

2013 Indiana Mobile Acoustic Bat Survey Program



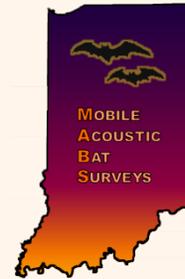
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SUMMARY

- 238 surveys in 74 counties provided complete acoustic data on summer resident bat populations in Indiana.
- Mean bat calls per detector-hour declined from 33.3 in 2012 to 22.2 in 2013.
- Calls identified as hoary bats and the big brown/silver-haired group comprised a greater percentage of all bat calls in 2013 compared to 2012, whereas those identified as eastern pipistrelles and eastern red bats comprised a smaller percentage. The percentage of calls identified as evening bats and *Myotis* spp. were essentially unchanged.
- Of the 57 counties surveyed in 2012 and 2013, 48 (84.2%) had a decrease in mean bat calls per detector-hour.
- Updated software and analysis methods will be used to compile a comprehensive report after surveying in 2014.

INTRODUCTION

Twelve of the 13 bat species identified from Indiana are listed as endangered or special concern by the Indiana Department of Natural Resources (IDNR). Indiana's Mobile Acoustic Bat Survey Program monitors trends in species abundance and location to aid conservation efforts, increase public awareness, assist in research, and identify critical matters of concern. With serious threats to bats from White-nose Syndrome (WNS), wind farm development, and habitat loss, and given the biologic, economic, and intrinsic value of bats, it is prudent to monitor Indiana's summer resident bat populations.

The IDNR conducted pilot mobile acoustic surveys in summer 2011 and has since completed statewide surveying in 2012 and 2013. This report summarizes the results from mobile acoustic bat surveys conducted in Indiana in 2013. Updated software and analysis methods will be used to compile a comprehensive report upon the completion of field work in 2014.

RESULTS

In 2013, 269 surveys were conducted by seven IDNR staff members and 21 contracted surveyors in 74 of Indiana's 92 counties. Of those, 238 (88.5%) provided complete acoustic data (Figure 1). Thirty-one surveys returned incomplete acoustic data due to equipment problems ($n=18$), inclement weather ($n=11$), and road closures or

wrong turns ($n=2$). The 238 completed surveys yielded 42,483 acoustic files, of which 9,370 (22.1%) contained echolocation calls of bats. The statewide mean was 22.2 bat calls per detector-hour, and county means ranged from 5.7 in White County to 46.2 in Crawford County (Figure 2).

Analysis labeled 2,817 files (30.0%) unclassified because they consisted of poor-quality sequences with few or fragmented pulses that could not be confidently identified to species or species group. The remaining files were classified as big brown/silver-haired (16.7%), hoary (11.5%), evening (11.5%), eastern red (10.5%), *Myotis* spp. (10.4%), and eastern pipistrelle (9.4%). The big brown/

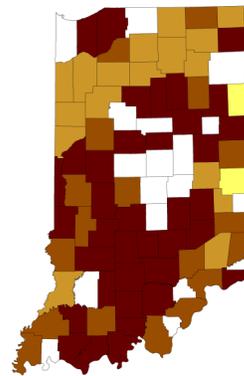


Figure 1: Total number of surveys returning complete acoustic data per county, 2013. Maroon = 4, dark brown = 3, light brown = 2, yellow = 1, white = not surveyed.

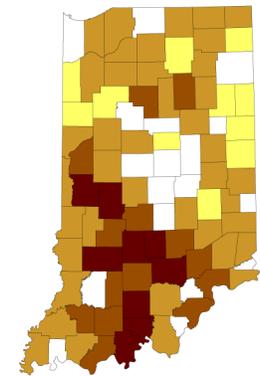


Figure 2: Mean number of bat calls per detector-hour, 2013. Maroon: 37.5–50, dark brown: 25–37.5, light brown: 12.5–25, yellow: 0–12.5, white: not surveyed.

silver-haired group was most abundant in four natural regions (Black Swamp Central Till Plain, Grand Prairie, Northern Lakes, and Northwestern Morainal). Most abundant in one natural region each were eastern red bats (Bluegrass), *Myotis* spp. (Highland Rim Shawnee Hills), and eastern pipistrelles (Southern Bottomlands Southern Lowlands) (Figure 3).

