PACIFIC FLYWAY

Management Plan: Western White-winged Dove

Adopted August 2024

Cover photograph: White-winged dove, © 2010 George Andrejko.

This management plan is one of a series of cooperatively developed plans for managing various populations of migratory birds in the Pacific Flyway. Inquiries about this plan may be directed to member States of the Pacific Flyway Council or to the Pacific Flyway Representative, U.S. Fish and Wildlife Service, Division of Migratory Bird Management, 445 W Gunnison Avenue, Suite 240, Grand Junction, CO 81501. Information regarding the Pacific Flyway Council and management plans can be found on the Internet at PacificFlyway.gov.

Suggested citation: Pacific Flyway Council. 2024. Management plan for the western white-winged dove. Pacific Flyway Council, care of the U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Grand Junction, Colorado. 26pp

MANAGEMENT PLAN

FOR THE

WESTERN WHITE-WINGED DOVE

Prepared for the

Pacific Flyway Council
U.S. Fish and Wildlife Service
Direccion General de Conservacion Ecologica de Recursos Naturales

by the

White-winged Dove Subcommittee
of the
Pacific Flyway Study Committee

July 1993
Revised May 2004
Revised August 2024

Approved by Doug Brimeyer
Chairperson, Pacific Flyway Council

August 30, 2024
Date

ACKNOWLEDGEMENTS

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PREFACE

The Pacific Flyway Council is an administrative body that forges cooperation among public wildlife agencies for the purpose of protecting and conserving migratory birds in western North America. The Council is composed of the director or an appointee from the public wildlife agency in each state, province, and territory in the western United States, Canada, and Mexico. Migratory birds use four major migratory routes (Pacific, Central, Mississippi, and Atlantic flyways) in North America. Because of the unique biological characteristics and relative number of hunters in these regions, state and federal wildlife agencies adopted the flyway structure for administering migratory bird resources within the United States. Each flyway has its own Council.

Management plans are developed by Council technical committees and include biologists from state, federal, and provincial wildlife and land-management agencies, universities, and others. Management plans typically focus on populations, which are the primary unit of management, but may be specific to species or subspecies. Management plans identify issues, goals, and actions for the cooperative management of migratory birds among State and Federal agencies to protect and conserve these birds in North America. Management of some migratory birds requires coordinated action by more than one flyway. Plans identify common goals and objectives, establish priority of management actions and responsibility for them, coordinate collection and analysis of biological data, foster collaborative efforts across geo-political boundaries, document agreements on harvest strategies, and emphasize research needed to improve conservation and management. Population sustainability is the first consideration, followed by equitable recreational and subsistence harvest opportunities. Management plans generally have a 5-year planning horizon, with revisions as necessary to provide current guidance on coordinated management. Management strategies are recommendations and do not commit agencies to specific actions or schedules. Fiscal, legislative, and priority constraints influence the level and timing of management activities.

Management plans are not intended as an exhaustive compendium of information available, research needed, and management actions. Plans include summaries of historical data and information from recent surveys and research that help identify: (1) the current state of the resource (i.e., population and associated habitat), (2) desired future condition of the resource (i.e., population goals and objectives), (3) immediate management issues managers face, and (4) management actions necessary and assignment of responsibilities to achieve the desired future condition, including harvest strategies and monitoring to evaluate population status and management progress.

The first management plan for western white-winged doves was adopted in July 1993. This document is the second revision of that plan. It was developed by the white-winged dove subcommittee of the Pacific Flyway Study Committee.

PACIFIC FLYWAY MANAGEMENT PLAN
FOR THE WESTERN WHITE-WINGED DOVE

INTRODUCTION

The white-winged dove (*Zenaida asiatica*) is one of 14 species of Columbidae occurring in North America north of Mexico (Aldrich 1993). Up to 12 morphological subspecies of white-winged doves were recognized (Saunders 1968) and subsequently lumped into four subspecies (Baptista et al. 1997), one of which was then elevated to a distinct species (*Z. a. meloda*, following Johnson and Clayton 2000). Two subspecies of white-winged dove reside and breed in the United States (Western, *Z. a. mearnsi*, and Eastern, *Z. a. asiatica;* Figure 1). The distribution of *Z. a. asiatica* encompasses south Texas through eastern Mexico, Guatemala, Honduras, El Salvador and into Nicaragua, as well as parts of south Florida and the West Indies (Schwertner et al. 2020). Birds from this population migrate through southern Mexico to winter in Central America. The breeding range of *Z. a. mearnsi* extends from southeastern California and Nevada through southern Arizona into southwestern New Mexico, Baja California, and southward into Guerrero and Puebla in south-central Mexico. Birds from the western population winter in the western Mexican states of Nayarit, Jalisco, Michoácan, Guerrero, Colima, and northern Oaxaca (Figure 1). Unlike the Eastern subspecies, doves from the Western subspecies rarely winter in Central America. Thus, there appears to be little geographical contact between the two populations in wintering areas, but they likely overlap in breeding areas (e.g., along the Pecos River in Texas and New Mexico; Pruett et al. 2000).

In the United States, Arizona hosts the largest breeding populations of western white-winged dove. Arizona has conducted both breeding population and harvest surveys since 1962 (e.g., Appendix A). California began collecting harvest data for western white-winged doves in 1992. In recent decades, white-winged doves have expanded northward, with measurable harvest in Nevada since 1999 and Utah since 2005 (Appendix B). Harvest in Colorado and New Mexico chiefly occurs in the Central Flyway portion of these states and is not considered here. While data from western white-winged doves across the Western Management Unit (WMU) are included in this plan, a majority of the western population, as well as most of the available breeding and harvest data, currently occurs in Arizona and California, so population demographic patterns presented in this plan are reflective of white-winged doves primarily found in Arizona and California.

Western white-winged doves are cooperatively managed by the United States Fish and Wildlife Service (USFWS) and state wildlife agencies through the Pacific and Central Flyway councils. Beginning in 1998, all states have required dove hunters to register with the USFWS Migratory Bird Harvest Information Program (HIP). Arizona and California state dove data overlap in the transition to the HIP survey from 1999 to 2002, but since 2003, only HIP estimates have been reported and are not comparable to earlier state survey methods (Appendix B).

