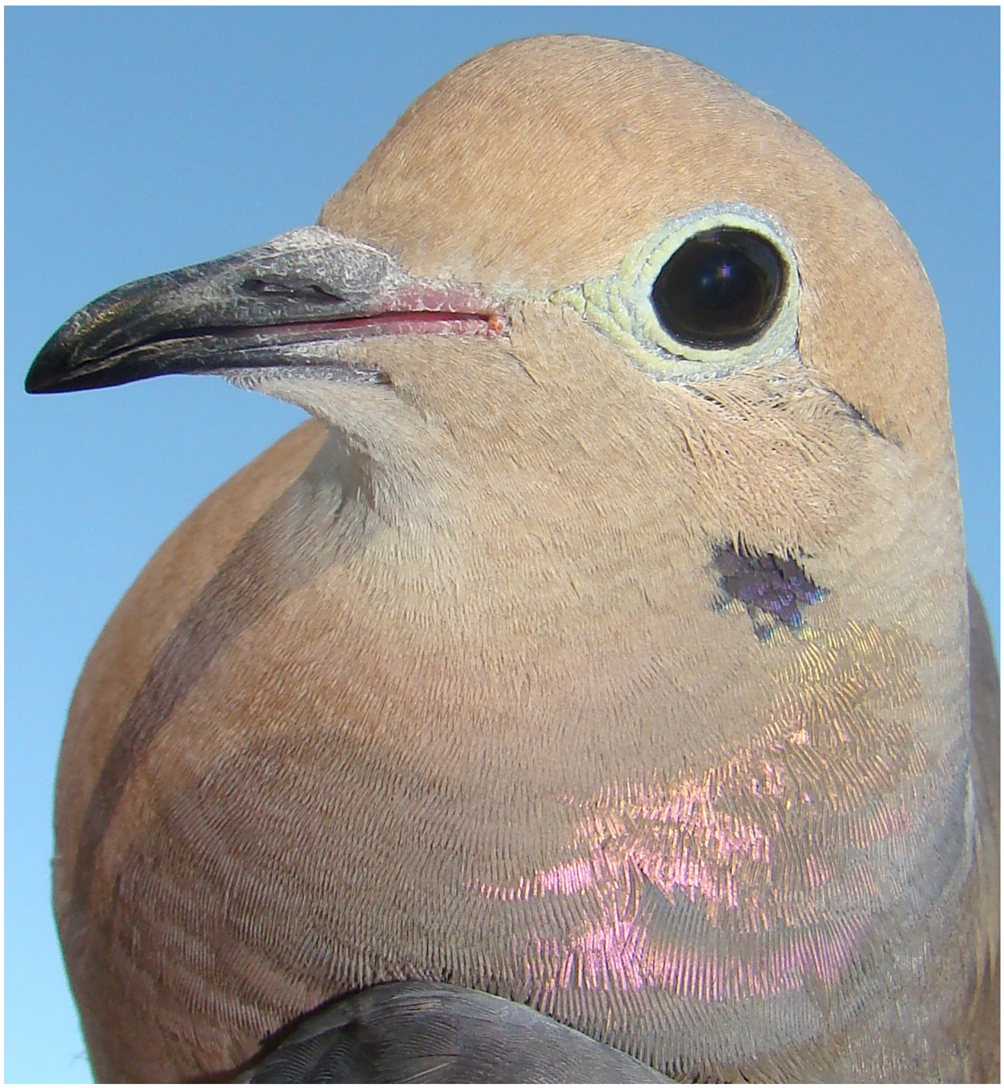
U.S. Fish & Wildlife Service

Mourning Dove

Population Status, 2019



Mourning Dove Population Status, 2019

U.S. Fish and Wildlife Service
Division of Migratory Bird Management
Branch of Assessment and Decision Support
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Cover photograph: Adult mourning dove. Photo by David Sharp.

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MOURNING DOVE POPULATION STATUS, 2019

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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 53 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 249 million doves in the U.S. as of 1 September 2018. Abundance (in millions of birds) varied among management units in 2018: EMU 56.5 (SE=2.7); CMU 136.8 (SE=7.6); and WMU 55.8 (SE=3.7). HIP estimates for mourning dove total harvest, active hunters, and total days afield in the U.S. in 2018 were 10,374,500 ± 429,500 (estimate ± SE) birds, 694,300 hunters, and 1,746,700 ± 69,000 days afield. Harvest and hunter participation at the management unit level were: EMU, 4,167,600 ±313,200 birds, 261,300 hunters, and 634,800 ± 40,200 days afield; CMU, 4,749,100 ± 283,900 birds, 332,900 hunters, and 852,100 ± 53,100 days afield; and WMU, 1,457,700 ± 76,000 birds, 100,100 hunters, and 259,800 ± 17,900 days afield.

