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

for the
Proposed Amendments to the 2014 Hunting Chapter
Of the
Visitor Service Plan
Swan Lake National Wildlife Refuge
Sumner, Missouri

Regional Director
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Abstract: The United States Fish and Wildlife Service proposes to provide additional hunting opportunities on Swan Lake National Wildlife Refuge in Sumner, Missouri. This environmental assessment 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).
The broad goals of the Swan Lake National Wildlife Refuge Hunting Plan are as follows:

- Provide the public with safe and enjoyable hunts that are compatible with Refuge purpose.
- Provide quality hunting opportunities that minimize conflict with other public use activities.
- Provide the public with opportunities to hunt wildlife species consistent with the laws and regulations of the State of Missouri, that do not adversely affect local wildlife populations, and are consistent with the 1997 National Wildlife Refuge System Improvement Act.
- Provide additional hunting opportunities for persons with disabilities and youth, if it is determined there is a need to expand beyond existing opportunities.

This Environmental Assessment (EA) is being submitted to address hunting opportunities proposed on Swan Lake National Wildlife Refuge, and has incorporated a Cumulative Impact Analysis to meet NEPA requirements. For further information about the Environmental Assessment, please contact:

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CHAPTER 1. PURPOSE AND NEED FOR ACTION

SECTION 1.1 Purpose

The Purpose of this Environmental Assessment is to evaluate alternatives for hunting programs on the fee title lands administered by Swan Lake National Wildlife Refuge (NWR).

SECTION 1.2 Need

Providing compatible wildlife-dependent recreation and educational activities on units of the National Wildlife Refuge System (NWRS) is a priority of the U. S. Fish and Wildlife Service (Service). The National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd et seq.) provides authority for the Service to manage the Refuge and its wildlife populations. In addition it declares that compatible wildlife-dependent public uses are legitimate and appropriate uses of the Refuge System that are to receive priority consideration in planning and management. There are six wildlife-dependent public uses: hunting, fishing, wildlife observation, wildlife photography, environmental education and interpretation. The Act directs managers to increase recreational opportunities, including hunting, on National Wildlife Refuges when compatible with the purposes for which the Refuge was established and the mission of the NWRS.

Increasing hunting opportunities on portions of the fee title lands administered by the Refuge will allow management of wildlife populations at acceptable levels, provide more wildlife-dependent recreational opportunities for the public, and promote a better understanding and appreciation of Refuge habitats and their associated fish and wildlife resources. Implementation of the proposed actions will be consistent and compatible with the Refuge Recreation Act, Refuge Administration Act, and the Swan Lake NWR Comprehensive Conservation Plan (CCP) (USFWS 2011).

SECTION 1.3 Background

Swan Lake National Wildlife Refuge was established in 1937 by Franklin D. Roosevelt through Executive Order 7563. The legal mandates that established or describe the purposes of the Refuge include: “as a refuge and breeding ground for migratory birds and other wildlife” (Executive Order 7563), “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” (16 U.S.C. ¤ 715d) and “... particular value in carrying out the national migratory bird management program.” (16 U.S.C. ¤ 667b).

The Refuge is responsible for managing 12,031 acres of fee title (owned) property. The largest portion consists of 10,670 acres of contiguous land located in Chariton County in north-central Missouri that was established under the Executive Order. Throughout this document, this parcel is referred to as Refuge land or Refuge acres.

The Yellow Creek Triangle is a 51 acre tract of Refuge land separated from the main part of the Refuge by a railroad right-of-way. Because of the difficulty in obtaining access to this area, it is treated separately in many sections of this Environmental Assessment.

Refuge staff manage 8 additional tracts of land totaling 1,361 acres. This document will refer to them as outlying units. These tracts were transferred to the Service from the Farm Service Agency (formerly the Farmer's Home Administration) and the U.S. Army Corps of Engineers in the 1980's and are scattered across five Missouri counties. A map of lands managed by the Refuge is provided in Figure 1.

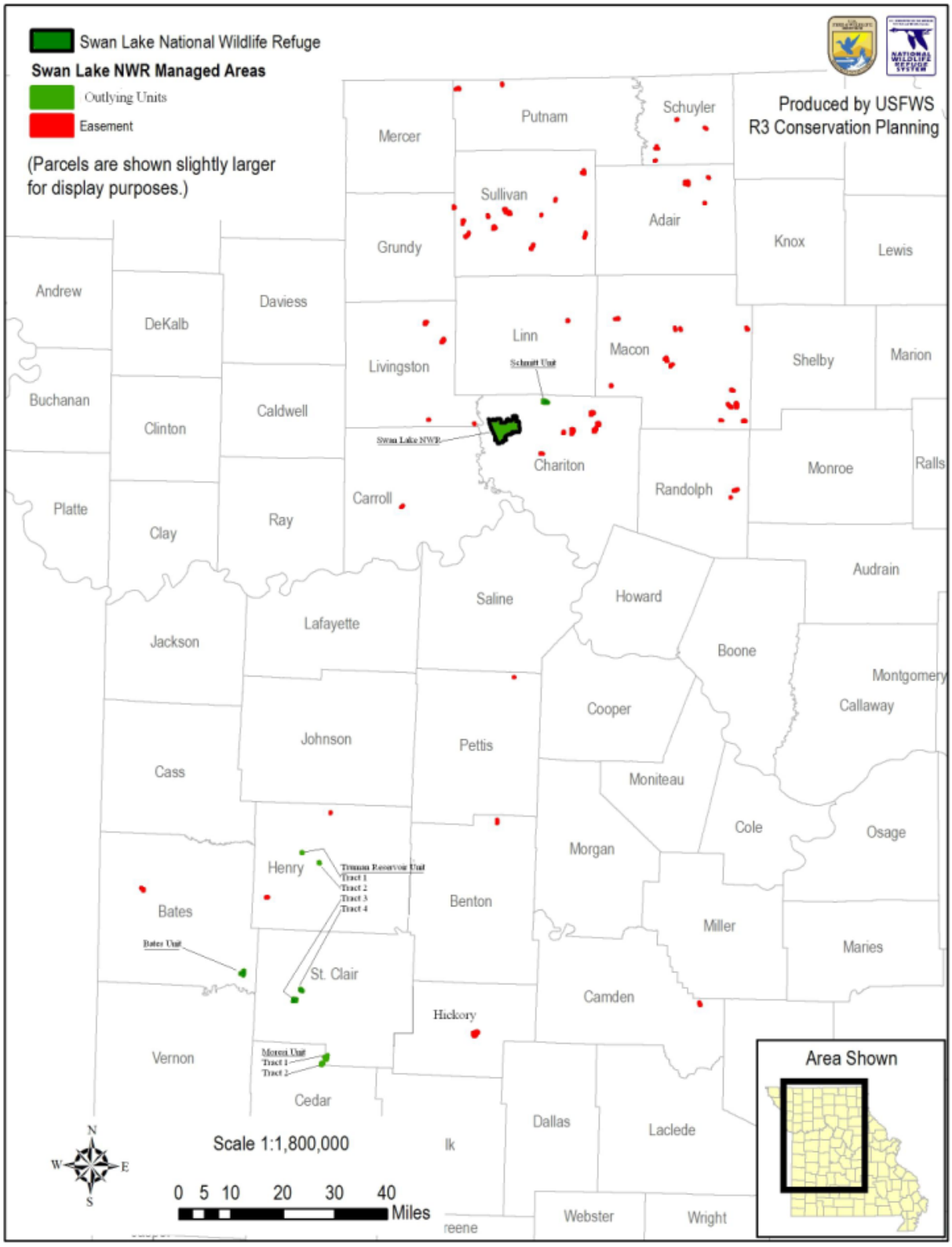

Figure 1: Swan Lake NWR Managed Areas

SECTION 1.4 Decisions That Need To Be Made

This Environmental Assessment has been prepared to evaluate the environmental consequences of opening additional lands administered by Swan Lake NWR to hunting and expanding the types of hunting allowed. Five alternatives are presented in this document:

(1) Eliminate all hunting – discontinue the current hunting program.

(2) No action - continue the current hunting program (goose and deer only).

(3) Limited expansion of hunting opportunities – allow waterfowl, mourning dove, white-tailed deer, and squirrel hunting on selected Refuge areas, open the Yellow Creek Triangle to statewide regulations consistent with Yellow Creek Conservation Area and the Outlying Units to hunting under state regulations. (Preferred Alternative.)

(4) Significant expansion of hunting opportunities – open 5,345 additional Refuge acres, the Yellow Creek Triangle, and the Outlying Units to hunting all species under state regulations.

(5) Unlimited expansion of hunting opportunities - open all 12,031 acres of Refuge land, Yellow Creek Triangle, and the Outlying Units to hunting under state regulations.

The Regional Director, U. S. Fish and Wildlife Service, Twin Cities, Minnesota, is the official responsible for determining the action to be taken in the proposal by choosing an alternative. He will also determine whether this Environmental Assessment (EA) is adequate to support a Finding of No Significant Impact (FONSI) decision, or whether there is a significant impact on the quality of the human environment, thus requiring the preparation of an Environmental Impact Statement (EIS).

CHAPTER 2. PROPOSED ACTION AND THE ALTERNATIVES

SECTION 2.1 Alternatives Eliminated from Detailed Study

Two potential alternatives were considered but not carried forward for detailed analysis. Neither of these alternatives would be consistent with the purposes for which Swan Lake National Wildlife Refuge (Refuge) was established, be compatible with Refuge management goals, nor contribute to the mission of the National Wildlife Refuge System (NWRS).

2.1.1 Eliminate all hunting – discontinue the current hunting program.

Implementation of this alternative would require termination of all hunting programs on the Refuge. Hunting has taken place on the Refuge for more than sixty years and is identified as a compatible use in the Swan Lake National Wildlife Refuge Comprehensive Conservation Plan (February 24, 2011). As detailed in Section 1.2; compatible wildlife-dependent public uses are legitimate and appropriate uses of the NWRS and are legislatively mandated for priority consideration.

For the reasons listed above, this alternative was dismissed from further consideration.

2.1.2 Unlimited expansion of hunting opportunities – open all 12,031 acres of Refuge land, Yellow Creek Triangle, and all Outlying Units to hunting in accordance with state regulations.

Implementation of this alternative would eliminate all Federal regulation of hunting programs on Refuge lands. Huntable species, season dates, shooting hours, and hunter type and preference would follow state regulations. Although this alternative might reduce Federal costs it would conflict with Executive Order 7563 which established the Refuge as an "inviolate sanctuary for migratory birds." Selection of this alternative would also prevent the implementation of hunting programs specifically designed to meet Refuge goals and management objectives.

For the reasons listed above this alternative was dismissed from further consideration.

SECTION 2.2 Alternatives Carried Forward for Detailed Analysis

The following alternatives were selected for detailed analysis:

Alternative A: No action – continue the current hunting program (goose and deer).

Alternative B: Limited expansion of hunting opportunities – allow waterfowl, mourning dove, deer, and squirrel hunting on selected Refuge areas, and open the Yellow Creek Triangle and the Outlying Units to hunting under state regulations (Preferred Alternative).

Alternative C: Significant expansion of hunting opportunities – open 5,345 Refuge acres, the Yellow Creek Triangle, and the Outlying Units to walk-in hunting under state regulations.

Specific details about each of the alternatives carried forward for detailed analysis are provided below.

2.2. A Alternative A: No action - continue the current hunting program.

The current Refuge hunt program allows goose and deer hunting only.

2.2. A.1 Current Goose Hunting Program.

Goose hunting on the Refuge is limited to 19 units totaling 1,016 acres. Each unit is restricted to a single hunting party, with a maximum of four hunters per party. Each hunter is limited to 25 shotgun shells. Hunting is only allowed four days per week during the hunting season. Hunting units in wetlands closes at 1:00 PM.

On weekend mornings, drawings are held to select hunters and assign areas. On weekday mornings, hunts are on a first come/first choice self-registration system. The locations of the hunting units are shown in Figure 2.

