



2019 Indiana Bat (*Myotis sodalis*) Population Status Update

- 2019 Range-wide Population: 537,297 bats occurring within 223 hibernacula in 16 states
- 3 Most Populous States: Missouri (195,157), Indiana (184,848) and Illinois (78,403)
- Number of Hibernacula by Current Population Status:
 - “Extant” (≥1 *M. sodalis* documented within past 10 yrs.): 344
 - “Historic” (surveys conducted within past 10 yrs., but no *M. sodalis* observed): 111
 - “Uncertain” (old records exist, but site hasn’t been surveyed within past 10 yrs.): 94
- Total Number of Hibernacula with 1 or more *M. sodalis* ever recorded: 549
- States with most Hibernacula: KY (126), MO (92), TN (54), WV (40), AR (39) and IN (37)
- % Change in Range-wide Population since 2007 (i.e., since arrival of WNS in NY): -19.2%
- States with Largest Net Loss of Indiana Bats since 2007 (% decline since 2007):
 1. Indiana: -53,220 (-22%)
 2. New York: -39,367 (-75%)
 3. Missouri: -18,157 (-9%)
 4. Kentucky: -15,220 (-21%)
 5. West Virginia: -14,125 (-96%)
 6. Tennessee: -6,509 (-73%)
 7. Ohio: -4,739 (-62%)
 8. Pennsylvania: -1,027 (-99%)

TABLE 1. Top 10 Largest Indiana Bat Hibernacula (out of 223) in 2019.

Hibernaculum Name	State	2019 Pop. Size	% of 2019 Overall Pop.	%Change From 2017 Pop.
1. Sodalis Nature Preserve	MO	180,801	34%	-8%
2. Jug Hole	IN	79,358	15%	+16%
3. Magazine Mine	IL	69,090	13%	0%
4. Wyandotte	IN	55,095	10%	+9%
5. Bat (Carter Caves SRP)	KY	26,237	5%	+3%
6. Ray's	IN	25,693	5%	-18%
7. Coon	IN	14,728	3%	-23%
8. Barton Hill Mine	NY	12,570	2%	+13%
9. Saltpeter	KY	11,806	2%	-20%
10. Brainerd	IL	5,900	1%	0%
All Others Combined (n=213)	Multiple	56,721	10%	-14%
Totals		537,297	100%	

TABLE 2. Percentage of 2019 Range-wide Population by Hibernaculum Priority Number.

Priority Number	# of Sites	2019 Population Size	% of 2019 Range-wide Pop.
P1A	14	477,017	88.8
P1B	13	7,771	1.4
P2A	33	44,843	8.3
P2B	26	1,004	0.2
P3	167	6,252	1.2
P4	296	410	0.1
Totals	549	537,297	100%

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. 2019 Population Estimates for the Indiana Bat (*Myotis sodalis*) by USFWS Region

Estimates are primarily based on winter surveys conducted in January and February of 2019 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	2011	2013	2015	2017	2019	% Change from 2017	% of 2019 Total
Region 2	Oklahoma	13	5	5	8	8	0.0%	0.0%
Region 3	Missouri	212,942	214,453	216,289	217,884	195,157	-10.4%	36.3%
	Indiana	225,477	226,572	185,720	180,611	184,848	2.3%	34.4%
	Illinois	57,212	66,817	69,924	81,143	78,403	-3.4%	14.6%
	Ohio	9,870	9,259	4,809	2,890	2,890	0.0%	0.5%
	Michigan	20	20	20	20	20	0.0%	0.0%
	Total		505,521	517,121	476,762	482,548	461,318	-4.4%
Region 4	Kentucky	70,626	62,018	64,599	58,057	55,946	-3.6%	10.4%
	Tennessee	12,887	15,569	4,952	2,567	2,397	-6.6%	0.4%
	Arkansas	1,206	856	1,398	1,722	2,749	59.6%	0.5%
	Alabama	261	247	90	85	90	5.9%	0.0%
	North Carolina	1	1	0	0	0	0.0%	0.0%
	Georgia	0	0	0	1	0	-	-
	Total		84,981	78,691	71,039	62,432	61,182	-2.0%
Region 5	New York	15,654	17,772	15,564	12,693	13,412	5.7%	2.5%
	West Virginia	20,296	3,845	2,373	1,076	620	-42.4%	0.1%
	Virginia	863	632	601	495	648	30.9%	0.1%
	New Jersey	409	448	193	118	79	-33.1%	0.0%
	Pennsylvania	516	120	24	23	11	-52.2%	0.0%
	Vermont	61	53	53	19	19	0.0%	0.0%
	Total		37,799	22,870	18,808	14,424	14,789	2.5%
Range-wide Total:		628,314	618,687	566,614	559,412	537,297	-4.0%	100.0%

