

APPENDIX V

THREATENED and ENDANGERED SPECIES PLANS

- **Indiana Bat Study Plan – V-1**
- **Vessel Strike Avoidance Measures – V-36**

DRAFT

**STUDY PLAN:
ENDANGERED BAT STUDIES ON MID-ATLANTIC EXPRESS, LLC'S
SPARROWS POINT LNG TERMINAL AND PIPELINE PROJECT,
BALTIMORE, HARTFORD, AND CECIL COUNTIES, MARYLAND AND
LANCASTER AND CHESTER COUNTIES, PENNSYLVANIA**

USFWS PROJECT # 2006-1631

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1.0 Introduction

Environmental Solutions & Innovations, Inc was hired by Haley & Aldrich of New York on behalf of AES Sparrows Point LNG, LLC and Mid-Atlantic Express, LLC (hereinafter referred to collectively as AES) to survey for the federally endangered Indiana Bat (*Myotis sodalis*) along a proposed 88-mile, liquefied natural gas (LNG) pipeline Right-of-Way (ROW) extending from the terminal site in Sparrows Point Industrial Complex east of Baltimore, Maryland to existing LNG facilities near Eagle, Pennsylvania. Following is information regarding the location of the studies and the methods used to collect the data.

Studies will be carried out under our U.S. Fish and Wildlife (USFWS) Federal Fish and Wildlife Permit (currently TE023664-18 a new number will be issued when our permit is revised in 2009). We currently hold a Pennsylvania Game Commission Special Use Permit (currently 28-2008; a new number is issued when the permit is revised in 2009), and will obtain both Scientific Collections and Endangered Species permits from the Maryland Department of Natural Resources in 2009 enabling us to work with endangered bats.

2.0 Summer Mist Net Surveys

2.1 Protocol

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

Netting is completed at 1-kilometer intervals along portions of the line in which appropriate habitat is proposed to be cleared. Netting is similarly completed for linear areas other than the ROW (e.g. access roads) where clearing will occur, except when access roads fall within 0.5 kilometer of the ROW and/or net site, they are covered by ROW netting. Netting segments are 1-kilometer long by 1 kilometer wide, creating a

netting block of 1 km². Net sites may be situated anywhere within each 1 km² block; thus, net sites will not be “forced” into even 1-kilometer spacing, although one net site will be completed for each linear kilometer of suitable habitat.

Aerial photographs obtained online from Pennsylvania Map (PAMAP) and the National Agriculture Imagery Program (NAIP) were used to evaluate the approximate number of net sites required for this survey. Using GIS, the entire pipeline corridor (between 50 and 100 feet wide by 88 miles long) was evaluated to determine where potential habitat (forested or wooded areas) would be removed to install the proposed pipeline. Areas within the construction corridor possessing no roosting habitat (i.e., agricultural, commercial and occasionally residential) were excluded. This produced a total of 105 sites (1-kilometer squares) along the approximately 88-mile pipeline. In addition, approximately four additional sites will be required to cover clearing for associated access roads, producing an estimated 109 sites total for this project. A flyover was recently completed to obtain new aerial photography for the project area; when those are available, the project area will be reanalyzed and therefore the final, estimated number of sites may be slightly more or less. Line deviations also require a reanalysis of that area.

When mist netting occurs, each segment of the line is evaluated individually by ESI’s on-site Field Supervisor to verify the accuracy of the habitat determination made from aerial photographs. The final report will include maps identifying all segments, both netted and not. Segments that are not netted because no wooded habitat is removed will be identified as such. Likewise the basis for this determination is documented with a ROW Habitat Exclusion data sheet and a representative photograph (See Section 3.2).

Pump stations and other above ground facilities are generally located close enough to the ROW to preclude additional netting requirements, and we have no information to suggest that any will be required. If clearing is required outside the 0.5-kilometer “buffer”, netting will be conducted accordingly (typically at a rate of 2 sites per 246 acres since these are areal parcels, not linear corridors).

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

2.2 Habitat Evaluation

When netting is completed, a habitat description will be completed for each net location. The emphasis of this description is habitat form: size and relative abundance of large trees and/or snags [≥ 2.5 inches DBH (Gumbert et al. 2002)] that may potentially serve as roost trees, canopy closure, understory clutter/openness, water availability, and flight corridors. Habitat form is emphasized because the Indiana bat roosts in a great many species of trees. Tree species composition is