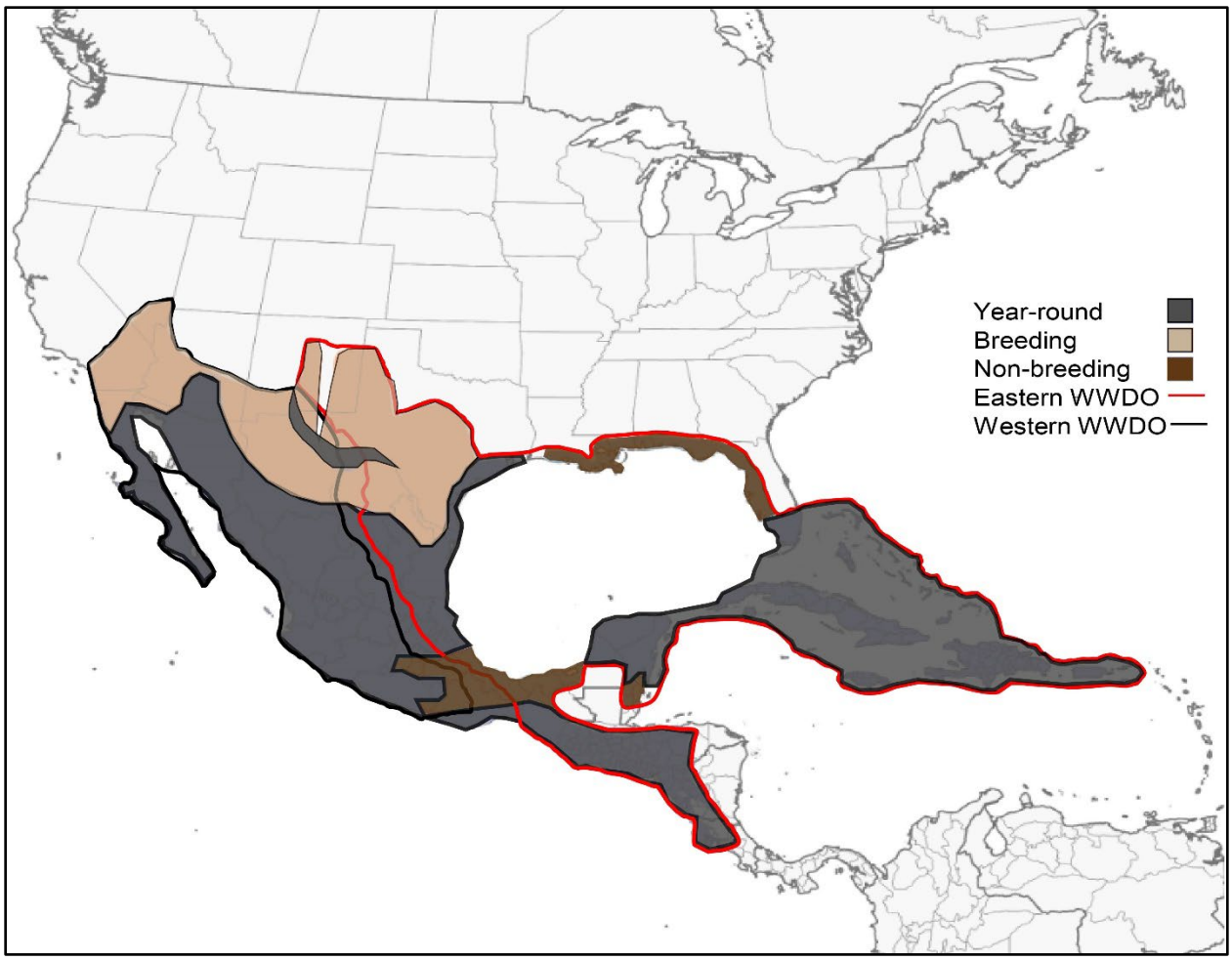

Figure 1. Current breeding, wintering, and resident range of white-winged dove populations in North America, adapted from Schwertner et al. (2020), as published in species account in Birds of the World (online). Map data provided by NatureServe in collaboration with Robert Ridgely and James Zook, The Nature Conservancy-Migratory Bird Program, Conservation International-CABS, World Wildlife Fund-US, and Environment Canada-WILDSPACE.

GOAL AND OBJECTIVES

The goal of this management plan is to ensure long-term conservation of white-winged doves in the Pacific Flyway while meeting the needs for consumptive and non-consumptive uses and minimizing depredation and nuisance concerns.

Objectives:

A. Maintain a minimum annual abundance index of at least 50 western white-winged doves per route as measured by the most recent 3-year average of white-winged doves seen or heard on Breeding Bird Survey [BBS] routes in the WMU.

B. Maximize potential for sustained consumptive and non-consumptive uses.

C. Increase habitat quality and quantity.

STATUS

Distribution

Saunders (1968) recognized multiple subspecies in *Z. asiatica*. George et al. (1994) subsequently proposed breeding, wintering, and resident areas for distinct white-winged dove populations in North America (i.e., larger eastern and western populations, and smaller populations in the Mexican Highlands, upper Big Bend, and Florida). More recent classification efforts (Baptista et al. 1997) aggregated several of Saunders' (1968) subspecies into the western (*Z. a. mearnsi*) and eastern (*Z. a. asiatica*) subspecies, and no longer recognize smaller populations designated by George et al. (1994). The Eastern population occupies most of the central United States, islands of the Caribbean, eastern Mexico and Central America, as well as the far southern Pacific coastal areas of Mexico, and as far south as Costa Rica (Figure 1), whereas the Western population is found primarily in the desert Southwest and into western Mexico. Eastern and western white-winged dove populations overlap in New Mexico and Colorado. The western population has expanded northward into parts of Nevada and southern Utah and south into central Mexico down to areas near the Isthmus of Tehuantepec (Figure 1). Small numbers of birds in the western population do not migrate south, but rather overwinter in parts of Arizona and New Mexico.

Habitat

White-winged doves nest at relatively low densities throughout the Sonoran, Mohave, and Chihuahuan deserts of southern and western Arizona, southern California, and southern New Mexico. However, in riparian woodlands near agricultural areas, breeding doves have historically occurred in high densities. Where habitat conditions are good, white-winged doves often form large nesting colonies, but in more marginal habitat, they typically nest as scattered pairs (George et al. 1994). Butler (1977) reported birds that nested in high densities in mesquite (*Prosopis* spp.) or salt cedar (*Tamarix ramosissima*) had higher nest success.

Responses of white-winged doves to agricultural activities are well documented and are likely partially responsible for large changes in abundance in the southwestern United States. For example, rapid declines in white-winged dove populations following either loss of food crops or nesting habitat have been noted in Arizona (Cunningham et al. 1977, Rea 1983) and Mexico (Tomlinson 1993). Likewise, eastern white-winged dove populations near Tamaulipas, Mexico increased tremendously following establishment of grain sorghum fields and irrigation in that area (Purdy and Tomlinson 1991).

