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MOURNING DOVE BREEDING POPULATION STATUS, 2002

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Abstract: This report includes Mourning Dove Call-count Survey information gathered over the last 37years within the conterminous United States. Trends were calculated for the most recent 2- and 10-year intervals and for the entire 37-year period. Between 2001 and 2002, the average number of doves heard per route increased significantly in the Western Management Unit. No change was detected for the Eastern and Central Units. Over the most recent 10 and 37-year periods, significant declines were indicated for doves heard in the Central and Western Units. Additionally, in the Eastern Management Unit, a significant decline was detected over 37 years while there was no trend indicated over the most recent 10 years. In contrast, for doves seen over the 10-year period, a significant increase was found in the Eastern Unit while no trends were found in the Central and Western Units. Over the 37-year period, no trend was found for doves seen in the Eastern and Central Units while a decline was indicated for the Western Unit.

The mourning dove (*Zenaida macroura*) is a migratory bird, thus, authority and responsibility for its management 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 United States and other countries. Mourning doves are included in the treaties with Great Britain (for Canada) and Mexico. These treaties recognize sport hunting as a legitimate use of a renewable migratory bird resource. As one of the most abundant species in both urban and rural areas of North America, it is familiar to millions of people. Maintenance of mourning dove populations in a healthy, productive state is a primary management goal. To this end, management of doves includes assessment of population status, regulation of harvest, and habitat management. Call-count surveys are conducted annually in the 48 conterminous states by state and federal biologists to monitor mourning dove populations. The resulting information on status and trends is used by wildlife administrators in setting annual hunting regulations.

The primary purpose of this report is to facilitate the prompt distribution of timely information. Results are preliminary and may change with the inclusion of additional data.

Artist, Joe Garcia and Wild Wings, Inc., Lake City, Minnesota, provided the cover art for this report.

DISTRIBUTION AND ABUNDANCE

Mourning doves breed from the southern portions of Canada throughout the United States into Mexico, Bermuda, the Bahamas and Greater Antilles, and scattered locations in Central America (Fig. 1). Although some mourning doves winter throughout most of the breeding range, except for central Canada and the north-central U.S., the majority migrate south, wintering in the southern United States and south throughout most of Mexico and Central America to western Panama (Aldrich 1993, Mirarchi and Baskett 1994).

The mourning dove is one of the most widely distributed and abundant birds in North America (Peterjohn et al. 1994, Fig. 1). Although not known precisely, the fall population has been estimated to be about 475 million (Dunks et al. 1982, Tomlinson et al. 1988). However, as there is evidence of population decreases since this estimate was made from data collected in the 1970's, we believe that the mourning dove population has declined to slightly more than 400 million in the United States.

POPULATION MONITORING

The Mourning Dove Call-count Survey was developed to provide an annual index to population size (Dolton 1993). This survey is based on work by McClure (1939) in Iowa. Field studies demonstrated the feasibility of the survey as a method for detecting annual changes in mourning dove breeding populations (Foote and Peters

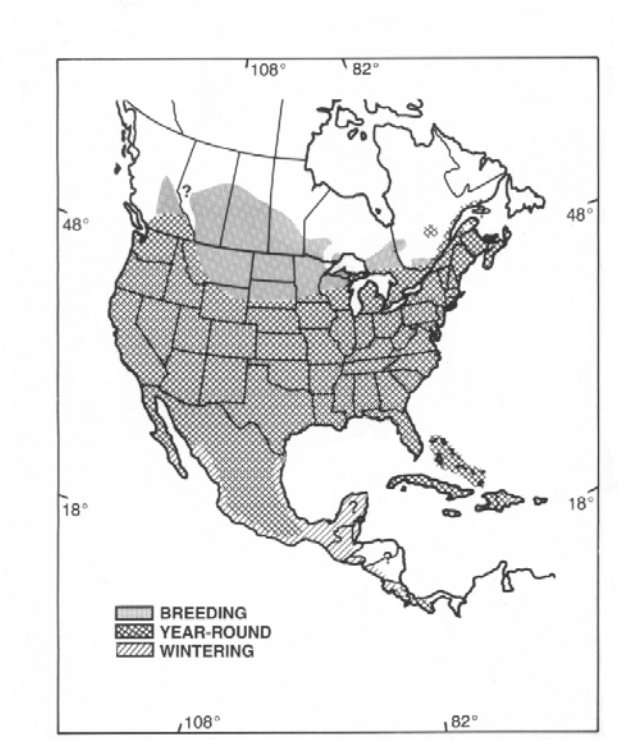

Fig. 1. Breeding and wintering ranges of the mourning dove (adapted from Mirarchi and Baskett 1994).

1952). In the United States, the survey currently includes more than 1,000 randomly selected routes, stratified by physiographic region. The total number of doves heard on each route is used to determine trends in populations and provides the basis for determining an index to population size during the breeding season. Indices for doves seen are also presented in this report, but only as supplemental information for comparison with indices of doves heard. Even though both the numbers of doves heard and seen are counted during the survey, they are recorded separately.

Within the United States, there are 3 zones that contain mourning dove populations that are largely independent of each other (Kiel 1959). These zones encompass the principal breeding, migration, and U.S. wintering areas for each population. As suggested by Kiel (1959), these 3 areas 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 divided into 2 groups of states for analyses. States permitting dove hunting were combined into one group and those prohibiting dove hunting into another. 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. Due to its small size, Rhode Island, which is a hunting state, was included in this nonhunting group of states for analysis.