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

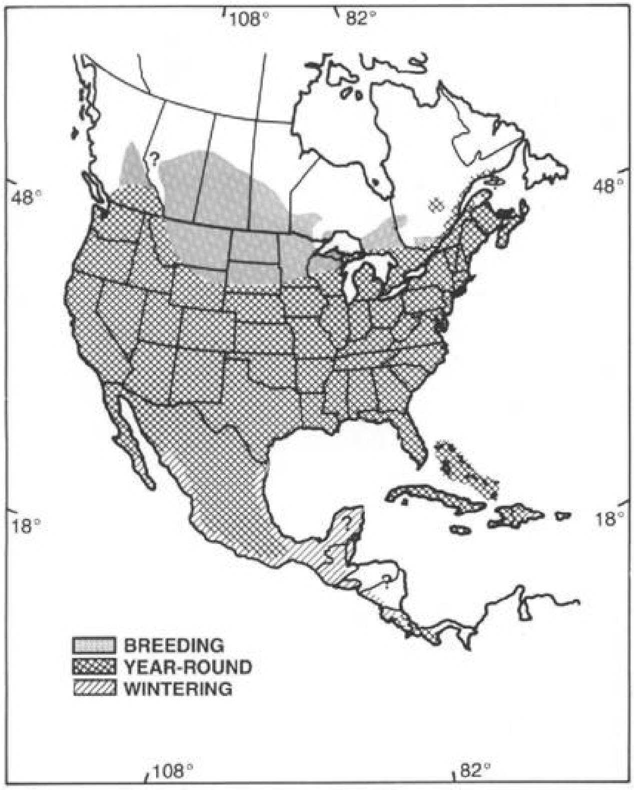

Figure 1. Breeding and wintering ranges of the mourning dove (adapted from Mirarchi and Baskett 1994).

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 1966–2018 BBS trend information is included in this report. Current-year BBS data are not available in time for inclusion in 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 the state 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

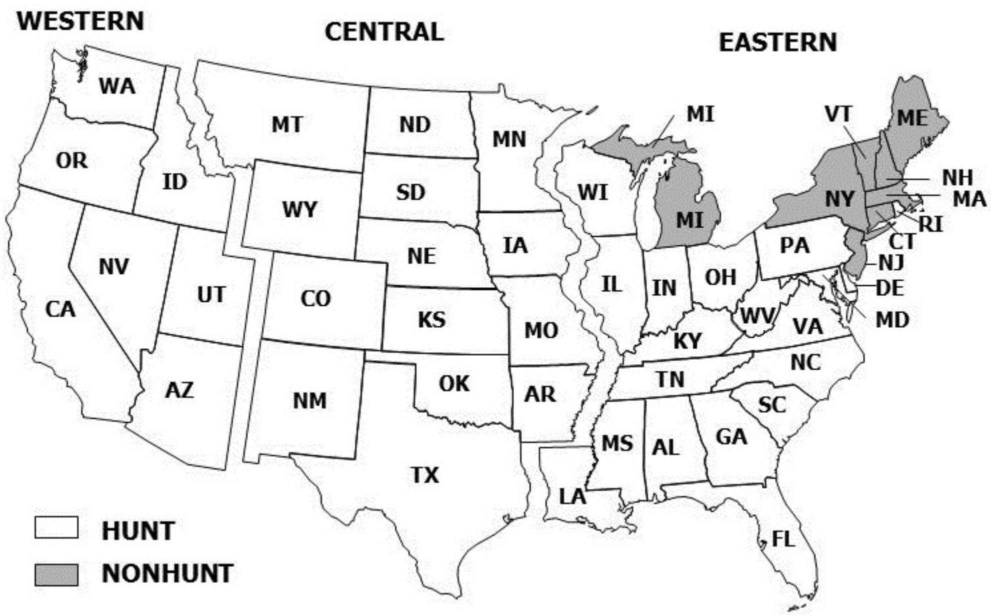

Figure 2.Mourning dove management units with 2018–19 hunt and non-hunt states.

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 2003–18 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. 2018). 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. Most 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 >100. 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. 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 53 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 53 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 53 years, and the most recent 10 years (Table 1).

Harvest Survey

Preliminary results of mourning dove harvest and hunter participation from HIP for the 2017–18 and 2018–19 hunting seasons are presented in Tables 2 and 3, respectively. Current (2018–19) HIP estimates indicate that in the U.S. about 10.4 million mourning doves were harvested by about 694,300 hunters who spent about 1.7 million days afield. The EMU and CMU total harvest represented 40% and 46%, respectively, of the national harvest of doves while the WMU represented 14% (Table 3). Between the 2017–18 and 2018–19 seasons: mourning dove harvest and hunter participation (days afield) declined in the EMU; hunter participation declined in the CMU yet the number of hunters remained the same; both number of hunters and participation increased in the WMU (Fig. 3, 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 16 years 301,112 doves were banded in the EMU, 259,686 in the CMU, and 121,767 in the WMU (Table 4). There have been 18,036, 12,798, and 4,256 recoveries of known-age banded birds in the EMU, CMU, and WMU, respectively.

