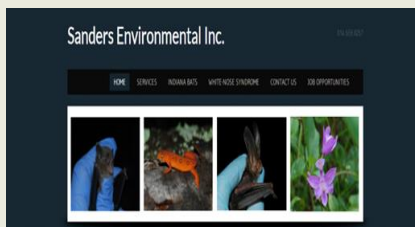


Evaluation of Bat Gates Attached to Culverts at Underground Mine Openings in West Virginia



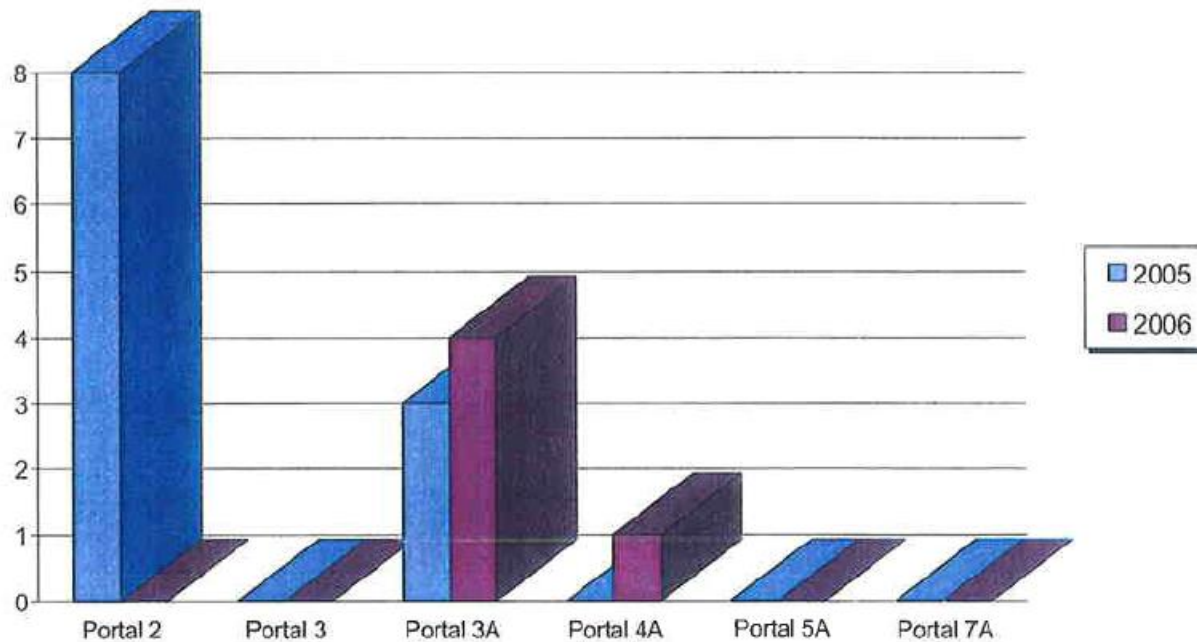
Background

- Many abandoned portals are too hazardous for traditional bat gates
- WVDEP closes AML openings with culverted gates
- FWS expressed concern, were bats using them
- Concern about how gates were being constructed
- Oversight study done on construction methods
- Overall WVDEP did a good job
- A few problems
- Study funded by OSM with WVDEP cooperation
- Sampling conducted by Sanders Environmental

Previous Surveys

2005 -2006 Pre Post Survey

Figure 3: Comparison of 2005 and 2006 Capture Success at 6 Abandoned Mine Portals in Kanawha and Putnam Counties, West Virginia



Pre/Post data

- ATS 2005-2006 report
 - None post at portal 2 because 90% obstructed, possibly improperly constructed
 - Portal 3A had 3 pre and 4 post
 - 4A had none pre and 1 each in 06 and 07 post
 - Some gates were improperly installed