METHODS

The Call-count Survey

Each call-count route is usually located on secondary roads and has 20 listening stations spaced at 1-mile intervals. At each stop, the number of doves heard calling, the number seen, and the level of disturbance (noise) that impairs the observer's ability to hear doves are recorded. The number of doves seen while driving between stops is also noted.

Counts begin one-half hour before sunrise and continue for about 2 hours. Routes are run once between 20 May and 5 June. Intensive studies in the eastern United States (Foote and Peters 1952) indicated that dove calling is relatively stable during this period. Surveys are not made when wind velocities exceed 12 miles per hour or when it is raining.

Estimation of Population Trends

A population trend is defined as the ratio of the dove population in an area in one year to the population in the preceding year. For more than 2 years of data, the trend is expressed as an average annual rate of change. A trend was first estimated for each route by numerically solving a set of estimating equations (Link and Sauer 1994). Observer data were used as covariables to adjust for differences in observers' ability to hear or see doves. The reported sample sizes are the number of routes on which a given trend estimate is based. This number may be less than the actual number of routes surveyed for several reasons. The estimating equations approach requires at least 2 non-zero counts by at least one observer for a route to be used. Routes that did not meet this requirement during the interval of interest were not included in the sample size. State and management unit trends were obtained by calculating a mean of all route trends weighted by land area, within-route variance in counts, and density (mean numbers of doves counted on

Fig. 2. Mourning dove management units with 2002 hunting and nonhunting states

each route). Variances of state and management unit trends were estimated by using route trends and a statistical procedure known as bootstrapping (Geissler and Sauer 1990).

The annual change, or trend, for each area in doves heard over the most recent 2- and 10-year intervals and for the entire 37-year period were estimated. Additionally, trends in doves seen were estimated over the 10- and 37-year periods as supplemental information for comparison.

For purposes of this report, statistical significance was defined as $P<0.05$, except for the 2-year comparison where $P<0.10$ was used because of the low power of the test. Significance levels are approximate for states with less than 10 routes.

Estimation of Annual Indices

Annual indices show population fluctuations about fitted trends (Sauer and Geissler 1990). The estimated indices were determined for an area (state or management unit) by finding the deviation between observed counts on a route and those predicted on the route from the area trend estimate. These residuals were averaged by year for all routes in the area of interest. To adjust for variation in sampling intensity, residuals were weighted by the land area of the physiographic regions within each state. These weighted average residuals were then added to the fitted trend for the area to produce the annual index of abundance. This method of determining indices superimposes yearly variation in counts on the long-term fitted trend. These indices should provide an accurate representation of the fitted trend for regions that are adequately sampled by survey routes. Additionally, only data from within an area are incorporated into the area's index. Since the indices are adjusted for observer differences and trend, the index for an area may be quite different from the actual count. In order to estimate the percent change from 2001 to 2002, a short-term trend (2 years) was calculated. The percent change estimated from this short-term trend analysis is the best estimator of annual change. Attempts to estimate short-term trends from the breeding population
indices (which were derived from residuals of the long-term trends) will yield less precise results. The annual index value incorporates data from a large number of routes that are not comparable between the two years 2001 and 2002, i.e., routes not run by the same observers. Therefore, the index is much more variable than the trend estimate.

In a separate analysis, the mean number of doves heard calling per route in 2002 was calculated for each state or groups of states. In contrast to the estimated annual indices presented in Table 2 (which illustrate population changes over time based on the regression line), the

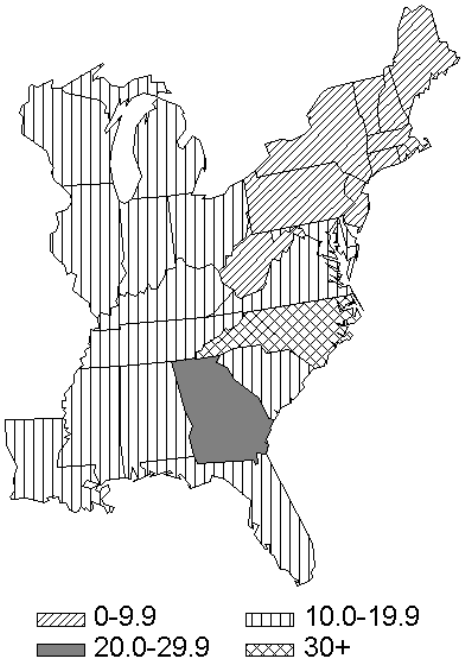

Fig. 3. Mean number of mourning doves heard per route by state in the Eastern Management Unit, 2001-2002.

estimated densities shown in Figs. 3, 7, and 11 illustrate the average *actual* numbers of doves counted in 2001 and 2002.

RESULTS

Eastern Management Unit

The Eastern Management Unit includes 27 states comprising 30% of the land area of the United States. Dove hunting is permitted in 18 states, representing 74% of the land area of the unit (Fig. 2).

2001-2002 Population Distribution.--North Carolina had one of the highest counts in the Nation with 40 actual doves heard per route over the 2 years (Fig. 3). Pennsylvania, West Virginia, New Jersey, New York, and the New England states averaged < 10 per route. Georgia had 23 doves heard per route while all other states had mean counts in the range of 10-20.

