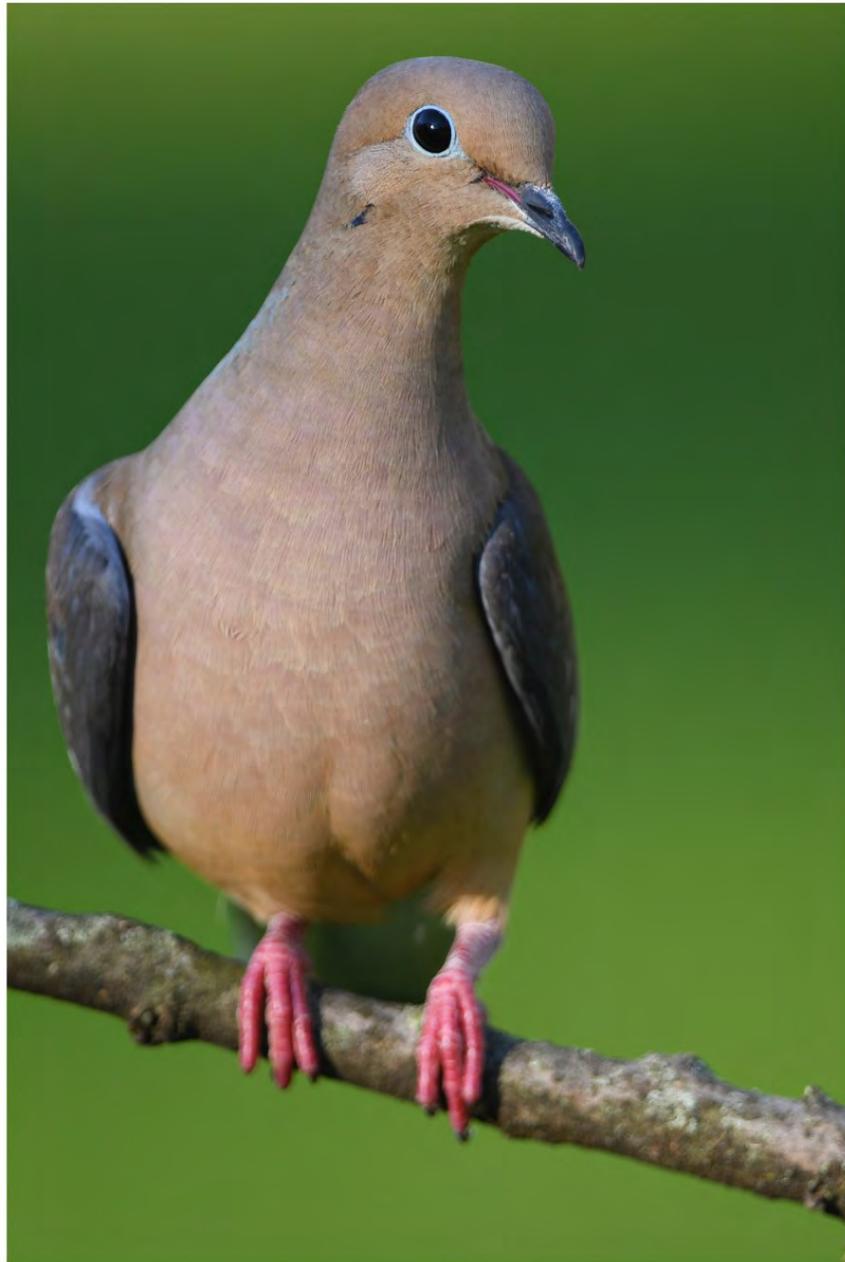




U.S. Fish & Wildlife Service

# Mourning Dove

*Population Status, 2020*



## **Mourning Dove Population Status, 2020**

U.S. Fish and Wildlife Service  
Division of Migratory Bird Management  
Branch of Assessment and Decision Support  
11510 American Holly Drive  
Laurel, MD 20708-4002

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**Cover photograph:** Adult mourning dove. Photo by John Brunjes.

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# MOURNING DOVE POPULATION STATUS, 2020

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*Abstract:* This report summarizes information collected annually in the U.S. on survival, recruitment, abundance and harvest of mourning doves. Trends in the number of doves heard and seen per route from the all-bird Breeding Bird Survey (BBS) are reported, and absolute abundance estimates based on band recovery and harvest data are provided. Harvest and hunter participation are estimated from the Migratory Bird Harvest Information Program (HIP). BBS data suggested the abundance of mourning doves over the last 54 years has increased in the Eastern Management Unit (EMU) and decreased in the Central (CMU) and Western (WMU) Management Units. Estimates of absolute abundance are available since 2003 and indicate that there were approximately 183 million doves in the U.S. as of 1 September 2019. Abundance (in millions of birds) varied among management units in 2019: EMU 43.9 (SE=2.1); CMU 114.9 (SE=8.7); and WMU 24.0 (SE=1.6). HIP estimates for mourning dove total harvest, active hunters, and total days afield in the U.S. in 2019 were 9,983,500  $\pm$  365,100 (estimate  $\pm$  SE) birds, 662,900 hunters, and 1,837,400  $\pm$  67,000 days afield. In 2019 harvest and hunter participation at the management unit level were: EMU, 3,656,800  $\pm$  136,700 birds, 242,300 hunters, and 643,500  $\pm$  42,800 days afield; CMU, 5,266,400  $\pm$  335,500 birds, 337,700 hunters, and 986,800  $\pm$  50,800 days afield; and WMU, 1,060,200  $\pm$  45,800 birds, 83,000 hunters, and 207,200  $\pm$  8,700 days afield.

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The mourning dove (*Zenaida macroura*) is one of the most abundant bird species in North America, and is familiar to millions of people. Authority and responsibility for management of this species in the U.S. is vested in the Secretary of the Interior. This responsibility is conferred by the Migratory Bird Treaty Act of 1918 which, as amended, implements migratory bird treaties between the U.S. and other countries. Mourning doves are included in the treaties with Great Britain (for Canada) and Mexico (U.S. Department of the Interior 2013). These treaties recognize sport hunting as a legitimate use of a renewable migratory bird resource.

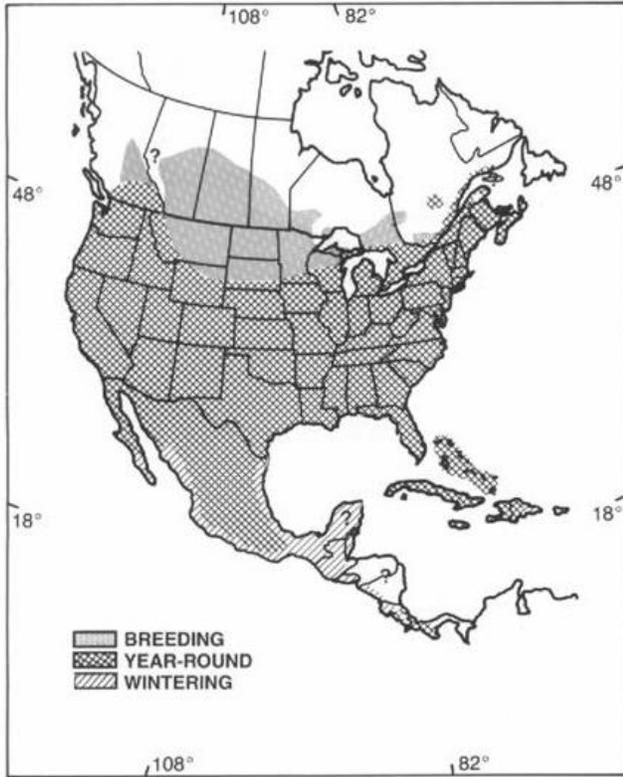
Maintenance of dove populations in a healthy, productive state is a primary management goal. Management activities include population assessment, harvest regulation, and habitat management. Each year, tens of thousands of doves are banded and thousands of wings from harvested doves are analyzed to estimate annual survival, harvest rates, recruitment, and abundance. The resulting information is used by wildlife managers in setting annual hunting regulations (USFWS 2017). Past federal frameworks for hunting mourning doves in the U.S. are in Appendix A.

## DISTRIBUTION

Mourning doves breed from southern Canada throughout the U.S. into Mexico, Bermuda, the Bahamas and Greater Antilles, and in scattered locations in Central America (Peterjohn et al. 1994, Fig. 1). Although mourning doves winter throughout much of their breeding range, the majority winter in the southern U.S., Mexico, and south through Central America to western Panama (Aldrich 1993, Mirarchi and Baskett 1994).

## POPULATION MONITORING

Within the U.S., three zones contain mourning dove populations that are largely independent of each other (Kiel 1959; Fig. 2). These zones encompass the principal breeding, migration, and U.S. wintering areas for each population. As suggested by Kiel (1959), these three zones were established as separate management units in 1960 (Kiel 1961). Since that time, management decisions have been made within the boundaries of the Eastern (EMU), Central (CMU), and Western (WMU) Management Units (Fig. 2). The EMU was further



**Figure 1.** Breeding and wintering ranges of the mourning dove (adapted from Mirarchi and Baskett 1994).

divided into two groups of states for some analyses: states permitting dove hunting were combined into one group (hunt) and those prohibiting dove hunting into another (non-hunt). Additionally, some states were grouped to increase sample sizes. Maryland and Delaware were combined; Vermont, New Hampshire, Maine, Massachusetts, Connecticut, and Rhode Island were combined to form a New England group. Even though Rhode Island is a hunt state, due to its small size and geographic location its data was included in this non-hunt group of states for analysis.

## Breeding Bird Survey

The North American Breeding Bird Survey (BBS; Robbins et al. 1986) is completed in June and is based on routes that are 24.5 miles long. Each route consists of 50 stops or point count locations at 0.5-mile intervals. At each stop, a 3-minute count is conducted whereby every bird seen or heard within a 0.25-mile (400 m) radius is recorded. Surveys start one-half hour before local sunrise and take about 5 hours to complete. Data

for birds heard and seen at stops are combined for BBS analyses.

Although the BBS is not used to inform annual mourning dove harvest management decisions, it is still of interest because it provides independent estimates of trends in abundance. Consequently, the 1966–2019 BBS trend information is included in this report. Current-year BBS data could not be analyzed in time for this report.