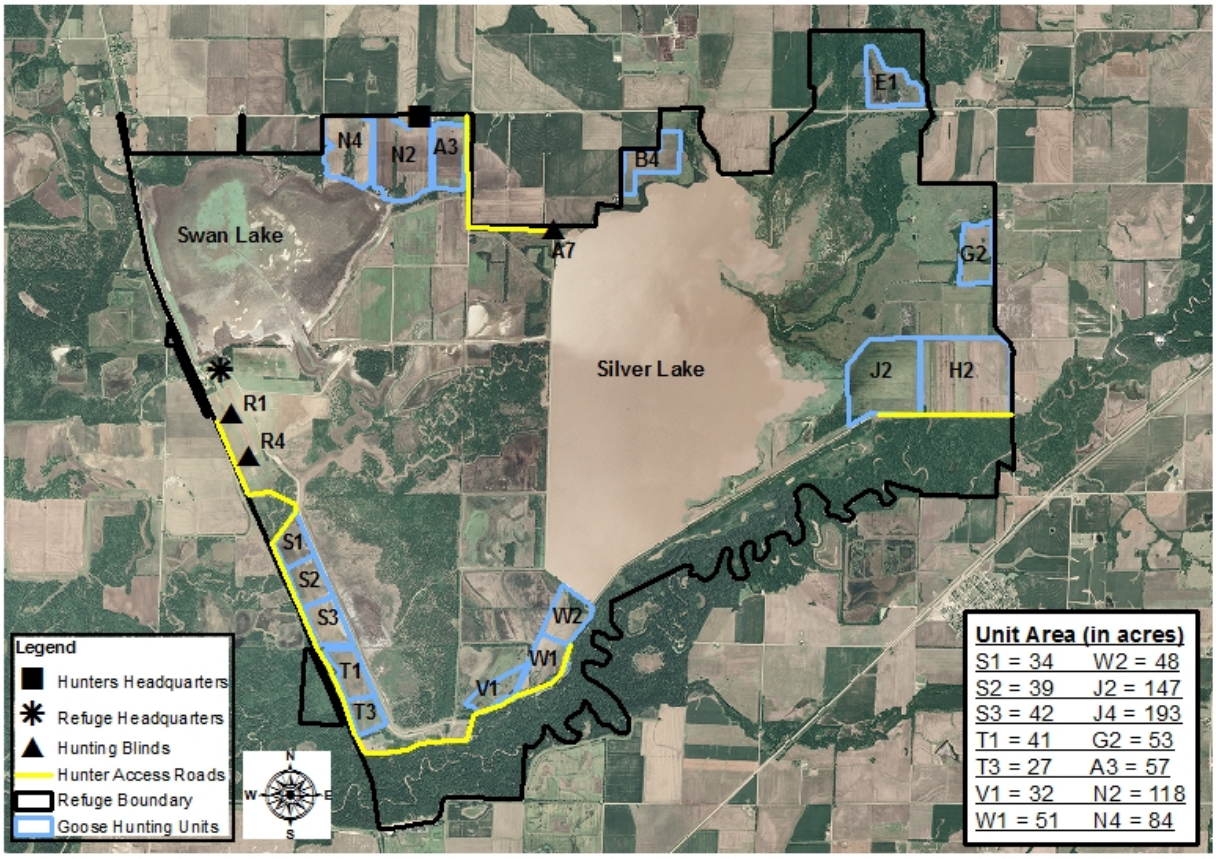

Figure 2: Current Goose Hunting Units (Alternative A)

Dates, hours, and bag limits for the goose hunt follows all other state regulations. The normal Missouri goose season usually begins in November and ends in January. A Light Goose

Conservation Order (LGCO) season typically opens February 1 and closes April 30. Hunting on the Refuge is allowed during the LGCO season, but only on 10 of the 19 units. During the LGCO season hunters can sign up for units in three day blocks and leave decoys in place overnight. Given the large bag limits there is no restriction on the number of shogun shells hunters may possess during the LGCO hunt.

2.2. A.2 Current Deer Hunting Program.

Up to three separate, two-day white-tailed deer hunts are held on the Refuge. The entire 10,670 acre main Refuge area is open for these hunts, except roadways and administrative sites. Refuge staff works closely with Missouri Department of Conservation (MDC) biologists to evaluate deer populations and set harvest goals.

The first hunt is provided for hunters with disabilities. Hunters apply directly to the Refuge using current approved forms (FWS-3-2354) and procedures. Ten hunters are selected and provided with accessible blinds. The hunt is usually held in late October or early November and is operated by volunteers, with assistance from Refuge staff.

The second hunt is for youth hunters. Hunters apply through the MDC managed deer hunt system. Depending on habitat conditions, fifteen to thirty hunters (under 16 years of age) receive permits to hunt on the Refuge. To increase the quality and safety of the hunt, half of the hunters are designated to hunt on the east side of the Refuge and half on the west side. This hunt is usually held the first weekend of December.

The final hunt is a managed (limited number) deer hunt that is open to all applicants. Hunters apply through the MDC managed deer hunt system. Depending on habitat conditions, up to 100 hunters receive permits to hunt on the Refuge and are restricted to either the east or west half of the Refuge. This hunt is usually held on the second or third weekend of December.

2.2. B Alternative B: Limited expansion of hunting opportunities – allow waterfowl, mourning dove, white-tailed deer, and squirrel hunting on selected Refuge areas, open the Yellow Creek Triangle to statewide regulations consistent with Yellow Creek Conservation Area and the Outlying Units to hunting under state regulations(Preferred Alternative).

This alternative would expand hunting opportunities on lands managed by the Refuge. Alternative B has seven major components.

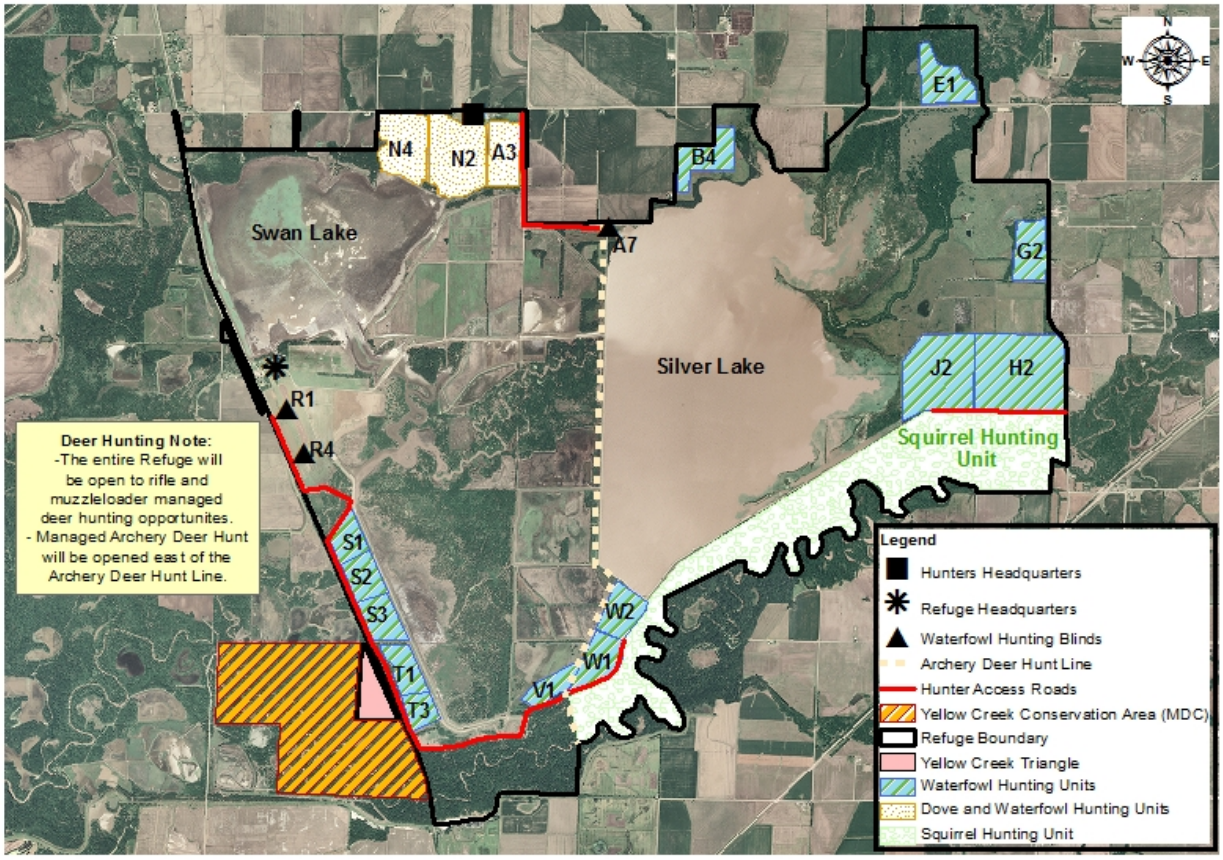

Figure 3: Alternative B Hunting Map (Preferred Alternative)

2.2. B.1 Retain Existing White-tailed Deer Firearm Hunting Program.

Under Alternative B, the existing deer hunting program would continue for Refuge land except the 51 acre Yellow Creek Triangle, roadways and a few administrative sites. (Yellow Creak Triangle is addressed in 2.2.B.5).

A total of approximately 10,619 Refuge acres would be open for up to three separate, two-day white-tailed deer hunts. Refuge staff would continue to work closely with Missouri Department of Conservation (MDC) biologists to evaluate deer populations and set harvest goals.

The first hunt would be provided to hunters with disabilities. Hunters would apply directly to the Refuge using current approved forms (FWS-3-2354) and procedures. Ten hunters would be selected and provided with accessible blinds. The hunt would be held in late October or early November and would be operated primarily by volunteers, with assistance from Refuge staff.

The second deer hunt would be only for youth hunters. Hunters would apply through the MDC managed deer hunt system. Depending on habitat conditions, fifteen to thirty hunters (under 16 years of age) would receive permits to hunt on the Refuge. To increase the quality and safety of the hunt, half of the hunters would be required to hunt on the east side of the Refuge and half on the west side. This hunt would usually be held the first weekend of December.

The final hunt would be a managed (limited number) deer hunt that would be open by random selection to all applicants. Hunters would apply through the MDC managed deer hunt system. Depending on habitat conditions, fifty to one hundred hunters would receive permits to hunt on the Refuge. Each hunter is permitted to hunt either the east or west half of Refuge. This hunt would usually be held on the second weekend of December.

2.2. B.2 Controlled Access Waterfowl Hunting

In Alternative B, the areas now open to goose hunting would also be opened for other types of waterfowl hunting (see Figure 2).

The current system of hunting four days each week, weekend early mornings draws, and weekday self-registration would continue. The total acreage of land open to hunting (1,016 acres) and the maximum number of hunters allowed per day (76) would not change. The major difference is that hunters would be allowed to hunt ducks, coot, teal and mergansers according to state regulations.

2.2. B.3 Mourning Dove Hunting

Alternative B proposes opening the 243 acres in existing goose hunting units N2, N4, and A3 to the hunting of mourning doves (see Figure 3). These units provide attractive habitat conditions during migration. Hunting would not interfere with other Refuge uses and management activities. These areas have clearly defined boundaries around the units. Hunting would be according to State regulations, but non-toxic shot would be required. Dove season generally runs from September 1 through early November in Missouri. Because demand for the hunt is expected to be light, hunters would be able to self-check in and check out at the hunting site with the use of MDC Harvest Cards for Dove. This will allow for the collection of harvest data collected on the MDC Harvest Cards for Dove, which will be utilized to inform decisions regarding future hunting regulations of this migratory bird.

2.2. B.4 Squirrel Hunting

Under Alternative B, the 826 acre area between Yellow Creek and the Auto Tour Road from the East Entrance Gate to the Silver Lake Spillway (see Figure 3) would be opened to squirrel hunting, according to state regulations. Population densities of gray and fox squirrels in this location are high and hunting activities during the typical state season (May 28 – February 15) would not interfere with other Refuge activities.

2.2. B.5 Open the Yellow Creek Triangle to Hunting

The Yellow Creek Triangle is a 51 acre tract of Refuge land cut off from the main part of the Refuge by a railroad right-of-way (see Figure 3).