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

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 46% greater than AHY harvest rate) than the CMU (21% greater) and WMU (9% 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 206,747 wings were obtained from 2007 to 2018 from birds harvested prior to September 15th. 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 2018 the WMU experienced lower-than-average age ratios in the

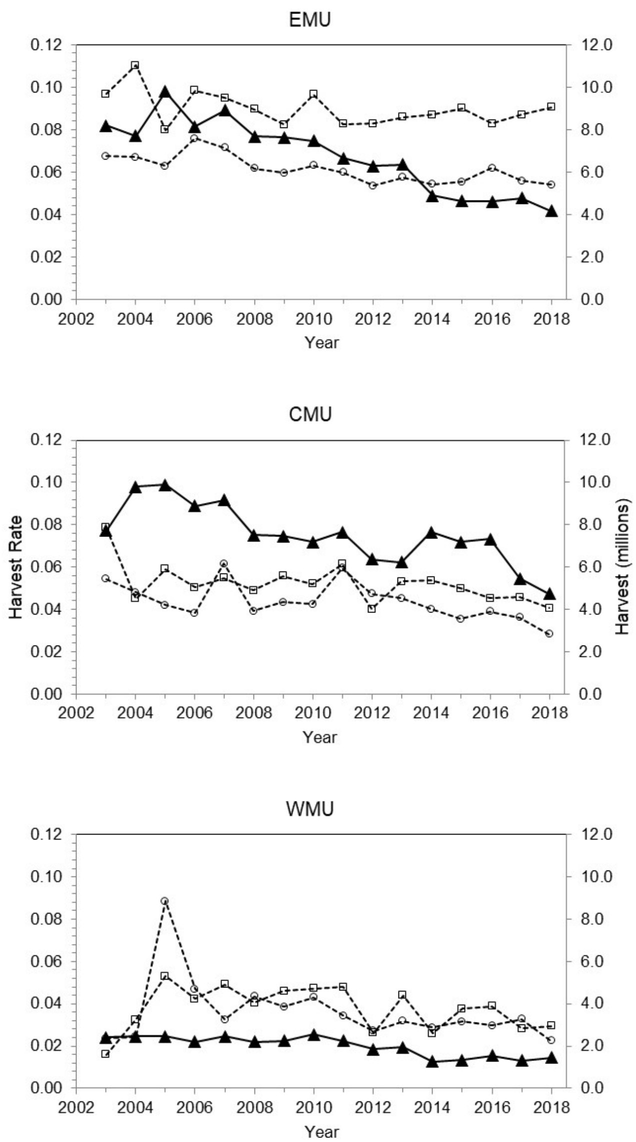

Figure 3. Estimated harvest (▲) and harvest rates of mourning dove 2003–2018. Harvest rates presented separately for hatch-year (□) and after-hatch-year (○) birds.

fall populations, whereas the EMU and CMU 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.

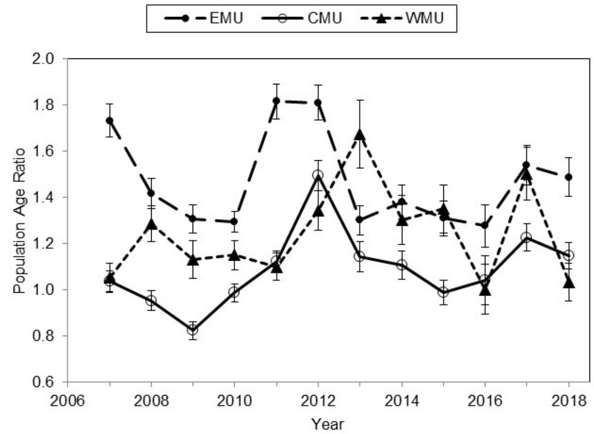

Figure 4. Estimated mourning dove fall population age ratios for each management unit, 2007–2018. Error bars represent 95% confidence intervals.

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 249 million mourning doves in the U.S. immediately prior to the 2018 hunting season. Compared to 2017, in 2018 abundance remained about the same in the CMU, declined in the EMU, and increased in the WMU.

