

Appendix A

Commonwealth of Pennsylvania
Pennsylvania Game Commission, Bureau of Wildlife Management
Wildlife Diversity Section
2001 Elmerton Avenue, Harrisburg, PA 17110-9797

Protocol for Assessing Abandoned Mines/Caves for Bat Surveys

In general, openings can be dismissed from bat surveys when:

1. There is only one horizontal opening less than 6 inches in diameter and no or very little airflow is detected.
2. Vertical shafts <1 foot in diameter.
3. Passage continues less than 50 feet and terminates with no fissures that bats can access.
4. Mines that are prone to flooding, collapsed shut and completely sealed, or otherwise inaccessible to bats.
5. Openings, which have occurred recently (within 1 year) due to subsidence.

Additional notes: Bats can access mines via old open buildings such as a fan house. Foliage and other vegetation in front of mine openings do not stop use by bats. They can navigate through foliage. Collapsed entrances with multiple crevices between boulders etc. are accessible to bats and should be sampled. Collapses completely sealed with fine soil are of course inaccessible to bats.

Sampling Dates, Times and Temperature Criteria

1. Spring sampling will be conducted between: April 10 thru May 10
2. Fall sampling will be conducted between: September 15 thru October 31
3. Sampling will start ½ hour before sunset and continue for at least 5 hours.
4. Weather must provide for:
 - a. Temperatures >50°F (10°C) for first 2 hours of sampling and not fall below 35°F (1.6°C) by midnight.
 - b. At least 3 hours free of heavy rain and thunderstorms.
5. Sampling will be conducted on two evenings. If no captures occur and no bat activity is noted with a bat detector on the first evening during acceptable weather conditions, sampling can be suspended for the site.
6. The shining of lights, and noise will be kept to a minimum with no smoking around the sample site. The use of radios, campfires, running vehicles, punk sticks, citronella candles and other disturbances will not be permitted within 300 feet of site during surveys.
7. Before conducting surveys, local residents and/or law enforcement agencies should be informed of the scheduled nighttime activities.

Equipment

No equipment, litter or other debris will be left unattended at site that could result in the capture or entanglement of any animals. Any equipment stored at site between sampling sessions will be clearly labeled with contact information.

Harp Trap: Place in front of opening and block surrounding space with plastic sheeting or bird netting. Traps should be tended at least once per hour. When the catch rate is high (>25 bats per hour) or during inclement weather, traps should be tended more frequently.

Mist Nets: 50 denier, 38mm mesh. Place in front or around opening. Nets need to be monitored closely and checked at least once every 20 minutes. At sites with a heavy bat swarm, the net may need to be monitored continuously.

Bat Detector: A bat detector should be on site to monitor bat activity when trapping or netting. Bat passes should be monitored and tallied for at least one hour after 10pm. Bat tallies should be reported along with the time sampled. Reporting format will be: Start and end time for 1-hour sample period and bat passes for that hour.

Other: In situations where it is too dangerous to approach an entrance, bat detectors and/or night vision/infrared recording devices may be used to monitor and record bat activity to determine bat use of the site. Bat activity in or around the entrance can be monitored by counting bat passes with a bat detector, or night vision/infrared video tapes can be made providing actual counts of bats entering the opening. As with trapping, monitoring should be conducted for 5 hours. Reporting format will be: Start and end time for 1-hour sample period and bat passes for that hour.

Reporting

In addition to reports for the client, the Pennsylvania Game Commission requires copies of the report as part of the vendor's permitting requirement. To simplify data entry, mandatory sampling summary forms are also required by the PA Game Commission for bat surveys within the Commonwealth. If the vendor did not receive a copy of the data form with the permit, they can be obtained by contacting the:

Pennsylvania Game Commission
Bureau of Law Enforcement, Technical Services Division
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
717/787-5740

INTERIOR WINTER HIBERNACULA SURVEYS

Sites that are determined to be safe for entry to conduct winter counts (primarily caves & stable hard rock mines) will be coordinated with the PA Game Commission, Wildlife Diversity Section and scheduled for interior surveys between January 1 and March 10. Contact information for the Wildlife Diversity Section is:

PA Game Commission
Bureau of Wildlife Management, Wildlife Diversity Section
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
(717) 787-5529

Mine Assessment – Closure Determination Protocol

1. All mine openings proposed for closure will be evaluated for bats using the attached protocol (Appendix A).
 - a. If a mine opening has one or more characteristics making bat occupation unlikely (as specified in Appendix A), the opening may be closed at any time without further consultation with the Fish and Wildlife Service.
 - b. If a mine opening is potentially suitable for bats, the opening will undergo a bat survey in accordance with the specifications detailed in Appendix A.
 - c. All results from bat surveys will be submitted to the Pennsylvania Game Commission in accordance with the attached reporting requirements, *Procedure and format for permittee reports to the PA Game Commission when conducting bat capture surveys within the Commonwealth* (Appendix C).
2. Survey results

This section details the course of action that will be taken for mine openings proposed for closure, based on the results of the bat survey, as detailed below.

