

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
DRAFT ENVIRONMENTAL ASSESSMENT

For

**Proposed Hunting Plan for Mingo National Wildlife Refuge, Wayne
and Stoddard Counties, Missouri**

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Abstract: The United States Fish and Wildlife Service proposes to provide hunting opportunities on the Mingo National Wildlife Refuge in Wayne and Stoddard Counties, Missouri that are compatible with the purpose of the Refuge. This draft environmental assessment (DEA) evaluates three possible alternatives for hunting opportunities. The preferred alternative would offer compatible hunting opportunities while providing non-hunting visitors with other priority public use opportunities (i.e., wildlife observation, wildlife photography, environmental education and interpretation). Hunting opportunities for persons with disabilities would be provided through use of specially located and designed blinds. Parking lots would provide appropriate access and help distribute use. The general goals of the hunting program are:

1. Provide the public with safe and enjoyable hunts that are compatible with the Refuge purpose.
2. Provide quality hunting opportunities that minimize conflict with other public use activities.
3. Provide the public with opportunities to hunt wildlife species allowed by the State of Missouri. Hunts will not adversely affect localized wildlife populations and will be consistent with the 1997 National Wildlife Refuge System Improvement Act and state of Missouri regulations.
4. Provide special opportunities for persons with disabilities and youth.

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Section 1.0 Purpose of and Need for Action

1.1 Introduction

The United States Fish and Wildlife Service (Service) has prepared this Draft Environmental Assessment (DEA) to evaluate the effects associated with hunting on Mingo National Wildlife Refuge (Mingo NWR; Refuge). This DEA complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 CFR 1500-1509) and Department of the Interior (516 DM 8) and Service (550 FW 3) policies (see Section 1.7 for a list of additional regulations with which this DEA complies).

1.2 Location:

The Proposed Action would occur in Stoddard and Wayne Counties, Missouri, within the Mingo Basin on Mingo NWR (Figure 1).

1.3 Background

Mingo National Wildlife Refuge is managed by the U.S. Fish and Wildlife Service (Service) under the Department of the Interior and is a unit of the National Wildlife Refuge System (NWRS).

National Wildlife Refuge System Mission and Goals:

The mission of the National Wildlife Refuge System is (National Wildlife System Administration Act of 1966, as amended [16 U.S.C. 668dd668ee]):

“To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

The National Wildlife Refuge System Improvement Act of 1997 established several important mandates aimed at making the management of national wildlife refuges more cohesive. The preparation of comprehensive conservation plans is one of those mandates. The legislation directs the Secretary of the Interior to ensure that the mission of the National Wildlife Refuge System and purposes of the individual refuges are carried out. It also requires the Secretary to maintain the biological integrity, diversity, and environmental health of the National Wildlife Refuge System.



Figure 1. Location of Mingo National Wildlife Refuge, Puxico, MO.

The Refuge System's Mission is to:

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.
- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation).
- Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

Mingo National Wildlife Refuge Purposes and Objectives:

Beginning in 1944, land was acquired for Mingo NWR with the approval of the Migratory Bird Conservation Commission. The purpose of the Refuge derives from the Migratory Bird Conservation Act, "... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (16 U.S.C. 715d). In acquiring the first tract for the Refuge, the land was identified as "urgently needed for the protection and conservation of migratory waterfowl and other wildlife." In a 1954 presentation to the Migratory Bird Conservation Commission, the Refuge was described as an "important unit in the Mississippi Flyway" and "an important wintering ground for many species of waterfowl."

One tract of the Refuge was acquired with Bureau of Outdoor Recreation funds. The purpose associated with this funding derives from the Refuge Recreation Act and includes lands "...suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 (Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended).

An additional purpose was acquired when Congress designated the 7,730 acre Mingo Wilderness in 1976. The establishing legislation for the Wilderness (Public Law 94-557) states that "wilderness areas designated by this Act shall be administered in accordance with the applicable provisions of the Wilderness Act...." The purposes of the Wilderness Act are additional purposes of that part of the Refuge that is within the Mingo Wilderness. The purposes of the Wilderness Act are to secure an enduring resource of wilderness, to protect and preserve the wilderness character of areas within the National Wilderness Preservation System (NWPS), and to administer the NWPS for the use and enjoyment of the American people in a way that will leave

these areas unimpaired for future use and enjoyment as wilderness.

Operational Goals:

The Refuge developed a Comprehensive Conservation Plan (CCP) to provide 15 year management plan that is consistent with Service policy and legal mandates. The CCP was completed in 2007 and established new operational goals and objectives for wildlife, habitat, and public use. The current project is in compliance with the Mingo CCP.

1.4 Purpose

The purpose of this Environmental Assessment is to evaluate different alternatives for implementing a Hunt Plan on Mingo National Wildlife Refuge (Refuge).

1.5 Need for the Action

The 1997 National Wildlife Refuge System Improvement Act mandated six priority public uses be provided when feasible and compatible with the purpose of the Refuge. These priority uses include hunting, fishing, wildlife photography, wildlife observation, environmental education and interpretation. The need for action therefore revolves around hunting as a priority use. There is also a need to reserve a portion of the Refuge for non-hunting visitors and special hunts for youth and persons with disabilities (termed accessible hunts), as well as designating no more than a maximum of 40% of Refuge lands for migratory bird hunting (per requirements of the Migratory Bird Conservation Act). The combination of hunting and non-hunting areas balances the needs of hunters, who may want as much hunting land as possible, with the needs of the non-hunting public. Other entities or interests affecting the management of hunting opportunities include: Mingo Wilderness Area, adjacent land owners and adjacent state areas.

This Environmental Assessment covers the Mingo NWR Hunt Plan, which is preceded by the overall Visitor Services Plan for the Mingo National Wildlife Refuge.

Mingo National Wildlife Refuge protects a remnant of the bottomland hardwood and cypress-tupelo swamp ecosystem that once formed a 2.5 million-acre contiguous natural landscape throughout the Mississippi River basin. The 21,592-acre Refuge represents the largest area in southeast Missouri of remaining habitat for numerous native and threatened plant and animal species. The Refuge touches the southeast boundary of the Ozark Plateau and slopes abruptly from an upland oak-hickory forest to bottomland hardwood forest, lower marsh, and expansive swamp and ditch system. Since the beginning of the 20th century, these lands have been drained and deforested for agricultural purposes, which has highly modified the natural landscapes and ecosystem functions. Guided by legal mandates, the Refuge has successfully pioneered techniques that maintain a delicate balance of preservation and active management strategies for reforestation and hydrological integrity of the natural systems for the benefit of migratory birds, other wildlife, and wildlife-dependent public use. The Refuge is located in a community that appreciates both the natural diversity and the rich biological integrity of the Refuge and the surrounding public and private lands that add to the core network of the natural landscape.

Current hunting opportunities within the Refuge are the hunting of white-tailed deer, turkey,

squirrel and waterfowl. Rules and regulations for hunting these species were established by the State of Missouri and the U.S. Fish and Wildlife Service.

Established in 1944 under authority of the Migratory Bird Treaty Act, the 21,592-acre Mingo NWR is located in Stoddard and Wayne counties in southeast Missouri. A shallow basin, the Refuge lies in an abandoned channel of the Mississippi River bordered on the west by the Ozark Plateau and on the east by Crowley's Ridge. The Refuge contains approximately 16,000 acres of bottomland and upland hardwood forest, 3,000 acres of marsh and water, 1,800 acres of cropland and moist soil units, and 170 acres of grassy openings. It is located approximately 150 miles south of St. Louis and 170 miles north of Memphis, TN (Figure 1).

The National Wildlife Refuge System Improvement Act specifically required that people be provided the opportunity to enjoy, understand and be part of wildlife conservation on refuges. The National Wildlife Refuge System Improvement Act states that compatible, wildlife-dependent recreational uses involving hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation are priority public uses of the Refuge System. The Service determines whether these uses are compatible for each individual refuge. A use is determined to be compatible if it does not interfere with the fulfillment of the mission of the Refuge System or the purpose of the individual refuge.

The Service's Regional Director will select one of the alternatives analyzed in detail and will determine, based on the facts and recommendations contained herein, whether this Environmental Assessment (EA) is adequate to support a Finding of No Significant Impact (FONSI) or whether an Environmental Impact Statement (EIS) will be required.

The Mingo National Wildlife Refuge Environmental Assessment and Comprehensive Conservation Plan (CCP) determined that hunting would be allowed on the Refuge and provided guidance for the hunting of turkey, squirrels, white-tailed deer (*Odocoileus virginianus*), and waterfowl. Therefore, a no hunting (not to be confused with No Action) alternative will not be considered in this EA. The CCP and current USFWS policy also cited the limitation of migratory bird hunting to no more than 40% of Refuge lands and advocated special hunting opportunities are provided for persons with disabilities.

The Service developed a strategic plan for implementing the National Wildlife Refuge System Improvement Act called "Conserving the Future" (U.S. Fish and Wildlife Service, 2011). This plan clarifies the vision for the National Wildlife Refuge System and outlines strategies for improving delivery of the System's mission. The proposed hunting plan is consistent with the priorities and strategies outlined in "Conserving the Future."

1.6 Decision to be made

This DEA will include an evaluation of the environmental effects of the action alternatives and provide information to help the Service fully consider environmental impacts. Using the analysis in this DEA, the Service will decide whether there would be any significant effects associated with the alternatives that would require the preparation of an environmental impact statement or whether the Proposed Action should be adopted.

1.7 Regulatory Compliance:

This DEA was prepared by the Service and represents compliance with applicable Federal statutes, regulations, Executive Orders, and other compliance documents, including the following:

- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996).
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470).
- Clean Air Act of 1972, as amended (42 U.S.C. 7401 *et seq.*).
- Clean Water Act of 1972, as amended (33 U.S.C. 1251 *et seq.*).
- Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*).
- Executive Order 12898, Federal Action Alternatives to Address Environmental Justice in Minority Populations and Low Income Populations, 1994.
- Fish and Wildlife Coordination Act of 1958, as amended (16 U.S.C. 661 *et seq.*).
- National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 *et seq.*).
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 *et seq.*).
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*).
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 *et seq.*).
- Protection and Enhancement of the Cultural Environment (Executive Order 11593).

Further, this DEA reflects compliance with applicable State of Missouri and local regulations, statutes, policies, and standards for conserving the environment and environmental resources such as water and air quality, endangered plants and animals, and cultural resources.

1.8 Scoping and Public Participation

Numerous comments about hunting were received during the public review period of the CCP and during the initial scoping period for this document. A public scoping meeting was held in Puxico, MO on December 15th, 2011. A partner's scoping meeting was held with Missouri Department of Conservation (MDC) on November 9th, 2011. The Refuge staff made a presentation on the planning process and NEPA at the meetings. The public meeting was attended by 87 people.

Key comments noted during the December 2011 meeting included:

- Provide good public access.
- Open as much of the Refuge as possible to priority public uses.
- Consider impacts to private landowners adjacent to the Refuge.
- Provide waterfowl sanctuaries to maintain a nucleus of birds in the area.
- Allow raccoon hunting on the Refuge.
- Increase the area planted in crops.
- Increase youth hunting opportunities.

2.0 Proposed Action and Alternatives

This section explains how alternatives were formulated and eliminated from further study, describes alternatives, and identifies the preferred alternative.

This DEA evaluates the environmental consequences of hunting alternatives on the Refuge. Three alternatives are presented in this document: 1) No Action Alternative – allow areas to be hunted as permitted through the previous hunt plan; 2) Open new portions of the Refuge to deer, turkey, waterfowl and squirrel hunting (preferred alternative); 3) Open the portion of the Refuge in Alternative 2 plus additional areas to deer, turkey, waterfowl and squirrel hunting.

Factors considered in the development of alternatives were:

1. Compatibility with the purpose of the Refuge and the mission of the National Wildlife Refuge System.
2. Natural resources of the Refuge.
3. Demands and expectations of public use, with concerns for safety.
4. Issues identified in the Draft Environment Assessment and Comprehensive Conservation Plan and comments from partners.
5. Requirements and guidance provided in establishment legislation, specifically the Migratory Bird Conservation Act and the Emergency Wetland Resources Act of 1986.

2.1 Alternatives Eliminated from Detailed Study

2.1.1 No Hunting

An alternative that would have closed the Refuge to all hunting was not considered for detailed analysis because:

- The Comprehensive Conservation Plan identified hunting as a future use after a Draft Environmental Assessment determined a Finding of No Significant Impact (FONSI).
- A No Hunting Alternative would conflict with the 1997 National Wildlife Refuge System Improvement Act, which mandates hunting opportunities be provided when feasible and compatible.
- Hunting is a tradition in Wayne and Stoddard Counties.
- Hunting is a useful management tool to control wildlife populations.

2.2. Description of Alternatives

2.2.1 Alternative 1- No Action – Allow areas to be hunted using existing regulations and locations.

This action would utilize the parameters of hunting established by current regulations. Species hunted would be those allowed by the current regulations and in areas currently open to hunting (Figures 2-5).