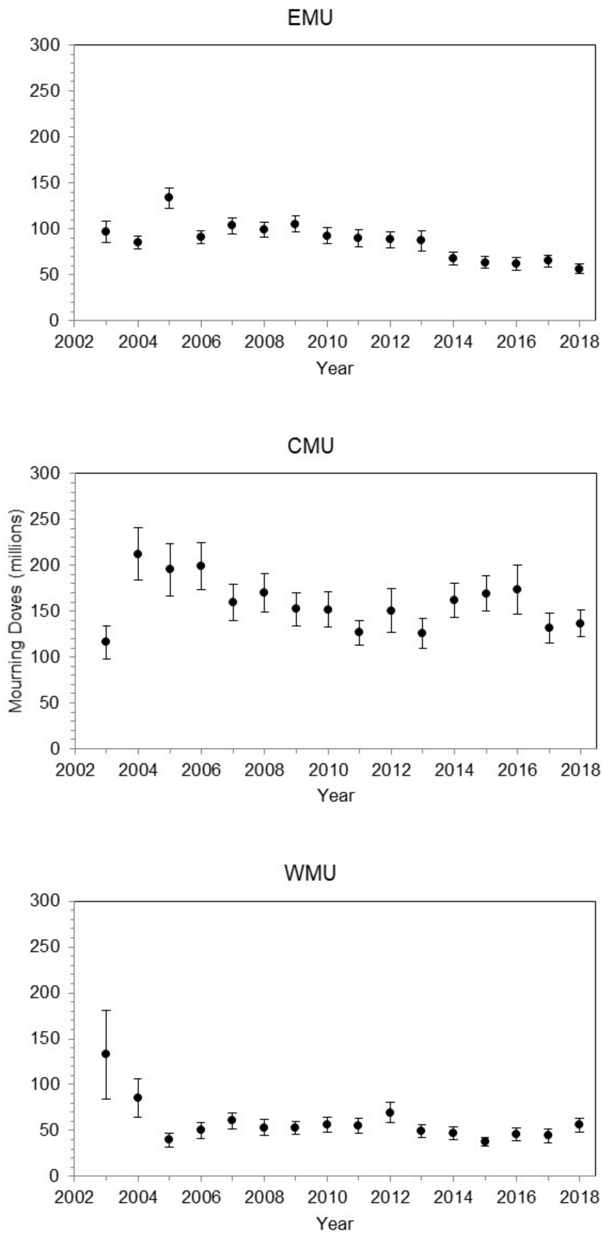

Figure 5. Estimates and 95% confidence intervals of mourning dove absolute abundance by management unit and year, 2003–2018. Estimates based on band recovery and harvest data.

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Table 1. Estimated trend[a] (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 53-year (1966–2018) and 10-year (2009–2018) periods.

Management Unit	53 year				10 year			
State	N	Trend	Lower	Upper	N	Trend	Lower	Upper
Eastern	1,781	0.3	0.2	0.4	1,472	-0.8	-1.1	-0.5
Hunt states	1,447	0.2	0.1	0.4	1,199	-0.9	-1.2	-0.6
AL	102	-0.9	-1.3	-0.6	87	-1.4	-2.5	-0.2
DE-MD	89	0.0	-0.3	0.2	72	-0.1	-1.0	0.8
FL	100	1.7	1.1	2.2	79	-0.1	-1.8	1.4
GA	105	-0.6	-0.9	-0.2	92	-0.2	-1.0	0.8
IL	102	0.5	0.0	0.9	100	-3.2	-4.3	-2.1
IN	64	-0.4	-0.8	0.0	53	-2.2	-3.6	-0.8
KY	56	0.6	0.2	1.0	37	0.2	-1.1	1.6
LA	94	2.2	1.7	2.7	71	1.6	0.3	2.9
MS	54	0.0	-0.5	0.5	43	0.3	-1.0	1.7
NC	95	0.2	-0.1	0.6	81	-0.4	-1.5	0.6
OH	78	0.5	0.1	0.9	59	-0.1	-1.5	1.3
PA	127	1.0	0.7	1.4	100	-1.1	-2.1	0.0
SC	47	-0.1	-0.6	0.3	38	-0.5	-1.9	0.8
TN	32	-0.2	-0.7	0.2	26	0.1	-1.1	1.3
VA	60	-0.2	-0.5	0.2	50	0.0	-1.0	1.0
WI	95	1.2	0.8	1.6	90	-2.2	-3.5	-1.0
WV	57	3.5	2.9	4.3	49	-1.3	-3.2	0.6
Non-hunt states	423	0.9	0.7	1.1	345	-0.1	-0.9	0.6
MI	90	0.5	0.1	1.0	72	-2.8	-4.4	-1.5
New England[b]	166	1.6	1.2	2.1	138	0.1	-1.1	1.3
NJ	42	-0.5	-1.0	0.1	30	-0.4	-1.5	0.7
NY	126	1.3	0.9	1.7	105	-0.3	-1.6	1.0
Central	1,223	-0.6	-0.7	-0.4	1,070	-0.8	-1.2	-0.4
AR	56	0.1	-0.5	0.7	49	-0.8	-2.7	1.1
CO	145	-0.6	-1.1	-0.1	133	-2.7	-4.0	-1.3
IA	38	0.6	0.1	1.0	32	0.6	-0.8	2.1
KS	65	-0.3	-0.7	0.1	61	-0.5	-1.9	0.9
MN	78	-1.1	-1.5	-0.6	73	-1.7	-3.1	-0.5
MO	93	-0.7	-1.2	-0.3	76	-0.4	-1.4	0.8
MT	88	-0.8	-1.3	-0.3	77	-0.6	-2.2	1.2
NE	51	-0.2	-0.7	0.2	46	-0.1	-1.2	0.9
NM	84	-0.7	-1.4	0.0	64	-3.4	-4.8	-1.8
ND	50	-0.1	-0.6	0.4	47	0.5	-1.1	2.2
OK	60	-1.2	-1.7	-0.8	53	-1.3	-2.6	0.1
SD	58	0.1	-0.4	0.6	52	-0.3	-1.9	1.3
TX	231	-0.8	-1.1	-0.5	206	-0.5	-1.4	0.4
WY	126	-1.3	-1.9	-0.7	101	-3.1	-4.5	-1.7
Western	719	-1.5	-1.8	-1.2	557	-4.4	-5.2	-3.6
AZ	88	-1.4	-2.1	-0.7	65	-2.0	-3.8	-0.2
CA	252	-1.0	-1.5	-0.6	188	-3.8	-5.1	-2.4
ID	50	-1.8	-2.7	-1.0	43	-7.0	-9.0	-4.9
NV	45	-2.3	-3.3	-1.4	32	-7.7	-10.8	-4.7
OR	117	-1.3	-2.2	-0.5	86	-6.6	-8.8	-4.3
UT	102	-2.7	-3.4	-1.9	90	-8.4	-10.1	-6.7
WA	77	-0.6	-1.2	-0.1	65	-1.6	-3.5	-0.1

[a]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.

