D1045.038
August 22, 2024

NORTHERN LONG-EARED BAT MIST-NET SURVEY REPORT

VENUE AT SUMMERS CORNER

BLOCK 286 & 287 * LOTS 3, 5, 6; 5 & 7
LITTLE EGG HARBOR TOWNSHIP, OCEAN COUNTY, NJ

***Prepared for*:**

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TABLE OF CONTENTS

Page No.

1.0 Executive Summary……..... 3

2.0 Introduction……..... 3

3.0 Perspective & Scope……..... 3

4.0 Target Species Description & Habitat Discussion..... 4

5.0 Project Site Description..... 4

6.0 Materials and Methods..... 5
6.1 Mist Net Trapping Survey..... 5
6.2 Inspection and Decontamination for White Nose Syndrome..... 6

7.0 Results..... 6
7.1 Mist Net Trapping Survey..... 6
7.2 White Nose Syndrome..... 8

8.0 Conclusion…..... 8

9.0 References..... 9

Tables

Table 1	Personnel Used for Conducting Indiana & Northern long-eared Bat Survey……..	6
Table 2	Mist Net Breakdown per Site……	6
Table 3	Dates, Times and Conditions Conducting Mist Net Surveys……	7

Figures

Figure 1 -	New Jersey Road Map
Figure 2 -	NW Tuckerton NJ USGS Quadrangle Map
Figure 3 -	Aerial Map
Figure 4 -	NJDEP Freshwater Wetlands Map
Figure 5 -	Mist Net Location Map

Appendices

Appendix A -	Site Photographs
Appendix B -	Bat Capture Data Sheets
Appendix C -	Scientific Collecting Permit
Appendix D -	Statements of Qualifications

1.0 EXECUTIVE SUMMARY

This report summarizes the results of a summer mist-net survey for the Federally-endangered northern long-eared bat (*Myotis septentrionalis*) for an approximate 145-acre site in Little Egg Harbor Township, Ocean County, New Jersey. The survey was required in support of the New Jersey Department of Environmental Protection (NJDEP) CAFRA application. Little Egg Harbor Township is not documented to contain maternity colony or hibernation occurrences of the northern long-eared bat (U.S. Fish & Wildlife Service [USFWS], 2023). DuBois & Associates, LLC (DuBois) performed a mist-net survey to determine the presence or absence of this species from the site in accordance with the 2024 *Range-Wide Indiana Bat & Northern Long-eared Bat Survey Guidelines* (the Federal Guidelines – USFWS, 2024).

DuBois surveyed the site for northern long-eared bat in August of 2024 for a total of twelve (12) net nights based on the 117-acre clearing limits associated with the project. The mist-net survey did not result in the capture of northern long-eared bat from the site. Based on the results of the survey, summer populations of northern long-eared bat are **likely absent** from this site. Therefore, it is the opinion of DuBois that the project is unlikely to have an adverse impact to the Federally-endangered northern long-eared bat.

2.0 INTRODUCTION

DuBois & Associates, LLC (DuBois), on behalf of ARH Associates, Inc. (ARH), has been retained to conduct a northern long-eared bat ("NLEB") mist net survey for the referenced project. According to the Federal list of *New Jersey Municipalities with Hibernation or Maternity Occurrence of Indiana Bat or Northern Long-eared Bat* (USFWS, 2023), Little Egg Harbor Township is not documented to contain maternities colony or hibernation occurrences of northern long-eared bat. However, the entire state of New Jersey falls within the potential range for the species. DuBois surveyed the site for potential summer populations of this bat in August of 2024 in accordance with Phase 2 mist-net survey methods of the Federal Guidelines. This report details the methods, results and conclusions of the Phase 2 northern long-eared bat mist-net survey.

DuBois is led by principal biologist Mr. Bryon DuBois who is a USFWS recognized qualified bat survey in New Jersey, New York and Pennsylvania and Mr. Anthony Silva who is a USFWS recognized qualified bat surveyor in New Jersey and Pennsylvania.

3.0 PERSPECTIVE AND SCOPE

The major and immediate threat to the survival of *Myotis* bats in the United States is the disease known as white-nose syndrome (WNS). The fungus believed to be the primary causative agent is known as *Pseudogymnoascus destructans* and is known to thrive in darkness, low temperatures (40-50°F) and high humidity (>90%), conditions that are associated with caves. It is not suspected to be the cause of death, but rather interrupts hibernating bats, causing them to deplete their fat storage during the winter. Since symptoms were first observed in New York in the winter of 2006-2007, WNS has spread rapidly in bat populations and has killed more than six million bats in eastern North America. Bats have been found sick and dying in unprecedented numbers in and around caves and mines. In some hibernacula, 90 to 100 percent of bats have died (USFWS, 2014).

To aid in the recovery and protection of the Indiana bat (*Myotis sodalis*) and northern long-eared bat, the USFWS has devised recommended guidance on survey methodologies to determine the presence or probable absence of these bats in summer and winter habitat areas of the United States. To determine whether any tree-removal activities required for potential future land-use activities could potentially conflict with occupied summer habitat for northern long-eared bats, ARH has elected to proceed with Phase 2 Step 4 (*Conduct Mist-net survey*) of the 2024 Guidelines. If a northern long-eared bat is not captured, no further summer surveys are necessary. If a northern long-eared bat is captured, then Phase 4 methods

(*Conduct Radio-tracking and Emergence Surveys*) are warranted. DuBois submitted a Northern Long-eared Bat Mist Net Survey Study Plan to the USFWS and NJDEP on behalf of ARH, detailing the methodology of the proposed study on August 1, 2024. A Scientific Collecting Permit was obtained from the NJDEP Endangered and Nongame Species Program (Permit No.: SC2024168) prior to conducting Phase 2 survey.

The project is classified as a non-linear project, which requires a minimum of ten (10) net nights per 123-acres of suitable summer habitat. A net night is defined as one net (1) operational for one (1) night. The clearing limits of the associated project total 117-acres. DuBois exceeded the minimum number of net nights in August, 2024 by sampling a total of six (6) net site locations that were sampled for two (2) calendar nights (i.e., 12 net nights). DuBois began the survey on the night of August 12th and completed the survey on the night of August 13th.

4.0 SPECIES DESCRIPTION & LIFE HISTORY

Northern long-eared bats spend the winter hibernating in caves and abandoned mines. These caves or mines typically have large passages and entrances with constant temperatures and high humidity with no air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur (USFWS 2014). Edge habitat (transition zone between two types of vegetation) is important for northern long-eared bats as they migrate and forage. When bats migrate from wintering caves to summer habitat or commute from roosts to feeding grounds, they move through the landscape in a manner that protects them from wind and predators. Instead of flying the shortest distance across a field, bats will take longer routes that follow edge habitat (WDNR 2013).

During the summer months, northern long-eared bats roost singly or in colonies underneath bark, in cavities of trees, or in crevices of both live and/or dead trees. They have also been known to roost in man-made structures as well. Northern long-eared bats prefer to roost in tall trees with a dynamic forest structure including old growth and some young trees (Foster and Kurta 1999). This bat seems opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices (USFWS 2014). Females form small maternity colonies which are located in trees, under shingles, and in buildings. Northern long-eared bats mostly forage within the forest and below the canopy mainly in upland forests on hillsides and ridges (Owen et al. 2003), but have also been noted to forage along paths, ponds and streams, at forest edges and rarely in barns and sheds. Foster and Kurta (1999) found all roost trees to be close to wetlands.

5.0 PROJECT SITE DESCRIPTION

The site is located with frontage on Center Street to the west, immediately south of Route 9 (*Figure 1: New Jersey Road Map*). The site can be found on the NW Tuckerton NJ United States Geological Survey (USGS) Quadrangles with NAD 1983 state plane coordinates (feet) of E(x) 530,304 and N(y) 277,198 at the approximate center of the site (refer to *Figure 2: NW Tuckerton NJ U.S.G.S Quadrangle Map*).

According to the desktop review, the site is primarily undeveloped with several dirt paths intermixed with mixed coniferous/deciduous forest. A forested wetland is located in the southern portion of the site. Historical excavation in several areas associated with mining operations remain along the western property boundary. Refer to *Figure 3: Aerial Map* for a depiction of the land coverage present on and in the vicinity of the subject site.

Surrounding land use is dominated by single family residential developments but includes a Tractor Supply Co. to the north and forested land to the west.

6.0 MATERIALS AND METHODS

6.1 Mist Net Survey

The mist-net survey was conducted in accordance with the Federal Guidelines (USFWS 2024). Mist nets were operational on the site on the nights of August 12th and August 13th, 2024. Net placement locations were selected based on the presence of the most optimal habitat features on-site, including an inundated pond feature, access trails, and a gravel roadway. As a clutter specialist species, where suitable flight corridors were lacking, DuBois utilized habitat features that would attract bat activity. Trails with inundated tire ruts and an existing pond which may draw foraging bats were utilized. When travel corridors were used, DuBois filled the entire corridor width to prevent bats from evading the net. Net sites varied in height based on the existing conditions at each location. Where the canopy allowed, DuBois utilized triple-high net sets. One (1) mist net was placed overtop an inundated pond feature while the remaining five (5) were placed on sandy access trails and a gravel roadway. Several corridors utilized contained inundated tire ruts which is likely to support a mosquito prey base. These areas were deemed the best possible locations to potentially capture northern long-eared bat. Refer to *Figure 5: Survey Location Map* and *Appendix A: Site Photographs* for a depiction of the mist net locations.

