



2017 Indiana Bat (*Myotis sodalis*) Population Status Update

- 2017 Range-wide Population: 530,705 bats occurring within 229 hibernacula in 17 states
- 3 Most Populous States: Missouri (217,884), Indiana (180,583) and Kentucky (58,155)
- Number of Hibernacula by Current Population Status:
 - “Extant” (≥1 *M. sodalis* documented within past 10 yrs.): 346
 - “Historic” (surveys conducted within past 10 yrs., but no *M. sodalis* observed): 96
 - “Uncertain” (old records exist, but site hasn’t been surveyed within past 10 yrs.): 96
- Total Number of Hibernacula with 1 or more *M. sodalis* ever recorded: 538
- States with most Hibernacula: KY (126), MO (90), TN (54), WV (39), AR (39) and IN (37)
- % Change in Range-wide Population in past 10 years (i.e., since arrival of WNS in NY): -20%
- States with ≥10% population decline over past 2 years: VT, WV, TN, OH, NJ, NY, VA & KY
- States with Largest Net Loss of Indiana Bats since 2007 (2017 pop. within parentheses):
 1. Indiana: -57,485 (180,583)
 2. New York: -40,086 (12,693)
 3. West Virginia: -13,669 (1,076)
 4. Kentucky: -13,011 (58,155)
 5. Tennessee: -6,333 (2,573)
 6. Ohio: -4,739 (2,890)
 7. Pennsylvania: -1,015 (23)

TABLE 1. Top 10 Largest Indiana Bat Hibernacula (out of 229) in 2017.

Hibernaculum Name	State	2017 Population Size	% of 2017 Range-wide Pop.
Sodalis Nature Preserve	MO	197,419	37%
Jug Hole	IN	68,681	13%
Wyandotte	IN	50,680	10%
Magazine Mine	IL	40,000	8%
Ray's	IN	31,503	6%
Bat (Carter Caves SRP)	KY	25,416	5%
Coon	IN	19,044	4%
Salt peter	KY	14,775	3%
Barton Hill Mine	NY	11,083	2%
Cookstove	MO	6,084	1%

TABLE 2. Percentage of 2017 Range-wide Population by Hibernaculum Priority Number.

Priority Number	# of Sites	2017 Population Size	% of 2017 Range-wide Pop.
P1A	16	464,686	87.6
P1B	11	4,012	0.8
P2A	36	53,058	10.0
P2B	22	649	0.1
P3	168	7,733	1.5
P4	285	567	0.1

P1A = recorded pop. ≥10,000 bats with ≥5,000 over past 10 yrs.; P1B = recorded pop. ≥10,000 bats with <5,000 over past 10 yrs.; P2A = recorded pop. ≥1,000 bats with ≥500 over past 10 yrs.; P2B = recorded pop. ≥1,000 bats with <500 over past 10 yrs.; P3 = recorded pop. ≥50 bats; P4 = recorded pop. <50 bats.



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TABLE 3. 2017 Population Estimates for the Indiana Bat (*Myotis sodalis*) by USFWS Region

Estimates are primarily based on winter surveys conducted in January and February of 2017 at known Priority 1 & 2 hibernacula throughout the species' range. Additional data from Priority 3 and 4 hibernacula were included when available.

NOTE: The USFWS considers these population estimates to be the best available data for this species. However, we also recognize that some of these data contain an undeterminable, but potentially significant and variable degree of error from one year to the next. Bat population estimation error is attributable to multiple factors including variable detectability of bats roosting within different hibernacula settings, some unknown number of bats using unknown/undocumented winter roost sites, and biologists using somewhat different survey techniques in different states. Bat biologists began widely using digital photography as a primary winter survey technique in 2007 and 2009 because it improves overall accuracy and reduces surveyor-associated error over traditional techniques. The USFWS generally has increased confidence in the accuracy of the population estimates subsequent to the use of digital photography. The USFWS asks data users to be cognizant of the limitations of these population data and to take proper precautions when interpreting and presenting population trends through time.