This area is currently closed to all hunting, except managed deer hunts. The Yellow Creek Triangle is directly adjacent to the Yellow Creek State Conservation Area (YCSCA), which is

open to waterfowl, small game and archery deer hunting under state regulation. Although the Yellow Creek Triangle is posted with standard Refuge signs, hunters in the adjacent State lands frequently enter the Federal area. To alleviate this problem and increase hunting opportunities, Alternative B would open the Yellow Creek Triangle to hunting under the same state regulations as the adjacent YCSCA.

2.2. B.6 Open the Outlying Units to Hunting

The Refuge manages four "Outlying Units" consisting of 8 tracts (1,361 acres). The tracts were transferred to the Service from the Farm Service Agency (formerly the Farmer's Home Association) and the US Army Corps of Engineers. The tracts are scattered across five Missouri counties (see Figure 1).

A table showing the names and sizes of these tracts is provided in Table 1 below.

Table 1: Summary of Outlying Units

Unit Name	Tract Names	Acreage
Truman Reservoir Unit	West Henry	34
	East Henry	54
	West St. Clair	240
	East St. Clair	120
		448 (Total)
Moresi Unit	East: St. Clair County	238
	West: Cedar County	119
		357 (Total)
Bates Unit	Bates	**230** (Total)
Schmitt Unit	Schmitt	**326** (Total)
	TOTAL	**1,361**

Because of their scattered locations and distance from the Refuge, it is difficult for staff to manage these Outlying Units. The units offer limited habitat for migratory waterfowl and are surrounded by land, both private and public.

This alternative proposes to open all Outlying Units to hunting under State regulations with limited restrictions on species, seasons, or hunting methods. Opening these units would provide additional hunting opportunities and reduce confusion among the public.

2.2. B.7 Open the East Half of the Refuge to Managed Archery Deer Hunting.

Alternative B will open the east portion of the Refuge to a managed white-tailed deer archery hunt (see Figure 3). This will allow hunters a broader range of hunting opportunities. Hunters

will be drawn for this hunt through the MDC managed deer hunt drawing system. A set number of hunters will be selected and given a 1-2 week window in late September or early October.

2.2. C Alternative C: Significant expansion of hunting opportunities – open 5,345 Refuge acres, the Yellow Creek Triangle, and the Outlying Units to hunting under state regulations.

This alternative would open 5,345 acres to migratory bird, upland game, archery deer, and turkey hunting according to State regulations. It would continue managed white-tailed deer firearms hunting. The Outlying Units would also be opened to all hunting in accordance with Missouri State Regulations.

Table 2: Hunting Seasons and Limits of Species in Missouri[a]

Game	Season Dates	Daily Limit	Possession Limit
Badger	11/15/2014 - 01/31/2015	Any number	Any number
Bobcat	11/15/2014 - 01/31/2015	Any number	Any number
Fox (Red or Gray)	11/15/2014 - 01/31/2015	Any number	Any number
Opossum	11/15/2014 -01/31/2015	Any number	Any number
Rabbit: Hunting	10/1/2014 - 02/15/2015	6	12
Raccoon	11/15/2014 - 01/31/2015	Any number	Any number
Striped Skunk	11/15/2014 - 01/31/2015	Any number	Any number
Common Snipe	09/01/2014 - 12/16/2014	8	24
Coyote	01/01/2014 - 12/31/2014	Any number	Any number
Crow	11/01/2014 - 03/03/2015	Any number	Any number
Deer: Archery	09/15/2014 - 11/14/2014 11/26/2014 - 01/15/2015		
Deer: Firearms	11/15/2014 - 11/25/2014		
Deer: Firearms, Alt. Methods	12/20/2014 - 12/30/2014		
Deer: Firearms, Antlerless	11/26/2014 - 12/07/2014		
Deer: Firearms, Urban	10/10/2014 - 10/13/2014		
Deer: Firearms, Youth	11/01/2014 - 11/02/2014 01/03/2015 - 01/04/2015		
Dove	09/01/2014 - 11/09/2014	15	45
Ducks	11/03/2012 - 01/01/2013	6	12
Ducks	10/27/2012 - 12/25/2012	6	12
Ducks	11/22/2012 - 01/20/2013	6	12
Geese: Brant	10/06/2012 - 10/14/2012 11/22/2012 - 01/31/2013	1	2
Geese: Canada Geese	10/06/2012 - 10/14/2012 11/22/2011 - 01/31/2013	3	6
Geese: Light Geese	10/27/2012 - 01/31/2013	20	Any number
Geese: Light Geese C.O.	02/01/2013 - 04/30/2013	Any number	Any number
Geese: White-fronted	11/22/2012 - 01/31/2013	2	4
Groundhog	05/12/2014 - 12/15/2014	Any number	Any number
Pheasant	11/01/2014 - 01/15/2015	2	4
Pheasant	12/01/2014 - 12/12/2014	1	1
Pheasant: Youth	10/25/2014 - 10/26/2014	2	4
Quail	11/01/2014 - 01/15/2015	8	16
Quail: Youth	10/25/2014 - 10/26/2014	8	16

Sora and Virginia Rails	09/01/2014 - 11/09/2014	25	75
Squirrel	05/24/2014 - 02/15/2015	10	20
Teal	09/06/2014 - 09/21/2014	6	18
Turkey: Archery	09/15/2014 - 11/14/2014 11/26/2014 - 01/15/2015		
Turkey: Fall Firearms	10/01/2014 - 10/31/2014		
Woodcock	10/15/2014 - 11/28/2014	3	9
Youth Waterfowl: Youth	10/27/2012 - 10/28/2012	6	12
Youth Waterfowl: Youth	10/20/2012 - 10/21/2012	6	12
Youth Waterfowl: Youth	11/17/2012 - 11/18/2012	6	12
Bullfrog and Green Frog	06/30/2014 – 10/31/2014	8	16

[a] Hunting seasons and bag limits are determined on a yearly basis by the Missouri Department of Conservation, and are thus subject to change.

2.2. C.1 White-tailed Deer Hunting Program.

Under Alternative C, the existing deer hunting program would continue for Refuge land. Additionally, the eastern portion of the Refuge would be opened to archery methods, according to State regulations when it would not conflict with managed deer firearm hunts.

A total of approximately 10,619 Refuge acres would be open for up to three separate, two-day white-tailed deer hunts. Refuge staff would continue to work closely with Missouri Department of Conservation (MDC) biologists to evaluate deer populations and set harvest goals.

The first hunt would be provided to hunters with disabilities. Hunters would apply directly to the Refuge using current approved forms (FWS-3-2354) and procedures. Ten hunters would be selected and provided with accessible blinds. The hunt would be held in late October or early November and would be operated primarily by volunteers, with assistance from Refuge staff.

The second deer hunt would be only for youth hunters. Hunters would apply through the MDC managed deer hunt system. Depending on habitat conditions, fifteen to thirty hunters (under than 16 years of age) would receive permits to hunt on the Refuge. To increase the quality and safety of the hunt, half of the hunters would be required to hunt on the east side of the Refuge and half on the west side. This hunt would usually be held the first weekend of December.

The final hunt would be a managed (limited number) deer hunt that would be open by random selection to all applicants. Hunters would apply through the MDC managed deer hunt system. Depending on habitat conditions, fifty to one hundred hunters would receive permits to hunt on the Refuge. Each hunter is permitted to hunt either the east or west half of Refuge. This hunt would usually be held on the second weekend of December.

Archery deer hunting would be open in the Open Hunting Area during the statewide archery season.

2.2. C.2. Open 5,345 Refuge acres to hunting in accordance with State regulations.

The eastern portion of the Refuge would be open to migratory bird, upland game, and turkey hunting according to Missouri State Regulations (see Figure 4).

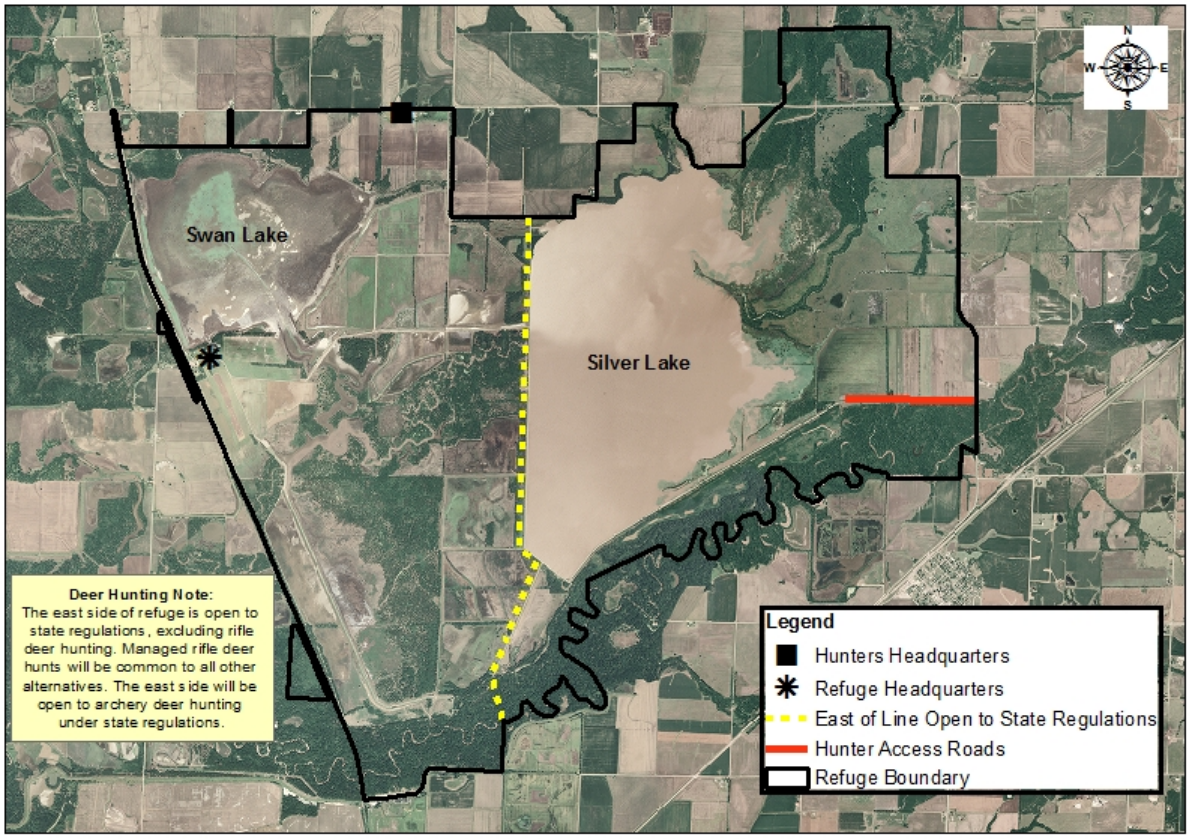

Figure 4: Alternative C Hunting Unit Map

2.2. C.3 Open the Outlying Units to Hunting

Because of their scattered locations and distance from the Refuge it is difficult for staff to manage these outlying units. These areas offer limited habitat for migratory waterfowl and are surrounded by land, both private and public, that is open to hunting. Although they were initially posted with Refuge signs many of the signs are missing, and trespass and encroachment problems are common. This alternative proposes to open all of these outlying areas to hunting under state regulations.

SECTION 2.3 Alternatives Comparison Table

Table 3 summarizes the hunting programs and associated acres that would occur under each of the alternatives carried forward for detailed analysis. Detailed discussion of the environmental impacts of each alternative can be found in Section 4.