- a. Detection Method 1 – trap placement at mine opening in accordance with Appendix A.

Capture Results / Opening	Action	Send survey results to:
No bats (of any species)	Close opening at any time	PGC
1 or more Indiana bats	Consult with USFWS	USFWS & PGC
1 to 3 bats	Close opening at any time, or install bat friendly gates	PGC
4 to 50 bats; 1 to 3 species <u>or</u> 1 to 5 small-footed bats	Close opening between June 1 and July 31, or install bat friendly gates	PGC
>5 small-footed bats	Install bat friendly gates or consult with PGC	PGC
4 to 50 bats; \geq 4 species	Consult with USFWS and PGC, or install bat friendly gates.	USFWS & PGC
> 50 bats	Install bat friendly gates	USFWS & PGC

- b. Detection Method 2 – Use of a bat detector with no trap over the mine opening, in accordance with Appendix A. This assumes the opening is too dangerous to set up a trap.

Results / Opening	Action	Send survey results to:
No detected bat passes into/out of mine opening for entire sample period	Close opening at any time	PGC
< 5 detected bat passes into/out of mine opening in a 1-hour period	Close opening between June 1 and July 31, or install bat friendly gates	PGC
> 5 detected bat passes into/out of mine opening in a 1-hour period	Consult with USFWS and PGC, or install bat friendly gates	USFWS & PGC

- c. Detection Method 3 – Use of a bat detector, while a trap is in place over the mine opening, in accordance with Appendix A. This assumes the presence of the trap will cause bats to repeat passes before attempting to enter the mine opening.

Results / Opening	Action	Send survey results to:
No detected bat passes at mine opening for entire sample period	Close opening at any time, unless capture results would prompt another action (see 2(a))	PGC
< 50 detected bat passes at mine opening in a 1-hour period	Close opening between June 1 and July 31, or install bat friendly gates, unless capture results would prompt another action (see 2(a))	PGC
> 50 detected bat passes at mine opening in a 1-hour period	Consult with USFWS and PGC, or install bat friendly gates	USFWS & PGC

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

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

Section 1 - Cover

A separate cover page should be provided for each project with the accompanying data of Sections 2 through 5 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, etc.).

This form may not be modified for reporting because it is used for data entry. If necessary, supplemental pages may be added to report unique data.

Section 3 - Bat Measurement and Capture Data Form

(FORM P-70008-M)

This form is **mandatory** for:

1. *Myotis sodalis* captures
2. *Myotis leibii* captures
3. Bats you are banding and all band recaptures
4. All radio-tagged bats (describe transmitter in remarks)
5. Bat species not usually found in Pennsylvania*.

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

This form may not be modified for reporting because it is used for data entry.

The surveyor also has the option to use this form for measuring and reporting all bats. 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). Banded bat information will be maintained in a database and future recaptures of your bands will be reported to you.

Section 4 - 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 5 - Photo Documentation

An example is provided. It is strongly encouraged that photographs be taken of identification characteristics of all *M.sodalis*, *M.leibii*, and species not usually found in PA. The photos should be labeled with the site, date and capture number.

Return reports to address on the heading of this page within 90 days of project completion.

COMMONWEALTH OF PENNSYLVANIA
Pennsylvania Game Commission
Bureau of Law Enforcement, Technical Services Division
2001 Elmerton Avenue, Harrisburg, PA 17110-9797

Section 1 - Cover

PERMITTEE BAT CAPTURE REPORT

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:

BAT NETTING/TRAPPING SITE SURVEY RECORD

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

3. Reporter: _____ 4. Assistants: _____

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

14. General Weather (circle one): Clear; Partly Cloudy; Mostly Cloudy; Cloudy; Drizzle; Intermittent 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>Pipistrellus subflavus</i>											
<i>Lasiurus borealis</i>											
<i>Lasiurus cinereus</i>											
<i>Lasionycteris noctivagans</i>											
Other – specify:											
Other – specify:											
Reproductive Status: NR= nonreproductive, PG= pregnant, L= lactating, PL= post lactating, SCR= scrotal/epididymis swollen. *Complete Measurement and Capture Data Form for all: (1) <i>Myotis sodalis</i> , (2) <i>Myotis leibii</i> , (3) bats you are banding or band recaptures, (4) radio-tagged bats and (5) bat species not usually found in PA.										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

