



**COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA GAME COMMISSION
BUREAU OF WILDLIFE MANAGEMENT
WILDLIFE DIVERSITY SECTION**

2001 Elmerton Avenue, Harrisburg, PA 17110-9797 Tel: 717.787.5529 Fax: 717.787.3292

DATE: May 15, 2015

SUBJECT: Changes to Bat Survey Protocols in Pennsylvania

TO: Pennsylvania Qualified Bat Surveyors



FROM: Greg Turner, Wildlife Biologist
2001 Elmerton Ave, Harrisburg, PA 17110

Dear Colleagues,

Another survey year is upon us and I thank you for your cooperation in providing the required summary reports in the correct format. Be assured that the data is being reviewed, entered into databases and tracked. As a group you are to be commended for the professionalism and dedication exhibited.

There are always a few items that will need your attention. In this year great change is upon us, with a new federal species listed. Current standards applied by the U.S Fish and Wildlife Service (USFWS) treat Indiana bat captures with a 5-mile random capture buffer and 2.5 mile buffer for captures with known roost trees. Similarly for northern long-eared bats, the random capture: identified roost tree buffers are 3.0:1.5 miles, respectively. The smaller buffer in both of these cases is based on scientific evidence suggesting routine travel distance from roost tree. In an effort to align with regional state and USFWS offices, the PGC will incorporate a standardized procedure where a small proportion of reproductive northern long-eared females/juveniles that meet body mass requirements (6%) will have a transmitter attached, and roost trees/emergence counts performed for a single night. The level of effort will be no less than a single female or juvenile every 3 miles (5 km) for linear projects or one per 123 acres for non-linear projects. Efforts above this minimum level are acceptable.

With such greatly reduced captures, we have also initiated a new, mandatory measurement of all bats captured. This is not initiated as a way to scrutinize your work, but because a new species was confirmed in the State last year, an evening bat! Please be vigilant for this species and photograph any individual that fits the forearm and morphological descriptions of this species. Location of the first ever maternity site would be a feather in your cap if possible for you to find.

In this digital age, we are happy to provide digital copies of any forms, and a blank database for data entry. This will be required in 2016. In this way, you can enter the data in the field and by submitting the forms and the database, we can double check and finalize your data more efficiently. Please feel free to ask for these prior to any permit in order to familiarize yourself with them. There will also be changes made to the QBS/BI list next year, with a new method to submit your packet. It will also be focused to become a list of active bat consultants.

Thank you for your continued cooperation.

cc: D. Brauning, C. Eyler, T. Librandi-Mumma, M. Scafini, R. Anderson, M. Turner, and P. Shellenberger

2015 PA Game Commission Bat Surveyor Packet
Commonwealth of Pennsylvania, Pennsylvania Game Commission

Standard and Minimum Effort Requirements for Qualified Bat Surveyor Netting within the Commonwealth of Pennsylvania for Environmental Review Projects

Mist-net or acoustical surveys will be carried out in accordance with and to the level of effort as specified by the U.S. Fish and Wildlife Service's (USFWS) "2015 Range-wide Indiana Bat Summer Survey Guidelines." <http://www.fws.gov/midwest/angered/mammals/inba/inbasummersurveyguidance.html>. Surveyors should refer to PNDI Project Environmental Review Receipt (Receipt) and personal communication with environmental review staff, and equally divide the level of effort to target the most appropriate habitat in an effort to detect all species of concern for that project. Any additional methods described in this document (i.e. reporting of dead bats, transmitter attachment etc.) must be followed as a requirement of the Pennsylvania Game Commission (PGC) Permit. We recommend consulting with environmental review staff of both the PGC and USFWS for approval of survey plans prior to actual surveys. Acoustical surveys to satisfy USFWS requests do not require a State permit; however, copies of all acoustic survey reports prepared for the USFWS should be sent to the PGC, and should include all details outlined in the Acoustical survey section. All participants are required to follow White-Nose decontamination protocols: <https://www.whitenosesyndrome.org/topics/decontamination>

Netting Season: May 15 – August 15

General Netting Guidelines and Prohibitions: Site selection is the ultimate responsibility of the permitted Qualified Bat Surveyor (QBS) on site, and will target prime capture locations for the targeted species rather than locations based on ease of placement (*i.e.*, open field). Professional judgment is foremost in site selection and net set deployment. Photographs of sets and a map of the project area depicting deployments are highly recommended to complete justification if deviating from standard PGC policy. Poles for triple or quad high nets will have a pulley system for efficient bat removal. Nets will be the lowest visibility weights available (50 denier 2-Ply Nylon or 75 denier 2-Ply Polyester) and 38 mm (~1.5 in) mesh. Standard net lengths will be available to cover most travel corridors ranging from 6 m (~19 ft) to 18 m (~59 ft).

Nets will be hung in the standard manner to provide bag in panels. Overstretched nets that eliminate panel bagging will not be permitted. Nets should be placed in what is considered prime habitat for the targeted species and be placed among "clutter" to minimize detection. Sites will be monitored quietly; loud noises (other than low volume occasional communication), running engines, smoking, campfires and other activities that disturb/alert bats, will not be allowed within 300 m of a Site. Each net Site will be sampled for 2 nights beginning at dusk for at least 5 hours (300 minutes). Different but proximate locations are suggested. Each net set must be staffed and checked ~every 10 minutes by a staff member. Both QBS and BIs may oversee a maximum of 2 sites, but only if each is staffed by another team member, constant communication is available, and travel time is less than 10 minutes between sites.