2001 to 2002 Population Changes.–No significant change was detected for the Unit although the average number of doves heard per route increased 2.1% (Table

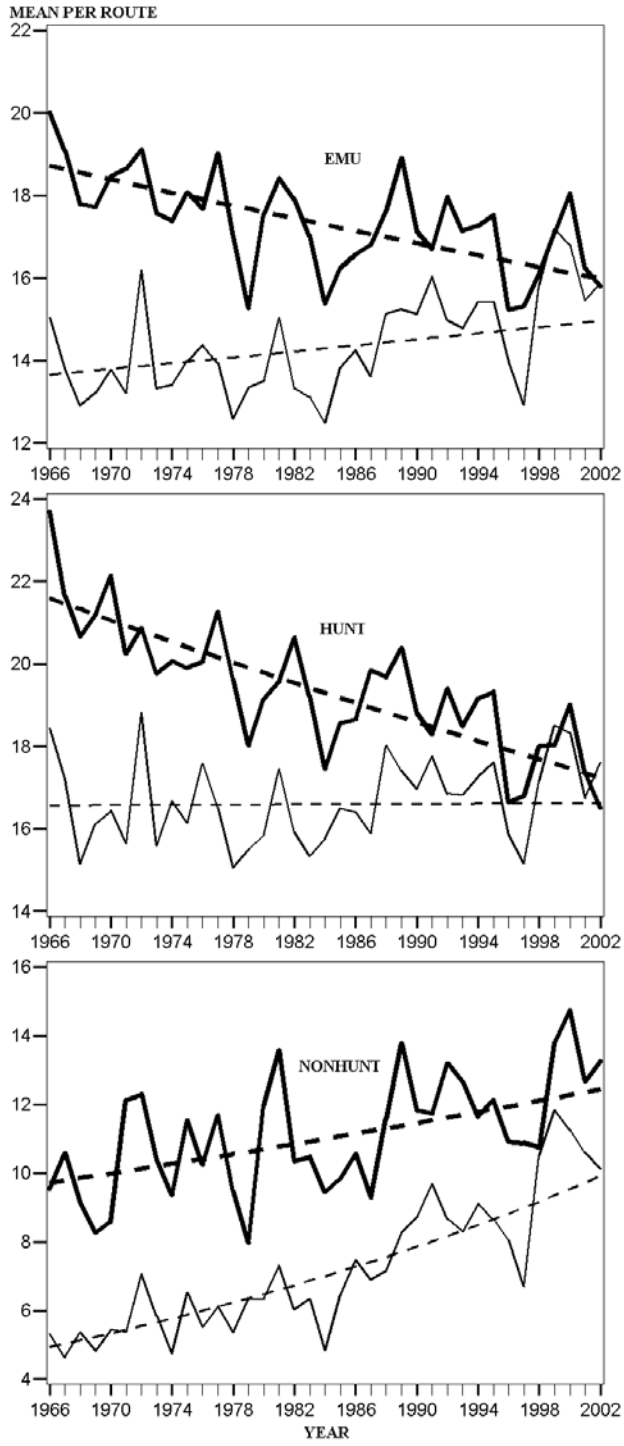

Fig. 4. Population indices and trends of breeding mourning doves in the Eastern Management Unit (EMU), combined EMU hunting states (HUNT), and combined EMU nonhunting states (NONHUNT), 1966-2002. Heavy solid line = doves heard; light solid line = doves seen. Light and heavy dashed lines = predicted trends.

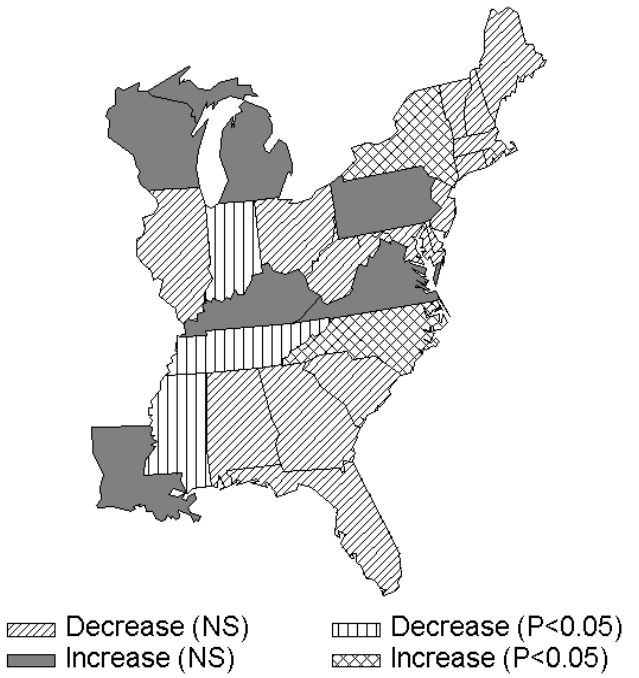

Fig. 5. Trends in number of mourning doves heard per route by state in the Eastern Management Unit, 1993-2002.

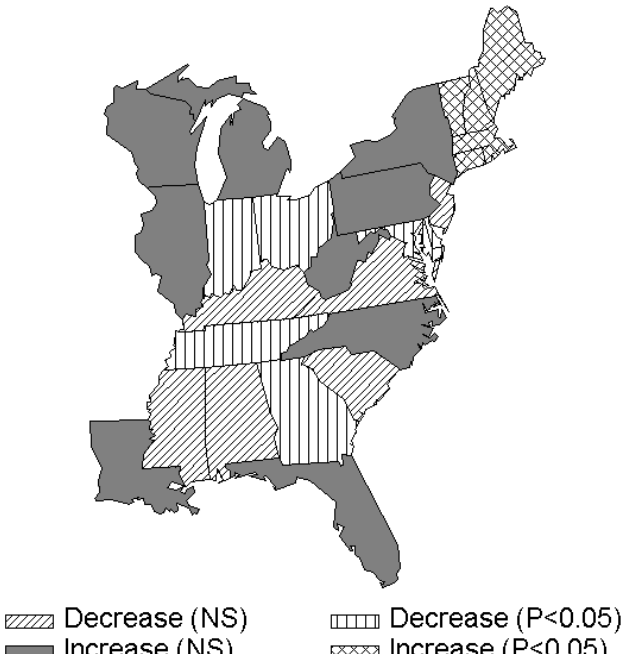

Fig. 6. Trends in the number of mourning doves heard per route by state in the Eastern Management Unit, 1966-2002.

