U.S. Fish & Wildlife Service

Mourning Dove

Population Status, 2016

Mourning Dove Population Status, 2016

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

August 2016

Cover photograph: Mourning Doves by Theresa Twilley Wiltrout ©

Suggested citation:

Seamans, M. E. 2016. Mourning dove population status, 2016. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C.

All Division of Migratory Bird Management reports are available on our web site at:

https://www.fws.gov/birds/surveys-and-data/reports-and-publications.php

MOURNING DOVE POPULATION STATUS, 2016

MARK E. SEAMANS, U.S. Fish and Wildlife Service, Division of Migratory Bird Management, 755 Parfet Street Suite 235, Lakewood, CO 80215

Abstract: This report summarizes information collected annually in the U.S. on survival, recruitment, abundance and harvest of mourning doves. We report on trends in the number of doves heard and seen per route from the all-bird Breeding Bird Survey (BBS), and provide absolute abundance estimates based on band recovery and harvest data. Harvest and hunter participation are estimated from the Migratory Bird Harvest Information Program (HIP). BBS data suggested that the abundance of mourning doves over the last 50 years increased in the Eastern Management Unit (EMU) and decreased in the Central (CMU) and Western (WMU) Management Units. Estimates of absolute abundance are available only since 2003 and indicate that there were about 266 million doves in the U.S. as of 1 September 2015. Abundance varied among management units in 2015: EMU 63,286,288 (SE=3,290,229); CMU 165,991,834 (SE=9,523,964); and WMU 37,043,828 (SE=2,510,384). HIP estimates for mourning dove total harvest, active hunters, and total days afield in the U.S. in 2015 were 13,157,300 ±391,200 (estimate ± SE) birds, 748,800 hunters, and 2,241,900 ±69,600 days afield. Harvest and hunter participation at the unit level were: EMU, 4,644,900 ±188,700 birds, 297,000 hunters, and 780,400 ± 31,800 days afield; CMU, 7,180,300 ± 338,000 birds, 369,800 hunters, and 1,235,000 ± 61,100 days afield; and WMU, 1,332,200 ± 56,000 birds, 82,000 hunters, and 226,500 ± 9,900 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 2014). Past federal frameworks for hunting in the U.S. are in Appendix A.

DISTRIBUTION

The mourning dove is one of the most widely distributed and abundant birds in North America (Peterjohn et al. 1994, Fig. 1). 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 (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., there are three zones that 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 areas were established as separate management units in 1960 (Kiel 1961). Since that time, management decisions

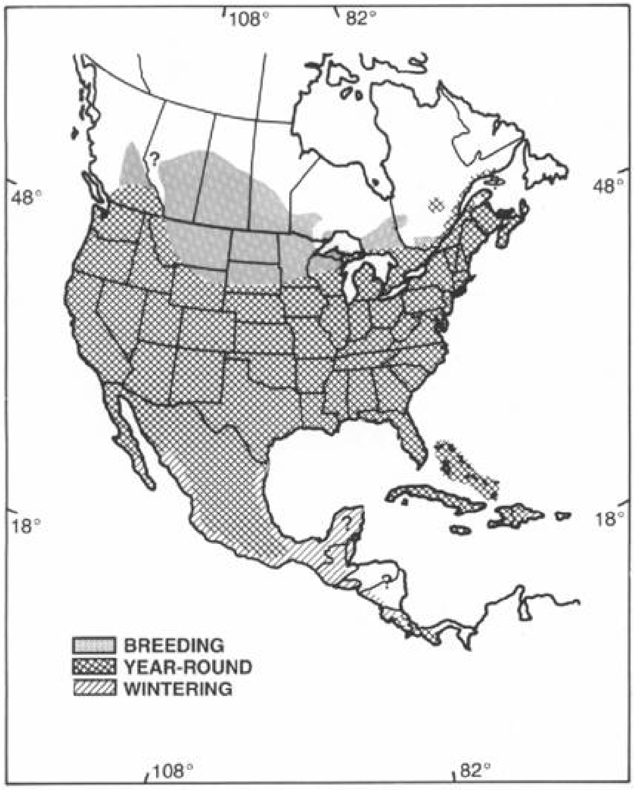

Figure 1. Breeding and wintering ranges of the mourning dove (adapted from Mirarchi and Baskett 1994).

have been made within the boundaries of the Eastern (EMU), Central (CMU), and Western (WMU) Management Units (Fig. 2). The EMU was further divided into two groups of states for analyses. States permitting dove hunting were combined into one group (hunt) and those prohibiting dove hunting into another (non-hunt). Wisconsin became a hunt state for the first time in 2003, Minnesota in 2004, and Iowa in 2011. 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) 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 within a 0.25-mile (400 m) radius or heard 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 harvest management decisions, it is still of interest because it provides independent estimates of trends in mourning dove abundance. Consequently, we are including 1966–2015 BBS trend information in this report. Current-year BBS data are not available in time for inclusion in the 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 between 1 September and 15 January (Appendix A).

Banding goals for each state (specified by Bird Conservation Region [BCR]) are based on a power analysis to estimate sample size 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, BCR areas and associated median BBS indices were used to determine sample size allocation. Placement of banding stations is left to the judgment of the state banding coordinator.

Harvest Survey

Wildlife professionals have long recognized that reliable harvest estimates are needed to monitor the impact of hunting. In the past, the U.S. Fish and Wildlife Service (USFWS) estimated harvest of mourning doves from the Mail Questionnaire Survey (Martin and Carney 1977, Martin 1979). However, the sampling frame was primarily waterfowl hunters because it included only those people who bought Migratory Bird Hunting and Conservation (Duck)