2-yr. Net Change:	-9,627	-52,073	-7,202	-22,115
2-yr. % Change:	-1.5%	-8.4%	-1.3%	-4.0%

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. 2019 Population Estimates for the Indiana Bat (*Myotis sodalis*) by Recovery Unit

Estimates are primarily based on winter surveys conducted in January and February of 2019 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	2011	2013	2015	2017	2019	% Change from 2017	% of 2019 Total
Ozark-Central	Missouri	212,942	214,453	216,289	217,884	195,157	-10.4%	36.3%
	Illinois	57,212	66,817	69,924	81,143	78,403	-3.4%	14.6%
	Arkansas	1,206	856	1,398	1,722	2,749	59.6%	0.5%
	Oklahoma	13	5	5	8	8	0.0%	0.0%
	Total	271,373	282,131	287,616	300,757	276,317	-8.1%	51.4%
Midwest	Indiana	225,477	226,572	185,720	180,611	184,848	2.3%	34.4%
	Kentucky	70,626	62,018	64,599	58,057	55,946	-3.6%	10.4%
	Ohio	9,870	9,259	4,809	2,890	2,890	0.0%	0.5%
	Tennessee	1,791	2,369	2,401	1,587	1,561	-1.6%	0.3%
	Alabama	261	247	90	85	90	5.9%	0.0%
	SW Virginia	307	214	137	70	119	70.0%	0.0%
	Michigan	20	20	20	20	20	0.0%	0.0%
	Georgia	0	0	0	1	0	-	-
Total	308,352	300,699	257,776	243,321	245,474	0.9%	45.7%	
Appalachia	West Virginia	20,296	3,845	2,373	1,076	620	-42.4%	0.1%
	E. Tennessee	11,096	13,200	2,551	980	836	-14.7%	0.2%
	Pennsylvania	516	120	24	23	11	-52.2%	0.0%
	Virginia	556	418	464	425	529	24.5%	0.1%
	North Carolina	1	1	0	0	0	-	-
	Total	32,465	17,584	5,412	2,504	1,996	-20.3%	0.4%
Northeast	New York	15,654	17,772	15,564	12,693	13,412	5.7%	2.5%
	New Jersey	409	448	193	118	79	-33.1%	0.0%
	Vermont	61	53	53	19	19	0.0%	0.0%
	Total	16,124	18,273	15,810	12,830	13,510	5.3%	2.5%
Range-wide Total:		628,314	618,687	566,614	559,412	537,297	-4.0%	100.0%