1). The population did not change significantly between years in the combined hunting states (-2.6%). The index for the combined nonhunting states increased significantly (26.5%).

The 2002 population index of 15.8 doves heard per route for the Unit, was slightly below the predicted count based on the long-term estimate of 16.0 (Fig. 4, Table 2). In the hunting states, the index of 16.5 was below the predicted estimate of 17.3, while in the nonhunting states, the index of 13.3 is above the predicted estimate of 12.4.

The population increased significantly in Michigan and the New England states while it decreased in Delaware/Maryland and Mississippi (Table 1). No significant changes were detected for other states.

Population Trends: 10 and 37-year.--Analyses indicated significant declines over the most recent 10 and 37-year periods for the combined hunting states (Table 1). No significant trend was found over either time period for the combined nonhunting states. For the Unit, there was no trend indicated over 10 years, but a significant decline shown over the long term. Annual indices both for doves heard and seen are shown in Fig. 4. In contrast to doves heard, an analysis of doves seen indicated a significant increasing trend for the Unit and 2 groups over 10 years. No trend was detected over 37 years for the Unit or 2 combinations of states.

State population trends for doves heard are shown in Fig. 5 (10-year interval) and Fig. 6 (37-year interval) and Table 1). Over 10 years, increases were found for North Carolina and New York while Indiana, Mississippi, and Tennessee showed declines. Between 1966 and 2002, an increase was noted in New England, while a downward trend was noted in Delaware/Maryland, Georgia, Indiana, Ohio, and Tennessee.

Central Management Unit

The Central Management Unit consists of 14 states, containing 46% of the land area in the U.S. It has the highest population index of the 3 units. Within the unit, dove hunting is permitted in 12 states (Fig. 2).

2001-2002 Population.–Kansas, Nebraska, North Dakota, and South Dakota had the highest actual average number of doves heard per route over the 2 years (22, 27, 23, and 23 respectively) (Fig. 7). Historically, North Dakota and Kansas often have the highest average counts in the Nation (Table 2). Montana, New Mexico, and Wyoming were the only states with less than 10 doves per route. The remaining states had intermediate values.

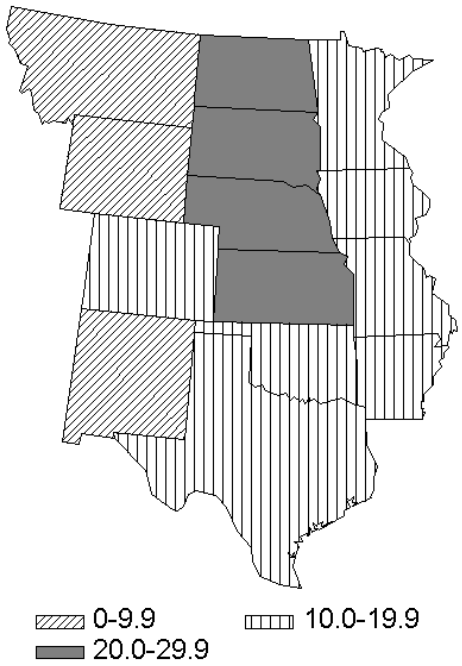

Fig. 7. Mean number of mourning doves heard per route by state in the Central Management Unit, 2001-2002.

2001 to 2002 Population Changes.--The average number of doves heard per route in the Unit did not change significantly between the 2 years (+3.7%; Table 1). The 2002 index for the Unit of 21.4 doves heard per route is only slightly below the predicted long-term trend estimate of 22.1 (Fig. 8, Table 2).

The population increased significantly in Minnesota and Wyoming (Table 1). No significant changes were found for the other states in the Unit.

Population Trends: 10 and 37-year.--A significant decline in doves heard was indicated for the Unit over both time periods (Table 1). Trends for doves seen were not significant for either time period.

State trends over 10 years are illustrated in Fig. 9 and Table 1. Montana showed an increase while Arkansas, Missouri, Nebraska, and Texas had declines during this time. Fig. 10 portrays trends over 37 years. No significant upward trend was found in doves heard for any state, but a significant downward trend was found in Missouri and Wyoming (Table 1).

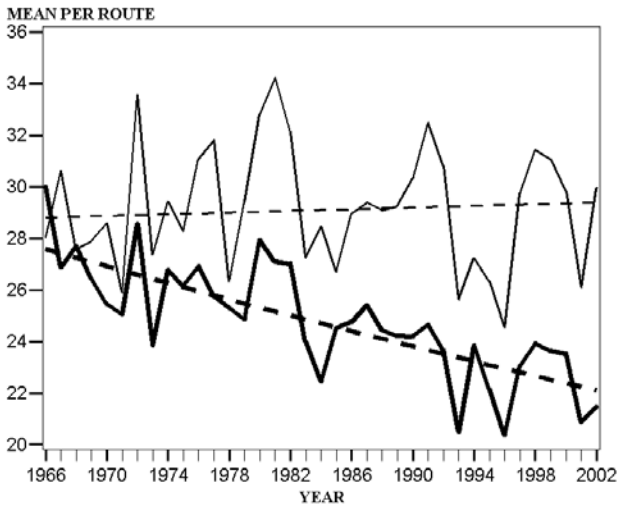

Fig. 8. Population indices and trends of breeding mourning doves in the Central Management Unit, 1966-2002. Heavy solid line = doves heard; light solid line = doves seen. Heavy and light dashed lines = predicted trends.