U.S. Fish & Wildlife Service

Mingo National Wildlife Refuge
Stoddard and Wayne Counties, Missouri

Managed (Quota) Hunt Area

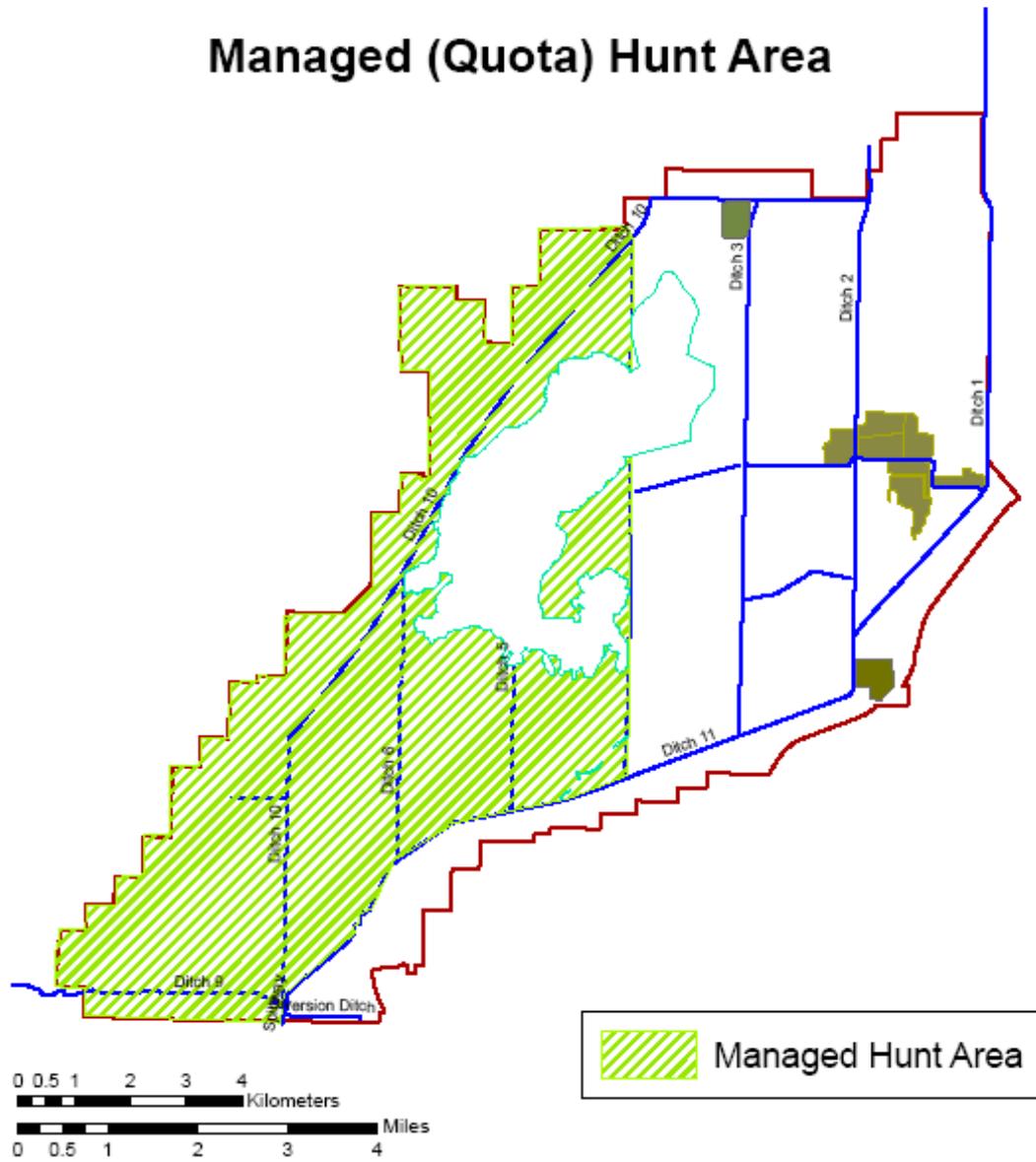


Figure 2. All alternatives managed hunt area.



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Stoddard and Wayne Counties, Missouri

Special Hunt Area

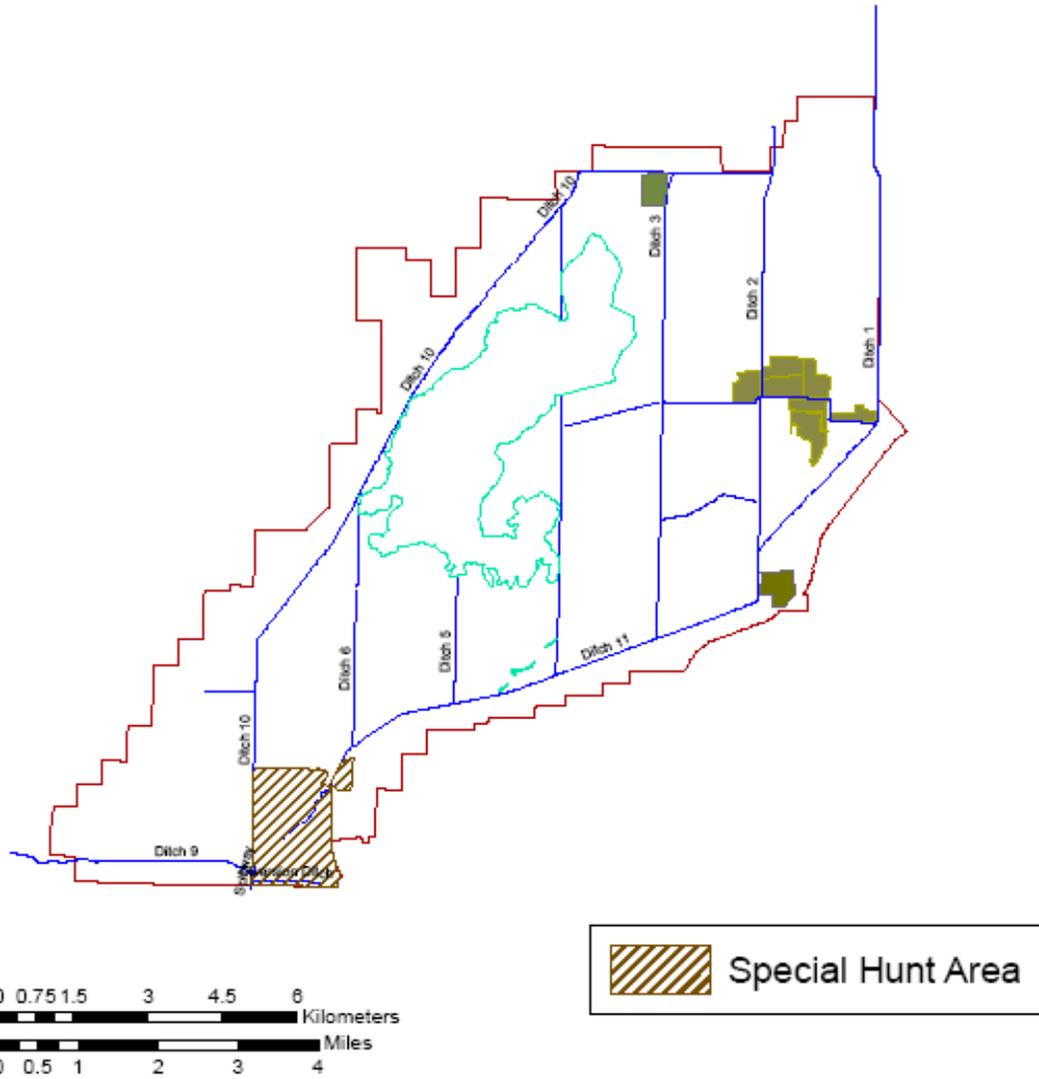


Figure 3. All alternatives special hunt area.



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Stoddard and Wayne Counties, Missouri

Hunt Plan Alternative 1 WATERFOWL

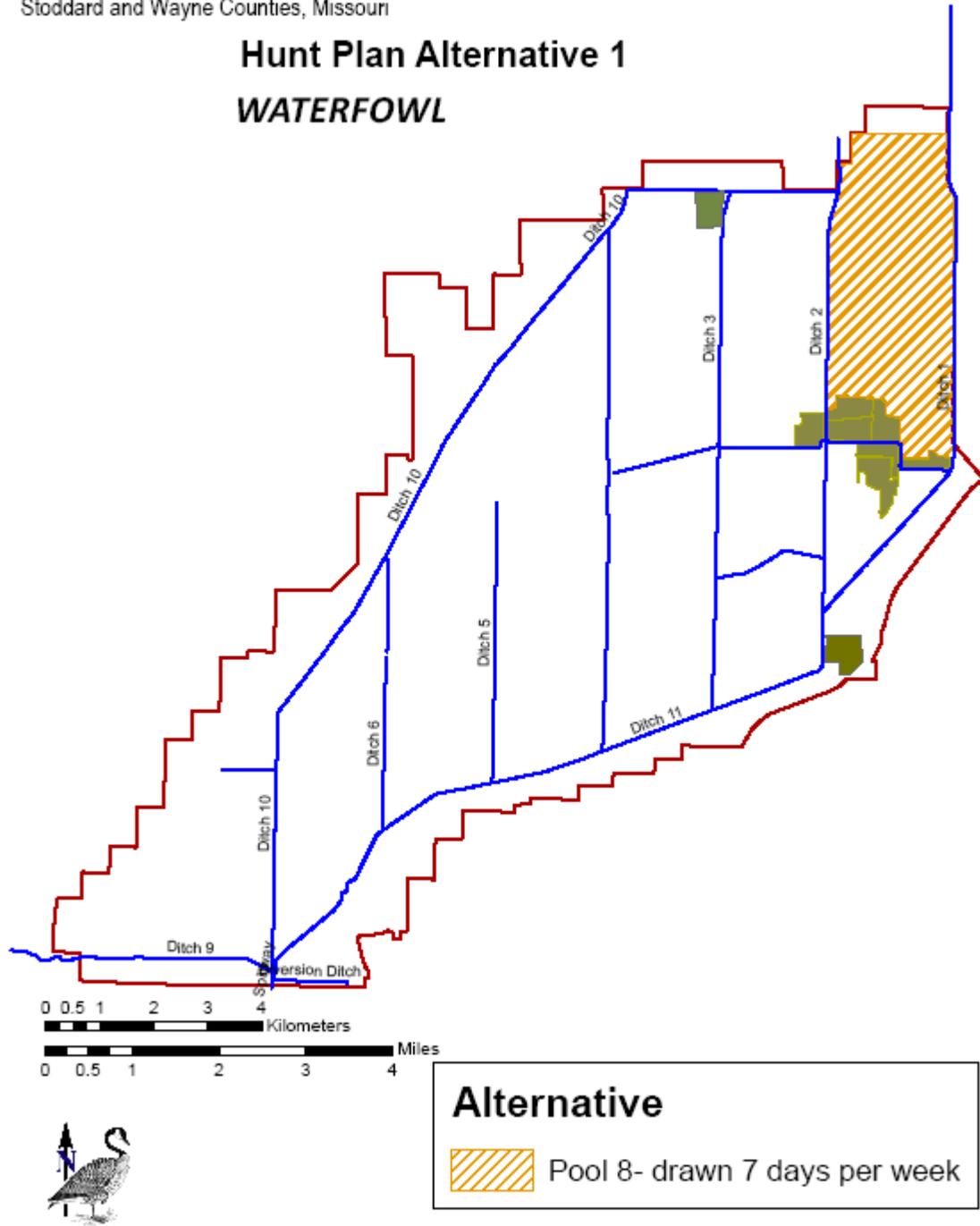


Figure 4. Pool 8 waterfowl hunt area.



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Mingo National Wildlife Refuge
Stoddard and Wayne Counties, Missouri

Hunt Plan Alternative 1
Archery Deer, Turkey, and Squirrel

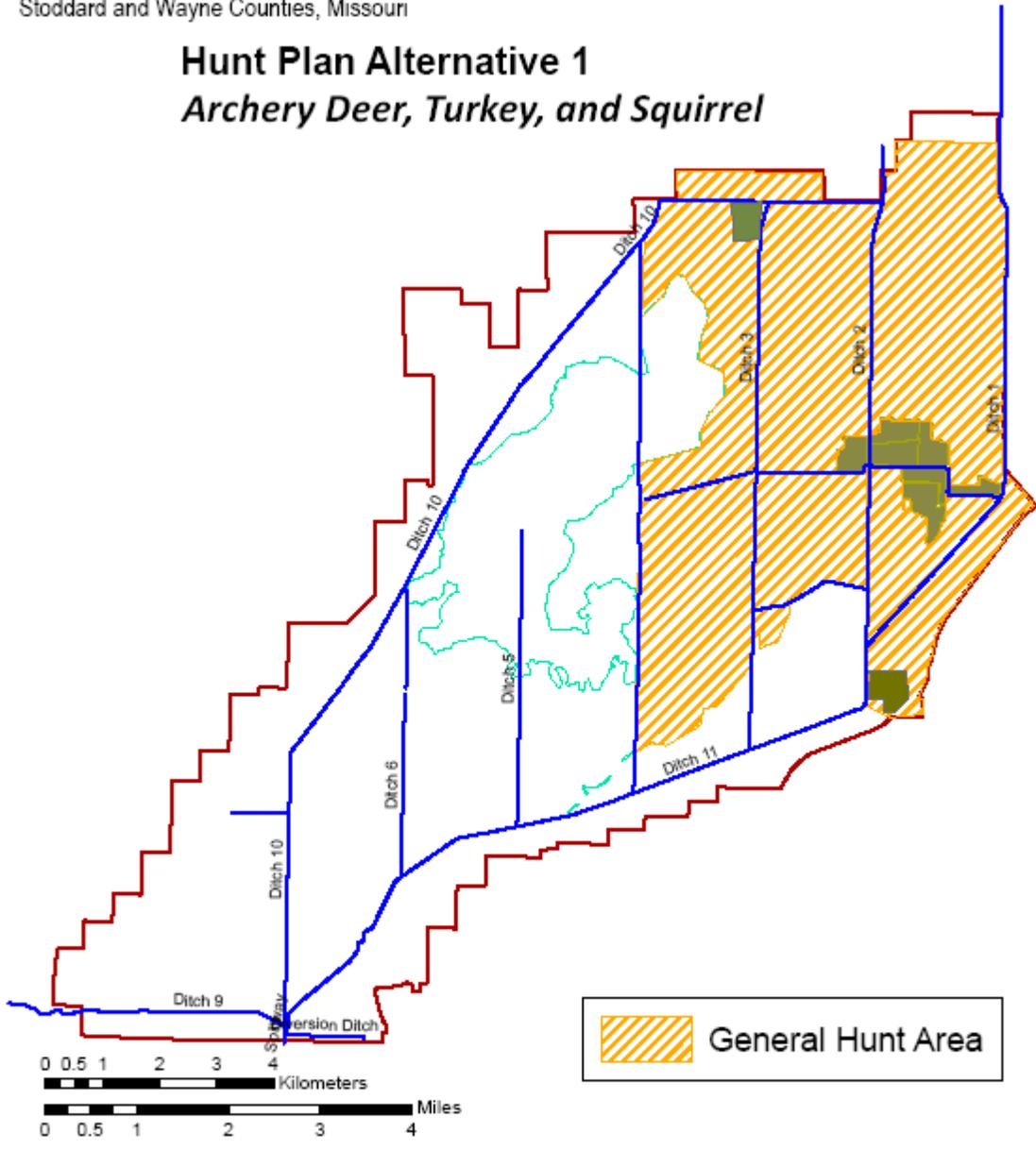


Figure 5. Alternative 1- General hunt area for archery deer, turkey and squirrel.

2.2.2 Alternative 2 – Preferred Alternative- Add Additional areas for archery deer, squirrel and spring turkey. Add additional quota hunts for deer as needed. Open additional waterfowl hunting opportunities in Pool 7. Raccoons hunted by Special Use Permit (SUP).

Under this alternative the hunt area would be expanded for archery deer/turkey, spring turkey and squirrel to include all areas south of the Ozark Highland Auto Tour (OHAT), North of Ditch 11 and east of Ditch 6 (Figure 6). The area between Ditches 4 & 6 would be closed to archery deer hunting on October 31st and would require personal property to be removed daily from the wilderness. Areas of Monopoly Marsh that are under water would be closed to hunting. Squirrel Season would close the day before archery deer season begins.

Quota and special hunts may be expanded under this alternative to include more hunts as needed to control deer populations on the refuge. The quota hunts will be based on the annual spotlight surveys, desired populations and in coordination with MDC.

Waterfowl would remain by MDC draw only under this alternative. Waterfowl hunting in Pool 8 would remain seven days per week during season for up to 50 hunters and Pool 7 would be open three days per week for up to 25 hunters. All waterfowl hunting would end at 1 p.m. Some years the hunt(s) would not occur due to lack of water or management needs for Pool 7 and/or Pool 8.