In general, there were fewer bat calls detected in 2013 than in 2012 (Figure 4), but the highest frequency of calls per survey remained in the 26-50 range (Figure 5) and the mean number of calls per survey again increased later in the surveying window (Figure 6). Compared with 2012 results, hoary bats and the big brown/silver-haired group comprised a larger percentage of the total in 2013, evening bats and the *Myotis* spp. group remained essentially unchanged, and eastern pipistrelles and eastern red bats comprised a smaller percentage of the total (Figure 7). Of the 57 counties surveyed in both years, only nine (15.8%) had a net increase in mean bat calls per detector-hour, while the remaining 48 counties decreased. The greatest increase in mean bat calls per detector-hour was 4.5 in Adams County and the greatest decrease was -32.6 in Owen County (Table 1).

In 2012, eastern pipistrelles were the most abundant species or species group in three of the seven natural regions, whereas in 2013 they were most abundant in only the Bluegrass natural region. The big brown/silver-haired group was most abundant in three natural regions in 2012, and it was most abundant in four natural regions in 2013. As a percentage of the total (excluding unclassified calls), hoary bats and the big brown/silver-haired group increased in five of seven natural regions, evening bats and the *Myotis* spp. group increased in four of seven natural regions, eastern red bats decreased in six of seven natural regions, and eastern pipistrelles decreased in all seven natural regions (Figure 8).

ACKNOWLEDGEMENTS

We thank our surveyors for their commitment to this work and all their late nights on the road. Thanks also to the staff at Titley Scientific for their technical advice and assistance, and to the local, state, and federal properties that hosted regional training sessions. The 2013 Indiana mobile acoustic bat survey program was supported by the State Wildlife Grant Program (T03S07), Section 6 of the Endangered Species Grant Program (E13R1), and public contributions to the Indiana Nongame Fund.

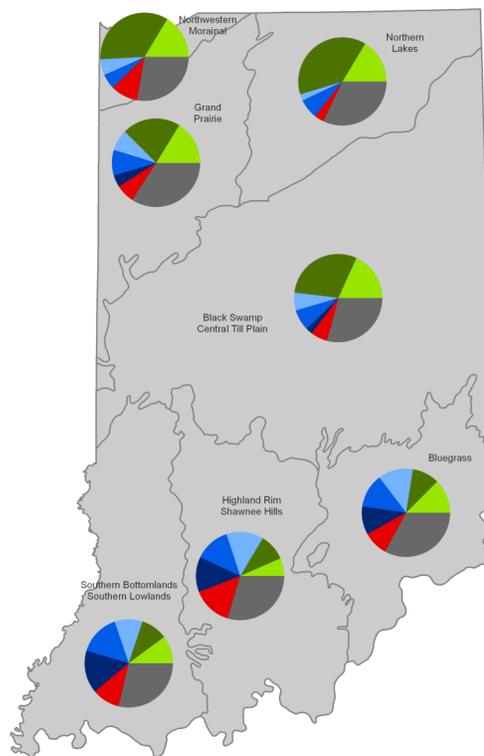


Figure 3: Percentage species representation by natural region areas, 2013. Light green = hoary, dark green = big brown/silver-haired, light blue = eastern red, blue = evening, dark blue = eastern pipistrelle, red = *Myotis* spp., grey = unclassified.