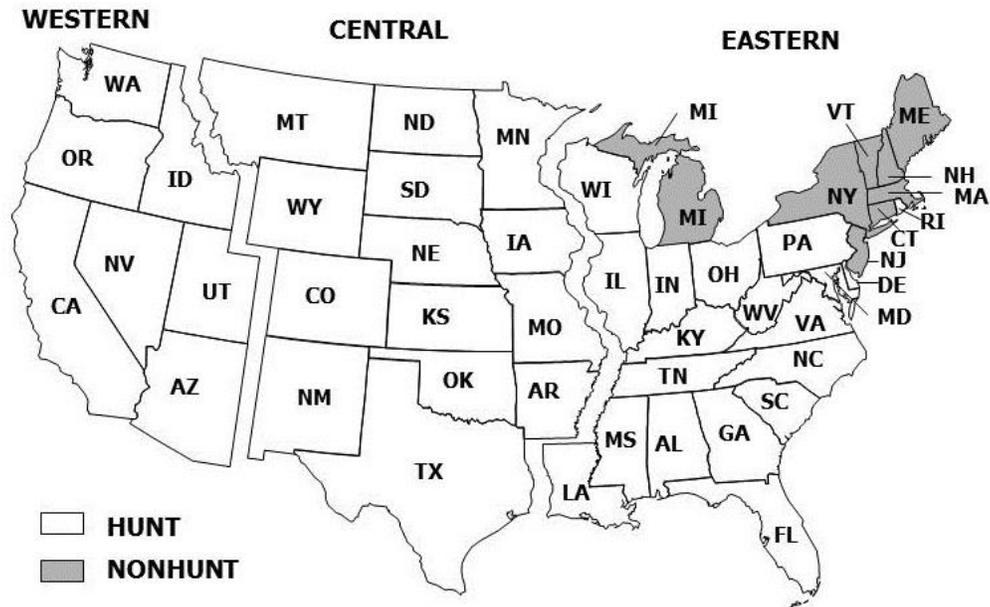
## Banding Program

A national banding program was initiated in 2003 to improve our understanding of mourning dove population biology and to help estimate the effect of harvest on mourning dove populations. Doves are banded in July and August in most of the lower 48 states. Band recoveries occur almost exclusively during the U.S. hunting seasons which occur primarily between 1 September and 31 January (Appendix A).

Banding goals for each state (specified by Bird Conservation Region [BCR]) are based on a power analysis that estimated sample sizes necessary to achieve a desired precision in estimates of population growth rate at the management unit level (Otis 2009). A weighting factor based on the median BBS index during 1966–2008 was used to determine banding goals for each state within the management units. Within states, the amount of area in each BCR and associated median BBS indices were used to determine sample size allocation. Placement of banding stations is left to the judgment of each state’s dove banding coordinator.

## Harvest Survey

The Harvest Information Program (HIP) was cooperatively developed by the FWS and state wildlife agencies to provide reliable annual estimates of hunter activity and harvest for all migratory game birds (Elden et al. 2002). The HIP sampling frame consists of all migratory game bird hunters. Under this program, state wildlife agencies collect the name, address, and additional information from each migratory bird hunter in their state, and send that information to the FWS. The FWS then selects stratified random samples of those hunters and asks them to voluntarily provide detailed information about their hunting activity. For example, hunters selected for the mourning dove



**Figure 2.** Mourning dove management units with 2019–20 hunt and non-hunt states.

harvest survey are asked to complete a daily diary about their mourning dove hunting and harvest during the current year’s hunting season. Their responses are then used to develop nationwide mourning dove harvest estimates. HIP survey estimates of mourning dove harvest have been available since 1999. Although estimates from 1999–2002 have been finalized, the estimates from 2003–19 should be considered preliminary as refinements are still being made in the sampling frame and estimation techniques.

### Parts Collection Survey

Age of individual doves can be determined by examination of their wings (Ruos and Tomlinson 1967, Braun 2014). Mourning dove wings are obtained during the hunting season and provide estimates of recruitment (number of young per adult in the population), which can be used to inform harvest management. From 2005–2009 some states collected wings for use in estimating age ratios in the fall populations. In 2007, the USFWS initiated the national Mourning Dove Parts Collection Survey, which expanded the geographical scope of the earlier state-based surveys.

The survey design for mourning dove wing collection follows that of waterfowl (Raftovich et al. 2019). The sampling frame is defined by hunters who identify themselves as dove hunters when purchasing a state

hunting license and who were active dove hunters the previous year.

Each year, state and federal biologists classify wings during a 2-day wingbee hosted by the Missouri Department of Conservation in Lee’s Summit, Missouri. Wings of harvested mourning doves are classified as juveniles (hatch-year birds [HY]) or adults (after-hatch-year birds [AHY]). A significant portion of wings are classified as unknown age where molt has progressed to a late stage. These harvest age ratios (HY/AHY) are used to estimate recruitment (population age ratio) after accounting for uncertainty related to unknown-age wings and age-specific vulnerability to harvest (Miller and Otis 2010).

### Call-count Survey

The Mourning Dove Call Count Survey (CCS) was conducted from 1966 to 2013. The CCS was developed to provide an annual index of abundance specifically for mourning doves (Dolton 1993). The CCS was discontinued because the harvest strategy adopted for mourning doves in 2013 does not make use of data from the CCS, but rather relies on estimates of absolute abundance. However, state and federal biologists conducted a national study from 2015 to 2017 using a subset of the historical CCS routes to determine if point count surveys that use distance sampling methods (Buckland et al. 2001) can produce absolute abundance

estimates. Those interested in historic CCS information can access the 2013 status report for mourning doves (available online at: <https://www.fws.gov/migratorybirds/pdf/surveys-and-data/Population-status/MourningDove/MourningDovePopulationStatus13.pdf>).

## METHODS

### Estimating Trends in Abundance Indices

BBS trends were estimated using a log-linear hierarchical model and Bayesian analytical framework (Sauer et al. 2008, 2010, 2017). The hierarchical model has a rigorous and sound theoretical basis and the indices and trends are directly comparable because trends are calculated directly from the indices.

With the hierarchical model, the log of the expected value of the counts is modeled as a linear combination of stratum-specific intercepts and trends, a random effect for each unique combination of route and observer, a year effect, a start-up effect on the route for first year counts by new observers, and over-dispersion (unexplained variation). Most of the parameters of interest are treated as random effects and some parameters are hierarchical in that they are assumed to follow distributions that are governed by additional parameters. The model is fit using Bayesian methods. Markov-chain Monte Carlo methods are used to iteratively produce sequences of parameter estimates which can be used to describe the distribution of the parameters of interest. Once the sequences converge, medians and credible intervals (CI, Bayesian confidence intervals) for the parameters are determined from the subsequent replicates. Annual indices are defined as exponentiated year and trend effects, and trends are defined as ratios of the year effects at the start and end of the interval of interest, taken to the appropriate power to estimate a yearly change (Sauer et al. 2008). Trend estimates are expressed as the average percent change per year over a given time period, while indices are expressed as the number of doves heard and seen per route.

Annual indices were calculated at the state, region (group of states), and dove management unit levels. Short- (recent 10-year period) and long-term (all years with data) trends were evaluated for each area. The median and 95th percentile credible intervals are

presented for estimates. The extent to which trend credible intervals exclude zero can be interpreted as the strength of evidence for an increasing or decreasing trend. Thus, there is evidence of a positive trend if the lower bound of the CI  $> 0$  and there is evidence of negative trend if the upper bound of the CI  $< 0$ . If the CI contains 0, then there is inconclusive evidence about trend in abundance. The reported sample sizes are the number of routes or sites on which trend estimates are based, which includes any route on which mourning doves were ever encountered in the region. BBS results are presented in Table 1.

### Estimating Survival, Harvest, Recruitment Rates, and Absolute Abundance

Band recovery models were used to estimate annual survival. A Seber parameterization (Seber 1970) using both direct and indirect dead recoveries was used to estimate survival rates. To estimate harvest rates only direct recoveries (bands recovered during the hunting season immediately following banding) were used and data were adjusted for band-reporting rate (Sanders and Otis 2012) prior to analysis.

Age-specific harvest and survival rates were estimated by state and management unit. Many states lacked sufficient sample sizes of banded birds to estimate annual survival rates; therefore, data were pooled over years to obtain mean annual estimates. Harvest rate for a year in a given state was only estimated when the number of banded birds in an age-class was  $>75$ . Annual harvest rates for management units were based on state-weighted harvest rate estimates. Each state's weight was the product of its habitat area (area within state presumed to be dove habitat) and average dove abundance estimated by the CCS index of doves heard during 2009–2013 (the CCS was discontinued after 2013). It should be possible to update the CCS portion of the weighting factor once analysis of the 2015–2017 CCS-distance sampling study is complete (*see* “Call-Count Survey” above).

For estimating survival rates, a model was formulated that allowed recovery rate to vary by state with an additive age effect (HY vs AHY), and allowed survival to vary by state and age. This model was used for inference regarding age and state-specific survival rates.

The approach of Miller and Otis (2010) was used to estimate annual recruitment rates. Samples were limited to wings collected during the first two weeks of September to minimize the proportion of unknown age wings and maximize the proportion of local birds in samples. Unknown age wings were assigned to an age-class based on previously estimated probabilities that adults will be in late stages of molt (Miller and Otis 2010). Band recovery data was used to adjust age-ratio estimates for differential vulnerability to harvest.

A simple Lincoln-type estimator was used to estimate abundance from annual harvest and harvest rates (Otis 2006). Abundance for each year was estimated at the management unit level separately for juvenile and adult doves by dividing age-specific total harvest (from the USFWS Harvest Information Program [Table 3] and Parts Collection Survey [Table 6]) by age-specific harvest rates estimated from direct (first hunting season after banding) recoveries of banded birds.

## RESULTS

### Breeding Bird Survey

*Eastern Management Unit.*—The BBS provided evidence that dove abundance increased in the EMU hunt and non-hunt states during the last 54 years (Table 1). Over the last 10 years abundance remained unchanged in the EMU non-hunt states, declined in the hunt states, and declined in the entire EMU.

*Central Management Unit.*—The BBS suggested that doves decreased in abundance over the last 54 years, and the most recent 10 years (Table 1).

*Western Management Unit.*—The BBS suggested that dove abundance decreased in the WMU over the last 54 years, and the most recent 10 years (Table 1).

### Harvest Survey

Preliminary results of mourning dove harvest and hunter participation from HIP for the 2018–19 and 2019–20 hunting seasons are presented in Tables 2 and 3, respectively. Current (2019–20) HIP estimates indicate that in the U.S. about 10 million mourning doves were harvested by about 663,000 hunters who spent about 1.8 million days afield. The EMU and CMU total harvest represented 37% and 53%,

respectively, of the national harvest of doves while the WMU represented 11% (Table 3). Between the 2018–19 and 2019–20 seasons mourning dove harvest declined in the EMU and WMU, and increased in the CMU (Fig. 3). Hunter participation (days afield) increased in the EMU and CMU and declined in the WMU (Tables 2 and 3).

Additional information about HIP, survey methodology, and results can be found in annual reports located at: <https://www.fws.gov/birds/surveys-and-data/reports-and-publications/hunting-activity-and-harvest.php>.