Raccoon season would be by SUP only and would coincide with the statewide season/regulations. Raccoon hunting would be allowed refuge wide but areas would be specified in the SUP. Raccoon, bobcats and feral hog may be taken by any legal means while hunting other open species during open season for that species.

2.2.3 Alternative 3 - Add Additional areas for archery deer, squirrel and spring turkey. Only one additional quota hunt for deer to be added as needed. Allow open hunting for waterfowl in Pool 7. Raccoons hunted by Special Use Permit (SUP) from the end of archery deer to the end of raccoon season.

Under this alternative, the hunt area would be expanded for archery deer/turkey, spring turkey and squirrel to include all areas south of the Ozark Highland Auto Tour (OHAT), North of Ditch 11 and east of Ditch 10. The area between Ditches 4 & 10 would be open during statewide season for archery deer, spring turkey and squirrel seasons (Figure 8). Squirrel season would go out the evening before the opening of archery season. Personal property must be removed from the wilderness area daily.

One additional quota and special hunt may be utilized under this alternative, for up to a total of four, to control deer populations on the refuge. The quota hunt will be based on the annual spotlight surveys and in coordination with MDC.

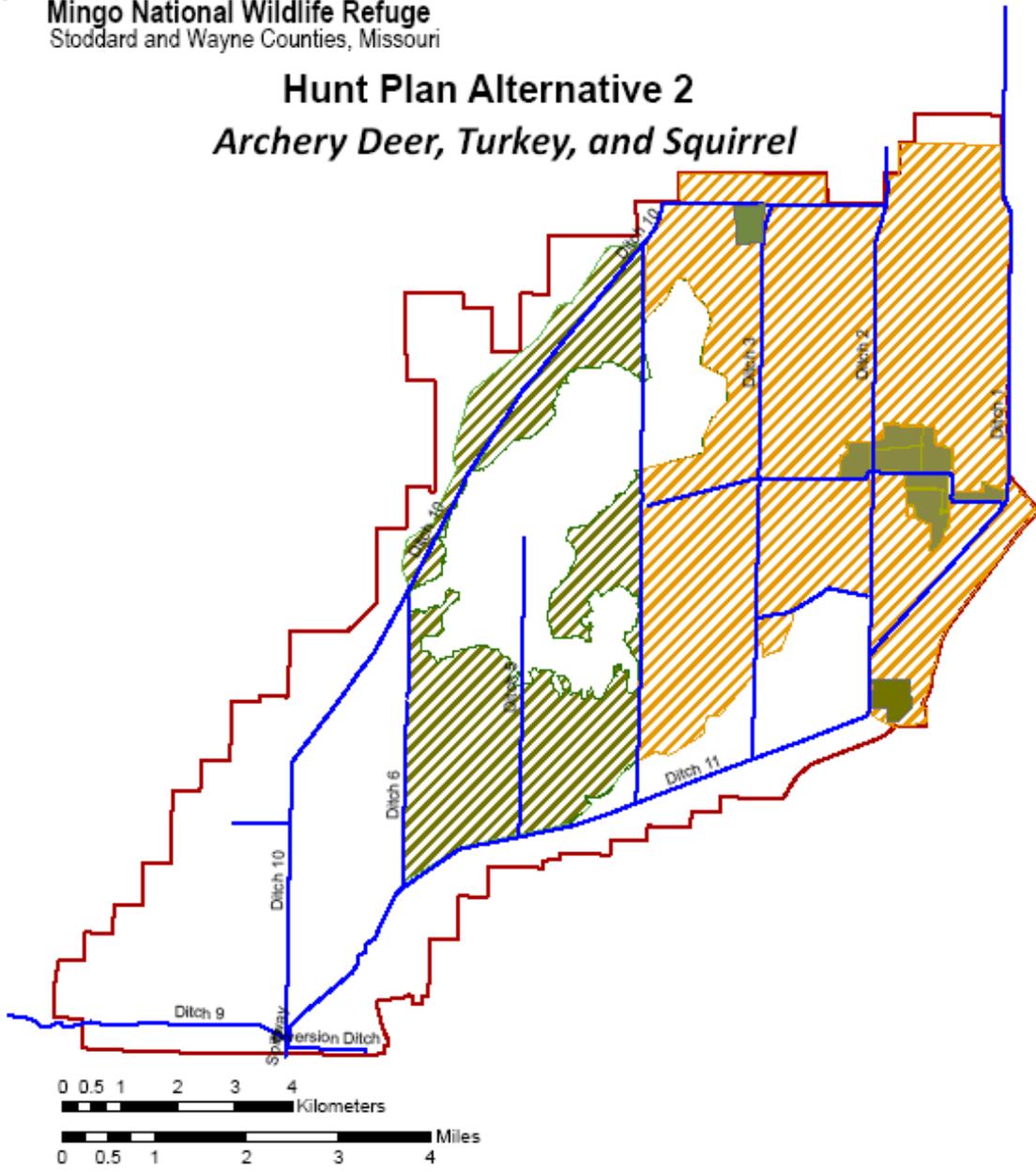


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Mingo National Wildlife Refuge
Stoddard and Wayne Counties, Missouri

Hunt Plan Alternative 2

Archery Deer, Turkey, and Squirrel



-  General Hunt Area
-  Expanded Hunt Area- Closes October 31st

Figure 6. Alternative 2 – Expanded hunt and general area for archery deer, turkey and squirrel.



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Mingo National Wildlife Refuge
Stoddard and Wayne Counties, Missouri

Hunt Plan Alternatives 2 WATERFOWL

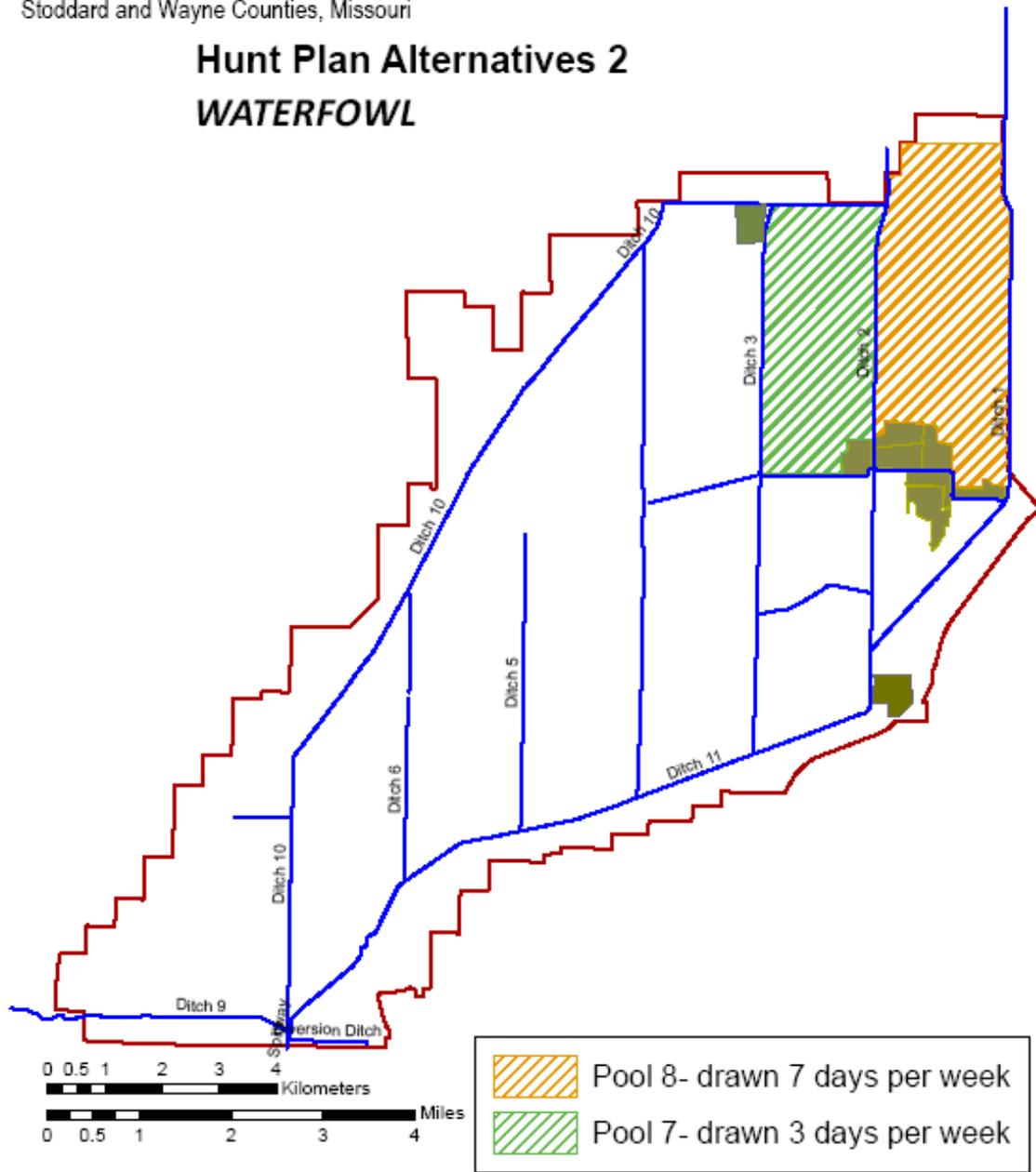


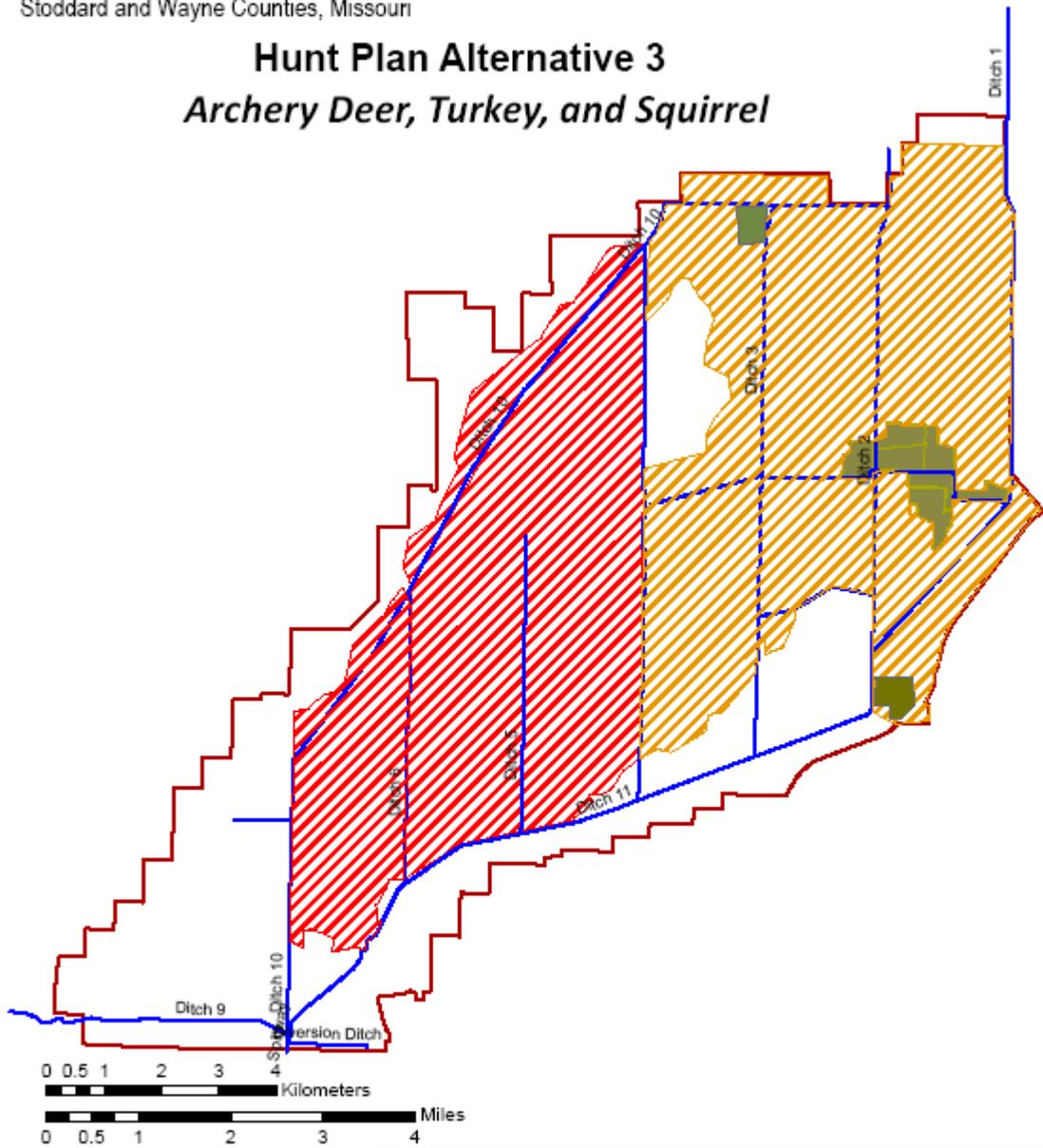
Figure 7. Alternative 2- Pool 7 and 8 waterfowl hunt areas.



U.S. Fish & Wildlife Service

Mingo National Wildlife Refuge
Stoddard and Wayne Counties, Missouri

Hunt Plan Alternative 3
Archery Deer, Turkey, and Squirrel



Alternatives

-  General Hunt Area
-  Expanded Hunt Area - Closes October 31st

Figure 8. Alternative 3– Expanded hunt area and general area for archery deer, turkey and squirrel.