All bats must be held until verified by a QBS or BI and the verification will occur within 20 minutes of capture. Unless a transmitter is being attached, all bats will be released unharmed within 20 minutes. All bats captured must be measured and recorded on PGC form P-70008-M. All listed species (State or Federal) captured must be reported to the PGC within 72 hours, and all federally listed species must be reported to the USFWS within 72 hours (see Contacts below). Any specimens that perish require immediate notification to the PGC and any federally listed species that perish require immediate notification to the USFWS. All such specimens must be retained in refrigerated or frozen condition, and provided to a PGC biologist. Any physical sample collection (*i.e.*, fur, blood, wing punch) needs prior approval and to be stated on permit. All forearm bands must be appropriate size for the species and have a unique identification number. Banding is limited to a maximum of 10 bands per project as a means to educate staff or to band listed species. Following the ethical standards below, generic banding is not permitted unless specifically stated on permit (repeated survey effort for mark/recapture is desired for justification). Banding of small-footed bats is prohibited unless authorized. Use of orange forearm bands is only permitted for Indiana bats captured across the State and yellow bands are only

Standard and Minimum Effort Requirements for Qualified Bat Surveyor Netting within the Commonwealth of Pennsylvania for Environmental Review Projects

permitted for Indiana bats captured at Canoe Creek. Photographs of definitive characteristics for all *Myotis* species, uncommon species, and injuries or deformities are highly recommended to accompany report.

Should we find that quality netting locations suitable for triple-high net sets are available but that lower net sets were deployed or poor quality netting locations were selected, or other violations explained above were not adhered to by the QBS, permits may be revoked and the qualified surveyor may be considered unable to select and set Sites, resulting in removal from the Pennsylvania list of QBS.

Netting Effort: Capture sites for bats should be evenly dispersed across the project area. Efforts may focus on one or several bat species, so surveyors should refer to PNDI Receipt and personal communication with environmental review staff from both the PGC and USFWS as appropriate, and equally divide the level of effort to target each prioritized species as appropriate for the project area. It should be recorded under the comment section for each site what the targeted species for each net set are. Each net Site will be sampled for 2 nights beginning at sunset for at least 5 hours (300 minutes). Different but proximate locations are suggested. Each net set will be checked ~every 10 minutes. Minimally, one person designated as a BI or QBS will record data on required forms and oversee no more than 2 sites at any time. To monitor greater than one site per BI/QBS, there must be an additional staff member to assist, ability to communicate between staff must exist at all times, and travel time between sites for the BI/QBS must be less than 20 minutes.

Minimum Nightly Effort/Site = 420 Units of Effort (UE) for Indiana Bats: With the exception of Indiana bats, the general USFWS guidelines should be followed, with the QBS using their best judgment to select the most appropriate sites for the targeted species at each project area. Given that Indiana bats are often captured in elevated net sets comprised of 3 or greater stacked nets, they will be considered the standard for this species when conducting surveys in PA. A capture site for Indiana bats is comprised of 2 net sets (4 poles), each capable of stacking a minimum of 3 (2.6m high) nets to reach canopy/sub-canopy (>7 m / 23 ft). Poles will have a pulley system for efficient bat removal. One unit of effort is equal to 1m² of net area in place for 1 hour - (total m² of capture area) x (minutes in place/60). Each net Site must provide a minimum of 420 UE. For example, 2 sets-each measuring 7 m high by 6 m wide in place for the required 5 hours would meet the minimum effort of 420 UE: ((7 m x 6 m) + (7 m x 6 m)) x 5 hrs. In the rare situation where stacked nets can't be used, minimum effort must still be met with more nets or net sets at a Site. As of 2008, average effort/Site of companies capturing Indiana bats in PA range from 490 to 680 UE. If unable to complete the required effort on one night, such as bad weather, the site will be repeated using full UE on another night.

Acoustical Survey Guidelines and Reporting Requirements: If the USFWS is requesting the survey, and the surveyor chooses to perform acoustic surveys, no State permit is required. It is the responsibility of the surveyor to meet any USFWS qualifications to properly conduct surveys, and follow all provided standards and protocols they provide, and complete analysis by their timeline. Reports should be forwarded to the PGC for any analysis that determines a State-listed species (Indiana, northern long-eared, or small-footed *Myotis*) is present. The surveyor should have all original files (including noise files) as recorded on file should they be requested. The report should include, but not limited to, a thorough description of equipment used at each site, placement, analysis of call reception/quality per site, and percent of calls identified. A table and detailed map

Standard and Minimum Effort Requirements for Qualified Bat Surveyor Netting within the Commonwealth of Pennsylvania for Environmental Review Projects.

of all State-listed species identified along with their locations is required (this includes inconclusive ID/species groupings containing the State-listed species). Detailed spectrographs from the original recording of all potential State-listed species calls are to be reported and paired with comparable, natural library calls from known species.