### Survival and Harvest Rates

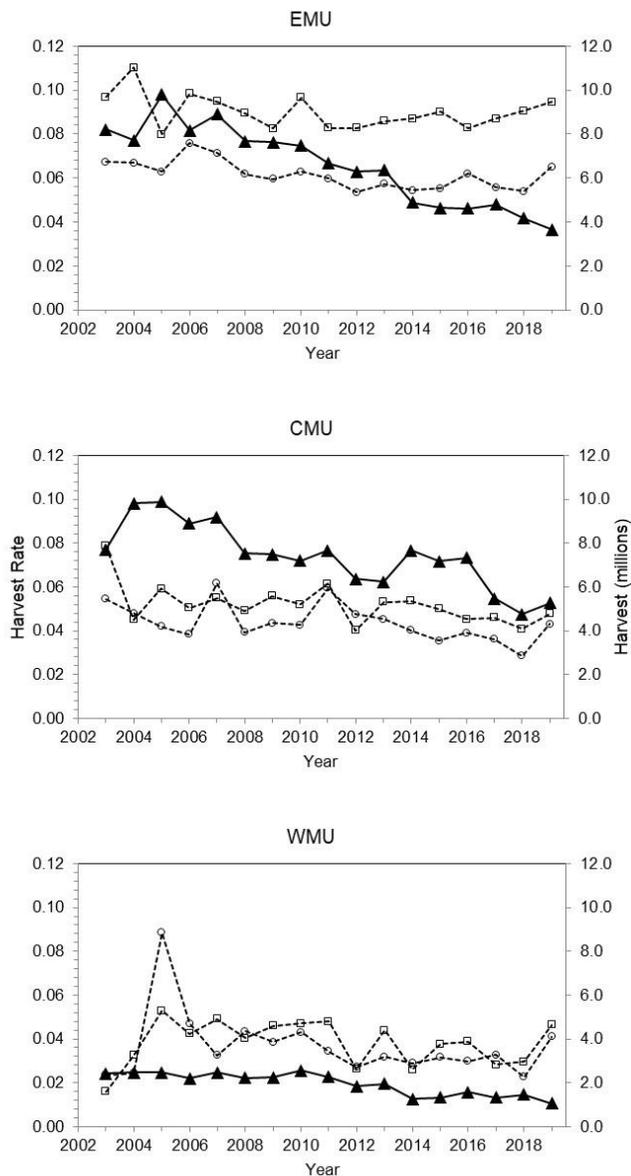
During July and August over the past 17 years 317,333 known age doves were banded in the EMU, 276,065 in the CMU, and 130,296 in the WMU (Table 4). There have been 19,237, 16,593, and 5,126 recoveries of known-age banded birds in the EMU, CMU, and WMU, respectively.

Mean annual HY survival was similar between the CMU and WMU but higher in the EMU (Table 5). AHY survival was similar among the management units.

Mean annual harvest rate was higher for HY individuals compared to AHY individuals in all the management units (Fig. 3, Table 5). This relationship was more pronounced in the EMU (HY harvest rate 47% greater than AHY harvest rate) than the CMU (29% greater) and WMU (17% greater). Mean annual harvest rates by age-class (HY and AHY) were greater in the EMU than in the other management units (Table 5). Within the EMU, the harvest rate of birds banded in the North Atlantic states (predominantly non-hunt states) was much lower than that of most hunt states (Table 5).

### Recruitment

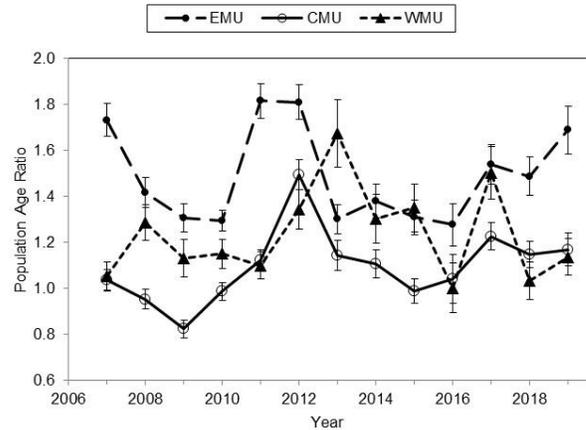
A total of 218,356 wings were obtained from 2007 to 2019 from birds harvested prior to September 15<sup>th</sup>. Overall recruitment rates were highest in the east and northwest and lowest in the Great Plains states and the southwest (Table 6). At the management unit level, the EMU typically had higher average annual recruitment compared to the CMU and WMU (Fig. 4). In 2019 the EMU experienced higher-than-average age ratios in the



**Figure 3.** Estimated mourning dove harvest (▲) and harvest rates (hatch-year=□ and after-hatch-year=○) by dove management unit, 2003–2019.

fall populations, whereas the CMU and WMU were near their long-term averages (Table 6).

Mean population age ratios for all states and years are provided in Table 6. There was much variation in the sample sizes for individual states. However, sample sizes were sufficient to calculate precise estimates of recruitment for all states.

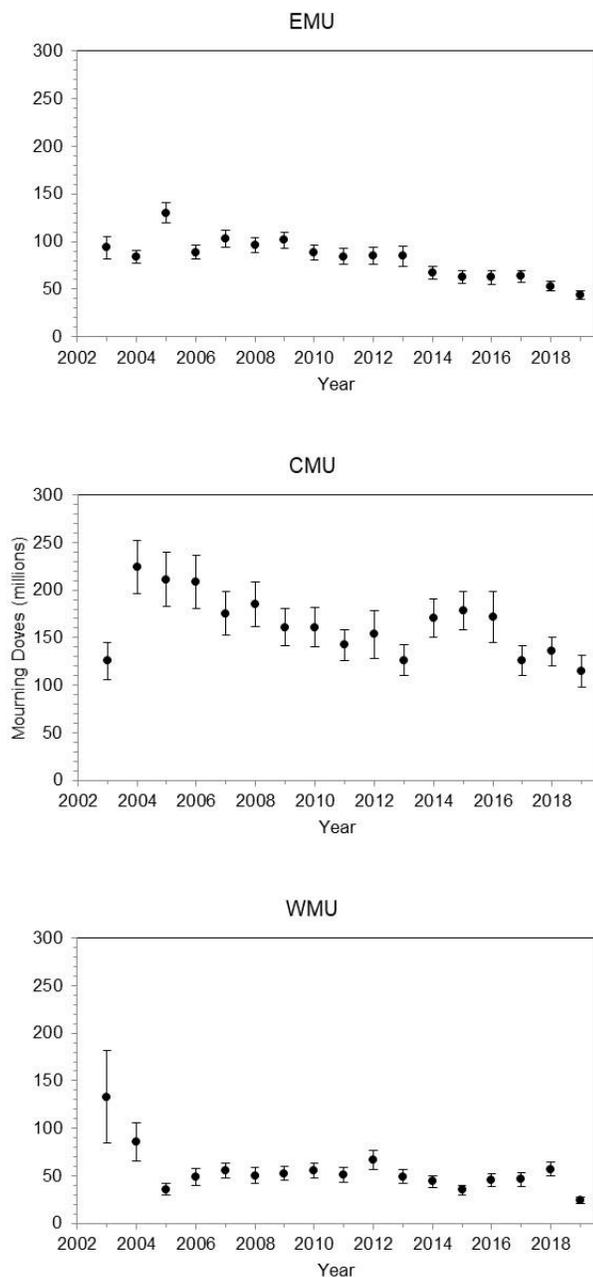


**Figure 4.** Estimated mourning dove fall population age ratios for each management unit, 2007–2019. Error bars represent 95% confidence intervals.

Age ratios for Florida are not estimated because hunting seasons there do not start until late September each year. At this late date most wings cannot be aged due to molt progression, precluding accurate estimates of age ratio.

### Absolute Abundance

Estimates of absolute abundance are available since 2003 (Fig. 5, Table 7). Estimates during the first 1 or 2 years may be biased in association with startup of the national mourning dove banding program when coordinators were gaining experience and some states were not yet participants. In addition, age ratio information was not available for the first 4 years (the annual averages from later years were used for estimating abundance during this period). The most recent estimates indicate that there were 183 million mourning doves in the U.S. immediately prior to the 2019 hunting season. Abundance estimates were lower in all management units in 2019 than 2018, and were the lowest abundances estimated for each unit since the Lincoln estimator was adopted.



**Figure 5.** Estimates and 95% confidence intervals of mourning dove absolute abundance by management unit and year, 2003–2019. Estimates based on band recovery and harvest data.

## ACKNOWLEDGMENTS

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**Table 1.** Estimated trend<sup>a</sup> (percent change per year and lower and upper 95% credible intervals) in mourning dove abundance based on Breeding Bird Survey data for management units and states during 54-year (1966–2019) and 10-year (2010–2019) periods.