U.S. Fish & Wildlife Service
Mingo National Wildlife Refuge
Stoddard and Wayne Counties, Missouri

Hunt Plan Alternatives 3 *WATERFOWL*

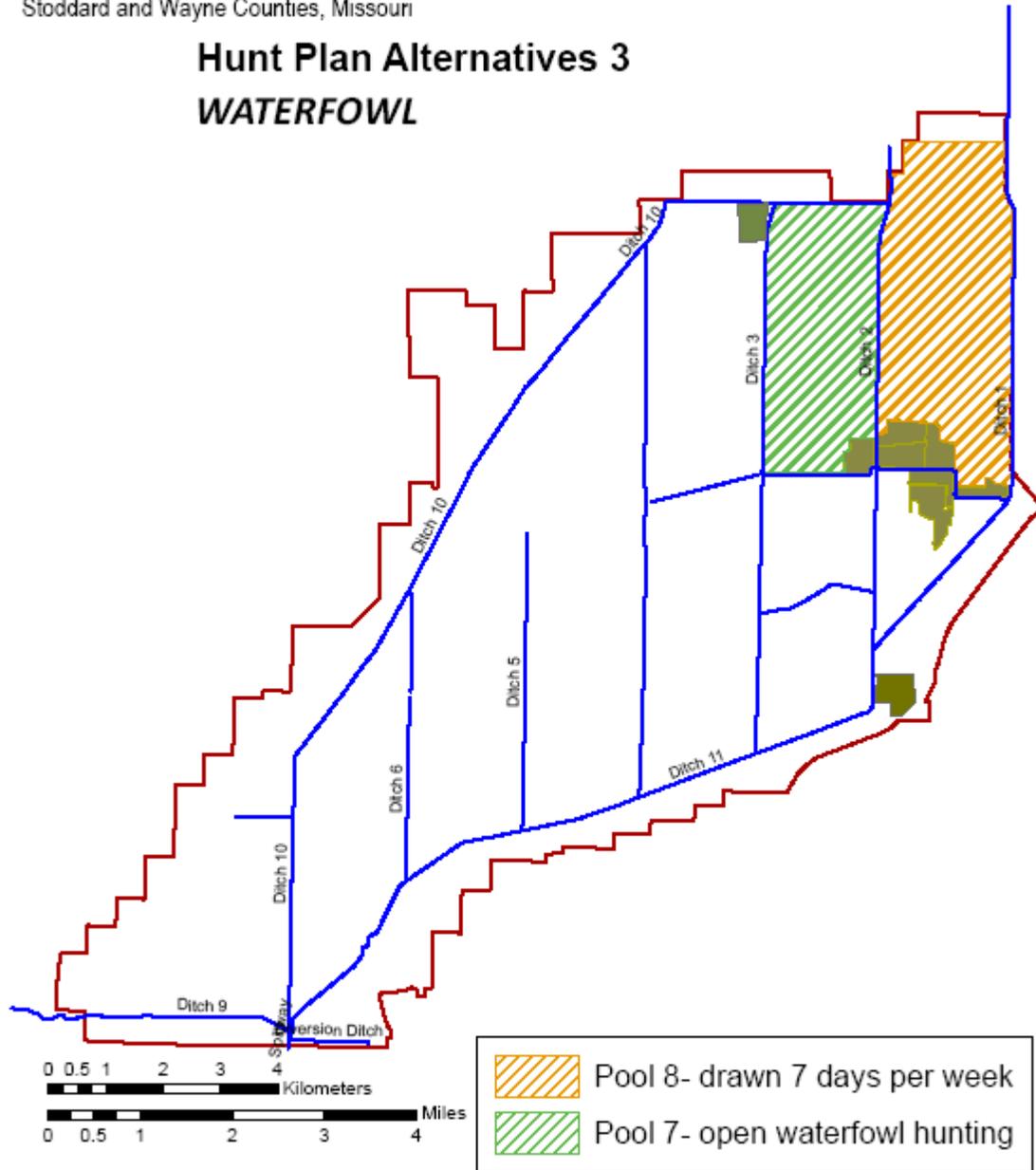


Figure 9. Alternative 3- Pool 7 & 8 waterfowl hunt areas.

Waterfowl hunting would remain by MDC draw in Pool 8 for up to 50 hunters, seven days per week until 1 p.m. during season. Pool 7 would be open for hunting until 1 p.m. during the Missouri waterfowl season (Figure 9). Some years the hunt(s) would not occur due to lack of water or management needs for Pool 7 and/or Pool 8.

Raccoon season would be by SUP only and begin at the end of archery deer season and run until the end of statewide season. Raccoon hunting would be allowed refuge-wide but areas would be specified in the SUP. Raccoon, bobcats and feral hog may be taken by any legal means while hunting other open species during open season for that species.

2.3 Comparison of Alternatives

The table below summarizes actions that are anticipated under each alternative. Some of the issues are carried into the impact assessment and described in more detail in Section 4.

Table 1: Table of alternatives analyzed in the DEA.

Action	Alternative 1 (No Action)	Alternative 2 (Preferred)	Alternative 3
Archery Deer/Turkey	Archery hunting allowed East of Ditch 4 and North of Ditch 11 (General Hunt Area) during statewide season.	Archery hunting allowed East of Ditch 4 and North of Ditch 11 (General Hunt Area) during statewide season. Hunting allowed between Ditches 4 and 6, south of Ozark Highland Auto Tour, north of Ditch 11 (Expanded General Hunt Area) and to the water's edge of Monopoly Marsh from state opening day until October 31 st . Personal property must be removed each day from the wilderness area.	Archery hunting allowed East of Ditch 4 and North of Ditch 11 (General Hunt Area) during statewide season. Hunting allowed between Ditches 4 and 10, south of Ozark Highland Auto Tour, north of Ditch 11 (Expanded General Hunt Area) and to the water's edge of Monopoly Marsh from state opening day until October 31 st . Personal property must be removed each day from the wilderness area.
Spring Turkey	Spring turkey firearm season allowed East of Ditch 4 and North of Ditch 11 during statewide season (General Hunt Area).	Spring turkey adult and youth firearm seasons allowed East of Ditch 6, North of Ditch 11 and South of the Ozark Highland Auto Tour (Expanded General Hunt Area).	Spring turkey adult and youth seasons allowed East of Ditch 10 (for the North/South portion of Ditch 10), North of Ditch 11 and South of the Ozark Highland Auto Tour (Expanded General Hunt Area).

Deer Quota/Special Hunts	Up to 3 quota hunts allowed West of Ditch 4 and North of Ditch 11(Managed Hunt Area).	Additional quota/special hunts allowed West of Ditch 4 and North of Ditch 11 (Managed Hunt Area) and in the Special Hunt Area based on population management needs and concurrence with MDC.	Up to 1 additional quota and/or special hunt (total of four) allowed West of Ditch 4 and North of Ditch 11 (Managed Hunt Area) based on population management needs and concurrence with MDC.
Waterfowl	Waterfowl hunting by MDC draw only in Pool 8.	Waterfowl hunting by MDC draw only in Pool 8 for up to 50 hunters, seven days per week and for three days per week for up to 25 hunters in Pool 7. Hunting would stop at 1 p.m. Some years the hunt would not occur due to lack of water or management needs for Pool 7 and/or 8.	Pool 7 open to waterfowl hunting during the Missouri waterfowl season. Hunting would stop each day at 1 p.m.
Squirrel	Squirrel hunting allowed East of Ditch 4 and North of Ditch 11 (General Hunt Area), opening with statewide season and closing September 30th.	Squirrel hunting allowed East of Ditch 6, North of Ditch 11 and South of the Ozark Highland Auto Tour (Expanded General Hunt Area). Opening with statewide season and closing the evening before the opening of statewide archery season. Archery hunters may continue to take squirrel by use of archery equipment during archery deer season.	Squirrel firearm season allowed East of Ditch 10, North of Ditch 11 and South of the Ozark Highland Auto Tour (Expanded General Hunt Area) opening with statewide season and closing the evening before archery deer season begins. Archery hunters may continue to take squirrel by use of archery equipment during archery deer season.
Raccoon	Not open.	Open by Special Use Permit only refuge-wide during the statewide season. Hunters will be assigned areas and dogs must have GPS or radio collars to allow for tracking of dogs.	Open by Special Use Permit only refuge-wide from the end of statewide archery to the end of statewide season. Hunters will be assigned areas and dogs must have GPS or radio collars to allow for tracking of dogs.

Raccoons/bobcats /feral hogs while hunting other species.	Feral hogs may be taken anytime, by any legal method, while hunting any other species open on the refuge. Raccoons and bobcats not open.	Raccoons and bobcats allowed to be taken while hunting any other species open to hunting on the refuge. Hunter must still abide by method of take, limits and season for raccoons and bobcats. Feral hogs may be taken anytime, by any legal method, while hunting any other species open on the refuge.	Raccoons and bobcats allowed to be taken while hunting any other species open to hunting on the refuge. Hunter must still abide by method of take, limits and season for raccoons and bobcats. Feral hogs may be taken anytime, by any legal method, while hunting any other species open on the refuge.
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3.0 Affected Environment

3.1 Physical Characteristics

Mingo National Wildlife Refuge lies at the northern tip of the Lower Mississippi River Ecosystem where it meets the Ozark Plateau Ecosystem. The forested wetlands found across the Mingo basin are characteristic of the Lower Mississippi River Ecosystem, while the upland forests found along the bluffs are characteristic of the Ozark Plateau Ecosystem.

The Lower Mississippi River Ecosystem was a 25-million-acre complex of forested wetlands that extended along both sides of the Mississippi River from Illinois to Louisiana. The extent and duration of seasonal flooding from the Mississippi River fluctuated annually, recharging aquatic systems and creating a diversity of dynamic habitats that supported a vast array of fish and wildlife. Today less than 20 percent of the bottomland hardwood forest remains and most is fragmented or in scattered patches throughout the region.

3.2 Natural Resources

3.2.1 Habitat

Established in 1944 under authority of the Migratory Bird Treaty Act, the 21,592-acre Mingo NWR is located in Stoddard and Wayne counties in southeast Missouri. A shallow basin, the Refuge lies in an abandoned channel of the Mississippi River bordered on the west by the Ozark Plateau and on the east by Crowley’s Ridge. The Refuge contains approximately 16,000 acres of bottomland and upland hardwood forest, 3,000 acres of marsh and water, 1,800 acres of cropland and moist soil units, and 170 acres of grassy openings.

Mingo NWR comprises many different habitat types. Due to the layout of the refuge, management units are separated into geographic blocks or by habitat management types to provide clear management objectives for each unit on the refuge. The refuge is divided into 8 management unit types with sub-units in most units (Table 2). Each unit represents a specific

habitat type and most occur across refuge lands. This diversity and juxtaposition of habitat types serve to enhance biodiversity on the refuge, and each management unit provides a unique set of resources that are necessary for target wildlife to complete their respective life cycles. The Mingo Wilderness area overlaps many of the habitat units and will be addressed in each appropriate unit.

Table 2: Management Units at Mingo NWR

Unit Name	Acres
Monopoly Marsh	2008
Rockhouse Marsh	903
Green Tree Reservoirs (GTRs)	6308
Bottomland Hardwood Units (BLH)	8861
Upland Forest	1315
Moist Soil Units	800
Openings, Croplands, Food Plots	804
Open Water	387 acres of open water including 77 miles of streams, rivers, and ditches.

3.2.2 Fish and Wildlife of the Refuge

A total of 279 resident and migratory bird species use Refuge habitats throughout each year. Tens of thousands of mallards (*Anus platyrhynchos*), Canada Geese (*Branta canadensis*), and other migrating waterfowl use Refuge wetlands as stopover or wintering habitat. Hooded Mergansers (*Lophodytes cucullatus*) and Wood Ducks (*Aix sponsa*) are resident breeders on the Refuge. Monopoly Marsh draws Wood Ducks from a five-state area during molting season. Bald Eagles (*Haliaeetus leucocephalus*), Least Bitterns (*Ixobrychus exilis*), and Mourning Doves (*Zenaida macroura*) are among the 108 bird species that regularly breed on the Refuge.

Thirty-eight mammal species are found within the Refuge. White-tailed deer, a species popular for hunting and viewing, are abundant at a population density of over 50 per square mile. There is a wide diversity of small mammals including three species of squirrels, two species of bats, and various mice, rats, and voles. The Refuge is one of the few places in Missouri where the swamp rabbit (*Sylvilagus aquaticus*), a larger relative of the eastern cottontail rabbit (*Sylvilagus floridanus*), is known to occur. Unlike other rabbits, the swamp rabbit regularly takes to the water to move about and avoid predators.

Amphibians and reptiles are abundant on the Refuge with more than 30 species of frogs, toads, salamanders, and snakes including the venomous western cottonmouth (*Agkistrodon piscivorus*), southern copperhead (*Agkistrodon contortrix*), and timber rattlesnake (*Crotalus horridus*). Many of these species hibernate within the cracks and crevices of the bluffs along the perimeter of the Refuge.

At least 46 species, including channel catfish (*Ictalurus punctatus*), white crappie (*Pomoxis annularis*), spotted bass (*Micropterus punctulatus*), and green sunfish (*Lepomis cyanellus*), are known to occur in the ponds and ditches of the Refuge.

3.2.3 Federally Threatened and Endangered Species

Special status species found within the project area that are listed as being either threatened (T), endangered (E) or as candidates (C) for being listed include: Indiana bat (*Myotis sodalis*).

3.3 Historical and Cultural Resources

The refuge has completed archeological surveys for almost 7,200 acres on the refuge, including the Mingo Job Corps campus prior to its transfer to the U.S. Forest Service. The surveys and other sources have identified more than 140 cultural resources sites on the refuge. Recorded archeological sites on the refuge represent all Midwest United States cultural periods from the earliest Paleo-Indian through 20th century Western, a period of about 12,000 years.

Nevertheless, evidence shows no human presence in the refuge and vicinity at the time Europeans first entered the region. One standing structure on the refuge, the Patrol or Sweet's Cabin from the early 20th century, is representative of Depression era homesteads in the region; it is historically significant and may be eligible for the National Register. As of September 2003, Stoddard and Wayne counties listed seven properties on the National Register of Historic Places, probably not indicative of the kinds of historic places that exist in the two counties. The refuge contains one of the National Register properties, the Mingo National Wildlife Refuge Archeology District.

The North American Consultation Database run by the Park Service to assist Federal agencies responding to the requirements of the Native American Graves and Protection and Repatriation Act lists no tribes with identified interests in Stoddard and Wayne counties. The database, however, is not a comprehensive list, being based on a limited number of legal sources. Cherokee, Choctaw, Creek, Delaware, Miami, Mingo (Iroquois), Osage, Quapaw, Seneca, and Shawnee may have had limited historic period interest in the refuge area, the Chickasaw and Tunica may have had protohistoric period interest, and the antecedent Pawnee and Wichita may have had prehistoric interest. Other interest groups that might have a cultural resources concern about the refuge have not yet been identified.

Cultural resources are important parts of the nation's heritage. The Service preserves valuable evidence of human interactions with each other and the landscape. Protection is accomplished in conjunction with the Service's mandate to protect fish, wildlife, and plant resources.

3.4 Economic Resources

The Refuge is tied to the local economy largely through the public's use of the Refuge for recreational opportunities. These opportunities typically come in the form of fishing, hunting, wildlife viewing and sightseeing.

3.5 Recreational Opportunities

In general, as described in the Comprehensive Conservation Plan and Visitor Services Plan, public uses to be considered include: a combination of hiking and auto interpretative trails, wildlife viewing and photography areas, environmental education stations, visitor center with exhibits, and special seasonal wildlife programs.

Hunting opportunities proposed on the Mingo NWR already exist on state, federal and other public lands in Wayne and Stoddard Counties. Currently Butler, Bollinger, Wayne and Stoddard Counties have nearly 244,157 acres of MDC Conservation Areas, National Forest and Army Corp of Engineer lands open for some level of hunting big game, upland game and migratory birds.

4.0 Environmental Consequences

This chapter describes the foreseeable environmental consequences of implementing the three management alternatives in Chapter 2. When detailed information is available, a scientific and analytic comparison between alternatives and their anticipated consequences is presented, which is described as "impacts" or "effects." When detailed information is not available, those comparisons are based on the professional judgment and experience of Refuge staff and Service and State biologists.