Six (6) total net sets were established on the project site from August 12-13th, 2024 for a total of twelve (12) net nights over two (2) survey dates. The survey dates lie within the acceptable date limits (May 15 to August 15) for documenting the presence of summer populations of northern long-eared bats. The project amounts to 117-acres. The level of effort exceeded the minimum of 10 net nights per 123-acres of suitable summer habitat stipulated in the Federal Guidelines.

DuBois utilized the finest, lowest-visibility mesh-nets commercially available. Two-ply 50 denier nylon (50/2) 38 mm mesh was used with BCM triple high aluminum pole setups. The survey equipment consisted of triple high mist nets, ranging from 5.2 meters high to 7.8 meters high and four (4) to nine (9) meters wide. Nets were hung as to provide bags in panels. Herbaceous vegetation below the nets was manually pulled aside and nets rose uninhibited below the forest canopy.

On the nights of August 12th and 13th, DuBois installed six (6) total nets which were checked every ten (10) minutes beginning shortly before sunset for a minimum of five (5) hours.

Mr. Bryon DuBois and Mr. Anthony Silva are USFWS Recognized Qualified Indiana Bat and Northern Long-eared Bat Surveyors, who were present during all surveys. All bats captured were held and subsequently processed/verified by Mr. Bryon DuBois or Mr. Anthony Silva. Subpermitees assisted in mist net set-up, take down, removal and data compilation of captured bats. Net sets were located in areas which allowed a Recognized Qualified Bat Surveyor to oversee every location.

Table 1: DuBois personnel used for Conducting Northern Long-eared Bat Mist-net Survey

Name	Title
Bryon DuBois*	Principal Biologist
Anthony Silva*	Sr. Biologist
Ethan DuBois	Staff Biologist
Israel Berrios	Staff Biologist
Frank Tutelian	Staff Biologist
Abigail Spagnola	Staff Biologist

*USFWS Recognized Qualified Bat Surveyor

Table 2: Mist net breakdown per site.

Net Set	Net Dimensions (meters)	Night Utilized	Net Coordinates (NAD 83)
Set 1	5.2 m x 4 m = 20.8 m^2	8/12 & 8/13	39.598417, -74.364187
Set 2	7.8 m x 6 m = 46.8 m^2	8/12 & 8/13	39.596931, -74.364781
Set 3	7.8 m x 4 m = 31.2 m^2	8/12 & 8/13	39.594313, -74.363474
Set 4	7.8 m x 6 m = 46.8 m^2	8/12 & 8/13	39.593200, -74.3663212
Set 5	5.2 m x 4 m = 20.8 m^2	8/12 & 8/13	39.589367, -74.365295
Set 6	7.8 m x 9 m = 70.2 m^2	8/12 & 8/13	39.587209, -74.366815

6.2 Inspection and Decontamination for White Nose Syndrome

To minimize the potential for disease transmission, any equipment that comes in contacts with bats was kept clean and disinfected following the approved protocols provided by http:///whitenosesyndrome.org/. Each captured bat was held individually in a disposable cloth and/or paper bag until it could be processed; holding of bats never exceeded one hour and bags were only used once per bat captured. The bags were discarded after a single use. Disposable latex gloves were worn over handling gloves and discarded after each processed bat. All equipment that came into contact with the bat's body (i.e. caliper) was disinfected for ten minutes prior to subsequent use. The disinfectants used were Lysol Disinfecting Wipes containing 0.28% di-methyl benzyl ammonium chloride.

WNS was evaluated on all captured individuals during this study. WNS is identified by the growth of fungus on the rostrum, ears and flight membranes of bats during hibernation. During the warmer months it can be identified by extremely underweight bats; flaky, dehydrated or wrinkled wing/tail membranes; wing lesions; discolored spots and/or scarring of flight and tail membranes; multiple small to medium sized holes in wing membranes; torn or necrotic areas at the trailing edge of wing and tail membranes. Any bats captured in the mist nets that displayed symptoms of WNS were photographed to document the damage and a score of 0 to 4 was assigned according to the level of damage. The methodology used to evaluate wing damage was that derived from Jonathan Reicherd within the literature entitled Wing-Damage Index Used for Characterizing Wing Condition of Bats Affected by White-nose Syndrome.

7.0 RESULTS

7.1 Mist Net Survey

The survey successfully captured thirty-two (32) big brown bats (*Eptesicus fuscus*) and five (5) eastern red bats (*Lasiurus borealis*). The survey results reveal that a summer population of **northern long-eared bat is likely absent from the site.** For specific datum on each individual bat capture, refer to *Appendix B*.

Table 3: Dates, Times & Conditions for Conducting Mist Net Surveys

Date	Time	Surveyors	Weather (Start & Stop)	Net Set Results (Unlisted nets did not capture bats)
8/12/2024	1955-0100	Bryon DuBois Anthony Silva Ethan DuBois Israel Berrios Abigail Spagnola Frank Tutelian	Start: Temp. 74°F Humidity: 70% Wind: 4 mph Precipitation: N/A Stop: Temp. 65°F Humidity: 62% Wind: 2 mph Precipitation: N/A	Net Set 1: *Glaucomys volans: 2* Net Set 2: *Glaucomys volans: 1* Net Set 3: *E. fuscus: 3* Net Set 5: *E. fuscus: 4* *L. borealis: 1* Net Set 6: *E. fuscus: 8* *L. borealis: 2*
8/13/2024	1955-0100	Bryon DuBois Anthony Silva Ethan DuBois Israel Berrios Abigail Spagnola Frank Tutelian	Start: Temp. 74°F Humidity: 70% Wind: 4 mph Precipitation: N/A Stop: Temp. 65°F Humidity: 77% Wind: 5 mph Precipitation: N/A	Net Set 1: *E. fuscus: 1* *Glaucomys volans: 4* Net Set 4: *E. fuscus: 3* Net Set 5: *Glaucomys volans: 2* Net Set 6: *E. fuscus: 13* *L. borealis: 2*

7.2 White Nose Syndrome

DuBois assessed each individual bat captured for signs of damage resulting from WNS by assigning a damage score based on the Wing-Damage Index Used for Characterizing Wing Condition of Bats Affected by White-nose Syndrome as prepared by Jonathan Reicherd from Boston University. Thirty-two (32) big brown bats and five (5) red bats were captured during the mist-net survey. Of those 37 bats, one (1) big brown were and assigned a wing score greater than 0. These individuals showed marginal signs of suspected WNS due to holes or scars within wing membranes and forearms and were assigned a wing score of 1. Refer to *Appendix A: Site Photographs* for a physical depiction of the captured bats' conditions. Weights of all bats captured were considered typical for the species.

8.0 CONCLUSION

DuBois completed a northern long-eared bat mist net survey for the proposed Center Street project in accordance with the 2024 Federal Guidelines. The survey was required in support of a pending NJDEP CAFRA application. Per the NJDEP, it was recommended that a mist net survey with radio telemetry (if applicable) be conducted. The mist net survey resulted in the capture of thirty-two (32) big brown bats and five (5) eastern red bats. None of these bats are on the State or Federal lists of threatened or endangered species. The results of the 2024 mist net survey do not suggest the presence of a summer population of the Federally-endangered northern long-eared bat on the site. Pursuant to the Guidelines, if there is no capture of northern long-eared bat, then no further summer surveys are recommended. Based on the absence of this species from our sampling regime, northern long-eared bat is not likely present on the site and additional summer surveys are not warranted. It is our finding that conformance with the threatened and endangered species protection standards of the Coastal Zone Management Rules N.J.A.C. 7:7-9.36 can be made for the northern long-eared bat.

9.0 REFERENCES

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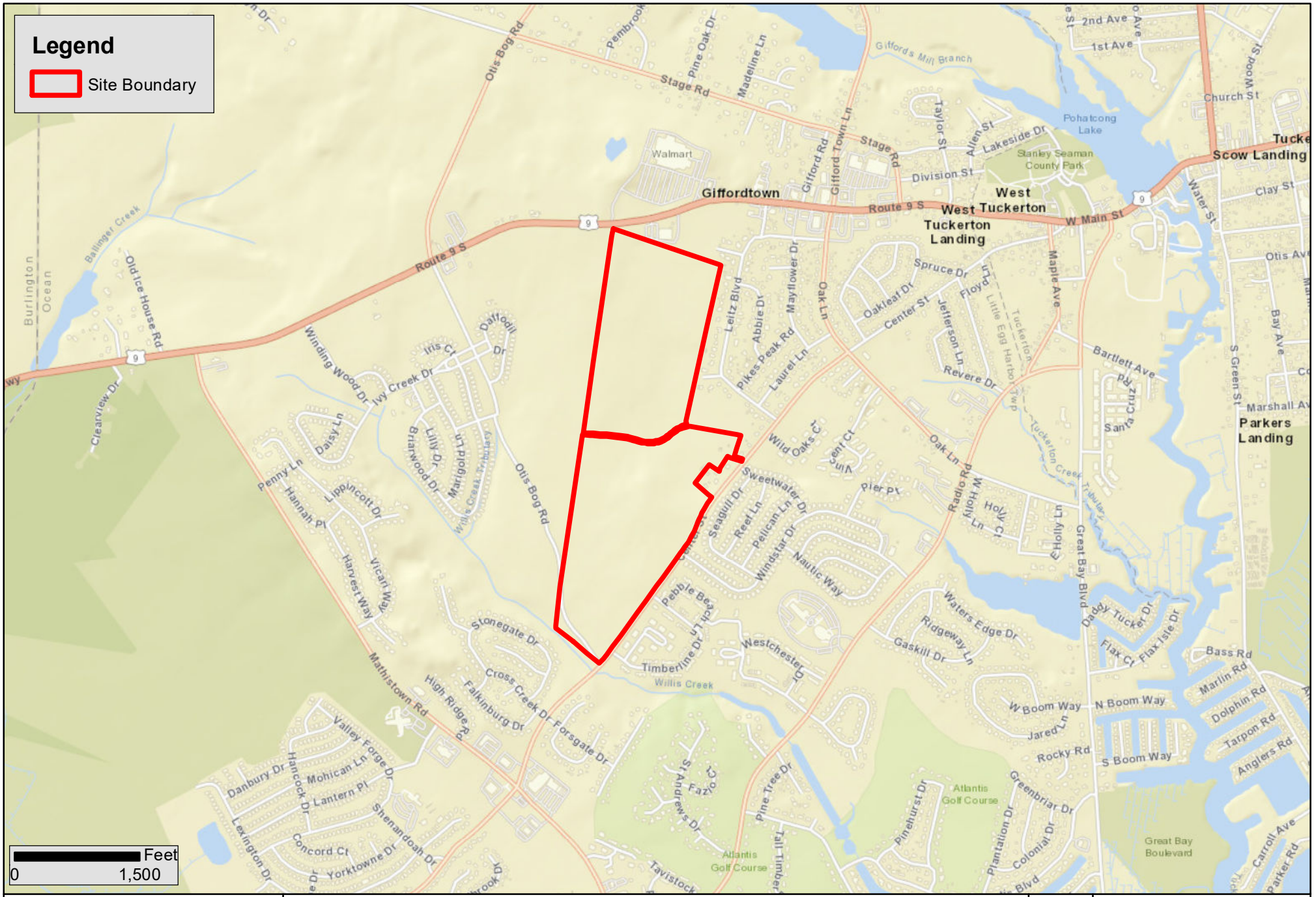
FIGURES