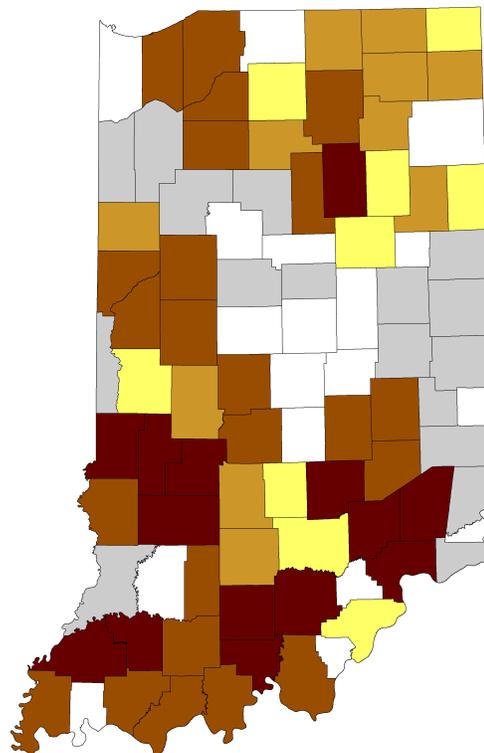


Figure 4: Net change in mean number of bat calls per detector-hour, 2012 to 2013. Maroon: -35 to -15, dark brown: -15 to -5, light brown: -5 to 0, yellow: 0 to 5, grey: not surveyed in 2012, white: not surveyed.

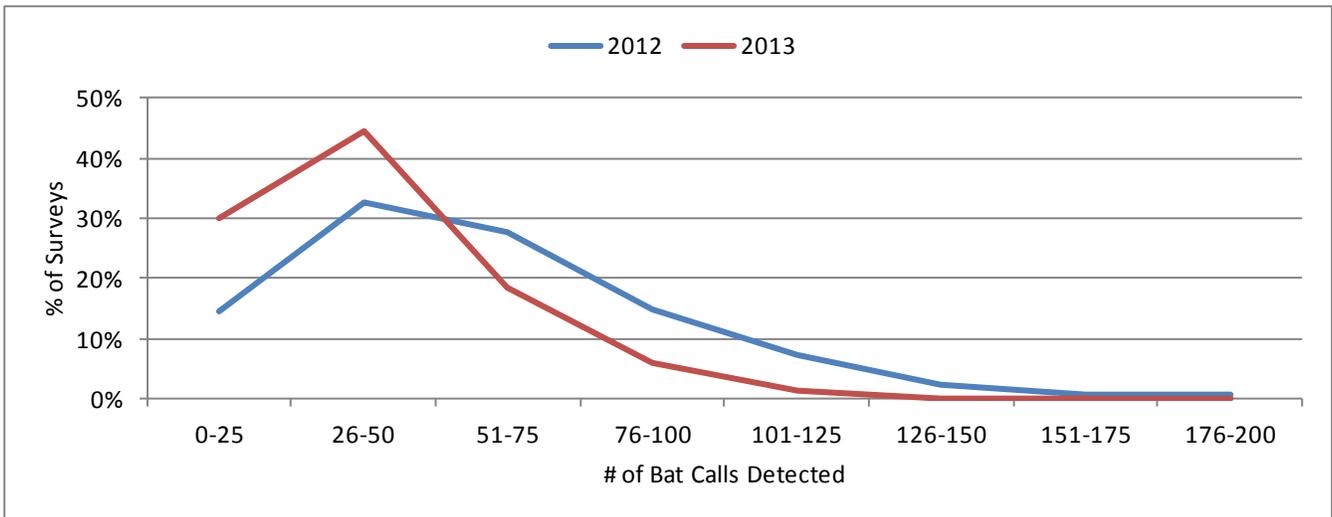


Figure 5: Number of bat calls detected, 2012 and 2013.