USFWS Region	State	2009	2011	2013	2015	2017	% Change from 2015	% of 2017 Total
Region 2	Oklahoma	0	13	5	5	5	0.0%	0.0%
Region 3	Indiana	213,244	225,477	226,572	185,720	180,583	-2.8%	34.0%
	Missouri*	211,107	212,862	214,255	215,911	217,884	0.9%	41.1%
	Illinois	53,351	57,212	58,840	53,940	52,354	-2.9%	9.9%
	Ohio	9,261	9,870	9,259	4,809	2,890	-39.9%	0.5%
	Michigan	20	20	20	20	20	0.0%	0.0%
	Total	486,983	505,441	508,946	460,400	453,731	-1.4%	85.5%
Region 4	Kentucky	57,319	70,626	62,018	64,571	58,155	-9.9%	11.0%
	Tennessee	12,715	12,887	15,569	4,952	2,573	-48.0%	0.5%
	Arkansas	1,480	1,206	856	1,398	1,722	23.2%	0.3%
	Alabama	253	261	247	90	85	-5.6%	0.0%
	North Carolina	1	1	1	0	0	0.0%	0.0%
	Georgia	0	0	0	0	1	-	-
Total	71,768	84,981	78,691	71,011	62,536	-11.9%	11.8%	
Region 5	New York	33,172	15,654	17,772	15,564	12,693	-18.4%	2.4%
	West Virginia	17,965	20,296	3,845	2,373	1,076	-54.7%	0.2%
	Virginia	731	863	632	601	495	-17.6%	0.1%
	New Jersey	619	409	448	193	127	-34.2%	0.0%
	Pennsylvania	1,035	516	120	24	23	-4.2%	0.0%
	Vermont	64	61	53	53	19	-64.2%	0.0%
	Total	53,586	37,799	22,870	18,808	14,433	-23.3%	2.7%
Range-wide Total:		612,337	628,234	610,512	550,224	530,705	-3.5%	100.0%
2-yr. Net Change:		15,897	-17,722	-60,288	-19,519			
2-yr. % Change:		2.6%	-2.8%	-9.9%	-3.5%			

* A previously unknown Indiana bat hibernaculum was discovered in Missouri in 2012. This "new" Priority 1 site contained a minimum of 123,000 bats when a partial survey was first conducted in January 2013 and over 197,000 when first completely surveyed in January 2017. Based upon first-hand accounts of very large clusters/numbers of unidentified hibernating bats at this site for several decades prior to its discovery by bat biologists, the Service decided to add the same number of bats as was found in 2017 to each previous biennium total for MO through 1981. Incorporating the newly discovered bat numbers in this manner, improved the accuracy of the Missouri, Ozark-Central Recovery Unit and range-wide population estimates over those reported in previous years and avoided artificial spikes in population trends in 2013-2017.

Compiled by Andy King (andrew_king@fws.gov), U.S. Fish and Wildlife Service, Indiana Ecological Services Field Office from data gathered from bat biologists throughout the species' range.

For additional information regarding the Indiana bat... <http://www.fws.gov/midwest/Endangered/mammals/inba/index.html>



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TABLE 4. 2017 Population Estimates for the Indiana Bat (*Myotis sodalis*) by Recovery Unit

Estimates are primarily based on winter surveys conducted in January and February of 2017 at known Priority 1 & 2 hibernacula throughout the species' range. Additional data from Priority 3 and 4 hibernacula were included when available.

NOTE: The USFWS considers these population estimates to be the best available data for this species. However, we also recognize that some of these data contain an undeterminable, but potentially significant and variable degree of error from one year to the next. Bat population estimation error is attributable to multiple factors including variable detectability of bats roosting within different hibernacula settings, some unknown number of bats using unknown/undocumented winter roost sites, and biologists using somewhat different survey techniques in different states. Bat biologists began widely using digital photography as a primary winter survey technique in 2007 and 2009 because it improves overall accuracy and reduces surveyor-associated error over traditional techniques. The USFWS generally has increased confidence in the accuracy of the population estimates subsequent to the use of digital photography. The USFWS asks data users to be cognizant of the limitations of these population data and to take proper precautions when interpreting and presenting population trends through time.