2-yr. Net Change:	-9,627	-52,073	-7,202	-22,115
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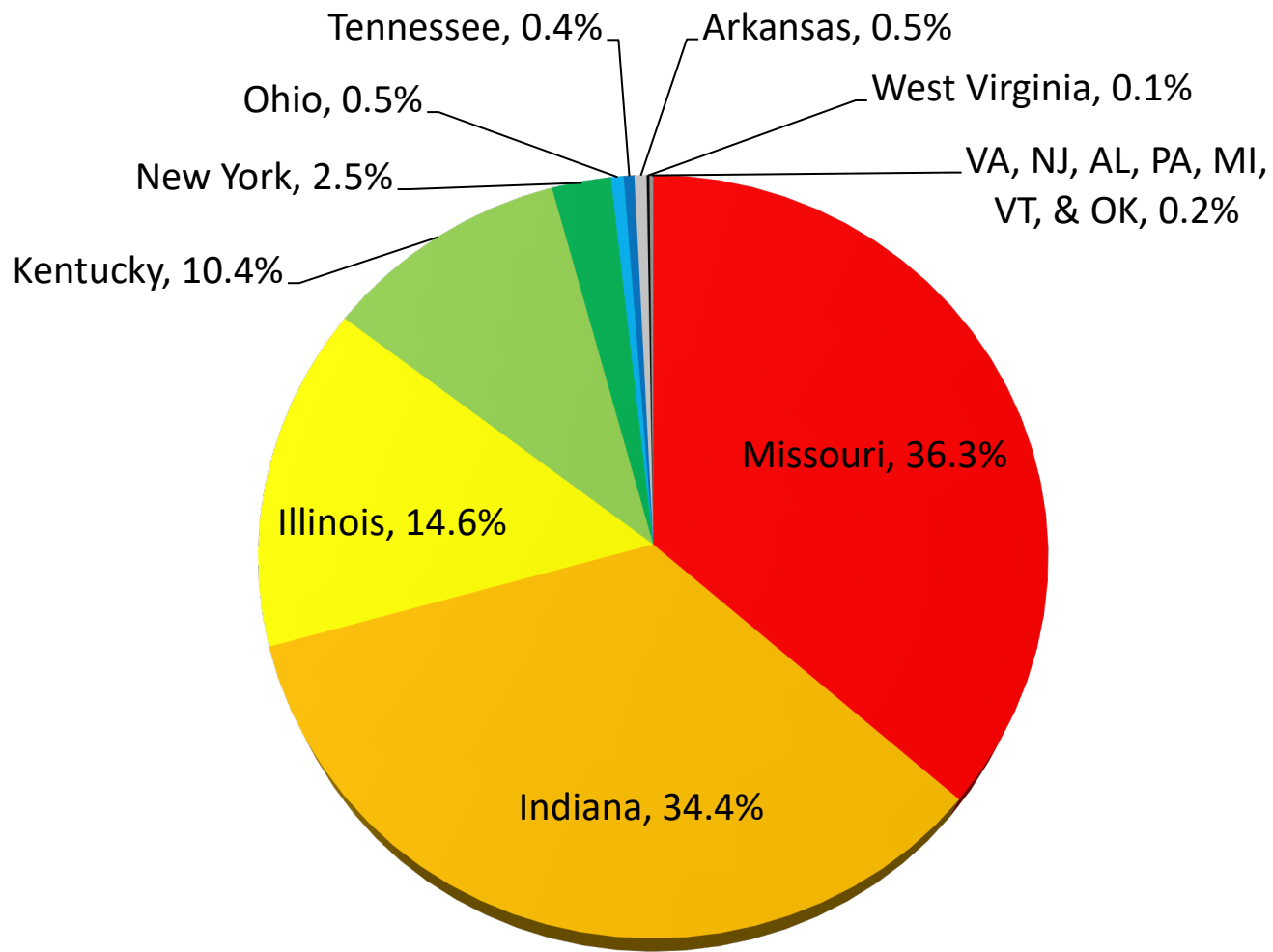


FIGURE 1. Percentage of the 2019 Indiana bat range-wide population (approx. 537,297 bats) hibernating within each state.