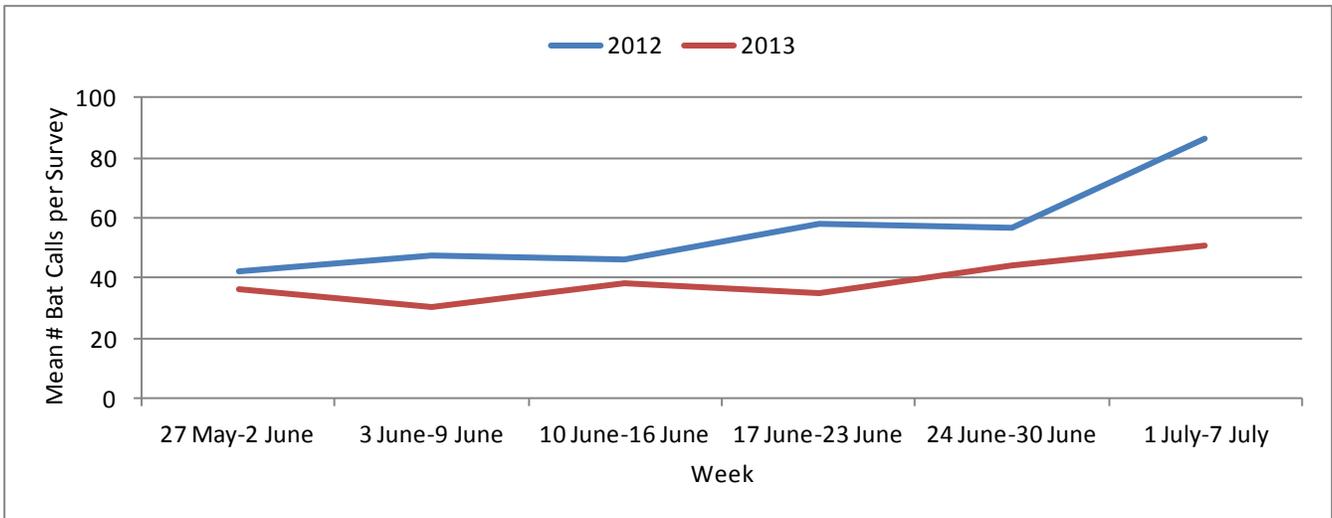


Figure 6: Mean number of bat calls per survey by week, 2012 and 2013.

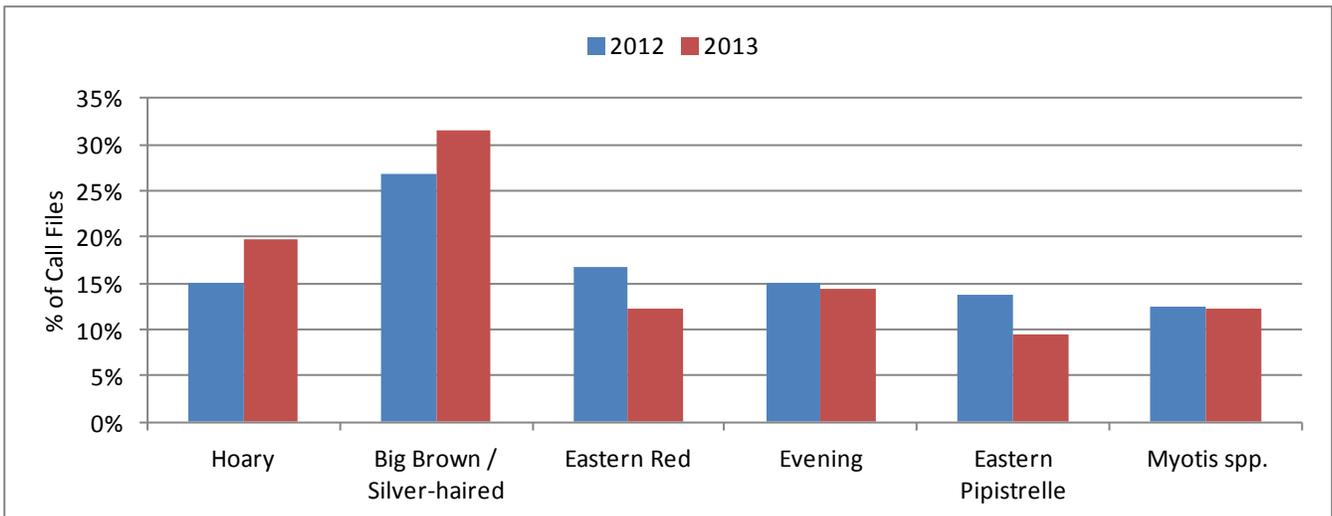


Figure 7: Percent of call files per species, 2012 and 2013 (excluding unclassified calls).