Table 1. USFWS Mist Netting Guidelines

NETTING GUIDELINES	
1.	Netting Season: 15 May to 15 August, when Indiana bats occupy summer habitat.
2.	Equipment (Mist Nets): constructed of the finest, lowest visibility mesh commercially available – monofilament or black nylon – with the mesh size approximately 1½ inch (1¼ – 1¾) (38 mm).
3.	Net Placement: mist nets extend approximately from water or ground level to tree canopy and are bounded by foliage on the sides. Net width and height are adjusted for the fullest coverage of the flight corridor at each site. A “typical” net set consists of three (or more) nets “stacked” on top of one another; width may vary up to 60 feet (20 m).
4.	Net Site Spacing: <ul style="list-style-type: none"> ◆ Streams – one net site per 0.6 mile (1 km) ◆ Land Tracts – two net sites per 246 acres (1 square km)
5.	Minimum Level of Effort Per Net Site: <ul style="list-style-type: none"> ◆ Two net locations (sets) per net site, with locations (sets) at least 100 feet (30 m) apart ◆ Two (calendar) nights of netting ◆ At least four net–nights (1 net–night = 1 net set deployed for 1 night); typically, two net sets are deployed at one site for two nights, resulting in four net-nights ◆ Sample Period: begin at dusk and net for 5 hours (approximately 0200h) ◆ Nets are monitored at approximately 10-minute intervals ◆ No disturbance near the nets between checks
6.	Weather Conditions: net only if the following weather conditions are met: <ul style="list-style-type: none"> ◆ No precipitation ◆ Temperature $\geq 10^{\circ}\text{C}$ (50°F) ◆ No strong winds
Source: U.S. Fish and Wildlife Service, 2007	

included in the assessment. Species composition is important because it provides insight to edaphic conditions on site. For example, an oak-hickory stand references a different set of conditions than does a beech-maple stand. ESI’s habitat characterization does more than emphasize species of large trees near the net. It identifies components of the canopy and subcanopy layers. ESI’s habitat

characterization also identifies dominant and subdominant elements of the canopy. The amount of understory, or clutter, is also recorded as many species of bats, including the Indiana bat, tend to avoid areas of high clutter.

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

- Netting is not completed in areas that have been cleared (e.g. row crops, hay fields/pastures, residences, etc.). *In contrast, wooded streams in an otherwise cleared area typically provide suitable habitat and will be netted.*
- Netting is not completed in areas where all woody stems are ≤ 6 inches dbh.
- A decision not to net discreet, specific areas is made if all habitat is unsuitable (e.g., even-age, live, smooth barked, young, small - < 10 inches dbh – stands of maple or tulip poplar) and the areas are not within a 1-kilometer netting interval. *In contrast, recently logged areas with a few remaining large trees, or young stands with a few large, old, often dead-or-dying “wolf trees” typically provide suitable habitat and will be netted.*

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

2.3 Net Placement

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

2.4 Emergence Counts

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

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

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

3.0 Portal Surveys

3.1 Search Protocol

Portals, signaling mine voids, are often found in western and northern Pennsylvania due to deposits of bituminous coal in those areas. However, this project is in southeastern Pennsylvania and northeastern Maryland. As such, GIS was utilized to identify other geologic features that may produce suitable wintering habitat for bats. Approximately 5 kilometers of karst areas were identified within the proposed ROW in Chester County, Pennsylvania.

At this time, there is no information on previously documented mine portals or cave voids within the project footprint.

Portal/cave searches will be conducted by teams of two individuals walking approximately 150 feet apart, 75 feet to either side of centerline. Each individual is responsible for searching areas within 75 feet to either side of the path they are walking. If portals are found, they are assessed for their potential to serve as bat hibernacula, based on a variety of characteristics as identified in the Pennsylvania Game Commission's (PGC) "Protocol for Assessing Abandoned Mines/Caves for Bat Surveys":

- Size of portal entrance (and the potential for predation)
- Presence/absence of guano
- Depth of the portal – i.e., did it extend beyond the depth to which a mine light shown, or did it appear to continue around a corner
- Air flow
- Other indications (such as spider webs or debris) that, by presence or state (disturbed vs. undisturbed), would provided evidence of use/no use by bats

All portals/caves found are documented with a GPS location, mine portal description data sheet, and photograph.

3.2 Survey Protocol

Portals that are potentially suitable for bat use (based upon the PGC protocol) will be trapped. Trapping is completed in accordance with the PGC Bureau of Wildlife

Management (Table 2) protocol. In addition, if more than five, state-listed *Myotis leibii* (or high numbers or diversity of common bats) are captured at a portal/cave, and it will be impacted by installation of the pipeline, ESI will notify the PGC.

Table 2. PGC Protocol for Conducting Mine/Cave Bat Surveys

TRAPPING GUIDELINES	
1.	Season: 10 April to 10 May or 15 September to 31 October
2.	Equipment <ul style="list-style-type: none"> ◆ Harp Trap – Traps are checked at least once every 20 minutes. ◆ Mist Nets – 50 denier, 38mm mesh. Nets checked at least once every 20 minutes ◆ Bat Detector – AnaBat acoustical data collected for duration of trapping on both evenings
3.	Net Placement: mist nets extend approximately from water or ground level to tree canopy and are bounded by foliage on the sides. Net width and height are adjusted for the fullest coverage of the flight corridor at each site. A “typical” net set consists of three (or more) nets “stacked” on top of one another; width may vary up to 60 feet (20 m).
4.	Sample Period: ½ hour before sunset and continue for at least 5 hours
5.	Minimum Level of Effort Per Net Site: <ul style="list-style-type: none"> ◆ Two (calendar) nights of netting ◆ If no captures occur and no bat activity is noted with ◆ a bat detector on the first evening during acceptable weather conditions, sampling will not be conducted a second night
6.	Weather Conditions: net only if the following weather conditions are met: <ul style="list-style-type: none"> ◆ At least 3 hours free of heavy rain and thunderstorms ◆ Temperature $\geq 10^{\circ}\text{C}$ (50°F) for first 2 hours of sampling ◆ Temperature above 1.6°C (35°F) until 0:00hr
Source: Pennsylvania Game Commission, 2004	