Weather -- Surveys will be suspended when:

- Rain, steady drizzle or heavy fog occurs.
- Temperature falls below 10°C (50°F).
- Winds that result in frequently moving/billowing nets OR wind gusts exceeding 18 mph.

Sampling may resume that night if/when the poor conditions pass. If a full five hours is not achieved in a night another full five hour night is required.

Qualified Bat Surveyors (QBS): A qualified surveyor is one whose credentials and experience have been reviewed by the USFWS Pennsylvania Field Office (USFWS-PAFO) and the (PGC) and found to have expertise in all of the following:

- Correct identification of bats of the northeast, to species.
- Collection of biological information on bats of the northeast.
- Selecting Net Sites and placing Net Sets to maximize bat captures.
- Attaching radio transmitters, and bat bands.
- Oversee entire radio-tracking process and mapping behavior gained thru biotelemetry.
- Identifying, describing, and conducting emergence counts of day roosts.
- Documenting study information (bats, net sets, portal entrances, etc.) with photography

A QBS is responsible for overseeing all aspects of surveys, and is, therefore, required to be at an active project site (including net surveys, telemetry monitoring and roost evaluations). The QBS is responsible for site selection, set installation and the inspection of net sets each night. Only a QBS may apply for a permit and the permit must list all QBS's and BI's for a project. QBS are the individuals who act in the capacity of Principal Investigator (PI), having in-field oversight responsibility for net setup, bat captures, bat identification, telemetry studies, safe handling procedures and adherence to WNS disinfection protocols. They are also the individuals responsible for ensuring permits are properly acquired, all bat permitting requirements are met, and ensuring that reports are accurate, complete and submitted to the appropriate agencies on time. In addition, the QBS will be in contact (2 way radio and/or cell phones) with site workers. A QBS may have oversight for the identification of bats at up to 2 net Sites at a time unless travel between sites is >20 minutes in which case only 1 Site can be monitored. The QBS will verify and oversee photo documentation of listed species, and other species not regularly found in PA (see page 4, Bat Measurement Section for list), and supervise radio tagging and telemetry. All QBS listed on permit have the potential to be held responsible for any violation confirmed.

Bat Identifier (BI): A BI is an experienced bat surveyor capable of identifying all bat species and may have oversight for the identification of bats at up to 2 net Sites at a time unless travel between sites is >20 minutes in which case only 1 Site can be monitored. Captured bats may not be held more than 20 minutes unless outfitting for telemetry or other processing documented in the permit.

BI's and Assistants that wish to document their bat experience can briefly note these activities in the comment sections of PGC Forms: P-70008-NT and/or P-70008-M. (example: Name identified 2 Indiana bats upon removal from net, measured, banded, attached transmitters and verified by QIBS as acceptable work.). Spelling Name clearly will facilitate future retrieval of this information from the database.

Assistants: Assistants are under the direct supervision of the QBS and are only responsible for assisting in site set-up, take-down and removal of bats. They do not need to be listed on the Pennsylvania QBS and BI list and do not need to be listed on any permit. An assistant can be noted as making correct ID's when they identify a bat prior to a QBS identifying it. Viewing bats already identified is valuable, but not noteworthy.

Telemetry: Please see the USFWS 2015 guidelines and/or consult with the PA field office for their requirements following captures of Indiana and northern long-eared bats. Telemetry requirements for Pennsylvania are listed in Appendix 1. In addition to this appendix, the PGC now requires telemetry will be conducted on a single reproductive female or juvenile meeting the 6% rule as stated by the USFWS in their 2015 guidelines, for every 3 miles (5 km) of linear project or a single reproductive female or juvenile meeting the 6% rule per 123 acres. For individuals fitted with a transmitter, only a single roost tree and single emergence count will be required by the PGC.

The PGC shall be notified for all species with transmitters attached. The USFWS-PAFO shall be notified for Federal bat captures and telemetry. Notification will occur as soon as possible but not to exceed 72 hours after capture. Additional nights of telemetry may be required depending upon project impacts to species habitat. Consultation with both the PGC Environmental Review staff and the USFWS-PAFO should occur prior to surveys to determine if effort listed here is adequate for the project. The frequency of transmitters, receivers and antennas will be tuned to 172 MHz. This will avoid conflicts with game species transmitters on animals and overlapping communication frequencies. This frequency will also allow PGC Diversity Staff to assist if a need arises (both on the ground and with aircraft). When conducting telemetry at the request of PGC Environmental Review, refer to standards and requirements located in Appendix I. Appendix I also has general guidance for transmitter attachments and maximum efforts for non-federally listed species. Other species may be requested on a project-specific basis.