4.1 Alternative 1- No Action – Allow areas to be hunted using current regulations

This action would utilize the parameters of hunting established by current regulations. Species hunted would be those allowed by the current regulations and in areas currently open to hunting.

4.1.1 Infrastructure

Providing hunting opportunities under this alternative will not adversely affect, temporarily or permanently, the Services ability to meet land use goals on any of the units open to hunting. Any additional refuge facility development, such as trailheads or parking lots, will not be for the sole use of hunters and would be developed under either alternative. Parking areas and trailheads will be used by all users of the Refuge, including staff conducting day-to-day operations critical to the mission of the Refuge. There will be a change in wildlife habitat if/where parking lots and trails are developed as those areas are converted to gravel or bare soil but wildlife may still use these areas.

4.1.2 Natural Resources

4.1.2.1 Habitats

The selection of this alternative would not have significant adverse effects on the quality of wildlife habitat or the natural environment. In any alternative, the amount of habitat by type would not change from the current situation. With any alternative, some minor trampling of vegetation from hunters using areas other than established trails is expected. Access throughout Refuge units for hunting is typically by foot. Occasionally hunters access some Refuge units via bicycle from the parking area at McGee Gate. This method of access is allowed on existing roads and levees, therefore, presents no significant adverse impacts to Refuge lands.

Impacts to Refuge soils and vegetation by hunters are minimal. Hunting is conducted on foot mostly by individuals or small groups. Typically hunter groups travel in dispersed patterns so soil compaction and vegetation trampling will be minimal. Current regulations prevent the cutting or removal of vegetation for hunting purposes.

Boating activity on the Refuge may occur while hunting. Hunters use boats to access areas for deer, turkey and waterfowl hunting. Because Refuge users, including hunters, are not allowed to use gasoline powered motors, there will be no impacts to air quality or solitude from the use of boats. Boating is only allowed in ditches and would likely not impact habitat in adjoining areas.

Other potential types of habitat damage specifically attributed to hunting activities, such as littering, are not significant. Refuge specific regulations limit the adverse impact of activities such as cutting of vegetation and the use of screw-in steps, through their prohibition.

With the exception of white-tailed deer, populations of hunted species are not at a level that could cause habitat damage. When populations are high, deer may damage habitat on the Refuge or on nearby public and private lands. Habitat damage on the Refuge and adjacent public lands appears to be localized. The Service receives few complaints of deer damage from surrounding landowners adjacent to the Refuge.

4.1.2.2 Biological Impacts

This alternative will result in few, if any additional biological impacts. Hunting will continue as it has under the current hunt plan.

4.1.2.3 Listed Species

No effect is expected for any of the threatened and endangered species found within the Refuge as a result of this alternative.

4.1.2.4 Historic Properties and Cultural Resources

This alternative will result in no additional ground disturbance or disturbance to standing structures, and it would have no effect on any historic properties.

4.1.5 Cumulative Impact Analysis of the No Action Alternative

4.1.5.A Anticipated Direct and Indirect Impact on Wildlife Species

Hunted Species

This alternative would have additional effect on some wildlife populations. Animal populations would be managed using additional hunting seasons and locations while offering additional recreation opportunities for the public.

White-tailed Deer

This alternative would allow deer populations to remain at current levels or increase. Deer populations on the refuge remain above desired levels (Table 3) with a 5 year average of 1623 deer. This is an average of 50 deer per square mile, well over the state average. Increasing hunting opportunities would likely increase doe harvest to the desired level of 200 a year per MDC recommendation (MDC, Lonnie Hanson Personal Communication 2001).

Deer populations in Missouri remain high at 1.4 million with the 2011 total harvest of 288,594 deer and a deer density of 21 deer per square mile in the state and only 13.8 deer per square mile in the Southeast Region. The total combined harvest for Wayne and Stoddard counties in 2011 was 5233 deer (MDC 2011). The average total harvest for the previous 5 years on the Refuge is 154 deer per season. These numbers have a negligible effect on the state or regional population.

Table 3. Mingo NWR Total Deer Harvest and Spotlight Population Estimates.

Year	Harvest (Archery+Quota)	Spotlight Survey (mean)
2006/07	149	1600-2535(2068)
2007/08	202	1091-2069 (1580)
2008/09	105	1099-1990 (1544)
2009/10	171	385-1301 (843)*
2010/11	143	1747-2413 (2080)
*Only 3 surveys completed post hunt		Unpublished USFWS Data

Turkeys

Turkeys would continue to be harvested following statewide limits and seasons under this alternative. In 2011 the turkey population in Missouri was estimated at 440,000 birds with a spring 2011 harvest of 42,220 and a fall harvest of 6,000. Wayne and Stoddard counties had a 2011 spring harvest of 676 birds (MDC 2011). Hunting turkeys under statewide regulations on the Refuge is expected to maintain current populations. In 2010 hunters reported taking 19

turkeys on the refuge and 28 turkeys during 2009. The Refuge was closed during the spring 2008 and 2011 seasons due to flooding. There were 16 turkeys harvested in the fall of 2011. These numbers have a negligible effect on the state or regional population.

Raccoons

Raccoons would not be hunted under state seasons and regulations. In 2009, MDC estimated the statewide raccoon population at 1.4 million with annual trapping of only 100,000. This has led to an increase in the occurrences of distemper across the state (MDC 2009). Raccoon populations would not be controlled through issued SUP. By not hunting raccoons, populations are expected to continue to climb to undesirable levels on the Refuge.

Squirrel

The average total harvest for the previous 4 years on the Refuge is 261 squirrels per season. Approximately 2,000,000 squirrels are harvested each year with a statewide population estimate of over 6 million (MDC 2012). Squirrel populations are expected to remain at desired levels under this alternative. These numbers would have a negligible effect on the state or regional population.

Bobcats

Bobcats would not be hunted under state seasons and regulations while hunting other species on the refuge. In 2010, MDC estimated the statewide bobcat population at 12,000 – 18,000 with annual harvest of 3,888 during the 2010-2011 season (MDC 2011). Wayne (38) and Stoddard (50) counties had a 2010/2011 harvest of 88 bobcats (MDC 2011). No bobcats would be harvested under this alternative.

Waterfowl

Waterfowl hunting in Pool 8 is a very popular activity for both resident and nonresident hunters. Pool 8 and Duck Creek Conservation Area are some of the last places to hunt waterfowl on public lands in flooded timber left in Missouri. The Pool 8 harvest and hunting opportunity is tied to rainfall and temperatures each winter with the refuge staff not flooding the pool until the trees are dormant each season (Table 4). Flooding will not be initiated in Pool 8 until trees are dormant.

The annual Waterfowl Population Status Report (USFWS 2011e) includes the most current breeding population and production information available for North America. According to the 2011 Waterfowl Population Status Report, the total duck population estimate was 45.6 ± 0.8 million birds and represents an 11% increase over last year's estimate of 40.9 ± 0.7 million birds and was 35% above the long-term average (1955-2010). Mallard abundance was estimated to be 9.2 ± 0.3 million birds, which was 9% above the 2010 estimate of 8.4 ± 0.3 million birds and 22% above the long-term average. The projected mallard fall-flight index was 11.9 ± 1.1 million birds (USFWS 2011e).

In 2011, an estimated 43.89 million duck-use days was recorded and is the second highest total on MDC and USFWS intensively-managed wetlands in Missouri (MDC 2012a). In 2011/12, approximately 44,071 hunters harvested 98,719 ducks on all MDC areas with an average of 2.24 birds/hunter.

Table 4. Pool 8 Waterfowl Harvest Data

Hunt Season	Ducks	Geese	# Hunters	Birds/hunter
2011/12	2,120	1	1,102	1.92
2010/11*	11	0	18	.61
2009/10	222	10	316	.73
2008/09	56	0	217	.26
2007/08	1708	0	783	2.18
2006/07	1634	2	681	2.4

* Pool 8 never reached full pool and it was a very dry year which limited the number of hunters and reduced hunt days.

Waterfowl disturbance or harvest would not increase under this alternative. The 6 year average harvest of 959 ducks per season would remain the same. No additional hunting opportunities for waterfowl would occur under this alternative. These numbers have a negligible effect on the flyway population.

Migratory game birds are those bird species so designated in conventions between the United States and several foreign nations for the protection and management of these birds. Under the Migratory Bird Treaty Act (16 U.S.C. 703-712), the Secretary of the Interior is authorized to determine when "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any ... bird, or any part, nest, or egg" of migratory game birds can take place, and to adopt regulations for this purpose. These regulations are written after giving due regard to "the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, and are updated annually (16 U.S.C. 704(a)). This responsibility has been delegated to the U.S. Fish and Wildlife Service as the lead federal agency for managing and conserving migratory birds in the United States. Acknowledging regional differences in hunting conditions, the Service has administratively divided the nation into four Flyways for the primary purpose of managing migratory game birds. Each Flyway (Atlantic, Mississippi, Central, and Pacific) has a Flyway Council, a formal organization generally composed of one member from each State and Province in that Flyway. Mingo NWR is located in the Mississippi Flyway.

The process for adopting migratory game bird hunting regulations, located in 50 CFR part 20, is constrained by three primary factors. Legal and administrative considerations dictate how long the rule making process will last. Most importantly, however, the biological cycle of migratory game birds controls the timing of data-gathering activities and thus the dates on which these results are available for consideration and deliberation. The process of adopting migratory game bird hunting regulations includes two separate regulations-development schedules based on "early" and "late" hunting season regulations. Early hunting seasons pertain to all migratory game bird species in Alaska, Hawaii, Puerto Rico, and the Virgin Islands; migratory game birds other than waterfowl (e.g. dove, woodcock, etc.); and special early waterfowl seasons, such as

teal or resident Canada geese. Early hunting seasons generally begin prior to October 1. Late hunting seasons generally start on or after October 1 and include most waterfowl seasons not already established. There are basically no differences in the processes for establishing either early or late hunting seasons. For each cycle, Service biologists and others gather, analyze, and interpret biological survey data and provide this information to all those involved in the process through a series of published status reports and presentations to Flyway Councils and other interested parties.

Because the Service is required to take an abundance of migratory birds and other factors in to consideration, the Service undertakes a number of surveys throughout the year in conjunction with the Canadian Wildlife Service, State and Provincial wildlife-management agencies, and others. To determine the appropriate framework for each species, the Service considers factors such as population size and trend, geographical distribution, annual breeding effort, the condition of breeding and wintering habitat, the number of hunters, and the anticipated harvest (Table 5). After frameworks are established for season lengths, bag limits, and areas for migratory game bird hunting, migratory game bird management becomes a cooperative effort of State and Federal Governments. After Service establishment of final frameworks for hunting seasons, the States may select season dates, bag limits, and other regulatory options for the hunting seasons. States may always be more conservative in their selections than the Federal frameworks but never more liberal. Season dates and bag limits for National Wildlife Refuges open to hunting are never longer or larger than the State regulations. In fact, based upon the findings of an environmental assessment developed when a National Wildlife Refuge opens a new hunting activity, season dates and bag limits may be more restrictive than the State allows.

Table 5. Preliminary estimates of waterfowl harvest and hunter activity in Missouri during the 2008 and 2009 hunting seasons. (Raftovich, R.V et al. 2010)

Missouri		
Duck Species Composition	2008	2009
Mallard	249,656	221,325
Domestic Mallard	552	0
Black Duck	0	176
Mallard x Black Duck Hybrid	368	0
Mottled Duck	0	0
Gadwall	74,554	43,949
Wigeon	11,781	6,680
Green-winged Teal	55,962	41,839
Blue-winged/Cinnamon Teal	26,508	17,228
Northern Shoveler	13,990	24,435
Northern Pintail	16,015	10,548
Wood Duck	14,359	8,790
Redhead	184	2,285
Canvasback	184	527
Greater Scaup	184	703
Lesser Scaup	1,289	2,285
Ring-necked Duck	8,468	10,899
Goldeneyes	1,473	3,867

Bufflehead	368	176
Ruddy Duck	0	0
Long-tailed Duck	0	0
Eiders	0	0
Scoters	0	176
Hooded Merganser	1,473	2,813
Other Mergansers	368	0
Other Ducks	0	0
Total Duck Harvest	477,700±35%	398,700±25%
Total Active Duck Hunters	29,000±12%	35,200±13%
Seasonal Duck Harvest Per Hunter	16.5±37%	11.3±28%

The waterfowl season on Mingo will follow the frameworks set in place for Missouri. Currently Mingo is in the “middle zone” and season typically runs from Early November to Early January. If that framework should change from current season dates or zones then waterfowl hunting would be reanalyzed in a hunt plan addendum.

Non-hunted Species

Non-hunted wildlife would include small mammals such as voles, moles, mice, and shrews; reptiles and amphibians such as snakes, skinks, turtles, lizards, salamanders, frogs and toads; and invertebrates such as butterflies, moths, other insects and spiders. Except for migratory birds and some species of migratory butterflies and moths, these species have very limited home ranges and hunting would not affect their populations regionally.

Disturbance to non-hunted wildlife would increase slightly. However, significant disturbance would be unlikely since small mammals are beginning to become inactive during late November and early December and many of these species are nocturnal during warmer months. Both of these qualities make hunter interactions with small mammals rare.

Hibernation or torpor by cold-blood reptiles and amphibians also limits their activity when temperatures are low. Squirrel and turkey hunters may encounter reptiles and amphibians during a portion of the hunting season. Invertebrates are also not active during cold weather and would have few interactions with hunters during the cooler portions of hunting season.

During turkey and early portions of squirrel season, hunters may encounter breeding wood ducks or hooded mergansers on the refuge. These interactions are not expected to be significant and disturbance would be rare.

Refuge regulations further mitigate possible disturbance by hunters to non-hunted wildlife. Vehicles are restricted to roads and the harassment or taking of any wildlife other than the game species legal for the season is not permitted.

4.1.5.B Anticipated Direct and Indirect Impact on Refuge Programs, Facilities, and Cultural Resources Other Refuge Wildlife-Dependent Recreation

Other Refuge Wildlife-Dependent Recreation: Each year thousands of people visit Mingo NWR (136,825 visits in 2009) to enjoy the resources. Wildlife observation visits, particularly bird watching, account for the highest wildlife-dependent recreational use recorded for the Refuge.

Under this alternative, the public hunting opportunity would remain the same. Hunting is also a way for the public to gain an increased awareness of Mingo NWR and the National Wildlife Refuge System.

Refuge Facilities. No additional impacts to Refuge facilities (roads, parking lots, trails) will occur with this alternative. Under this alternative, Refuge facilities would continue as they are now. Maintenance or improvement of existing roads and parking areas will cause minimal short term impacts to localized soils and may cause some temporary wildlife disturbance.

Cultural Resources. This alternative will not have any additional impacts to cultural resources.

4.1.5.C Anticipated Direct and Indirect Impact on Refuge Environment and Community

The No Action alternative will have little if any additional impact on soils, air quality, water quality or solitude. Vegetation, as stated above, could be affected if the deer population increases to a level to cause degradation of Refuge communities.

