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Mourning Dove National Strategic Harvest Management Plan

U.S. Fish & Wildlife Service

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Prepared for the:

Pacific, Central, Mississippi, and Atlantic Flyway Councils
U.S. Fish and Wildlife Service

Prepared by the:

National Mourning Dove Planning Committee with input from the
Pacific Flyway Study Committee
Central Flyway Webless Migratory Game Bird Technical Committee
Eastern Management Unit Dove Technical Committee

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Approved by:

Chair, Pacific Flyway Council — July 25, 2003 Date

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Chair, Atlantic Flyway Council — July 25, 2003 Date

INTRODUCTION

This document provides a long-range vision for improving mourning dove management through the development of predictive harvest strategies. The purposes of this plan are to: (1) promote the concept of coordinated management of mourning doves to insure uniformity of regulatory action and equitable conservation across the species range in the 3 Mourning Dove Management Units; (2) acknowledge the need to recognize demographic differences among management units; and, (3) acknowledge that the current harvest management system, and the knowledge base supporting it, needs improvement. Future recommendations will be made regarding management unit-specific harvest strategies and initiation of new, long-term monitoring efforts.

Management has consisted of annual population trend surveys and the establishment of annual hunting regulations. Additionally, some states conducted either annual or periodic harvest surveys. These survey and harvest data, however, did not give managers the ability to either correlate or predict the impact of regulation changes on harvest or population levels. For example, hunting opportunity was restricted in the Western Management Unit (WMU) beginning in 1987 due to long-term dove population declines. The dove population in the WMU appears to have stabilized, but it is unlikely that hunting was solely responsible for the decline that prompted these restrictions. Unfortunately, available data were insufficient to allow managers to relate demographic parameters to harvest or hunting regulations.

Managers have increasingly become concerned about the status of mourning dove populations given their economic and social importance, and apparent population declines. Management concerns include: (1) limited data upon which to make harvest management decisions; (2) population survey results indicating declines; and, (3) uncertainty regarding the cause of population declines. Some managers believe that hunting opportunity should be commensurate with population status while others believe that a restriction on hunting opportunity is unnecessary when harvest is not known to be the causative factor of a decline.

The inability to correlate mourning dove hunting regulations with their impact on demographic parameters has not been considered a problem heretofore because mourning doves are widely distributed, abundant, and adaptable to a variety of habitats. Additionally, trends in population indices in past years were relatively stable and the estimated total harvest was declining. In recent years, declines in the long-term population index have become apparent in all 3 management units. In the WMU, the decline was generally considered the result of long-term habitat changes (Reeves et al. 1993). However, it is difficult to pinpoint exact causes of declines. A combination of factors involving both reproduction and survival is likely responsible. Since mourning doves are habitat generalists, it is difficult to target and develop habitat management programs. Thus, the future of dove management depends primarily upon harvest management and our understanding of how harvest affects dove populations. Consequently, this plan deals with harvest management rather than habitat issues.

Increasingly, there has been broad-scale support for improving the way dove harvest is addressed. Harvest management plans have been prepared in both the WMU and the Central Management Unit (CMU), but neither plan provided a clear decision-making process regarding hunting regulations. In 1998, the U.S. Fish and Wildlife Service (FWS) notified the dove technical committees in the CMU and the Eastern Management Unit (EMU) that if downward population trends continued, harvest framework reductions would be implemented. Furthermore, they asked that harvest management strategies be developed that included decision criteria that explicitly state when regulatory changes will be made and what the changes would be, and an estimate of the effect of the regulatory options. In 1999, a workshop was held in the CMU to attempt to improve upon the harvest management decision-making process. In 2000, a Joint Flyway recommendation was approved to support establishing a working group composed of representatives from the FWS and the flyway councils, i.e., their technical committees, to develop acceptable guidelines for management unit plans, i.e., harvest management objectives and strategies. Similar recommendations have been made by the Central Flyway Council and the Migratory Shore and Upland Game Bird Working Group of the International Association of Fish and Wildlife Agencies.