Ethical Standards from USFWS, PA Field Office-Reminder that Surveyors are expected to:

- Current permits covering all work locations to be conducted in Pennsylvania are required.
- Follow all provisions of State Permits including White Nose Syndrome decontamination protocols.
- Conduct surveys and studies in a manner that ensures the safety of all bats. Physical samples including but not limited to fur, blood, and wing punches are prohibited unless authorized on permit. Requests must be made when applying for permit.
- Follow established survey guidelines, and accurately, fully, and truthfully report on the methods used and results obtained during these surveys.
- Maintain field notes documenting their work and provide copies of field notes upon request.
- Report all federally endangered, i.e. *M.sodalis* and *M.septentrionalis*, bat findings to the Service and PGC within 72 hours.
- Contact the Service and PGC immediately (same day) if any State or federally listed bat is killed or injured, and keep the specimen refrigerated or frozen for submission to the PGC
- Maintain the confidentiality of Indiana bat sites.
- Obtain landowner permission before accessing land.
- Refrain from removing any bats from their habitat, holding them in captivity, collecting tissue (wing punches) or blood samples, conducting radio-telemetry studies, or harp trapping unless specifically authorized by a State Permit. Weighing, measuring, analyzing and photographing Indiana bats are standard operating procedures that take place when conducting mist net surveys.

Standard and Minimum Effort Requirements for Qualified Bat Surveyor Netting within the Commonwealth of Pennsylvania for Environmental Review Projects.

Failure to adhere to any of these ethical standards or guidelines may result in an individual's removal from the list of qualified surveyors and revocation of their State Permit.

USFWS Pennsylvania Field Office (814) 234-4090
Pam Shellenberger Pamela_Shellenberger@fws.gov
Melinda Turner Melinda_Turner@fws.gov
Robert Anderson Robert_M_Anderson@fws.gov

Contacts:

PA Game Commission
Greg Turner (814) 237-1432 grturner@pa.gov
Michael Scafani (717) 409-2848 mscafani@pa.gov
Tracey Librandi Mumma (717)787-4250 tlibrandi@pa.gov

COMMONWEALTH OF PENNSYLVANIA

Pennsylvania Game Commission, Bureau of Wildlife Protection, Special Permits Enforcement Division
2001 Elmerton Avenue, Harrisburg, PA 17110-9797

Procedure and format for permittee reports to the PA Game Commission when conducting bat capture surveys within the Commonwealth.

The report is divided into six sections that include: (1) Cover page, (2) Site Survey Record, (3) Bat Measurement and Capture Data Forms, (4) Roost forms, (5) Maps and (6) Photo Documentation.

Section 1 - Cover

A separate cover page should be provided for each project with the accompanying data of Sections 2 through 6 contained within. An example is provided.

Section 2* - Bat Netting/Trapping Site Survey Record

(FORM P-70008-N/T)

This is a **mandatory** two-page summary of site(s) surveyed and of captures. It should be completed for all sites surveyed, including those with no captures. If a capture technique other than mist netting or harp trapping is used, it should be described in remarks. Complete 1 for each site survey night (If site is trapped twice, 2 site survey records are required).

Section 3* - Bat Measurement and Capture Data Form

(FORM P-70008-M)

Starting in 2015, reporting all captures on this form is MANDATORY.

All measurements should follow North American collector standards (Nagorsen, D. W. and R. L. Peterson. 1980. Measurements and Weights. Pp. 22-26 in Mammal Collectors' Manual. Royal Ontario Museum, Publications in Life Sciences).

Band color restrictions: Yellow- only on *M.sodalis* at Canoe Creek St. Park; Orange- only for *M.sodalis* elsewhere. Other bands may be applied to *M.sodalis*. A limit of 10 bands per project rule is in place. Mass banding projects need a formal proposal submitted, and approval noted on permit. Banding of *M.leibii* is prohibited without prior approval.

Section 4* – Roost Forms

When conducting telemetry 2 roost forms are provided: one for describing roosts (WD-DR-02/13) and another for bat emergence data (WD-EM-02/13). Species required for telemetry are described in above telemetry section (Page 4).

***Section 2, 3, and 4 forms may not be modified for reporting because they are used for data entry. If necessary, supplemental pages may be added to report unique data. Electronic versions of forms may be requested.**

Section 5 - Maps

An example is provided. All survey sites will be reported on a map (preferably a 7.5' USGS Topographic Map) so that locations can be accurately located and coordinates verified.

Section 6 - Photo Documentation

An example is provided. Photographs (preferably digital) will be taken of identification characteristics of every individual of all state and federally listed species and species not usually found in PA*. The photos should be labeled with the site, date and capture number, and preferably have this information in background of photo.

* Pennsylvania species: *Myotis lucifugus*, *Myotis septentrionalis*, *Myotis leibii*, *Myotis sodalis*, *Eptesicus fuscus*, *Perimyotis subflavus*, *Lasiurus borealis*, *Lasiurus cinereus*, and *Lasionycteris noctivagans*

Mail 2 hard copies of reports to address on the heading of this page within 120 days of project completion.

COMMONWEALTH OF PENNSYLVANIA
Pennsylvania Game Commission
Bureau of Wildlife Protection, Special Permits Enforcement Division
2001 Elmerton Avenue, Harrisburg, PA 17110-9797

Section 1 - Cover

PERMITTEE BAT CAPTURE REPORT

Mail **hard copy** of reports to address on the heading of this page within 90 days of project completion.

Permit Number _____

Project Name: _____

Company/
Organization/
Permittee Name: _____

Address: _____

Phone: (_____) _____ - _____ **Fax:** (_____) _____ - _____

E-Mail: _____

Project Supervisor Name: _____

Supervisor Contact: Phone: (_____) _____ - _____

E-Mail: _____

If this is contracted work, provide the name & address of the individual/organization work is being performed for:

Mail 2 **hard copies** of report to address on heading of cover page within 120 days of project completion.