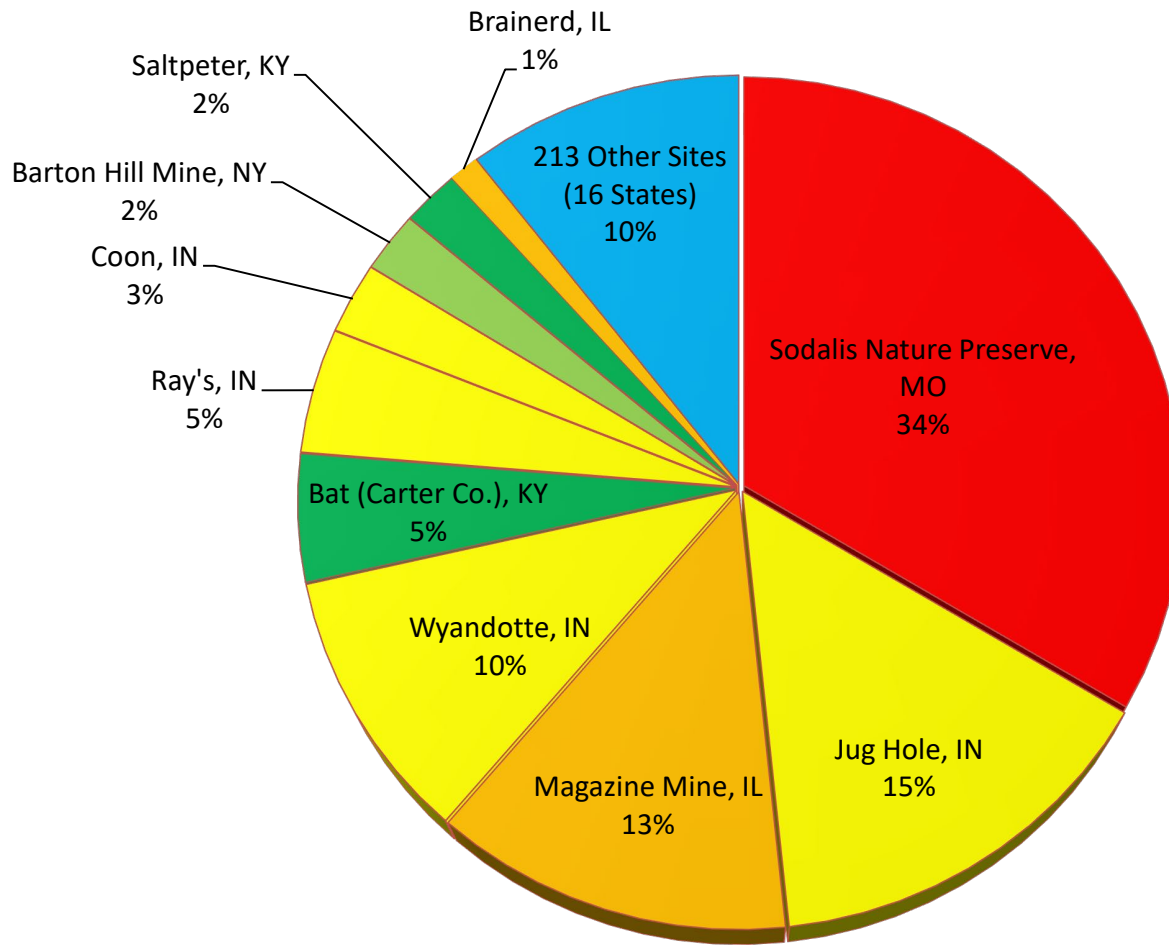


FIGURE 2. Percentage of the 2019 Indiana bat range-wide population (approx. 537,297 bats) hibernating within the ten largest hibernacula (color-coded by state).