4.0 Radio Telemetry Methodology

4.1 Capture of Sodalis

After collecting morphometric data, all adult Indiana bats are fitted with radio transmitters. If juvenile Indiana bats are also captured at a site, then only adult bats are fitted with transmitters. If only juveniles are captured, then they will be fitted with transmitters. Transmitters affixed to pregnant or juvenile bats will not constitute more than 5% of the bat's weight (Aldridge et al. 1988). If, at any point, a reproductive adult is captured, any subsequent juvenile bats from that site will not be fitted with transmitters. Transmitters are obtained from Wildlife Materials, Inc., Titley Electronics, PTY LTD, Blackburn Transmitters, or a similarly reputable vendor.

Bat transmitters weigh 0.20 to 0.68 gram; however, ESI typically uses 0.25-gram transmitters, favoring minimal impact to the bat over the additional tracking window associated with larger devices. These 0.25 gram transmitters tend to last between seven and 14 days. Transmitters are activated and tested before attachment. A small interscapular area is trimmed of fur and the transmitter is attached to this area with non-toxic surgical adhesive. The adhesive degrades over time (typically one to four weeks) and the transmitter falls off the bat. Biologists record the transmitter weight, weight of the bat before and after transmitter attachment, and holding time. Bats are released unharmed near the point of capture. Standardized data forms are used for transmitter attachment.

4.2 Diurnal Roost Telemetry

All Indiana bats tagged with transmitters are tracked for a minimum of six days or until shed by the bat. (Because receivers are not water resistant, telemetry will not occur during rain; however, barring rain telemetry will occur over six *consecutive* days.) A Wildlife Materials TRX-2000S PLL Synthesized Tracking Receiver, Advanced Telemetry Systems, Inc. Model R2000 Scanning Receiver, or Titley Australis 26k receiver, or similar standard equipment, in conjunction with three or four element folding yagi directional antennas, loop antennas, and whip unidirectional antennas (manufactured by Wildlife Materials, Inc. or a similarly reputable firm) are used to track tagged bats. Signals are detected and followed to roost trees.

Beginning the day after bat capture and transmitter attachment, ESI biologists use telemetry to locate each bat's diurnal roost. Roost trees are identified to species and dbh is measured. The approximate height that each bat is roosting and general condition of the roost tree (dead, live, dying, % bark cover, etc.) and percentage of exfoliating bark are noted. A description of habitat near the roost (tree, hibernacula,

man-made structure, etc.) is recorded. Roosts and associated habitat are characterized on standardized data forms.

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

Emergence counts are conducted for a minimum of 6 days for each bat and 3 days for each identified roost.

4.3 Nocturnal Foraging Telemetry

The impact to foraging habitat associated with habitat removal for a linear corridor tends to be small as a proportion of total availability. Likewise, studies have shown that Indiana bats may benefit from pipeline rights of way (Brown and Brack 2003, Brack 2006) and/or open green spaces (Rommé et al. 1995, Farmer et al. 2002, Gardner and Cook 2002). However, there is a point at which the anthropogenic nature of a landscape decreases the productivity of the land for foraging bats. As such, ESI proposes not to conduct nighttime foraging telemetry studies if an Indiana bat is captured in a predominantly wooded area. However, if an Indiana bat is captured in a predominantly cleared area (i.e., >75 percent of lands within a 2.5 mile radius of the capture site) then nighttime foraging telemetry will be conducted for 6 nights or until the transmitter fails or is shed.

Nocturnal telemetry begins the evening of the first day on which a diurnal roost is found. Initially, bats may need to be followed without triangulation to determine where they spend nighttime hours. When areas of use are located, bat activity is monitored from at least three (typically four) receiver locations so that signal azimuths can be plotted and triangulation data can be used to more precisely determine the origin point of transmitter signals. Fixed receiver stations are used when possible. Stations are located using a combination of experience and anticipation to minimize the effect of terrain, movement of receiver stations, and maximize coverage.

Depending on the number of bats tracked simultaneously, transmitter bearings are taken approximately every 1 to 4 minutes for all bats whose signals are detected. Each telemetry station records the compass bearing of the signal and signal strength. Two-way radios are used to synchronize data collection among telemetry stations. GPS coordinates for telemetry stations are recorded. ESI uses standardized data forms for recording receiver station locations and to collect telemetry compass azimuth readings. Bats are tracked from sunset until bat activity noticeably diminishes or ceases (typically 3 to 6 hours per night).