Haughey (1986) studied desert nesting white-winged doves and their relationships to saguaro cactus (*Carnegiea gigantea*) in the Saguaro National Monument in southern Arizona, where they were totally dependent on native food sources. The doves used saguaros extensively for both nectar and fruit in Arizona, and several authors (noted e.g. in Haughey 1986) cite the overlap in nesting range of white-winged doves and distribution of the saguaro. Those areas where white-wing doves occur and saguaro does not (i.e., southeastern California, southwestern New Mexico, southeastern Arizona, southern Nevada and southern Utah) may represent recent range extensions in response to agricultural or anthropogenic modifications (e.g., increased availability of water and supplementary food resources in suburban areas).

Life history
Western white-winged doves typically migrate to northern breeding areas of the southwestern United States and northern Mexico in April (George et al. 1994). Males territorialize suitable nesting habitat in proximity to food and water resources and begin attracting mates through audible and physical displays. Once a mate has been secured, the female selects a nest site within the male's territory and builds a nest over 2–5 days with natural vegetative materials supplied by the male. Doves will nest as isolated pairs in sparse vegetation in the desert or in larger numbers where citrus orchards, mesquite bosques, or salt cedar thickets are in relatively close proximity to agricultural fields (Cottam and Trefethen 1968, Cunningham et al. 1977, Haughey 1986, George et al. 1994).

The female will lay a clutch of two eggs over the course of 2–3 days. Incubation begins after the first egg is laid, lasts for about 14 days, and is the shared responsibility of both the male and female. After hatching, the young are fed for the first week on "crop milk", a secretion produced in the crop of both sexes of adults, and mixed with mostly seeds in the second week. The young fledge 13–16 days after hatching and the adult male continues to feed them until they are able to find food on their own at about 4 weeks old (George et al. 1994). If the nest is destroyed, lost to predation, or after successfully fledging young, the female can begin laying another clutch of eggs a mere three days afterwards (Cottam and Trefethen 1968).

After the nesting period ends in early August, both the adults and young congregate into large flocks while feeding heavily before they migrate south. When this occurs, morning and evening flights to and from roosting and feeding sites become routine until migration begins (typically in late August to early September), with some older hatch-year birds traveling north to seek out food (Blankinship et al. 1972, George 1993). Timing of migration may be influenced by diminishing local food resources, hunting activity, or changes in weather.

Public Uses
White-winged dove hunting seasons have been permitted in Arizona and California since at least 1901, in Nevada since 1961, in Utah since 2005, and in Mexico for many years. Hunting season dates and bag limits in Arizona have changed significantly during the past 60 years, with bag limits, season lengths, and shooting hours reduced from 1970 to the mid-1990s, after which the season was liberalized to include a season length of 15 days (1988), all-day shooting hours (2009), and a daily bag limit of 10 white-winged doves (2011; Appendix C; see Cottam and Trefethen 1968:320 for Arizona regulations prior to 1956). In California, Nevada, and Utah, seasons and bag limits have remained relatively constant (Appendices D–F); current bag limits in these states are in the aggregate with mourning doves.

To obtain harvest statistics for white-winged doves, Arizona conducted random mail surveys of general license holders from 1962 through 1998 (Appendix B). From 1982 to 1998, the mean number of white-winged dove hunters per year sampled from this survey was 430. Results of the surveys were then multiplied by the estimated proportion of license holders that hunted doves each year. California also collected harvest information with a random mail survey from 1992 through 1998 (Appendix D), and in 2020, sent harvest surveys out over email, hoping to improve response rates. However, random mail or email surveys (like those conducted in Arizona and California) commonly show inflated harvest estimates due to non-response survey bias and

poorly-defined sampling frames (Fisher 1996). Consequently, these harvest estimates should be considered indicative of trend only, with the caveat that even trend data over time for harvest may not be comparable when survey methodologies change.

A more coordinated and standardized sampling of dove hunters followed with the introduction of the Harvest Information Program (HIP). Since 1999, HIP has been collecting harvest metrics for the USFWS from all states except Hawaii. All dove hunters must register for HIP and surveys are sent to a random sample of registrants before the start of the season in each state. Because HIP estimates use the same sampling protocol among states, they should provide consistent, timely harvest estimates that can be used to manage white-winged dove populations in the WMU (Figure 2).

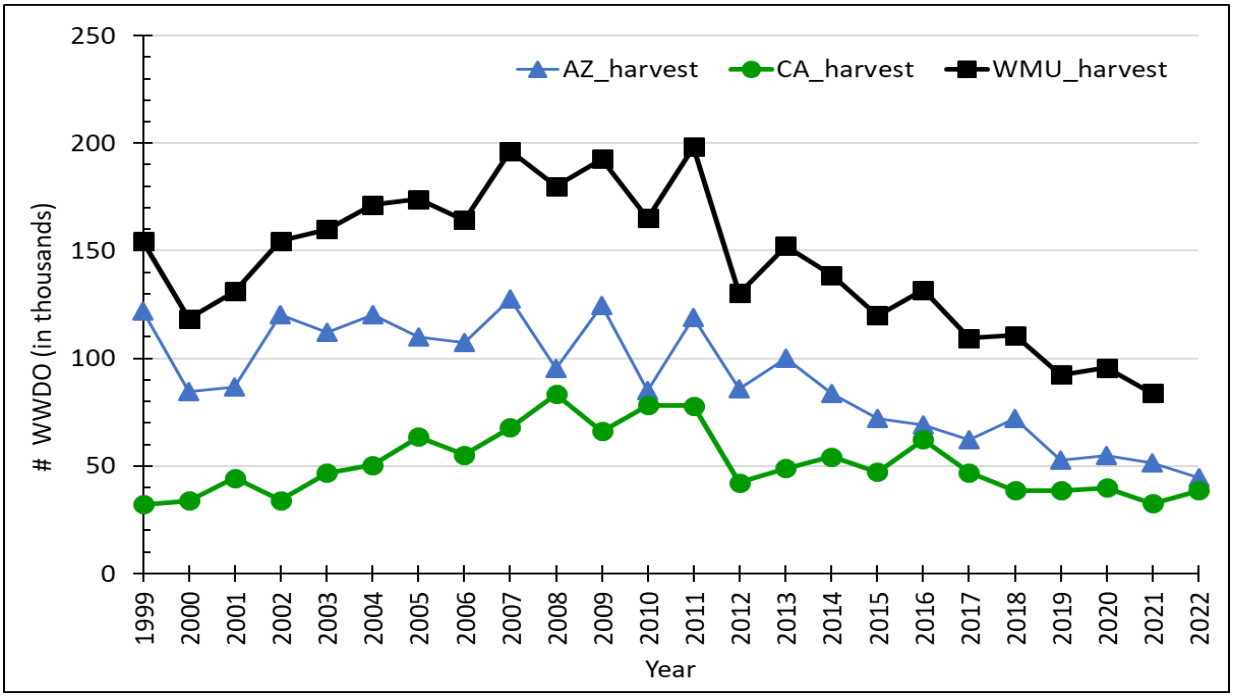

Figure 2. Estimated annual harvest of white-winged doves for Arizona, California, and the Western Management Unit, as reported through Harvest Information Program data for 1999–2022. Current harvest in Nevada and Utah is minimal and included in the Western Management Unit total.