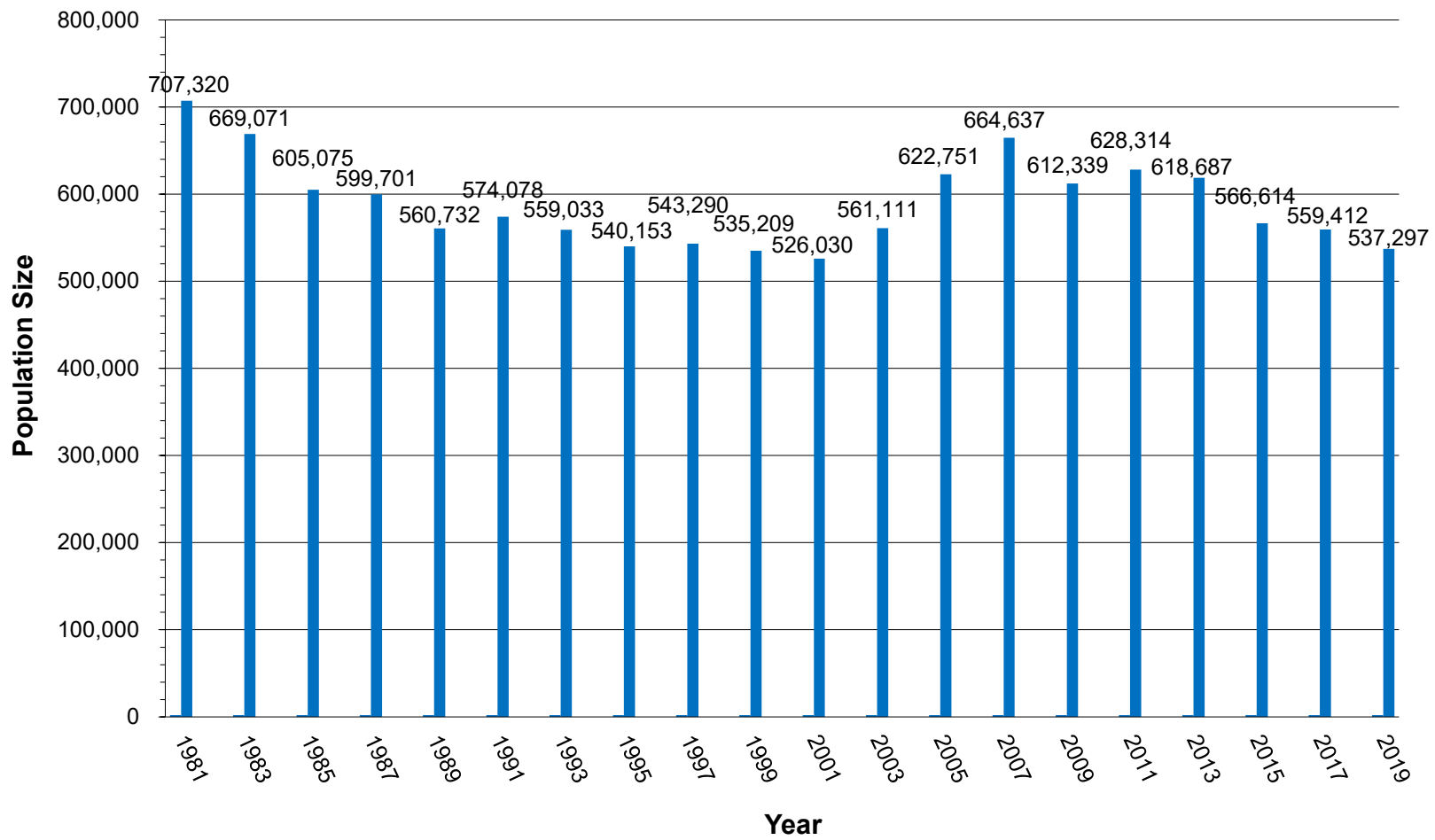


FIGURE 3. Indiana bat range-wide population estimates from 1981 to 2019.