2005-2007 WVDEP Survey Results

WV AML Mine Portal Pre and Post Gate Bat Sampling Summary

| <u>Site Name</u> | <u>Big Brown</u> | <u>Pip</u> | <u>N. longear</u> | <u>L. brown</u> | <u>Indiana</u> | <u>Smallfooted</u> | <u>Total</u> |
|---------------------------------------|------------------|------------|-------------------|-----------------|----------------|--------------------|--------------|
| Possum Hollow Portal 3A 2007 | | 7 | 2 | 4 | | | 13 |
| Possum Hollow Portal 3A 2006 | | 1 | 2 | 1 | | | 4 |
| Possum Hollow Portal 3A 2005 Pre-gate | | 1 | | 2 | | | 3 |
| Possum Hollow Portal 4A 2007 | | | 1 | | | | 1 |
| Possum Hollow Portal 4A 2006 | | | | | | 1 | 1 |
| Possum Hollow Portal 4A 2005 Pre-gate | | | | | | | 0 |
| Possum Hollow Portal 5A 2007 | | | | | | | 0 |
| Possum Hollow Portal 5A 2006 | | | | | | | 0 |
| Possum Hollow Portal 5A 2005 Pre-gate | | | | | | | 0 |
| Possum Hollow Portal 7A 2007 | | | | | | | 0 |
| Possum Hollow Portal 7A 2006 | | | | | | | 0 |
| Possum Hollow Portal 7A 2005 Pre-gate | | | | | | | 0 |
| Lamberts Run 2007 | | 7 | 12 | 13 | | | 32 |
| Lamberts Run Pre-gating 2006 | | 11 | 8 | 2 | | | 21 |
| Ring Hollow 2007 | | | | | | | 0 |
| Ring Hollow Pre-gating 2006 | | 3 | 1 | | | | 4 |
| US Park Service Mine - 2007 | 1 | 22 | 3 | 3 | | | 29 |
| US Park Service Mine Pre-gate - 2006 | 1 | 65 | 7 | 19 | 3 | 3 | 98 |
| US Park Service Mine Pre-gate - 2002 | | 3 | 2 | 4 | | | 9 |

Date and weather condition data for US ParkService Mine not provided, which may help explain capture rate variations.