[b] 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 95% confidence intervals (CI, expressed as the interval half width in percent) of mourning dove harvest and hunter activity during the 2017–18 hunting season[a]. Data rounded to nearest 100.

Management Unit	Harvest		Active hunters		Hunter days afield		Harvest per hunter[b]	
State	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
Eastern	4,783,300	8	286,200[a]	†[c]	758,500	8	†[c]	†[c]
AL	483,600	30	27,600	14	64,900	27	17.5	34
DE	19,600	36	1,600	30	4,100	49	12.5	47
FL	119,100	77	6,500	47	27,000	80	18.3	91
GA	963,500	20	43,500	12	121,600	18	22.2	24
IL	344,900	29	17,100	20	52,500	25	20.1	36
IN	122,100	20	10,300	23	25,300	23	11.9	31
KY	254,700	18	11,900	29	30,900	27	21.4	34
LA	141,900	32	15,800	32	30,800	33	9.0	45
MD	67,500	28	5,400	24	11,600	26	12.5	37
MS	316,500	25	13,600	18	35,700	22	23.3	30
NC	531,300	24	43,300	21	96,600	22	12.3	32
OH	67,200	43	5,900	30	16,000	39	11.4	53
PA	96,400	26	10,900	30	43,600	35	8.9	40
RI	800	194	200	117	500	122	4.0	226
SC	606,200	28	28,900	22	90,000	32	20.9	36
TN	334,800	39	19,400	25	44,300	30	17.3	46
VA	262,600	19	17,900	16	39,900	16	14.7	25
WI	40,800	37	5,500	31	20,500	34	7.5	48
WV	9,800	26	1,000	23	2,600	39	10.2	34
Central	5,462,800	10	332,200[a]	†[c]	1,058,800	11	†[c]	†[c]
AR	287,100	35	16,200	29	35,500	30	17.7	45
CO	117,600	25	11,300	19	24,100	20	10.4	31
IA	134,900	16	11,200	13	28,300	17	12.0	21
KS	290,600	34	21,800	24	58,300	35	13.3	41
MN	39,100	30	6,800	63	16,200	45	5.7	70
MO	367,200	18	27,400	13	65,700	16	13.4	22
MT	8,900	45	1,300	57	2,200	63	7.1	73
NE	177,900	16	12,300	16	31,000	15	14.5	23
NM	73,900	51	5,500	57	16,500	70	13.5	77
ND	59,400	26	4,100	26	11,400	31	14.7	36
OK	315,600	29	17,500	16	45,600	24	18.1	34
SD	111,600	31	5,700	22	18,400	26	19.5	38
TX	3,469,500	14	190,500	13	703,300	17	18.2	19
WY	9,400	57	700	42	2,200	84	13.1	71
Western	1,315,000	9	90,600[a]	†[c]	235,100	9	†[c]	†[c]
AZ	350,700	11	18,600	5	52,400	8	18.8	12
CA	766,900	12	50,100	9	125,700	13	15.3	15
ID	108,500	42	6,900	26	22,700	39	15.7	49
NV	16,000	32	2,700	25	6,200	44	6.0	40
OR	19,700	47	2,800	54	8,500	63	7.1	72
UT	29,600	55	6,800	32	15,000	46	4.3	64
WA	23,700	80	2,700	42	4,700	44	8.7	91
United States	11,561,100	6	709,000[a]	†[c]	2,052,400	7	†[c]	†[c]

[a]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.

[b]Seasonal harvest per hunter.

[c] No estimate available.

Table 3. Preliminary estimates and 95% confidence intervals (CI, expressed as the interval half width in percent) of mourning dove harvest and hunter activity during the 2018–19 hunting season[a]. Data rounded to nearest 100.