State survey data suggested white-winged dove harvest in Arizona peaked in 1968 (740,000) and dropped to a plateau of about 400,000 in the mid-1970s before declining to harvest levels of 100,000–140,000 birds in the 1990s (Appendix B). HIP data from 2000 to the present (Figure 2) suggest harvest has been declining since ~2011. However, recent declines (since ~2015) in harvest trends appear to be primarily associated with Arizona's switch to an online hunter licensing platform and incomplete reporting of paper and online HIP stamp sales and data transfer to the USFWS rather than a decline in white-winged dove numbers in Arizona because state surveys showed stable or increasing populations during the same timeframe.

Mean California harvest was 56,939 for 1992–2020 (Appendix B). State survey data suggested annual harvest between 40,000 and 60,000 birds during the last 3 decades. HIP data (Figure 2) suggest harvest increased from 2000 until ~2011, but has been declining since, with small upticks in 2014 and 2016. A 2020 state survey for migratory bird harvest suggested that harvest was ~18,000 birds, but also suggested that fewer dove hunters out fewer days and with different harvest methods all likely played a role in declining numbers.

Sanders and Olson (2021) evaluated the status and harvest potential of western white-winged doves using all available sources from BBS, HIP, US Geological Survey Bird Banding Lab, and the Arizona Game and Fish Department (AZGFD). They found the current level of harvest was well below that needed to achieve a maximum sustained yield and that some hunting restrictions (e.g., restrictive bag limits) in Arizona and California may be unnecessary. However, they also cautioned that demographic parameters were uncertain and the model was sensitive to recruitment, a measure where data were generally lacking.

Population Demographics

The North American BBS (Pardieck et al. 2019) has been collecting information on white-winged dove numbers in the WMU since 1968. The BBS collects information annually in the spring on all birds present along thousands of established routes on secondary roads in the United States and Canada, with observers stopping every 0.5 mile along 24.5-mile routes to count for 3-minute intervals. Every bird seen or heard within 0.25-mile radius is recorded. BBS data are then combined in a Bayesian framework that accounts for variability in observer experience and skill to produce an annual index of abundance (as a measure of birds/route) for each avian species (Sauer and Link 2011, Sauer et al. 2020). Although most of the white-winged doves in the WMU occur in Arizona and California, index data for all states in the WMU are used in a harvest strategy to inform decisions about appropriate bag limits for western white-winged doves in the WMU (Figure 3). BBS abundance indices suggest that white-winged dove numbers have been relatively stable over the past 50 years in the WMU (Figure 3). Using these data to manage western white-winged dove populations also aligns with management strategies for other columbiform birds in the WMU, i.e., mourning doves (*Zenaida macroura*) and Pacific Coast band-tailed pigeons (*Patagioenas fasciata monilis*).

Arizona has conducted an independent survey similar to the BBS of white-winged dove abundance annually since 1962 (Appendix A). The survey is intended to provide an annual index to population size (Dolton 1993) by recording the total number of doves heard along survey routes through key habitat types in Arizona. Historically, white-winged dove routes were placed in chapparal, Sonoran desert, and Chihuahuan desert habitats, but all the Chihuahuan and many of the chapparal routes have been lost to development. The call-count index is calculated in mean weights for each habitat type (i.e., using the number of routes/habitat type out of the total routes multiplied by the mean number of white-winged dove calls/habitat type) that are summed together for the index. The call-count index for white-winged doves generally ranged between 40–50 from 1962–2015. Since then, call counts have increased (Appendix A), due to higher numbers of calling birds rather than additional routes. AZGFD biologists have attributed lower historical white-winged dove numbers in Arizona to observed losses of large nesting colonies associated with high hunting pressure and mesquite bosque removal in the 1960s and 1970s (Brown 1982, Stromberg 1993), as well as shifts in agricultural crops (Cunningham et al. 1997)

and possible over harvest, as white-winged doves may be more vulnerable to over harvest than mourning doves (George 1993). Clearing of the large mesquite forests in river bottoms for flood control and fuel wood removed the most productive nest areas. Invasive tamarisk trees have replaced mesquite in the same areas and provide equally suitable nesting habitat. Observations suggest the recent increase in white-winged dove numbers in the call-count survey is likely due to a return of small grain crops (i.e., blue durum wheat) grown in Arizona where large breeding colonies have historically occurred. The more dispersed, solitary nesting white-winged dove populations have been less affected by these changes and have remained relatively stable in Arizona.