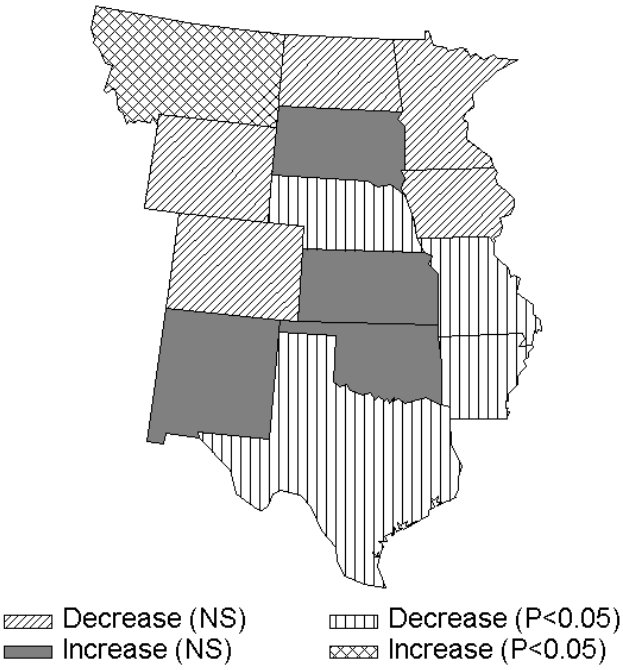

Fig. 9. Trends in number of mournig doves heard per route by state in the Central Management Unit, 1993-2002.

Western Management Unit

Seven states comprise the Western Management Unit and represent 24% of the land area in the United States. All states within the unit permit mourning dove hunting.

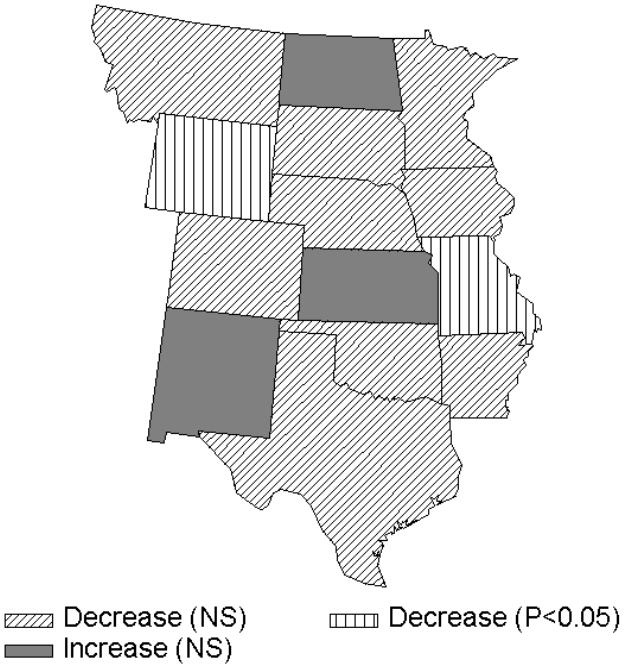

Fig. 10. Trends in mourning doves heard per route by state in the Central Management Unit, 1966-2002.

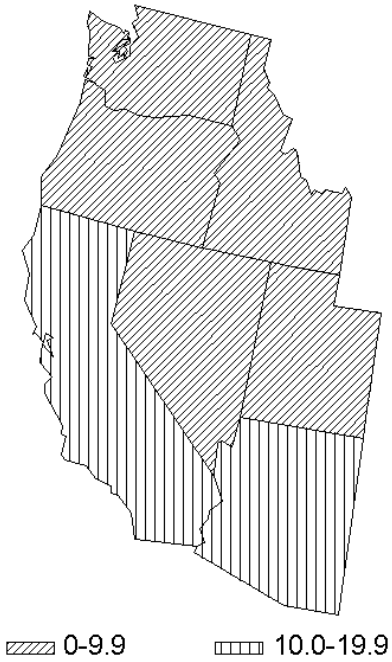

Fig. 11. Mean number of mourning doves heard per route by state in the Western Management Unit, 2001-2002.

2001-2002 Population Distribution.–Arizona and California averaged 13 and 11 actual doves heard per route, respectively (Fig. 11). The other states in the Unit averaged < 10 birds per route.

2001 to 2002 Population Changes.--The average number of doves heard per route increased significantly between years with the index increasing by 14.0% (Table 1). The 2002 population index of 10.3 doves heard per route is above the predicted count of 8.3 based on the long-term estimate (Fig. 12, Table 2).

The number of doves heard per route increased significantly in California (Table 1). No significant differences were found in other states.

Population Trends: 10 and 37-year.--A significant decline in numbers of doves heard was indicated for both time periods (Table 1). Analyses of doves seen also indicated a significant decline for the long-term periods, but no trend over 10 years.

Trends by state are illustrated in Figs. 13 and 14, and Table 1. Arizona shows a decline over 10 years while all states in the Unit have a decline between 1966 and 2002.