Management Unit State	54 year				10 year			
	N	Trend	Lower	Upper	N	Trend	Lower	Upper
Eastern	1,794	0.3	0.2	0.4	1,474	-1.1	-1.4	-0.8
Hunt states	1,458	0.2	0.1	0.3	1,218	-1.1	-1.5	-0.8
AL	102	-0.6	-0.9	-0.3	89	-1.8	-2.8	-0.7
DE-MD	90	0.3	0.1	0.6	75	0.1	-0.9	1.0
FL	102	2.0	1.5	2.5	81	-1.4	-2.8	0.0
GA	107	-0.2	-0.6	0.1	95	-0.2	-1.2	0.7
IL	104	0.1	-0.3	0.5	101	-0.8	-1.8	0.2
IN	65	-0.7	-1.1	-0.3	58	-2.3	-3.6	-1.0
KY	56	0.5	0.2	0.9	38	-1.4	-2.7	-0.1
LA	96	1.5	1.0	2.1	69	-0.3	-1.8	1.3
MS	54	-0.2	-0.8	0.3	43	-0.1	-1.8	1.5
NC	95	0.2	-0.2	0.5	81	-2.2	-3.2	-1.2
OH	78	0.6	0.2	1.0	59	0.3	-1.1	1.6
PA	127	1.1	0.8	1.5	100	-1.9	-2.9	-1.0
SC	47	-0.4	-0.8	0.1	40	-1.1	-2.6	0.4
TN	32	-0.2	-0.7	0.2	27	-0.2	-1.7	1.3
VA	60	-0.2	-0.6	0.2	51	-0.8	-2.1	0.4
WI	96	1.2	0.8	1.7	91	-1.4	-2.6	-0.3
WV	57	3.4	2.8	4.0	50	-0.7	-2.5	1.2
Non-hunt states	426	1.2	0.9	1.3	331	-0.1	-0.7	0.5
MI	90	0.4	0.0	0.9	70	-2.8	-4.1	-1.5
New England <sup>b</sup>	168	1.9	1.5	2.3	133	-0.6	-1.6	0.4
NJ	42	-0.1	-0.6	0.5	27	-0.3	-1.9	1.3
NY	126	1.5	1.1	1.9	96	0.3	-0.9	1.4
Central	1,256	-0.6	-0.9	-0.4	1,101	-1.0	-1.4	-0.6
AR	55	-0.1	-0.6	0.4	48	-1.3	-3.0	0.3
CO	148	-0.8	-1.3	-0.2	132	-4.6	-5.9	-3.2
IA	38	0.2	-0.2	0.7	32	0.1	-1.4	1.6
KS	65	-0.3	-0.7	0.1	61	-0.8	-2.0	0.4
MN	79	-0.9	-1.4	-0.5	74	-3.0	-4.5	-1.7
MO	94	-0.8	-1.2	-0.4	80	1.9	0.7	3.1
MT	94	-0.4	-0.9	0.2	87	1.2	-0.5	3.0
NE	69	-0.3	-0.7	0.2	63	-1.3	-2.7	0.0
NM	83	-0.9	-3.5	0.0	64	-0.5	-2.1	1.1
ND	51	0.2	-0.2	0.7	48	-0.8	-2.2	0.6
OK	60	-0.9	-1.3	-0.4	52	-0.2	-1.8	1.5
SD	58	0.2	-0.3	0.7	53	0.2	-1.4	1.8
TX	235	-1.0	-1.3	-0.7	205	-1.3	-2.1	-0.4
WY	127	-1.2	-1.9	-0.5	102	-4.1	-5.7	-2.4
Western	717	-1.6	-1.9	-1.2	543	-3.4	-4.3	-2.5
AZ	88	-1.7	-2.5	-0.9	65	-4.5	-6.5	-2.4
CA	253	-1.1	-1.6	-0.7	182	-2.8	-4.3	-1.2
ID	49	-2.2	-3.1	-1.1	42	-6.6	-8.9	-4.3
NV	45	-1.7	-2.6	-0.7	32	-0.2	-3.8	3.6
OR	115	-1.7	-2.4	-0.9	83	-0.3	-2.6	2.1
UT	101	-2.2	-3.2	-1.3	86	-5.6	-7.5	-3.6
WA	78	-0.3	-1.1	0.3	64	-0.5	-2.0	1.2

<sup>a</sup>Trend estimated from annual indices derived from a log-linear hierarchical model fit using Bayesian methods. There is evidence of a positive trend if the lower CI > 0 and there is evidence of negative trend if the upper CI < 0. If the CI contains 0, then there is inconclusive evidence about trend in abundance.

<sup>b</sup> New England consists of CT, ME, MA, NH, RI, and VT; RI is a hunt state but was included in this group for purposes of analysis.

**Table 2.** Preliminary estimates and their standard errors (SE) of mourning dove harvest and hunter activity during the 2018–19 hunting season<sup>a</sup>. Data rounded to nearest 100.

Management Unit	Harvest		Active hunters		Hunter days afield		Harvest per hunter <sup>b</sup>	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Eastern	4,167,600	313,200	261,300 <sup>a</sup>	† <sup>c</sup>	634,800	40,200	† <sup>c</sup>	† <sup>c</sup>
AL	415,700	64,000	30,400	3,100	58,800	7,800	13.7	2.5
DE	15,000	5,600	1,100	300	2,400	900	13.1	5.7
FL	107,700	25,100	8,800	2,700	18,500	4,100	12.3	4.7
GA	679,700	104,000	32,400	3,200	84,800	15,300	21.0	3.8
IL	155,000	38,800	11,900	1,700	29,400	6,400	13.0	3.7
IN	110,800	31,600	7,400	1,600	15,900	3,400	14.9	5.4
KY	245,400	45,200	15,000	2,600	35,800	9,300	16.3	4.1
LA	133,200	53,000	8,000	2,400	22,000	7,700	16.7	8.3
MD	51,500	8,800	5,700	900	8,600	1,200	9.0	2.1
MS	273,400	41,600	15,700	1,700	32,800	4,100	17.4	3.2
NC	684,600	223,700	37,200	6,400	94,200	26,100	18.4	6.8
OH	169,100	36,700	12,800	2,200	36,300	7,900	13.2	3.6
PA	88,900	13,900	9,500	2,000	25,800	4,500	9.4	2.5
RI	1,700	800	600	200	2,400	1,100	3.0	1.8
SC	522,300	133,200	28,200	4,400	83,700	15,600	18.5	5.5
TN	276,800	57,300	15,500	3,000	31,600	6,200	17.8	5.1
VA	205,200	26,800	16,000	1,800	33,800	3,600	12.8	2.2
WI	18,100	6,300	3,600	1,000	14,100	4,800	5.0	2.3
WV	13,700	3,000	1,400	200	3,800	1,000	9.6	2.7
Central	4,749,100	283,900	332,900 <sup>a</sup>	† <sup>c</sup>	852,100	53,100	† <sup>c</sup>	† <sup>c</sup>
AR	170,600	44,700	12,400	2,700	24,500	5,200	13.8	4.7
CO	121,500	17,300	10,000	1,200	20,200	2,700	12.2	2.2
IA	107,800	12,300	9,000	1,000	23,500	3,100	12.0	1.9
KS	337,600	75,000	22,900	4,100	44,300	7,800	14.8	4.2
MN	55,300	14,000	7,100	2,500	16,900	5,500	7.8	3.4
MO	309,400	37,800	26,000	2,300	48,300	4,400	11.9	1.8
MT	9,800	2,200	1,200	400	3,500	1,100	8.0	3.0
NE	189,100	33,800	11,600	1,300	33,700	4,900	16.3	3.4
NM	126,900	20,100	9,900	1,000	28,200	3,400	12.8	2.4
ND	65,200	15,100	3,900	600	11,800	2,800	16.7	4.7
OK	181,300	30,500	13,600	2,100	29,200	4,600	13.4	3.1
SD	69,400	10,600	4,900	600	11,500	1,600	14.0	2.8
TX	2,990,400	260,900	199,100	18,100	553,200	51,000	15.0	1.9
WY	14,800	3,100	1,400	300	3,200	700	10.8	3.0
Western	1,457,700	76,000	100,100 <sup>a</sup>	† <sup>c</sup>	259,800	17,900	† <sup>c</sup>	† <sup>c</sup>
AZ	352,700	21,700	19,000	600	55,100	2,500	18.6	1.3
CA	892,600	66,100	52,500	3,100	129,400	10,000	17.0	1.6
ID	88,800	27,500	11,300	2,300	24,100	6,200	7.8	2.9
NV	21,400	6,100	2,700	500	6,200	1,400	7.9	2.7
OR	13,200	3,900	2,500	600	18,300	12,700	5.3	2.0
UT	25,300	4,800	6,400	900	12,400	2,600	4.0	0.9
WA	63,700	10,400	5,800	700	14,200	2,200	11.1	2.3
United States	10,374,500	429,500	694,300 <sup>a</sup>	† <sup>c</sup>	1,746,700	69,000	† <sup>c</sup>	† <sup>c</sup>

<sup>a</sup>Hunter number estimates at the management unit and national levels may be biased high, because the HIP sample frames are state specific; therefore hunters are counted more than once if they hunt in >1 state. Variance is inestimable.

<sup>b</sup>Seasonal harvest per hunter.

<sup>c</sup> No estimate available.

**Table 3.** Preliminary estimates and their standard errors (SE) of mourning dove harvest and hunter activity during the 2019–20 hunting season<sup>a</sup>. Data rounded to nearest 100.

Management Unit	Harvest		Active hunters		Hunter days afield		Harvest per hunter <sup>b</sup>	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Eastern	3,656,800	136,700	242,200 <sup>a</sup>	† <sup>c</sup>	643,500	42,800	† <sup>c</sup>	† <sup>c</sup>
AL	512,800	59,000	28,600	2,000	61,700	5,900	17.9	2.4
DE	20,700	3,700	1,200	200	4,000	600	17.3	3.9
FL	113,000	24,900	7,400	1,600	24,200	4,800	15.2	4.7
GA	713,600	58,600	33,400	2,200	93,300	7,100	21.3	2.2
IL	148,800	21,700	11,300	1,300	25,900	3,400	13.2	2.4
IN	112,600	16,200	8,600	1,200	21,100	2,800	13.1	2.6
KY	223,300	14,500	11,200	1,000	32,800	3,100	19.9	2.2
LA	63,800	17,200	6,100	1,400	11,200	2,500	10.5	3.8
MD	66,200	9,100	6,200	900	18,400	5,200	10.7	2.1
MS	193,400	20,900	12,700	1,200	28,400	3,500	15.2	2.2
NC	336,600	35,100	33,300	3,700	61,000	6,300	10.1	1.5
OH	93,000	17,100	10,200	1,300	25,000	3,400	9.1	2.0
PA	98,500	18,100	12,200	1,800	75,400	37,600	8.1	1.9
RI	300	100	100	0	300	100	2.8	1.3
SC	493,200	80,500	22,400	2,500	60,900	8,000	22.0	4.4
TN	228,700	26,700	17,100	2,000	46,300	9,400	13.4	2.2
VA	186,000	15,400	13,600	1,100	33,600	3,000	13.7	1.6
WI	41,400	9,800	5,300	1,000	17,200	4,500	7.8	2.4
WV	10,900	1,700	1,100	100	2,700	400	9.5	1.9
Central	5,266,400	335,500	337,700 <sup>a</sup>	† <sup>c</sup>	986,800	50,800	† <sup>c</sup>	† <sup>c</sup>
AR	328,100	74,800	14,200	2,200	37,500	7,100	23.0	6.3
CO	106,300	9,500	10,700	800	22,800	2,000	10.0	1.2
IA	29,900	4,700	3,600	400	11,000	1,800	8.2	1.5
KS	389,800	64,200	22,300	1,900	64,800	8,500	17.5	3.3
MN	40,200	11,800	3,900	1,400	9,400	2,300	10.4	4.8
MO	268,000	28,400	21,100	1,500	47,100	3,800	12.7	1.6
MT	16,600	4,600	1,600	400	3,600	800	10.1	3.6
NE	137,700	14,100	10,700	1,000	24,500	2,500	12.8	1.8
NM	125,400	22,000	8,300	700	28,800	4,100	15.0	2.9
ND	75,000	19,500	4,100	500	11,900	2,000	18.5	5.4
OK	247,900	26,700	14,800	1,200	38,000	4,200	16.7	2.2
SD	103,300	19,100	4,700	600	15,500	2,700	22.0	4.9
TX	3,385,000	315,600	216,300	13,100	669,000	48,800	15.7	1.7
WY	13,200	2,200	1,300	200	2,800	500	10.5	2.4
Western	1,060,200	45,800	83,000 <sup>a</sup>	† <sup>c</sup>	207,200	8,700	† <sup>c</sup>	† <sup>c</sup>
AZ	235,400	15,300	13,100	500	36,500	2,000	17.9	1.3
CA	641,600	37,400	44,500	2,200	112,000	6,800	14.4	1.1
ID	48,600	15,700	6,700	1,500	13,400	3,300	7.2	2.8
NV	25,300	8,400	3,000	500	6,200	1,200	8.5	3.1
OR	24,200	7,800	3,300	600	8,400	1,800	7.3	2.7
UT	38,700	6,300	7,600	800	17,600	2,500	5.1	1.0
WA	46,400	7,000	4,800	500	13,100	2,100	9.7	1.8
United States	9,983,500	365,100	662,900 <sup>a</sup>	† <sup>c</sup>	1,837,400	67,000	† <sup>c</sup>	† <sup>c</sup>

<sup>a</sup>Hunter number estimates at the management unit and national levels may be biased high, because the HIP sample frames are state specific; therefore hunters are counted more than once if they hunt in >1 state. Variance is inestimable.