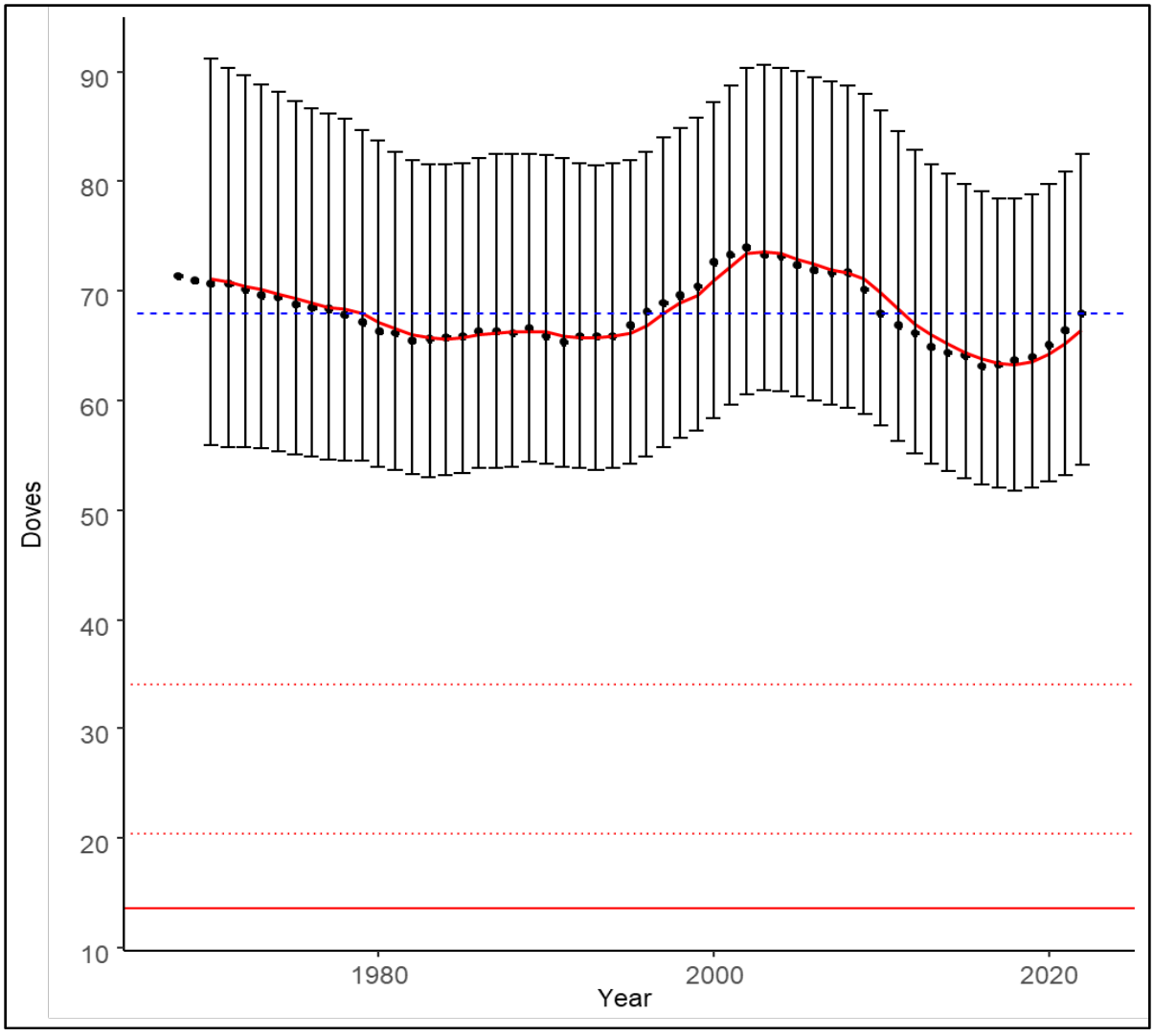

Figure 3. Western Management Unit Population of white-winged dove abundance (index) in spring. Black circles are annual estimates of abundance (index), 1968–2022. The red line is a moving 3-year average with 70% credible intervals (1970–2022) and the blue dashed line is the long-term average (LTA) of the annual estimates. Red dashed lines represent threshold values (at 0.5 and 0.3 of the LTA) in the harvest strategy decision and the red solid line is the closure threshold (0.2 of the LTA).

MANAGEMENT ISSUES

A. Population Status

1. Information is lacking on the validity and distribution of western white-winged dove subspecies. Banding efforts are still limited in range, though greater efforts to band across their distribution may likely provide better data on survival rates, age ratios, recruitment, and migration patterns.

2. Sex ratios are relatively unknown; there is no consistent diagnostic key to determine gender using external physical characteristics.

3. Information is lacking on relative importance of non-hunting mortality factors, though lead ingestion and biocides have been implicated to affect survival and recruitment.

B. Harvest Assessment

1. Western white-winged doves lack a harvest strategy; harvest rates and band reporting in Mexico, where most western white-winged doves winter, are relatively unknown.

C. Habitat

1. The distribution of western white-winged doves shifts as crops and agricultural practices change, and their habitat use north of Arizona and California is largely unevaluated.

RECOMMENDED MANAGEMENT STRATEGIES

The following management actions are recommendations to guide cooperative efforts to meet stated objectives of this plan. Degree and timing of their implementation by various wildlife agencies will be influenced by personnel, fiscal, and legislative constraints beyond the scope of this plan. Whenever possible, management actions in this plan should be integrated with those in management plans for other Pacific Flyway dove populations, local and regional land use plans, and habitat conservation programs. Management actions should be accompanied by monitoring efforts to examine their effectiveness to meet population and habitat objectives in an adaptive management approach.

A. Population Status

1. Develop and test techniques that cost-effectively and reliably monitor range-wide population size.

   Priority: 1

   Responsibility: Arizona, California, Nevada, and Utah in conjunction with the USFWS.

   Schedule: Ongoing.

2. Evaluate banding needs for a range-wide banding program to assess harvest and survival probabilities of western white-winged doves.

   Priority: 1

   Responsibility: All states, CWS, USFWS

   Schedule: by 2025.

B. Harvest Assessment

1. Build partnerships and cooperative efforts with Mexico to improve reporting of harvest and recovered bands.

   Priority: 2

   Responsibility: Arizona, California, in conjunction with the USFWS.

   Schedule: Ongoing.

C. Habitat

1. Evaluate distribution of white-winged doves north of Arizona and California and the food crops they utilize annually.

   Priority: 3

   Responsibility: Nevada and Utah.

   Schedule: Ongoing.

D. Research

1. Refine techniques to accurately assign age and gender for live and harvested birds.

   Priority: 1

   Responsibility: Arizona, California, Nevada, Utah in conjunction with USFWS.

   Schedule: Ongoing.

2. Investigate effects of biocides and lead shot ingestion on white-winged doves.
   Priority: 3

   Responsibility: States, USGS, USFWS.

   Schedule: Ongoing.

HARVEST STRATEGY

The harvest management objective is to maintain hunting regulations that meet the overall objectives of this plan and align with the National Mourning Dove Harvest Strategy as part of an aggregate dove bag limit. The white-winged dove harvest strategy involves four regulatory alternatives: Standard, Restrictive, Very Restrictive, and Closed. Threshold values for each alternative will use the most recent moving 3-year average BBS index value as a percentage of the long-term average index of abundance (birds/route) modeled from BBS data for white-winged doves in the WMU during 1968–2022.

a. The Standard alternative of 60 days and 15 white-winged doves daily bag limit will be prescribed when 85% confidence (lower 70% credible interval) in the most recent moving 3-year average BBS index is ≥ 50% of the long-term average.

b. The Restrictive alternative of 60 days and 10 white-winged doves daily bag limit will be prescribed when 85% confidence (lower 70% credible interval) in the most recent moving 3-year average BBS index is ≥ 30% of the long-term average.

c. The Very Restrictive alternative of 60 days and 2 white-winged dove daily bag limit will be prescribed when 85% confidence (lower 70% credible interval) in the most recent moving 3-year average BBS index is ≥ 20% of the long-term average.

d. The Closed season alternative will be prescribed when either the above conditions for an open season are not met or when the season for the WMU population of mourning doves is closed.

ANNUAL REVIEW

The White-winged Dove subcommittee shall meet annually, or as needed, to review progress towards achieving the goal and objectives of this plan, and to recommend actions and revisions. The Subcommittee shall report to the Pacific Flyway Council through the Pacific Flyway Study Committee on accomplishments and shortcomings of the cooperative management efforts. The Subcommittee shall be composed of representatives from the U.S. Fish and Wildlife Service Headquarters and Region 2, and state agencies responsible for management of the western white-winged dove, including Arizona Game and Fish Department, California Fish and Wildlife Department, and Nevada Department of Wildlife. It is the responsibility of those subcommittee members to assure that the objectives and procedures of this plan are integrated and coordinated with those plans and activities of the various wildlife and land management agencies and local planning systems within their agency's purview. Chairmanship will be appointed biennially and rotated among member agencies. The Subcommittee will exercise its prerogative to invite to attend and participate as an ex officio member at meetings any individual, group, agency, or representative whose expertise, counsel or managerial capacity is required for the coordination and implementation of management programs.