IBat Recovery Unit	State	2009	2011	2013	2015	2017	% Change from 2015	% of 2017 Total
Ozark-Central	Illinois	53,351	57,212	58,840	53,940	52,354	-2.9%	9.9%
	Missouri*	211,107	212,862	214,255	215,911	217,884	0.9%	41.1%
	Arkansas	1,480	1,206	856	1,398	1,722	23.2%	0.3%
	Oklahoma	0	13	5	5	5	0.0%	0.0%
	Total	265,938	271,293	273,956	271,254	271,965	0.3%	51.2%
Midwest	Indiana	213,244	225,477	226,572	185,720	180,583	-2.8%	34.0%
	Kentucky	57,319	70,626	62,018	64,571	58,155	-9.9%	11.0%
	Ohio	9,261	9,870	9,259	4,809	2,890	-39.9%	0.5%
	Tennessee	1,657	1,791	2,369	2,401	1,598	-33.4%	0.3%
	Alabama	253	261	247	90	85	-5.6%	0.0%
	SW Virginia	217	307	214	137	70	-48.9%	0.0%
	Michigan	20	20	20	20	20	0.0%	0.0%
	Georgia	0	0	0	0	1	-	-
Total	281,971	308,352	300,699	257,748	243,402	-5.6%	45.9%	
Appalachia	West Virginia	17,965	20,296	3,845	2,373	1,076	-54.7%	0.2%
	E. Tennessee	11,058	11,096	13,200	2,551	975	-61.8%	0.2%
	Pennsylvania	1,035	516	120	24	23	-4.2%	0.0%
	Virginia	514	556	418	464	425	-8.4%	0.1%
	North Carolina	1	1	1	0	0	-	-
	Total	30,573	32,465	17,584	5,412	2,499	-53.8%	0.5%
Northeast	New York	33,172	15,654	17,772	15,564	12,693	-18.4%	2.4%
	New Jersey	619	409	448	193	127	-34.2%	0.0%
	Vermont	64	61	53	53	19	-64.2%	0.0%
	Total	33,855	16,124	18,273	15,810	12,839	-18.8%	2.4%
Range-wide Total:		612,337	628,234	610,512	550,224	530,705	-3.5%	100.0%
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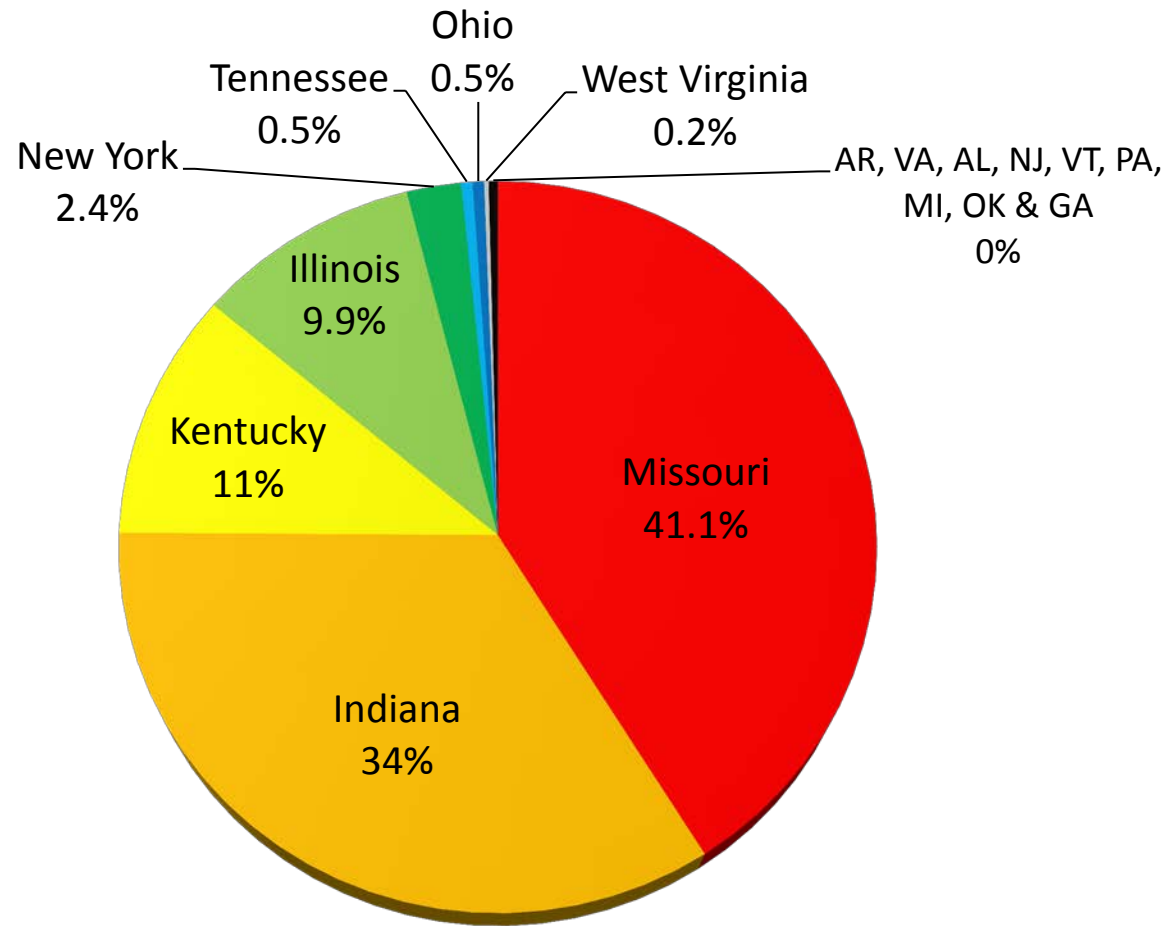