In 2001, a National Mourning Dove Planning Committee was formed and met to begin the process of developing a plan of action that would lead to guidelines the management unit technical committees could use to prepare management plans for their respective management units. Todd Sanders (CO) represented the WMU; Jay Roberson (TX) and John H. Schulz (MO) represented the CMU; Tommy Hines (FL) and David Scott (OH) represented the EMU; David Otis represented USGS; and, David Dolton represented the FWS. Mike Rabe (AZ) joined the group in 2002 as a second representative from the WMU.

The Planning Committee concluded that the current harvest management decision-making process could not be improved with existing information. Consequently, the group decided to prepare this simple vision document that would provide a long-range strategy for improving mourning dove harvest management. This Plan is expected to provide a common philosophy and framework that will result in (1) development of predictive harvest strategies that may be incorporated into unit-specific management plans, and (2) recommendations regarding initiation of new, long-term monitoring efforts.

This Plan focuses on concepts rather than specific details, and represents an initial step towards improving the decision-making process in establishing mourning dove harvest regulations. The document outline consists of 4 questions:

1. Where are we currently with our mourning dove management? (*Where are we?*)

2. Where do we envision the future of mourning dove harvest management? (*Where do we want to be?)*

3. How will we get to this desired future condition? (*How will we get there?*)

4. How will we know if we met our goal? (*Did we make it?*)

George Andrejko / Arizona Game & Fish Department

Where Are We?

Jim Matthews

Jim Rathert / Missouri Department of Conservation

Current State of Management

". . . Federal and State hunting regulations have been based upon the best information available . . . [but the] information on which to base management [decisions] has been far from complete. Although much was known about the dove's life history, there has been [a] need for information on populations and production, migration, and local movements, on the influence of changing land use and weather, and on the effects of hunting" (Southeastern Association of Game and Fish Commissioners 1957:1). Since the time of this statement, a large body of research has been conducted on mourning doves (Baskett et al. 1993) and much has been learned (Tomlinson et al. 1994, Mirarchi and Baskett 1994). Despite the extensive and voluminous nature of information gathered, the basic question of how harvest affects survival and reproductive rates remains unanswered.

Many causative factors have contributed to our inability to address basic questions related to mourning dove harvest management. Mourning doves are ubiquitous habitat generalists that use almost every major ecological habitat type (Aldrich and Duvall 1958). Mourning doves are also relatively numerous and visible compared to other avian species (Robbins et al. 1986, Tomlinson and Dolton 1987), and this relative abundance has minimized concerns about possible effects of over-harvest. Historically, few data existed to provide the rationale for changing mourning dove hunting season frameworks; e.g., Mourning Dove Call-count Survey (CCS) population trends, individual state harvest estimates [prior to full implementation of the Harvest Information Program (HIP)], and expert biological opinion. Thus, mourning dove hunting season frameworks have remained relatively stable (Table 1) and administrators and biologists have not changed those frameworks on an annual or regular basis.

Population Status and Harvest Surveys

Despite the fact that mourning doves are among the 10 most ubiquitous and numerous bird species in the continental U.S. (Robbins et al. 1986), population indices have been declining since 1966 when the nationwide CCS was initiated. The CCS revealed declines in all 3 management units during the periods 1966-2002 (EMU, -0.4%/year [-13.4% total], $P < 0.05$; CMU, -0.6%/year [-19.5% total], $P < 0.01$; and, WMU, -2.2%/year [-55.1% total], $P < 0.01$) (Dolton and Holmes 2002). During the 10-year period, 1993-2002, populations in the EMU showed no significant trend (-0.7%/year [-6.1% total], $P > 0.10$) while the CMU and WMU population indices showed continued declines (CMU, -1.1%/year [-9.5% total], $P < 0.05$; WMU, -1.8%/year [-15.1% total], $P < 0.01$). In contrast, analyses of the North American Breeding Bird Survey (BBS) during 1966-2002 suggest an increase for the EMU (0.5%/year [19.7% total], $P < 0.05$), and declining trends for the CMU and WMU (CMU, -0.6%/year [-19.5% total], $P < 0.05$; WMU, -1.2%/year [-35.2% total], $P < 0.05$) (Dolton and Rau 2003). A short-term (1992-2002) increase was detected for the EMU (0.8%/year [7.4% total]; $P < 0.05$) while no trend was indicated for the CMU (0.4%/year [3.7% total]; $P > 0.10$) or the WMU (0.6%;year [5.5% total], $P > 0.10$).