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APPENDICES

Appendix A. White-winged dove average call-count indices and percent juvenile white-winged doves from total white-winged doves in hunter bags in Arizona, 1962–2023. Call-count indices are from routes run by Arizona Game & Fish Department and percent juveniles in the bag is calculated from 2 check stations in the first days of the season.

Year	Ave Call-Count Index	% Juvenile Harvested		Year	Ave Call-Count Index	% Juvenile Harvested
1962	33.1	NA		1993	32.6	51
1963	40.2	NA		1994	26.9	44
1964	35.9	NA		1995	31.2	51
1965	43.2	NA		1996	31.1	63
1966	48.4	NA		1997	31	56
1967	51.5	NA		1998	35	41
1968	52.3	57		1999	26.2	68
1969	41.1	69		2000	30.9	70
1970	33.9	58		2001	28.5	45
1971	31.3	54		2002	24.6	61
1972	35.4	79		2003	20.3	55
1973	36.5	67		2004	25.2	69
1974	31	75		2005	23.2	82
1975	29	58		2006	23.7	60
1976	30.9	66		2007	24.2	61
1977	32.7	74		2008	25.1	74
1978	35.6	65		2009	32.4	54
1979	30.8	43		2010	26.4	77
1980	34.9	51		2011	27.8	33
1981	32.9	65		2012	22.1	73
1982	29.3	61		2013	25.3	77
1983	32.9	83		2014	35.2	80
1984	31.1	82		2015	28.2	39
1985	37.7	41		2016	90.8	78
1986	34.1	69		2017	61.3	68
1987	29.9	78		2018	79.4	71
1988	26.7	78		2019	74	74
1989	30.7	73		2020	104.9	NA
1990	28	71		2021	145.6	80
1991	30.6	46		2022	134.8	65
1992	30.8	63		2023	191.3	30

Appendix B. Western white-winged dove harvest in Western Management Unit States, 1962–2022. Numbers prior to 1999 were estimated by states, whereas numbers from 1999 to the present are estimated using HIP surveys and may not be comparable to the earlier numbers.

YEAR	Arizona	California	Nevada	Utah
1962	448,398	--	--	--
1963	385,249	--	--	--
1964	412,542	--	--	--
1965	549,045	--	--	--
1966	578,166	--	--	--
1967	703,157	--	--	--
1968	740,079	--	--	--
1969	664,053	--	--	--
1970	407,921	--	--	--
1971	390,016	--	--	--
1972	355,633	--	--	--
1973	484,095	--	--	--
1974	425,127	--	--	--
1975	502,225	--	--	--
1976	455,692	--	--	--
1977	274,998	--	--	--
1978	327,555	--	--	--
1979	288,516	--	--	--
1980	75,611	--	--	--
1981	182,535	--	--	--
1982	134,981	--	--	--
1983	137,284	--	--	--
1984	177,957	--	--	--
1985	194,508	--	--	--
1986	192,734	--	--	--
1987	112,838	--	--	--
1988	99,955	--	--	--
1989	74,944	--	--	--
1990	100,163	--	--	--
1991	107,455	--	--	--
1992	94,551	64,403	--	--
1993	107,393	55,363	--	--
1994	138,080	109,427	--	--
1995	106,925	63,679	--	--
1996	140,974	60,183	--	--
1997	119,446	105,819	--	--
1998	165,190	39,280	--	--
1999	122,100	32,100	100	--
2000	84,500	33,900	0	--
2001	86,500	44,500	100	--
2002	120,400	34,000	100	--

Appendix B. Continued

YEAR	Arizona	California	Nevada	Utah
2003	112,300	46,800	800	--
2004	120,300	50,500	600	--
2005	110,100	63,600	200	200
2006	107,400	55,200	600	1,000
2007	127,600	67,900	0	800
2008	95,300	83,300	50	1,200
2009	124,500	66,100	600	1,500
2010	84,900	78,200	400	1,800
2011	118,900	77,900	300	1,200
2012	86,000	42,200	200	500
2013	100,000	48,900	3,300	0
2014	83,800	54,400	300	200
2015	72,200	47,300	500	0
2016	69,000	62,300	200	200
2017	62,700	47,000	200	100
2018	72,000	38,600	50	200
2019	52,490	38,563	1,231	91
2020	54,898	39,826	580	304
2021	51,422	32,469	0	0
2022	44,568	38,682	341	0

Appendix C. Season dates, season lengths, and bag/possession limits for white-winged doves in Arizona, 1956–2023.

Year	Season Dates[1]	Season Length	Bag/possession Limits[2]
1956	9/1–10/4 & 12/8–23	34 & 16	12/15
1957	9/1–29 & 12/7–27	29 & 21	25/25
1958	9/1–28 & 12/13–1/3	28 & 22	25/25
1959	9/1–27 & 12/12–1/3	27 &23	25/25
1960	9/1–25 & 12/10–1/3	25 & 25	25/25
1961	9/1–24 & 12/9–31	24 & 23	25/25
1962	9/1–24 & 12/8–1/2	24 & 26	25/25
1963	9/1–25 & 12/7–31	25 & 25	25/25
1964	9/1–27 & 12/12–1/3	27 & 23	25/25
1965	9/1–26	26	25/25
1966	9/1–25	25	25/25
1967	9/1–24	24	25/25
1968	9/1–24 & 12/11–1/5	24 & 26	25/25
1969	9/1–28 & 12/21–1/11	28 & 22	25/25
1970	9/1–20 & 12/12–1/10	20 & 30	10/10
1971	9/1–12	12	10/10
1972	9/1–12	12	10/10
1973	9/1–23	23	10/10
1974	9/1–22	22	10/10
1975	9/1–21	21	10/10
1976	9/1–20	20	10/10
1977	9/1–25	25	10/10
1978	9/1–24	24	10/10
1979	9/1–23	23	10/10
1980[3]	9/1–28	28	5/10 North & 6/12 South
1981	9/1–27	27	6/12
1982	9/1–26	26	6/12
1983	9/1–26	26	6/12
1984	9/1–23	23	6/12
1985	9/1–22	22	6/12
1986	9/1–21	21	6/12
1987	9/1–13	13	6/12
1988	9/1–11	11	6/12
1989	9/1–10	10	6/12
1990	9/1–10	10	6/12
1991	9/1–10	10	6/12
1992	9/1–10	10	6/12
1993	9/1–12	12	6/12
1994	9/1–11	11	6/12
1995	9/1–10	10	6/12
1996	9/1–10	10	6/12

