPTILES AND AMPHIBIANS

Acris crepitans (hidden)

Eurycera cirriger (imm.)

Eurycera cirriger

Site picture

Site picture

HAILE GOLD MINE Oct-Nov 2012
SITE LLR2 : REPTILES AND AMPHIBIANS

Site picture

Acris gryllus (camouflaged)

Acris crrepitans

Acris crepitans

Hyla femoralis

Rana hechscheri

HAILE GOLD MINE Oct-Nov 2012
SITE LLR3 : REPTILES AND AMPHIBIANS

Site picture

Eurycera cirriger

HAILE GOLD MINE Oct-Nov 2012
SITE LLR4: REPTILES AND AMPHIBIANS

Site picture

Site picture

Eurycera cirriger

unidentified tadpole

HAILE GOLD MINE Oct-Nov 2012
SITE LLR5: REPTILES AND AMPHIBIANS

Eurycera cirriger

HAILE GOLD MINE Oct-Nov 2012
SITE LLR6: REPTILES AND AMPHIBIANS

Eurycera cirriger

Hyla cinerea

Hyla cinerea

HAILE GOLD MINE Oct-Nov 2012
SITE UT1: SITE PICTURES

Site picture

Site picture

JS

Date 11/1/11

Haile Gold Mine

Field Team: RWK JS

0930

WTW pH/oxi 340i Meter Calibration
pH 4 i - 4.12 F - 4.01
pH 7 F - 7.00
Slope 56.9
D.O i - 9.16 F - 10.80
Slope - .63
Temp - 12.2

0940

Water Chemistry By Site

HGMC 1 pH - 4.70
D.O - 8.69 mg/L
Temp - 10.8°C

~~HGC~~ BC 1 - Dry

1138
BC 2 pH - 5.42
D.O - 11.11 mg/L
Temp - 10.0°C

Streambanks and nearby riparian zone traversed for reptiles + amphibians at each site

LLR5 - 1400
pH - 5.46
D.O - 11.35 mg/L
Temp - 13.4°C

BC 4 - 1530 pH - 5.55
D.O - 11.69 mg/L
Temp - 15.5°C

UT 1 - Dry - No flow. Scattered pools only
CB3 - 1750 pH - 5.62
D.O - 10.95 mg/L
Temp - 12.4°C

BC-1 Dry - no flow

Timed MHSP protocol for aquatic macroinvertebrates at all sites, except UT1 + BC1

ite

d nearby
traversed
amphibians

frog ≈ 3"L

sites
overnight

Date | Haile Gold Mine | Rwk JS

10/18/14

WTW Meter Calibration

pH/ox i 340i

pH 4 i - 4.06 F - 4.01
pH 7 F - 7.00
Slope - 57.3
D.O i - 9.17 F - 9.41
D.O Slope - 0.44
Temp - 18.5°C

Time | LLR1 | Water Chemistry By Site

1030 pH - 6.04
D.O - 5.18 mg/L
Temp - 16.5°C

1215 LLR2

pH 6.22
D.O. 7.63 mg/L
temp 19.4°C

Streambanks and nearby riparian zone traversed for reptiles + amphibians at each site

1400 LLR3

pH - 6.29
D.O - 8.11
Temp - 21.3°C

1530 LLR4

pH 6.16
DO 9.85 mg/L
temp 22°C

1645 HGMC 2 | 1 green/brown frog ≈ 3"L

pH - 5.25
D.O - 9.78
Temp - 21.5°C

Timed MHSP protocol for aquatic macroinvertebrates at all sites
Sampling terminated by storm event; >1 inch rainfall overnight

Date: 11/2/11

Haile Gold Mine

Field Team: RWK, JS

WTW pH/ox 340i

Meter Calibration

pH 4i - 4.11 F - 4.01
7 F - 7.00
Slope 55.6
D.O. i - 10.41 f - 11.12
slope - 1.60
Temp - 11.9°C

Time

Water Chemistry By Site

1200
CB1
pH — 5.70
D.O — 11.02 mg/L
Temp 8.5 °C

Site CB2 : No site access. Hunting taking place nearby.

1400
LLR6
pH - 5.76
D.O - 10.94 mg/L
Temp 11.2 °C

Timed MHSP at sites CB1 and LLR6 for aquatic macroinvertebrates.

Streambanks and nearby riparian zone traversed for reptiles and amphibians at each site