BAT NETTING/TRAPPING SITE SURVEY RECORD

1. Survey Date: _____ 2. Company Name: _____

3. Bat Identifier: _____ 4. Assistants: _____
(Responsible Recorder)

5. Site Name and/or Number: _____

6. Site is (circle one): hibernation site summer habitat

7a. If hibernation site circle one: limestone mine, coal mine, limestone cave, sandstone cave, RR tunnel,
other structure, describe - _____.

7b. If summer habitat, describe area being sampled (e.g. forested stream or forest clearing with stream):

8. County: _____ 9. 7.5' Quad.: _____

10. Was site GPS'd (required) ? YES - NO

11. Geographic Coordinates (D-M-S): Latitude: ____°-____'-____"N, Longitude: ____°-____'-____"W
Datum (circle one): NAD27 (Preferred), NAD83, WGS84, Other: _____

12. Ownership and Access: (Who owns site or controls access? Give name and address.) _____

13. Time (military) & Temperature: Start Time _____ h Stop Time _____ h Total Minutes: _____
Start Temp. _____ °C End Temp. _____ °C (must stay ≥10°C for summer netting)

14. General Weather (circle one): Clear; Partly Cloudy; Mostly Cloudy; Cloudy; Drizzle; Intermittent Rain;
(suspend netting during periods of rain) Steady Rain; Thunderstorms; Snow; Other: _____.

15. General Wind Conditions (circle one): Calm, Breezy (Leaves Rustling), Windy (Trees Swaying).

16. Capture Setup at Site:

Set #	Type	Count	Dimensions	Description	TOTAL AREA (m)
1	Nets	4	12m x 2.6m	Stacked over trail	124.8 sq. m

Total Capture Area: _____ sq. m

(Site Survey Record – Continued) Site Name/No.: _____ Date: _____

17. Describe habitat 150 m around site: (topography and vegetation including dominant tree species.)

18. Was reproductive status checked? YES / NO (if “NO” only enter numbers in **Total** columns)

***CAPTURE RESULTS**

Species	Number of Adult Females				No. Juv. Fem.	Total No. Fem.	Number of Adult Males		No. Juv. Male	Total No. Males	Species Totals
	NR	PG	L	PL			SCR	NR			
<i>Eptesicus fuscus</i>	2		1			3	2	1	1	4	7
<i>Myotis lucifugus</i>											
<i>Myotis septentrionalis</i>											
<i>Myotis leibii</i>											
<i>Myotis sodalis</i>											
<i>Eptesicus fuscus</i>											
<i>Perimyotis subflavus</i>											
<i>Lasiurus borealis</i>											
<i>Lasiurus cinereus</i>											
<i>Lasionycteris noctivagans</i>											
Other – specify:											
Other – specify:											
<p>Reproductive Status: NR= nonreproductive, PG= pregnant, L= lactating, PL= post lactating, SCR= scrotal/epididymis swollen. Note: Pregnant is a category for females that are visibly pregnant. All others should be classified as NR Visibly pregnant last year may be noted in comments.</p> <p>*Complete Measurement and Capture Data Form for all Captures Photo document all listed species, all species not considered residents, or abnormalities noted</p>										Grand Total	

19. **BAT DETECTORS & OTHER MONITORING DEVICES:** Tallies of bat passes / hour. One to 5 hours required for Indiana bat hibernacula surveys. Monitor one hour after 22:00 hrs when trapping/netting hibernacula and 5 hours when only monitoring with bat detectors, night vision or infrared device (when site can not be trapped/netted). Describe procedure & equipment used in remarks.

1 st hour	2 nd hour	3 rd hour	4 th hour	5 th hour
Start Time:				
End Time:				
Tallies:	Tallies:	Tallies:	Tallies:	Tallies:

20. REMARKS:

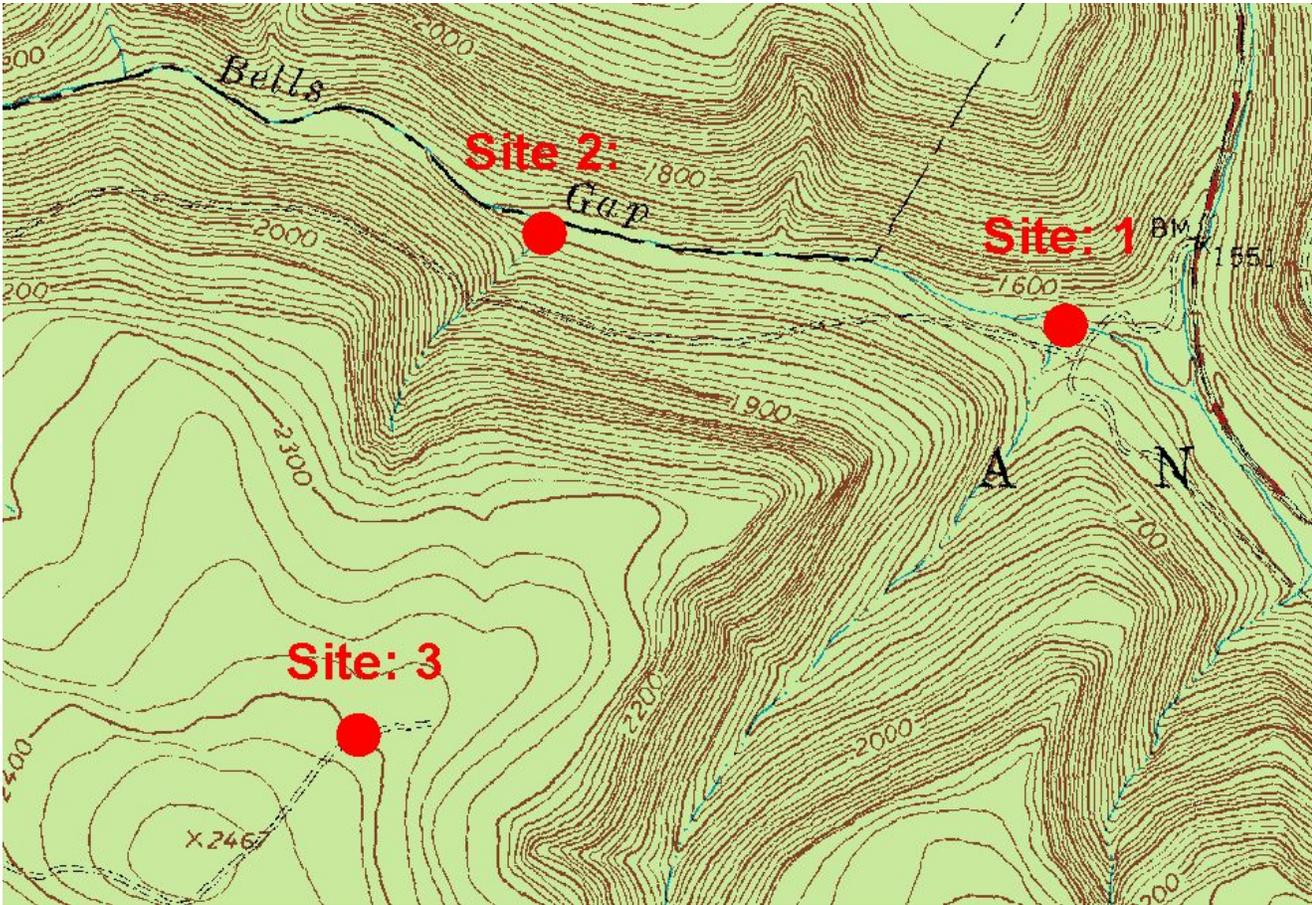
Bat Measurement and Capture Data Form

Site Name Or Number:				Date:				Set No. Captured In:			Name of Person Identifying the Bat:				*Capture Number:
Height in meters captured above ground surface: _____m				Body Measurements (grams and millimeters)						Band Information (if banded) (Band Males on bat's RIGHT fa., Females on bat's LEFT fa.)					Transmitter Attached? If so: Frequency (mHz)
<u>Species</u>	<u>Sex</u>	<u>Age</u>	<u>Repro. Condition</u>	<u>Wt. (g)</u>	<u>Ear</u>	<u>Tragus</u>	<u>Fore- arm</u>	<u>Hind Foot</u>		<u>Recapture Yes/No</u>	<u>Band Material</u>	<u>Band Color</u>	<u>Band Inscription</u>	<u>Band on Left/Right</u>	
<u>Time of Capture</u>	<u>Photo Taken</u> Yes / No		<u>WNS Wing Score</u>		<u>Wing Photo ID:</u> Remarks:										
<i>Repro. Condition: NR= nonreproductive, PG= pregnant, L= lactating, PL= post lactating, SCR= scrotal/epididymis swollen</i>															
Site Name Or Number:				Date:				Set No. Captured In:			Name of Person Identifying the Bat:				*Capture Number:
Height in meters captured above ground surface: _____m				Body Measurements (grams and millimeters)						Band Information (if banded) (Band Males on bat's RIGHT fa., Females on bat's LEFT fa.)					Transmitter Attached? If so: Frequency (mHz)
<u>Species</u>	<u>Sex</u>	<u>Age</u>	<u>Repro. Condition</u>	<u>Wt. (g)</u>	<u>Ear</u>	<u>Tragus</u>	<u>Fore- arm</u>	<u>Hind Foot</u>		<u>Recapture Yes/No</u>	<u>Band Material</u>	<u>Band Color</u>	<u>Band Inscription</u>	<u>Band on Left/Right</u>	
<u>Time of Capture</u>	<u>Photo Taken</u> Yes / No		<u>WNS Wing Score</u>		<u>Wing Photo ID:</u> Remarks:										
<i>Repro. Condition: NR= nonreproductive, PG= pregnant, L= lactating, PL= post lactating, SCR= scrotal/epididymis swollen</i>															
Site Name Or Number:				Date:				Set No. Captured In:			Name of Person Identifying the Bat:				*Capture Number:
Height in meters captured above ground surface: _____m				Body Measurements (grams and millimeters)						Band Information (if banded) (Band Males on bat's RIGHT fa., Females on bat's LEFT fa.)					Transmitter Attached? If so: Frequency (mHz)
<u>Species</u>	<u>Sex</u>	<u>Age</u>	<u>Repro. Condition</u>	<u>Wt. (g)</u>	<u>Ear</u>	<u>Tragus</u>	<u>Fore- arm</u>	<u>Hind Foot</u>		<u>Recapture Yes/No</u>	<u>Band Material</u>	<u>Band Color</u>	<u>Band Inscription</u>	<u>Band on Left/Right</u>	
<u>Time of Capture</u>	<u>Photo Taken</u> Yes / No		<u>WNS Wing Score</u>		<u>Wing Photo ID:</u> Remarks:										

*Capture Number = number in sequence by site.