This alternative may have impacts on hunting opportunities in the local area. Under this alternative additional hunters would not be able to utilize the Refuge and fewer people will use facilities both on and off of the Refuge. This alternative would also not increase public hunting opportunity and may lead to increased usage of surrounding private and public lands.

4.1.5.D Other Past, Present, Proposed, and Reasonably Foreseeable Hunts and Anticipated Impacts

This alternative would have no additional anticipated impacts from hunting.

4.1.6 Environmental Justice

Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations” was signed by President Bill Clinton on February 11, 1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities’ access to public information and participation in matters relating to human

health or the environment. This assessment has not identified any adverse or beneficial effects for either alternative unique to minority or low-income populations in the affected area. Neither alternative will disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low income populations.

Hunting opportunities proposed on Mingo NWR already exist on state, federal and other public lands in the area where the Refuge is located. The Refuge Recreation Act of 1962 (16U.S.C. 460K) and the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668-ddee) provide authorization for hunting and fishing on National Wildlife Refuges. The effects of hunting on Refuges have been examined in several environmental review documents, including the Final Environmental Impact Statement on the Operation of the National Wildlife Refuge System (1976), Recommendations on the Management of the National Wildlife Refuge System (1978), and the Draft Environmental Impact Statement on the Management of the National Wildlife Refuges (1988). Nothing in the establishing authority for Mingo National Wildlife Refuge [Fish and Wildlife Act of 1956{16U.S.C. 742f}] precludes hunting on the Refuge.

4.2 Alternative 2 – Preferred Alternative- Add additional areas for archery deer, squirrel and spring turkey. Add additional quota hunts for deer as needed. Open additional waterfowl hunting opportunities in Pool 7 with draw hunts 3 days per week. Raccoons hunted by Special Use Permit (SUP) and while hunting other open species. Feral hogs may be taken by legal means while hunting other species.

Under this alternative, the general hunt area would be expanded for archery deer/turkey, spring turkey and squirrel to include all areas south of the Ozark Highland Auto Tour (OHAT), north of Ditch 11 and east of Ditch 6. The area between Ditches 4 and 6 would be closed to archery deer hunting on October 31st. Squirrel season would close the day before archery deer season begins.

Quota and Special hunts may be expanded under this alternative to include more hunts as needed to control deer populations on the refuge. The quota hunts will be based on the annual spotlight surveys, desired deer populations and in coordination with MDC.

Waterfowl hunting would remain by MDC draw only under this alternative. Waterfowl hunting in Pool 8 would remain seven days per week during season and Pool 7 would be open three days per week for waterfowl hunting. All waterfowl hunting would end at 1 p.m.

Raccoon season would be by SUP only during the statewide season. Raccoon (when in season), bobcats (when in season) and feral hog may be taken by any legal means while hunting other open species. No significant impacts are expected from this alternative.

4.2.1 Infrastructure

Providing hunting opportunities under this alternative will not adversely affect, temporarily or permanently, the Services ability to meet land use goals on any of the units open to hunting. Any additional refuge facility development, such as trailheads or parking lots, will not be for the sole use of hunters and would be developed under either alternative. Parking areas and trailheads will be used by all users of the Refuge, including staff conducting day-to-day operations critical to

the mission of the Refuge. There will be a change in wildlife habitat if/where parking lots and trails are developed as those areas are converted to gravel or bare soil but wildlife may still use these areas.

4.2.2 Natural Resources

4.2.2.1 Habitats

The selection of this alternative would not have significant adverse effects on the quality of wildlife habitat or the natural environment. In any alternative, the amount of habitat by type would not change from the current situation. With any alternative, some minor trampling of vegetation from hunters using areas other than established trails is expected. Access throughout Refuge units for hunting is typically by foot. Occasionally hunters access some Refuge units via bicycle from the parking area at McGee Gate. This method of access is allowed on existing roads and levees, therefore, presents no significant adverse impacts to Refuge lands.

Impacts to Refuge soils and vegetation by hunters are minimal. Hunting is conducted on foot mostly by individuals or small groups. Typically hunter groups travel in dispersed patterns so soil compaction and vegetation trampling will be minimal. Current regulations prevent the cutting or removal of vegetation for hunting purposes.

Boating activity on the Refuge may occur while hunting. Hunters use boats to access areas for deer, turkey and waterfowl hunting. Because Refuge users, including hunters, are not allowed to use gasoline powered motors, there will be no impacts to air quality or solitude from hunting from boats. Boating is only allowed in ditches and would likely not impact habitat in adjoining areas.

Other potential types of habitat damage specifically attributed to hunting activities, such as littering, are not significant. Refuge specific regulations limit the adverse impact of activities such as cutting of vegetation and the use of screw-in steps, through their prohibition.

With the exception of white-tailed deer and raccoon, populations of hunted species are not at a level that could cause habitat damage. When populations are high, deer may damage habitat on the Refuge or on nearby public and private lands. Habitat damage on the Refuge and adjacent public lands appears to be localized. The Service receives few complaints of deer damage from surrounding landowners adjacent to the Refuge.

4.2.2 Biological Impacts

This alternative will result in few additional biological impacts. There will be some additional impact to resident wildlife when areas that were previously not hunted or disturbed are opened due to increased foot traffic and game harvest. The harvest of Refuge wildlife species will be in accordance with Federal regulations and Missouri state limits or limits set by the Refuge. Other wildlife not being harvested will be disturbed by hunters flushing or moving the wildlife as the animals try to avoid human contact. This disturbance will be similar to the disturbance non-hunted animals experience on state Conservation Areas and federal lands and be minimal and

temporary in nature. Impacts to hunted species' populations would be done in a regulated manner and in a way to benefit overall populations by maintaining those populations at desired levels.

Waterfowl would have some additional disturbance in Pool 7 under this alternative. These areas are currently open to archery deer hunting and some additional disturbance would be expected due to waterfowl hunting in an area. This will be partially mitigated by limiting the amount of hunters in the area, the time hunters would be allowed to utilize the area and numerous other federal and state regulations related to waterfowl hunting and would not be at significant levels.

4.2.3 Listed Species

No effect is expected for any of the threatened and endangered species found within the Refuge as a result of this alternative.

4.2.4 Historic Properties and Cultural Resources

This alternative may include minor ground disturbing activities and no disturbance to standing structures, and it would have no effect on any historic properties. Minor ground disturbing activities may include the addition hunting related infrastructure such as parking lots or kiosk. If additional infrastructure is needed, appropriate analyses will occur for these projects on a case by case basis.

4.2.5 Cumulative Impact Analysis of the Preferred Alternative

4.2.5.A Anticipated Direct and Indirect Impact on Wildlife Species

Hunted Species

This alternative would have additional effect on some wildlife populations. Animal populations would be managed using additional hunting seasons and locations while offering additional recreation opportunities for the public.

White-tailed Deer

This alternative would allow deer populations to be better maintained and reduce over browsing of vegetation that may occur on a more frequent level on both Refuge and adjacent lands. Deer populations on the refuge remain above desired levels (Table 3) with a 5 year average of 1623 deer. This is an average of 50 deer per square mile, well over the state average. Increasing hunting opportunities would likely increase doe harvest to the desired level of 200 a year per MDC recommendation (MDC, Lonnie Hanson Personal Communication 2001).

Deer populations in Missouri remain high at 1.4 million with the 2011 total harvest of 288,594 deer and a deer density of 21 deer per square mile in the state and only 13.8 deer per square mile in the Southeast Region. The total combined harvest for Wayne and Stoddard counties in 2011 was 5233 deer (MDC 2011). The average total harvest for the previous 5 years on the Refuge is 154 deer per season. With additional hunting areas opened for archery and additional quota

hunts, the average season harvest is expected to be between 190-260 deer. This would be an increase of 24-69% over the 5 year average harvest. These numbers would have a negligible effect on the state and regional deer population.

Turkeys

Turkeys would be harvested following statewide limits and seasons under this alternative. In 2011 the turkey population in Missouri was estimated at 440,000 birds with a spring 2011 harvest of 42,220 and a fall harvest of 6,000. Wayne and Stoddard counties had a 2011 spring harvest of 676 birds (MDC 2011). Hunting turkeys under statewide regulations on the Refuge is expected to maintain current populations. In 2010 hunters reported taking 19 turkeys on the refuge and 28 turkeys during 2009. The Refuge was closed during the spring 2008 and a portion of the 2011 seasons due to flooding. There were 16 turkeys harvested in the fall of 2011. With additional hunting areas opened for turkey hunting, the average harvest is expected to be between 25-40 turkeys. These numbers would have a negligible effect on statewide populations and a minimal effect on regional populations.

Raccoons

Raccoons would be hunted under state seasons and regulations. In 2009, MDC estimated the statewide raccoon population at 1.4 million with annual trapping of only 100,000. This has led to an increase in the occurrences of distemper across the state (MDC 2009). Raccoons harvest levels will be controlled through issued SUP and will be based on and set from, the annual raccoon survey data. There is currently no daily or possession limit on raccoons in Missouri. Control of raccoons may reduce impacts to nesting species such as wood ducks and hooded mergansers. The harvest would have a negligible effect on statewide or regional populations.

Squirrel

The average total harvest for the previous 4 years on the Refuge is 261 squirrels per season. Approximately 2,000,000 squirrels are harvested each year with a statewide population estimate of over 6 million (MDC 2012). With additional hunting areas opened for squirrel hunting the average is expected to be between 290-330 squirrels. Squirrel populations are expected to remain at desired levels under this alternative. These numbers would have a negligible effect on the state or regional population.

Bobcats

Bobcats could be hunted under state seasons and regulations while hunting other species on the refuge. In 2010, MDC estimated the statewide bobcat population at 12,000 – 18,000 with annual harvest of 3,888 during the 2010-2011 season (MDC 2011). Wayne (38) and Stoddard (50) counties had a 2010/2011 harvest of 88 bobcats (MDC 2011). It is estimated that 3-5 bobcats would be harvested on the refuge per season. These numbers would have a negligible effect on the state population and a minimal effect on the regional population.

Waterfowl

Waterfowl hunting in Pool 8 is a very popular activity for both resident and nonresident hunters. Pool 8 and Duck Creek Conservation Area are some of the last places to hunt waterfowl on public lands in flooded timber left in Missouri. The increase in opportunity would result in more hunters being allowed to utilize this diminishing hunting opportunity. The Pool 8 harvest and hunting opportunity is tied to rainfall and temperatures each winter with the refuge staff not flooding the pool until the trees are dormant each season (Table 4). Flooding will not be initiated in Pool 7 or 8 until trees are dormant.

The annual Waterfowl Population Status Report (USFWS 2011e) includes the most current breeding population and production information available for North America. According to the 2011 Waterfowl Population Status Report, the total duck population estimate was 45.6 ± 0.8 million birds and represents an 11% increase over last year's estimate of 40.9 ± 0.7 million birds and was 35% above the long-term average (1955-2010). Mallard abundance was estimated to be 9.2 ± 0.3 million birds, which was 9% above the 2010 estimate of 8.4 ± 0.3 million birds and 22% above the long-term average. The projected mallard fall-flight index was 11.9 ± 1.1 million birds (USFWS 2011e).

In 2011, an estimated 43.89 million duck-use days was recorded and is the second highest total on MDC and USFWS intensively-managed wetlands in Missouri (MDC 2012a). In 2011/12, approximately 44,071 hunters harvested 98,719 ducks on all MDC areas with an average of 2.24 birds/hunter.

Waterfowl disturbance would increase in Pool 7 due to the addition of waterfowl hunting in that unit. These disturbances would be minimized by limiting the number of hunters, days the unit is hunted and by current regulations. This area is currently open to archery deer hunting and some additional disturbance would be expected due to waterfowl hunting in an area. The addition of Pool 7 to limited waterfowl hunting would increase available waterfowl hunting on the Refuge by 4.6% or 800 acres. This leaves a total of 15,667 acres (89.7%) of waterfowl habitat not being hunted for waterfowl.

The estimated seasonal waterfowl harvest for this alternative is expected to average between 1050-1250 ducks and 2-3 geese. These numbers would have a negligible effect on the flyway population.

Migratory game birds are those bird species so designated in conventions between the United States and several foreign nations for the protection and management of these birds. Under the Migratory Bird Treaty Act (16 U.S.C. 703-712), the Secretary of the Interior is authorized to determine when "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any ... bird, or any part, nest, or egg" of migratory game birds can take place, and to adopt regulations for this purpose. These regulations are written after giving due regard to "the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, and are updated annually (16 U.S.C. 704(a)). This responsibility has been delegated to the U.S. Fish and Wildlife Service as the lead federal agency for managing and conserving migratory birds in the United States. Acknowledging regional differences in hunting conditions, the Service has

administratively divided the nation into four Flyways for the primary purpose of managing migratory game birds. Each Flyway (Atlantic, Mississippi, Central, and Pacific) has a Flyway Council, a formal organization generally composed of one member from each State and Province in that Flyway. Mingo NWR is located in the Mississippi Flyway.

The process for adopting migratory game bird hunting regulations, located in 50 CFR part 20, is constrained by three primary factors. Legal and administrative considerations dictate how long the rule making process will last. Most importantly, however, the biological cycle of migratory game birds controls the timing of data-gathering activities and thus the dates on which these results are available for consideration and deliberation. The process of adopting migratory game bird hunting regulations includes two separate regulations-development schedules based on "early" and "late" hunting season regulations. Early hunting seasons pertain to all migratory game bird species in Alaska, Hawaii, Puerto Rico, and the Virgin Islands; migratory game birds other than waterfowl (e.g. dove, woodcock, etc.); and special early waterfowl seasons, such as teal or resident Canada geese. Early hunting seasons generally begin prior to October 1. Late hunting seasons generally start on or after October 1 and include most waterfowl seasons not already established. There are basically no differences in the processes for establishing either early or late hunting seasons. For each cycle, Service biologists and others gather, analyze, and interpret biological survey data and provide this information to all those involved in the process through a series of published status reports and presentations to Flyway Councils and other interested parties.

Because the Service is required to take an abundance of migratory birds and other factors in to consideration, the Service undertakes a number of surveys throughout the year in conjunction with the Canadian Wildlife Service, State and Provincial wildlife-management agencies, and others. To determine the appropriate framework for each species, the Service considers factors such as population size and trend, geographical distribution, annual breeding effort, the condition of breeding and wintering habitat, the number of hunters, and the anticipated harvest (Table 5). After frameworks are established for season lengths, bag limits, and areas for migratory game bird hunting, migratory game bird management becomes a cooperative effort of State and Federal Governments. After Service establishment of final frameworks for hunting seasons, the States may select season dates, bag limits, and other regulatory options for the hunting seasons. States may always be more conservative in their selections than the Federal frameworks but never more liberal. Season dates and bag limits for National Wildlife Refuges open to hunting are never longer or larger than the State regulations. In fact, based upon the findings of an environmental assessment developed when a National Wildlife Refuge opens a new hunting activity, season dates and bag limits may be more restrictive than the State allows.