DuBois & ASSOCIATES

New Jersey Road Map

Block 286 * Lots 3, 5 & 6; Block 287 * Lot 7
Little Egg Harbor Township, Ocean County, NJ

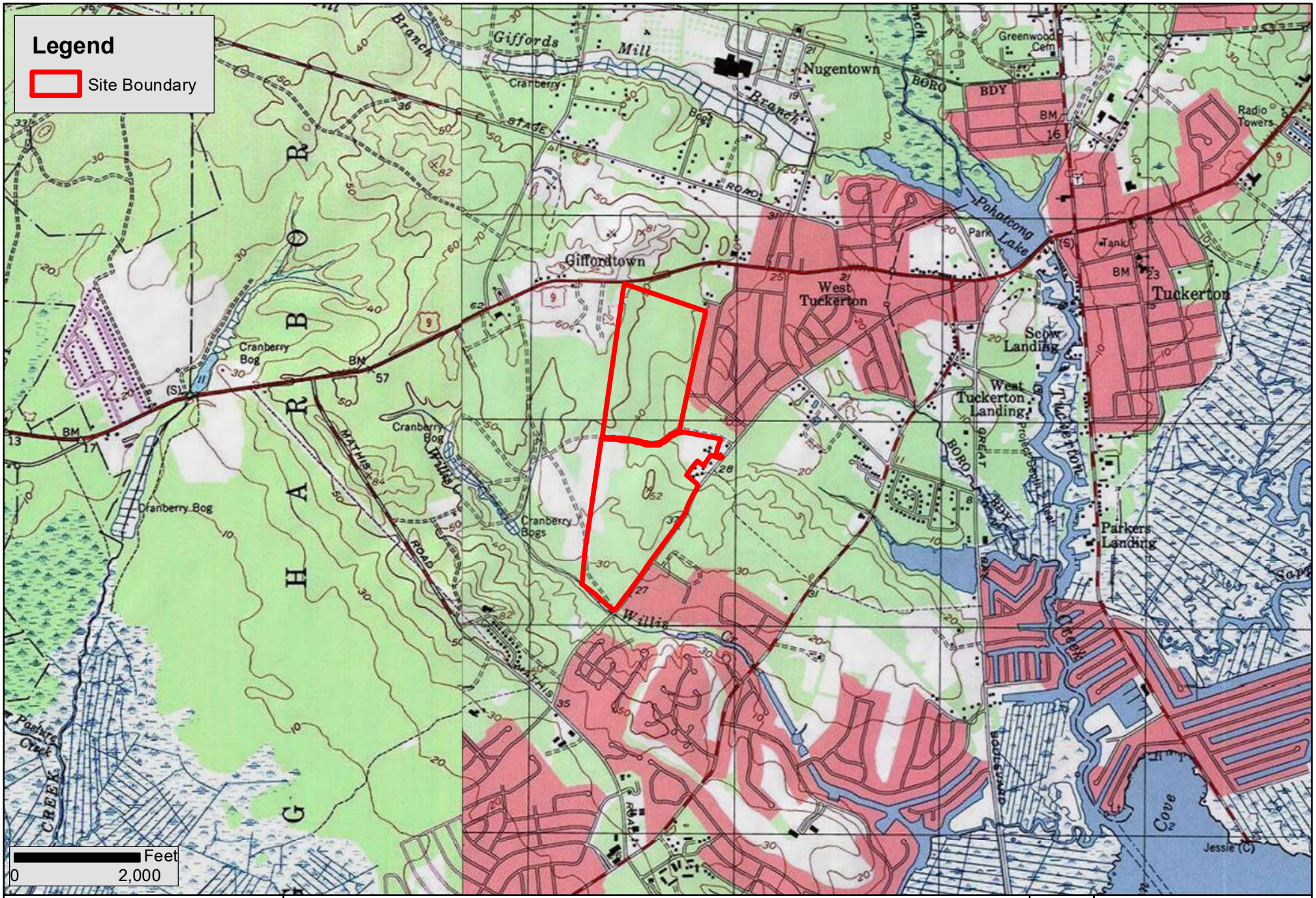
NORTH

Figure 1

Job No.: D1045.038
Scale: 1 in = 1,500 ft
Date: 8/22/2024
Drawn By: HJ

Document Path: S:\JOBS NUMBERS\D1045.038\Road.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.



DuBois & ASSOCIATES

NW Tuckerton USGS Quadrangle Map

Block 286 * Lots 3, 5 & 6; Block 287 * Lot 7
Little Egg Harbor Township, Ocean County, NJ

NORTH

Figure 2

Job No.: D1045.038
Scale: 1 in = 2,000 ft
Date: 8/22/2024
Drawn By: HJ

Document Path: S:\JOBS NUMBERS\D1045.038\Quad.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

DuBois & ASSOCIATES

Aerial Map

Block 286 * Lots 3, 5 & 6; Block 287 * Lot 7
Little Egg Harbor Township, Ocean County, NJ

NORTH

Figure 3

Job No.: D1045.038
Scale: 1 in = 800 ft
Date: 8/22/2024
Drawn By: HJ

Document Path: S:\JOBS NUMBERS\D1045.038\Aerial.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

DuBois & ASSOCIATES

NJDEP Freshwater Wetlands Map

Block 286 * Lots 3, 5 & 6; Block 287 * Lot 7
Little Egg Harbor Township, Ocean County, NJ

NORTH

Figure 4

Job No.: D1045.038	
Scale: 1 in = 800 ft	
Date: 8/22/2024	
Drawn By: HJ	

Document Path: S:\JOBS NUMBERS\D1045.038\Wet.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

DuBois & ASSOCIATES

Mist Net Location Map

Block 286 * Lots 3, 5 & 6; Block 287 * Lot 7
Little Egg Harbor Township, Ocean County, NJ

NORTH

Figure 5

Job No.: D1045.038
Scale: 1 in = 650 ft
Date: 8/22/2024
Drawn By: ED

Document Path: S:\JOBS NUMBERS\D1045.038\Correspondence\NLEB Mist Net Survey\Mist Net_5.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

APPENDIX A

SITE PHOTOGRAPHS

Site Photographs
Center Street Project
Little Egg Harbor Township, Ocean County, New Jersey

Photo 1: View of Net #1 along an existing dirt access road.

Photo 2: View of an eastern red brown bat captured by DuBois' mist net regime.

Photo 3: View of a big brown bat captured by DuBois' mist net regime.

Photo 4: View of Net #2 associated an intersection of two existing dirt trails.

Photo 5: View of Net #3 which was associated with inundated tire ruts to elicit bat activity.

Photo 6: Additional view of a juvenile red bat captured by DuBois on August 13th.

Photo 7: View of Net #4 within a historical burrow pit/inundated pond.

Photo 8: View of a big brown bat captured in Net #4 on August 12th.

Photo 9: View of Net #5 being erected along a tight trail.

Photo 10: View of Net #6 along an existing gravel road in close proximity to wetland features off-site.

Photo 11: View of tight corridors targeted by DuBois and adjacent forested features.

Photo 12: Additional view of a big brown bat captured by DuBois on August 13, 2024.