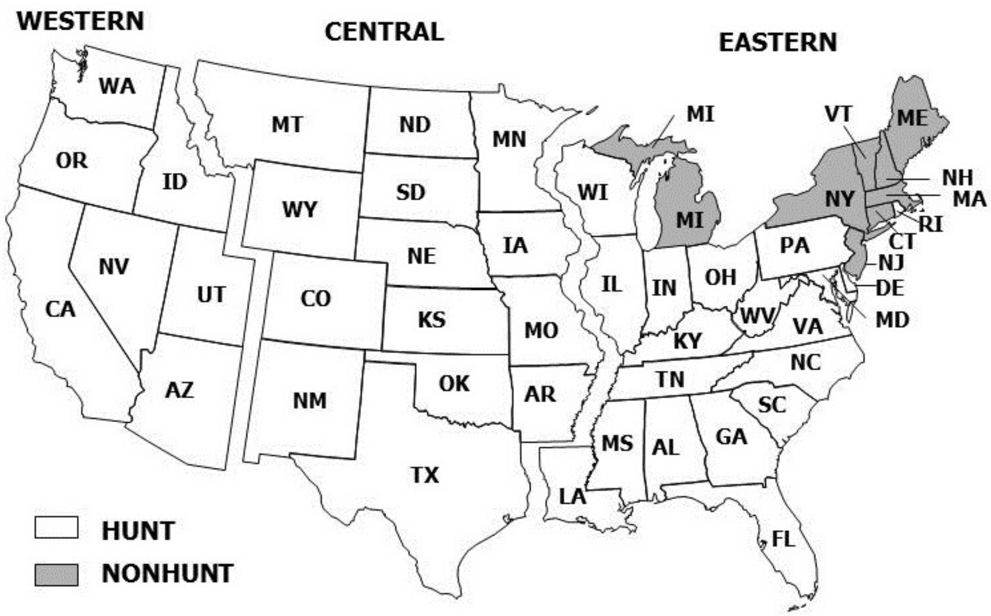

Figure 2.Mourning dove management units with 2016 hunt and non-hunt states.

Stamps. The estimate of harvest from this survey was not the total estimate of dove harvest, but rather the total estimate of dove harvest by hunters who purchased Duck Stamps. Therefore, it underestimated total dove harvest and dove hunter activity. Some states conducted dove harvest surveys, but the usefulness of these surveys in estimating dove harvest at larger scales was limited because of partial geographic coverage, the lack of consistent survey methodology, and thus an inability to compare survey results among states.

To remedy the limitations associated with the Mail Questionnaire Survey and the state surveys, the USFWS initiated the Migratory Bird Harvest Information Program (HIP). The program was established in 1992 and became fully operational on a national scale in 1999. HIP is designed to enable the USFWS to conduct nationwide surveys that provide reliable annual estimates of the harvest of mourning doves and other migratory game bird species at state, management unit, and national levels. Under HIP, states provide the USFWS with the names and addresses of all licensed migratory bird hunters each year and then surveys are conducted to estimate harvest and hunter participation (i.e., number of active hunters, total days afield) in each state. All states except Hawaii participate in the program.

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 easily obtained during the hunting season and can potentially 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. 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 3-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 or HY) or adults (after-hatch-year birds or AHY). A significant portion of wings are classified as unknown age where molt has progressed to a late stage. These harvest age ratios are used to estimate recruitment (population age ratio) after accounting for uncertainty related to unknown-age wings and age-specific harvest vulnerability (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 absolute abundance estimates. However, state and federal biologists are conducting a national study 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 that can be used to make regulatory decisions. Those interested in historic CCS information can look at previous status reports for mourning doves (available online at https://www.fws.gov/birds/surveys-and-data/reports-and-publications.php).

METHODS

Estimation of Trends in Abundance Indices

BBS trends were estimated using a log-linear hierarchical model and Bayesian analytical framework (Sauer et al. 2008, Sauer et al. 2010). The hierarchical model has a rigorous and realistic 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 strata-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. 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. We present the median and 95th percentile credible intervals 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 CI > 0 and there is evidence of negative trend if 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.

Estimation of Survival, Harvest Rate, Recruitment and Absolute Abundance

Band recovery models were used to estimate annual survival. Only direct recoveries were used to estimate harvest rates and data were adjusted for reporting rate (Sanders and Otis 2012) prior to analysis. We used a Seber parameterization (Seber 1970) and all dead recoveries to estimate survival rates. No adjustment was made to account for band reporting probabilities when estimating survival, and both direct and indirect recoveries were used.

We estimated age specific harvest and survival rates 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. We only estimated harvest rate for a year in a given state when the number of banded birds in an age-class was >100. Management unit level harvest rates were based on state weighted harvest rate estimates. The state weight was the product of state habitat area (area within state presumed to be dove habitat) and dove abundance estimated by the Call Count Survey-heard index during the most recent 5-year moving average (2009-2013, when the Call Count Survey was discontinued).

For estimating survival we formulated a model that allowed recovery rate to vary by state with an additive age effect, and allowed survival to vary by state and age. We used this model for inference regarding age and state specific survival rates.

We used the approach of Miller and Otis (2010) to estimate annual recruitment. We limited samples 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) band recoveries.

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 50 years (Table 1). Over the recent 10 years there was evidence that abundance remained unchaged in the EMU non-hunt states, declined in the hunt states, and remained relatively unchanged in the entire EMU.

Central Management Unit.—In the CMU, the BBS provided evidence that doves decreased in abundance over the last 50 years, but not the most recent 10 years (Table 1).

Western Management Unit.—The BBS provided evidence that dove abundance decreased in the WMU over the last 50 years but not during the most recent 10-year interval (Table 1).

Harvest Survey

Preliminary results of mourning dove harvest and hunter participation from HIP for the 2014 and 2015 hunting seasons are presented in Tables 2 and 3, respectively. Current (2015) HIP estimates indicate that in the U.S. about 13.2 million mourning doves were harvested by about 750,000 hunters that spent about 2.2 million days afield. The EMU and CMU total harvest represented 35% and 55%, respectively, of the national harvest of doves while the WMU represented 10% (Table 3). Considering the precision of estimates, mourning dove harvest and hunter participation were similar between the 2014 and 2015 seasons (Fig. 3, Tables 2 and 3).

Additional information about HIP, survey methodology, and results can be found in annual reports located in Harvest Survey's report page, Hunting Activity & Harvest at http://www.fws.gov/birds/surveys-and-data/reports-and-publications/hunting-activity-and-harvest.php.

Survival and Harvest Rate

Over the past 13 years 251,395, 205,930, and 93,364 mourning doves have been banded during July and August in the EMU, CMU and WMU, respectively (Table 4). There have been 15,667, 11,949, and 3,670 recoveries of banded birds in the EMU, CMU, and WMU, respectively.