Coordinates of the fixed telemetry stations and all transmitter azimuths taken at each station are entered into LOAS® 4.0 (Ecological Software Solutions; Urnäsch,

Switzerland) to calculate transmitter signal locations. LOAS generates locations using a Maximum Likelihood Estimator (MLE) based up on the data available (biangulation, triangulation, or quadrangulation). Output from LOAS is then imported into ArcGIS® (ESRI; Redlands, California) so they can be analyzed using Home Range Tools for ArcGIS (Rodgers et al. 2005). ESI typically uses a 95 percent Fixed Kernel method for home range analysis. All telemetry data collected for each bat for all days are pooled to create a single activity area for each bat. Bat activity areas are then plotted on geo-referenced aerial photography and USGS topographical maps.

5.0 Inaccessible Properties

With a proposed pipeline length of 88 miles (and a potential bat-netting corridor width of 1 kilometer), the total area for which landowner access must be acquired is 141 kilometers² (55 mi², 34,000 ac). It is inevitable that AES will not gain access to all parcels within the 0.5-km mist netting buffer. Therefore, the following is proposed for properties for which landowner access cannot be obtained:

- If access cannot be obtained for a high quality flyway within a 1-kilometer² block, the next best property, for which access can be obtained, within that 1-kilometer² block will be netted.
- If access cannot be obtained for *any* suitable flyways within a 1-kilometer² block, the best and most similar habitat, in one of the adjacent blocks will be netted instead. (This may result in two net sites being placed in some 1-kilometer² blocks.)
- In the event that access cannot be obtained for *any* habitat within *multiple*, adjacent 1-kilometer² blocks, ESI will place multiple net sites within the closest, 1-kilometer² blocks to the inaccessible properties. If possible, sites will be chosen in areas that possess habitat connectivity to the inaccessible properties.

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

6.0 Avoidance and Minimization

To facilitate planning and smooth project execution, AES endeavors to gain agreement from USFWS on what minimization and avoidance measures will be employed under various capture scenarios:

6.1 Capture of a Single, Adult Male

If a single adult male Indiana bat is captured and:

- a roost tree cannot be located (after 6 days of telemetry efforts) then it will be assumed that the individual is transient and thus a seasonal cutting restriction (1 November to March 31) is not required.
- one or more roosts are located, but emergence counts show that bat to be the only bat roosting in the tree(s), then it will be assumed that the individual is transient and thus a seasonal cutting restriction (1 November to March 31) will be required for the identified roost tree(s), but not for the surrounding area, unless 2 nights of emergence observations are used to establish a lack of use of the roost tree and it is removed the next day following the second evening of observation.
- one or more roosts are located and emergence counts reveal multiple bats using the tree(s), then at least two AnaBat acoustical detectors will be placed near the roost tree(s) for at least 2 nights to facilitate identification of species using the tree(s). The two filters provided by the KDFWR / USFWS Frankfort field office will be used to determine if Indiana bat calls are recorded by the AnaBat. If those filters produce two or more separate call files for Indiana bats, ESI will either conduct additional mist netting in the area to attempt to catch and transmitter additional Indiana bats to understand how the bats are using the area OR assume a maternity colony is present and employ a seasonal cutting restriction within a reasonable distance of identified roost tree(s). One behalf of AES, ESI requests input from USFWS on the appropriate distance.

6.2 Capture of Adult Female or Juvenile

Capture of an adult female or juvenile Indiana bat indicates that a maternity colony is present in the area. In the past, emergence counts of greater than 20 bats were often considered indicative of a “primary roost” while trees with less than 20 bats were considered “secondary roosts”. However, as we have come to understand that most colonies exhibit a fission-fusion society structure, it can be difficult to understand which trees are primary trees, how many trees actually constitute a maternity colony, and if there are multiple colonies present in an area (ESI 2007

revised 2008). As such, if an adult female or juvenile Indiana bat is captured, ESI will endeavor to collect adequate data to understand the location and number of roosts, and the number of bats using each roost tree, facilitating a determination of the number of maternity colonies and the overall size of the area used by the bats. Efforts to this end include:

- Completion of dusk emergence counts at all identified roosts for a minimum of 3 days. (Night vision scopes and/or AnaBat recording devices may be used as deemed appropriate by field staff.)
- If no primary roost (i.e., tree with over 20 bats) is located during telemetry efforts, up to four additional calendar nights of netting will be conducted near the bat's known roost(s) to capture and transmitter additional reproductive individuals from the same colony to facilitate identification of at least one primary roost. A seasonal cutting restriction will be observed within a reasonable distance of any identified roost trees. One behalf of AES, ESI requests input from USFWS on the appropriate distance.

If a reproductive individual is caught and a roost tree can not be located, AES will observe a seasonal cutting restriction within a reasonable of the capture site. One behalf of AES, ESI requests input from USFWS on the appropriate distance.

7.0 Timeline and Reporting

Portal/cave searches will be conducted during the remaining months of 2008 and a report of findings will be submitted to USFWS by 28 February 2009. If potentially suitable portals/caves are located during searches they will be trapped between 10 April and 10 May 2009. The portal/cave search report will be amended to include results of the trapping surveys and resubmitted to USFWS by 15 June 2009.