Management Unit	Harvest		Active hunters		Hunter days afield		Harvest per hunter[b]	
State	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
Eastern	4,167,600	7	261,300[a]	†[c]	634,800	6	†[c]	†[c]
AL	415,700	15	30,400	10	58,800	13	13.7	18
DE	15,000	37	1,100	22	2,400	35	13.1	43
FL	107,700	23	8,800	30	18,500	22	12.3	38
GA	679,700	15	32,400	10	84,800	18	21.0	18
IL	155,000	25	11,900	14	29,400	21	13.0	28
IN	110,800	28	7,400	22	15,900	21	14.9	35
KY	245,400	18	15,000	17	35,800	25	16.3	25
LA	133,200	39	8,000	30	22,000	34	16.7	49
MD	51,500	17	5,700	16	8,600	14	9.0	23
MS	273,400	15	15,700	11	32,800	12	17.4	18
NC	684,600	32	37,200	17	94,200	27	18.4	36
OH	169,100	21	12,800	17	36,300	21	13.2	27
PA	88,900	15	9,500	21	25,800	17	9.4	26
RI	1,700	49	600	31	2,400	45	3.0	58
SC	522,300	25	28,200	15	83,700	18	18.5	29
TN	276,800	20	15,500	19	31,600	19	17.8	28
VA	205,200	13	16,000	11	33,800	10	12.8	17
WI	18,100	34	3,600	28	14,100	33	5.0	44
WV	13,700	22	1,400	17	3,800	25	9.6	27
Central	4,749,100	6	332,900	†[c]	852,100	6	†[c]	†[c]
AR	170,600	26	12,400	21	24,500	21	13.8	33
CO	121,500	14	10,000	11	20,200	13	12.2	18
IA	107,800	11	9,000	11	23,500	13	12.0	15
KS	337,600	22	22,900	17	44,300	17	14.8	28
MN	55,300	25	7,100	34	16,900	32	7.8	42
MO	309,400	12	26,000	8	48,300	9	11.9	15
MT	9,800	22	1,200	29	3,500	32	8.0	37
NE	189,100	18	11,600	11	33,700	14	16.3	21
NM	126,900	16	9,900	10	28,200	12	12.8	18
ND	65,200	23	3,900	16	11,800	24	16.7	28
OK	181,300	16	13,600	15	29,200	15	13.4	22
SD	69,400	15	4,900	12	11,500	13	14.0	19
TX	2,990,400	9	199,100	9	553,200	9	15.0	12
WY	14,800	20	1,400	18	3,200	21	10.8	28
Western	1,457,700	5	100,100	†[c]	259,800	7	†[c]	†[c]
AZ	352,700	6	19,000	3	55,100	5	18.6	7
CA	892,600	7	52,500	6	129,400	8	17.0	9
ID	88,800	30	11,300	20	24,100	25	7.8	36
NV	21,400	28	2,700	17	6,200	23	7.9	33
OR	13,200	29	2,500	24	18,300	68	5.3	37
UT	25,300	18	6,400	13	12,400	20	4.0	23
WA	63,700	16	5,800	12	14,200	15	11.1	20
United States	10,374,500	4	694,300	†[c]	1,746,700	4	†[c]	†[c]

[a]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.

[b]Seasonal harvest per hunter.

[c] No estimate available.

Table 4. Number of mourning doves banded in each management unit, state, and year, 2003–2018. 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 State	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.[a]	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

[a]Combined total for North Atlantic non-hunt states: CT, NH, ME, MA, NJ, NY, and VT.

Table 4 (continued).

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

[a]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, 2003–2018. Estimates by age-class: hatch-year (HY) and after-hatch-year (AHY). Standard errors are in parentheses.

Management Unit	Annual Survival				Annual Harvest Rate			
State	HY (SE)		AHY (SE)		HY (SE)		AHY (SE)	
Eastern	0.272	(0.007)	0.404	(0.004)	0.089	(0.001)	0.061	(0.001)
AL	0.286	(0.021)	0.401	(0.018)	0.095	(0.008)	0.063	(0.005)
DE-MD[a]	0.295	(0.026)	0.367	(0.022)	0.124	(0.009)	0.088	(0.008)
FL	0.267	(0.032)	0.426	(0.026)	0.038	(0.006)	0.032	(0.005)
GA	0.286	(0.018)	0.403	(0.014)	0.125	(0.004)	0.079	(0.006)
IL	0.291	(0.019)	0.379	(0.019)	0.071	(0.003)	0.049	(0.004)
IN	0.273	(0.025)	0.398	(0.015)	0.083	(0.008)	0.076	(0.005)
KY	0.318	(0.020)	0.391	(0.014)	0.064	(0.004)	0.052	(0.004)
LA	0.301	(0.012)	0.445	(0.015)	0.108	(0.006)	0.053	(0.006)
MS	0.207	(0.017)	0.399	(0.019)	0.150	(0.009)	0.086	(0.005)
North Atl[b]	0.346	(0.094)	0.609	(0.072)	0.006	(0.008)	0.004	(0.003)
NC	0.209	(0.015)	0.384	(0.014)	0.098	(0.002)	0.063	(0.004)
OH	0.274	(0.021)	0.370	(0.016)	0.053	(0.003)	0.044	(0.003)
PA	0.228	(0.023)	0.420	(0.026)	0.044	(0.006)	0.020	(0.004)
SC	0.285	(0.016)	0.421	(0.012)	0.093	(0.005)	0.061	(0.004)
TN	0.215	(0.017)	0.383	(0.018)	0.113	(0.005)	0.074	(0.004)
VA	0.337	(0.039)	0.443	(0.026)	0.033	(0.006)	0.036	(0.004)
WI	0.301	(0.031)	0.476	(0.028)	0.053	(0.005)	0.032	(0.004)
WV	0.465	(0.050)	0.428	(0.045)	0.018	(0.003)	0.014	(0.003)
Central	0.277	(0.007)	0.447	(0.005)	0.051	(0.001)	0.042	(0.001)
AR	0.206	(0.022)	0.393	(0.023)	0.085	(0.013)	0.059	(0.006)
CO	0.583	(0.056)	0.483	(0.032)	0.012	(0.002)	0.026	(0.004)
IA	0.282	(0.019)	0.476	(0.016)	0.041	(0.008)	0.030	(0.007)
KS	0.324	(0.018)	0.464	(0.012)	0.065	(0.005)	0.059	(0.004)
MN	0.392	(0.039)	0.568	(0.029)	0.029	(0.005)	0.018	(0.004)
MO	0.160	(0.009)	0.355	(0.009)	0.160	(0.009)	0.134	(0.007)
MT	0.991	(0.002)	0.997	(0.000)	0.017	(0.006)	0.015	(0.004)
ND	0.540	(0.035)	0.573	(0.020)	0.020	(0.002)	0.012	(0.002)
NE	0.347	(0.034)	0.455	(0.018)	0.030	(0.004)	0.033	(0.003)
NM	0.664	(0.087)	0.564	(0.063)	0.007	(0.002)	0.006	(0.002)
OK	0.246	(0.018)	0.425	(0.019)	0.082	(0.006)	0.061	(0.009)
SD	0.453	(0.020)	0.491	(0.014)	0.035	(0.003)	0.026	(0.003)
TX	0.356	(0.023)	0.470	(0.016)	0.055	(0.005)	0.039	(0.004)
WY	0.487	(0.180)	0.391	(0.109)	0.012	(0.005)	0.013	(0.003)
Western	0.303	(0.014)	0.437	(0.008)	0.036	(0.001)	0.033	(0.001)
AZ	0.323	(0.024)	0.436	(0.017)	0.021	(0.003)	0.016	(0.002)
CA	0.291	(0.019)	0.430	(0.012)	0.057	(0.006)	0.062	(0.007)
ID	0.286	(0.046)	0.474	(0.032)	0.027	(0.004)	0.018	(0.003)
NV	0.338	(0.048)	0.476	(0.038)	0.041	(0.007)	0.034	(0.005)
OR	0.352	(0.050)	0.440	(0.040)	0.028	(0.009)	0.032	(0.005)
UT	0.220	(0.048)	0.417	(0.061)	0.020	(0.005)	0.012	(0.004)
WA	0.301	(0.024)	0.430	(0.026)	0.049	(0.006)	0.035	(0.008)