OSM/WVDEP 2014 Study

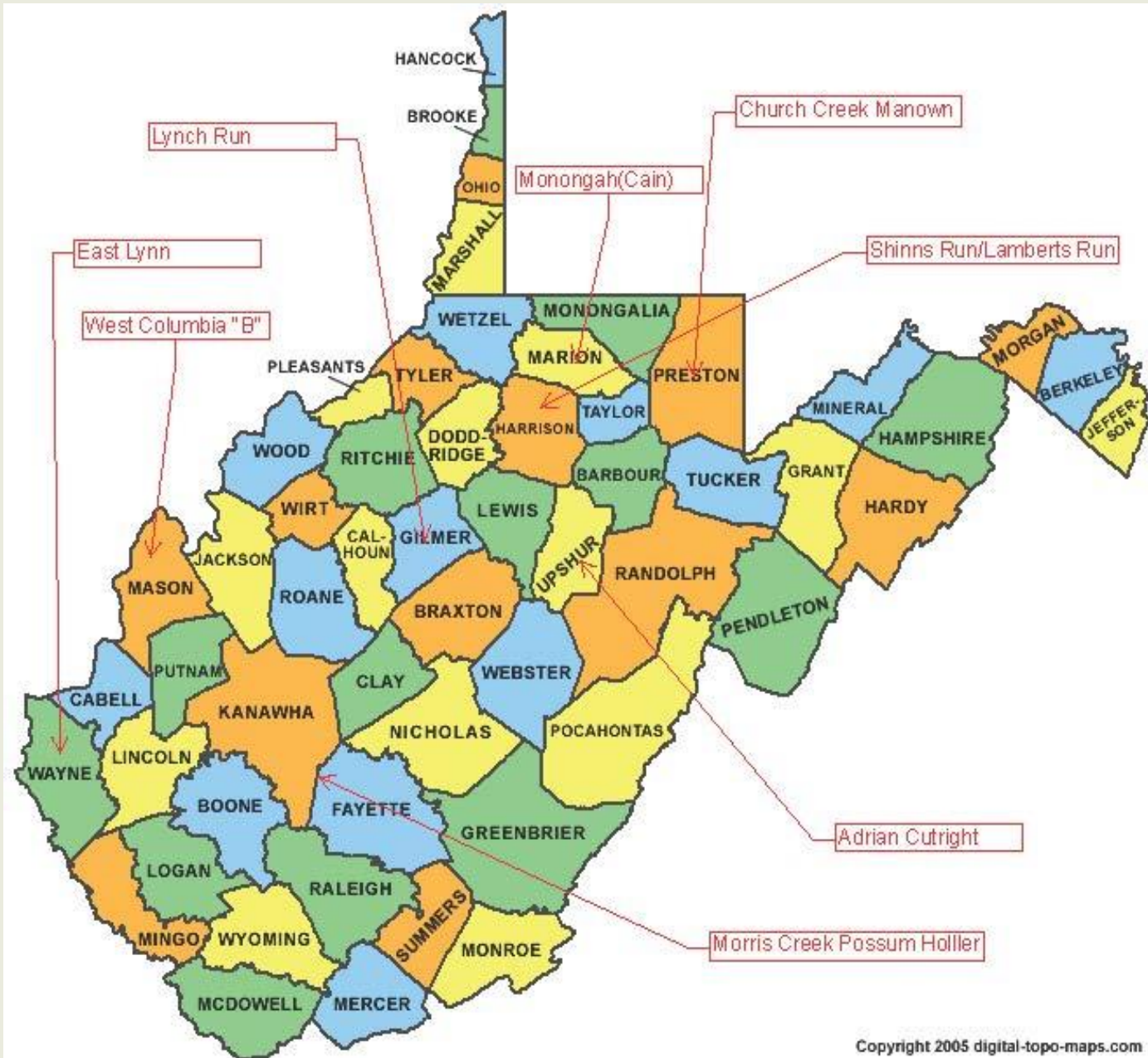
Methods

- Bat Survey Protocol for Assessing Use of Potential Hibernacula
- Sampled in September and October
- Each portal sampled 2 non-consecutive nights at least 2 weeks apart
- Harp traps
- Acoustic sampling with Petterson D 500X detectors
- WNS protocols and documentation

Site Characterization

- 12 abandoned mine sites
- Total of 38 portals sampled
- Culverts inserted into abandoned portals
- Culverts were either metal or plastic
- Gates attached to the end of the culvert
- One standard gate in the sample

Fall 2014 OSM Sample Sites



Sample sites with number of portals

| Site # | Site name | County | # Portals |
|--------|------------------------------|-----------------|-----------|
| 1 | East Lynn II #4 | Wayne | 4 |
| 2 | East Lynn II Emergency | Wayne | 3 |
| 3 | West Columbia "B" | Mason | 5 |
| 4 | Morris Creek - Possum Hollow | Kanawha/Fayette | 10 |
| 5 | Shinns Run #2 | Harrison | 3 |
| 6 | Shinns Run #3 | Harrison | 2 |
| 7 | Lamberts Run Allen Site #5 | Harrison | 1 |
| 8 | Church Creek Manown #1 | Preston | 1 |
| 9 | Adrian (Cutright) #2 | Upshur | 3 |
| 10 | Monongah (Cain) | Marion | 1 |
| 11 | Lynch Run #6 Phase I | Gilmer | 1 |
| 12 | Lynch Run #6 Phase II | Gilmer | 4 |

Results

| Site | Indiana bat | Tri-colored bat | Gate | Air flow | Date of capture |
|-------------------|-------------|-----------------|---------------------------------|--------------------|-------------------------------------|
| Morris Creek | 1 | 2 | Traditional/ plastic culvert | Light to medium | 9-18-14 10-2-14 (I.B. +1 pip) |
| Adrian (Cutright) | | 2 | Metal culvert | None | 10-1-14 |
| East Lynn II #4 | | 1 | Plastic culvert | Slight to none | 10-3-14 |