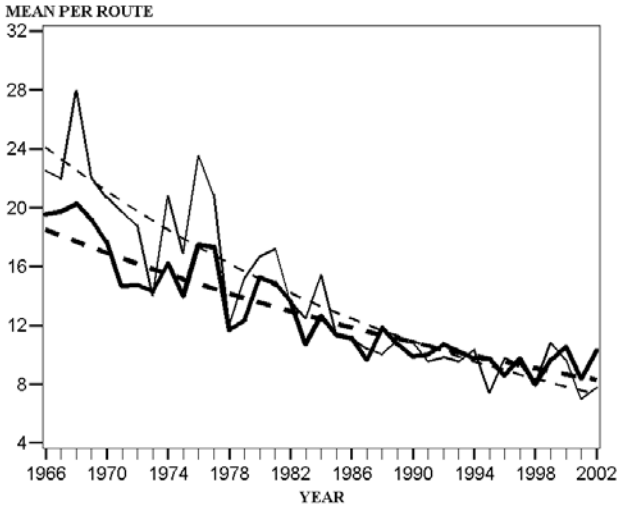

Fig. 12. Population idices and trends of breeding mourning doves in the Western Management Unit, 1966-2002. Heavy solid line = doves heard; light solid line = doves seen. Light and heavy dashed lines = predicted trends.

Breeding Bird Survey Results

There has been considerable discussion about utilizing the North American Breeding Bird Survey (BBS) as a measure of mourning dove abundance. Consequently,

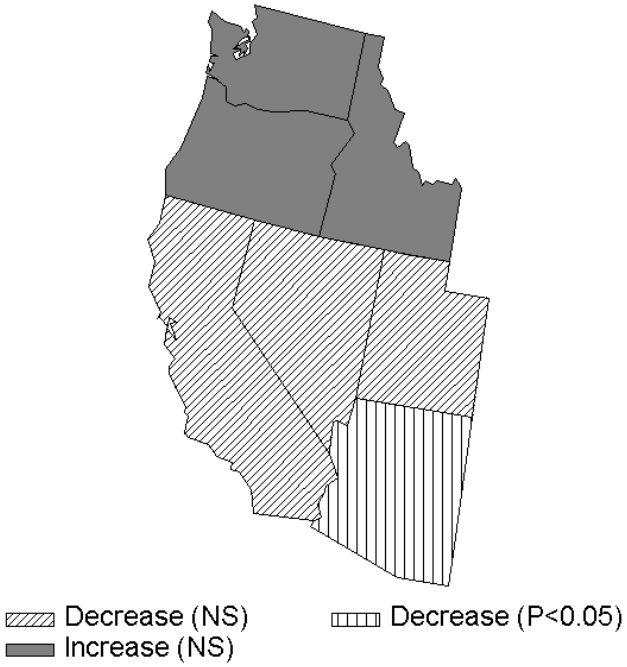

Fig. 13. Trends in number of mourning doves heard per route by state in the Western Management Unit, 1993-2002.

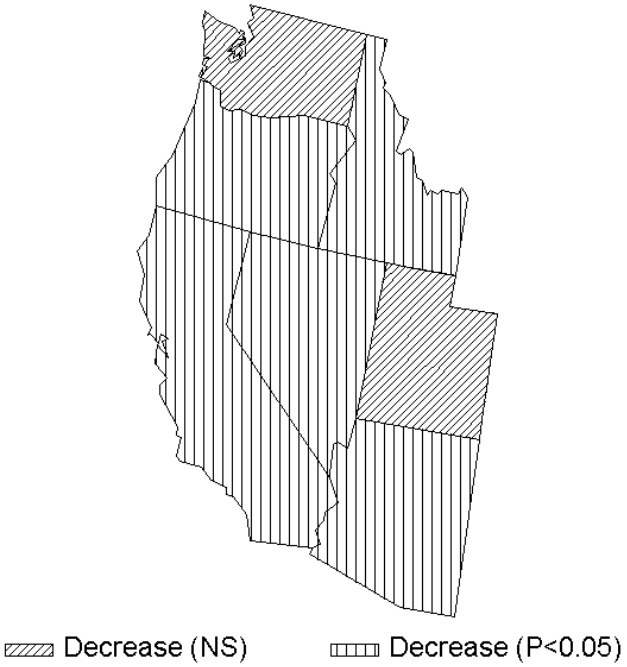

Fig. 14. Trends in number of mourning doves heard per route by state in the Western Management Unit, 1966-2002.

we are including trend information in this report to enable readers to compare BBS results with the Mourning Dove Call-count Survey (CCS) results from last year's mourning dove status report (Dolton et al. 2001). Sauer et al. (1994) discussed the differences in the methodology of the 2 surveys. The BBS is based on 50-stop routes that are surveyed in June. Also with the BBS, data for doves heard and seen are combined for analyses while those data are analyzed separately with the CCS. Unfortunately, BBS data are not available in time for use in regulations development during the year of the survey. Trends calculated from BBS data for the 10-year period (1992-2001) and over 36 years (1966-2001) are presented in Table 3.

In general, trends indicated by the BBS tend to indicate fewer declines. The major differences occur in the Eastern Unit. This is likely due to the larger sample size of BBS survey routes and greater consistency of coverage by BBS routes in the Unit (Sauer et al. 1994), although additional analyses are needed to clarify some differences in results between surveys within states.

For the 10-year period, 1992-01 the CCS indicated a significant decline (P<0.01) in doves heard for the combined hunting sates in the EMU while the BBS showed no trend (*P*<0.10). For the nonhunting states, the CCS showed no trend (P>0.10) while the BBS showed a significant decline (P<0.01). For the ENU as a whole, there was a significant decline (P<0.01) with the CCS while the BBS showed no trend (P>0.10). For the CMU, the CCS showed a significant decline (*P*<0.01) while the BBS showed no trend (*P*>0.10). In the WMU, the CCS indicated a significant decline (*P*<0.01) while the BBS showed no trend (*P*>0.10).