Mean annual survival was similar between the CMU and WMU for both HY and AHY individuals (Table 5). HY and AHY survival in the EMU was lower than in the other 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

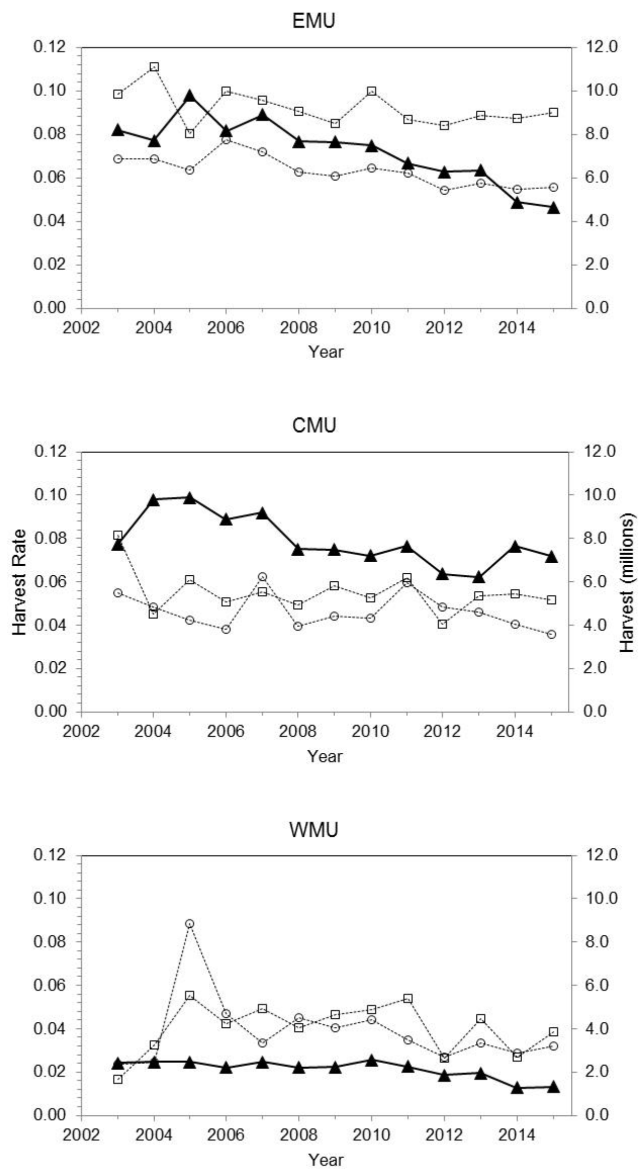

Figure 3. Estimated harvest (▲) and harvest rates of mourning dove 2003–2015. Harvest rates presented separately for hatch-year (□) and after-hatch-year (○).

(27% greater) and WMU (19% 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 the hunt states (Table 5).

Recruitment

We obtained 173,032 wings during 2007–2015 from

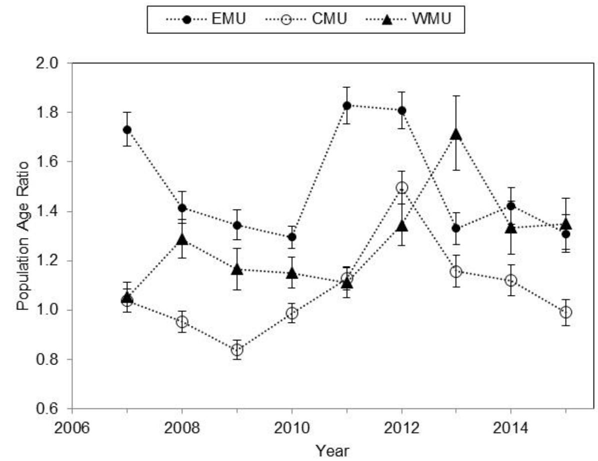

Figure 4. Estimated mourning dove fall population age ratios for each management unit, 2007–2015. Error bars represent 95% confidence intervals.

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 had higher average annual recruitment and more annual variation compared to the CMU and WMU (Fig. 4). In 2015 the WMU experienced a higher-than-average population age ratio, whereas the CMU and EMU were lower than average (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 now appear sufficient to calculate precise estimates of recruitment for all states.

We do not estimate age ratios for Florida because hunting seasons there do not start until 1 October 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

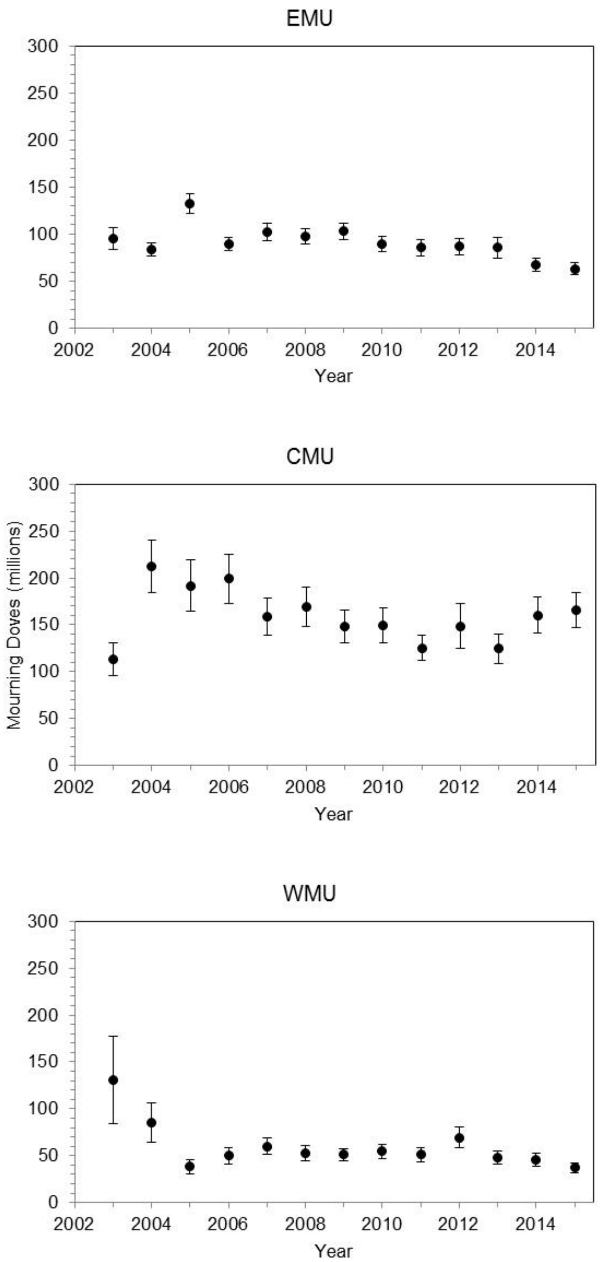

Figure 5. Estimates and 95% confidence intervals of mourning dove absolute abundance by management unit and year, 2003–2015. Estimates based on band recovery and harvest data.