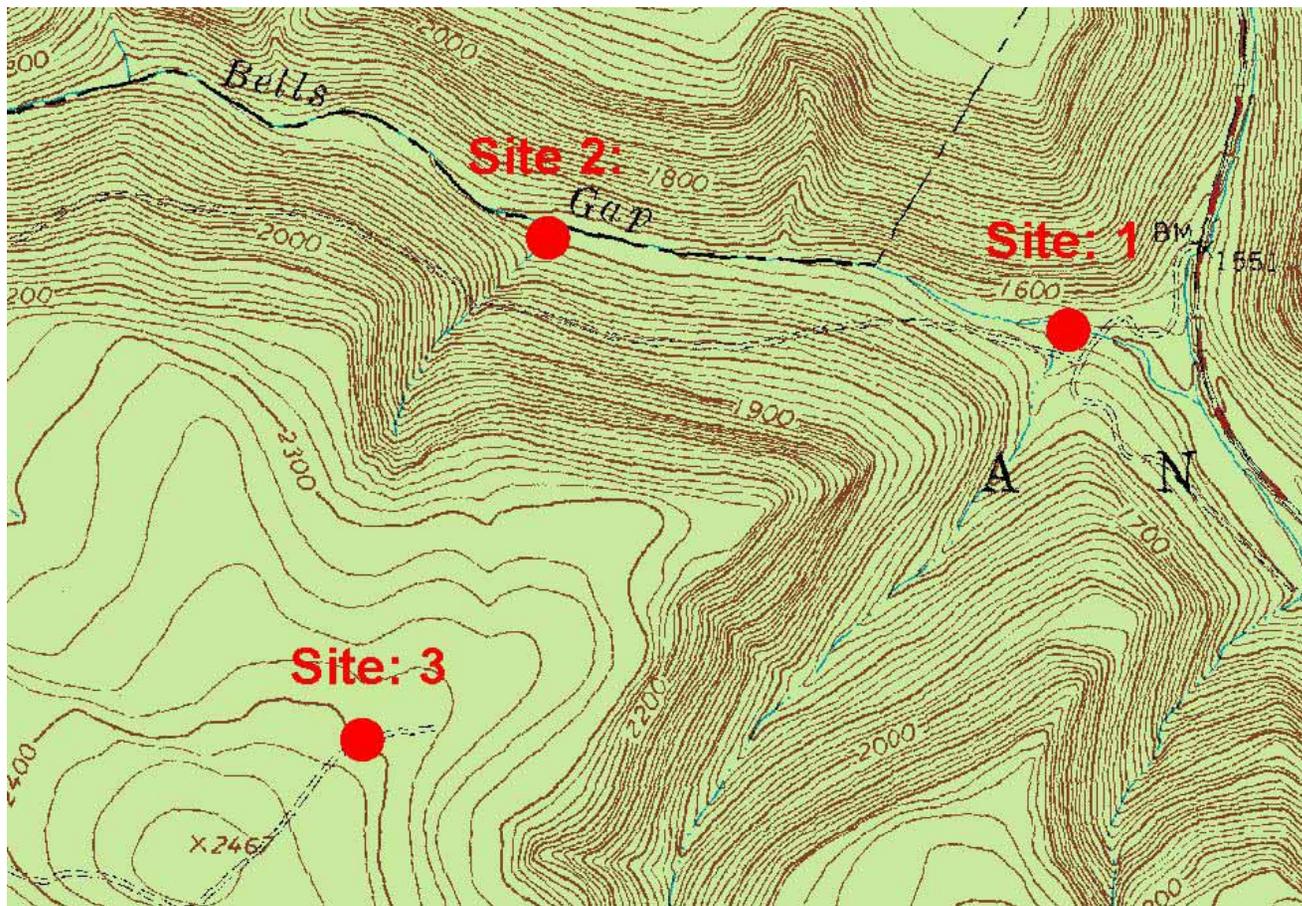
(Complete for all (1) *Myotis sodalis*, (2) *Myotis leibii*, (3) bats you are banding or band recaptures, (4) radio-tagged bats and (5) bat species not usually found in PA)

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	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	Remarks:												
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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	Remarks:												

*Capture Number = number in sequence by site.

Section 4 - Maps (example)

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



Section 5 - Photos (example)

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

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

Capture Number: **06**

Portrait



Keeled Calcar