Over 36 years, results were very similar with both surveys for the Central and Western Management Units with both surveys indicating significant declines (BBS: *P*<0.01 for both Units; CCS: *P*<0.05 for CMU, *P*<0.01 for WMU). In the Eastern Unit, CCS analyses indicated a tendency toward a decline (*P*<0.10) over the period. In contrast, the BBS showed an increase (*P*<0.01). The combined hunting states in the EMU showed a decline (*P*<0.01) with the CCS, while there was no trend indicated with the BBS (*P*>0.10). The nonhunting states of the EMU were different also. The CCS showed no trend (*P*>0.10), but BBS data indicated a significant increase (*P*<0.01).

HARVEST ESTIMATES

State Surveys

In past years, a compilation of nonuniform, periodic state harvest surveys has been used to obtain rough estimates of the number of mourning doves killed and the number of dove hunters. These figures have been summarized by Sadler (1993). In general, mourning dove harvest in the EMU was relatively constant from 1966-87, with between 27.5 and 28.5 million birds taken. The latest estimate, a 1989 survey, indicated harvest had dropped to about 26.4 million birds shot by an estimated 1.3 million hunters. In the CMU, although hunting pressure and harvest varied widely among states, dove harvest in the Unit generally increased between 1966-87 to an annual average of about 13.5 million birds. In 1989, almost 11 million doves were taken by about 747,000 hunters. Dove harvest in the WMU has declined significantly over the years following a decline in the breeding population. In the early 1970's, about 7.3 million doves were taken by an estimated 450,000 hunters. By 1989, the harvest had dropped to about 4 million birds shot by approximately 285,000 hunters.

In summary, it appears that the dove harvest throughout the United States is on the decrease. However, the mourning dove remains an extremely important game bird, as more doves are harvested than all other migratory game birds combined. A 1991 survey indicated that doves provided about 9.5 million days of hunting recreation for 1.9 million people (U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, Bureau of the Census 1993). A survey conducted in 1996 estimated that doves were hunted about 8.1 million days by 1.6 million people (U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, Bureau of the Census 1997).

Harvest Information Program (HIP)

Wildlife professionals have long recognized that reliable harvest estimates are needed to monitor the impact of hunting. States have established harvest surveys to meet their individual needs for game species, and a federal waterfowl harvest survey has been conducted since 1952. However, there are serious problems with using either current state or federal harvest surveys to monitor the national or regional harvests of mourning doves and other non-waterfowl migratory game birds, especially on an annual basis. The federal waterfowl hunter survey system of obtaining names and addresses of duck stamp buyers is inadequate because non-waterfowl hunters are excluded. More than half the nation's migratory game bird hunters do not hunt waterfowl, thus, they cannot be sampled by that survey. Attempts to use state harvest surveys to obtain coordinated national and regional estimates have been unsuccessful because sample frames and survey methodologies vary widely among states.
To remedy these problems, state wildlife agencies and the U.S. Fish and Wildlife Service initiated the national, cooperative Harvest Information Program in 1992. This program is designed to enable the Service to conduct harvest surveys that will provide reliable annual estimates of the harvest of mourning doves and other migratort game bird species. Under the Harvest Information Program, states provide the Service with the names and addresses of all licensed migratory bird hunters each year, and the Service conducts surveys to estimate the harvest in each state.

California, Missouri, and South Dakota voluntarily participated in a 2-year pilot stage of the Harvest Information Program in 1992 and 1993, and each year since then more states have entered the program. In 1998, all states except Hawaii participated in the program.

Preliminary results of the total estimated harvest for the 2000-01 season by management unit and for the U.S. are as follows: Eastern: 10,292,200 " 8%; Central: 13,102,800 " 6%; Western: 2,024,500 " 9%; and, U.S.: 25,419,500 " 5%. It is important to note that these estimates do not necessary indicate that the harvest has declined. They cannot be compared directly with earlier estimates since they are based on a different sampling scheme. The reliability of these estimates depends primarily upon the quality of the sample frame provided by each participating state. If a state's sample frame does not include all migratory bird hunters in that state, the survey results underestimate hunter activity and harvest for the state. Beginning next year, we expect to have the past year's harvest survey results available in time for this report.

The Harvest Surveys Section is continuing to work with states to improve the accuracy and precision of the harvest estimates.. In the future, results will be presented by state within dove management unit.

ACKNOWLEDGMENTS

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Table 1.Trends (% change[a] per year as determined by linear regression) in number of mourning doves heard along call-count survey routes, 1966-2002.