estimating abundance during this period). The most recent estimates indicate that there were 266 million mourning doves in the U.S. immediately prior to the 2015 hunting season. Compared to previous years, abundance appeared to be very low in the WMU in 2015. However, abundance appeared to remain relatively unchanged in the EMU and CMU.

ACKNOWLEDGMENTS

State wildlife agencies and the U.S. Fish and Wildlife Service (USFWS) cooperated to collect the data presented in this report. The following participated in the November 2015 Dove Wingbee: M. Caby (MO), J. Duguay (LA), L. Fendrick (OH), J. Fleming (MO), A. Friesen (KS), S. Kelly (USFWS), T. Kulowiec (MO), W. Little (KY), J. Neal (OK), J. Odell (AZ), R. Rau (USFWS), R. Schultheis (KS), J. Schulz (UM), M. Symmank (TX), and S. Willis (TX). A special thanks to R. Bredesen (MO) for providing the space at the J.A. Reed Memorial Wildlife Area for the Wingbee. J. Sauer (USGS) analyzed the BBS data and provided statistical support. We recognize his commitment to the annual assessment of abundance data, report contributions, and extraordinary work hours during report preparation. K. Wilkins and B. Raftovich (USFWS) provided HIP and Parts Collection data, while T. Ceaser II, L. Heckstall, and P. Mathias (USFWS) entered data from the Dove Wingbee. M. Rogosky (USGS BBL) provided band and encounter data. J. Dubovksy, E. Kershner, P. Padding, R. Rau, and F. Rivera-Milán (USFWS) reviewed a draft of this report. V. Neatrour helped format and produce the cover page of this report. This report would not be possible without the significant contributions of all involved.

LITERATURE CITED

Aldrich, J.W. 1993. Classification and distribution. Pages 47-54 *in* T.S. Baskett, M.W. Sayre, R.E. Tomlinson, and R.E. Mirarchi, Editors. Ecology and management of the mourning dove. Stackpole Books, Harrisburg, Pennsylvania, USA.

Braun, C.E. 2014. Use of secondary feathers to age mourning doves. North American Bird Bander 39:1–6.

Buckland, S.T., D.R. Anderson, K.P. Burnham, J.L. Laake, D.L. Borchers, and L. Thomas. 2001. Introduction to distance sampling. Oxford University Press Inc., New York.

Dolton, D.D. 1993. The call-count survey: historic development and current procedures. Pages 233–252 *in* T.S. Baskett, M.W. Sayre, R.E. Tomlinson, and R.E. Mirarchi, editors. Ecology and management of the mourning dove. Stackpole Books, Harrisburg, Pennsylvania, USA.

Kiel, W.H. 1959. Mourning dove management units, a progress report. U.S. Fish and Wildlife Service, Special Scientific Report—Wildlife 42.

Kiel, W.H. 1961. The mourning dove program for the future. Transactions of the North American Wildlife and Natural Resources Conference 26:418–435.

Martin E.M. 1979. Hunting and harvest trends for migratory game birds other than waterfowl: 1964–76. U. S. Department of the Interior, Fish and Wildlife Service, Special Scientific Report No. 218, Washington, D.C., USA.

Martin, E. M., and S. M. Carney. 1977. Population ecology of the mallard, IV. A review of duck hunting regulations, activity, and success, with special reference to the mallard. U.S. Department of the Interior, Fish and Wildlife Service, Resource Publication 130, Washington, D.C., USA.

Miller, D.A., and D.L. Otis. 2010. Calibrating recruitment estimates for mourning doves from harvest age ratios. Journal of Wildlife Management 74:1070–1079.

Mirarchi, R.E. and T.S. Baskett. 1994. Mourning dove (*Zenaida macroura*). In A. Poole and F. Gill, editors, The birds of North America, No. 117. The Academy of Natural Sciences, Philadelphia and The American Ornithologists' Union, Washington, D.C., USA.

Otis, D.L. 2006. A mourning dove hunting regulation strategy based on annual harvest statistics and banding data. Journal of Wildlife Management 70:1302–1307.

Otis, D.L. 2009. Mourning dove banding needs assessment. U.S. Fish and Wildlife Service. Unpublished report. 22pp. Available online: https://www.fws.gov/birds/surveys-and-data/webless-migratory-game-birds/doves-and-pigeons.php

Peterjohn, B. G., J. R. Sauer and W. A. Link. 1994. The 1992 and 1993 summary of the North American breeding bird survey. Bird Populations 2:46–61.

Ruos, J. L., and R. E. Tomlinson. 1967. Results of mourning dove wing collection in the eastern management unit, 1966–67. U.S. Bureau of Sport Fisheries and Wildlife Administration Report, Washington, D.C., USA.

Sanders, T. A., and D. L. Otis. 2012. Mourning dove reporting probabilities for web-address versus toll-free bands. Journal of Wildlife Management 76:480–488.

Sauer, J. R., W. A. Link, W. L. Kendall, and D. D. Dolton. 2010. Comparative analysis of mourning dove population change in North America. Journal of Wildlife Management 74:1059–1069.

Sauer, J. R., W. A. Link, W. L. Kendall, J. R. Kelly, and D. K. Niven. 2008. A hierarchical model for estimating change in American woodcock populations. Journal of Wildlife Management. 58:204–214.

Seber, G.A.F. 1970. Estimating time-specific survival and reporting rates for adult birds from band returns. Biometrika 57:313–318.