Section 5 - Maps (example)

Blair Co., Blandburg Quadrangle, Bells Gap Area.
Location of Sites 1, 2, and 3 for Project PA-24



Section 6 - Photos (example)

Male *Myotis sodalis* captured at **Site 1**

Capture date: **7/18/01**

Capture Number: **06**

Portrait



Keeled Calcar



Mail 2 **hard copies** of report to address on the heading of this page within 120 days of project completion to:

Pennsylvania Game Commission
Bureau of Wildlife Protection, Special Permits Enforcement Division
2001 Elmerton Avenue, Harrisburg, PA 17110-9797

**PA GAME COMMISSION
Wildlife Diversity Section
Bat Tree - Day Roost - Data Sheet**

1-

Landowner: **Name:** _____ **Address:** _____

Phone: _____

2-BAT INFO

Dates on Roost: _____ **Day Roost Number:** _____

(Date = Date bat was on roost; TreeNo.= Bat # & numbered tree, in sequence, for that bat - 241PGC-01)

Surveyors: _____ **Roost Type:** Tree - Building - Other _____

Bat Species: _____ **Band No.:** _____ **Transmitter Frequency:** _____

Ht.(m) bat is roosting off ground: _____ **Was Bat Emergence Form Completed? YES - NO**

Comments: *(Where is bat roosting? Under bark? If building-describe)*

3-LOCATION

County: _____ **Quadrangle:** _____

Latitude: _____ (DMS) **Elevation (ft.):** _____

Longitude: _____ (DMS) **%Slope:** _____ **Slope Aspect (0-360):** _____

Datum: Nad27 (preferred) NAD83/WGS84 (circle one)

4-TREE INFORMATION

Species: _____ **DBH (cm):** _____ **Is Tree Alive? YES - NO (CIRCLE)**

Height: (%UP _____ + %DOWN _____) X **Dist.(m) to tree** _____ = _____ **m**

1st Branch Ht. (%UP _____ + %DOWN _____) X **Dist.(m) to tree** _____ = _____ **m**

Estimate % Canopy Cover Around Tree: _____

Is suitable roost area on tree exposed to direct sunlight? **YES - NO (circle one)**

If so - estimate # of hours of exposure to direct sun: _____

Azimuth of Exposure (which way does exposed part of tree face): _____ (0-360)

Exfoliating Bark? **YES - NO** **Estimate % of tree with Exfoliating Bark:** _____

Cavities? YES - NO If yes - Describe: _____

5-SURROUNDING HABITAT

Distance (m) to Water: _____ **Water Type:** _____

Understory Species: _____

Overstory Species: _____

On reverse side of form Comment on Overstory Species and Habitat Composition.

PA GAME COMMISSION, Wildlife Diversity Section
Bat Emergence Form

* It is important to keep lights and noise disturbance to a minimum during the emergence period. *

ROOST NO.: _____ **DATE:** _____

ROOST TYPE: Building - Tree - Rock - Other _____

Surveyors: _____

Transmitted Bat Band No.: _____ **Transmitter Frequency:** _____

Weather **Temperature:** _____ *F

Sky Condition Code: _____ **Wind Scale Code:** _____

Sky Conditions		Beaufort Wind Scale	
Code		Code	MPH Indicators
0	Clear or a few clouds	0	<1 Smoke rises vertically
1	Partly cloudy/variable sky	1	1-3 mph Smoke Drift shows wind direction
2	Cloudy (broken) or overcast	2	4 - 7 mph Wind felt on face/leaves rustle
4	Fog or smoke	3	8 - 12 mph Leaves&sm.twigs in constant motion
5	Drizzle	4	13 - 18 mph Raises dust & loose paper
7	Snow	5	19 - 24 mph Small trees in leave sway
8	Showers		

Night Vision Equipment Used? **YES - NO** Bat Detector Used? **YES - NO**

Telemetry Equipment Present? **YES - NO**

Time Surveyors arrived at Roost : _____ *(use 24 hour clock for times)*

Time First Bat Seen Flying: _____

Time Transmitted Bat Emerged: _____ **And Azimuth Last Detected:** _____

Time Last Bat Seen Emerging: _____ **Total Emergence Count:** _____

Comments: *(include other emergence observations, weather, bat behavior, etc.)*

**PENNSYLVANIA GAME COMMISSION
Environmental Review Bat Telemetry Protocol**

Appendix I

**Pennsylvania Game Commission
Environmental Review Telemetry Protocol**

Refer to these standards when specific telemetry is requested by environmental review staff in the Bureau of Wildlife Habitat Management. This document also provides general guidance for attaching transmitters to bats.