Mist net surveys will be conducted between 15 May and 15 August 2009 and a complete survey report, covering all field studies completed by ESI for the Sparrows Point Project will be submitted to USFWS by 30 September 2009.

ESI's report(s) include maps showing the proposed ROW alignment, construction corridor, all portal search areas, all portals trapped, all net site locations and excluded areas as well as the 0.5-kilometer and 0.5-mile buffers. Copies of all field data sheets and photographs (portals, net sites, excluded areas, etc.) are included. The final report will detail survey methods, weather results, net site habitat analysis, and basic statistical analysis of results, including species diversity and richness.

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

8.0 Personnel

A list of ESI staff likely to be involved in the mist netting field work for AES's Sparrows Point Project follows. Other staff not listed here may also participate – resumes can be provided in advance of surveys if requested by USFWS; all individuals responsible for bat identification will be listed on ESI's scientific collection permit(s).

1. Dr. Virgil Brack, Jr. – Principal Scientist & Project Manager
2. Mr. Adam Mann
3. Mr. Jason Duffey
4. Ms. Erin Pfeffer
5. Mr. Jack Basiger
6. Mr. Jonathan Hootman
7. Mr. David Jeffcott
8. Mr. John Timpone
9. Mr. Justin Boyles
10. Mr. Daniel Cox
11. Mr. Jody Nicholson

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

9.0 Literature Cited

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**APPENDIX A
SAMPLE DATA SHEETS**



ROW HABITAT EXCLUSION (Linear Corridor Study)

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

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

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

Location of Excluded Section:

Eastern Terminus: _____ **Approximate Milepost:** _____ **and/or**

Landmark: _____

UTM Zone: _____ **Easting:** _____ **Northing:** _____

Western Terminus: _____ **Approximate Milepost:** _____ **and/or**

Landmark: _____

UTM Zone: _____ **Easting:** _____ **Northing:** _____

Approximate Length: _____

Reasons for Exclusion:

Habitat Types: *(Check all that apply)*

- | | | |
|--|---|---|
| <input type="checkbox"/> Industrial / Commercial | <input type="checkbox"/> Recent Clearcut | <input type="checkbox"/> Open Agriculture |
| <input type="checkbox"/> Residential | <input type="checkbox"/> Saplings only | <input type="checkbox"/> Meadow |
| <input type="checkbox"/> Open Water / Lake | <input type="checkbox"/> Scrub / Shrub | <input type="checkbox"/> Mowed Grass |
| <input type="checkbox"/> Large River | <input type="checkbox"/> Trees unsuitable as roosts | <input type="checkbox"/> Other |

Estimated tree dbh range: Lg: _____ Sm: _____ **Stream Present:** ___ No ___ Yes

Roost Tree Potential: ___ None ___ Poor ___ Moderate

Travel Corridor: ___ No ___ Yes *IF YES, THEN* ___ Riparian ___ Upland



NET SITE HABITAT DESCRIPTION

Project #: _____ **Date:** _____ **Biologists:** _____
Project Name: _____ **Site Name/#:** _____
State: _____ **County:** _____ **USGS Quad:** _____
Camera #: _____ **Picture #s:** _____ **GPS Unit #:** _____ **Waypoint #:** _____
UTM Zone: _____ **Easting:** _____ **Northing:** _____
 Distance to closest water source (meters): _____ Type of water source: _____
 Water source name: _____

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS):

Bank Height: _____ meters Channel Width: _____ meters Stream Width: _____ meters
 Substratum: ___ Bedrock ___ Boulder ___ Cobble ___ Gravel ___ Sand ___ Silt/Clay
 Still Water Present (Y/N): _____ Average Water Depth: _____ m or cm Clarity (H,M,L): _____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh) _____ **Subdominant Canopy Species (< 40 cm/16" dbh)** _____

 Estimated dbh range: Lg: _____ Sm: _____ Estimated dbh range: Lg: _____ Sm: _____
 Relative abundance of dominant vs. subdominant (ratio): _____
 Estimated canopy closure: _____ Closed _____ Moderate _____ Open
 Roost tree potential consists of: _____ Large Trees _____ Snags _____ Both _____ Neither
 Roost tree potential for the area is: _____ High _____ Moderate _____ Low
 Roost potential comments: _____
 Subcanopy clutter: _____ Closed _____ Moderate _____ Open
 Subcanopy comprised largely of: _____ Lower Branches of _____ Saplings _____ Shrubs
 _____ Canopy Trees
 Common Subcanopy Species: _____

Habitat Description: _____

Check all that apply:
 ___ Mature Upland Forest ___ Recently Logged Forest ___ Crop/Pasture Land ___ Shrub/scrub Swamp
 ___ Young Upland Forest ___ Pine Plantation ___ Stream/River ___ Vernal Pool
 ___ Mature Lowland Forest ___ Woodlot/ForestEdge ___ Emergent Wetland ___ Deepwater Lake/Pond
 ___ Young Lowland Forest ___ Old Field ___ Forested Swamp ___ Other _____
 Herbaceous Cover: ___ Sparse ___ Moderate ___ Dense