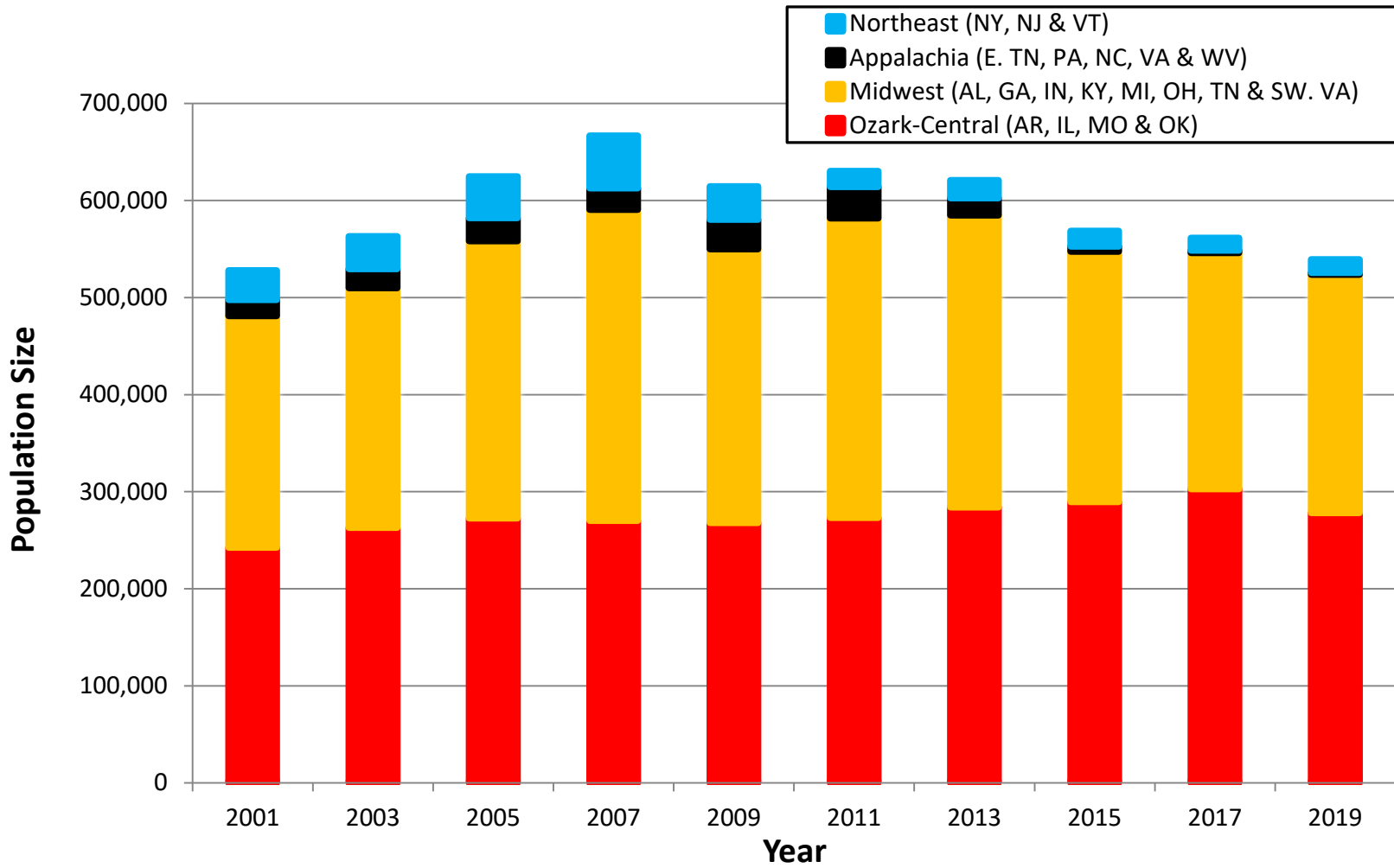


FIGURE 4. Indiana bat population estimates by recovery unit from 2001 to 2019.