Contact:
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Bureau of Wildlife Habitat Management
Pennsylvania Game Commission
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PENNSYLVANIA GAME COMMISSION

Environmental Review Bat Telemetry Protocol

- ❖ Objective: To identify and characterize roosts (trees, buildings, rocky areas), foraging areas, and travel corridors.
- ❖ Data collected from telemetry surveys will be used by PGC Environmental Review staff to determine how to best avoid, minimize, and if necessary, mitigate for potential impacts to bat species.
- ❖ PGC Environmental Review staff may request the use of this telemetry protocol for Eastern small-footed bats (*Myotis leibii*), silver-haired bats (*Lasionycteris noctivagans*), Seminole bats (*Lasiurus seminolus*), or other bat species as specified in PA Game Commission (PGC) PNDI response letters. This is in addition to requests for telemetry made by USFWS on federally listed species, as outlined in earlier sections of the bat packet.

Bat Telemetry Protocol:

- *Banding and Transmitter Attachment*
 - Banding
 - Do not attach arm bands or take wing punches without prior PGC approval: banding materials and ID numbers must be approved prior to use. No orange or yellow darvic bands are to be used without specific approval. Split metal bands with tabs and unique number system are preferred for generic banding of species, numbering must be approved ahead of time
 - No banding *M. leibii*
 - Transmitters
 - Try not to exceed 5% and **DO NOT** exceed more than 10% of the bats body weight
 - With the lighter transmitters you should be able to be close to 5%; any transmitter that fits weight rule may be used
- *Equipment*
 - Receivers: Receiver can be a scanning or non-scanning type
 - Antennas
 - Antennas must be tuned to the frequencies of your transmitters and receiver (172 MHz)
 - Antennas should be at least a 2-element (H-antenna) or 3+ element (yagi)
 - Transmitters
 - Transmitters should be tuned to 172 MHz to match the PGC; Approval and justification required in advance from the PGC
 - Transmitter application
 - Transmitters are attached with latex, medical adhesive
 - Recommend PERMA-TYPE surgical cement (Plainville, CT 06062).
 - Using scissors, remove a small patch of fur from the mid-dorsal region (between shoulder blades), then glue the transmitter to the bat's skin with a latex, medical adhesive (Perma-type, Skin-Bond Cement or Osto-Bond)
 - A thin layer of glue is applied to the bat and transmitter separately, allowed to dry a couple minutes until tacky, then joined together to form a secure bond according to manufacturer recommendations
- *Level of effort*
 - Maximum number = 6 bats per survey season if a standard PNDI project; if a large PNDI project (i.e. cannot be entered into the PNDI environmental review online tool) then consult with PGC environmental review staff to determine the maximum number of bats.

PENNSYLVANIA GAME COMMISSION

Environmental Review Bat Telemetry Protocol

- All eastern small-footed bats (*Myotis leibii*)
- Reproductive female and juvenile silver-haired bats (*Lasionycteris noctivagans*)
- Reproductive female and juvenile Seminole bats (*Lasiurus seminolus*)
- Any other bat species as requested by PGC Environmental Review staff
- Minimum of 3 nights of telemetry per bat
- Minimum of 10 hours a night with a minimum of 3 successful triangulations per hour totaling 30 successful triangulations per night
 - Lead biologist should have experience conducting telemetry on flying bats, be familiar with triangulation programs, be able to overcome typical field application difficulties (i.e. bounce/terrain), and be confident they are meeting these requirements
 - 10 hour minimum per night includes the time spent by the bat roosting, unless time spent roosting can be attributed to weather (rain, wind over 18 mph, and/or night with starting temperatures below 60°F).
 - No more than 2 hours of any night should be missed due to telemetry crew error and/or weather reasons (rain, wind over 18 mph, and/or night with starting temperatures below 60°F).
- For each day any transmittered bat is documented roosting at a particular day roost, a minimum of 1 emergence count is required.
 - All day roost found must have a minimum of 1 emergence count conducted
 - Surveyors should arrive at least ½ hour before sunset and remain at the roost tree, counting all bats emerging until the time at which all bats have emerged or the lighting diminishes to a point at which the surveyor can no longer see to count the bats
 - If emergence counts during telemetry are conducted on nights when the starting temperature is below 60°F and wind codes are 4 and above an additional emergence count is needed when more favorable weather conditions exist
- *Data sheets and Data*
 - Process data by individual animal and provide shapefiles of data points, minimum convex polygons of evening activity and fixed kernel utilization distribution of 95%, 75%, and 50% of the activity data.
 - PGC data sheets MUST be completed:
 - Bat-Netting/Trapping Site Survey Record
 - Bat Measurement and Capture Data Form
 - Bat Transmitter Detection Record
 - Day Roost Forms
 - Complete this form for all roost types – trees, rocks, building, etc.
 - Regardless of roost type, fill out the following under 4-Roost Information:
 - Canopy cover estimation
 - Whether roost is exposed to direct sunlight
 - Hours of exposure to direct sunlight
 - Azimuth of exposure
 - Bat Emergence Form
 - Bats' activity schedule referenced to general locations on a map
 - Foraging and Roosting as a minimum for activity remarks
 - Fall telemetry of males should include amount of time within mine, foraging and roosting