FIGURE 1. Percentage of the 2017 Indiana bat range-wide population (approx. 530,705 bats) hibernating within each state.

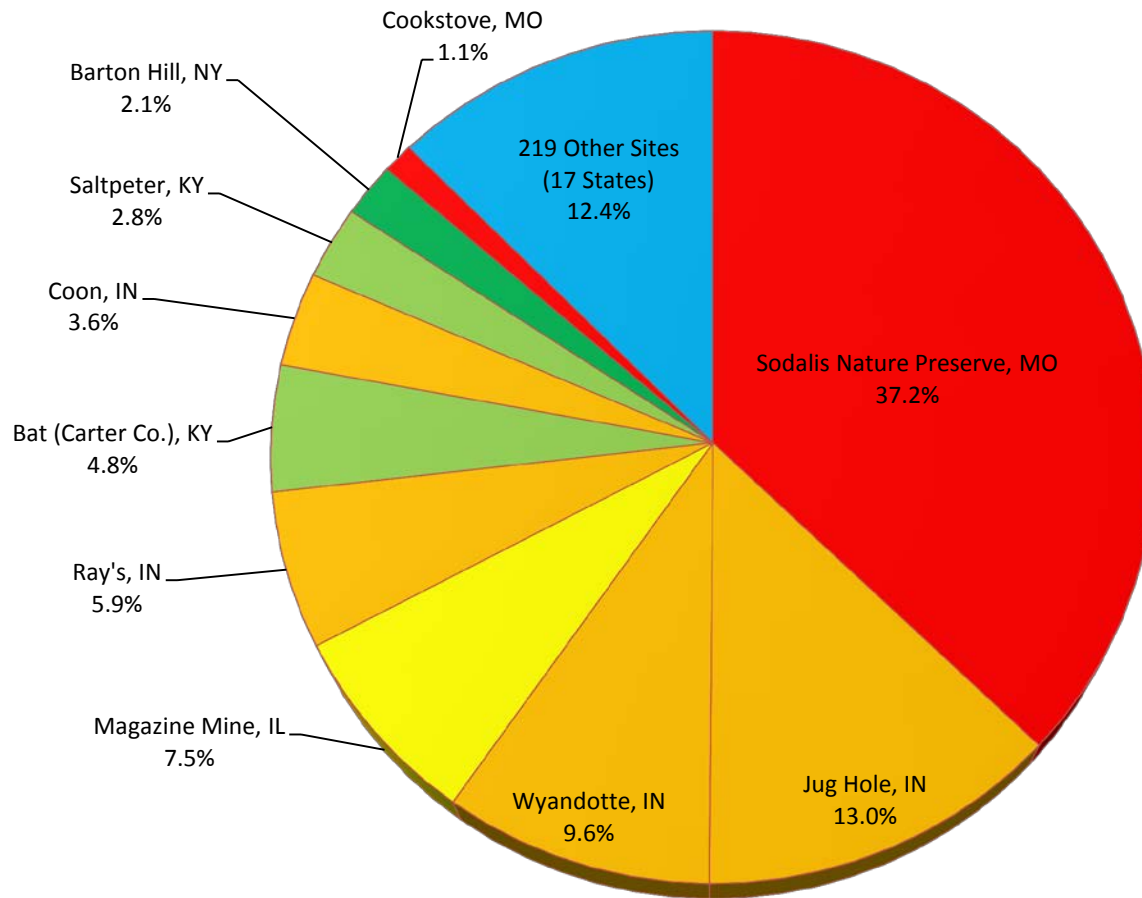


FIGURE 2. Percentage of the 2017 Indiana bat range-wide population (approx. 