The waterfowl season on Mingo will follow the frameworks set in place for Missouri. Currently Mingo is in the "middle zone" and season typically runs from Early November to Early January. If that framework should change from current season dates or zones then waterfowl hunting would be reanalyzed in a hunt plan addendum.

Non-hunted Species

Non-hunted wildlife would include small mammals such as voles, moles, mice, and shrews; reptiles and amphibians such as snakes, skinks, turtles, lizards, salamanders, frogs and toads; and

invertebrates such as butterflies, moths, other insects and spiders. Except for migratory birds and some species of migratory butterflies and moths, these species have very limited home ranges and hunting would not affect their populations regionally.

Disturbance to non-hunted wildlife would increase slightly. However, significant disturbance would be unlikely since small mammals are beginning to become inactive during late November and early December and many of these species are nocturnal during warmer months. Both of these qualities make hunter interactions with small mammals rare.

Hibernation or torpor by cold-blood reptiles and amphibians also limits their activity when temperatures are low. Squirrel and turkey hunters may encounter reptiles and amphibians during a portion of the hunting season. Invertebrates are also not active during cold weather and would have few interactions with hunters during the cooler portions of hunting season.

During turkey and early portions of squirrel season, hunters may encounter breeding wood ducks or hooded mergansers on the refuge. These interactions are not expected to be significant and disturbance would be rare.

Refuge regulations further mitigate possible disturbance by hunters to non-hunted wildlife. Vehicles are restricted to roads and the harassment or taking of any wildlife other than the game species legal for the season is not permitted.

4.2.5.B Anticipated Direct and Indirect Impact on Refuge Programs, Facilities, and Cultural Resources Other Refuge Wildlife-Dependent Recreation

Other Refuge Wildlife-Dependent Recreation: Each year thousands of people visit Mingo NWR (136,825 visits in 2009) to enjoy the resources. Wildlife observation visits, particularly bird watching, account for the highest wildlife-dependent recreational use recorded for the Refuge.

Under this alternative, the public hunting opportunity would increase while not impacting non-hunting recreational activities significantly. Hunting is also a way for the public to gain an increased awareness of Mingo NWR and the National Wildlife Refuge System.

Refuge Facilities. Additional impacts to Refuge facilities (roads, parking lots, trails) will occur with this alternative. Under this alternative, Refuge facilities would be created or modified to allow for additional hunting opportunities. Additional parking may be created in areas already disturbed. Maintenance or improvement of existing roads and parking areas will cause minimal short term impacts to localized soils and may cause some temporary wildlife disturbance.

Cultural Resources. This alternative will have minimal additional impacts to cultural resources. Any ground disturbing activities associated with this alternative will have a cultural clearance conducted prior to activities being initiated. Hunting activities will result in no ground disturbance or disturbance to standing structures and would have no effect on any historic properties.

4.2.5.C Anticipated Direct and Indirect Impact on Refuge Environment and Community

The preferred alternative will have little if any additional impact on soils, air quality, water quality or solitude. Vegetation, as stated above, could be affected if the deer population increases to a level high enough to cause degradation of plant communities.

This alternative may have impacts on hunting opportunities in the local area. Under this alternative additional hunters would be able to utilize the Refuge and more people will use facilities both on and off of the Refuge. This alternative would also increase public hunting opportunity and may lead to decreased usage of surrounding private and public lands.

As a result of this alternative, expenditures by visitors for meals, lodging and transportation would increase in the communities where these Refuge lands are located. According to the 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation, hunters spent \$234.4 million in Missouri on hunting trip-related expenses. In addition, Missouri residents spent \$739.7 million on non-consumptive recreational activities in 2006 (US CENSUS 2006). A total of \$3.4 billion was spent on wildlife related recreation in Missouri. Municipalities and community organizations could bring additional tourism revenues into their economies by establishing partnerships with the Service to develop and promote the recreational opportunities that are available on the Refuge lands in their communities.

Hunting would benefit vegetation as it is used to keep resident deer populations in balance with the carrying capacity of the habitat. The biological integrity of the Refuge would be protected under this alternative, and the Refuge purpose of restoring bottomland hardwoods for migratory birds and wildlife would be achieved.

Impacts to the natural hydrology would be negligible. The Refuge staff expects impacts to air and water quality to be minimal and only due to Refuge visitor's use of automobiles on adjacent township and county public roads. The effect of these Refuge-related activities on overall air and water quality in the region are anticipated to be negligible.

Existing State water quality criteria and use classifications are adequate to achieve desired on-Refuge conditions; thus, implementation of the proposed action would not impact adjacent landowners or users beyond the constraints already implemented under existing State standards and laws.

Impacts associated with solitude are expected to be minimal given the limited time, season, and space management techniques used to avoid conflicts among user groups.

There is a potential to have some minimal disturbance on the general public, nearby residents, and Refuge visitors. The disturbance factor is considered minimal, as the Refuge already has hunting taking place on thousands of federal and state properties, and on hundreds of thousands of acres of private property. It is possible that Refuge hunting will increase hunting opportunities on surrounding lands, by increasing the wildlife moving beyond the boundary of the Refuge.

The Ozark Highland Auto tour is expected to be rehabilitated in the next 2-3 years. This route may be opened for longer periods of time during the year. Some additional conflicts might be

expected as part of this alternative as more people would be in the expanded hunt area during season. This is expected to be minimal as only the very northern portion of the expanded hunt area would be in contact with the auto tour.

4.2.5.D Other Past, Present, Proposed, and Reasonably Foreseeable Hunts and Anticipated Impacts

Hunting has been allowed on Mingo NWR for multiple decades and approved and registered in the Code of Federal Regulations each hunting season if changes are warranted. If public use levels expand in the future or unanticipated conflicts between user groups may occur, Service experience has proven that time and space zoning can be an effective tool in eliminating conflicts between user groups. On a case by case basis, the onsite manager will determine if such a tool is necessary to limit conflicts.

4.2.5.E Anticipated Impacts If Individual Hunts Are Allowed To Accumulate

National Wildlife Refuges, including Mingo NWR, conduct or will conduct hunting programs within the framework of State and Federal regulations. The Preferred Alternative is at least as restrictive as the State of Missouri and in some cases, the hunts will be more restrictive. By maintaining hunting regulations that are as, or more, restrictive than the States, the Refuge will ensure that they are maintaining seasons which are supportive of management on a regional basis. Additionally, Refuge will coordinate with MDC annually to maintain regulations and programs that are consistent with the States' management program.

The hunting of big game, upland/small game, and migratory bird game species will have minimal impacts to local, regional, state, and flyway populations. Refuge personnel expect additional number animals will be harvested on Refuge land. This additional harvest will allow populations of resident wildlife to be better maintained at healthy levels and more opportunities for the public to participate in hunting activities.

Refuge personnel expect and witness that most hunters respect spacing needs between hunters and blinds and will essentially regulate themselves. User conflicts might occur between non-consumptive users and hunters. This is not expected, as hunting seasons take place when most non-consumptive uses (wildlife observation, photography) have become minimal or occur in areas that remain closed to hunting.

4.2.6 Environmental Justice

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations" was signed by President Bill Clinton on February 11, 1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities' access to public information and participation in matters relating to human

health or the environment. This assessment has not identified any adverse or beneficial effects for either alternative unique to minority or low-income populations in the affected area. Neither alternative will disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low income populations.

Hunting opportunities proposed on Mingo NWR already exist on state, federal and other public lands in the area where the Refuge is located. The Refuge Recreation Act of 1962 (16U.S.C. 460K) and the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668-ddee) provide authorization for hunting and fishing on National Wildlife Refuges. The effects of hunting on Refuges have been examined in several environmental review documents, including the Final Environmental Impact Statement on the Operation of the National Wildlife Refuge System (1976), Recommendations on the Management of the National Wildlife Refuge System (1978), and the Draft Environmental Impact Statement on the Management of the National Wildlife Refuges (1988). Nothing in the establishing authority for Mingo National Wildlife Refuge [Fish and Wildlife Act of 1956{16U.S.C. 742f}] precludes hunting on the Refuge.

4.3 Alternative 3 - Archery deer, spring turkey and squirrel would be expanded to Ditch 10. Only one additional quota hunt for deer as needed. Open additional waterfowl hunting in Pool 7. Raccoons hunted by Special Use Permit (SUP) and while hunting other open species. Feral hogs may be taken by legal means while hunting other species.

Most of the impacts associated with Alternative 2 will be the same or similar for Alternative 3. This alternative includes hunting for the same species as proposed in Alternative 2 with changes in season dates and areas open for hunting.

Under this alternative the hunt area would be expanded for archery deer/turkey, spring turkey and squirrel to include all areas south of the Ozark Highland Auto Tour (OHAT), North of Ditch 11 and east of Ditch 10. The area east of Ditches 10 would be open during statewide season for spring turkey. Archery deer season would end October 31st between Ditches 4 and 10. Squirrel season would end the evening before the beginning of archery deer season.

Quota and Special hunts may be expanded under this alternative to include more hunts as needed to control deer populations on the refuge. The quota hunts will be based on the annual spotlight surveys and in coordination with MDC.

Waterfowl hunting would remain by MDC draw in Pool 8 for up to 50 hunters, seven days per week during season. Pool 7 would be open for hunting during the Missouri waterfowl season (Figure 9). All waterfowl hunting would end at 1 p.m. Some years the open hunting in Pool 7 may not occur due to management needs. Pool 8 may not be open during the entire season due to lack of water or management needs.

Raccoon season would be by SUP only and begin at the end of archery deer season and run until the end of statewide season for raccoon. Bobcats (when in season) and feral hog may be taken by any legal means while hunting other open species. These numbers would have a negligible effect on the state or regional population.

4.3.1 Infrastructure

Providing hunting opportunities under this alternative will not adversely affect, temporarily or permanently, the Services ability to meet land use goals on any of the units open to hunting. Any additional refuge facility development, such as trailheads or parking lots, will not be for the sole use of hunters and would be developed under either alternative. Parking areas and trailheads will be used by all users of the Refuge, including staff conducting day-to-day operations critical to the mission of the Refuge. There will be a change in wildlife habitat if/where parking lots and trails are developed as those areas are converted to gravel or bare soil but wildlife may still use these areas.

4.3.2 Natural Resources

4.3.2.1 Habitats

The selection of this alternative would not have significant adverse effects on the quality of wildlife habitat or the natural environment. In any alternative, the amount of habitat by type would not change from the current situation. With any alternative, some minor trampling of vegetation from hunters using areas other than established trails is expected. Access throughout Refuge units for hunting is typically by foot. Occasionally hunters access some Refuge units via bicycle from the parking area at McGee Gate. This method of access is allowed on existing roads and levees, therefore, presents no significant adverse impacts to Refuge lands.

Impacts to Refuge soils and vegetation by hunters are minimal. Hunting is conducted on foot mostly by individuals or small groups. Typically hunter groups travel in dispersed patterns so soil compaction and vegetation trampling will be minimal.

Boating activity on the Refuge may occur while hunting. Hunters use boats to access areas for deer, turkey and waterfowl hunting. Because Refuge users, including hunters are not allowed to use motorized boats there will be no impacts to air quality or solitude from hunting from boats. Boating is only allowed in ditches and would likely not impact habitat in adjoining areas.

Other potential types of habitat damage specifically attributed to hunting activities, such as littering, are not significant. Refuge specific regulations limit the adverse impact of activities such as cutting of vegetation and the use of screw-in steps, through their prohibition.

With the exception of white-tailed deer and raccoon, populations of hunted species are not at a level that could cause habitat damage. When populations are high, deer may damage habitat on the Refuge or on nearby public and private lands. Habitat damage on the Refuge and adjacent public lands appears to be localized. The Service receives few complaints of deer damage from surrounding landowners adjacent to the Refuge.

4.3.2 Biological Impacts

This alternative will result in few additional biological impacts. There will be some additional impact to resident wildlife when areas that were formally not hunted or disturbed are opened due

to increased foot traffic and game harvest. The harvest of Refuge wildlife species will be in accordance with Federal regulations and Missouri state limits or limits set by the Refuge. Other wildlife not being harvested will be disturbed by hunters flushing or moving the wildlife as the animals try to avoid human contact. This disturbance will be similar to the disturbance non-hunted animals experience on state Conservation Areas and federal lands and be minimal and temporary in nature. Impacts to hunted species' populations would be done in a regulated manner and in a way to benefit overall populations by maintaining those populations at desired levels.

Waterfowl would have some additional disturbance in Pool 7 under this alternative. These areas are currently open to archery deer hunting and some additional disturbance would be expected due to waterfowl hunting in an area. This will be partially mitigated by the time hunters would be allowed to utilize the area and numerous other federal and state regulations related to waterfowl hunting but may be at significant levels for Pool 7 and adjacent areas.

4.3.3 Listed Species

No effect is expected for any of the threatened and endangered species found within the Refuge as a result of this alternative.

4.3.4 Historic Properties and Cultural Resources

This alternative will result in no additional ground disturbance or disturbance to standing structures, and it would have no effect on any historic properties.

4.3.5 Cumulative Impact Analysis of Alternative 3.

4.3.5.A Anticipated Direct and Indirect Impact on Wildlife Species

Hunted Species

This alternative would have additional effect on some wildlife populations. Animal populations would be managed using additional hunting seasons and locations while offering additional recreation opportunities for the public.

White-tailed Deer

This alternative would allow deer populations to be better maintained and reduce over browsing of vegetation that may occur on a more frequent level both on the Refuge and adjacent lands. Deer populations on the refuge remain above desired levels at an average over the past 5 years of 1623 deer for an average about deer per square mile. Increasing hunting opportunities would likely increase doe harvest to the desired level of 200 per year per MDC recommendation (MDC Lonnie Hanson Personal Communication 2001).

Deer populations in Missouri remain high at 1.4 million with the 2011 total harvest of 288, 594 deer. The total combined harvest for Wayne and Stoddard counties in 2011 was 5233 deer (MDC 2011). The average total harvest for the previous 5 years on the Refuge is 154 deer per season. With additional hunting areas opened for archery and 1 additional quota hunt, the

average season harvest is expected to be between 180-220 deer. These numbers would have a negligible effect on the state or regional deer populations.

Turkeys

Turkeys would be harvested following statewide limits and seasons under this alternative. In 2011 the turkey population in Missouri was estimated at 440,000 birds with a spring 2011 harvest of 42,220 and a fall harvest of 6,000. Wayne and Stoddard counties had a 2011 spring harvest of 676 birds (MDC 2011). Hunting turkeys under statewide regulations on the Refuge is expected to maintain current populations. In 2010 hunters reported taking 19 turkeys on the refuge and 28 turkeys during 2009. The Refuge was closed during the spring 2008 and 2011 seasons due to flooding. There were 16 turkeys harvested in the fall of 2011. With additional hunting areas opened for turkey hunting, the average harvest is expected to be between 29-45 turkeys. These numbers would have a negligible effect on the state population and a minimal effect on the regional population.