Table 1: Results summarized by county for mobile acoustic bat surveys conducted in Indiana, May–July 2013, with a comparison of mean calls per detector-hour to 2012 results.

County	2013						2012	Net Change (2012 to 2013)
	No. Surveys Completed	Total Miles	Total Detector-hours	Mean Speed (mph)	Total Calls Detected	Mean Calls per Detector-hour	Mean Calls per Detector-hour	
Adams	1	26.8	1.68	15.9	16	9.5	5.0	4.5
Bartholomew	4	103.9	6.20	16.8	185	29.8	59.7	-29.8
Benton	2	55.6	3.22	17.3	23	7.2	8.8	-1.6
Brown	4	109.2	6.92	15.8	315	45.5	44.6	0.9
Cass	4	106.1	6.82	15.6	211	31.0	Not Surveyed	-
Clark	3	82.8	5.12	16.2	146	28.5	28.2	0.3
Clay	3	82.6	5.23	15.8	106	20.3	36.3	-16.0
Clinton	4	114.4	7.33	15.6	112	15.3	Not Surveyed	-
Crawford	4	104.1	6.60	15.8	305	46.2	67.9	-21.7
Dearborn	3	84.2	5.23	16.2	105	20.1	Not Surveyed	-
Decatur	4	107.0	7.15	15.0	147	20.6	30.9	-10.3
Dekalb	4	106.3	7.05	15.1	85	12.1	13.1	-1.1
Delaware	4	109.0	7.28	15.0	136	18.7	Not Surveyed	-
Dubois	3	77.9	4.73	16.5	168	35.5	44.0	-8.5
Elkhart	2	54.3	3.63	14.9	57	15.7	18.9	-3.3
Fayette	2	57.5	3.48	16.5	70	20.1	Not Surveyed	-
Fountain	4	108.7	7.27	15.0	215	29.6	35.8	-6.2
Franklin	3	79.9	4.77	16.8	109	22.9	Not Surveyed	-
Fulton	2	54.3	3.30	16.4	61	18.5	23.5	-5.0
Gibson	3	76.9	4.58	16.8	114	24.9	49.7	-24.8
Grant	4	102.0	6.60	15.5	93	14.1	10.1	4.0
Greene	4	112.5	7.05	16.0	280	39.7	62.5	-22.8
Harrison	3	84.9	5.82	14.6	123	21.1	32.2	-11.1
Hendricks	3	83.5	5.23	16.0	76	14.5	23.9	-9.4
Henry	2	63.0	3.85	16.4	80	20.8	Not Surveyed	-
Huntington	3	81.0	5.55	14.6	81	14.6	12.4	2.2
Jackson	4	101.3	6.25	16.2	277	44.3	43.9	0.4
Jasper	2	53.1	3.05	17.4	51	16.7	Not Surveyed	-
Jay	4	114.4	7.72	14.8	66	8.6	Not Surveyed	-
Jefferson	3	82.5	5.13	16.1	152	29.6	46.1	-16.5
Jennings	3	79.7	4.97	16.1	140	28.2	47.4	-19.3
Knox	2	52.1	3.25	16.0	43	13.2	Not Surveyed	-
Kosciusko	2	57.8	3.90	14.8	48	12.3	18.5	-6.2
Lagrange	3	78.5	4.77	16.5	111	23.3	25.8	-2.5
LaPorte	4	102.6	6.03	17.0	136	22.5	30.6	-8.1
Lawrence	4	112.3	7.10	15.8	221	31.1	33.7	-2.6
Marshall	2	50.7	3.17	16.0	57	18.0	13.7	4.3
Martin	4	115.1	7.23	15.9	270	37.3	49.9	-12.6
Miami	4	112.6	7.12	15.8	96	13.5	25.8	-12.3
Monroe	4	100.8	6.28	16.0	243	38.7	40.5	-1.8
Montgomery	4	103.4	6.65	15.6	112	16.8	23.8	-6.9
Morgan	4	108.5	6.67	16.3	207	31.1	37.2	-6.1
Newton	2	57.5	3.33	17.3	29	8.7	Not Surveyed	-
Noble	2	52.7	3.15	16.7	63	20.0	23.7	-3.7
Orange	4	103.3	6.23	16.6	234	37.5	65.9	-28.4
Owen	4	107.8	6.83	15.8	180	26.3	58.9	-32.6
Parke	3	87.2	5.13	17.0	222	43.2	41.6	1.7
Perry	4	116.2	7.00	16.6	300	42.9	49.6	-6.7
Pike	4	113.2	6.87	16.5	180	26.2	54.0	-27.8
Porter	4	100.6	6.17	16.4	104	16.9	22.7	-5.8
Posey	3	79.1	4.90	16.2	111	22.7	36.1	-13.4
Pulaski	2	50.9	3.08	16.5	51	16.5	22.2	-5.7
Putnam	4	114.7	6.67	17.2	263	39.5	43.4	-3.9
Randolph	3	81.3	5.37	15.2	61	11.4	Not Surveyed	-
Ripley	2	58.2	3.32	17.6	45	13.6	32.4	-18.8
Rush	4	110.5	7.22	15.3	56	7.8	14.3	-6.5