530,705 bats) hibernating within the ten largest hibernacula and others.

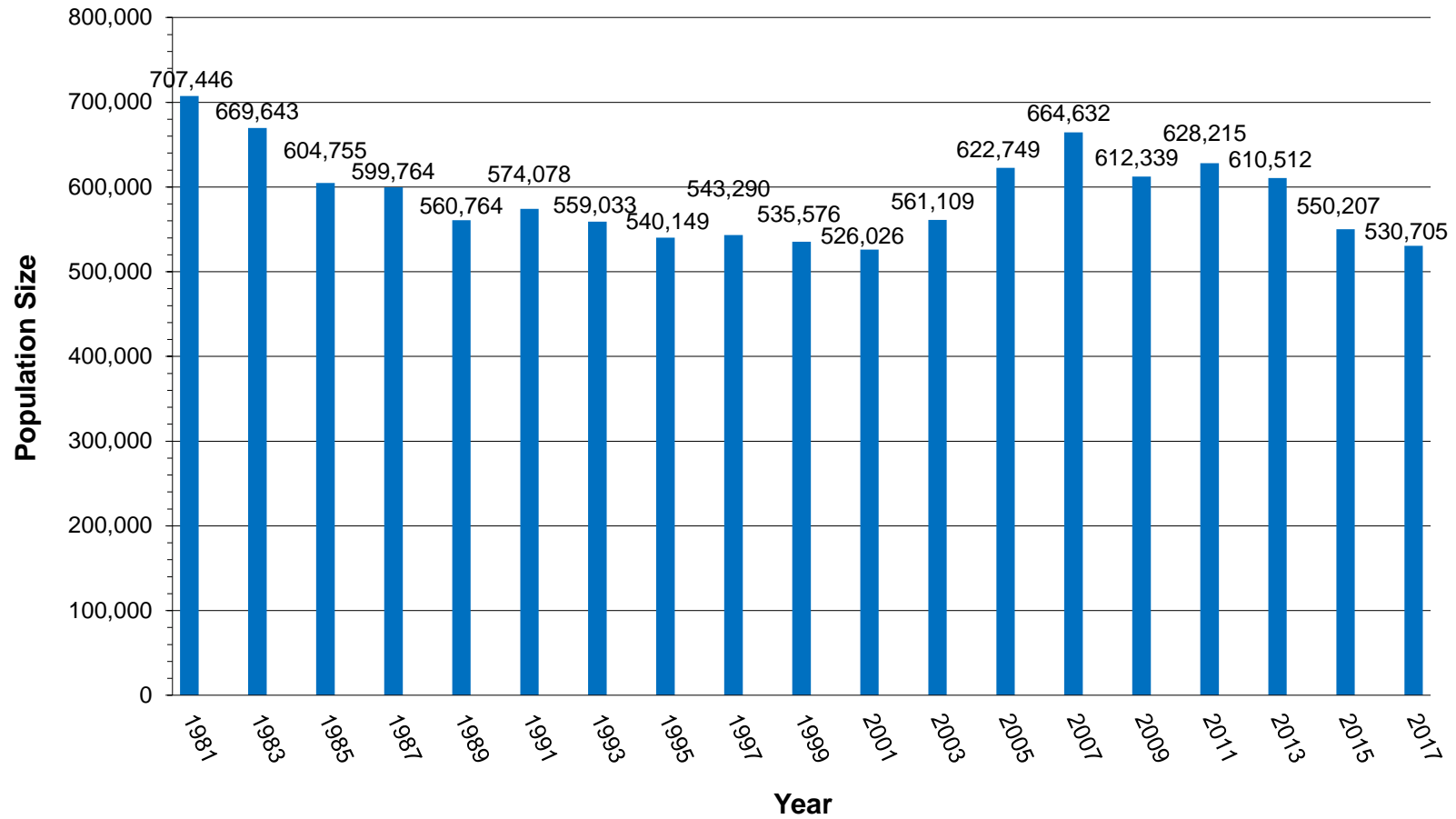


FIGURE 3. Indiana bat range-wide population estimates from 1981 to 2017.