APPENDIX B

Bat Capture Data Sheets

GROUP 1

1955-100

START:
74° 4 mph
70% Hum
DEW POINT: 59
CC: 15%

END:
65° 2 mph
62% Hum
DEW POINT: 54
CC: 20%

DuBois Environmental Consultants

Phase 2 or 3 Mist-Netting Data Sheets

Site Name: CENTER STREET	Job Number: D1045.038	Date: 8/12/24	
Location: LITTLE EGG HARBOR			
County: OCEAN CO.	State: NJ	Quad Name: NW TUCKERTON	
Lat/Long: N: 39.595161	W: -74.365079	Surveyors: BD, ASG, FT	

#	Net #	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1	1	8:32	FLYING SQUIRREL									
2	1	9:49	FLYING SQUIRREL									
3	4	10:29	BIG BROWN	J	M	NR	44.2	13.1	2		0	
4	4	10:30	BIG BROWN	J	M	NR	41.0	14.4	2		0	
5	4	11:35	BIG BROWN	A	M	TD	44.5	16.2	4		0	
6	2	11:42	FLYING SQUIRREL									
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

*Reproductive Condition: (P) pregnant; (L) lactating; (PL) post lactating; (NR) non-reproductive; (TD) testes descended

Moon Phase: %

	Rise	Set
Moon:		
Sun:		7:56

Time	Temp	Sky	Wind	# Bats
0800	74	0	3	
0900	74	0	2	
1000	70	0	1	
1100	68	6	1	
1200	66	0	1	
100	65	0	1	
Avg				

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or Overcast
4	Smoke or Fog
5	Drizzle or Light Rain
6	Thunderstorm

Beauford Wind Code	
0	Calm (0 mph)
1	Light Wind (1-3 mph)
2	Light Breeze (4-7 mph)
3	Gentle Breeze (8-12 mph)
4	Moderate breeze (13-18 mph)

GROUP 2

1955 - 100

START: 740 4MPH 70% HUM DEW POINT: 59 CC: 15%

END: 65° 2MPH 62% HUM DEW POINT: 54 CC: 20%

DuBois Environmental Consultants

Phase 2 or 3 Mist-Netting Data Sheets

Site Name: CENTER STREET	Job Number: D1045.038	Date: 8/12/24	
Location: LITTLE EGG HARBOR			
County: OCEAN CO.	State: NJ	Quad Name: NW TUCKERTON	
Lat/Long: N: 39.595161	W: -74.365079	Surveyors: AS, ED, IS	

#	Net #	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1	6	8:12	BIG BROWN	A	F		46.2	19.3	6		0	
2	6	8:12	BIG BROWN	A	F		44.6	15.3	6		0	
3	6	8:20	RED BAT	A	F		43.7	14	4		0	
4	6	8:20	RED BAT	J	F	NR	42.6	8.6	5		0	
5	6	8:31	BIG BROWN	A	F		47.1	19.6	2		0	
6	6	8:39	BIG BROWN	A	F		46.1	18.3	4		0	
7	6	8:47	BIG BROWN	J	F	NR	45.8	14.8	4		0	
8	6	8:47	BIG BROWN	J	M	NR	44.0	16	4		0	
9	6	9:15	BIG BROWN	J	M	NR	43.7	16.6	6		0	
10	6	9:15	BIG BROWN	J	F	NR	41.1	12.5	2		0	
11	5	9:40	BIG BROWN	A	M		48.2	21.2	5		0	
12	5	11:10	BIG BROWN	A	F		46.6	19.1	4		0	
13	5	11:10	BIG BROWN	J	F	NR	40.2	13.9	6		0	
14	5	12:51	BIG BROWN	J	M	NR	44.6	16.1	6		0	
15	5	12:51	RED BAT	A	F		41.2	13.8	2		0	
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

*Reproductive Condition: (P) pregnant; (L) lactating; (PL) post lactating; (NR) non-reproductive; (TD) testes descended

Moon Phase: %

	Rise	Set
Moon:		
Sun:		7:56

Time	Temp	Sky	Wind	# Bats
0800	74	0	2	
0900	74	0	2	
1000	70	0	1	
1100	68	0	1	
1200	66	0	1	
100	65	0	1	
Avg				

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or Overcast
4	Smoke or Fog
5	Drizzle or Light Rain
6	Thunderstorm

Beauford Wind Code	
0	Calm (0 mph)
1	Light Wind (1-3 mph)
2	Light Breeze (4-7 mph)
3	Gentle Breeze (8-12 mph)
4	Moderate breeze (13-18 mph)

GROUP 1

START: 72° 4 MPH 71% HUM CLEAR

END: 65° S-SW 72% HUM CLEAR

DuBois Environmental Consultants

Phase 2 or 3 Mist-Netting Data Sheets

Site Name: CENTER STREET	Job Number: D1045.038	Date: 8/13/24	
Location: LITTLE EGG HARBOR			
County: OCEAN CO	State: NJ	Quad Name: NW TUCKERTON	
Lat/Long: N: 39.595161	W: -74.36029	Surveyors: BD ASG FT	

#	Net #	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1	1	9:50	FLYING SQUIRREL									
2	1	10:10	BIG BROWN	A	F		46.3	18.1	6		0	
3	4	10:20	BIG BROWN	J	F	NR	43.9	14.9	1		0	
4	4	10:20	BIG BROWN	J	M	NR	45.2	15.8	4		0	
5	1	11:10	FLYING SQUIRREL									
6	1	11:20	FLYING SQUIRREL									
7	4		BIG BROWN	J	M	NR	41.6	13.9	4		0	
8	1	12:35	FLYING SQUIRREL									
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

*Reproductive Condition: (P) pregnant; (L) lactating; (PL) post lactating; (NR) non-reproductive; (TD) testes descended

Moon Phase: %

	Rise	Set
Moon:		
Sun:		7:55

Time	Temp	Sky	Wind	# Bats
0800	72	0	2	
0900	70	0	2	
1000	68	0	2	
1100	66	0	2	
1200	65	0	2	
100	64	0	2	
Avg				

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or Overcast
4	Smoke or Fog
5	Drizzle or Light Rain
6	Thunderstorm

Beauford Wind Code	
0	Calm (0 mph)
1	Light Wind (1-3 mph)
2	Light Breeze (4-7 mph)
3	Gentle Breeze (8-12 mph)
4	Moderate breeze (13-18 mph)

GROUP 2

START: 72° 4mph 71% HUMIDITY CLEAR

END: 65° S mph 72% HUM CLEAR

DuBois Environmental Consultants

Phase 2 or 3 Mist-Netting Data Sheets

Site Name: CENTER STREET	Job Number: D1645.030	Date: 8/13/24	
Location: LITTLE EGG HARBOR			
County: OCEAN CO.	State: NJ	Quad Name: NW TUCKERTON	
Lat/Long: N: 39.595161	W: -74.650079	Surveyors: DS ED JB	

#	Net #	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1	6	8:14	E. RED BAT	J	F	NR	42.6	8.2	6		0	
2	6	8:14	E. RED BAT	ESCAPED DURING REMOVAL								
3	6	8:18	BIG BROWN	J	M	NR	44.6	13.0	4		1	
4	6	8:19	BIG BROWN	J	M	NR	42.6	14.1	6		0	
5	6	8:22	BIG BROWN	J	M	NR	41.9	14.3	6		0	
6	6	8:25	BIG BROWN	J	F	NR	39.7	14.1	4		0	
7	6	8:33	BIG BROWN	A	F		47.3	19.2	2		0	
8	6	8:35	BIG BROWN	A	M		38.4	18.1	2.5		0	
9	6	8:39	BIG BROWN	J	F	NR	43.4	14.2	1		0	
10	6	8:55	BIG BROWN	A	F		47.1	14.1	3		0	
11	6	9:40	BIG BROWN	J	M	NR	44.2	14.1	2		0	
12	5	9:45	FLYING SQUIRREL									
13	6	10:32	BIG BROWN	J	M	NR	45.2	13.2	4		0	
14	6	11:31	BIG BROWN	A	M		47.1	21.1	6			
15	5	12:33	FLYING SQUIRREL									
16	6	12:57	BIG BROWN	J	M	NR	48.3	15.2	5		0	
17	6	1:01	BIG BROWN	J	M	NR	47.9	14.9	5		0	
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

*Reproductive Condition: (P) pregnant; (L) lactating; (PL) post lactating; (NR) non-reproductive; (TD) testes descended

Moon Phase: %

	Rise	Set
Moon:		
Sun:		7:55

Time	Temp	Sky	Wind	# Bats
0800	72	0	2	
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APPENDIX C

SCIENTIFIC COLLECTION PERMIT

NEW JERSEY DEP
Fish and Wildlife

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FISH AND WILDLIFE
Endangered & Nongame Species Program
Mail Code 501-03, P.O. Box 420,
Trenton, NJ 08625
Phone: 609-292-9400
scientificcollectingpermits@dep.nj.gov

PHILIP D. MURPHY
Governor

TAHESHA WAY
Lt. Governor

SHAWN M. LATOURETTE
Commissioner

SCIENTIFIC COLLECTING PERMIT

This will certify that New Jersey DEP Fish and Wildlife has authorized:

DUBOIS & ASSOCIATES, LLC
Bryon DuBois
190 North Main Street
Manahawkin, NJ 08050

to collect/possess/release the following native fauna for scientific study:

PURPOSE OF STUDY: To conduct bat mist-netting survey for client as part of a NJDEP CAFRA project review, to determine whether northern long-eared bat is utilizing the site as summer habitat; to perform radio-telemetry on northern long-eared bats captured and emergence surveys at roosts.

SPECIES AND NUMBERS: Unlimited number of bats of any species present within the project area may be captured by mist-nets, including little brown (*Myotis lucifugus*), northern long-eared (*M. septentrionalis*), eastern small-footed (*M. leibii*), tricolored (*Perimyotis subflavus*), big brown (*Eptesicus fuscus*), eastern red (*Lasiurus borealis*), northern hoary (*L. cinereus*), and silver-haired bat (*Lasionycteris noctivagans*). It is expected that up to 5 individual northern long-eared bats may be captured and radio-tracked to locate day roosts. Guano samples may be collected from bats in hand to aid in confirming the species ID of questionable or important individuals.