Table 3: General Comparison of Alternatives with Acres Open for Hunting

Location: Type of Hunt	Alternative A (No Action)	Alternative B (Preferred)	Alternative C
Deer Hunting			
Refuge: Managed Firearm	10,670 acres	10,619 acres	10,619 acres
Refuge (East half): Managed Archery	Closed	5,345 acres	NA
Refuge: Archery under State Regulation	Closed	Closed	5,345 acres
Outlying Units: Firearm under State Regulation	Closed	1,361 acres	1,361 acres
Outlying Units: Archery under State Regulation	Closed	1,361 acres	1,361 acres
Yellow Creek Triangle: Archery under State Regulation	Closed	51 acres	NA
Migratory Waterfowl* Hunting			
Refuge: Controlled access goose	1,016 acres	NA	NA
Refuge: Controlled access all migratory waterfowl under State regulation	Closed	1,016 acres	NA
Refuge: All migratory waterfowl under State regulation	Closed	Closed	5,345 acres
Outlying Units: All migratory waterfowl under State regulation	Closed	1,361 acres	1,361 acres
Yellow Creek Triangle: All migratory waterfowl under State regulation	Closed	51 acres	NA
Small Game Hunting			
Refuge: mourning dove only	Closed	243 acres	NA
Refuge: Squirrel only	Closed	826 acres	NA
Refuge: All small game under State regulation	Closed	Closed	5,345 acres
Outlying Units: All small game under State regulation	Closed	1,361 acres	1,361 acres
Yellow Creek Triangle: All small game under State regulation	Closed	51 acres	NA
Turkey Hunting			
Refuge: Turkey under State regulation	Closed	Closed	5,345 acres
Outlying Units: Turkey under State regulation	Closed	1,361 acres	1,361 acres
Yellow Creek Triangle: Turkey under State regulation	Closed	51 acres	NA
**Federal regulations define waterfowl as ducks, geese (including brant), coots and gallinules.*			

CHAPTER 3. AFFECTED ENVIRONMENT

SECTION 3.1 Introduction

Swan Lake National Wildlife Refuge (Refuge) is located in Chariton County, Missouri, near the town of Sumner. It encompasses almost 11,000 acres of bottomland forest, grasslands, and wetlands within the Grand River floodplain. Highways and gravel roads border the north, east, and west sides of the Refuge. Land use around the Refuge is predominantly agriculture. Soybeans, corn, and wheat are the major crops. Beef cattle and hogs are the principal livestock.

The Refuge manages four "Outlying Units" consisting of 8 tracts totaling 1,361 acres. These tracts were transferred to the Service from the Farm Service Agency (formerly the Farmer's Home Association) and the U.S. Army Corps of Engineers. The tracts are scattered across five Missouri counties.

SECTION 3.2 Landscape Information

SECTION 3.2.1 Geologic History

The Grand River floodplain was formed around 20,000 years ago when the pre-Illinoian ice sheet, which had covered northern Missouri, receded. This created a topography of glacial till, gently rolling hills, and numerous small drainages. Annual flooding of the area deposited deep layers of nutrient rich alluvial soil and allowed lush native grasslands and bottomland forests to grow.

SECTION 3.2.2 Climate

The climate of north-central Missouri is characterized by hot, humid summers and mild winters. Spring weather is turbulent and thunderstorms and tornados are fairly common. Average monthly temperatures range from 15 degrees Fahrenheit in January to 80 degrees Fahrenheit in July. Average annual precipitation is 38.27 inches, with the heaviest amounts usually occurring during the months of May, June, and September.

SECTION 3.2.3 Historic Vegetation

The following description of historic vegetation within the Grand River watershed is excerpted from the Grand River Inventory and Assessment (MDC undated).

> *The pre-settlement Grand River Watershed was characterized by long narrow prairies generally oriented north-south and divided by timbered ridge tops and stream valleys (Schroeder 1982). Only in the southwest part of the basin did prairies open up to wide expanses averaging 1 or 2 miles across. Schroeder (1982) describes the riparian areas common to the watershed:*

In addition to the upland prairies, bottomland prairies occurred regularly on the flood plains of streams, sometimes becoming so extensive that timber was restricted to the river bank and rougher valley slopes.

Large areas of the broad flood plains of streams in the Grand-Chariton region supported a `luxuriant growth of coarse wild grass' (Watkins et al. 1921). Sometimes these wet prairies occupied the entire bottomland, except for a timber strip fringing the banks of streams. Clay or gumbo soils prevented good drainage, and marshes and ponds abounded.

Survey notes reveal a complex pattern of small lakes or ponds, wet prairie, intensively meandering creeks with and without river bank timber, and dense timber only along the Grand River channel in northwest Chariton County in what is now the Swan Lake area. There was nothing but wet prairie at the present Swan Lake site."

SECTION 3.2.4 Current Land Use/Cover

Extensive land use conversion in the Grand River watershed over the past century has produced a landscape **dominated by agriculture.**

Table 4 shows the distribution of current land cover, as well as the potential natural vegetation based on county soil survey data and historical records.

Table 4: Current Land Cover and Potential Natural Vegetation in Grand River Watershed and Sub-basins

Potential Natural Vegetation	Current Land Cover	Grand River Watershed	Lower Grand River Watershed	Yellow Creek Watershed	Turkey Creek Watershed
Prairie	Pasture/Hay	1,479,521			
Prairie	Cropland	1,148,901			
Forest	Pasture/Hay	891,699			
Forest	Forest	402,278			
Forest	Wetland	347,450			
Forest	Cropland	215,917			
Forest	Pasture/Hay		459,825		
Prairie	Pasture/Hay		278,183		
Prairie	Cropland		268,057		
Forest	Forest		142,800		
Forest	Cropland		111,289		
Forest	Pasture/Hay			152,029	
Forest	Forest			31,593	
Prairie	Pasture/Hay			20,330	
Prairie	Cropland			19,794	
Forest	Cropland			17,542	
Prairie	Cropland				21,572
Prairie	Pasture/Hay				11,867
Forest	Pasture/Hay				11,401
Forest	Cropland				5,023
Prairie	Wetland				2,433

SECTION 3.2.5 Socioeconomic Information

A comparison of socioeconomic information for Chariton County and the entire state of Missouri is presented in

Table 5 (2012: United States Census Bureau 2012).

Table 5: Socioeconomic Information for Chariton County and the State of Missouri

Measure, Date	Chariton County	Missouri
Population, 2011 estimate	7,734	6,010,688
Population, 2010 (April 1) estimates base	7,831	5,988,927
Population, percent change, April 1, 2010 to July 1, 2011	-1.20%	0.40%
Population, 2010	7,831	5,988,927
Persons under 5 years, percent, 2011	6.10%	6.40%
Persons under 18 years, percent, 2011	22.30%	23.50%
Persons 65 years and over, percent, 2011	21.60%	14.20%
Female persons, percent, 2011	50.80%	51.00%
White persons, percent, 2011 (a)	96.50%	84.00%
Black persons, percent, 2011 (a)	2.20%	11.70%
American Indian and Alaska Native persons, percent, 2011 (a)	0.30%	0.50%
Asian persons, percent, 2011 (a)	0.10%	1.70%
Native Hawaiian and Other Pacific Islander persons, percent, 2011 (a)	*Z*	0.10%
Persons reporting two or more races, percent, 2011	0.90%	1.90%
Persons of Hispanic or Latino Origin, percent, 2011 (b)	0.60%	3.70%
White persons not Hispanic, percent, 2011	96.00%	80.80%
Living in same house 1 year & over, 2006-2010	91.30%	83.20%
Foreign born persons, percent, 2006-2010	0.80%	3.70%
Language other than English spoken at home, pct. age 5+, 2006-2010	0.80%	5.90%
High school graduates, percent of persons age 25+, 2006-2010	84.70%	86.20%
Bachelor's degree or higher, pct. of persons age 25+, 2006-2010	14.20%	25.00%
Veterans, 2006-2010	817	511,253
Mean travel time to work (minutes), workers age 16+, 2006-2010	23.2	23.2
Housing units, 2010	4,167	2,712,729
Homeownership rate, 2006-2010	80.10%	70.00%
Housing units in multi-unit structures, percent, 2006-2010	6.30%	19.60%
Median value of owner-occupied housing units, 2006-2010	$76,500	$137,700
Households, 2006-2010	3,145	2,349,955
Persons per household, 2006-2010	2.39	2.45
Per capita money income in past 12 months (2010 dollars) 2006-2010	$19,978	$24,724
Median household income 2006-2010	$41,558	$46,262
Persons below poverty level, percent, 2006-2010	14.30%	14.00%

(a) Includes persons reporting only one race
(b) Hispanics may be of any race, so also are included in applicable race categories
Z: Value greater than zero but less than half unit of measure shown

SECTION 3.2.6 Cultural Resources and Historic Preservation

North-central Missouri contains archeological evidence for the earliest suspected human presence in the Americas, the Early Man cultural period prior to 12,000 B.C.; and extending through the Paleo-Indian, Archaic, Woodland, Mississippian, and historic Western cultures.

Although a complete cultural survey of the Refuge has not been performed, earlier partial surveys have located 30 historical and archeological sites.

SECTION 3.2.7 Other Conservation and Recreation Lands in the Area

The state of Missouri and owns and manages more than 100 areas within a 50-mile radius of the Refuge (see Figure 5). Lands include public access sites, fish and wildlife areas, recreation areas, forests, historic sites, and nature preserves. Other federal lands in the area include units of the Big Muddy National Fish and Wildlife Refuge along the Missouri River. Local governments own and manage community parks in the area. Conservation easements and lands enrolled in the Natural Resources Conservation Service's Wetland Reserve Program contribute thousands of acres to long-term conservation efforts.

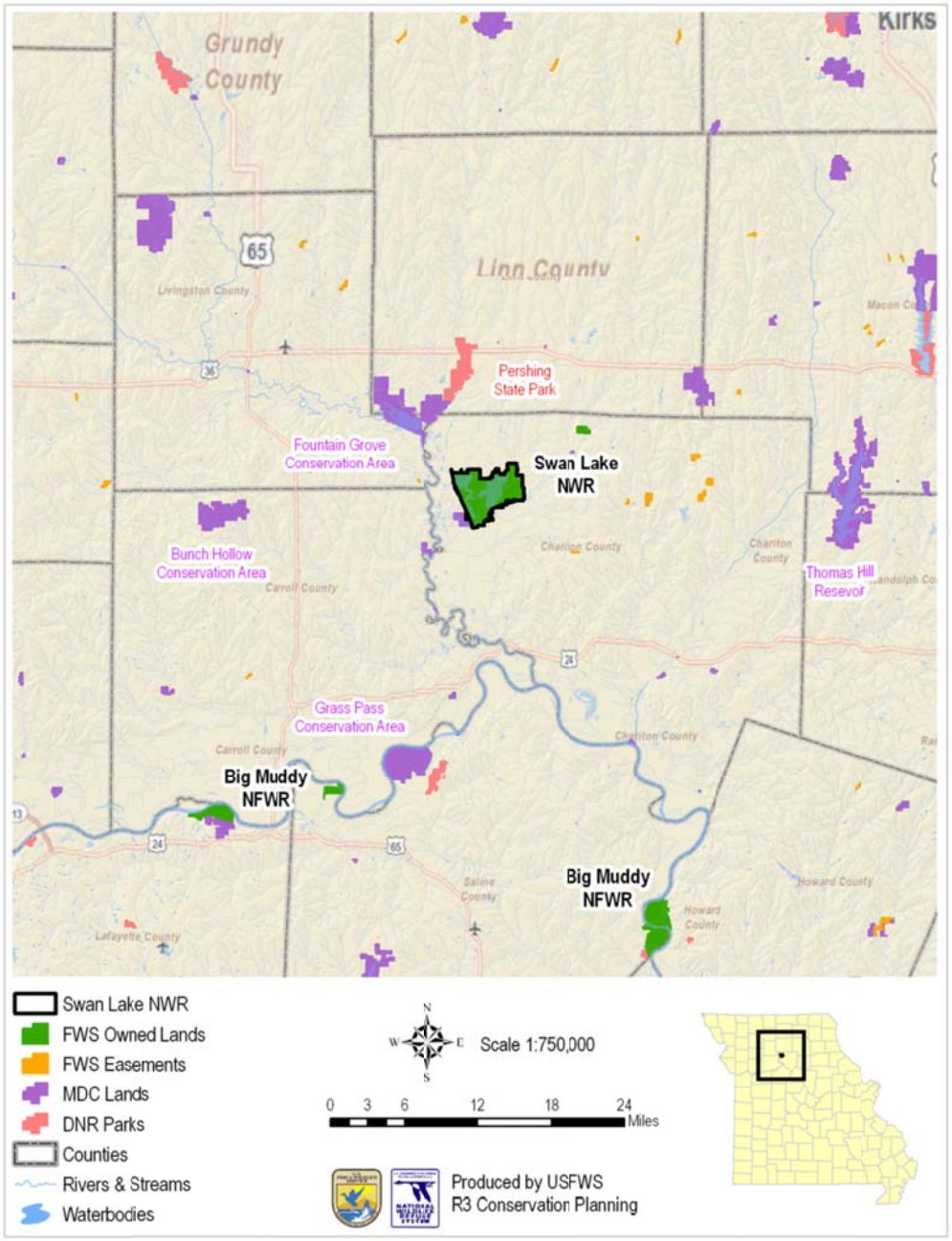

Figure 5: Other Conservation and Recreation Lands in the Vicinity of Swan Lake NWR

SECTION 3.3 Refuge Information

SECTION 3.3.1 Refuge Soils

The Refuge lies in the glacial till plain of north-central Missouri. Underlying bedrock is primarily shale and coal with occasional limestone. The topography is relatively flat with elevations ranging from 653.91 feet to 741.56 feet. Soil types of the Refuge are listed in Table 6 below.