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NET SITE HABITAT DESCRIPTION (continued)

Project #:	State/County:	Site Name/#:	Initials:
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SKETCH: NETS A and B



LEGEND	COMMENTS
Nets: ● — ●	_____



Beaufort Wind Scale

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

2008 Lunar Phases

New Moon	First Quarter	Full Moon	Last Quarter
March 14	March 21	March 29	April 6
April 12	April 20	April 28	May 5
May 12	May 20	May 28	June 3
June 10	June 18	June 26	July 3
July 10	July 18	July 25	August 1
August 8	August 16	August 23	August 30
September 7	September	September 22	September 29
October 7	October 14	October 21	October 28

Weather Guidelines for Mist-netting¹

1. Net only if the following weather conditions are met:

- ◆ No precipitation
- ◆ Temperature $\geq 10^{\circ}\text{C}$ (50°F)
- ◆ No strong winds

2. Moonlight: avoid net sets with direct exposure to a moon $\frac{1}{2}$ -full or greater – typically by utilizing forest canopy cover.

¹ U.S. Fish and Wildlife Service. 2007. Indiana Bat (*Myotis sodalis*) draft recovery plan: First Revision. Ft. Snelling, Minnesota.



MINE PORTAL DESCRIPTION

Project No: _____ Project Name: _____

Date: _____ Biologists: _____

State: _____ County: _____

Site Name/# _____ No. of Portals: _____

GPS: Unit #: _____ Waypoint Name: _____

UTM Zone: _____ Easting: _____ Northing: _____

Camera #: _____ Photo ID #s: _____

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

Is portal recommended for bat survey? No ___ Yes ___ Why _____

Comments: _____

Please include site sketch on back when feasible.



BAT TRANSMITTER DATA

Project #: _____ Date: _____ Biologists: _____

Project Name: _____ Site Name/#: _____

State: _____ County: _____ Camera #: _____

Picture #: _____

Bat Species: _____ Capture Time: _____

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

Transmitter weight = _____ grams Frequency number: _____

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

FINAL CHECK:

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

RELEASE TIME: _____ TOTAL HOLD TIME: _____ minutes

RELEASE LOCATION: _____

COMMENTS:



ROOST TREE DATA

Project #: _____ Date: _____ Biologists: _____

Project Name: _____ State: _____ County: _____

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

UTM Zone: _____ Easting: _____ Northing: _____

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

Capture Date: _____ Capture Site: _____

Frequency: _____ Roost Name/#: _____

ROOST TREE DATA

Roost tree species: _____ dbh: _____ cm

Estimated height from ground to roost: _____ (meters)

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

Tree health: Live Dead Partial

Observed roost potential: Exfoliating Bark Cracks/crevasses Hollow Unknown

Bat vocalizations: Yes No

Guano on ground/foilage: Yes No

Is guano fresh (if present)?: Yes No

Guano volume (if present): _____

DESCRIPTION OF SURROUNDING HABITAT

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

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

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

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

Estimated canopy closure at roost: _____ %

Slope: Steep Moderate Slight None Direction facing: _____

Distance to nearest water source: _____ m or km (circle one) Distance to nearest flight corridor: _____ meters

Habitat Description: _____

Check all that apply:

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> Mature Upland Forest | <input type="checkbox"/> Recently Logged Forest | <input type="checkbox"/> Crop/Pasture Land | <input type="checkbox"/> Shrub/scrub Swamp |
| <input type="checkbox"/> Young Upland Forest | <input type="checkbox"/> Pine Plantation | <input type="checkbox"/> Stream/River | <input type="checkbox"/> Vernal Pool |
| <input type="checkbox"/> Mature Lowland Forest | <input type="checkbox"/> Woodlot/ForestEdge | <input type="checkbox"/> Emergent Wetland | <input type="checkbox"/> Deepwater Lake/Pond |
| <input type="checkbox"/> Young Lowland Forest | <input type="checkbox"/> Old Field | <input type="checkbox"/> Forested Swamp | <input type="checkbox"/> Other _____ |

Herbaceous Cover: Sparse Moderate Dense

Comments:



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ROOST TREE DATA (continued)

Page ___ of ___

State/County: _____ Project Name/ #: _____ Date: _____
 Frequency: _____ Roost Name/ #: _____ Initials: _____