<sup>b</sup>Seasonal harvest per hunter.

<sup>c</sup> No estimate available.

**Table 4.** Number of mourning doves banded in each management unit, state, and year, 2003–2019. Only known-age birds banded in July or August are included in the table and used in analysis of survival and harvest rates.

Mgmt Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Eastern	15,652	17,454	20,142	20,862	21,717	19,461	21,309	20,475	18,946	19,525	19,411
AL	1,130	1,112	991	961	889	117	1,147	1,026	942	1,010	1,097
DE	0	0	0	0	0	68	111	133	103	205	107
FL	830	960	916	858	773	1,027	799	865	736	968	805
GA	1,424	1,161	1,396	1,136	1,234	1,332	1,450	1,670	1,244	1,498	1,258
IL	6	6	47	1,163	1,267	1,378	1,877	1,833	2,034	1,501	1,276
IN	6	1,175	1,211	1,253	1,261	963	1,008	1,312	1,162	1,418	1,136
KY	1,444	1,566	1,454	1,637	1,608	1,867	2,391	2,232	1,786	1,299	1,553
LA	1,205	655	2,412	2,581	3,516	2,347	1,955	1,826	1,738	1,362	1,729
MD	472	482	719	571	708	322	334	312	377	346	366
MI	39	26	0	2	6	2	4	0	2	10	0
MS	1,071	994	1,008	656	690	822	928	448	462	605	666
North Atl. <sup>a</sup>	20	4	19	34	12	12	460	1,176	1,286	967	974
NC	1,283	1,539	1,662	1,299	1,307	1,736	1,685	1,198	795	1,847	1,734
OH	1,984	2,712	2,020	1,976	1,993	1,958	2,007	955	1,264	1,393	1,300
PA	1,564	1,590	1,658	1,838	1,748	942	903	899	827	899	1,007
RI	0	2	0	0	0	0	14	22	0	0	13
SC	1,041	863	1,484	1,461	1,761	1,720	1,875	1,953	1,911	1,795	1,902
TN	938	1,277	1,154	1,275	866	1,199	653	854	635	651	785
VA	474	546	804	585	642	603	599	554	496	522	420
WI	7	18	561	973	836	725	761	838	807	926	895
WV	714	768	626	603	600	321	348	369	339	303	388
Central	10,491	12,562	10,960	11,355	10,499	16,230	19,595	17,380	18,710	18,219	18,868
AR	782	975	1,085	914	822	711	514	0	424	222	297
CO	7	12	11	20	467	753	670	953	984	940	1,254
IA	1,940	2,191	2,458	1,099	987	1,694	1,238	1,078	2,216	2,089	1,649
KS	1,230	1,426	1,412	1,457	1,099	2,377	3,388	2,445	3,211	3,385	3,739
MN	0	4	0	0	363	529	700	1,164	853	1,026	1,390
MO	1,983	2,063	1,739	2,219	1,729	2,512	2,861	2,903	2,296	2,168	2,453
MT	0	0	0	0	0	0	0	322	270	296	223
NE	926	1,237	721	753	799	1,057	1,014	997	1,316	1,454	1,345
NM	3	11	14	4	0	463	1,059	625	114	717	829
ND	745	1,293	1,072	976	703	782	1,135	1,666	1,741	1,433	1,344
OK	391	447	528	715	826	1,513	2,746	1,520	1,661	1,488	1,182
SD	1,506	1,303	851	1,768	1,456	1,713	1,693	1,771	1,356	1,430	1,370
TX	978	1,600	1,069	1,430	1,237	2,078	2,575	1,936	2,268	1,502	1,702
WY	0	0	0	0	11	48	2	0	0	69	91
Western	3,261	3,658	4,494	4,559	6,495	6,253	9,059	9,348	7,552	8,634	8,961
AZ	1,653	1,574	1,582	2,436	2,562	2,544	3,831	3,599	3,818	3,362	3,718
CA	252	157	819	1,160	1,870	1,706	2,693	3,468	1,422	2,458	2,269
ID	440	854	837	730	615	594	466	453	355	677	511
NV	0	0	0	0	0	120	431	488	642	729	200
OR	0	0	0	0	0	173	245	219	243	319	734
UT	0	0	0	233	722	398	685	553	323	319	770
WA	916	1,073	1,256	0	726	718	708	568	749	770	759
United States	29,404	33,674	35,596	36,776	38,711	41,944	49,963	47,203	45,208	46,378	47,240

<sup>a</sup>Combined total for North Atlantic non-hunt states: CT, NH, ME, MA, NJ, NY, and VT.

**Table 4** (continued).

Mgmt Unit	2014	2015	2016	2017	2018	2019
Eastern	17,993	18,448	16,772	16,069	16,876	16,221
AL	1,149	987	1,133	942	1,010	1,323
DE	202	38	94	92	30	169
FL	906	772	759	642	716	689
GA	954	1,336	1,152	1,132	1,466	1,650
IL	1,988	2,048	1,810	2,211	2,039	1,538
IN	1,237	977	653	1,171	982	689
KY	1,430	1,759	1,324	1,516	1,321	1,100
LA	1,066	1,769	1,596	1,232	1,759	1,346
MD	279	306	221	283	361	348
MI	0	0	0	0	0	0
MS	791	675	448	666	546	564
North Atl. <sup>a</sup>	141	118	159	191	10	3
NC	1,326	1,163	1,199	1,004	1,023	1,367
OH	1,336	1,312	1,316	1,314	1,072	1,300
PA	993	795	737	824	808	784
RI	0	55	0	0	0	15
SC	1,831	1,990	1,918	1,566	1,484	967
TN	677	611	540	609	530	730
VA	525	580	442	492	555	540
WI	789	800	887	746	798	873
WV	373	357	384	378	366	228
Central	21,545	19,516	19,982	18,357	15,417	16,379
AR	342	300	359	413	233	280
CO	1,335	1,011	1,419	923	1,017	1,125
IA	1,960	2,027	1,906	2,201	1,878	2,058
KS	3,233	3,332	2,868	3,403	2,451	2,457
MN	782	388	357	490	327	604
MO	2,997	1,966	1,983	1,465	1,635	1,242
MT	417	439	283	330	330	549
NE	1,505	1,357	1,718	1,458	1,101	1,094
NM	661	701	682	855	1,131	866
ND	1,675	1,620	1,647	1,685	614	1,356
OK	1,561	1,604	1,402	1,154	740	971
SD	1,872	2,052	2,329	1,278	1,197	916
TX	2,770	2,391	2,645	2,115	2,022	2,123
WY	435	328	384	587	741	739
Western	10,139	10,951	9,110	9,098	10,195	8,529
AZ	3,319	2,983	3,032	3,388	3,532	3,445
CA	3,510	4,535	3,293	3,265	3,877	2,384
ID	756	770	685	657	646	657
NV	600	401	498	415	458	636
OR	1,122	1,057	737	697	886	860
UT	349	282	59	73	13	52
WA	483	923	806	603	783	495
United States	49,677	48,915	45,864	43,524	42,488	41,133

<sup>a</sup>Combined total for North Atlantic non-hunt states: CT, NH, ME, MA, NJ, NY, and VT.

**Table 5.** Estimates of mean annual survival and harvest rate of mourning doves by management unit and state that banded doves, 2003–2019. Estimates by age-class: hatch-year (HY) and after-hatch-year (AHY). Standard errors are in parentheses.