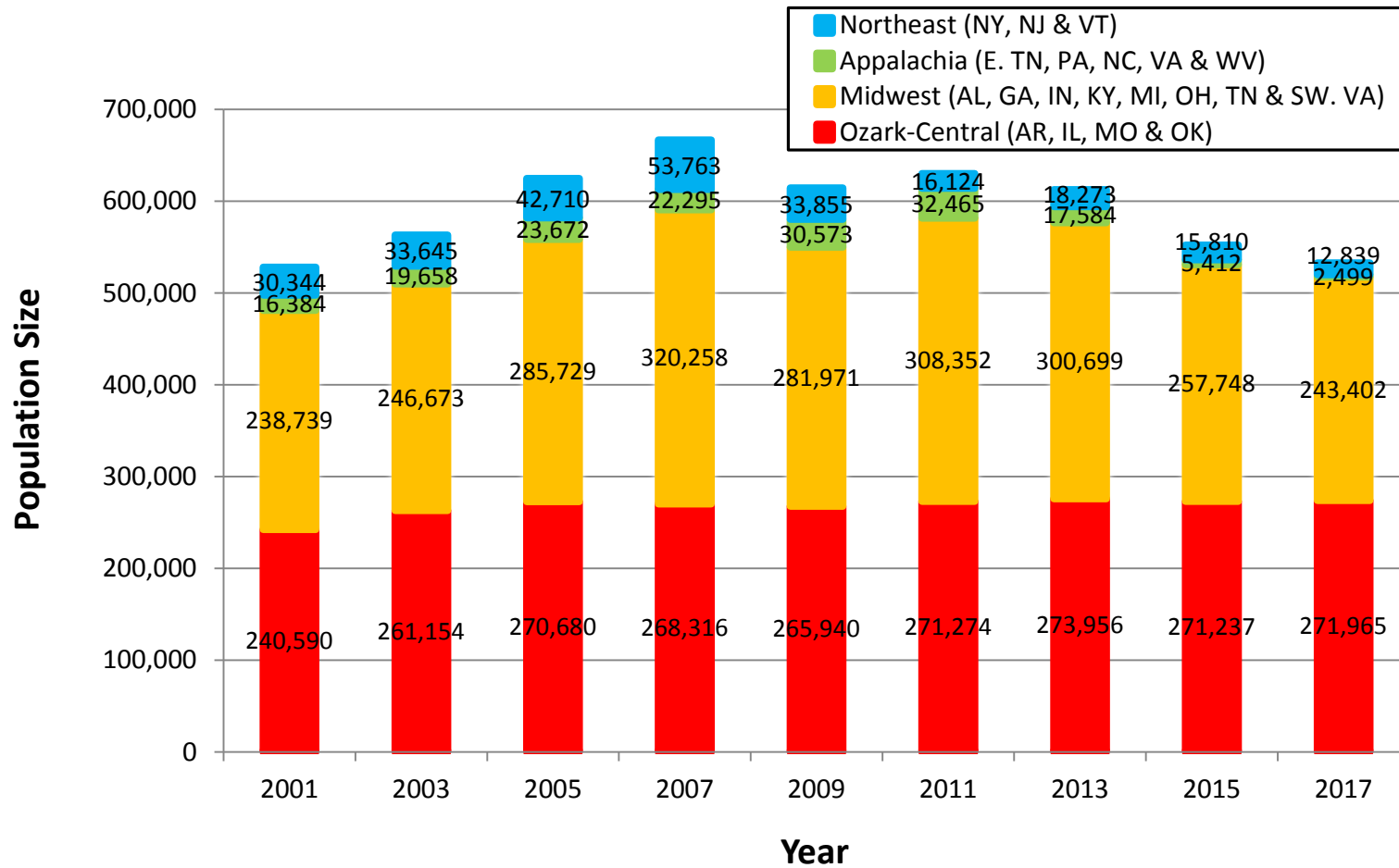


FIGURE 4. Indiana bat population estimates by recovery unit from 2001 to 2017.