Table 6: Swan Lake NWR Soil Types by Acreage

Soil Type	Acreage	Percent
Carlow silty clay, 0 to 2 percent slopes, rarely flooded	0	0.00%
Shannondale silt loam, 0 to 2 percent slopes	10	0.10%
Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded	10	0.10%
Gifford silty clay loam, 2 to 9 percent slopes, eroded, rarely flooded	35	0.30%
Grundy silt loam, 2 to 5 percent slopes	38	0.30%
Speed silt loam, 0 to 2 percent slopes, occasionally flooded	151	1.40%
Lagonda silt loam, 2 to 5 percent slopes, eroded	168	1.50%
Blackoar silt loam, 0 to 2 percent slopes, occasionally flooded	217	2.00%
Triplett silt loam, 0 to 2 percent slopes, rarely flooded	367	3.30%
Dockery silt loam, 0 to 2 percent slopes, frequently flooded	419	3.80%
Tice silt loam, 0 to 2 percent slopes, frequently flooded	440	4.00%
Tina silt loam, 0 to 2 percent slopes, rarely flooded	797	7.20%
Carlow silty clay, 0 to 2 percent slopes, occasionally flooded	1125	10.20%
Water	2782	28.50%
Tuskeego silty clay loam, 0 to 2 percent slopes, occasionally flooded	4110	37.30%
Totals	**11,025**	**100.00%**

SECTION 3.3.2 Refuge Land Cover

The cover types shown in Figure 6 were derived from aerial photographs and are based on the National Vegetation Classification System (NVCS), the Federal Standard for vegetative classification. A number of the NVCS categories were combined to form the eight cover types depicted.

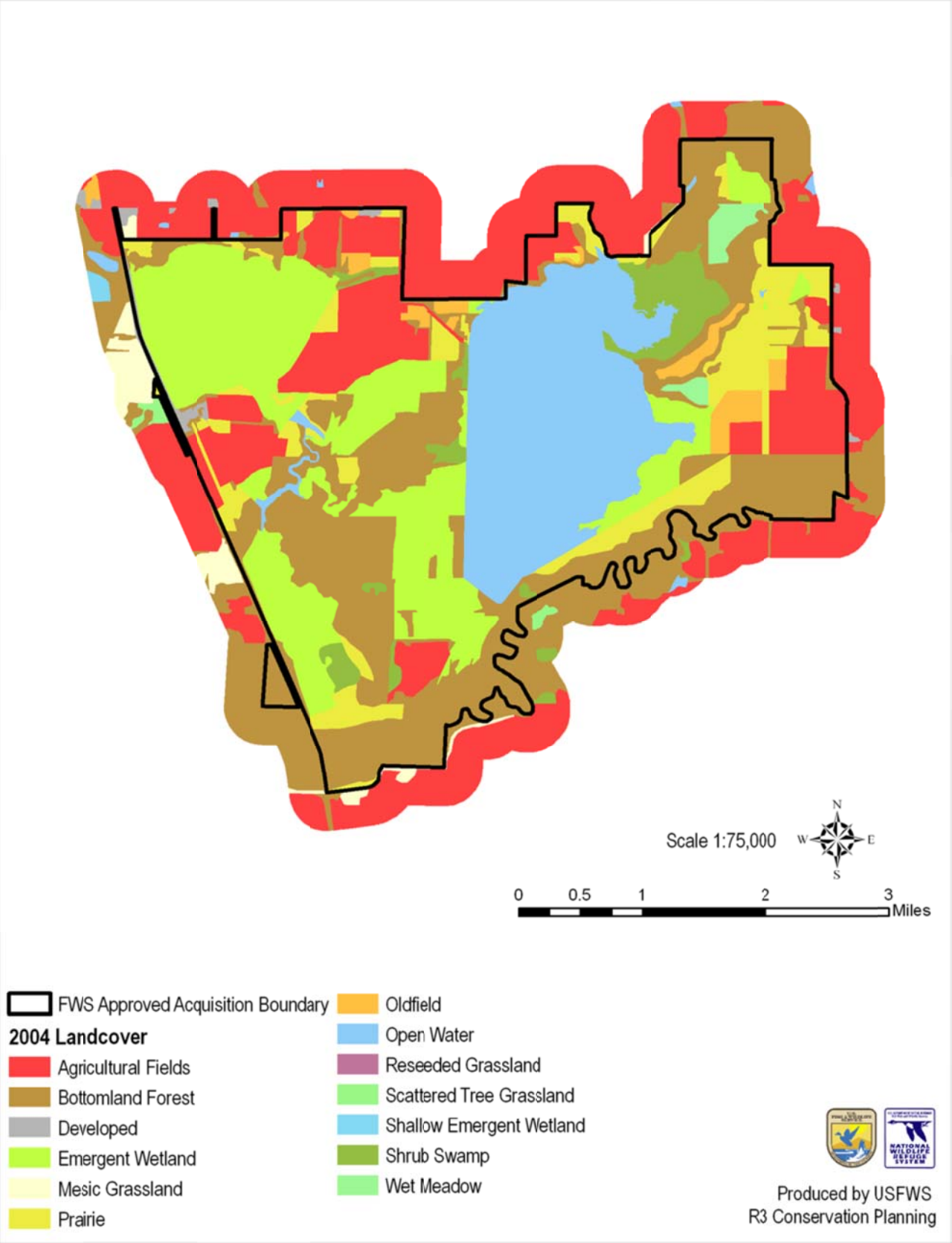

Figure 6: Current Land Cover of Swan Lake NWR

SECTION 3.3.2.1 Bottomland Forest

There are more than 3,100 acres of bottomland forest on the Refuge with the largest contiguous block found along Yellow Creek. This cover type consists of bottomland closed-canopy hardwood forest generally occurring on wet soil and in floodplains. It is dominated by pin oak, silver maple, swamp white oak, and shagbark hickory with green ash, elm, black willow, river birch, and honey locust. The understory varies from open areas dominated with sedges and woodland forbs to denser areas with a shrub layer of gooseberry, Western snowberry, and common prickly ash. These areas are subject to seasonal flooding.

SECTION 3.3.2.2 Emergent Wetland

There are more than 2,000 acres of emergent wetland habitat on the Refuge. Emergent wetlands, commonly referred to as marshes and sloughs, are characterized by erect, rooted water plants that are present for most of the growing season in most years. These wetlands normally contain standing water, though at times they will dry up. Common perennial plants found in emergent wetlands include cattail, bulrushes, arrowheads, and sedges. More than 800 acres of this habitat are managed using moist soil practices; when water levels are manipulated to create optimum habitat conditions for migratory birds.

SECTION 3.3.2.3 Open Water

Silver Lake contains nearly all of the more than 2,100 acres of open water on the Refuge. This cover type is defined as having less than 4 percent visible vegetation, either floating or submerged.

SECTION 3.3.2.4 Agricultural Fields

There are 1,365 acres of agricultural fields on the Refuge. These are cultivated areas that consist of a variety of grasses and forbs or row crops (wheat, corn or annual/perennial mixtures mowed for hay). Some of these areas are subject to occasional flooding.

SECTION 3.3.2.5 Native Prairie

The Refuge contains approximately 1,000 acres of native prairie. These areas were either rarely or never cultivated in the past. Flooding and surface water is often present during much of the year. Native prairie sites are grassy fields dominated by reed canary grass, sedges and native grasses with a small number of scattered shrubs and small trees.

SECTION 3.3.2.6 Wet Meadow

Wet meadow habitat occurs on about 110 acres of the Refuge. It is a type of wetland that commonly occurs in poorly drained areas, such as shallow lake basins, low-lying farmland, and the land between shallow marshes and upland areas. Wet meadows often resemble grasslands and are typically drier than other marshes. For most of the year wet meadows are without standing water, except seasonally, though the high water table allows the soil to remain

saturated. A variety of water-loving grasses, sedges, rushes, and wetland wildflowers proliferate in the highly fertile soil of wet meadows.

SECTION 3.3.2.7 Shrub Swamp

There are approximately 410 acres of shrub swamp habitat on the Refuge, most of which occurs along the perimeter of open water and emergent wetland habitats. Shrub swamp is dominated by deciduous woody vegetation less than 20 feet in height. Dominant species are mostly buttonbush and willow with an underlying mix of sedges and grasses and/or emergent vegetation, depending on water depth. The shrub layer varies from mostly open (25 percent) to closed (80 percent) and may contain scattered trees.

SECTION 3.3.2.8 Old Field

The 240 acres of old field habitat occurs on disturbed soils and is dominated by reed canary grass, smooth brome, quack grass and weedy herbaceous species. These areas are usually drier than those of wet meadow habitats and were once regularly cultivated for crops but now are left fallow. They are subject to occasional flooding.

SECTION 3.4 Wildlife

SECTION 3.4.1 Birds

A variety of birds are year-around residents of Swan Lake NWR, including many waterfowl. During spring and fall migrations, there is a great diversity of birds due to the Refuge's location between the Central Flyway and the Mississippi Flyway. It is not uncommon for the Refuge to host up to 100,000 ducks, mostly dabblers, during the fall migration. The Eastern Prairie Population (EPP) of Canada geese used Swan Lake NWR as their main wintering grounds until the late 1980s. In recent years, winter distribution of the EPP flock has shifted farther north, but thousands of geese still winter on the Refuge. Wintering waterfowl also attract bald eagles. The Refuge also provides habitat for thousands of migratory shorebirds and is designated as a regionally important site under the Western Hemisphere Shorebird Reserve Network. The shallow water wetlands and moist soil units on the Refuge provide critical habitat for many species of waterfowl, shore birds, and marsh birds; while the grasslands, forested wetlands, and farmland provide habitat for a variety of passerine birds. A complete list of bird species and a general guide to their seasonal occurrence and status on the Refuge can be found in Appendix A.

SECTION 3.4.2 Mammals

There are 46 mammals documented as occurring on the Refuge, from rare Indiana bats to common white-tailed deer. Seven mammal species are known to have occurred but have not been documented in recent years. A complete list of mammal species that occur on the Refuge can be found in Appendix A.

SECTION 3.4.3 Amphibians and Reptiles

A variety of salamanders, toads, turtles, lizards, frogs, and snakes inhabit the Refuge, including the Western massasauga rattlesnake, a Species of Concern in Missouri.

SECTION 3.4.4 Fish and Other Aquatic Species

A 2007 fisheries survey of Silver Lake found 15 species including white crappie, freshwater drum, flathead catfish, and short nose gar. Flood events dramatically affect the number and composition of the Silver Lake fishery. An earlier survey of Silver Lake conducted in 1996 identified 16 fish species, but only 9 of these were reported again in the 2007 survey. No fisheries surveys have been conducted on other Refuge waters.

SECTION 3.4.5 Invertebrates

No comprehensive survey of invertebrates has been completed on the Refuge, but 20 species of butterflies and 24 species of dragonflies are documented as occurring on the Refuge. A list of these species is included in Appendix A.

SECTION 3.4.6 Threatened and Endangered Species

SECTION 3.4.6.1 State-listed Species.

A number of species of concern in the state of Missouri are documented on the Refuge including: least bittern, common moorhen, western massasauga, and Franklin's ground squirrel.