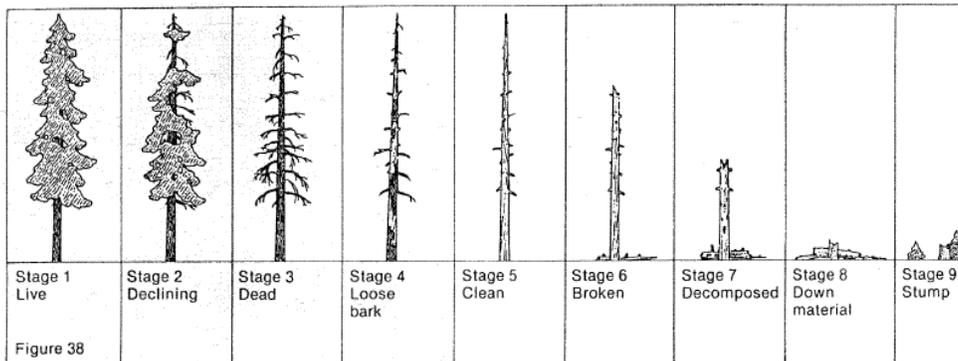
Sketch: Roost Tree Habitat



Comments: _____

Sketch: Roost Tree

Stages of Decay:





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ANABAT DATA

Project #: _____ Task #: _____ Biologists: _____
 Project Name: _____ Site Name/#: _____
 State: _____ County: _____ USGS Quad: _____
 Camera #: _____ Picture #s: _____ GPS Unit #: _____ Waypoint #: _____
 UTM Zone: _____ Easting: _____ Northing: _____

Date	Start	End	Total time	Total # files	# Bat calls	# Sodalis calls	Rain / Cold

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

Water source name: _____

Tree species present _____ Estimated dbh range: Lg: _____ Sm: _____

Estimated canopy closure: _____ Closed _____ Moderate _____ Open

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

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

Roost potential comments: _____

Subcanopy clutter: _____ Closed _____ Moderate _____ Open

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

Habitat Description: _____

Check all that apply:

- ___ Mature Upland Forest ___ Recently Logged Forest ___ Crop/Pasture Land ___ Shrub/scrub Swamp
 - ___ Young Upland Forest ___ Pine Plantation ___ Stream/River ___ Vernal Pool
 - ___ Mature Lowland Forest ___ Woodlot/ForestEdge ___ Emergent Wetland ___ Deepwater Lake/Pond
 - ___ Young Lowland Forest ___ Old Field ___ Forested Swamp ___ Other _____
- Herbaceous Cover: ___ Sparse ___ Moderate ___ Dense



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ANABAT DATA (continued)

Project #:	State/County:	Site Name/#:	Initials:
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SKETCH: AnaBat location (relative to net sites) & surrounding habitat



LEGEND	COMMENTS
<p>Nets: ● — ●</p> <p>Anabat: A</p>	<hr/> <hr/> <hr/> <hr/> <hr/>

AES Sparrows Point LNG, LTD Sparrows Point LNG Terminal

Vessel Strike Avoidance Measures and Injured or Dead Protected Species Reporting Plan

Proposed Plan and Protected Species Identification Training

AES Sparrows Point LNG, LTD (AES) has developed this preliminary Vessel Strike Avoidance and Reporting Plan (Plan) to outline specific measures which will be implemented to assure consistency with the existing and proposed regulations for Marine Mammals and Right Whale protection for all activities associated with operation of the LNG facility and the LNG vessel transit route within the Chesapeake Bay Seasonal Management Area. AES will ensure that all operators of construction and support vessels, and LNG carriers calling at the AES Sparrows Point LNG Terminal (Sparrows Point Facility) are fully aware of the requisite federal regulations and that these vessels act accordingly. As the AES project evolves, this Plan will be updated to provide greater detail on how vessels calling into the facility can be best briefed in order to enhance reporting while minimizing any whale strikes. All modifications to this Plan will be submitted to FERC and the National Marine Fisheries Service (NMFS) for review and approval in advance of implementation. Prior to initiation of operation of the LNG Terminal, AES will verify reporting contact information for NOAA representatives and update the plan, as appropriate, to incorporate specific contact information for NOAA personnel including names, phone numbers, facsimile numbers as well as mailing and e-mail addresses.

As part of its facility operations, AES will provide and implement Port Regulations for all vessels that call on the Sparrows Point Facility. The Port Regulations will include operational and regulatory requirements, which will ensure that the vessels can call safely and securely on the Sparrows Point Facility. When a vessel is nominated to discharge at the Sparrows Point Facility, the facility will require the vessel to provide information regarding the physical attributes of the vessel so that AES can determine its compatibility with the facility and properly prepare for the vessel arrival. Once AES clears the vessel, AES will provide the vessel with the Port Regulations for their review, understanding, and acknowledgement. The Port Regulations include applicable regulatory requirements, which ensure that the vessels can call safely and securely on the Sparrows Point Facility. This Plan will be incorporated in the Sparrows Point Facility fuel supply agreements to ensure that all LNG vessels review, understand, and acknowledge the information specific to vessel strike avoidance and reporting requirements. Additionally, AES will incorporate a copy of the NOAA/USCG produced training CD entitled “A Prudent Mariner’s Guide to Right Whale Protection”, and a list of references and resources for additional information on North Atlantic Right Whales into the Sparrows Point Facility Port Regulations to ensure that all LNG vessels review and acknowledge the information.