LOCATIONS (*Entrance to any land must be with the prior permission of the landowner or managing governmental agencies*): Center Street (Block 286 Lots 3, 5 & 6, and Block 287 Lot 7 in Little Egg Harbor Twp, Ocean Co. NJ.

STUDY DATES: May 15 – August 15, 2024

SUBPERMITTEES: Anthony Silva, Amy Jones, Ethan DuBois, Israel Berrios, Abigail Spagnola, Frank Tutelian, Ben Langbein, Ben Rochat

SPECIAL CONDITIONS: (*Please read carefully as some conditions have changed*)

1. Permittees are required to follow the latest U.S. National White-Nose Syndrome Decontamination Protocol (updated October 2020). The protocols are posted at https://www.whitenosesyndrome.org under "**Decontamination Information**."
2. You must **inform the USFWS NJ Field Office** (Sarah Crestol: sarah_crestol@fws.gov; (609) 382-5271) that you plan to attach transmitters to federally listed species prior to field work.
3. Prior to deploying bat transmitters, the permittee must coordinate with Kris Schantz, Endangered and Nongame Species Program (ENSP), regarding **transmitter frequencies** to be used. She can be reached at kris.schantz@dep.nj.gov.
4. Bats may be captured using mist nets and harp traps and held individually in cloth or paper bags in order to be weighed or to await handling. Cloth bags may only be used one time per night and must be decontaminated between uses (see #1). Single-use paper bags are a suitable alternative.
5. All **nets must be tagged** with the permittee's name, permit number, and telephone number. **Nets cannot be set and left unattended.** Bats should be promptly removed from mist nets (within 10 minutes of capture).

NEW JERSEY DEP
Fish and Wildlife

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Lt. Governor

SHAWN M. LATOURETTE
Commissioner

SCIENTIFIC COLLECTING PERMIT

SPECIAL CONDITIONS (continued):

6. Every effort should be made to **minimize the handling and holding time** of captured bats. Bats are to be released on the night of capture immediately after all pertinent information has been collected and recorded.
7. Bats **may not be removed** from the study site. (In the event a bat is injured or killed, see #12.)
8. Both wings and the uropatagium (tail membrane) must be inspected for damage that results from White-nose Syndrome (WNS). All bats captured must be scored according to the **wing-damage index** described by Reichard and Kunz (at https://www.whitenosesyndrome.org/mmedia-education/wing-damage-index-publication).
9. The following species of cave bats that are captured may be – but are *not* required to be – **banded prior to release** using bands supplied by NJFW ENSP: Big brown (*Espesicus fuscus*), little brown (*Myotis lucifugus*), northern long-eared (northern myotis; *M. septentrionalis*), Indiana (*M. sodalis*) and tricolored bat (*Perimyotis subflavus*). We prefer that tree bats not be banded. **Small-footed bats (*M. leibii*) should not be banded**. Contact MacKenzie Hall, ENSP, at mackenzie.hall@dep.nj.gov or (908) 236-0184 to discuss and request bat bands.
10. Diagnostic **photo-documentation** is requested for any *Myotis* or *Perimyotis* species encountered. Files should be labeled with a capture ID, band number or other unique identifier and submitted along with the capture data/report at the conclusion of the study.
11. **Keep watch for "bat ticks"** (*Ornithodoros kelleyi*), a soft-bodied tick species whose larvae may be found engorged on bats. Please record any instances of ticks on bats, and carefully collect the tick specimen(s) if you are able, following the **attached instructions**.
12. In the event that a bat is injured during field work, it should be held in captivity and the permittee should contact one of the nearest state **licensed bat rehabilitators** (listed at www.njfishandwildlife.com/bornwild.htm). **Deceased** *Myotis* or *Perimyotis* bats should be collected, labeled and kept frozen for the ENSP to obtain. Please report all occurrences of bat injuries or death to the ENSP by contacting MacKenzie Hall at (908) 236-0184 or mackenzie.hall@dep.nj.gov.
13. The ENSP must be informed within 24 hours in the event of any Myotis or Perimyotis species encountered. Please contact MacKenzie Hall at mackenzie.hall@dep.nj.gov or (908) 236-0184.
14. The NJ Field Office of the US Fish and Wildlife Service must be notified within 5 days in the event of the capture of an Indiana bat, northern long-eared bat or tricolored bat. Please contact Sarah Crestol at sarah_crestol@fws.gov or (609) 382-5271.
15. Please use the USFWS **Northeastern US Spreadsheet** for entering and reporting bat survey data: https://www.fws.gov/library/collections/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines
16. All capture and banding data, unused bat bands, and any reports or articles resulting from this work must be submitted to MacKenzie Hall, ENSP (mackenzie.hall@dep.nj.gov), at the conclusion of the study.
17. While **COVID-19** concerns exist regarding the potential for human-to-bat virus transmission, all permitted bat handling activities shall follow the most current agency guidance for minimizing transmission risk. Please refer to the Centers for Disease Control and Prevention's *Reducing the Risk of SARS-CoV-2 Spreading between People and Wildlife* (https://www.cdc.gov/healthypets/covid-19/wildlife.html), and contact mackenzie.hall@dep.nj.gov with any questions or to discuss your planned precautions.

NEW JERSEY DEP
Fish and Wildlife

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Lt. Governor

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Commissioner

SCIENTIFIC COLLECTING PERMIT

***IMPORTANT NOTE*: A COPY OF THIS PERMIT MUST BE CARRIED BY ALL PERMITTEES AND SUBPERMITTEES WHILE IN THE FIELD AND SHOWN UPON REQUEST WHILE ENGAGED IN COLLECTION ACTIVITIES. ALL CONDITIONS MUST BE STRICTLY ADHERED TO.**

Every effort must be made to preserve natural habitats during research and collecting activities.

Any sightings or captures of NJ Endangered or Threatened wildlife or other wildlife of interest – *besides those of bats already being documented under this permit* – must be reported to NJ Fish and Wildlife. See https://dep.nj.gov/njfw/conservation/reporting-rare-wildlife-sightings/.

The collection of New Jersey State Endangered and Threatened Species is *STRICTLY PROHIBITED* unless otherwise authorized.

Entrance to any land must be with the prior permission of the landowner or managing governmental agencies.

Collection of birds, mammals, reptiles, amphibians, or any other indigenous animals for consumption or profit is prohibited. The patenting, licensing, trademarking, or copyrighting, or the obtaining of any type of legal protection because of or due to the collection of animals under this permit is also prohibited. Any specimens or components of specimens collected under this permit, and the research results derived from collected specimens or components of specimens are to be used for scientific or educational purposes only and may not be used for commercial or other revenue-generating purposes.

An annual report must be submitted to New Jersey DEP Fish and Wildlife, Endangered & Nongame Species Program by January 31 for the preceding calendar year. End of year report should include purpose of study, study design, conservation value of study, methods, data collected and results.

DATE ISSUED: AUGUST 6, 2024
THIS PERMIT EXPIRES DECEMBER 31, 2024
FEE PAID: $22.00

ASSISTANT COMMISSIONER
NEW JERSEY DEP FISH AND WILDLIFE

c:
-South Region Law Office
-file

APPENDIX D

STATEMENT OF QUALIFICATIONS

Bryon DuBois
Principal Senior Biologist

190 North Main Street
Manahawkin, NJ 08050
609-488-2857

Education:

B.S. Biology & Ecology,
West Chester University, 1993

Certifications:

Professional Wetland Scientist
Society of Wetland Scientist

Certified Sr. Ecologist, The Ecological Society of America

Recognized Qualified Indiana Bat Surveyor – N.J., N.Y., P.A., 2006

Recognized Qualified Bog Turtle Surveyor – N.J., N.Y., P.A., D.E., M.D.

Certified Subsurface Evaluator
NJDEP# 0001940

Recognized Qualified Delmarva Fox Squirrel Surveyor – M.D., D.E

Professional Affiliations:

Member: Society of Wetland Scientists 1997 – Present

Member: The Ecological Society of America 1998 – Present

Member: New Jersey Division of Fish, Game and Wildlife Conservation Corps. 2000 – Present

Member: Pine Beach Environmental Commission 1995 – 2003

Wetland Mitigation Council 2003 – present

New Jersey Builders Association 1999 – Present

Fields of Competence:

Mr. Bryon DuBois has over 30 years' experience in the fields of regulatory compliance, ecology, biology, wetland science, wildlife management, hydrology and habitat restoration. He has managed numerous large-scale projects through the approval process in New Jersey, Pennsylvania, Maryland and Delaware. Mr. DuBois is highly respected by the regulatory agencies in N.J. and surrounding states. He has made positive contributions to policies effecting protected species (both state and federal), wetland mitigation, regulation and coastal zone policies through NJDEP, PADEP, MDDNR, DEDNR and ACOE.

Professional Experience:

In 2000 Mr. Bryon DuBois created an environmental consulting firm to focus on more objective ecological and environmental issues while focusing primarily on the regulated community. Since that time, he has performed numerous long-term studies on several influential species such as Bog Turtles, Pine Snakes, Northern Long-eared Bats and Indiana Bats along with assessments of habitat and creation of mitigation measures. In addition, Mr. DuBois began designing and managing the construction of wetland mitigation projects tailored to a specific habitat type or land use. In many instances the projects were approved and exceeded the standard requirements without increasing cost for the client. These mitigation projects helped Mr. DuBois become nominated to the State of New Jersey's Wetland Mitigation Council in 2003 by the Governor of New Jersey. Since that time Mr. DuBois has reviewed and received approval for numerous mitigation related projects and banks in New Jersey, Pennsylvania and Maryland.