Controversy exists about the relative merits of the CCS and BBS to index mourning dove population size (Sauer et al. 1994). The CCS protocol is designed specifically for doves, but the number of routes is generally much smaller than for the BBS, which leads to concerns about the ability of the CCS to detect trends. A reliable calibration algorithm does not exist for converting either CCS or BBS indices to estimates of mourning dove abundance or density. Furthermore, CCS indices may not be correlated with abundance or density, but rather represent an index to unmated males in the breeding season (Baskett 1993). Habitat changes along survey routes may also confound interpretation of observed CCS trends because such changes can lead to decreased detectability of individuals (Miller et al., unpublished data). Thus, we have long-term trend data, but interpretation of the indices derived from these data are the subject of continuing debate. Work is underway to determine if CCS and BBS data can be combined to strengthen the data set.

One of the purposes of this plan, however, is to move the dove harvest management debate away from proximate issues dealing with CCS and BBS issues, and instead focus upon ultimate issues of building reliable knowledge about relationships between changes in mourning dove harvest and population demographics. Recent professional debate has focused attention on the inability of surveys like the CCS or BBS to actually have any meaningful value in making management decisions (Anderson 2001, Anderson 2003, Engeman 2003). The first set of problems involves issues related to convenience sampling along roadsides; e.g., a lack of valid inference to the population of interest, and no basis for assessing the precision or accuracy of population parameters estimated (Anderson 2001). Secondly, index values should not be assumed to be a representation of population size or density. The index values can be affected by variables related to the observer, variables associated with environmental effects on the number of animals detected, and biological and behavioral aspects of the animal's detectability (Anderson 2001). Thus, if these factors are not accounted for, index values will

Jim Matthews

not accurately represent population status and trend. Recognizing that mourning doves are a vitally important continental resource to hunters and nonhunters, it is critical that future harvest management decisions be based upon meaningful and reliable information compared to the status quo of index values and/or a combination of uncertain harvest estimates.

With the complete implementation of HIP in 1998, annual estimates of harvest and hunting effort are now available for all states. This program was established with the primary goal of providing a means to conduct uniform, national harvest surveys annually for all migratory game bird species (Ver Steeg and Elden 2002). HIP was designed to give reliable estimates of total harvest, hunter numbers, and days hunted for the first time, irrespective of statewide differences in licensing structure. According to Ver Steeg and Elden (2002), *"Although HIP hunter activity and harvest estimates for doves, woodcock, and other migratory game bird species are not identical to similar estimates derived from state surveys, the differences seem to be mainly due to differences in the sample frames, survey instruments and procedures, and analytical assumptions used. In most cases, state survey and HIP estimates of the harvest per active hunter for those species agree closely. While HIP is currently providing standard state, regional, and national hunter activity and harvest estimates as intended, there is still much room for improvement."*

Reproduction

Published studies on the breeding ecology of mourning doves date back at least 80 years, and several summaries of these results have been compiled (Hanson and Kossack 1963, U.S. Fish and Wildlife Service 1977, Sayre and Silvy 1993). This collection of small-scale, relatively short-term studies serves to establish bounds on parameters such as length of the nesting season, young fledged per breeding pair, and nest density. However, lack of standardized field sampling methodology and the short time frames preclude direct use of these data to construct general models of productivity on large, management unit scales. The most comprehensive study of breeding was conducted in 1979-80, for the primary purpose of estimating effects of September hunting on nesting success (Geissler et al. 1987). The study involved 106 sites in 27 states, and provided the basis for comparing nesting chronology and productivity among large-scale geographical units. Most recently, Miller et al. (2001) estimated productivity and associated parameters of nesting ecology in several habitat types in California. Otis (2003) developed a simple model of estimated productivity (defined as recruitment into the fall population) per breeding pair on a regional scale. The model is used to define upper and lower bounds for potential productivity, but its utility for predicting productivity in a given year is untested.