AES will request the following actions and provide the following information to LNG vessels regarding federal laws and regulations for protected species, ship strike information, critical habitat, migratory

**AES Sparrows Point LNG, LTD
Sparrows Point LNG Terminal
Vessel Strike Avoidance Measures and
Injured or Dead Protected Species Reporting Plan**

routes and seasonal abundance, and recent sightings of protected species.

Vessel Strike Avoidance

In order to avoid causing injury or death to marine mammals the following measures must be taken when consistent with safe navigation:

1. Vessel operations and crews will maintain a vigilant watch for marine mammals to avoid striking sighted protected species.
2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel and note the sighting in the Marine Biological (Sea Turtle and Marine Mammal) Observation Log Form
3. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups or large assemblages of whales are observed near an underway vessel, when safety permits. A single whale at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.
4. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path, steer behind the whale's path of travel and avoid crossing ahead of the whale. If whales approach the vessel at close range, do not attempt to maneuver around them unless collision is imminent. When capable of safely doing so, attempt to remain parallel to the animal's course. When safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

Additional Requirements for the North Atlantic Right Whale

1. AES will request LNG vessels to slow to a speed of 10 knots or less during the migratory season, when consistent with safe navigation. This seasonal notification will be in effect between November 1 and April 30, including approaches and departures within 20 nautical miles (nmi) seaward of the mouth of the Chesapeake Bay. This area will be referred to as the Chesapeake Bay Seasonal Management Area (SMA).
2. AES will request LNG vessels to notify NOAA if they are unable to transit at the requested 10 knots or less in the SMA. LNG vessels will be requested to provide NOAA with the following information and document on the SMA Variance Report Form:
 - a. Date and time of entry into / exit from SMA,
 - b. Ship speed through SMA,
 - c. Reason increased speed was necessary (e.g., weather conditions affecting maneuverability), and
 - d. Special actions taken.
3. To reduce the probability of encounters with Right Whales within the SMA, AES will advise vessels, when consistent with safe navigation, to utilize the designated shipping channels into and out of the mouth of the Chesapeake Bay to reach a location 30 nmi

**AES Sparrows Point LNG, LTD
Sparrows Point LNG Terminal
Vessel Strike Avoidance Measures and
Injured or Dead Protected Species Reporting Plan**

from the coast while avoiding areas of recent whale sightings.

4. AES will distribute the most recent version of the NOAA/USCG produced training CD entitled “A Prudent Mariner’s Guide to Right Whale Protection” prior to calling on the Sparrows Point Facility. LNG vessel masters will be requested to view the CD and to ensure that lookouts are aware of relevant information. Additionally, AES will distribute training and informational materials to LNG vessel operators regarding Right Whales, information on how to report Right Whale sightings, and requirements to check maritime advisory information systems for Right Whale sightings. LNG vessel operators will be requested to check with various communication media for general information regarding avoiding ship strikes and specific information regarding Right Whale sighting locations. These include NOAA Weather Radio, U.S. Coast Guard NAVTEX broadcasts, the Sighting Advisory System (SAS) website, SAS fax and email distribution list, Notices to Mariners, and an automatic reply with the latest Right Whale sighting through emailing ne.rw.sightings@noaa.gov.
5. Upon receipt of a 96-hour port call notice from a LNG vessel during the migration season described in Paragraph 1 above, AES will notify the vessel that it is whale migration season and request that the vessel follow the associated speed regulation and vessel strike avoidance measures contained in this plan.
6. If a sighted whale is believed to be a Right Whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103(c)).
7. Injured, dead, or entangled Right Whales will be immediately reported to the U.S. Coast Guard via VHF Channel 16.

Injured/Dead Protected Species Reporting

Sightings of any injured or dead protected species (sea turtles and marine mammals) should be reported immediately, regardless of whether the injury or death is caused by project activities. Sightings of injured or dead whales and sea turtles not associated with project activities can be reported to the USCG on VHF Channel 16, or to NMFS Stranding and Entanglement Hotline: (978) 281-9351.

In addition, if the injury or death of a marine mammal was caused by a collision with your vessel, the NMFS Stranding and Entanglement Hotline should be notified immediately (978-281-9351), and responsible parties should remain available to assist the respective marine mammal salvage and stranding network as needed. The NMFS’ Northeast Regional Office must also be provided with a full report of the incident, including the following information:

- Location, date, and time of the accident or sighting,
- Speed of the vessel,
- Size of the vessel,
- Description of the impact,
- Fate of the animal, if known,
- Species and size, if known,
- Wind speed and direction, and
- Water depth.

Marine Biological (Sea Turtle and Marine Mammal) Incident Log Form

Date: _____

Vessel Name: _____ Size of Vessel: _____

Name of Observer: _____

Location of Vessel: _____ Wind Speed and Direction: _____

Water Depth: _____ Speed of Vessel: _____

(If the injury or death of a marine mammal was caused by a collision with your vessel, the NMFS Stranding and Entanglement Hotline should be notified immediately (978-281-9351), and responsible parties should remain available to assist the respective marine mammal salvage and stranding network as needed.)

Description of Incident/Impact (include fate of animal, If known):

Corrective Actions/Measures Taken

Signature

Date