Appendix C. Continued

Year	Season Dates	Season Length	Bag/possession Limits
1997	9/1–14	14	6/12
1998	9/1–15	15	6/12
1999	9/1–15	15	6/12
2000	9/1–15	15	6/12
2001	9/1–15	15	6/12
2002	9/1–15	15	6/12
2003	9/1–15	15	6/12
2004	9/1–15	15	6/12
2005	9/1–15	15	6/12
2006	9/1–15	15	6/12
2007	9/1–15	15	6/12
2008	9/1–15	15	6/12
2009	9/1–15	15	6/12
2010	9/1–15	15	6/12
2011	9/1–15	15	10/20
2012	9/1–15	15	10/20
2013	9/1–15	15	10/30
2014	9/1–15	15	10/30
2015	9/1–15	15	10/30
2016	9/1–15	15	10/30
2017	9/1–15	15	10/30
2018	9/1–15	15	10/30
2019	9/1–15	15	10/30
2020	9/1–15	15	10/30
2021	9/1–15	15	10/30
2022	9/1–15	15	10/30
2023	9/1–15	15	10/30

[1] Federal white-winged dove frameworks have been set to coincide with those of mourning doves. The frameworks have allowed a white-winged dove season only during the first segment of a split mourning dove season from 1971 to present. From 1983–1986, all WMU states were permitted a mourning dove framework option (including white-winged doves in CA, AZ, and NV) of 60 days (45 in 1982) and 15/30 aggregate bag/possession. In 1987, WMU states were given the option of a 30-day consecutive day season any time between September 1 and January 15 or a 45-day split season to be divided within two time periods (September1–15 and November 1 to January 15). In 1992, Arizona was permitted a 60-day split season to be divided within two overall time periods (September 1–15 and November 1–January 15). Shooting hour frameworks were ½ hour before sunrise to sunset throughout the 36-year period. However, Arizona elected to allow only the ½ day white-wing hunting (1/2 hour before sunrise until noon) from 1989–2002.

[2] Between 1957 and 1979, mourning and white-winged doves had separate limits; since 1980, aggregate bag limits permitting either 10, 12, or 15 doves, no more than 5, 6, or 10 could be white-winged doves, have been in effect.

[3] Arizona was divided into a special white-winged dove zone and the remainder of the state in 1979. Hunting was permitted from noon to sunset during the first 3 days of the season in the special zone. In 1980, the state was divided into North and South zones, that latter having shooting hours of sunrise to noon. Since then the seasons and bag limits have applied statewide.

Appendix D. Season dates, season lengths, and bag/possession limits for white-winged doves in California, 1956–2023.

Year	Season Dates[1]	Season Length	Bag/possession Limits[2]
1956	9/1–9/30	30	10/10
1957	9/1-30	30	10/10
1958	9/1-30	30	10/10
1959	9/1-30	30	10/10
1960	9/1-30	30	10/10
1961	9/2–10/1	30	10/10
1962	9/1–9/30	30	10/10
1963	9/1-30	30	10/20
1964	9/5–10/14	40	10/20
1965	9/1–10/3 & 12/10–19	33 & 10	12/24
1966	9/1–10/2 & 12/10–18	32 & 9	10/20
1967	9/2–10/11	40	10/20
1968	9/1–30 & 11/30–12/8	30 & 9	10/12
1969	9/1–30 & 11/29–12/14	30 &16	10/12
1970	9/1–30 & 11/28–12/13	30 &16	10/12
1971	9/1–30 & 11/27–12/12	30 &16	10/12
1972	9/1–30 & 11/25–12/10	30 &16	10/12
1973	9/1–30 & 11/24–12/9	30 &16	10/12
1974	9/1–30 & 11/23–12/8	30 &16	10/12
1975	9/1–30 & 11/22–12/7	30 &16	10/12
1976	9/1–30 & 11/20–12/5	30 &16	10/12
1977	9/1–30 & 11/19–12/4	30 &16	10/12
1978	9/1–30 & 11/18–12/3	30 &16	10/12
1979	9/1–30 & 11/17–12/2	30 &16	10/12
1980	9/1–30 & 11/15–12/4	30 & 20	10/20
1981	9/1–30 & 11/19–12/3	30 & 20	10/20
1982	9/1–30 & 11/20–12/4	30 &15	10/20
1983	9/1–30 & 11/19–12/3	30 &15	10/20
1984	9/1–10/15 & 11/17–12/1	45 & 15	10/20
1985	9/1–10/15 & 11/16–30	45 & 15	10/20
1986	9/1–10/15 & 11/15–29	45 & 15	10/20
1987	9/1–30	30	10/20
1988	9/1–15 & 11/12–12/26	15 & 45	10/20
1989	9/1–15 & 11/11–12/25	15 & 45	10/20
1990	9/1–15 & 11/10–12/24	15 & 45	10/20
1991	9/1–15 & 11/9–12/23	15 & 45	10/20
1992	9/1–15 & 11/14–12/28	15 & 45	10/20
1993	9/1–15 & 11/13–12/27	15 & 45	10/20
1994	9/1–15 & 11/14–12/26	15 & 45	10/20
1995	9/1–15 & 11/11–12/25	15 & 45	10/20
1996	9/1–16 & 11/9–12/23	15 & 45	10/20

Appendix D. Continued

Year	Season Dates	Season Length	Bag/possession Limits
1997	9/1–15 & 11/8–12/22	15 & 45	10/20
1998	9/1–14 &11/8–12/23	15 & 45	10/20
1999	9/1–15 & 11/13–12/27	15 & 45	10/20
2000	9/1–15 & 11/11–12/25	15 & 45	10/20
2001	9/1–15 & 11/14–12/28	15 & 45	10/20
2002	9/1–15 & 11/9–12/23	15 & 45	10/20
2003	9/1–15 & 11/8–12/22	15 & 45	10/20
2004	9/1–15 & 11/13–12/27	15 & 45	10/20
2005	9/1–15 & 11/12–12/26	15 & 45	10/20
2006	9/1–15 & 11/11–12/25	15 & 45	10/20
2007	9/1–15 & 11/10–12/24	15 & 45	10/20
2008	9/1–15 & 11/8–12/22	15 & 45	10/20
2009	9/1–15 & 11/14–12/28	15 & 45	10/20
2010	9/1–15 & 11/13–12/27	15 & 45	10/20
2011	9/1–15 & 11/12–12/26	15 & 45	10/20
2012	9/1–15 & 11/10–12/24	15 & 45	10/20
2013	9/1–15 & 11/9–12/23	15 & 45	10/30
2014	9/1–15 & 11/8–12/22	15 & 45	10/30
2015	9/1–15 & 11/14–12/28	15 & 45	10/30
2016	9/1–15 & 11/12–12/26	15 & 45	10/30
2017	9/1–15 & 11/11–12/25	15 & 45	10/30
2018	9/1–15 & 11/10–12/24	15 & 45	10/30
2019	9/1–15 & 11/9–12/23	15 & 45	10/30
2020	9/1–15 & 11/14–12/28	15 & 45	10/30
2021	9/1–15 & 11/13–12/27	15 & 45	10/30
2022	9/1–15 & 11/12–12/26	15 & 45	10/30
2023	9/1–15 & 11/11–12/25	15 & 45	10/30