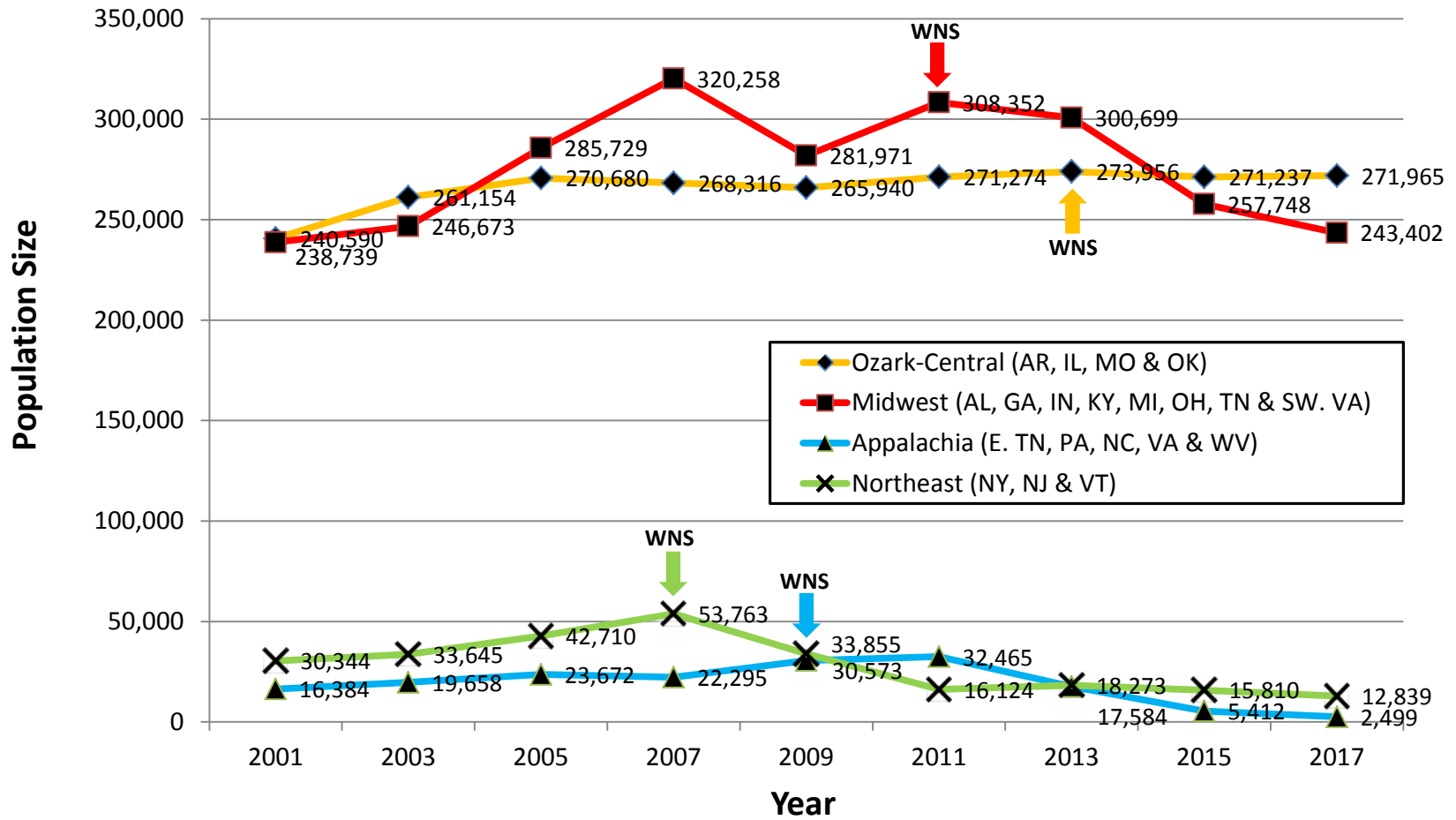


FIGURE 5. Indiana bat population estimates by recovery unit from 2001 to 2017. (color-coded arrows depict approx. time of arrival of white-nose syndrome within multiple MYSO sites in each RU).