Management Unit State	Annual Survival				Annual Harvest Rate			
	HY (SE)		AHY (SE)		HY (SE)		AHY (SE)	
Eastern	0.356	(0.008)	0.470	(0.004)	0.088	(0.001)	0.060	(0.001)
AL	0.359	(0.023)	0.460	(0.017)	0.100	(0.007)	0.065	(0.005)
DE-MD <sup>a</sup>	0.319	(0.027)	0.417	(0.022)	0.124	(0.009)	0.090	(0.008)
FL	0.345	(0.036)	0.506	(0.025)	0.038	(0.006)	0.033	(0.005)
GA	0.336	(0.019)	0.470	(0.013)	0.130	(0.004)	0.082	(0.006)
IL	0.342	(0.020)	0.396	(0.018)	0.071	(0.003)	0.050	(0.004)
IN	0.332	(0.026)	0.463	(0.014)	0.085	(0.008)	0.077	(0.005)
KY	0.364	(0.021)	0.451	(0.013)	0.064	(0.004)	0.053	(0.004)
LA	0.423	(0.013)	0.514	(0.013)	0.110	(0.006)	0.056	(0.006)
MS	0.245	(0.019)	0.457	(0.019)	0.152	(0.008)	0.088	(0.005)
North Atl <sup>b</sup>	0.324	(0.090)	0.589	(0.070)	0.005	(0.008)	0.004	(0.003)
NC	0.282	(0.017)	0.456	(0.014)	0.101	(0.007)	0.063	(0.004)
OH	0.372	(0.025)	0.468	(0.016)	0.054	(0.003)	0.040	(0.004)
PA	0.410	(0.028)	0.500	(0.024)	0.045	(0.006)	0.020	(0.004)
SC	0.335	(0.017)	0.469	(0.012)	0.095	(0.005)	0.061	(0.003)
TN	0.312	(0.020)	0.475	(0.017)	0.117	(0.005)	0.076	(0.004)
VA	0.484	(0.043)	0.497	(0.024)	0.032	(0.006)	0.039	(0.004)
WI	0.426	(0.032)	0.520	(0.025)	0.050	(0.005)	0.031	(0.004)
WV	0.481	(0.053)	0.551	(0.043)	0.024	(0.005)	0.023	(0.003)
Central	0.307	(0.008)	0.481	(0.005)	0.066	(0.001)	0.051	(0.001)
AR	0.325	(0.029)	0.476	(0.022)	0.083	(0.011)	0.061	(0.006)
CO	0.548	(0.053)	0.480	(0.029)	0.014	(0.002)	0.026	(0.004)
IA	0.269	(0.018)	0.493	(0.015)	0.041	(0.008)	0.029	(0.007)
KS	0.340	(0.018)	0.498	(0.011)	0.063	(0.005)	0.059	(0.003)
MN	0.353	(0.037)	0.555	(0.027)	0.025	(0.003)	0.014	(0.003)
MO	0.204	(0.010)	0.419	(0.009)	0.154	(0.010)	0.129	(0.008)
MT	0.305	(0.078)	0.520	(0.065)	0.018	(0.005)	0.015	(0.003)
ND	0.473	(0.034)	0.591	(0.020)	0.012	(0.001)	0.009	(0.001)
NE	0.371	(0.034)	0.505	(0.018)	0.022	(0.002)	0.028	(0.002)
NM	0.600	(0.082)	0.597	(0.055)	0.013	(0.003)	0.008	(0.001)
OK	0.293	(0.019)	0.430	(0.018)	0.081	(0.006)	0.064	(0.008)
SD	0.442	(0.020)	0.492	(0.014)	0.029	(0.003)	0.025	(0.003)
TX	0.387	(0.024)	0.505	(0.015)	0.057	(0.005)	0.040	(0.004)
WY	0.302	(0.138)	0.430	(0.087)	0.012	(0.001)	0.008	(0.001)
Western	0.316	(0.014)	0.471	(0.008)	0.042	(0.001)	0.036	(0.001)
AZ	0.332	(0.024)	0.477	(0.016)	0.021	(0.003)	0.016	(0.001)
CA	0.325	(0.019)	0.466	(0.011)	0.061	(0.005)	0.064	(0.007)
ID	0.321	(0.049)	0.520	(0.031)	0.026	(0.003)	0.019	(0.002)
NV	0.283	(0.039)	0.455	(0.027)	0.045	(0.008)	0.036	(0.004)
OR	0.367	(0.047)	0.439	(0.036)	0.030	(0.008)	0.033	(0.004)
UT	0.257	(0.052)	0.545	(0.058)	0.022	(0.004)	0.016	(0.004)
WA	0.285	(0.025)	0.466	(0.027)	0.051	(0.005)	0.038	(0.007)

<sup>a</sup>Data combined for Delaware and Maryland.

<sup>b</sup>Data combined for North Atlantic states: CT, NH, ME, MA, NJ, NY, RI, and VT.

**Table 6.** Estimated age ratios (juveniles per adult) by management unit and state based on the Parts Collection Survey, 2007–2019. Age ratios are corrected for unknown age wings and differential vulnerability. Sample size is the number of wings examined. Standard errors are in parentheses.

Management Unit	2007 <sup>a</sup>		2008		2009		2010		2011		2012	
State												
Eastern	1.73	(0.04)	1.42	(0.03)	1.35	(0.03)	1.30	(0.02)	1.83	(0.04)	1.81	(0.04)
AL	3.79	(2.69)	1.25	(0.17)	1.95	(0.29)	1.35	(0.10)	2.14	(0.19)	2.74	(0.27)
DE	1.15	(0.16)	1.88	(0.23)	0.89	(0.18)	1.60	(0.24)	3.21	(0.45)	1.47	(0.17)
GA	3.13	(0.40)	1.70	(0.24)	1.43	(0.18)	1.77	(0.20)	3.51	(0.48)	2.09	(0.18)
IL	1.85	(0.11)	1.21	(0.08)	1.47	(0.11)	1.29	(0.08)	1.51	(0.12)	2.50	(0.21)
IN	1.62	(0.07)	1.80	(0.15)	1.54	(0.11)	1.15	(0.06)	2.00	(0.12)	1.60	(0.12)
KY	1.68	(0.14)	1.18	(0.17)	1.58	(0.17)	1.77	(0.14)	1.65	(0.12)	1.69	(0.14)
LA	1.09	(0.13)	1.61	(0.25)	2.26	(0.31)	2.30	(0.26)	2.94	(0.58)	1.60	(0.25)
MD	2.07	(0.21)	1.52	(0.19)	1.24	(0.13)	1.39	(0.12)	1.45	(0.14)	1.93	(0.15)
MS	1.42	(0.14)	1.57	(0.16)	1.81	(0.17)	1.07	(0.07)	1.38	(0.13)	1.70	(0.24)
NC	1.80	(0.14)	1.67	(0.14)	1.40	(0.09)	1.04	(0.05)	1.73	(0.13)	1.45	(0.09)
OH	2.06	(0.19)	2.26	(0.29)	1.42	(0.16)	0.87	(0.07)	1.75	(0.15)	2.36	(0.29)
PA	1.35	(0.14)	1.03	(0.11)	0.93	(0.10)	1.03	(0.11)	1.91	(0.24)	1.62	(0.18)
RI <sup>b</sup>	----	----	----	----	----	----	----	----	----	----	----	----
SC	1.91	(0.12)	1.39	(0.09)	1.17	(0.08)	1.55	(0.09)	2.37	(0.16)	1.50	(0.10)
TN	1.82	(0.28)	1.34	(0.20)	1.13	(0.11)	1.51	(0.14)	2.13	(0.21)	3.25	(0.36)
VA	1.79	(0.11)	1.23	(0.07)	0.88	(0.07)	1.19	(0.06)	1.38	(0.08)	1.58	(0.08)
WI	1.00	(0.18)	1.58	(0.17)	1.24	(0.18)	2.04	(0.23)	1.27	(0.19)	2.04	(0.27)
WV	1.93	(0.24)	2.56	(0.58)	1.16	(0.19)	1.62	(0.25)	2.09	(0.32)	1.39	(0.22)
Central	1.04	(0.02)	0.95	(0.02)	0.84	(0.02)	0.99	(0.02)	1.13	(0.02)	1.50	(0.03)
AR	1.09	(0.10)	2.77	(0.35)	1.27	(0.11)	1.19	(0.10)	1.52	(0.14)	2.54	(0.27)
CO	1.12	(0.06)	1.09	(0.07)	0.83	(0.06)	1.43	(0.09)	1.37	(0.10)	1.12	(0.11)
IA	† <sup>c</sup>	†	†	†	†	†	†	†	2.07	(0.59)	1.54	(0.16)
KS	1.32	(0.07)	0.99	(0.07)	0.89	(0.07)	1.11	(0.07)	1.10	(0.07)	1.46	(0.11)
MN	1.26	(0.90)	0.54	(0.33)	2.51	(0.72)	6.41	(3.83)	0.98	(0.10)	2.06	(0.18)
MO	1.62	(0.12)	0.93	(0.07)	0.94	(0.06)	1.21	(0.10)	1.58	(0.11)	1.96	(0.13)
MT	1.30	(0.16)	0.68	(0.09)	1.45	(0.23)	1.49	(0.17)	1.85	(0.26)	1.27	(0.16)
ND	1.07	(0.15)	0.92	(0.11)	1.39	(0.26)	0.65	(0.09)	0.99	(0.10)	1.56	(0.16)
NE	0.68	(0.04)	0.83	(0.06)	0.80	(0.09)	1.02	(0.07)	0.82	(0.05)	1.49	(0.11)
NM	0.55	(0.08)	0.35	(0.04)	0.48	(0.04)	0.59	(0.04)	0.71	(0.07)	0.68	(0.06)
OK	1.41	(0.17)	1.35	(0.10)	1.15	(0.07)	1.05	(0.06)	1.76	(0.14)	1.72	(0.16)
SD	1.07	(0.09)	0.89	(0.07)	1.08	(0.11)	1.05	(0.10)	1.18	(0.11)	1.73	(0.15)
TX	0.78	(0.05)	1.24	(0.07)	0.67	(0.04)	0.86	(0.04)	1.21	(0.05)	1.47	(0.07)
WY	1.32	(0.16)	0.90	(0.10)	0.75	(0.10)	1.68	(0.16)	1.51	(0.14)	1.05	(0.13)
Western	1.05	(0.03)	1.29	(0.04)	1.17	(0.04)	1.15	(0.03)	1.11	(0.03)	1.34	(0.04)
AZ	0.52	(0.03)	0.85	(0.04)	0.72	(0.04)	0.74	(0.04)	0.74	(0.04)	0.72	(0.05)
CA	1.22	(0.08)	1.45	(0.08)	1.23	(0.10)	1.15	(0.06)	1.15	(0.06)	1.35	(0.07)
ID	1.12	(0.10)	0.88	(0.17)	1.52	(0.16)	1.56	(0.18)	1.45	(0.25)	1.56	(0.15)
NV	1.13	(0.11)	1.09	(0.21)	0.97	(0.13)	0.96	(0.08)	1.14	(0.11)	1.28	(0.13)
OR	1.75	(0.29)	1.42	(0.60)	1.10	(0.18)	2.24	(0.28)	0.98	(0.16)	0.98	(0.13)
UT	1.19	(0.16)	0.73	(0.09)	0.69	(0.14)	0.79	(0.09)	1.17	(0.11)	1.36	(0.19)
WA	1.50	(0.10)	1.62	(0.12)	1.55	(0.15)	1.41	(0.12)	1.53	(0.13)	1.66	(0.15)

<sup>a</sup> Standard errors for estimates only incorporate sampling error for the proportion of young in the sample and do not incorporate additional uncertainty from correction factors for unknown age wings and differential vulnerability.

<sup>b</sup> Insufficient data to estimate age ratio for RI in most years.

<sup>c</sup> Iowa did not have a hunting season until 2011.