From 2003 to the present-day Mr. DuBois has successfully managed, designed and received approval for projects ranging from airports to industrial centers, wastewater management facilities and large commercial areas along with the residential component. He has been asked to present topics related environmental regulations at the Atlantic City Builders Convention, the Eastern Region Airports Conference in Hershey, Pennsylvania, the U.S. Fish and Wildlife Bog Turtle Convention, the N.J. Pinelands Commission, the Louisiana Fish and Game Council and dozens of planning boards in towns across N.J. and P.A. His diverse experience has made him a good candidate to speak publicly on projects that require many different issues from ecology to water quality. Mr. DuBois has extensive experience using ESRI Arc Map Geographic Information Systems (GIS) software, global positioning systems (GPS) and computer-aided design and drafting software (CADD) for permitting purposes. In addition, Mr. DuBois has held over 300 scientific collecting permits for surveys performed within the Mid-Atlantic States, many of which involve a telemetry component.

Through hard work and an extensive background as an outdoorsman, Mr. DuBois has been recognized as a solid contributor in his field. Mr. DuBois has applied logical and objective solutions to some of the most difficult environmental projects and has met a balance between environmentalists and developers alike.

Bryon DuBois
Principal Senior Biologist

190 North Main Street
Manahawkin, NJ 08050
609-488-2857

Association of N.J. Environmental Commission (ANJEC) 1995 – 2010

N.J. Concrete & Aggregate Society 2003 – 2016

Projects of Relevance:

•Assisting on approximately half of the cave surveys throughout New Jersey for the Endangered and Non-game Species Program from 2003-2005
•Worked with Ms. Melissa Craddock performing surveys or habitat assessments on approximately eight (8) former mines in New Jersey.
•Conducted Bat evaluations in New Jersey and Pennsylvania for the past 20 years.
•Have confirmed and witnessed Indiana Bat roosting, breeding, and overwintering habitat in New York, New Jersey, Pennsylvania, and Virginia.
•Approval on over 300 scientific permits to collect threatened/endangered species for studies throughout New Jersey and Pennsylvania.
•2000 – As part of management plan for a large development, proposed bat houses along golf course to control insects. Later installed certified bat houses along each hole of the golf course. Monitoring of bat house continues presently. Monitoring of success ratios and mist netted to confirm success.
•2003 – Spent over 100 man-hours performing habitat assessments and field work for support of site assessments.
•2004 – Performed over ninety (90) person hours performing identifications type visits to local museums, research, cave surveys and mist netting.
•2005 – Performed several site assessments, including a bat count at Hibernia Mine and mist netting a roost site at Great Swamp. Summer and studies included mist netting in northeast Pennsylvania and harp netting outside Hibernia mine.
•2006-2020– Conducted over forty (40) large mist net studies in Northern New Jersey, Maryland and Pennsylvania – captures of all local species of bats including Indiana Bats, Northern Long Eared and Small footed bats.

Summary:

From 2003 -2005 Mr. DuBois has spent a considerable amount of volunteer with the ENSP Program performing Bat surveys. After that time projects have been completed by him and his team over six states, on over forty (40) projects and for numerous clients. Bats that Mr. DuBois has captured and examined regularly include Little Brown (*Myotis lucifugus*), Big Brown (*Eptesicus fuscus*), pipistelle (*Pipistrellus subflavus*), northern long-eared (*Myotis septentrionalis*) and red bats (*Lasiurus borealis*). Bats caught with less regularity included Indiana Bats (*Myotis sodalis*), small Footed (*Myotis leibii*) and Hoary Bats (*Lasiurus cinereus*). Mr. DuBois has captured and identified with regularity Indiana Bats in the company of agency representatives. His trapping experience with other species provides unique and solid background which should be recognized. He has regularly helped agency biologists with a number of species and has been beneficial to the species which he specializes in.

Anthony Silva
Senior Biologist/Environmental Scientist
asilva@denviro.com

190 N. Main Street
Manahawkin, NJ 08050
609-488-2857

Education:

B.S. Environmental Studies
The Richard Stockton College of New Jersey – 2006

Graduated Magna Cum Laude with Program Distinction

Certifications:

USFWS Qualified Bat Surveyor (QBS) – NJ & PA

USFWS Qualified Bog Turtle Surveyor (QBTS) – NJ, DE, MD, PA

Professional Wetland Scientist (PWS) – Society of Wetland Scientists

NJDEP ENSP Recognized Qualified Venomous Snake Monitor

PA DCNR Wild Plant Management Permittee

Continuing Education:

BCM: Bat Acoustic Software Training Workshop: Ansted, WV

Wildlife Acoustics: Introduction to Kaleidoscope for Bat Analysis

Wildlife Acoustics: Using Kaleidoscope Pro for Bat Auto-ID

SonoBat: Advanced Bat Acoustics: A Master Class

Vesper: Echolocation 101/Best Practices & Acoustic ID of Eastern Bats

Bats and Bridges Survey Training hosted by USFWS and NJDEP

Fields of Competence:

Mr. Silva has over 18 years of experience in the fields of biology, ecology, wetland science and land use regulatory compliance. He conducts various environmental site assessments, rare species habitat evaluations and ecological sampling investigations. He has conducted numerous survey techniques for bats throughout New Jersey, Pennsylvania and New York.

Professional Experience:

Mr. Silva is a senior biologist and environmental scientist with the firm of DuBois & Associates. He is responsible for conducting faunal and floral sampling investigations, natural resource inventories, threatened/endangered species habitat assessments and directed surveys. Mr. Silva is well versed as to the survey and sampling protocols required under the jurisdiction of the USFWS, NJDEP, the Pinelands Commission and other agencies for Threatened and Endangered Species Surveys.

Mr. Silva deploys and operates mist nets designed to capture various bat species, including the Federally-endangered Indiana bat and other declining *Myotis* bats. Mr. Silva is fortunate enough to have performed mist net surveys during the pre-White nose syndrome era when *Myotis* bats on the summer landscape were much more common. Surveying during this time period allowed him to personally identify and process numerous *Myotis* bats that are now considered rare. Mr. Silva is well versed in the set-up process and nightly operation of mist nets and decontamination protocols; is rabies-vaccinated; measures pertinent morphometrics on captured bats including sex, age, reproductive condition, forearm length, an assessment of wing damage and overall health condition. Mr. Silva has performed over 35 mist net surveys) throughout NJ, PA and NY amounting to ~ 140 survey nights.

Mr. Silva configures, operates and deploys acoustic detectors in the field which are designed to detect and record bat echolocation calls. Mr. Silva is trained and proficient in data management and post-processing analysis of the echolocation call data using several bat acoustic software media. Mr. Silva has conducted 40 acoustic surveys totaling approximately 275 detector nights.

Mr. Silva attended Bats and Bridges Survey Training in New Jersey and routinely performs bridge inspections to determine bat occupancy of bridges in support of infrastructure rehabilitation projects. This includes assessing bridge undersides to determine whether favorable characteristics for roosting bat species are present, such as cracks in concrete, expansion joints, or other suitable fissures. Bat indicators such as staining, guano droppings or live bats are sought to determine whether bridges are functioning as roosting habitat for bats.

Mr. Silva has also assisted in several bat radio-telemetry studies and has calculated home range statistics, core-use foraging areas and determined critical roost locations. Emergence surveys to tally potential bats and confirm roost locations have been performed for several old building structures prior to demolition in support of HUD-funded residential development projects; in support of electric utility hazard tree removals; and bridge inspections.

Anthony Silva
Senior Biologist/Environmental Scientist
asilva@denviro.com

190 N. Main Street
Manahawkin, NJ 08050
609-488-2857

Western Bat Working Group: Bats and Wind Energy Austin, TX.

Northeast Bat Working Group: Annual Conferences & Acoustic Geek Session

Professional Affiliations:

Member: Northeast Bat Working Group

Member: New Jersey Division of Fish, Game and Wildlife Conservation Corps.

Member: Northeast Partners in Amphibian and Reptile Conservation

Member: The Wildlife Society

Member: Flora of New Jersey Project

Career Positions:

Trident Environmental Consultants, Toms River, NJ – Biologist/Environmental Scientist 2006 – 2014

DuBois & Associates, Manahawkin, NJ – Sr. Biologist/Environmental Scientist 2014 – Present

Projects of Relevance:

Resource Extraction Indiana Bat Habitat Mitigation Plan
Luzerne County, PA

Mr. Silva authored and developed an Indiana Bat Habitat Mitigation Plan for a mineral quarry in Luzerne County, Pennsylvania. The quarry is located within the area of a known Indiana bat hibernaculum and the Plan was developed to ensure protection of this endangered species pursuant to the Endangered Species Act of 1973. The measures within the Plan satisfied USFWS concerns regarding expansion of quarry operations and Indiana bat protection.