Estimates of Fall recruitment in terms of number of juveniles (Hatching Year or HY) per adult (After Hatching Year or AHY) in the pre-hunting season population, can be derived from age ratios observed in the harvest, corrected for differential harvest vulnerability of age classes (Nichols and Tomlinson 1993). Harvest age ratios usually are estimated by using wing collection surveys, e.g., waterfowl species and woodcock. A few data sets containing age-ratio data for mourning doves are available, but no long-term program has been instituted. Wing surveys were done in conjunction with the banding studies in the EMU from 1966-71 (Hayne 1975, U.S. Fish and Wildlife Service, unpublished data), and Haas (1978) and McGowan and Otis (1998) reported harvest age ratios from 1968-75 and 1992-95, respectively, in South Carolina. While these data are helpful in providing some insight into the range of pre-hunting season age ratios, they do not provide a comprehensive basis for building general predictive models.

Annual Survival and Harvest Mortality

Banding studies dating back to the 1950s have been used to generate annual survival estimates (Newsom et al. 1957, Tomlinson et al. 1960). Survival estimates on a management unit scale were derived from the intensive banding studies carried out in each management unit in the 1960s and 1970s (Dunks et al. 1982, Tomlinson et al. 1988, Martin and Sauer 1993); these same data have been used to derive updated estimates using more contemporary analysis techniques (Otis and White 2002, Otis 2002). However, aside from a few small scale banding studies in South Carolina (McGowan and Otis 1998), Ohio (Scott et al., 2004) and Missouri (Schulz et al. 1996), and a fall telemetry study in South Carolina (Berdeen, 2004), no new annual or seasonal mortality estimates have been generated for dove populations during the past 3 decades. In most years, $\leq$1,000 doves are banded in the entire U.S., and recovery rates are negligible (K. A. Wilkins, FWS, personal communication). Thus, derivation of contemporary annual mortality rates based on band recovery data is not feasible.

The relationship between hunting

and non-hunting mortality in the annual cycle of mourning dove populations has not received much attention. A notable exception was a study of the effects of increased bag limits in the EMU during the years 1966-72. This study could detect no change in annual mortality rates in years when the bag limit was raised from 12 to 18 (Hayne 1975). However, a recent re-analysis of this study concluded that the increase in bag limit did not result in a significant increase in harvest rate, and therefore no inferences about the effect of harvest on annual survival could logically be made (Otis and White 2002). Currently, there are no models for relating harvest regulation parameters to realized harvest rates.

Estimates of harvest rate have been derived from estimates of band recovery rate and independent estimates of band reporting rate (Tomlinson 1968, Reeves 1979, Otis 2002, Scott et al. 2004). These derived harvest rate estimates have generally ranged between 5-15%, which has not been considered detrimental to long-term population status. Thus, the implicit conclusion in the literature to date has been that hunting mortality is less than any reasonable, postulated threshold for additive hunting mortality. However, no rigorous tests of the competing hypotheses of additive and compensatory mortality have been conducted. A recent 3-year banding study in Ohio (1996-98) yielded separate harvest rate estimates for urban and rural mourning doves (0.010 and 0.046, respectively), and a band reporting rate estimate of 20.9% (Scott et al. 2004). Contemporary estimates or indices of regional-scale harvest rates are not available due to the general lack of contemporary estimates of band recovery rates and reporting rates.

Population Models

Informed harvest management of game species should rely on population models that represent hypotheses about the relationships between survival, reproduction, and harvest rates. When estimates of the parameters in these models are provided, predictions about population status can be made and compared to independent population indices, if available. Investigators who analyzed and reported on the last generation of large-scale banding studies used simple life history equations to conclude that production in all management units was sufficient to offset mortality and, therefore, maintain the current population (Dunks et al. 1982, Tomlinson et al. 1988, Martin and Sauer 1993); dove harvest management has relied on this inference since that era. Despite the long-standing importance of mourning doves as a game bird, no formal harvest regulation process involving even the most elementary models has been developed.

A set of population models, each based on a different assumption about the relationship between annual survival and harvest rates, is being developed (Otis, unpublished report). However, parameter estimates in these models are based almost completely on data that are at least 20 years old. Thus, the accuracy and utility of these models for predicting contemporary population status is unknown.