**Table 6** (continued).

Management Unit State	2013 <sup>a</sup>		2014		2015		2016		2017		2018	
Eastern	1.33	(0.03)	1.42	(0.04)	1.31	(0.04)	1.31	(0.05)	1.54	(0.04)	1.49	(0.04)
AL	1.67	(0.18)	1.10	(0.10)	1.56	(0.17)	1.86	(0.26)	1.57	(0.23)	1.62	(0.23)
DE	1.97	(0.37)	1.30	(0.21)	0.42	(0.11)	0.96	(0.26)	29.34	(18.61)	1.28	(0.44)
GA	1.45	(0.11)	1.70	(0.16)	1.30	(0.12)	1.69	(0.16)	1.63	(0.12)	1.70	(0.13)
IL	1.36	(0.11)	1.48	(0.12)	1.15	(0.12)	0.93	(0.12)	1.28	(0.13)	1.70	(0.16)
IN	1.49	(0.12)	1.28	(0.12)	1.05	(0.09)	0.93	(0.13)	1.41	(0.14)	2.21	(0.21)
KY	1.23	(0.10)	1.41	(0.12)	1.18	(0.15)	1.29	(0.18)	1.49	(0.12)	1.46	(0.13)
LA	1.82	(0.29)	1.01	(0.76)	5.29	(2.89)	0.86	(0.26)	1.28	(0.28)	1.47	(0.23)
MD	1.64	(0.18)	1.78	(0.25)	1.69	(0.29)	2.76	(0.58)	2.50	(0.40)	1.82	(0.29)
MS	1.19	(0.12)	1.38	(0.15)	1.50	(0.18)	0.96	(0.18)	1.96	(0.23)	0.79	(0.11)
NC	1.12	(0.08)	1.01	(0.09)	0.97	(0.08)	0.83	(0.10)	1.81	(0.16)	1.58	(0.16)
OH	1.35	(0.15)	2.14	(0.22)	0.95	(0.10)	1.59	(0.26)	1.40	(0.18)	1.92	(0.31)
PA	1.27	(0.17)	1.30	(0.23)	1.57	(0.26)	1.04	(0.19)	0.93	(0.14)	1.28	(0.18)
RI <sup>b</sup>	----	----	0.76	(0.76)	----	----	0.67	(0.61)	----	----	----	----
SC	1.28	(0.12)	1.88	(0.18)	1.94	(0.23)	2.85	(0.35)	1.80	(0.19)	1.23	(0.12)
TN	1.38	(0.16)	2.01	(0.25)	1.36	(0.16)	1.19	(0.31)	1.44	(0.20)	1.82	(0.25)
VA	0.98	(0.09)	1.16	(0.15)	2.35	(0.31)	0.92	(0.11)	1.55	(0.19)	1.11	(0.12)
WI	1.64	(0.20)	1.39	(0.19)	2.78	(0.55)	3.14	(0.84)	1.34	(0.28)	2.35	(0.45)
WV	0.95	(0.32)	3.98	(1.19)	2.74	(0.71)	0.94	(0.23)	1.13	(0.17)	0.89	(0.17)
Central	1.16	(0.03)	1.12	(0.03)	0.99	(0.03)	1.07	(0.05)	1.23	(0.03)	1.15	(0.03)
AR	1.51	(0.15)	0.82	(0.10)	1.27	(0.15)	1.15	(0.17)	1.21	(0.16)	0.99	(0.15)
CO	1.62	(0.15)	1.48	(0.14)	0.92	(0.07)	1.09	(0.17)	1.35	(0.12)	0.84	(0.06)
IA	1.26	(0.21)	1.16	(0.13)	0.78	(0.09)	0.88	(0.19)	1.38	(0.10)	1.37	(0.15)
KS	1.37	(0.20)	1.50	(0.13)	1.00	(0.08)	1.00	(0.17)	1.32	(0.09)	1.25	(0.11)
MN	1.24	(0.16)	1.45	(0.25)	1.05	(0.21)	1.15	(0.41)	1.57	(0.36)	2.11	(0.53)
MO	1.07	(0.12)	1.93	(0.26)	2.41	(0.31)	1.17	(0.23)	1.42	(0.11)	2.19	(0.15)
MT	1.40	(0.26)	1.42	(0.26)	0.98	(0.12)	0.53	(0.14)	1.62	(0.22)	0.78	(0.10)
ND	1.23	(0.13)	1.24	(0.13)	1.32	(0.11)	1.00	(0.23)	2.12	(0.22)	1.28	(0.10)
NE	0.82	(0.08)	0.77	(0.10)	0.81	(0.09)	1.21	(0.23)	1.17	(0.11)	0.73	(0.06)
NM	0.52	(0.07)	0.41	(0.06)	0.77	(0.14)	0.84	(0.21)	0.46	(0.06)	0.61	(0.10)
OK	1.75	(0.19)	0.89	(0.10)	1.32	(0.15)	1.78	(0.29)	1.81	(0.20)	1.84	(0.30)
SD	1.07	(0.10)	0.93	(0.08)	0.91	(0.09)	0.97	(0.20)	1.15	(0.13)	1.29	(0.10)
TX	1.40	(0.11)	1.56	(0.10)	1.14	(0.10)	1.22	(0.16)	0.99	(0.06)	1.32	(0.09)
WY	2.06	(0.33)	0.89	(0.10)	0.81	(0.08)	2.27	(1.74)	1.03	(0.15)	0.71	(0.12)
Western	1.72	(0.08)	1.33	(0.06)	1.35	(0.05)	1.03	(0.06)	1.50	(0.06)	1.03	(0.04)
AZ	1.38	(0.13)	0.75	(0.05)	0.97	(0.06)	0.79	(0.06)	1.03	(0.06)	0.65	(0.05)
CA	1.62	(0.16)	1.54	(0.12)	1.41	(0.12)	1.44	(0.20)	1.71	(0.14)	1.30	(0.10)
ID	1.64	(0.17)	1.58	(0.17)	1.68	(0.21)	1.06	(0.15)	1.61	(0.18)	0.91	(0.12)
NV	1.30	(0.23)	0.93	(0.15)	1.57	(0.23)	0.58	(0.26)	1.17	(0.18)	0.85	(0.11)
OR	1.52	(0.18)	1.77	(0.39)	1.43	(0.26)	1.35	(0.34)	1.07	(0.27)	2.06	(0.42)
UT	1.27	(0.21)	1.70	(0.25)	0.85	(0.12)	0.76	(0.20)	1.85	(0.33)	1.71	(0.30)
WA	2.20	(0.26)	2.30	(0.48)	1.87	(0.25)	0.68	(0.16)	2.37	(0.27)	1.12	(0.15)

<sup>a</sup> Standard errors for estimates only incorporate sampling error for the proportion of young in the sample and do not incorporate additional uncertainty from correction factors for unknown age wings and differential vulnerability.

<sup>b</sup> Insufficient data to estimate age ratio for RI in most years.

**Table 6** (continued).

Management Unit State	2019 <sup>a</sup>		2007–2019		
			Sample Size	Mean	SE
Eastern	1.69	(0.05)	92,135	1.49	(0.01)
AL	2.06	(0.35)	4,316	1.66	(0.05)
DE	3.71	(1.89)	1,968	1.52	(0.07)
GA	2.01	(0.18)	6,202	1.77	(0.05)
IL	1.72	(0.19)	8,315	1.47	(0.03)
IN	1.47	(0.15)	10,299	1.50	(0.03)
KY	2.45	(0.23)	6,762	1.55	(0.04)
LA	1.29	(0.26)	1,972	1.69	(0.08)
MD	2.60	(0.48)	4,135	1.69	(0.05)
MS	1.46	(0.22)	4,882	1.33	(0.04)
NC	1.89	(0.22)	8,972	1.32	(0.03)
OH	0.95	(0.29)	4,482	1.49	(0.05)
PA	0.85	(0.18)	3,200	1.16	(0.04)
RI <sup>b</sup>	----	----	35	4.29	(1.85)
SC	1.89	(0.19)	9,019	1.64	(0.04)
TN	1.36	(0.23)	3,699	1.64	(0.06)
VA	1.15	(0.11)	9,652	1.29	(0.03)
WI	2.07	(0.36)	2,509	1.61	(0.07)
WV	1.29	(0.23)	1,716	1.46	(0.07)
Central	1.17	(0.04)	83,050	1.09	(0.01)
AR	1.85	(0.47)	4,454	1.36	(0.04)
CO	1.12	(0.10)	8,855	1.15	(0.02)
IA	1.10	(0.11)	2,819	1.18	(0.04)
KS	1.05	(0.14)	8,684	1.16	(0.02)
MN	0.90	(0.20)	1,860	1.31	(0.06)
MO	1.46	(0.13)	7,879	1.44	(0.03)
MT	1.72	(0.27)	2,722	1.19	(0.05)
ND	1.43	(0.14)	4,528	1.24	(0.04)
NE	0.94	(0.09)	7,479	0.87	(0.02)
NM	0.59	(0.10)	4,351	0.56	(0.02)
OK	0.94	(0.12)	6,403	1.32	(0.03)
SD	1.73	(0.17)	6,093	1.13	(0.03)
TX	1.25	(0.12)	13,573	1.09	(0.02)
WY	2.40	(0.61)	3,350	1.13	(0.04)
Western	1.14	(0.04)	43,171	1.21	(0.10)
AZ	0.75	(0.04)	14,411	0.72	(0.01)
CA	1.38	(0.08)	11,814	1.32	(0.02)
ID	0.81	(0.16)	3,783	1.37	(0.04)
NV	1.40	(0.27)	3,177	1.10	(0.04)
OR	2.19	(0.48)	1,857	1.48	(0.07)
UT	0.88	(0.14)	2,586	1.06	(0.04)
WA	2.26	(0.37)	5,543	1.61	(0.04)

<sup>a</sup> Standard errors for estimates only incorporate sampling error for the proportion of young in the sample and do not incorporate additional uncertainty from correction factors for unknown age wings and differential vulnerability.

<sup>b</sup> Insufficient data to estimate age ratio for RI in most years.

**Table 7.** Estimates of absolute abundance of mourning doves on 1 September each year based on band recovery and harvest data by year and management unit in the U.S., 2003–2019.

Year	Management Unit						Total (United States)	
	Eastern		Central		Western		N	SE
	N	SE	N	SE	N	SE		
2003	93,571,352	5,831,251	125,305,721	9,892,807	133,009,176	24,632,880	351,886,249	27,178,114
2004	83,931,176	3,527,293	224,087,285	14,291,753	85,123,531	10,268,152	393,141,992	17,948,006
2005	129,862,493	5,521,154	211,139,588	14,667,677	35,726,102	3,155,822	376,728,184	15,986,966
2006	88,778,565	3,615,957	209,043,761	14,261,539	49,068,419	4,630,127	346,890,746	15,424,161
2007	102,715,066	4,630,452	175,183,512	11,696,012	55,696,842	4,118,463	333,595,420	13,236,296
2008	96,127,567	3,958,908	185,317,548	12,016,929	50,193,383	4,220,613	331,638,499	13,337,658
2009	101,313,528	4,169,551	160,872,344	9,835,874	52,489,867	3,673,152	314,675,739	11,296,974
2010	88,484,776	4,099,096	160,883,858	10,369,817	55,747,201	3,945,975	305,115,836	11,828,204
2011	84,240,210	4,378,502	142,069,895	8,082,139	50,984,039	4,043,566	277,294,144	10,042,046
2012	84,947,366	4,328,390	153,272,774	12,611,491	66,517,652	5,236,408	304,737,792	14,324,966
2013	84,760,715	5,356,836	126,378,935	8,432,215	49,022,184	3,694,826	260,161,834	10,651,276
2014	67,341,741	3,429,433	170,318,077	10,187,274	43,791,382	3,230,983	281,451,199	11,224,117
2015	62,877,001	3,264,336	178,050,389	10,355,350	34,992,011	2,400,201	275,919,401	11,119,808
2016	62,420,827	3,523,536	171,989,660	13,765,186	45,713,478	3,479,971	280,123,964	14,628,939
2017	63,567,760	3,248,060	125,924,667	8,066,333	46,051,063	3,891,104	235,543,491	9,526,611
2018	53,104,011	2,588,621	135,640,419	7,661,716	57,125,365	3,807,598	245,869,794	8,938,717
2019	43,914,557	2,095,419	114,933,904	8,694,866	23,993,314	1,641,356	182,841,775	9,093,158

**Appendix A.** Federal framework dates, season length, and daily bag limit for mourning dove hunting in the U.S. by management unit, 1918–2020.