SECTION 3.4.6 .2 Federally Listed Threatened/Endangered/Candidate Species

Two federally endangered species; the interior least tern and the Indiana bat, have been observed on the Refuge.

The presence of a reproductively active female Indiana bat was documented on the Refuge in 2003. There have been several additional sightings of bats roosting in dead and decaying trees in the bottomland forest around Yellow Creek. There are no documentations of Indiana bats hibernating on the Refuge and it is highly unlikely they do. The Northern Long-Eared Bat is a proposed species and has not been observed on Swan Lake NWR but has been observed in the region.

The interior least tern is an uncommon visitor to the Refuge during spring and early fall migration. It prefers habitats in or near wide and open river channels and nests in sandy or graveled beaches and sandbars with sparse vegetation. These types of habitats do not occur on Swan Lake NWR. Interior least terns have never been sighted on the Refuge during the open season dates for deer and goose hunting, including the Light Goose Conservation Order season.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter describes the anticipated environmental consequences of implementing management alternatives presented in Chapter 2. When detailed information is available, a scientific and analytic comparison between alternatives and their expected 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.

Section 4. A Alternative A: No action: continue the current hunting program.

Under Alternative A, the hunting program would remain as a managed goose hunt and up to three, two-day white-tailed deer hunts.

4. A 1. Direct and Indirect Impacts

4. A 1.1 Infrastructure

About 34,000 people visit Swan Lake National Wildlife Refuge each year. Since 2009 hunter visits annually represented less than one percent of total visits (see Table 7). Under Alternative A, the number of hunter visits is expected to remain similar to the past 5 years. The Refuge staff does not anticipate any significantly increased impact, maintenance costs, or wear on roads, trails and facilities from the small number of hunt visits.

Table 7: Hunting Visitor Trends at Swan Lake NWR Since 2005

Swan Lake NWR Visits								
Refuge Annual Performance Plan Measures	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
5.04 Total number of visitors	15,500	14,000	15,000	25,000	30,000	29,000	34,000	34,000
5.11 Waterfowl hunt visits	700	730	750	249	122	67	39	131
5.14 Big game hunt visits	125	100	100	100	121	130	104	99
5.15 Total hunting visits	825	830	850	349	243	197	143	230
Percent of total visits by hunters	***5.32%***	***5.93%***	***5.67%***	***1.40%***	***0.81%***	***0.68%***	***0.42%***	***0.68%***

Alternative A requires infrastructure to administer goose and deer hunting on the Refuge. This includes the use of the Hunting Headquarters building for morning goose hunt drawings and a check station and pre-hunt briefing area for managed deer hunts. Markers and signage identifying Hunting units are identified by markers and signage. Roads are maintained as part of the Auto Tour Route and additional access roads are maintained to some of the goose hunting

units. In the future, online drawings incorporating MDC hunt draw systems could reduce the amount of infrastructure necessary.

4. A 1.2 Habitats

Habitat disturbances would remain minimal, as they have been in the past. Habitats are managed in accordance with the CCP Objectives and future Habitat Management Plans.

Hunting access occurs during the fall and winter months, which is outside the growing season and reduces vegetation disturbance. By nature, hunting is a very dispersed activity, which reduces trampling and social trails. All vehicles are required to stay on maintained roadways which reduce soil and vegetation disturbances. Stands and other devices that damage trees, such as screw in steps, are prohibited.

Alternative A will allow Refuge staff to maintain populations within carrying capacity of Refuge habitats. Staff coordinates with the local MDC Big Game Biologist and adapt quotas based on population objectives.

Non-motorized boats are permitted on water on the Refuge during goose and deer hunts. This use is very minimal and only a few hunters use boats to access units surrounded by water of that are flooded. Any impacts by non-motorized boats will be insignificant.

4. A 1.3 Wildlife

The most significant direct impact to wildlife under this alternative will be short term reductions in Refuge populations of the hunted species (geese and white-tailed deer) and disturbances caused by hunt activities.

4. A 1.3.1 Geese.

Under Alternative A, the Refuge would continue harvesting geese on the Refuge. Up to 60,000 Canada geese and 800,000 snow geese stage on the Refuge during peak fall and spring migration periods. The Refuge goose hunting program harvest averaged 78 geese annually from 2006-2009. Because the goose hunt will not change under this alternative, harvest numbers are expected to remain similar to those that have occurred in the past.

An annual harvest of 78 geese could affect local nesting populations if most of the harvest was concentrated on birds raised on or in close vicinity to the Refuge. However, there is no evidence to suggest that local breeding geese are being harvested in any significant numbers. As well as direct mortality, hunt activities also provide a slight disturbance factor to geese utilizing the Refuge. To minimize this impact, regulations limit the days of hunting (4 per week), the number of hunting sites (19), the number of hunters per site (4), and the number of shotgun shells per hunter (25). To further reduce the disturbance factor, hunting sites adjacent to water are closed after 1:00 p.m. These regulations coupled with the large area of the Refuge that is closed to hunting (9,654 acres), insure that disturbances to geese (and other wildlife species) is kept far

below levels that could cause significant stress or reduce the value of the Refuge for resting and feeding activities.

4. A 1.3.2 Big Game

White-tailed deer are the only big game species hunted on the Refuge under Alternative A. In the 2013 Swan Lake NWR Deer Spotlight Survey Report, the estimated density was 26.7 deer/mi^2 on the Refuge, which is close to the goal density for MDC. Hunting is used as a management tool to keep the deer population at a sustainable level. Deer hunting as prescribed in all three alternatives will allow the Refuge Manager to manage refuge deer populations within the MDC management objectives of 15-25 deer/mi^2.

Deer and goose hunting as described under Alternative A will create some disturbances to deer populations. These disturbances should be minimal and at a tolerable level to deer populations. The deer hunts occur outside of the regular statewide firearms seasons. This allows deer to find sanctuary on private lands outside the Refuge during the managed Refuge hunts and vice versa during the statewide deer seasons. Goose hunting occurs on a small portion of the Refuge, which will allow deer to seek sanctuary in the interior parts of the Refuge.

4. A 1.3.3 Threatened and Endangered Species

Two Federally listed species have been documented on the Refuge. The interior least tern uses the Refuge as a migratory stop-over habitat, and the Indiana bat utilizes bottomland hardwoods around Yellow Creek as breeding and summer roosting habitat. The Northern Long-Eared Bat is a proposed species and has not been observed on Swan Lake NWR, but has been observed in the region. The potential impact of the hunting program on these species is significantly reduced by the late fall timing of the hunts. No significant adverse effects to these species are anticipated.

The Endangered Species Act (Act) directs all Federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the Act. Section 7 of the Act, called "Interagency Cooperation," ensures that Federal Agencies do not jeopardize the existence of any listed species. A complete Section 7 of the selected alternative will be completed for the Swan Lake NWR Hunt Plan prior to its final approval.

4. A 1.3.4 Other Wildlife

The largest negative impact to other wildlife species from Alternative A is the disturbance caused by hunt activities. Short term displacement of many species may occur as hunters travel through areas or discharge firearms. The population most vulnerable to this disturbance is the up to 350,000 ducks which stage on the Refuge during fall and spring migration periods.

The impacts of the disturbances to wildlife anticipated under Alternative A is moderated considerably by the low number of hunters, the timing of the hunts, specific Refuge regulations, and the large area of inviolate sanctuary provided during the goose seasons.

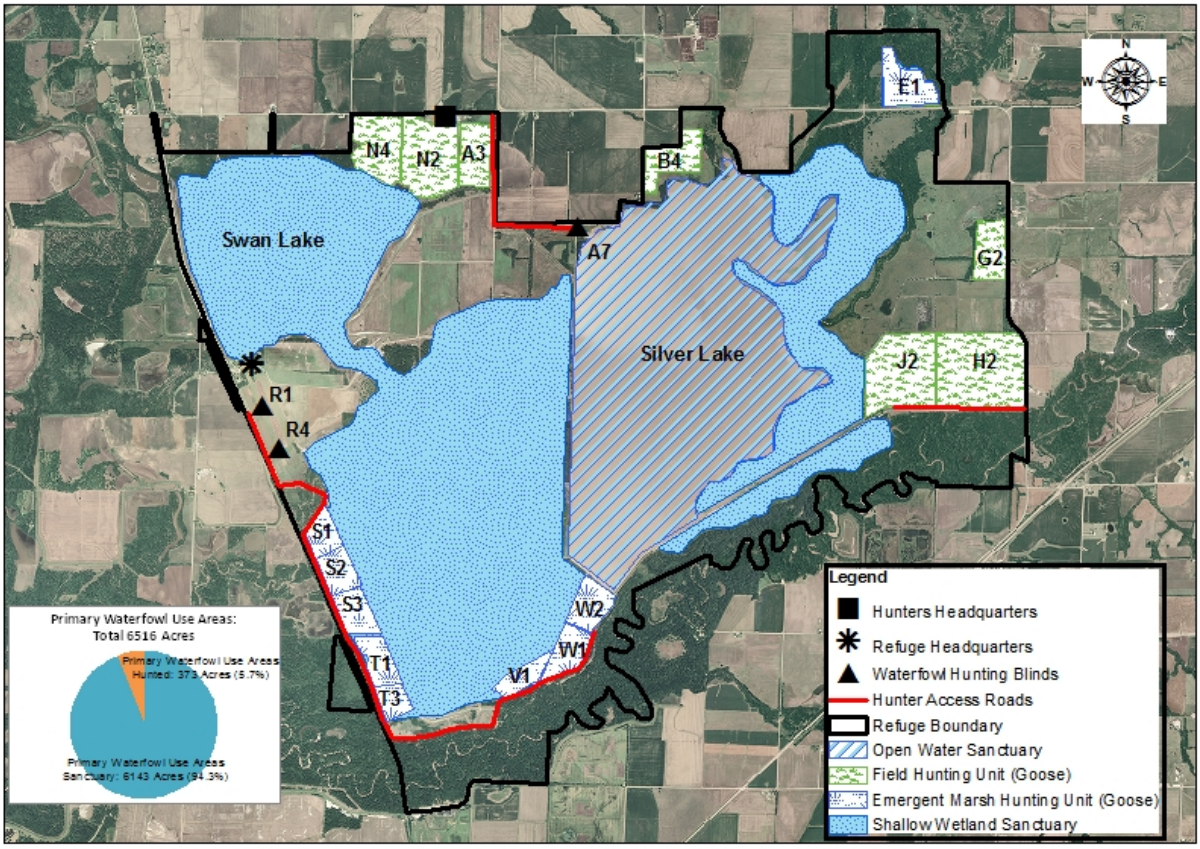

Figure 7: Sanctuary Areas and Goose Hunting Units for Alternative A

Since 2009, annual hunter visits have represented less than one percent of total Refuge visits and average about 200. Under Alternative A, the number of hunter visits is expected to remain similar to what they have been in the past.

The majority of hunting on the Refuge takes place in late fall and early winter. This is outside of the nesting and rearing season so any displacement caused by this activity will not cause significant impact for most species.

Waterfowl Sanctuary Areas

To minimize potential impacts of goose hunting on resting waterfowl sanctuary areas, regulations limit the number of hunting sites (19), the number of hunters per site (4), the number of shotgun shells per hunter (25), and the days of hunting (4 per week),. To further reduce the disturbance factor, hunting sites adjacent to water are closed after 1:00 p.m. These regulations, coupled with the large area of the Refuge that is closed to hunting (9,654 acres), ensure that disturbances to waterfowl sanctuary areas and other wildlife species is kept far below levels that could cause significant stress or reduce the value of the Refuge for resting and feeding activities.

As many as three separate, two-day white-tailed deer hunts may occur under this alternative. These hunts would take place over the entire 10,670 acres of the Refuge and some disturbance may occur to wildlife present. The level of disturbance will be directly related to total number of

hunters, which varies year to year based upon deer populations. In recent years, hunter numbers averaged around 100 and never exceeded 150. Some temporary displacement of wildlife may occur during the deer hunt, but because of the short two-day seasons, the small number of hunters, the large huntable area, and the tendency of hunters to disperse throughout the Refuge, no significant impact to any species is anticipated.