Roy Tomlinson

WHERE DO WE WANT TO BE?

Goal and Objective

Specifically needed are harvest management strategies developed for each management unit that include decision criteria that explicitly state when regulatory changes will be made, what the changes will be, and the estimated effect of regulatory options. Management unit technical committees may then incorporate these specific strategies into their own management plan. Although these strategies will be developed with a common framework, each management unit technical committee would have the flexibility to adopt their own specific implementation and evaluation criteria, knowing that population status and extrinsic environmental conditions may not be similar among the 3 management units during any given time frame.

The overall goal is to:

> Develop and continuously improve an objective framework for making informed harvest management decisions based on demographic models that predict effects of harvest management actions and environmental conditions on population abundance.

The objective is to:

> Promulgate harvest regulations that will maximize the expected harvest rate while maintaining the desired population abundance.

Population Models

The process of development and continued evaluation of harvest management strategies should be grounded in quantitative population models that synthesize knowledge of current life history parameters and how they are affected by intrinsic and extrinsic factors. Use of such models has a long history in the management of game species. The collection of research publications, symposia, and technical workshops conducted on population models is voluminous (Shenk and Franklin 2001).

The most basic expression of annual change in population size is:

$N_{t+1} = N_t \{ S_A + S_J * P \}$, where

N_t = population size in year t,
N_{t+1}= population size the next year,
S_A = annual survival rate of adult,
S_J= annual survival rate of juveniles,
P = number of female recruits into the fall population per breeding female (Fig. 1).

The importance of this basic population model is that it provides a framework for tracking population change as a function of changes in basic life history parameters. This becomes useful in a management context when these parameters can in turn be modeled as functions of extrinsic factors such as amount of available breeding habitat or hunting pressure. Such factors and the mechanisms responsible for their change can in turn be modeled as functions of additional parameters, and this modeling can continue down through several increasingly detailed strata.

The development of a mourning dove population model will require several components:

1. A set of models that relate annual age-specific survival rate to harvest rate. Models will differ depending on what is assumed about the relationship between hunting and non-hunting mortality during the annual life cycle.

2. A model that relates realized harvest rate to harvest regulation parameters such as bag limit and season length.

3. A model that relates breeding population density and environmental conditions to annual productivity.

4. A reliable and interpretable population index or density estimate derived from CCS and/or BBS data.

Adaptive Resource Management

Our knowledge of the ecology of the mourning dove and its population status will always be incomplete. Therefore, we can only strive to make the best management decisions possible given the knowledge at hand. Concurrently, we want to increase our knowledge of dove ecology, and thereby improve our ability to make good management decisions, by learning from the outcomes of previous management decisions. These concepts of iterative learning and feedback, acknowledgment of imperfect information, and a formal decision making process are important concepts in the adaptive resource management (ARM) paradigm (Walters 1986). Although it is unrealistic to envision a formal adaptive process of dove harvest management similar to that currently used for waterfowl, we should investigate the feasibility of using several basic tenets of ARM as a framework to guide planning and implementation of a process that will develop and change during the next several years.

HOW DO WE GET THERE?

Development of an informed harvest management strategy for mourning doves requires a long-term coordinated commitment to demographic data collection and assessment, quantitative population models, and adaptive resource management. However, this Plan does not obligate state or federal agencies to make any specific commitment since it will depend on the feasibility of rectifying needs identified given the availability of funding and personnel. Experience has demonstrated that interactions among changing landscapes, abiotic factors, human population demographics, and the adaptive responses of game species to these changing dynamics dictate that management cannot be static or short-term.

Large-scale and long-term monitoring programs will be required to generate the demographic data necessary to drive the proposed harvest management system. The intensity and frequency of these efforts is difficult to project at present because of the lack of contemporary information on dove population status and dynamics. Initial efforts toward development of the proposed harvest management system will be greater than long-term maintenance of the program.

Many of the details of implementing the newly envisioned program will require a planned approach where complex questions and issues are broken down into smaller and smaller tasks. For example, the population model will likely require a detailed step-down research plan to help describe and isolate the pieces of information needed, and describe how the new information will build upon previously gained information.