Year	Management Unit								
	Eastern			Central			Western		
	Dates <sup>a</sup>	Days	Bag	Dates	Days	Bag	Dates	Days	Bag
1918	Sep 1–Dec 31	107	25	Sep 1–Dec 15	106	25	Sep 1–Dec 15	106	25
1919–22	Sep 1–Jan 31	108	25	Sep 1–Dec 15	106	25	Sep 1–Dec 15	106	25
1923–28	Sep 1–Jan 31	108	25	Sep 1–Dec 31	106	25	Sep 1–Dec 15	106	25
1929	Sep 1–Jan 31	106	25	Sep 1–Dec 31	106	25	Sep 1–Dec 15	106	25
1930	Sep 1–Jan 31	108	25	Sep 1–Dec 15	106	25	Sep 1–Dec 15	106	25
1931	Sep 1–Jan 31	106	25	Sep 1–Dec 15	106	25	Sep 1–Dec 15	106	25
1932–33	Sep 1–Jan 31	106	18	Sep 1–Dec 15	106	18	Sep 1–Dec 15	106	18
1934	Sep 1–Jan 31	106	18	Sep 1–Jan 15	106	18	Sep 1–Dec 15	106	18
1935	Sep 1–Jan 31	107	20	Sep 1–Jan 16	106	20	Sep 1–Jan 05	107	20
1936	Sep 1–Jan 31	77	20	Sep 1–Jan 16	76	20	Sep 1–Nov 15	76	20
1937 <sup>b</sup>	Sep 1–Jan 31	77	15	Sep 1–Nov 15	76	15	Sep 1–Nov 15	76	15
1938	Sep 1–Jan 31	78	15	Sep 1–Nov 15	76	15	Sep 1–Nov 15	76	15
1939	Sep 1–Jan 31	78	15	Sep 1–Jan 31	77	15	Sep 1–Nov 15	76	15
1940	Sep 1–Jan 31	77	12	Sep 1–Jan 31	76	12	Sep 1–Nov 15	76	12
1941	Sep 1–Jan 31	62	12	Sep 1–Oct 27	42	12	Sep 1–Oct 12	42	12
1942	Sep 1–Oct 15	30	10	Sep 1–Oct 27	42	10	Sep 1–Oct 12	42	10
1943	Sep 1–Dec 24	30	10	Sep 1–Dec 19	42	10	Sep 1–Oct 12	42	10
1944	Sep 1–Jan 20	58	10	Sep 1–Jan 20	57	10	Sep 1–Oct 25	55	10
1945	Sep 1–Jan 31	60	10	Sep 1–Jan 31	60	10	Sep 1–Oct 30	60	10
1946	Sep 1–Jan 31	61	10	Sep 1–Jan 31	60	10	Sep 1–Oct 30	60	10
1947–48 <sup>c</sup>	Sep 1–Jan 31	60	10	Sep 1–Dec 3	60	10	Sep 1–Oct 30	60	10
1949	Sep 1–Jan 15	30	10	Sep 1–Nov 14	45	10	Sep 1–Oct 15	45	10
1950	Sep 1–Jan 15	30	10	Sep 1–Dec 3	45	10	Sep 1–Oct 15	45	10
1951	Sep 1–Jan 15	30	8	Sep 1–Dec 24	42	10	Sep 1–Oct 15	45	10
1952	Sep 1–Jan 10	30	8	Sep 1–Nov 6	42	10	Sep 1–Oct 12	42	10
1953	Sep 1–Jan 10	30	8	Sep 1–Nov 9	42	10	Sep 1–Oct 12	42	10
1954 <sup>d</sup>	Sep 1–Jan 10	40	8	Sep 1–Nov 9	40	10	Sep 1–Oct 31	40	10
1955	Sep 1–Jan 10	45	8	Sep 1–Nov 28	45	10	Sep 1–Dec 31	45	10
1956 <sup>e</sup>	Sep 1–Jan 10	55	8	Sep 1–Jan 10	55	10	Sep 1–Jan 10	50	10
1957	Sep 1–Jan 10	60	10	Sep 1–Jan 10	60	10	Sep 1–Jan 10	50	10
1958–59	Sep 1–Jan 15	65	10	Sep 1–Jan 15	65	10	Sep 1–Jan 15	50	10
1960–61 <sup>f</sup>	Sep 1–Jan 15	70 <sup>g</sup>	12	Sep 1–Jan 15	60	15	Sep 1–Jan 15	50	10
1962	Sep 1–Jan 15	70 <sup>g</sup>	12	Sep 1–Jan 15	60	12	Sep 1–Jan 15	50	10
1963	Sep 1–Jan 15	70 <sup>g</sup>	10	Sep 1–Jan 15	60	10	Sep 1–Jan 15	50	10
1964–67	Sep 1–Jan 15	70 <sup>g</sup>	12	Sep 1–Jan 15	60	12	Sep 1–Jan 15	50	12
1968	Sep 1–Jan 15	70 <sup>g</sup>	12	Sep 1–Jan 15	60	12	Sep 1–Jan 15	50	10
1969–70	Sep 1–Jan 15	70 <sup>g</sup>	18 <sup>h</sup>	Sep 1–Jan 15	60	10	Sep 1–Jan 15	50	10
1971–79	Sep 1–Jan 15	70 <sup>g</sup>	12	Sep 1–Jan 15	60	10	Sep 1–Jan 15	50	10
1980	Sep 1–Jan 15	70	12	Sep 1–Jan 15 <sup>i</sup>	60	10	Sep 1–Jan 15	70 <sup>j</sup>	10 <sup>k</sup>
1981	Sep 1–Jan 15	70	12	Sep 1–Jan 15 <sup>i</sup>	45 <sup>l</sup>	15 <sup>l</sup>	Sep 1–Jan 15	70 <sup>j</sup>	10 <sup>k</sup>
1982	Sep 1–Jan 15	45 <sup>m</sup>	15 <sup>m</sup>	Sep 1–Jan 15 <sup>i</sup>	45 <sup>m</sup>	15 <sup>m</sup>	Sep 1–Jan 15	45 <sup>m</sup>	15 <sup>m</sup>
1983–86	Sep 1–Jan 15	60 <sup>m</sup>	15 <sup>m</sup>	Sep 1–Jan 15 <sup>i</sup>	60 <sup>m</sup>	15 <sup>m</sup>	Sep 1–Jan 15	60 <sup>m</sup>	15 <sup>m</sup>
1987–07 <sup>n</sup>	Sep 1–Jan 15	60 <sup>m</sup>	15 <sup>m</sup>	Sep 1–Jan 15 <sup>i</sup>	60 <sup>m</sup>	15 <sup>m</sup>	Sep 1–Jan 15	60 <sup>o</sup>	10
2008	Sep 1–Jan 15	70	15	Sep 1–Jan 15 <sup>i</sup>	60 <sup>m</sup>	15 <sup>m</sup>	Sep 1–Jan 15	60 <sup>o</sup>	10
2009–13	Sep 1–Jan 15	70	15	Sep 1–Jan 15 <sup>i</sup>	70	15	Sep 1–Jan 15	60 <sup>o</sup>	10
2014	Sep 1–Jan 15	90	15	Sep 1–Jan 15 <sup>i</sup>	70	15	Sep 1–Jan 15	60 <sup>o</sup>	15
2015	Sep 1–Jan 15	90	15	Sep 1–Jan 15 <sup>i</sup>	70	15	Sep 1–Jan 15	60	15 <sup>p</sup>
2016–17	Sep 1–Jan 15	90	15	Sep 1–Jan 15 <sup>i</sup>	90	15	Sep 1–Jan 15	60	15 <sup>p</sup>
2018–19	Sep 1–Jan 31	90	15	Sep 1–Jan 15 <sup>i</sup>	90	15	Sep 1–Jan 15	60	15 <sup>p</sup>

<sup>a</sup> From 1918–1947, seasons for doves and other “webless” species were selected independently and the dates were the earliest opening and latest closing dates chosen. Dates were inclusive. There were different season lengths in various states with some choosing many fewer days than others. Only bag and possession limits, and season dates were specified.

<sup>b</sup> Beginning in 1937, the bag and possession limit included white-winged doves in selected states.

<sup>c</sup> From 1948–1953, states permitting dove hunting were listed by waterfowl flyway. Only bag and possession limits, and season dates were specified.

<sup>d</sup> In 1954–1955, states permitting dove hunting were listed separately. Only bag and possession limits, and season dates were specified.

## Appendix A. Continued.

<sup>e</sup> From 1956–1959, states permitting dove hunting were listed separately. Framework opening and closing dates for seasons (but no maximum days for season length) were specified for the first time along with bag and possession limits.

<sup>f</sup> In 1960, states were grouped by management unit for the first time. Maximum season length was specified for the first time.

<sup>g</sup> Half days.

<sup>h</sup> More liberal limits allowed in conjunction with an Eastern Management Unit hunting regulations experiment.

<sup>i</sup> The framework extended to January 25 in Texas.

<sup>j</sup> 50–70 days depending on state and season timing.

<sup>k</sup> Arizona was allowed 12.

<sup>l</sup> States had the option of a 60-day season and daily bag limit of 12.

<sup>m</sup> States had the option of a 70-day season and daily bag limit of 12.

<sup>n</sup> Beginning in 2002, the limits included white-winged doves in all states in the Central Management Unit. Beginning in 2006, the limits included white-winged doves in all states in the Eastern Management Unit.

<sup>o</sup> 30–60 days depending on state (30 in Idaho, Nevada, Oregon, Utah, Washington; 60 in Arizona and California).

<sup>p</sup> In Idaho, Nevada, Oregon, and Utah daily limit is 15 mourning and white-winged doves in the aggregate. In Arizona and California daily limit is 15 mourning and white-winged doves in the aggregate, of which no more than 10 can be white-winged doves.

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