Federal and State-listed Bat Presence/Absence Survey
Plainfield Township, Northampton County, PA

Provided nightly mist-net operation and bat handling / morphometric recording for a potential land development project using triple-high stacked mist nets. Assisted with nightly fixed-triangulation radio-telemetry of a captured eastern small-footed bat. Triangulation incorporated collecting a series of compass bearings to the direction of the strongest radio signal at three different locations and plotting the point of intercept where the bearings bisect. Close approach direction finding was performed during the daytime from publicly available access points in an effort to further pin-point the bat's diurnal roosting location. GPS location and temporal data was digitized in the office and spatial statistics were gathered using the ArcMET GIS extension, which is a movement ecology tool built and designed for analysis within the fields of animal movement ecology and wildlife conservation. Both the Minimum Convex Polygon (MCP) utility tool and the Kernel Density Estimation (KDE) utility tool in ArcMET was used to determine the 50%, 75% and 95% home range probability estimates for the eastern small-footed bat. The results of remote direction finding and close approach direction finding methods revealed that the tracked eastern small-footed bat diurnally roosted in a large pile of slate talus associated with a quarry with a KDE 95% home range estimate of 259.8 ac. The bat foraged within 0.46-miles (0.75 km) of the estimated roost locations. Trajectory path statistics indicate that the sum of distances flown by the radio-tracked small-footed bat over 4 nights amounted to 25.1 miles.

Night-Before Clearing Indiana Bat Acoustic Survey
City of Newburgh, Orange County, NY

A road improvement project required the removal of approximately 0.4-acres of trees within potential Indiana bat habitat. An acoustic survey was performed by Mr. Silva the night prior to scheduled tree removal to determine the presence or absence of Indiana bat, as well as other *Myotis* bats, within the work area. The acoustic survey resulted in the absence of *Myotis* bats within the work area. Upon verbal confirmation of the negative survey results with the NYDEC the morning after the previous night's survey, the permittee was authorized to conduct tree clearing on that day only, and tree clearing was completed.

Ethan DuBois
Staff Biologist
edubois@denviro.com

190 North Main Street
Manahawkin, NJ 08050
609-488-2857

Education:

B.S. Environmental Science
Elizabethtown College - 2020

M.S. Wildlife & Fisheries Resources
Clemson University - 2021

Certifications:

Certified Ecologist - Ecological Society of America

USFWS Qualified Bog Turtle Surveyor - NJ

Open Water Scuba Certified - Scuba Diving International

Delaware DNREC Sediment & Stormwater Program Blue Card

Continuing Education:

Rutgers N.J. Agricultural Experiment Station Office of Continuing Professional Education -Identification of Wetland Plants in Winter Form

Rutgers N.J. Agricultural Experiment Station Office of Continuing Professional Education - Hydric Soils

Bats and Bridges Survey Training hosted by USFWS and NJDEP

Vespor Bats - Acoustic ID of Eastern Bats

N.J. Conservation Foundation & P. P. A: Fundamentals of Pinelands Botany

NJ Boating Safety Certificate - 2023

Qualifications:

Mr. Ethan DuBois is a Staff Biologist with the firm of DuBois & Associates. He is responsible for performing and assisting with faunal and floral sampling investigations, environmental site assessments and on-site soil analysis. Mr. E DuBois has conducted various rare, threatened and endangered species studies. Since starting at DuBois & Associates, Mr. E. DuBois has participated in numerous studies on various species such as Bog Turtles, Indiana Bats, Northern Long-eared Bats, Northern Pine Snakes, Timber Rattlesnakes, Pine Barrens Treefrogs, Northern Red-Bellied Cooters, Red-headed Woodpeckers, Barred Owl, Blue Spotted Salamanders, Eastern Tiger Salamanders and state-listed mussels.

Mr. E. DuBois has performed and assisted in habitat and visual surveys for Bog Turtles in New Jersey, Pennsylvania, and Maryland. These activities include directed visual surveys, implementation of data collection, population and habitat management, identification of nesting locations, along with habitat analysis. He has also been responsible for the maintenance and operation of multiple ecological trapping arrays, including drift fence-box funnel trap arrays designed to capture threatened and endangered snake species, as well as bog turtle trapping arrays in Pennsylvania.

Mr. E DuBois has assisted and performed threatened/endangered species assessments, monitoring, and reporting under the jurisdiction of USFWS, NJDEP and New Jersey Pinelands Commission. He regularly performs evaluations on utility easements throughout the state of New Jersey evaluating habitats for state listed reptiles and amphibians, raptors, bats and grassland birds. In conjunction with these surveys, a variety of Geographic Information Systems (GIS) products are developed and distributed to vegetation maintenance and utility construction crews in efforts to remain in compliance. Mr. E DuBois has played an intergral role in developing these tools that reflect best management practices and time-of-year restrictions created by the State of New Jersey.

In addition to the above responsibilities, Mr. E DuBois assisted with numerous acoustic and mist net surveys for federally listed bat species dating back to 2016. Efforts include but are not limited to assisting in the installation of mist net regimes and acoustic detectors, recording of data upon collection, analysis of acoustic calls and reporting.

Mr. E. DuBois also performs biological/environmental construction monitoring associated with utility right-of-way's throughout New Jersey, Pennsylvania, Delaware and Maryland. Environmental oversight ensures the project is conducted in an environmentally responsible manner and in accordance with all applicable soil erosion and sediment control (SESC) standards and best management practices. Biological oversight in and around sensitive habitats ensures that the project does not have any adverse impacts to sensitive habitats or rare faunal and floral species.

Ethan DuBois
Staff Biologist
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609-488-2857

Professional Affiliations:

The Wildlife Society - National Member, NJ Chapter Member

Member: Northeast Partners in Amphibian and Reptile Conservation & Turtle Working Group

Career Positions:

DuBois & Associates, Manahawkin, NJ – Staff Biologist, 2014 – Present

Projects of Relevance:

JCP&L Vegetation Management Program

Since 2020, Mr. E DuBois has been apart of a team which develops and provides GIS mapping products which depict best-management-practices and time-of-year restrictions to maintenance crews throughout the northern half of New Jersey. Mr. E DuBois has assisted in habitat evaluations associated with numerous state and federally listed species to aid in the conservation of them along utility easements. These efforts include monitoring while work is being conducted to ensure the protection of listed fauna an flora documented within the easement. All surveys utilize coordination with local USFWS offices as well as NJDEP.

Marsh Creek Reservoir Restoration Project

Mr. E. DuBois played an integral role in several facets of the Marsh Creek Reservoir Restoration Project. The initial objective was document and estimate the northern red-bellied cooter population in a portion of the overall reservoir (Ranger Cove) prior to the removal and relocation of individuals before the commencement of construction. In total 73 Pennsylvania-threatened northern red-bellied cooters were trapped and relocated outside the turbidity curtain prior to construction. Mr. E DuBois assisted in monitoring efforts and post-construction habitat enhancements which included the installation of basking structures and additional nesting areas in the vicinity of Ranger Cove.

South Jersey Transit Authority - Atlantic City Expressway Widening Project

Mr. E DuBois has conducted and assisted in a series of environmental and ecological surveys for the Atlantic City Expressway Widening Project. Assessments include but are not limited to Phase II surveys associated with the bog turtle, acoustic surveys associated with federally-listed bat species, raptor nest surveys as well wetland evaluations. Following these assessments, Mr. E DuBois has assisted in the reporting and data interpretation.

Additionally, Mr. E DuBois has assisted in several large scale presence/absence surveys including trapping surveys, visual surveys as well as vocalization and auditory surveys throughout the Pinelands. Targeted species include he northern pine snake, northern long-eared bat, red-headed woodpecker, barred owl, pine barrens treefrog and the timber rattlesnake.

Education:

Mr. E. DuBois received a Bachelor of Science degree in Environmental Science with a Business Administration Minor in May of 2020. Following graduation, Mr. E. DuBois enrolled in an M.S Program in Wildlife and Fisheries Resources at Clemson University which he completed in December 2021. While at Clemson, Mr. E. DuBois selected graduate level classes including Wildlife Habitat Management, Restoration Ecology, Plant Biology, Global Change Ecology, Fisheries Management and Conservation, as well as Conservation Issues.

Israel Berrios
Environmental Scientist
iberrios@denviro.com

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Education:

B.S. Biology with a Concentration in Ecology
West Chester University – 2014

Certifications:

USFWS Qualified Bog Turtle Surveyor – NJ

PA DCNR Wild Plant Management Permittee - #22-842

Delaware DNREC Sediment & Stormwater Program Blue Card Certification B 2018/12/13 004

State of Maryland Erosion & Sediment Control Certification No. RPC015013

Continuing Education:

N.J. Conservation Foundation & P.P.A: Fundamentals of Pinelands Botany

N.J. Department of Agriculture – State Soil Conservation Committee: N.J. Soil Erosion & Sediment Control Standards Training Course

Swamp School LLC
USACOE Hydric Soils Indicators Online Training Course

Rutgers N.J. Agricultural Experiment Station Office of Continuing Professional Education – Vegetation Identification for South N.J.

Bats & Bridges Survey Training Hosted by USFWS & NJDEP

Vespor Bats – Acoustic ID of Eastern Bats

Fields of Competence:

Mr. Berrios has 7 years of experience in the fields of regulatory land use, radio telemetry, wetland science, soil science, biology and ecology.

Professional Experience:

Mr. Berrios is a biologist and environmental scientist with the firm of DuBois & Associates. He is responsible for assisting with faunal and floral sampling investigations, site assessments, monitoring, and threatened/endangered species habitat assessments. He is also technical support for the maintenance of a variety of ecological trapping arrays and herptile surveys. Furthermore, Mr. Berrios has participated in conducting studies on various species throughout New Jersey, the Pinelands of New Jersey, and Pennsylvania including Cope's gray treefrog, Pine Barrens treefrog, barred owl, red-shouldered hawk, wood turtle, bog turtle, northern red-bellied cooter, red-headed woodpecker, northern pine snake, among others.