[a]Data combined for Delaware and Maryland.
[b]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, 2007–2018. 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 State	2007[a]		2008		2009		2010		2011		2012	
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[b]	----	----	----	----	----	----	----	----	----	----	----	----
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[c]	†[c]	†	†	†	†	†	†	†	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)

[a] 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.
[b] Insufficient data to estimate age ratio for RI in most years.
[c] Iowa did not have a hunting season until 2011.

Table 6 (continued).

Management Unit State	2013[a]		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[b]	----	----	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)

[a] 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.
[b] Insufficient data to estimate age ratio for RI in most years.

Table 6 (continued).

Management Unit State	2007–2018 Sample Size	Mean	SE
Eastern	87,906	1.48	(0.01)
AL	4,162	1.64	(0.05)
DE	1,945	1.51	(0.07)
GA	5,634	1.74	(0.05)
IL	7,970	1.46	(0.03)
IN	9,913	1.50	(0.03)
KY	6,216	1.49	(0.04)
LA	1,871	1.71	(0.08)
MD	3,990	1.67	(0.05)
MS	4,704	1.32	(0.04)
NC	8,651	1.31	(0.03)
OH	4,440	1.49	(0.05)
PA	3,111	1.18	(0.04)
RI[b]	19	2.00	(0.97)
SC	8,574	1.63	(0.04)
TN	3,557	1.65	(0.06)
VA	9,215	1.30	(0.03)
WI	2,362	1.59	(0.07)
WV	1,591	1.48	(0.08)
Central	78,826	1.08	(0.01)
AR	4,387	1.35	(0.04)
CO	8,364	1.15	(0.03)
IA	2,448	1.19	(0.05)
KS	8,449	1.16	(0.03)
MN	1,781	1.33	(0.06)
MO	7,351	1.44	(0.03)
MT	2,542	1.16	(0.05)
ND	4,117	1.23	(0.04)
NE	6,996	0.87	(0.02)
NM	4,187	0.56	(0.02)
OK	6,141	1.34	(0.03)
SD	5,662	1.10	(0.03)
TX	13,126	1.08	(0.02)
WY	3,275	1.11	(0.04)
Western	40,015	1.22	(0.01)
AZ	12,986	0.71	(0.01)
CA	10,726	1.31	(0.03)
ID	3,674	1.39	(0.05)
NV	3,068	1.09	(0.04)
OR	1,761	1.45	(0.07)
UT	2,435	1.08	(0.04)
WA	5,365	1.60	(0.04)

[b] 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., 2003–2018.