4. A 1.4 Historic Properties and Cultural Resources

There are no historic properties on Swan Lake NWR. This alternative will result in no significant ground disturbance or disturbance to standing structures, and it would have no effect on any historic properties.

4. A 1.5. Refuge Environment and Community

Under Alternative A hunters would continue to represent less than one percent of total annual visitation to the Refuge. Based on more than 60 years of hunt observations, Refuge personnel expect no significant adverse impacts on soils, vegetation, or natural hydrology. Impacts to the air quality, water quality, human health, and human safety are also anticipated to be negligible.

Given the large size of the Refuge, access restrictions, and the limited number of hunters, no impacts associated with solitude are expected from this alternative.

Expenditures by visitors for meals, lodging and transportation in the communities around the Refuge would remain similar to those that have occurred in the past.

There is a potential to have some minimal disturbance on the general public and nearby residents. The disturbance factor is considered minimal however, as similar hunting programs have been in place for over 60 years. The Refuge is located in a rural area which has a rich hunting tradition and many local landowners view the hunts as a positive occurrence because they increase hunting opportunities on surrounding lands and reduce crop depredations through reduction of the deer herd.

4. A 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 unique to minority or low-income populations in the affected area. The Proposed Action will not

disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low-income populations.

The Refuge Recreation Act of 1962 (16 U. 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 and fishing 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).

Objective 3-2 of the Refuge Comprehensive Conservation Plan states that the currently existing goose and white-tailed deer hunts will be maintained. It also provided for additional hunting opportunities for youth and persons with disabilities.

The hunting program under this alternative will allow users to continue to experience Refuge wildlife and habitats, and assist in maintenance of deer populations at an appropriate level.

4. A.2 Cumulative Impact Analysis

4. A 2.1 Cumulative Impact on Infrastructure

About 34,000 people visit Swan Lake National Wildlife Refuge each year. Since 2009, annual hunter visits have represented about 2.6% percent of total visits. Under Alternative A, the number of hunter visits is expected to remain similar to what they have been in the past. The Refuge staff does not anticipate any significantly increased impact, maintenance costs, or wear on roads, trails and facilities from the small number of hunt visits.

Some Refuge facilities used predominantly or exclusively by hunters require periodic maintenance and will need eventual replacement, including the building used for hunter orientations and check in. Markers and signage identifying hunting units and portable blinds for accessible hunts have to be installed and maintained.

4. A 2.2 Cumulative Impact on Habitats

Under Alternative A, all habitats would be managed in accordance with the CCP objectives, future Habitat Management Plans, and adaptations required in management to meet national, regional, state, and refuge habitat management objectives.

Hunter access is primarily during the fall and winter months, which is outside the growing season, making vegetative disturbances from foot traffic insignificant. Hunters are not allowed to cut shooting lanes, place nails or screw-in steps, or install blinds that damage trees. All vehicles are required to stay on maintained roadways which reduce soil and vegetation disturbances

Deer harvest is regulated through the number of hunting permits issued and is managed to maintain populations within the carrying capacity of the Refuge and surrounding area habitats. Management decisions are coordinated with the Missouri Department of Conservation (MDC) big game biologists. Crop depredation by refuge deer populations can cause significant damage to neighboring landowners, as well as to Refuge crops and other wildlife habitats.

As described above, direct impacts to Refuge habitats will be minor and short term in nature. The different type of impacts collectively will not cause negative impacts to refuge habitats due to the fact they are all minor impacts, dispersed over a large area, and infrequent. The Refuge will develop Habitat Management Plans based on Adaptive Management processes. Any unanticipated impacts should be identified and addressed through these future monitoring activities.

4. A 2.3 Cumulative Impact on Wildlife

Cumulative impacts to Refuge habitats under Alternative A would be minor and short term in nature, because of the seasonality, dispersed nature of the activity, and low numbers of participants. The different types of impacts collectively should not cause negative impacts to Refuge habitats .

4. A 2.3.1 Geese

Under Alternative A, the Refuge would continue harvesting geese on the Refuge.

There will be impacts to geese that utilize the Refuge for resting and feeding. This will include indirect disturbances caused by hunters and the direct harvest of geese by hunters. Under this Alternative, 90% of the Refuge is not hunted for migratory birds (see Figure 7), which leaves it as undisturbed area for geese to retreat from hunting pressure. The other disturbance can be caused by deer hunters. These disturbances are generally limited because deer hunts occur before most of the geese arrive at the Refuge and the number of hunters is controlled. The geese that are flushed will usually only flush for a short distance and the disturbance will be minimal.

Table 8: Swan Lake NWR Goose Harvest Data and Estimates (Alternative A)*

	# of Geese Harvested in 2012 Season	% of Total Nationwide Harvest	% of Total Flyway Harvest	% of Total Missouri State Harvest
Swan Lake	78	0.002%	0.008%	0.137%
Missouri	56,900	1.783%	5.575%	----------
Mississippi Flyway	1,020,700	31.985%	----------	----------
Total in US	3,191,200	----------	----------	----------

Federal Framework for Migratory Bird Hunting Seasons

The U.S. Fish and Wildlife Service annually prescribe frameworks, or outer limits, for dates and times when hunting may occur and the number of birds that may be taken and possessed. These frameworks are necessary to allow State selections of season and limits for recreation and sustenance to aid Federal, State, and tribal governments in the management of migratory game birds, and permit harvests at levels compatible with population status and habitat conditions. Because the Migratory Bird Treaty Act stipulates that all hunting seasons for migratory game birds are closed unless specifically opened by the Secretary of the Interior, the Service annually promulgates regulations (50 CFR Part 20) establishing the frameworks from which States may select season dates, bag limits, shooting hours, and other options for each migratory bird hunting season. The frameworks are essentially permissive in that hunting of migratory birds would not be permitted without them. Thus, in effect, Federal annual regulations both allow and limit the hunting of migratory birds.

Migratory game birds are those bird species designated in conventions between the United States and several foreign nations for protection and management. Migratory game birds that are affected by this alternative are discussed in Section 4.2.2. 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 consideration of "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 an associated Flyway Council; a formal organization generally composed of one member from each State and Province located within that flyway. Swan Lake NWR is within 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, administrative, and biological. 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. Bird monitoring data are available through the Service's Division of Migratory Bird Management Website http://www.fws.gov/migratorybirds/.

Because the Service is required to take abundance of migratory birds and other factors into 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 frameworks for each species. 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 are considered. 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. This process will be utilized to monitor cumulative impacts of hunted migratory birds in all four alternatives.

NEPA considerations by the Service for hunted migratory game bird species are addressed by the programmatic document, “Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds (FSES 88-14)," filed with the Environmental Protection Agency on June 9, 1988. Notice of Availability was published in the Federal Register on June 16, 1988 (53 FR 22582), and a Record of Decision on August 18, 1988 (53 FR 31341). Annual NEPA considerations for waterfowl hunting frameworks are covered under a separate Environmental Assessment, "Duck Hunting Regulations for 2006-07," and an August 24, 2006, Finding of No Significant Impact. Further, in a notice published in the September 8, 2005, Federal Register (70 FR53376), the Service announced its intent to develop a new Supplemental Environmental Impact Statement for the migratory bird hunting program.

Public scoping meetings were held in the spring of 2006, as announced in a March 9, 2006, Federal Register notice (71 FR 12216). More information may be obtained from: Chief, Division of Migratory Bird Management., U.S. Fish and Wildlife Service, Department of the Interior, MS MBSP-4107-ARLSQ, 1849 C Street, NWR, Washington, DC 20240.

4. A 2.3.2 Cumulative Impact on Big Game

Any cumulative impacts will contribute to the overall management of a healthy deer population on a local, regional, and state level in accordance with MDC deer population objectives. Deer harvest numbers over the five year period from 2009-2013 averaged 27.2 deer harvested per year on the Refuge. According to MDC records (http://mdc.mo.gov/hunting-trapping/reports/deer-reports/deer-harvest-map), on average there were 2,322 deer harvested in Chariton County and 287,438 deer harvested in Missouri during that same period (see Table 9).

Table 9: Swan Lake NWR Deer Harvest Data and Estimates (Alternatives A)

	Estimated # of Deer to be Harvested	% of Total Statewide Harvest	% of Total County Harvest
Swan Lake Estimate for Alternative A	27.2	0.009%	1.171%
Chariton County	2,322	0.808%	----------
Missouri Statewide	287,438	----------	----------

Deer harvested on the Refuge represent less than 1% of the total harvest in Chariton County. The Refuge harvest contributes to harvest objectives for the overall deer herd management, especially on a local level. All hunters who harvest deer on the Refuge are required to check in their deer harvest numbers with MDC. This allows MDC to calculate deer harvest numbers with county and statewide harvest numbers and to set future harvest limits. The Refuge also conducts annual spotlight surveys to determine deer densities on and around the Refuge. This data is used in consultation with MDC Big Game Biologist to set harvest quotas on the Refuge hunts to sustain a healthy deer population.

4. A 2.3.3 Cumulative Impact on Threatened and Endangered Species

All impacts from deer and goose hunting to endangered and threatened species will be extremely rare as these hunting activities occur when Indiana bat, northern long-eared bat, and interior least tern have migrated out of the area. Any cumulative impacts over the short term or long term to any endangered or threatened species on the Refuge will be insignificant.

4. A 2.3.4 Cumulative Impact on Other Wildlife

Waterfowl that utilize the Refuge are often the most sensitive during the hunting season. Most of the Refuge will remain closed to hunting and provide sanctuary for duck, teal, coot, goose, and dove, as well as other species. Access routes to and from hunting units are carefully designated to ensure that hunters do not cause disturbances to designated sanctuary areas on the Refuge.

4. A 2.4 Cumulative Impact on Historic Properties and Cultural Resources

There are no historic properties located on Swan Lake NWR, therefore impacts from goose and deer hunting are expected to have no negative effects to historic properties and cultural resource on the Refuge under this alternative.

4. A 2.5 Cumulative Impact on Refuge Environment and Community

The No Action alternative will have little if any 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 grassland communities.

This alternative may have impacts on hunting opportunities in the local area. Most landowners with hunting opportunities in the area restrict access to hunting through leasing practices. This increases the importance of public land for those that do not have an ability to own or lease property with viable hunting opportunities.

4. A 2.6 Cumulative Impact on Other Past, Present, Proposed, and Reasonably Foreseeable Hunts and Anticipated Impacts

This alternative would not expand past hunting opportunities; therefore there would be no anticipated impacts from this alternative.

4. A 2.7 Cumulative Impact on 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 unique to minority or low-income populations in the affected area. The Proposed Action will not disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low-income populations.

The Refuge Recreation Act of 1962 (16 U. 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 and fishing 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).

Objective 3-2 of the Refuge Comprehensive Conservation Plan states that the currently existing goose and white-tailed deer hunts will be maintained. It also provided for additional hunting opportunities for youth and persons with disabilities

The hunting program under this alternative will allow users to continue to experience Refuge wildlife and habitats, and assist in maintenance of deer populations at an appropriate level.

Section 4. B Alternative B: Limited expansion of hunting opportunities – allow waterfowl, mourning dove, white-tailed deer, and squirrel hunting on selected Refuge areas, open the Yellow Creek Triangle to statewide regulations consistent with Yellow Creek Conservation Area and the Outlying Units to hunting under state regulations

Alternative B would expand the hunting program to include waterfowl, dove, and squirrel hunting on the Refuge. The Yellow Creek Triangle, which is the small tract of Refuge property located between the railroad right-of-way and the Yellow Creek Conservation Area will be opened to hunting consistent with the Yellow Creek Conservation Area regulations (Figure 3: Alternative B hunting Map). Alternative B would also open the four Outlying Units to statewide Missouri hunting seasons and regulations.

4. B 1. Direct and Indirect Impacts

4. B 1.1 Infrastructure

Alternative B will have more impact on Refuge infrastructure due to increased hunting visits. On average, from 2008-2012 hunters were about 2.6% of the total visitors for the Refuge. We anticipate that to increase about 5-6% under Alternative B (See Table 10 for a summary). These impacts will be to the hunter check station, restrooms, waterfowl hunting blinds, and roads. We anticipate impact to infrastructure to require an additional 2-3 days of maintenance each year. Yellow Creek Triangle access will only be through state-managed lands, so impact should be minimal. Some Outlying Units have existing primitive parking areas and other may require some construction. Parking lots are typically grassy areas with no investment in surface materials such as gravel or asphalt.