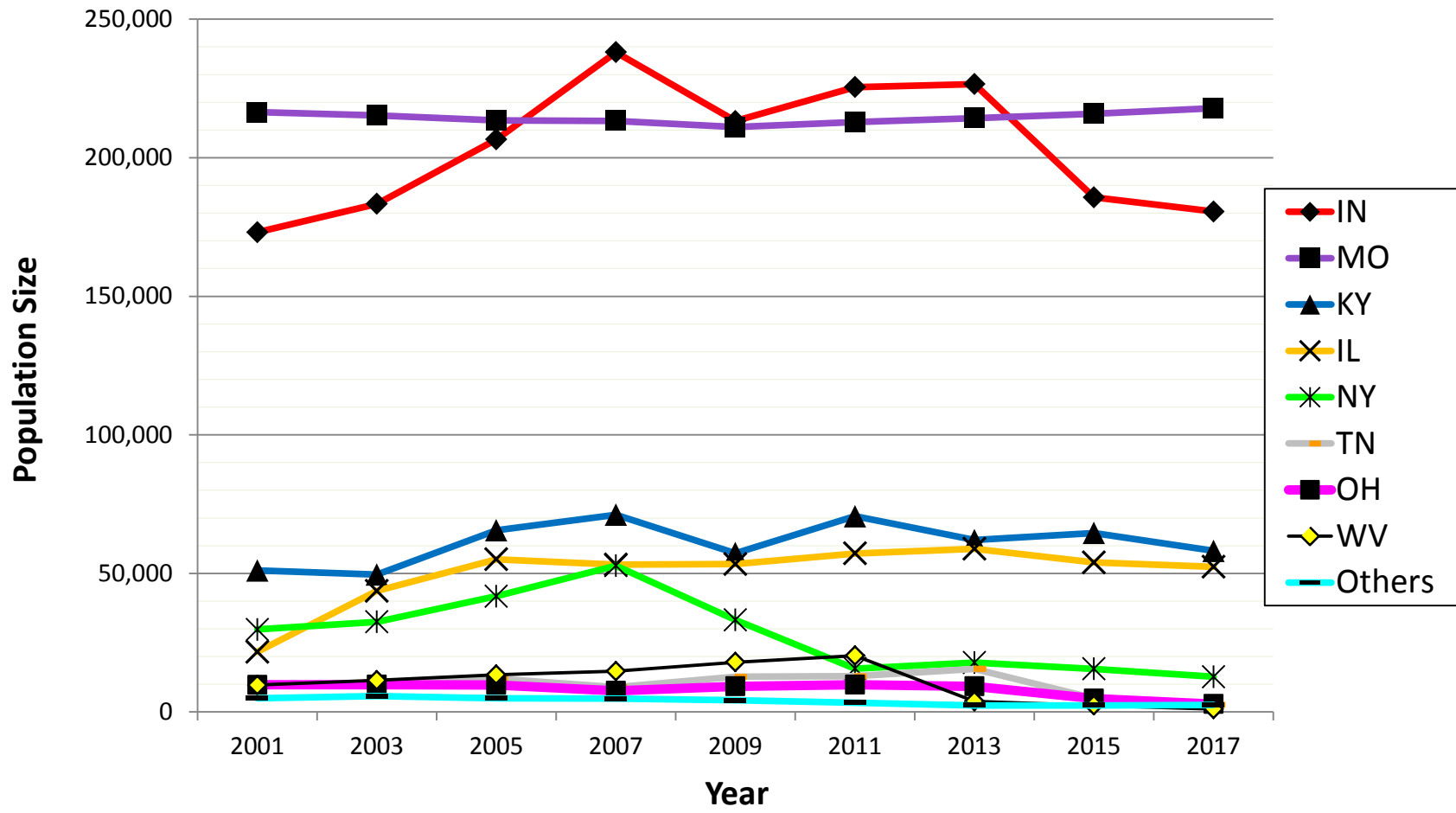


FIGURE 6. Indiana bat population estimates by state from 2001 to 2017.