U.S. Department of the Interior. 2013. Final Supplemental Environmental Impact Statement: Issuance of annual regulations permitting the sport hunting of migratory birds. U.S. Fish and Wildlife Service. Washington, D.C., USA. Available online at: https://www.fws.gov/birds/policies-and-regulations/regulations/how-regulations-are-set-the-process.php

U.S. Fish and Wildlife Service. 2014. Mourning Dove Harvest Strategy. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C. Available online at: https://www.fws.gov/birds/surveys-and-data/webless-migratory-game-birds/doves-and-pigeons.php

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 50-year (1966–2015) and 10-year (2006–2015) periods.

Management Unit	50 year				10 year			
State	N	Trend	Lower	Upper	N	Trend	Lower	Upper
Eastern	1,750	0.4	0.3	0.5	1,450	-0.3	-0.6	0.0
Hunt states	1,422	0.4	0.2	0.5	1,185	-0.4	-0.7	-0.1
AL	97	-1.1	-1.5	-0.7	82	-1.0	-2.1	0.2
DE-MD	86	-0.1	-0.3	0.2	72	-0.5	-1.6	0.4
FL	99	2.0	1.4	2.6	79	1.0	-0.5	2.3
GA	101	-0.6	-0.9	-0.2	88	-0.4	-1.2	0.6
IL	102	0.5	0.1	1.0	99	-3.4	-4.5	-2.3
IN	63	-0.3	-0.7	0.1	54	-2.2	-3.6	-0.8
KY	56	0.8	0.3	1.2	37	1.1	-0.2	2.6
LA	95	2.5	2.0	3.0	71	2.9	1.6	4.2
MS	54	0.0	-0.7	0.7	43	0.6	-0.9	2.3
NC	94	0.4	0.0	0.7	80	0.5	-0.4	1.3
OH	78	0.9	0.4	1.3	59	-0.8	-2.2	0.6
PA	127	1.1	0.7	1.5	101	-0.1	-1.2	0.9
SC	45	-0.1	-0.6	0.4	38	-0.2	-1.5	1.0
TN	29	-0.4	-0.9	0.1	23	0.0	-1.1	1.3
VA	57	-0.1	-0.5	0.2	49	0.0	-1.0	1.0
WI	95	1.2	0.8	1.7	90	-0.6	-1.9	0.7
WV	57	3.7	2.9	4.4	49	-0.6	-2.5	1.4
Non-hunt states	414	1.0	0.8	1.2	337	0.4	-0.3	1.2
MI	87	0.8	0.4	1.2	71	-0.6	-1.9	0.7
New England[b]	161	1.8	1.3	2.3	134	0.5	-0.7	1.8
NJ	41	-0.5	-1.1	0.1	29	-0.5	-1.8	0.6
NY	126	1.4	1.0	1.9	102	1.0	-0.4	2.3
Central	1,190	-0.5	-0.6	-0.3	1,046	0.2	-0.2	0.6
AR	54	0.3	-0.3	0.9	48	1.3	-0.7	3.4
CO	143	-0.5	-1.1	0.0	130	-2.5	-4.0	-1.1
IA	38	0.6	0.1	1.2	32	1.1	-0.4	2.8
KS	65	-0.2	-0.6	0.3	62	0.1	-1.4	1.6
MN	78	-1.0	-1.4	-0.5	72	-0.6	-1.9	0.7
MO	84	-0.8	-1.3	-0.3	71	0.4	-0.7	1.7
MT	75	-0.7	-1.2	0.0	71	0.5	-1.1	2.6
NE	51	-0.2	-0.7	0.3	46	0.1	-1.0	1.3
NM	78	-0.2	-0.9	0.5	59	-0.1	-1.8	1.6
ND	50	-0.2	-0.7	0.4	47	-0.2	-1.9	1.3
OK	60	-1.2	-1.7	-0.7	53	-1.2	-2.7	0.2
SD	58	0.1	-0.4	0.6	51	1.0	-0.6	2.8
TX	230	-0.7	-1.0	-0.3	205	1.3	0.4	2.2
WY	126	-1.0	-1.6	-0.3	99	-0.6	-2.1	0.8
Western	708	-1.1	-1.4	-0.7	552	-0.8	-1.7	0.1
AZ	87	-1.1	-1.8	-0.3	64	-2.2	-4.0	-0.4
CA	250	-0.6	-1.0	-0.2	186	0.2	-1.4	1.7
ID	48	-0.8	-1.7	0.0	42	2.5	0.3	4.8
NV	43	-1.9	-2.9	-0.9	30	-2.9	-6.3	0.7
OR	114	-0.9	-1.8	-0.1	89	2.2	-0.1	4.7
UT	101	-1.9	-2.7	-1.0	89	-1.9	-3.7	-0.1
WA	77	-0.2	-0.8	0.4	64	0.2	-1.2	1.8

[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 CI > 0 and there is evidence of negative trend if the 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 for management units and states during the 2014 hunting season[a].