In addition to data and research needs, there should be commensurate development of a new paradigm for cooperation among state and federal agencies to implement and maintain a rigorous harvest management strategy for doves. The process will require more formal and rigorous evaluation of population status, effects of proposed harvest strategies, and ongoing data requirements. Thus, increased resources from all the stakeholders will be required to achieve the described management goals.

Following is a tentative schedule of implementation:

July 2003 — Initiation of a national pilot reward-band study. [Coordinated by David Otis(USGS-BRD); rewards are to be paid by the FWS]

December 2004 — Development and finalization of 1st generation population models. [David Otis and technical committees]

July 2005-2006 — Preparation and adoption of regional harvest management plans with specific harvest-management strategies. [Technical committees; input from the FWS]

July 2005-2006 — Development and adoption of appropriate demographic models andestablishment of data collection programs to support needs of regional harvest management plans. [Technical committees, flyway councils, FWS]

2007 or later — Initiation and evaluation of appropriate regulation changes based on approved regional harvest management plans. [Technical committees, flyway councils, FWS]

Jim Rathert / Missouri Department of Conservation

DID WE MAKE IT?

The goal and objective of this plan will be fulfilled when (1) harvest management strategies are developed and management plans prepared for each of the 3 management units that include decision criteria that explicitly state when regulatory changes will be made, what the changes will be, and the estimated effect of regulatory options, and (2) harvest management strategies, decision criteria, regulatory changes, and estimated effects are based on an understanding of current harvest and demographic parameters and their relationships.

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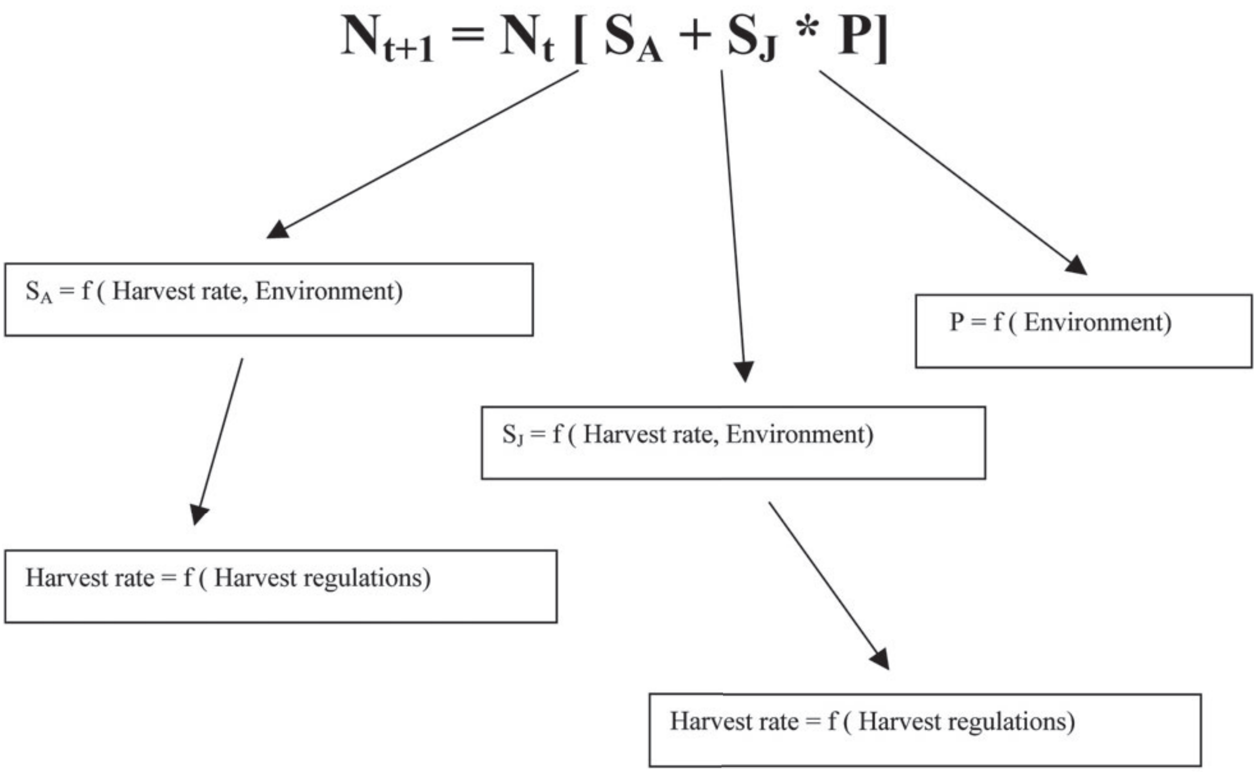