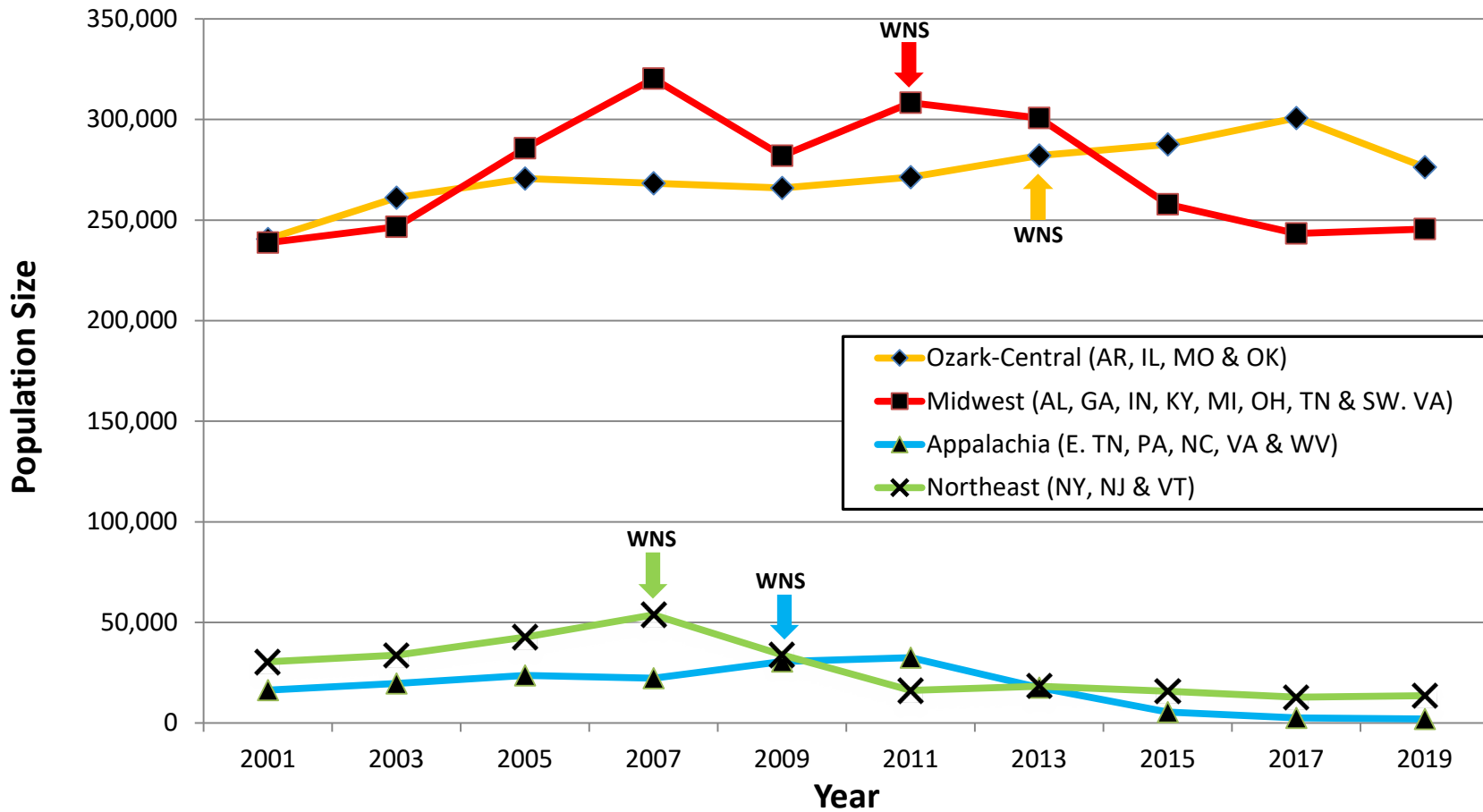


FIGURE 5. Indiana bat population estimates by recovery unit from 2001 to 2019. (color-coded arrows depict approx. time of arrival of white-nose syndrome within multiple MYSO sites in each RU).