	2 year (2001-2002)					10 year (1993-2002)					37 year (1966-2002)				
	N	% Change		90% CI		N	% Change		90% CI		N	% Change		90% CI	
EASTERN UNIT															
															Hunt
AL	25	1.7		-16.0	19.5	4	-1.5		-3.2	0.3	4	-0.5		-1.4	0.3
DE/MD	13	-25.6	**	-46.7	-4.5	4	-0.5		-3.0	1.9	4	-1.7	**	-2.9	-0.5
FL	19	18.2		-1.1	37.4	3	-1.3		-3.4	0.8	3	0.1		-0.8	1.0
GA	18	-2.9		-24.8	19.0	5	-2.7	*	-5.2	-0.2	5	-0.9	**	-1.6	-0.2
IL	16	-8.5		-19.9	2.8	2	-1.2		-4.2	1.7	2	0.4		-0.9	1.7
IN	11	-5.5		-17.7	6.6	3	-3.3	***	-5.3	-1.3	3	-1.6	***	-2.5	-0.7
KY	14	1.6		-21.1	24.4	5	1.2		-0.7	3.0	5	-0.5		-1.8	0.8
LA	19	-13.6		-32.6	5.4	3	2.0		-0.2	4.2	3	1.1	*	0.1	2.1
MS	18	-19.5	**	-34.7	-4.4	2	-4.4	**	-7.6	-1.1	2	-1.7		-3.5	0.0
NC	20	-4.2		-13.3	4.8	5	2.0	***	0.8	3.1	5	0.2		-0.8	1.2
OH[c]	36	16.5		-2.0	35.0	5	-0.7		-3.4	2.0	5	-1.0	***	-1.6	-0.5
PA	6	-0.9		-15.0	13.1	5	1.8		-1.2	4.8	5	1.1		-0.6	2.8
SC	16	-2.4		-16.6	11.9	4	-1.0		-2.8	0.8	4	-1.1	*	-2.2	-0.1
TN	16	-1.6		-9.9	6.7	7	-3.6	**	-5.9	-1.3	7	-1.7	***	-2.7	-0.6
VA	19	-2.1		-30.4	26.1	7	0.9		-0.9	2.7	7	-2.1		-4.3	0.1
WV	8	-13.4		-40.2	13.5	3	-0.6		-3.6	2.4	3	1.6		-0.2	3.5
Subunit	274	-2.6		-7.2	2.1	67	-1.2	**	-1.9	-0.4	67	-0.6	**	-1.1	-0.2
															Nonhunt
MI	14	49.1	***	29.1	69.2	2	2.0		-0.4	4.4	2	0.4		-0.9	1.8
N.England[d]	32	27.2	**	9.4	45.0	6	-0.9		-2.4	0.6	6	1.8	***	1.0	2.7
NJ	10	5.0		-14.9	24.9	4	-4.3		-12.3	3.8	4	-1.9		-5.0	1.13
NY	11	17.8		-13.5	49.0	6	5.2	***	2.8	7.6	6	1.7		-0.4	3.8
WI	15	-7.0		-17.7	3.6	4	1.7		-1.3	4.7	4	0.3		-0.9	1.5
Subunit	82	26.5	***	17.2	35.7	22	1.4	*	0.2	2.7	22	0.7		-0.1	1.4
Unit	356	2.1		-2.2	6.4	89	-0.7		-1.3	0.0	89	-0.4	**	-0.8	-0.1
CENTRAL UNIT															
AR	13	-6.4		-38.1	25.3	6	-3.5	***	-5.6	-1.4	6	-0.8		-2.1	0.4
CO	12	-4.0		-23.6	15.5	7	-0.6		-3.5	2.4	7	-0.6		-1.5	0.4
IA	9	-4.3		-30.5	21.9	2	-2.2		-5.4	1.0	2	-0.2		-0.8	0.4
KS	19	4.1		-15.8	23.9	4	1.9		-2.2	6.1	4	0.1		-0.6	0.8
MN	7	71.8	**	19.1	124.5	4	-3.5	*	-7.0	0.0	4	-1.3		-3.0	0.3
MO	13	2.2		-26.6	30.9	4	-5.7	***	-7.8	-3.6	4	-2.3	***	-3.5	-1.1
MT	12	44.6		-12.6	101.7	4	5.6	***	2.8	8.3	4	-1.7		-3.6	0.1
NE	18	-7.2		-21.6	7.2	4	-2.3	**	-3.9	-0.7	4	-0.9	*	-1.6	-0.1
NM	16	-16.4		-42.4	9.7	8	0.8		-2.0	3.5	8	0.7		-0.5	1.9
ND	15	-3.1		-20.2	14.0	3	-0.7		-2.5	1.1	3	0.3		-1.2	1.8
OK	16	-6.2		-29.4	17.0	5	0.2		-2.7	3.1	5	-1.1		-3.6	1.5
SD	11	5.7		-6.7	18.1	5	1.3		-2.4	5.0	5	-0.5		-2.0	0.9
TX	111	4.9		-4.8	14.6	8	-1.5	**	-2.7	-0.3	9	-0.4		-1.1	0.3
WY	9	33.4	*	2.4	64.5	5	-3.7		-8.0	0.7	5	-3.3	**	-5.9	-0.7
Unit	281	3.7		-2.3	9.7	69	-1.1	**	-1.9	-0.3	70	-0.6	***	-1.0	-0.3
WESTERN UNIT															
AZ	26	-14.2		-29.7	1.3	6	-3.4	***	-5.1	-1.7	6	-1.1	***	-1.8	-0.4
CA	47	24.1	***	9.2	39.1	9	-0.8		-2.1	0.5	9	-2.5	***	-3.6	-1.5
ID	13	55.9		-35.1	147.0	6	0.2		-4.5	5.0	6	-2.9	**	-5.1	-0.8
NV	15	50.0		-6.3	106.4	2	-0.1		-4.7	4.4	2	-4.9	***	-6.6	-3.2
OR	10	36.1		-5.3	77.5	8	0.7		-3.1	4.5	8	-2.6	**	-4.8	-0.5
UT	7	77.0		-43.0	196.9	5	-2.4		-5.9	1.1	5	-3.8	*	-7.0	-0.6
WA	18	6.7		-19.1	32.5	6	0.2		-4.4	4.7	6	-2.3	*	-4.2	-0.3
Unit	136	14.0	*	2.2	25.8	42	-1.8	***	-2.9	-0.8	42	-2.2	***	-2.8	-1.6

[a] Mean of route trends weighted by land area and population density. The estimated count in the next year is (%/100+1) times the count in the current year where % is the annual change. Note: Extrapolating the estimated trend statistic (% change per year) over time (e.g., 37 years) may exaggerate the total change over the period.

[b] *P<0.1; **P<0.05; ***P<0.01.

[c] Ohio became a hunting state in 1995.

[d] New England consists of CT, ME, MA, NH, RI, and VT.