	Management Unit							
	Eastern		Central		Western		Total (United States)	
Year	N	SE	N	SE	N	SE	N	SE
2003	97,094,513	6,064,778	115,959,969	9,083,540	133,009,176	24,632,880	346,063,657	26,945,705
2004	85,261,922	3,771,785	212,277,363	14,399,028	85,332,781	10,816,458	382,872,066	18,399,841
2005	133,864,796	5,585,792	195,221,706	14,360,467	39,524,165	4,064,647	368,610,666	15,935,666
2006	91,226,766	3,681,597	198,935,183	13,132,836	49,982,543	4,595,130	340,144,492	14,392,385
2007	103,270,549	4,643,051	159,359,373	10,248,917	60,836,189	4,488,973	323,466,111	12,114,004
2008	99,161,449	4,099,339	170,152,446	10,776,807	53,223,559	4,336,301	322,537,454	12,318,590
2009	105,390,713	4,353,973	152,007,771	9,098,037	52,402,177	3,566,539	309,800,661	10,698,203
2010	92,630,840	4,310,457	151,673,346	9,683,098	56,445,553	3,982,475	300,749,739	11,322,656
2011	89,680,638	4,699,596	126,481,380	7,038,435	54,687,331	4,211,907	270,849,350	9,453,355
2012	88,177,763	4,506,764	150,524,296	12,213,567	69,601,648	5,522,306	308,303,707	14,141,358
2013	87,273,044	5,516,294	125,215,209	8,315,293	49,358,601	3,735,436	261,846,854	10,654,909
2014	67,906,148	3,455,880	161,973,868	9,626,455	46,934,185	3,451,022	276,814,201	10,794,503
2015	63,399,923	3,295,170	169,087,782	9,728,146	37,850,515	2,549,522	270,338,220	10,582,771
2016	62,546,909	3,533,429	173,240,690	13,794,854	45,484,932	3,459,388	281,272,531	14,654,368
2017	65,155,758	3,346,436	131,277,443	8,381,517	44,280,258	3,687,424	240,713,459	9,749,131
2018	56,519,885	2,783,635	136,817,698	7,561,142	55,765,865	3,698,489	249,103,448	8,865,569

Appendix A. Federal framework dates, season length, and daily bag limit for mourning dove hunting in the U.S. by management unit, 1918–2018.

	Management Unit								
	Eastern			Central			Western		
Year	Dates[a]	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[b]	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[c]	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[d]	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[e]	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[f]	Sep 1–Jan 15	70[g]	12	Sep 1–Jan 15	60	15	Sep 1–Jan 15	50	10
1962	Sep 1–Jan 15	70[g]	12	Sep 1–Jan 15	60	12	Sep 1–Jan 15	50	10
1963	Sep 1–Jan 15	70[g]	10	Sep 1–Jan 15	60	10	Sep 1–Jan 15	50	10
1964–67	Sep 1–Jan 15	70[g]	12	Sep 1–Jan 15	60	12	Sep 1–Jan 15	50	12
1968	Sep 1–Jan 15	70[g]	12	Sep 1–Jan 15	60	12	Sep 1–Jan 15	50	10
1969–70	Sep 1–Jan 15	70[g]	18[h]	Sep 1–Jan 15	60	10	Sep 1–Jan 15	50	10
1971–79	Sep 1–Jan 15	70[g]	12	Sep 1–Jan 15	60	10	Sep 1–Jan 15	50	10
1980	Sep 1–Jan 15	70	12	Sep 1–Jan 15[i]	60	10	Sep 1–Jan 15	70[j]	10[k]
1981	Sep 1–Jan 15	70	12	Sep 1–Jan 15[i]	45[l]	15[l]	Sep 1–Jan 15	70[j]	10[k]
1982	Sep 1–Jan 15	45[m]	15[m]	Sep 1–Jan 15[i]	45[m]	15[m]	Sep 1–Jan 15	45[m]	15[m]
1983–86	Sep 1–Jan 15	60[m]	15[m]	Sep 1–Jan 15[i]	60[m]	15[m]	Sep 1–Jan 15	60[m]	15[m]
1987–07[n]	Sep 1–Jan 15	60[m]	15[m]	Sep 1–Jan 15[i]	60[m]	15[m]	Sep 1–Jan 15	60[o]	10
2008	Sep 1–Jan 15	70	15	Sep 1–Jan 15[i]	60[m]	15[m]	Sep 1–Jan 15	60[o]	10
2009–13	Sep 1–Jan 15	70	15	Sep 1–Jan 15[i]	70	15	Sep 1–Jan 15	60[o]	10
2014	Sep 1–Jan 15	90	15	Sep 1–Jan 15[i]	70	15	Sep 1–Jan 15	60[o]	15
2015	Sep 1–Jan 15	90	15	Sep 1–Jan 15[i]	70	15	Sep 1–Jan 15	60	15[p]
2016–17	Sep 1–Jan 15	90	15	Sep 1–Jan 15[i]	90	15	Sep 1–Jan 15	60	15[p]
2018	Sep 1–Jan 31	90	15	Sep 1–Jan 15[i]	90	15	Sep 1–Jan 15	60	15[p]

[a] 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.

[b] Beginning in 1937, the bag and possession limit included white-winged doves in selected states.

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

[d] In 1954–1955, states permitting dove hunting were listed separately. Only bag and possession limits, and season dates were specified.

Appendix A. Continued.

[e] 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.

[f] In 1960, states were grouped by management unit for the first time. Maximum season length was specified for the first time.

[g] Half days.

[h] More liberal limits allowed in conjunction with an Eastern Management Unit hunting regulations experiment.

[i] The framework extended to January 25 in Texas.

[j] 50–70 days depending on state and season timing.

[k] Arizona was allowed 12.

[l] States had the option of a 60-day season and daily bag limit of 12.

[m] States had the option of a 70-day season and daily bag limit of 12.

[n] 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.

[o] 30–60 days depending on state (30 in Idaho, Nevada, Oregon, Utah, Washington; 60 in Arizona and California).

[p] 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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