Management Unit	Total harvest		Active hunters		Hunter days afield		Harvest per hunter[b]	
State	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
Eastern	4,889,800	8	310,200	†[c]	791,300	7	†	†
AL	467,200	17	30,600	12	65,900	15	15.3	20
DE	13,600	66	1,100	53	2,400	65	12.8	84
FL	155,400	27	9,300	32	28,000	27	16.7	42
GA	661,600	14	39,700	13	94,600	13	16.7	19
IL	380,800	25	20,200	16	56,600	20	18.9	30
IN	147,500	38	7,300	19	24,800	32	20.1	42
KY	255,000	62	14,200	48	33,200	53	17.9	79
LA	172,200	48	15,200	32	38,300	48	11.4	58
MD	86,500	25	6,000	23	14,400	23	14.5	32
MS	293,400	25	13,800	16	39,600	26	21.2	30
NC	626,100	27	39,800	19	90,600	21	15.7	34
OH	168,800	24	12,000	20	37,100	20	14	31
PA	147,200	27	19,700	24	57,600	23	7.5	37
RI	1,200	163	100	0	400	98	13	185
SC	681,500	28	30,000	18	87,700	28	22.7	34
TN	413,000	27	27,600	20	59,400	24	15	33
VA	160,700	13	15,600	15	36,000	23	10.3	19
WI	51,100	26	7,500	29	23,500	30	6.8	40
WV	7,000	53	500	39	1,300	45	13.5	65
Central	7,654,700	10	427,100	†	1,333,600	9	†	†
AR	347,900	29	19,900	21	47,900	28	17.5	36
CO	173,100	19	14,400	14	27,800	16	12	25
IA	130,000	13	9,200	9	27,100	12	14.2	17
KS	485,300	18	26,200	10	70,700	14	18.5	21
MN	54,800	29	6,900	51	20,200	59	8	59
MO	374,200	17	24,100	12	62,200	15	15.5	21
MT	8,500	37	1,400	42	2,900	41	6	56
NE	172,900	15	9,700	12	26,700	13	17.7	20
NM	115,200	15	7,600	10	24,100	15	15.1	18
ND	47,600	23	3,900	25	11,900	30	12.2	34
OK	417,900	21	19,100	13	56,900	24	21.9	25
SD	106,800	25	6,400	21	17,500	24	16.7	32
TX	5,199,400	14	276,800	10	934,300	13	18.8	17
WY	21,100	25	1,500	26	3,400	23	13.6	33
Western	1,265,000	8	102,300	†	261,800	8	†	†
AZ	370,000	10	24,200	6	65,600	9	15.3	12
CA	677,100	13	52,600	9	136,000	13	12.9	17
ID	111,000	28	9,900	20	25,700	24	11.2	33
NV	24,800	29	2,700	22	6,600	27	9.1	37
OR	19,600	31	3,600	27	8,800	36	5.5	43
UT	34,000	25	5,800	17	12,200	32	5.9	30
WA	28,400	28	3,400	23	6,900	26	8.3	35
United States	13,809,500	6	839,600	†	2,386,700	6	†	†

[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 for management units and states during the 2015 hunting season[a].

Management Unit	Total harvest		Active hunters		Hunter days afield		Harvest per hunter[b]	
State	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
Eastern	4,644,900	8	297,000	†[c]	780,400	8	†	†
AL	428,000	19	26,700	12	59,500	17	16.1	23
DE	24,900	29	1,300	30	3,700	32	19.5	39
FL	141,900	39	7,000	34	22,400	29	20.3	52
GA	725,700	16	41,800	13	104,400	21	17.3	20
IL	283,600	30	18,400	18	55,800	38	15.4	36
IN	93,600	23	7,900	22	24,600	39	11.9	31
KY	286,500	29	15,200	21	38,300	26	18.9	35
LA	214,100	42	16,400	27	39,000	40	13.1	51
MD	63,100	28	5,200	23	12,300	24	12.1	36
MS	257,100	18	16,200	17	34,900	21	15.9	25
NC	734,300	29	48,700	20	117,500	25	15.1	35
OH	131,200	35	8,600	25	28,000	33	15.3	42
PA	119,200	35	17,800	28	58,500	41	6.7	44
RI	1,100	125	300	65	1,200	131	4.3	146
SC	548,600	24	27,900	19	72,000	21	19.7	31
TN	288,400	45	12,000	41	35,100	45	24.0	61
VA	229,500	20	17,300	16	40,400	27	13.2	25
WI	60,400	63	7,100	33	29,400	46	8.5	71
WV	13,700	21	1,500	13	3,700	26	9.3	30
Central	7,180,300	9	369,800	†	1,235,000	10	†	†
AR	252,400	22	17,800	24	37,600	22	14.2	33
CO	204,500	22	14,200	15	38,900	23	14.4	26
IA	111,500	18	9,200	15	24,600	16	12.1	23
KS	558,200	20	28,600	13	86,400	18	19.5	24
MN	96,700	86	9,700	48	28,200	54	10.0	100
MO	307,400	24	22,500	14	54,300	17	13.6	27
MT	18,000	54	1,600	49	5,100	54	11.0	69
NE	160,600	17	9,000	17	25,500	18	17.9	25
NM	111,900	22	7,000	11	23,100	14	16.0	25
ND	73,500	25	4,200	23	12,800	25	17.3	34
OK	294,000	18	18,200	15	45,300	17	16.1	24
SD	84,500	30	5,300	15	16,000	25	16.0	34
TX	4,892,100	13	220,700	11	834,000	14	22.2	18
WY	14,900	28	1,700	23	3,300	30	8.9	40
Western	1,332,200	8	82,000	†	226,500	9	†	†
AZ	401,400	7	17,100	3	53,900	5	23.5	8
CA	686,800	13	43,600	10	114,100	14	15.8	16
ID	100,700	45	5,200	26	18,500	40	19.3	52
NV	22,400	23	2,200	27	5,000	24	10.1	31
OR	22,500	35	3,200	31	9,100	43	7.0	48
UT	54,800	39	6,500	21	14,600	30	8.5	44
WA	43,600	41	4,200	28	11,200	33	10.3	49
United States	13,157,300	6	748,800	†	2,241,900	6	†	†

[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, 2003–2015. 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	987
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	0	0	0	0	0	14	22	0	0	0
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)***.*** Number of mourning doves banded in each management unit, state, and year, 2003–2015. 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	2014	2015
Eastern	17,993	18,448
AL	1,149	987
DE	202	38
FL	906	772
GA	954	1,336
IL	1,988	2,048
IN	1,237	977
KY	1,430	1,759
LA	1,066	1,769
MD	279	306
MI	0	0
MS	791	675
North Atl.[a]	141	173
NC	1,326	1,163
OH	1,336	1,312
PA	993	795
RI	0	0
SC	1,831	1,990
TN	677	611
VA	525	580
WI	789	800
WV	373	357
Central	21,545	19,516
AR	342	300
CO	1,335	1,011
IA	1,960	2,027
KS	3,233	3,332
MN	782	388
MO	2,997	1,966
MT	417	439
NE	1,505	1,357
NM	661	701
ND	1,675	1,620
OK	1,561	1,604
SD	1,872	2,052
TX	2,770	2,391
WY	435	328
Western	10,139	10,951
AZ	3,319	2,983
CA	3,510	4,535
ID	756	770
NV	600	401
OR	1,122	1,057
UT	349	282
WA	483	923
United States	49,677	48,915