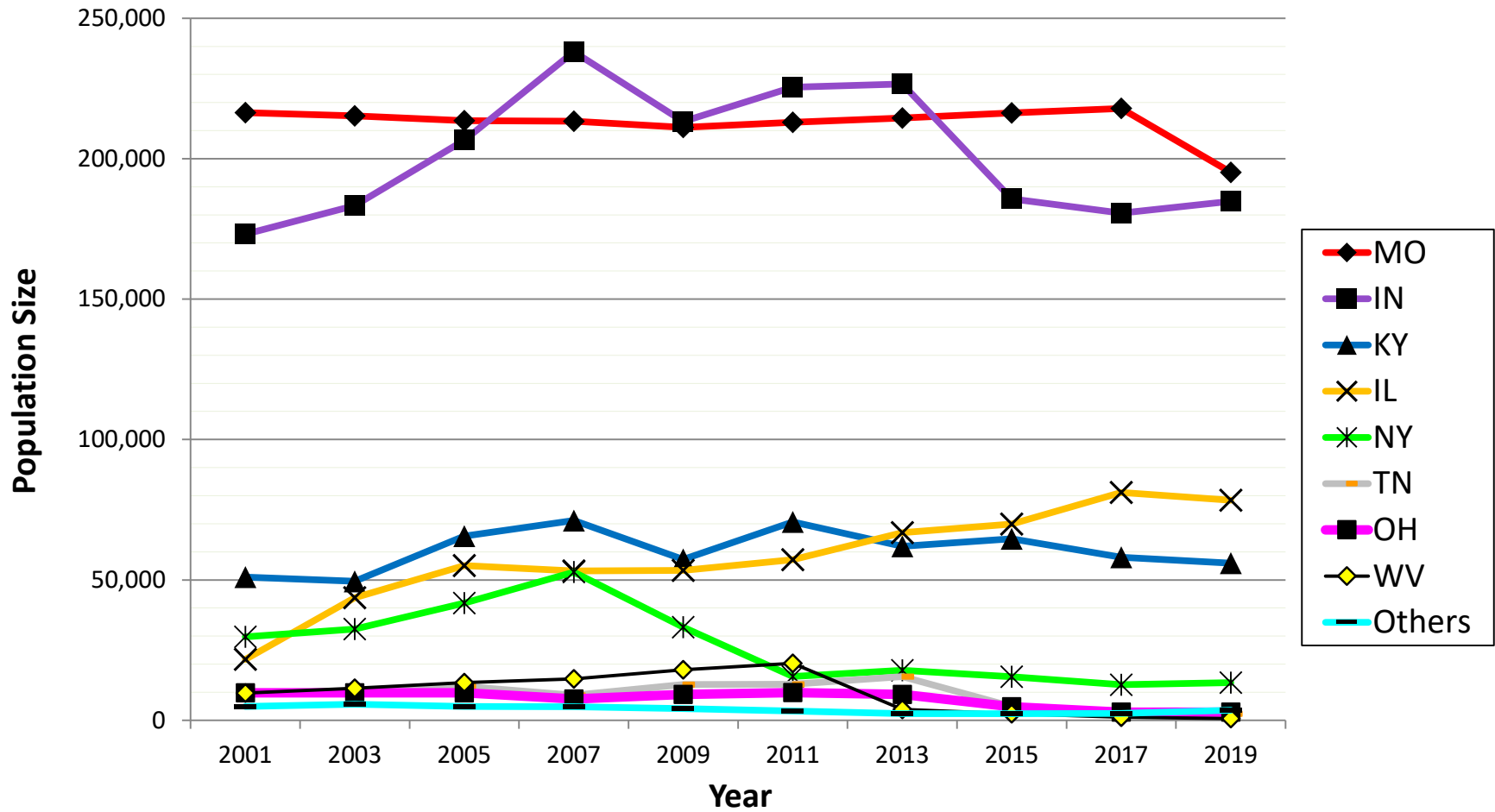


FIGURE 6. Indiana bat population estimates by state from 2001 to 2019.