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County	2013						2012	Net Change (2012 to 2013)
	No. Surveys Completed	Total Miles	Total Detector-hours	Mean Speed (mph)	Total Calls Detected	Mean Calls per Detector-hour	Mean Calls per Detector-hour	
Shelby	4	113.5	7.53	15.1	138	18.3	25.1	-6.8
Spencer	4	104.3	6.90	15.1	176	25.5	36.3	-10.8
Starke	3	85.7	5.17	16.6	74	14.3	22.9	-8.6
Steuben	2	50.9	3.10	16.4	71	22.9	21.4	1.5
Sullivan	3	84.3	5.38	15.7	125	23.2	36.6	-13.4
Switzerland	4	110.6	6.72	16.5	157	23.4	Not Surveyed	-
Tippecanoe	3	85.5	5.37	15.9	68	12.7	20.0	-7.3
Tipton	4	103.8	6.53	15.9	38	5.8	Not Surveyed	-
Vermillion	4	104.8	6.18	17.0	139	22.5	Not Surveyed	-
Vigo	4	107.6	7.05	15.3	169	24.0	50.1	-26.2
Wabash	4	113.3	7.20	15.7	183	25.4	47.1	-21.6
Warren	2	53.3	3.32	16.1	80	24.1	37.8	-13.7
Warrick	4	109.5	6.70	16.3	105	15.7	25.4	-9.7
Washington	4	108.0	6.35	17.0	122	19.2	34.2	-15.0
Wayne	1	27.9	1.67	16.7	30	18.0	Not Surveyed	-
Wells	4	109.6	7.10	15.5	75	10.6	11.8	-1.3
White	2	55.7	3.35	16.6	19	5.7	Not Surveyed	-
Whitley	2	50.1	3.40	14.7	53	15.6	20.6	-5.0
Total	238	6465.3	405.27	-	9370	-	-	-
Mean	3.22	87.4	5.48	16.0	126.6	22.2	33.3	-9.5

	Southern Bottomlands Southern Lowlands	Highland Rim Shawnee Hills	Bluegrass	Black Swamp Central Till Plain	Grand Prairie	Northern Lakes	Northwestern Morainal
Hoary	Blue	Blue	Blue	Blue	Blue	Red	Red
Big Brown/Silver-haired	Red	Blue	Red	Blue	Blue	Blue	Blue
Evening	Blue	Blue	Blue	Red	Red	Blue	Red
<i>Myotis</i> spp.	Blue	Blue	Red	Red	Blue	Red	Blue
Eastern Red	Red	Blue	Red	Red	Red	Red	Red
Eastern Pipistrelle	Red	Red	Red	Red	Red	Red	Red

Figure 8: Species by natural region trends, 2012 to 2013. Blue = species or group increased as a percentage of the whole, red = species or group decreased as a percentage of the whole (excluding unclassified calls).