[1] Federal white-winged dove frameworks have been set to coincide with those of mourning doves. White-winged dove hunting is permitted in Imperial, Riverside, and San Bernadino counties only. From 1983–1986, all WMU states were permitted a mourning dove framework option (including white-wings in CA, AZ, and NV) of 60 days (45 in 1982) and 15/30 aggregate bag/possession. In 1987, WMU states were given the option of a 30-day consecutive day season any time between September 1 and January 15 or a 45-day split season to be divided within two time periods (September1–15 and November 1–January 15). In 1992, California was permitted a 60-day split season to be divided within two overall time periods (September 1–15 and November 1–January 15). Shooting hour frameworks were ½ hour before sunrise to sunset throughout the 36-year period.

[2] Aggregate limits were in effect since 1956, in 1964 and again during 1982–1986, the aggregate bag limit was 12, no more than 10 of which could be white-winged doves.

Appendix E. Season dates, season lengths, and bag/possession limits for white-winged doves in Nevada, 1961–2023.

Year	Season Dates[1]	Season Length	Bag/possession Limits[2 4]
1961[3]	9/1–10/20	50	10/20
1962	9/1–10/20	50	10/20
1963	9/1–10/20	50	10/20
1964	9/1–10/20	50	10/20
1965	9/1–10/20	50	12/24
1966	9/1–10/20	50	12/24
1967	9/1–10/20	50	12/24
1968	9/1–10/20	50	10/20
1969	9/1–10/20	50	10/20
1970	9/1–10/20	50	10/20
1971	9/1–10/20	50	10/20
1972	9/1–10/20	50	10/20
1973	9/1–10/20	50	10/20
1974	9/1–10/20	50	10/20
1975	9/1–10/20	50	10/20
1976	9/1–10/20	50	10/20
1977	9/1–10/20	50	10/20
1978	9/1–10/20	50	10/20
1979	9/1–10/20	50	10/20
1980	9/1–10/20	50	10/20
1981	9/1–10/20	50	10/20
1982	9/1–10/15	45	10/20
1983	9/1–10/30	60	10/20
1984	9/1–10/30	60	10/20
1985	9/1–10/30	60	10/20
1986	9/1–10/30	60	10/20
1987	9/1–9/30	30	10/20
1988	9/1–9/30	30	10/20
1989	9/1–9/30	30	10/20
1990	9/1–9/30	30	10/20
1991	9/1–9/30	30	10/20
1992	9/1–9/30	30	10/20
1993	9/1–9/30	30	10/20
1994	9/1–9/30	30	10/20
1995	9/1–9/30	30	10/20
1996	9/1–9/30	30	10/20
1997	9/1–9/30	30	10/20
1998	9/1–9/30	30	10/20
1999	9/1–9/30	30	10/20
2000	9/1–9/30	30	10/20
2001	9/1–9/30	30	10/20

Appendix E. Continued

Year	Season Dates[1]	Season Length	Bag/possession Limits[2, 4]
2002	9/1–9/30	30	10/20
2003	9/1–9/30	30	10/20
2004	9/1–9/30	30	10/20
2005	9/1–9/30	30	10/20
2006	9/1–9/30	30	10/20
2007	9/1–9/30	30	10/20
2008	9/1–9/30	30	10/20
2009	9/1–9/30	30	10/20
2010	9/1–9/30	30	10/20
2011	9/1–9/30	30	10/20
2012	9/1–9/30	30	10/20
2013	9/1–9/30	30	10/20
2014	9/1–9/30	30	15/45
2015	9/1–9/30	30	15/45
2016	9/1–10/30	60	15/45
2017	9/1–10/30	60	15/45
2018	9/1–10/30	60	15/45
2019	9/1–10/30	60	15/45
2020	9/1–10/30	60	15/45
2021	9/1–10/30	60	15/45
2022	9/1–10/30	60	15/45
2023	9/1–10/30	60	15/45

[1] Federal white-winged dove frameworks have been set to coincide with those of mourning doves. From 1983–1986, all WMU states were permitted a mourning dove framework option (including white-wings in CA, AZ, and NV) of 60 days (45 in 1982) and 15/30 aggregate bag/possession. In 1987, WMU states were given the option of a 30-day consecutive day season any time between September 1 and January 15 or a 45-day split season to be divided within two time periods (September1–15 and November 1 to January 15). In 1992, Nevada was permitted a 30-day consecutive day season between September 1 and January 15. Shooting hour frameworks were ½ hour before sunrise to sunset throughout the 36-year period.

[2] Aggregate limits were in effect since 1962, in 1964 and again during 1982–1986, the aggregate bag limit was 12, no more than 10 of which could be white-winged doves.

[3] There was no open season for white-winged doves in Nevada prior to 1961.

[4] White-winged dove harvest in Nevada was only allowed in Clark County from 1961–1965, and only in Clark and Nye County from 1965–2011.

Appendix F. Season dates, season lengths, and bag/possession limits for white-winged doves in Utah, 2005–2023.

Year	Season Dates[1]	Season Length	Bag/possession Limits[2]
2005	9/1–9/30	30	10/20
2006	9/1–9/30	30	10/20
2007	9/1–9/30	30	10/20
2008	9/1–9/30	30	10/20
2009	9/1–9/30	30	10/20
2010	9/1–9/30	30	10/20
2011	9/1–9/30	30	10/20
2012	9/1–9/30	30	10/20
2013	9/2–9/30	29	10/30
2014	9/1–10/30	60	15/45
2015	9/1–10/30	60	15/45
2016	9/1–10/30	60	15/45
2017	9/1–10/30	60	15/45
2018	9/1–10/30	60	15/45
2019	9/2–10/30	59	15/45
2020	9/1–10/30	60	15/45
2021	9/1–10/30	60	15/45
2022	9/1–10/30	60	15/45
2023	9/1–10/30	60	15/45

[1] Federal white-winged dove frameworks have been set to coincide with those of mourning doves. In 2005, Utah was permitted a 30-day consecutive day season between September 1 and January 15, then a 60-day consecutive day season in 2014.

[2] Aggregate limits have been in effect since Utah began its white-winged dove seasons.