Fig. 1. Model for use in dove harvest management. N_t = population size in year t, S_A = annual survival rate of adults, S_J = annual survival rate of juveniles, P = number of female recruits into the fall population per breeding female, and *f* = is a function of.

Misty Sumner

Table 1. Daily bag and possession limits and season length for mourning doves in the United States by management unit, 1918-2002 (adapted from Reeves 1993).[a]

	Eastern Management Unit			Central Management Unit			Western Management Unit		
Year	Bag	Poss.	Days	Bag	Poss	Days	Bag	Poss.	Days
1918-31	25	25	b	25	25	b	25	25	b
1932-34	18	18	b	18	18	b	18	18	b
1935-36	20	20	b	20	20	b	20	20	b
1937-39 c	15	15	b	15	15	b	15	15	b
1940-41 c	12	12	b	12	12	b	12	20	b
1942-47 c	10	10	b	10	10	b	10	20	b
1948-54	10	10	b	10	10	b	10	20	b
1955-56	8	8	b	10	10	b	10	20	b
1957-59	10	20	b	10	20	b	10	20	b
1960-61	12	24	70[d]	15	30	60	10	20	50
1962	12	24	70[d]	12	24	60	10	20	50
1963	10	20	70[d]	10	20	60	10	20	50
1964-67	12	24	70[d]	12	24	60	12	24	50
1968	12	24	70[d]	12	24	60	10	20	50
1969-70	18[e]	36[e]	70[d]	10	20	60	10	20	50
1971-79	12	24	70[d]	10	20	60	10	20	50
1980	12	24	70	10	20	60	10	20	50
1981	12	24	70	12	24	60	10	20	50
				or					
				15	30	45			
1982	12	24	70	12	24	70	12	24	70
	or			or			or		
	15	30	45	15	30	45	15	30	45
1983-86	12	24	70	12	24	70	12	24	70
	or			or			or		
	15	30	60	15	30	60	15	30	60
1987-02[f]	12	24	70	12	24	70	10	20	30 or 45[g]
	or			or					
	15	30	60	15	30	60			

a From 1918-59, results were complied from 4 representative mid-latitude states were selected in the EMU, 4 in the CMU, and 2 in the WMU. In all years, a few states sometimes restricted limits further than those permitted by the U.S. Fish and Wildlife Service. Aggregate bag and possession limits of mourning doves, white-winged doves, and white-tipped doves often were selected in states or portions thereof where and when hunting of these doves was allowed.

b 1918-34: the federal frameworks for season length approximated the full 3 1/2 months maximum permitted by the Convention between the United States and Great Britain for the Protection of Migratory Birds in 1916. 1935: 86 days in eastern states, 106-107 in western states. 1936-40: about 76 days (61-77). 1941: 42 days. 1942-43: 30 days in eastern states and 42 days in central and western states. 1944: 57 days. 1945-48: 60 days in most eastern and some western states. 1949-53: 30 (30-45) days nearly nationwide. 1954: 40 days, then gradually to 45 full days or 65 half days in the Southeast in 1958. 1955: 45 days. 1956-59: 50 days in central and western states (summarized from Reeves 1993:438-441).

c During 1937-47, the limits included white-winged doves on a nationwide basis.

d Half days.

e More liberal limits allowed in conjunction with Eastern Management Unit hunting regulations experiment.

f Beginning in 2002, the limits included white-winged doves in the Central Management Unit.

g Depending on state and season timing.

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