Mr. Berrios has assisted in habitat and visual surveys for Bog Turtles in New Jersey, Delaware, and Pennsylvania. These activities include helping with directed visual surveys, implementation of data collection and habitat analysis. Mr. Berrios is also a USFWS Recognized Qualified Bog Turtle Surveyor in the State of New Jersey.

Mr. Berrios is also responsible for the organization and execution of various environmental reports including Letters of Interpretation (LOIs), feasibility studies, site assessments, field and lab analysis of soils, and permitting for a wide variety of projects.

In conjunction with performing surveys for a variety of environmental/ecological assessments, Mr. Berrios has gained experience using ESRI Arc Map Geographic Information Systems (GIS) software and global positioning systems (GPS). Maps are created to depict a visual representation for clients of site-specific characteristics in relation to various projects. These tools are also used in mapping species movements such as turtles, bats and snakes.

In addition to the above responsibilities, Mr. Berrios has assisted in/ conducted plant surveys within various vegetation communities, which have included numerous species considered rare or listed as protected in various states. Mr. Berrios has assisted in/conducted numerous botanical investigations for rare plant species within the jurisdiction of the New Jersey Pinelands Commission, the New Jersey Department of Environmental Protection, and the Pennsylvania Department of Conservation of Natural Resources. Many projects include botanical surveys along existing transmission line rights-of-ways; investigations have led to the delineation and protection of rare plant occurrences while permitting utilities to perform upgrades and maintenance operations within their easements.

Mr. Berrios also performs biological/environmental construction monitoring associated with utility projects throughout New Jersey. Environmental oversight ensures the project is conducted in an environmentally responsible manner and in accordance with all applicable SESC standards, best management practices, and any local, state or federal permit conditions. Biological oversight in and around environmentally sensitive and regulated areas ensures that the project does not

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Career Positions:

DuBois & Associates, Manahawkin, NJ – Environmental Scientist 2015 – Present

have any adverse impacts to critical habitats, rare faunal and floral species, or environmentally regulated areas.

Education:

Mr. Berrios received a Bachelor of Science degree in Biology with a concentration in Ecology in December of 2014. While attending West Chester University, Mr. Berrios selected upper-level classes including Freshwater Ecology, Vertebrate Ecology, Plant Physiology, and Population Biology/Invasive Ecology. All classes were supplemented with hands-on laboratory experience using professional techniques, as well as site-specific trips for fieldwork.

Abigail Spagnola
Environmental Scientist
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190 North Main Street
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609-488-2857

Education:

B.S. in Environmental Science
Stockton University -- 2019

P.S.M in Environmental Science with a Concentration in Ecology
Stockton University
2020

Certifications:

Delaware DNREC Sediment & Stormwater Program Blue Card Certification B 2019/12/12 000

Continuing Education:

Bats and Bridges Survey Training hosted by USFWS and NJDEP

NJ Boating Safety Certificate

Career Positions:

DuBois & Associates, Manahawkin, NJ – Environmental Scientist, 2019 – Present

Professional Experience:

Mrs. Abigail Spagnola is an Environmental Scientist with the firm of DuBois & Associates. She is responsible for faunal and floral sampling investigations, environmental site assessments and on-site soil analysis. She also handles any technical support needed in various rare, threatened and endangered species studies. Since starting at DuBois & Associates, Mrs. Spagnola has assisted with studies on several species such as Northern Red-bellied Cooter, Red Shouldered Hawks, Pine Snakes, Corn Snakes, Barred Owls, Indiana Bats, Northern Long Eared Bats, Ospreys, and Bald Eagles. These activities include helping with directed visual surveys, implementation of data collection and habitat analysis.

Mrs. Spagnola has assisted in habitat and visual surveys for Bog Turtles in New Jersey and Pennsylvania. She has also assisted with the maintenance and operation of multiple ecological trapping arrays, including drift fence-box funnel traps designed to capture threatened and endangered snake species.

Mrs. Spagnola is also responsible for the organization and execution of various environmental reports including Preliminary Assessments, Phase I environmental assessments, Letter of Interpretation (LOIs), feasibility studies, site assessments, CAFRA permits, and various State General Permits for submittal to the New Jersey Department of Environmental Protection (NJDEP).

In conjunction with performing surveys for a variety of environmental/ecological assessments, Mrs. Spagnola has gained extensive experience using ESRI Arc Map Geographic Information Systems (GIS) software and global positioning systems (GPS). Maps are created to depict a visual representation for clients of site-specific characteristics in relation to various projects. These tools are also used in mapping species such as turtles, bats and snakes.

Mrs. Spagnola also performs biological/environmental construction monitoring associated with utility right-of-way's throughout New Jersey. Environmental oversight ensures the project is conducted in an environmentally responsible manner and in accordance with all applicable SESC standards and best management practices. Biological oversight in and around sensitive habitats ensures that the project does not have any adverse impacts to sensitive habitats or rare faunal and floral species.

Projects of Relevance:

Phase 1 and Phase 2 Bog Turtle Surveys along Several Transmission Line Upgrade Projects within Lancaster, Northampton, Lebanon, Adams and Berks Counties, PA: Performed phase 1 and phase 2 bog turtle surveys under the supervision of a qualified bog turtle surveyor. Assessed numerous wetlands for bog turtle habitat suitability and performed phase 2 surveys within wetlands determined to contain suitable habitat parameters. These surveys were coordinated with the USFWS, the PA Fish and Boat Commission, and the NJDEP.

Abigail Spagnola
Environmental Scientist
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Education:

Mrs. Spagnola received a Bachelor of Science degree from Stockton University in Environmental Science in May of 2019. While attending Stockton University, Mrs. Spagnola selected upper-level classes including freshwater ecology, wildlife management, soil science, ecological forest management, and geographic information systems. All classes were supplemented with hands-on laboratory experience using professional techniques, as well as site-specific trips for fieldwork.

Mrs. Spagnola received a Professional Science Master degree from Stockton University in Environmental Science in May of 2020. Mrs. Spagnola selected ecological classes including ecosystem ecology, wetlands ecology, plant ecology, land use planning and environmental quality. Mrs. Spagnola conducted research on the federally endangered bog turtle during her Masters' program.

Frank Tutelian
Environmental Consultant
ftutelian@denviro.com

190 North Main Street
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Education:

B.S. in Agricultural Business Pennsylvania State University -- 2020

Minor in Environmental Resource management with a Concentration in sustainability Pennsylvania State University 2020

Certifications:

Delaware DNREC Sediment & Stormwater Program Blue Card Certification B 2021/3/17 000

Pennsylvania Certified in ESM of Dirt and Gravel Roads 2020/5/30

Career Positions:

DuBois & Associates, Manahawkin, NJ – Environmental Consultant, 2020 – Present

Professional Experience:

Mr. Frank Tutelian is an Environmental Consultant with the firm of DuBois & Associates. He is responsible for faunal and floral sampling investigations, environmental site assessments and on-site soil analysis. He also handles any technical support needed in various rare, threatened and endangered species studies. Since starting at DuBois & Associates, Mr. Tutelian has assisted with studies on several species such as Northern Red-bellied Cooter, Pine Snakes, Barred Owls, Evening Bats, Indiana Bats, Northern Long Eared Bats, Ospreys, and Bald Eagles. These activities include helping with directed visual surveys, implementation of data collection and habitat analysis.

Mr. Tutelian has assisted in habitat and visual surveys for Bog Turtles in New Jersey and Pennsylvania. He has also assisted with the maintenance and operation of multiple ecological trapping arrays, including drift fence-box funnel traps designed to capture threatened and endangered snake species.

Mr. Tutelian is also responsible for the organization and execution of various environmental reports including Letter of Interpretation (LOIs), feasibility studies, site assessments, CAFRA permits, and various State General Permits for submittal to the New Jersey Department of Environmental Protection (NJDEP).

In conjunction with performing surveys for a variety of environmental/ecological assessments, Mr. Tutelian has gained extensive experience using ESRI Arc Map Geographic Information Systems (GIS) software and global positioning systems (GPS). Maps are created to depict a visual representation for clients of site-specific characteristics in relation to various projects. These tools are also used in mapping species such as turtles, bats and snakes.

Mr. Tutelian also performs biological/environmental construction monitoring associated with utility right-of-way's throughout New Jersey. Environmental oversight ensures the project is conducted in an environmentally responsible manner and in accordance with all applicable SESC standards and best management practices. Biological oversight in and around sensitive habitats ensures that the project does not have any adverse impacts to sensitive habitats or rare faunal and floral species.

Projects of Relevance:

Phase 1 and Phase 2 Bog Turtle Surveys along Several Transmission Line Upgrade Projects within Lancaster, Northampton, Lebanon, Adams and Berks Counties, PA: Performed phase 1 and phase 2 bog turtle & Red-bellied Cooter surveys under the supervision of a qualified bog turtle and Northern red-bellied cooter surveyor. Assessed numerous wetlands for bog turtle habitat suitability and performed phase 2 surveys within wetlands determined to contain suitable habitat parameters. These surveys were coordinated with the USFWS, the PA Fish and Boat Commission, and the NJDEP.

Frank Tutelian
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Education:

Mr. Tutelian received a Bachelor of Science degree from Pennsylvania State University in Agricultural Business and a Minor in Environmental Resource Management in May of 2020. While attending Pennsylvania State University Mr. Tutelian completed high level courses dealing with soil erosion, BMPs and sustainability.