[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, 2003–2015. 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	0.25	(0.01)	0.41	(0.01)	0.088	(0.001)	0.060	(0.001)
AL	0.25	(0.01)	0.32	(0.03)	0.101	(0.009)	0.066	(0.005)
DE-MD[a]	0.24	(0.02)	0.42	(0.02)	0.127	(0.009)	0.088	(0.009)
FL	0.24	(0.02)	0.41	(0.02)	0.040	(0.006)	0.032	(0.007)
GA	0.24	(0.01)	0.41	(0.02)	0.129	(0.006)	0.076	(0.007)
IL	0.24	(0.01)	0.40	(0.01)	0.071	(0.004)	0.052	(0.006)
IN	0.23	(0.01)	0.41	(0.02)	0.076	(0.007)	0.076	(0.006)
KY	0.25	(0.01)	0.40	(0.02)	0.062	(0.004)	0.052	(0.005)
LA	0.28	(0.01)	0.42	(0.01)	0.114	(0.007)	0.063	(0.007)
MS	0.22	(0.01)	0.46	(0.01)	0.154	(0.008)	0.087	(0.006)
North Atl[b]	0.39	(0.07)	0.38	(0.02)	0.005	(0.001)	0.003	(0.001)
NC	0.21	(0.01)	0.58	(0.08)	0.105	(0.009)	0.067	(0.004)
OH	0.21	(0.01)	0.37	(0.01)	0.056	(0.003)	0.046	(0.004)
PA	0.23	(0.02)	0.37	(0.02)	0.050	(0.007)	0.026	(0.004)
SC	0.27	(0.01)	0.40	(0.02)	0.093	(0.006)	0.061	(0.004)
TN	0.21	(0.01)	0.45	(0.01)	0.111	(0.005)	0.076	(0.004)
VA	0.27	(0.02)	0.37	(0.02)	0.045	(0.006)	0.041	(0.005)
WI	0.31	(0.02)	0.45	(0.02)	0.059	(0.005)	0.037	(0.004)
WV	0.25	(0.01)	0.49	(0.03)	0.022	(0.003)	0.015	(0.004)
Central	0.28	(0.01)	0.45	(0.01)	0.071	(0.001)	0.056	(0.001)
AR	0.24	(0.02)	0.37	(0.02)	0.088	(0.015)	0.067	(0.007)
CO	0.41	(0.04)	0.57	(0.04)	0.013	(0.002)	0.028	(0.004)
IA	0.32	(0.02)	0.47	(0.02)	0.035	(0.009)	0.025	(0.008)
KS	0.33	(0.01)	0.48	(0.01)	0.069	(0.006)	0.061	(0.004)
MN	0.41	(0.03)	0.56	(0.03)	0.031	(0.006)	0.017	(0.005)
MO	0.21	(0.01)	0.33	(0.01)	0.169	(0.010)	0.142	(0.007)
MT	0.41	(0.10)	0.57	(0.11)	0.015	(0.006)	0.017	(0.007)
ND	0.46	(0.02)	0.61	(0.02)	0.021	(0.003)	0.012	(0.002)
NE	0.32	(0.02)	0.48	(0.02)	0.034	(0.004)	0.038	(0.003)
NM	0.49	(0.07)	0.64	(0.07)	0.008	(0.002)	0.008	(0.002)
OK	0.26	(0.01)	0.40	(0.02)	0.089	(0.007)	0.062	(0.010)
SD	0.39	(0.02)	0.55	(0.01)	0.036	(0.004)	0.027	(0.004)
TX	0.35	(0.02)	0.50	(0.02)	0.054	(0.006)	0.041	(0.005)
WY	0.08	(0.09)	0.14	(0.14)	0.000	(0.000)	0.022	(0.001)
Western	0.30	(0.02)	0.43	(0.01)	0.044	(0.001)	0.037	(0.001)
AZ	0.30	(0.02)	0.43	(0.02)	0.025	(0.004)	0.018	(0.002)
CA	0.28	(0.02)	0.41	(0.01)	0.058	(0.008)	0.070	(0.009)
ID	0.31	(0.03)	0.44	(0.03)	0.027	(0.004)	0.019	(0.003)
NV	0.28	(0.04)	0.50	(0.04)	0.057	(0.010)	0.042	(0.007)
OR	0.30	(0.05)	0.45	(0.05)	0.037	(0.012)	0.027	(0.006)
UT	0.28	(0.04)	0.41	(0.05)	0.022	(0.005)	0.013	(0.005)
WA	0.30	(0.02)	0.43	(0.02)	0.052	(0.006)	0.041	(0.010)

[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 (juvenile to adult) by state based on the Parts Collection Survey, 2007–2015. 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	†	†	†	†	†	†	†	†	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)