Raccoons

Raccoons would be hunted under state seasons and regulations. In 2009, MDC estimated the statewide raccoon population at 1.4 million with annual trapping of only 100,000. This has led to an increase in the occurrences of distemper across the state (MDC 2009). Raccoons harvest levels will be controlled through issued SUP and will be based on and set from the annual raccoon survey data. There is currently no daily or possession limit on raccoons in Missouri. The harvest would have a negligible effect on statewide or regional populations.

Squirrel

The average total harvest for the previous 4 years on the Refuge is 261 squirrels per season. Approximately 2,000,000 squirrels are harvested each year with a statewide population estimate of over 6 million (MDC 2012). With additional hunting areas opened for squirrel hunting the average is expected to be between 310-350 squirrels. Squirrel populations are expected to remain at desired levels under this alternative. These numbers would have a negligible effect on statewide or regional populations.

Bobcats

Bobcats could be hunted under state seasons and regulations while hunting other species on the refuge. In 2010, MDC estimated the statewide bobcat population at 12,000 – 18,000 with annual harvest of 3,888 in the 2010-2011 season (MDC 2011). Wayne (38) and Stoddard (50) counties had a 2010/2011 harvest of 88 bobcats (MDC 2011). It is estimated that 3-5 bobcats would be harvested on the refuge. These numbers would have a negligible effect on the state population and a minimal effect on the regional population.

Waterfowl

Waterfowl hunting in Pool 8 is a very popular activity for both resident and nonresident hunters. Pool 8 and Duck Creek Conservation Area are some of the last places to hunt waterfowl in

flooded timber left in Missouri on Public lands. The increase in opportunity would result in more hunters being allowed to utilize this diminishing hunting opportunity. The Pool harvest and hunting opportunity is tied to rainfall and temperatures each winter with the refuge staff not flooding the pool until the trees are dormant each season (Table 4). Flooding will not be initiated in Pool 7 or 8 until trees are dormant.

The annual Waterfowl Population Status Report (USFWS 2011e) includes the most current breeding population and production information available for North America. According to the 2011 Waterfowl Population Status Report, the total duck population estimate was 45.6 ± 0.8 million birds and represents an 11% increase over last year's estimate of 40.9 ± 0.7 million birds and was 35% above the long-term average (1955-2010). Mallard abundance was estimated to be 9.2 ± 0.3 million birds, which was 9% above the 2010 estimate of 8.4 ± 0.3 million birds and 22% above the long-term average. The projected mallard fall-flight index was 11.9 ± 1.1 million birds (USFWS 2011e).

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Waterfowl disturbance would increase in Pool 7 due to the addition of hunting in that unit and would be more than in the preferred alternative. This area is currently open to archery deer hunting and potentially significant additional disturbance would be expected due to open waterfowl hunting in the area. These disturbances would be minimized days the unit is hunted and by current regulations. The addition of Pool 7 to limited waterfowl hunting would increase available waterfowl hunting on the Refuge by 4.6% or 800 acres. This leaves a total of 15,667 acres (89.7%) of waterfowl habitat, excluding Pools 7 and 8, not being hunted for waterfowl.

It is nearly impossible to determine an estimated waterfowl harvest for this alternative. There are no similar hunting situations to compare to in Missouri where open hunting is allowed on a small tract of public land in flooded timber. Undoubtedly the harvest would be higher than in alternatives 1 and 2 and may be to levels that would cause an effect on local populations.

Due to the relative small size of Pool 7, open hunting would be expected to cause additional conflicts among hunters. With the potential to have numerous hunters in the pool during open hunting, self-regulation and safe spacing requirements would be strained. This may also lead to unsafe situations where too many hunters are trying to hunt the same small area. Unlimited access to the pool would cause congestion and may overwhelm Refuge infrastructure.

Migratory game birds are those bird species so designated in conventions between the United States and several foreign nations for the protection and management of these birds. Under the Migratory Bird Treaty Act (16 U.S.C. 703-712), the Secretary of the Interior is authorized to determine when "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any ... bird, or any part, nest, or egg" of migratory game birds can take place, and to adopt regulations for this purpose. These regulations are written after giving due regard to "the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, and are updated

annually (16 U.S.C. 704(a)). This responsibility has been delegated to the U.S. Fish and Wildlife Service as the lead federal agency for managing and conserving migratory birds in the United States. Acknowledging regional differences in hunting conditions, the Service has administratively divided the nation into four Flyways for the primary purpose of managing migratory game birds. Each Flyway (Atlantic, Mississippi, Central, and Pacific) has a Flyway Council, a formal organization generally composed of one member from each State and Province in that Flyway. Mingo NWR is located in the Mississippi Flyway.

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Non-hunted Species

Non-hunted wildlife would include small mammals such as voles, moles, mice, and shrews; reptiles and amphibians such as snakes, skinks, turtles, lizards, salamanders, frogs and toads; and invertebrates such as butterflies, moths, other insects and spiders. Except for migratory birds and some species of migratory butterflies and moths, these species have very limited home ranges and hunting would not affect their populations regionally.

Disturbance to non-hunted wildlife would increase slightly. However, significant disturbance would be unlikely since small mammals are beginning to become inactive during late November and early December and many of these species are nocturnal. Both of these qualities make hunter interactions with small mammals rare.

Hibernation or torpor by cold-blood reptiles and amphibians also limits their activity when temperatures are low. Squirrel and turkey hunters may encounter reptiles and amphibians during a portion of the hunting season. Invertebrates are also not active during cold weather and would have few interactions with hunters during the cooler portions of hunting season.

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Refuge regulations further mitigate possible disturbance by hunters to non-hunted wildlife. Vehicles are restricted to roads and the harassment or taking of any wildlife other than the game species legal for the season is not permitted.

4.3.5.B Anticipated Direct and Indirect Impact on Refuge Programs, Facilities, and Cultural Resources Other Refuge Wildlife-Dependent Recreation

Other Refuge Wildlife-Dependent Recreation: Each year thousands of people visit Mingo NWR (136,825 visits in 2009) to enjoy the resources. Wildlife observation visits, particularly bird watching, account for the highest wildlife-dependent recreational use recorded for the Refuge.

Under this alternative, the public hunting opportunity would increase while potentially impacting non-hunting recreational activities at minor levels. Hunting allowed to Ditch 10 may increase conflict with non-hunting users of the Ozark Highland Auto Tour. This alternative would leave less area closed to general hunting and increase the potential for user conflicts. Hunting is also a way for the public to gain an increased awareness of Mingo NWR and the National Wildlife Refuge System.

Refuge Facilities. Additional impacts to Refuge facilities (roads, parking lots, trails) will occur with this alternative. Under this alternative, Refuge facilities would need be created or modified to allow for additional hunting opportunities. Additional parking would be created in areas already disturbed. Maintenance or improvement of existing roads and parking areas will cause minimal short term impacts to localized soils and may cause some temporary wildlife disturbance.

Cultural Resources. This alternative will have minimal additional impacts to cultural resources. Any ground disturbing activities associated with this alternative will have a cultural clearance conducted prior to activities being initiated. Hunting activities will result in no ground disturbance or disturbance to standing structures and would have no effect on any historic properties.

4.3.5.C Anticipated Direct and Indirect Impact on Refuge Environment and Community

The preferred alternative will have little if any additional impact on soils, air quality, water quality or solitude. Vegetation, as stated above, could be affected if the deer population increases to a level to cause degradation of communities.

This alternative may have impacts on hunting opportunities in the local area. Under this alternative additional hunters would be able to utilize the Refuge and more people will use facilities both on and off of the Refuge. This alternative would also increase public hunting opportunity and may lead to decreased usage of surrounding private and public lands.

As a result of this alternative, expenditures by visitors for meals, lodging and transportation would increase in the communities where these Refuge lands are located. According to the 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation, hunters spent \$234.4 million in Missouri on hunting trip-related expenses. In addition, Missouri residents spent \$739.7 million on non-consumptive recreational activities in 2006. A total of \$3.4 billion was spent on wildlife related recreation in Missouri. Municipalities and community organizations could bring additional tourism revenues into their economies by establishing partnerships with the Service to develop and promote the recreational opportunities that are available on the Refuge lands in their communities.

Hunting would benefit vegetation as it is used to keep resident deer populations in balance with the carrying capacity of the habitat. The biological integrity of the Refuge would be protected under this alternative, and the Refuge purpose of restoring bottomland hardwoods for migratory birds and wildlife would be achieved.

Impacts to the natural hydrology would be negligible. The Refuge staff expects impacts to air and water quality to be minimal and only due to Refuge visitor's use of automobiles on adjacent township and county public roads. The effect of these Refuge-related activities on overall air and water quality in the region are anticipated to be negligible.

Existing State water quality criteria and use classifications are adequate to achieve desired on-Refuge conditions; thus, implementation of the proposed action would not impact adjacent landowners or users beyond the constraints already implemented under existing State standards and laws.

Impacts associated with solitude are expected to be minimal but slightly higher than with alternative 2, given that a larger portion of the wilderness and adjoining area to the Ozark Highland Auto Tour.

There is a potential to have some disturbance on the general public, nearby residents, and Refuge visitors. The disturbance factor is considered minimal but higher than with alternative 2. The

Refuge System and States already have hunting taking place on thousands of properties, and on hundreds of thousands of acres of private property. It is possible that Refuge hunting will increase hunting opportunities on surrounding lands, by increasing the wildlife moving beyond the boundary of the individual Refuge units.

The Ozark Highland Auto tour is expected to be rehabilitated in the next 2-3 years. This route may be opened for longer periods of time during the year. Some additional conflicts might be expected as part of this alternative as more people would be in the expanded hunt area during season. This is expected to be minimal, but more extensive than in alternative 2, as larger portion of the expanded hunt area would be in contact with the auto tour.

4.3.5.D Other Past, Present, Proposed, and Reasonably Foreseeable Hunts and Anticipated Impacts

Hunting has been allowed on Mingo NWR for multiple decades and approved and registered in the Code of Federal Regulations each hunting season if changes are warranted. If public use levels expand in the future or unanticipated conflicts between user groups may occur, Service experience has proven that time and space zoning can be an effective tool in eliminating conflicts between user groups. On a case by case basis, the onsite manager, will determine if such a tool is necessary to limit conflicts.

4.3.5.E Anticipated Impacts If Individual Hunts Are Allowed To Accumulate

National Wildlife Refuges, including Mingo NWR, conduct or will conduct hunting programs within the framework of State and Federal regulations. The Preferred Alternative is at least as restrictive as the State of Missouri and in some cases, the hunts will be more restrictive. By maintaining hunting regulations that are as, or more, restrictive than the States, individual Refuges will ensure that they are maintaining seasons which are supportive of management on a regional basis. Additionally, Refuges coordinate with the MDC annually to maintain regulations and programs that are consistent with the States' management program.

The hunting of big game, upland/small game, and migratory bird game species will have minimal impacts to local, regional, state, and flyway populations. Refuge personnel expect additional number animals will be harvested on Refuge land. This additional harvest will allow populations of resident wildlife to be better maintained at a healthy level and more opportunities for the public to participate in hunting activities.

Refuge personnel expect and witness that most hunters respect spacing needs between hunters and will essentially regulate themselves. User conflicts might occur between non-consumptive users and hunters. This may occur under this alternative, as hunting seasons take place when some non-consumptive uses (wildlife observation, photography) are open along the Ozark Highland Auto Tour and in the Mingo Wilderness Area.

4.3.6 Environmental Justice

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations" was signed by President Bill Clinton on February 11,

1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities' access to public information and participation in matters relating to human health or the environment. This assessment has not identified any adverse or beneficial effects for either alternative unique to minority or low-income populations in the affected area. Neither alternative will disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low income populations.

Hunting opportunities proposed on Mingo NWR already exist on state, federal and other public lands in the area where the Refuge is located. The Refuge Recreation Act of 1962 (16U.S.C. 460K) and the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668-ddee) provide authorization for hunting and fishing on National Wildlife Refuges. The effects of hunting on Refuges have been examined in several environmental review documents, including the Final Environmental Impact Statement on the Operation of the National Wildlife Refuge System (1976), Recommendations on the Management of the National Wildlife Refuge System (1978), and the Draft Environmental Impact Statement on the Management of the National Wildlife Refuges (1988). Nothing in the establishing authority for Mingo National Wildlife Refuge [Fish and Wildlife Act of 1956{16U.S.C. 742f}] precludes hunting on the Refuge.

4.4 Comparison of Environmental Impacts by Alternative

Table 6. Environmental impacts for each alternative.

RESOURCE	ALTERNATIVE 1 (NO ACTION)	ALTERNATIVE 2 (Preferred)	ALTERNATIVE 3
Big Game	No additional impact to current deer populations	Additional deer harvested to reach management goals. Improvement of overall habitat on refuge.	A slight increase in deer populations may occur on a portion of the Refuge due to a reduced number of quota hunts
Squirrel and Turkeys	No additional impact to current populations	Increase in harvest is expected due to additional hunting opportunities. Harvest would be monitored to maintain desirable levels.	Increase in harvest is expected due to additional hunting opportunities. Harvest would be monitored to maintain desirable levels.
Migratory Birds	No impact, all areas would be open as in the past.	Some increased impacts in Pool 7 due to increased disturbance from additional limited hunting.	Some increased impacts in Pool 7 due to increased disturbance from additional limited hunting.
Raccoon, bobcat, feral hogs	No additional impact to raccoon or bobcat. Feral hog impact as in the past	Increase in harvest is expected due to additional hunting opportunities. Harvest would be monitored to maintain desirable levels.	Increase in harvest is expected due to additional hunting opportunities. Harvest would be monitored to maintain desirable levels.
Other Concerns - Habitats	No change expected	No impact	No impact
Threatened and Endangered Species	No impact	No impact	No impact
Historic and Cultural Resources	No impact	No impact	No impact

5.0 Environmental Justice

No one group or Tribe represented in the community would be disproportionately impacted by building the administrative facility on the parcel. Thus, Alternatives 1, 2 and 3 would not result in any environmental justice issues.

6.0 List of Preparers

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Lindsey Landowski, Assistant Refuge Manager, Mingo National Wildlife Refuge
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For issues identification and public use ideas:

Public comments from public scoping meeting.

Federal and state listed threatened and endangered species:

<http://www.fws.gov/midwest/endangered/lists/missouri-cty.html>

<http://mdc.mo.gov/discover-nature/field-guide/endangered-species/endangered-species-field-guide>

Draft document reviewed by:

U.S. Fish and Wildlife Service, Ft. Snelling, MN

The Mingo Hunting Plan will be a “Living Document”. It is anticipated that changes will need to occur as data is gathered, habitats are restored and wildlife populations fluctuate. All major changes will be announced through the development of a supplemental Environmental Assessment and must always remain compatible with the purpose for establishing the Mingo National Wildlife Refuge.

7.0 References

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