Sites With Captures

Morris Creek



Postconstruction portals along access road



Morris Creek - Possum Hollow cont'd



Portal 10



Portal 9



Portal 8



Portal 6



Portal 7

One pip captured here

Morris Creek- Possum Hollow



Portal 5



Portal 4



Portal 3

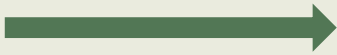


Portal 1



Portal 2

Traditional Gate



One Ibat and one pip captured here

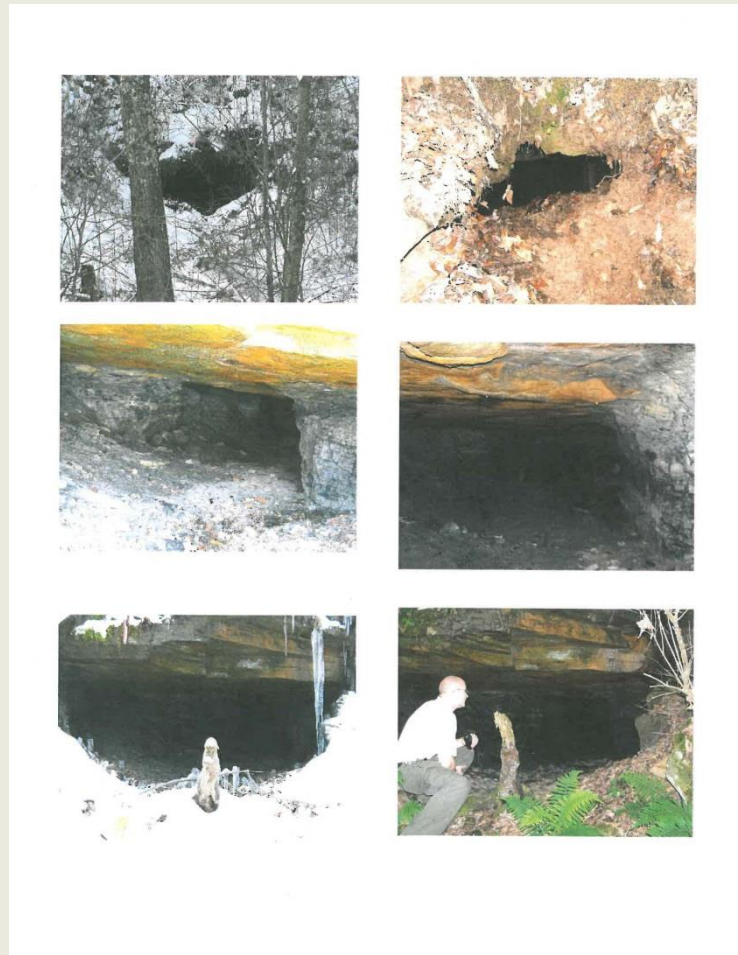
Morris Creek Traditional Bat Gate



Indiana Bat (*Myotis sodalis*)



Adrian (Cutright) Before Installation



Adrian (Cutright) #2

2 pips caught here



Portal 1



Portal 2



Portal 3

East Lynn II #4



Portal 1



Portal 2



Portal 3



Portal 4

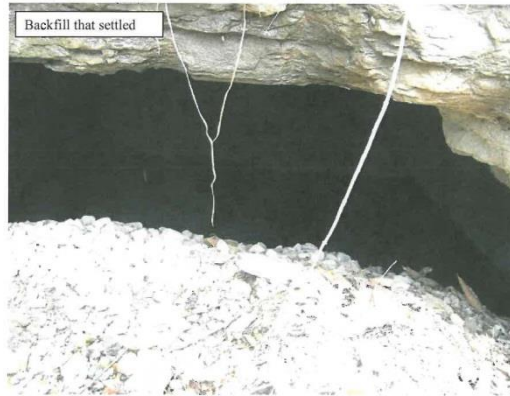
One pip captured here

Church Creek Manown #1



Portal 1

Settled Backfill





Pipe should have been against gate. Several areas that pipe did not touch gate.



2014 DEP other sites surveyed pre-construction

| Project Name | Dates | County | Bat Gates | Northern long-eared | Tri-colored | Eastern small footed | Virginia big-eared | Big brown | Totals |
|------------------------------------------|------------|------------|-----------|---------------------|-------------|----------------------|--------------------|-----------|--------|
| Alkol Portals | 9/10 -10/1 | Lincoln | 4 | 1 | | | | | 1 |
| Bickmore Refuse #2 | " | Clay | 4 | | 3 | | | | 3 |
| Big Creek Complex | " | Fayette | 5 | | | 13 | | 1 | 14 |
| Cambria (Nicholas Co.) Portals | " | Nicholas | 3 | | | 1 | | | 1 |
| Ridgeview (Dunlap) Portals | " | Boone | 6 | | 1 | | | | 1 |
| Chattaroy (Kirk) Portals | 9/28-10/13 | Mingo | 2 | | | | | | |
| Earling Refuse Pile | " | Logan | 7 | | 1 | 2 | | | 3 |
| Itmann (Burdiss) Drainage | " | Wyoming | 2 | | | 1 | | | 1 |
| Mudlick Portals | " | Wyoming | 9 | | | | | | |
| Canyon Refuse and Dump | 9/10-10/1 | Monongalia | 7 | | 2 | | | | 2 |
| Laurel Run #3 | " | Marion | 9 | 2 | 1 | | | | 3 |
| Perry Hollow (Posey) Portals | " | Harrison | 2 | | | | | | |
| Tyrone (Stimmell) Portals | " | Monongalia | 3 | | | | | | |
| Chaffey Run Strip | 9/15-9/27 | Tucker | 1 | 2 | | | 8 | | 10 |
| Davis Coal and Coke | " | Tucker | 4 | | | | 11 | | 11 |
| Lick Run #4 | " | Preston | 3 | | | | | | |
| Mtn View Portals | " | Preston | 3 | | 3 | | | | 3 |
| Squires Creek (Moats) Refuse and Portals | " | Preston | 3 | 1 | | | | | 1 |
| Tallmansville (Anderson) Portals | " | Upshur | 2 | | | | | | |
| Total sites | | 20 | | | | | | | |
| Total gates | | | 59 | | | | | | |
| Total bats | | | | 6 | 11 | 17 | 19 | 1 | 54 |

Cautions

- Pre post construction data are the only things directly comparable
- Not a study per se, just a collection of surveys
- Time of year diffs. We may have been too early. Our dates were 9/17-9/20 and 10/1-10/4

Thanks

- OSM Charleston Field Office
- Twanda Dennis, OSM Contracting, Pittsburgh
- WVDEP: Rob Rice, Travis Parsons, Malcolm Allison
- Sanders Environmental

Questions?