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

Table 6 (continued). Estimated age ratios (juvenile to adult) by state based on the Parts Collection Survey, 2007–2015. 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	2013[a]		2014		2015		2007-2015 Sample Size	2007-2015 Mean	2007-2015 SE
Eastern	1.33	(0.03)	1.42	(0.04)	1.31	(0.04)	74,843	1.50	(0.01)
AL	1.67	(0.18)	1.10	(0.10)	1.56	(0.17)	3,564	1.63	(0.06)
DE	1.97	(0.37)	1.30	(0.21)	0.42	(0.11)	1,787	1.50	(0.07)
GA	1.45	(0.11)	1.70	(0.16)	1.30	(0.12)	3,689	1.81	(0.06)
IL	1.36	(0.11)	1.48	(0.12)	1.15	(0.12)	6,917	1.50	(0.04)
IN	1.49	(0.12)	1.28	(0.12)	1.05	(0.09)	8,773	1.50	(0.03)
KY	1.23	(0.10)	1.41	(0.12)	1.18	(0.15)	4,785	1.53	(0.05)
LA	1.82	(0.29)	1.01	(0.76)	5.29	(2.89)	1,576	1.82	(0.10)
MD	1.64	(0.18)	1.78	(0.25)	1.69	(0.29)	3,526	1.61	(0.06)
MS	1.19	(0.12)	1.38	(0.15)	1.50	(0.18)	4,045	1.36	(0.04)
NC	1.12	(0.08)	1.01	(0.09)	0.97	(0.08)	7,467	1.30	(0.03)
OH	1.35	(0.15)	2.14	(0.22)	0.95	(0.10)	3,872	1.50	(0.05)
PA	1.27	(0.17)	1.30	(0.23)	1.57	(0.26)	2,621	1.18	(0.05)
RI	----	----	0.76	(0.76)	----	----	14	3.32	(2.10)
SC	1.28	(0.12)	1.88	(0.18)	1.94	(0.23)	7,496	1.62	(0.04)
TN	1.38	(0.16)	2.01	(0.25)	1.36	(0.16)	3,055	1.68	(0.06)
VA	0.98	(0.09)	1.16	(0.15)	2.35	(0.31)	8,351	1.33	(0.03)
WI	1.64	(0.20)	1.39	(0.19)	2.78	(0.55)	2,072	1.55	(0.07)
WV	0.95	(0.32)	3.98	(1.19)	2.74	(0.71)	1,247	1.77	(0.10)
Central	1.16	(0.03)	1.12	(0.03)	0.99	(0.03)	64,550	1.07	(0.01)
AR	1.51	(0.15)	0.82	(0.10)	1.27	(0.15)	3,809	1.40	(0.05)
CO	1.62	(0.15)	1.48	(0.14)	0.92	(0.07)	7,008	1.17	(0.03)
IA	1.26	(0.21)	1.16	(0.13)	0.78	(0.09)	1,250	1.08	(0.06)
KS	1.37	(0.20)	1.50	(0.13)	1.00	(0.08)	6,922	1.14	(0.03)
MN	1.24	(0.16)	1.45	(0.25)	1.05	(0.21)	1,599	1.31	(0.07)
MO	1.07	(0.12)	1.93	(0.26)	2.41	(0.31)	5,612	1.37	(0.04)
MT	1.40	(0.26)	1.42	(0.26)	0.98	(0.12)	2,018	1.22	(0.05)
ND	1.23	(0.13)	1.24	(0.13)	1.32	(0.11)	2,908	1.14	(0.04)
NE	0.82	(0.08)	0.77	(0.10)	0.81	(0.09)	5,835	0.86	(0.02)
NM	0.52	(0.07)	0.41	(0.06)	0.77	(0.14)	3,717	0.56	(0.02)
OK	1.75	(0.19)	0.89	(0.10)	1.32	(0.15)	5,477	1.30	(0.04)
SD	1.07	(0.10)	0.93	(0.08)	0.91	(0.09)	4,506	1.07	(0.03)
TX	1.40	(0.11)	1.56	(0.10)	1.14	(0.10)	10,954	1.09	(0.02)
WY	2.06	(0.33)	0.89	(0.10)	0.81	(0.08)	2,935	1.13	(0.04)
Western	1.72	(0.08)	1.33	(0.06)	1.35	(0.05)	33,639	1.23	(0.01)
AZ	1.38	(0.13)	0.75	(0.05)	0.97	(0.06)	10,487	0.72	(0.01)
CA	1.62	(0.16)	1.54	(0.12)	1.41	(0.12)	9,259	1.29	(0.03)
ID	1.64	(0.17)	1.58	(0.17)	1.68	(0.21)	2,929	1.45	(0.05)
NV	1.30	(0.23)	0.93	(0.15)	1.57	(0.23)	2,628	1.12	(0.04)
OR	1.52	(0.18)	1.77	(0.39)	1.43	(0.26)	1,538	1.45	(0.08)
UT	1.27	(0.21)	1.70	(0.25)	0.85	(0.12)	2,108	1.02	(0.04)
WA	2.20	(0.26)	2.30	(0.48)	1.87	(0.25)	4,690	1.61	(0.05)

[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.

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., 2003–2015.

	Management Unit							
	Eastern		Central		Western		Total (United States)	
Year	N	SE	N	SE	N	SE	N	SE
2003	95,309,821	5,936,812	113,279,645	8,805,148	130,756,689	23,740,563	339,346,155	26,007,512
2004	83,875,871	3,690,579	211,845,135	14,348,254	85,215,015	10,793,393	380,936,021	18,330,033
2005	132,794,566	5,525,611	191,676,127	14,034,939	38,449,838	3,869,583	362,920,531	15,571,948
2006	89,778,144	3,606,335	198,862,186	13,129,745	49,969,575	4,604,943	338,609,906	14,373,634
2007	102,380,934	4,595,082	158,182,346	10,146,315	59,860,570	4,387,999	320,423,850	11,971,509
2008	98,054,573	4,040,673	169,300,620	10,709,532	52,516,245	4,289,543	319,871,438	12,223,800
2009	103,089,071	4,237,048	148,487,151	8,868,563	50,903,066	3,438,976	302,479,288	10,412,999
2010	89,871,635	4,158,125	149,485,549	9,512,012	54,722,323	3,827,152	294,079,506	11,064,152
2011	85,742,115	4,454,969	125,454,975	6,963,865	51,056,398	3,866,139	262,253,488	9,126,291
2012	86,822,493	4,426,412	148,465,032	12,040,150	69,355,734	5,485,348	304,643,259	13,951,609
2013	85,611,474	5,406,917	124,415,412	8,254,414	48,012,268	3,620,332	258,039,153	10,510,799
2014	67,670,788	3,441,955	160,398,861	9,525,167	45,761,079	3,369,968	273,830,728	10,673,919
2015	63,286,288	3,290,229	165,991,834	9,523,964	37,043,828	2,510,384	266,321,949	10,384,293

Appendix A. Federal framework dates, season length, and daily bag limit for mourning dove hunting in the U.S. by management unit, 1918–2016.

	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	70	15	Sep 1–Jan 15	60	15[p]
2016	Sep 1–Jan 15	90	15	Sep 1–Jan 15[q]	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.

[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.

Appendix A. Continued.

[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.

[q] In Texas season ends 25 January.

U.S. Fish and Wildlife Service
Division of Migratory Bird Management
Population and Assessment Branch
11510 American Holly Drive
Laurel, Maryland 20708-4016

http://www.fws.gov
August. 2016

For StateTransfer Relay Service: TTY/Voice:711