Table 10. Number of Increased Hunting Visits Associated with Alternative B by Type of Visit.

Visit Type	Estimated # of Visits[a]	% Total Visits
Squirrel Hunting	20-40	.06% - .11%
Yellow Creek Triangle	100-200	.29% - .58%
Teal/Dove	150-250	.44% - .74%
Waterfowl	1,200-1,400	3.53% - 4.12%
Outlying Units (per unit)	20-100	.06% - .29%
Additional Hunting Visits	1,550-2,290	4.5% - 6.7%
Total Refuge Visits	34,000	100%

[a] Estimates based upon hunter visits to nearby MDC managed Conservation Areas.

4. B 1.2 Habitats

Alternative B will have more impact upon Refuge habitats due to increased hunting visits. There will be increased foot traffic in the bottomland forest area that will be opened to squirrel hunting under this alternative, but the traffic will be minimal and dispersed and disturbances insignificant.

Due to the early teal and dove seasons (September) there will be disturbances to habitat earlier in the fall under Alternative B. Early fall disturbances will not be significant; as the growing season has passed and hunters will be limited to specific areas on the Refuge (see Figure 3). Dove hunters could impact Refuge agricultural crops that provide food for migratory birds. Because of the short duration, small number of hunters, and access by foot only disturbance to crops will be minimal.

Alternative B will create more disturbances to Refuge habitats through increased usage by waterfowl hunters. Based on estimates from managed waterfowl hunting at Fountain Grove State Conservation Area, which is located near Swan Lake NWR, an additional 1,200-1,400 uses are expected. Disturbances to habitat during the waterfowl hunting will not be significant though because the growing season has passed, access to units will be restricted to foot traffic only, and hunters will not be allowed to cut vegetation.

Alternative B will create more disturbances to the habitats of the Outlying Units. These additional disturbances will be insignificant due to the existing habitat conditions and quality. MDC Conservation agents estimate that 20-100 hunters will use each Outlying Unit.

4. B 1.3 Wildlife

Alternative B will expand hunting opportunities on the Refuge, Yellow Creek Triangle, and Outlying Units, which will create more disturbances to wildlife. Limiting the number of hunters and timing of hunts should be considered in the development of a Hunting Plan to help minimize disturbances from the expansion of waterfowl hunting opportunities on the Refuge, which will account for roughly 70% of increased uses.

Ducks, doves, and squirrels occur on the Refuge, and other game species occur on the Outlying Units. Under this alternative the Refuge will be contribute to the management of these species in accordance with state, regional, and national objectives. By providing hunting opportunities for additional species the Refuge will be consistent with the MDC management objectives for those game species on regional and statewide levels.

4. B 1.3.1 Geese and Waterfowl

Alternative B would result in a harvest of waterfowl and geese on the Refuge, Yellow Creek Triangle, and Outlying Units. In this EA, all harvest estimates include teal, coots, mergansers, and ducks as waterfowl. The Refuge would contribute to the overall harvest of waterfowl and geese according to state, regional, and national harvest objectives.

Additional hunting season may lead to increased migratory bird disturbance. Disturbances will be minimized by limiting days, hours and numbers of hunters. The interior of the Refuge will remain as inviolate sanctuary, leaving approximately 90% of the Refuge undisturbed during migration periods. All access roads to the hunting units will be located to minimize disturbances to sanctuary areas from hunters.

Waterfowl and goose disturbance are limited during managed deer hunts because of the short duration and limited number of hunters. Most deer hunters avoid wet areas, which limits disturbances to waterfowl and geese. Previous hunts have had limited impacts to waterfowl and geese.

The managed archery hunt will take place on the east side of the refuge, away from wetlands, and will occur before peak migration periods.

4. B 1.3.2 Mourning Dove

Alternative B would result in a harvest of mourning dove on the Refuge, Yellow Creek Triangle, and Outlying Units. The Refuge would contribute to state, regional, and national harvest objectives of mourning dove.

Mourning dove populations will not experience a significant increase in mortality, because adjacent lands to these areas are already open to mourning dove hunting. Though more hunters will have access, it is not expected to be a significant harvest increase for the area.

4. B 1.3.3 Small Game

Alternative B would result in the harvest of squirrels on the Refuge, and other small game on the Yellow Creek Triangle, according to Yellow Creek Conservation Area Regulations, and Outlying Units, according to State regulations. Some raccoon harvest is anticipated on the Yellow Creek Triangle and Outlying Units, for example. These regulations are set based upon the biological data provided by MDC small game biologist. Small game populations on the Refuge are dynamic with those off the Refuge and should be managed consistently. Alternative

B will allow refuge management to be consistent with MDC management objectives for small game species.

4. B 1.3.4 Big Game

Most impacts to deer populations on the Refuge in this alternative are common to Alternative A, which were previously discussed in Section 4. A1.3.2. This alternative would add a managed archery hunt on the east side of the refuge. This additional hunt will be factored with the other managed hunts, to keep harvest numbers within population objectives.

Alternative B would result in harvest of deer on the Yellow Creek Triangle and Outlying Units in accordance with state regulations. These regulations are based upon the biological data provided by MDC big game biologists. Since white-tailed deer populations are interdependent with those off of Refuge properties, this will allow the Refuge's management to be consistent with MDC management objectives.

Wild turkey would be harvested from the Outlying Units and the Yellow Creek Triangle in accordance with state regulations set by MDC. The state regulations for turkey harvest are based upon biological data provided by MDC big game biologists, and the Refuge's management would be consistent with MDC management objectives for turkey.

4. B 1.3.5 Threatened and Endangered Species

Alternative B will open the bottomland forest along Yellow Creek to squirrel hunting and the Yellow Creek Triangle Unit to hunting migratory bird, upland game, and big game according to state regulations. Bottomland forest is habitat for Indiana and northern long-eared bats during the summer breeding season when squirrel season is open. However, the greatest threat to these bats is during hibernation and no hibernacula are located on the refuge. In addition, hunting is only open during daylight hours when bats are inactive. Hunting already occurs on the adjacent Yellow Creek Conservation Area in accordance with State Regulations and by making the Yellow Creek Triangle Unit consistent with these regulations it will have no additional impact on either bat species.

Under Alternative B there will be early teal season, which usually occurs around the middle two weeks of September. Interior least terns could be present on the Refuge during this time, though their occurrence is considered rare. The potential for being misidentified as a teal is unlikely as their differences in size, shape, flight patterns, and color are very distinctive. Any disturbances caused by hunters will be minimal because only 10% of refuge wetlands will be open

Threatened or endangered species have not been documented in the Outlying Units. There are no anticipated impacts on threatened and endangered species on those units.

A Section 7 Evaluation will be completed before the plan gets final approval.

4. B 1 3.6 Other Wildlife

The largest impacts to other wildlife species from this alternative on the Refuge, Yellow Creak Triangle, and Outlying Units are the disturbances caused by hunt activities. Short term displacement may occur as hunters travel through or discharge firearms in areas inhabited by wildlife.

The impacts of the disturbances to wildlife anticipated under Alternative B is moderated by the limited number of hunters, the timing of the hunts, specific Refuge regulations, and the large area of inviolate sanctuary closed to hunting on the Refuge.

The majority of hunting on the Refuge, Yellow Creek Triangle, and Outlying Units takes place in late fall and early winter. This is outside of the nesting and rearing season of most species, so any displacement caused by this activity will not cause significant impact for most species.

To minimize these potential impacts Refuge regulations limit the number of waterfowl hunting sites (19), the number of hunters per site (4), the number of shells per hunter (25), and the days of hunting (4 per week). To further reduce the disturbance factor, hunting sites adjacent to water are closed after 1:00 P.M. These regulations coupled with the large area of the Refuge that is closed to hunting (9,654 acres) insure that disturbances to waterfowl and other wildlife species is kept far below levels that could cause significant stress or reduce the value of the Refuge for resting and feeding activities.

As many as three separate, two-day managed white-tailed deer hunts and one managed archery white-tailed deer hunt may occur under this alternative. The two-day managed hunts would take place over the entire 10,670 acres of the Refuge and some disturbance may occur to all wildlife present. The level of disturbance will be directly related to the total number of hunters, which will vary from year to year based upon deer populations. In the past, the number of hunters has averaged around 100 and has never caused significant disruptions to wildlife utilizing the refuge.

4. B 1.4 Historic Properties and Cultural Resources

This alternative will result in no significant ground disturbance or disturbance to standing structures. If any major ground disturbances or structural disturbances were to become necessary to carry out this hunting program a Review with the Regional Cultural Resources Officer would occur beforehand.

4. B 1.5 Refuge Environment and Community

Under this alternative, the number of hunters that would visit the Refuge and the outlying areas on an annual basis would increase by roughly 1550-2290. Despite the increase in Refuge traffic and visitation, Refuge personnel expect no significant adverse impacts on soils, vegetation, or natural hydrology. Vehicles will be kept to established roadways and parking lots. Most travel will be by foot. The use will be dispersed and will mostly occur outside the growing season. Impacts to the air quality, water quality, human health, and human safety are not expected.

Foot traffic in the Yellow Creek Triangle area may increase, but it would be insignificant due the timing (after growing season) and location (areas specified by the Refuge). I may lead to increased maintenance in the future.

Given the large size of the Refuge, access restrictions, and the limited number of hunters, minimal impacts associated with solitude are expected from this alternative. The surrounding private and public lands are also hunted and the community encourages the sport, so any hunting disturbance is likely to be neutral or positive.

Expenditures by visitors for meals, lodging and transportation in the communities around the Refuge would remain similar to those that have occurred in the past. There may be increases because of the increase in hunter visitation.

There is a potential to have some minimal disturbance on the general public and nearby residents, especially since some seasons (e.g. squirrel) will overlap with typical visitor use seasons. The disturbance factor is considered minimal because hunting will be located in areas not frequented by typical visitors. Additionally, the highest increased use associated with Alternative B, duck hunting, will occur when the interior of the Refuge is closed to visitors besides hunters. The Refuge is located in a rural area with a rich hunting tradition and many in the local community view hunts, and waterfowl hunting in particular, as a positive occurrence.

4. B 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 unique to minority or low-income populations in the affected area. The Proposed Action will not disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low-income populations.

The Refuge Recreation Act of 1962 (16 U. 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 and fishing 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).

Objective 3-2 of the Refuge Comprehensive Conservation Plan states that the currently existing goose and white-tailed deer hunts will be maintained and additional hunting programs which emphasize opportunities for youth and persons with disabilities would be proposed within two years.

The maintenance and increase of the hunting program under this alternative will allow public user groups to continue to experience Refuge wildlife and habitats, promote and facilitate appreciation of Refuge and Service goals and objectives, and assist in maintenance of deer populations at an appropriate level.

4. B.2 Cumulative Impact Analysis

4. B 2.1 Cumulative Impact on Infrastructure

Impacts to Refuge infrastructure from additional hunt visits will result in more maintenance of Refuge facilities, especially roads and parking lots. This could potentially add more cost to the Refuge maintenance program. The Refuge estimates 3 additional staff days per year for road maintenance under Alternative B. Since the number of hunters is controlled in most Alternative B hunts, impacts could be minimized with new hunter limits or by developing a fee system.

Some Refuge facilities used predominantly or exclusively by hunters require periodic maintenance and will need eventual replacement, including the building used for hunter orientations and check in. Markers and signage identifying hunting units and portable blinds for accessible hunts have to be installed and maintained.

4. B 2.2 Cumulative Impact on Habitats

Under Alternative B, all habitats would be managed in accordance with the CCP objectives, future Habitat Management Plans, and adaptations required in management to meet national, regional, state, and Refuge habitat management objectives.

Hunter access is primarily during the fall and winter months, which is outside the growing season, making vegetative disturbances from foot traffic insignificant. Hunters are not allowed to cut shooting lanes, place nails or screw-in steps, or install blinds that damage trees. All vehicles are required to stay on maintained roadways which reduce soil and vegetation disturbances

Deer, small game, and migratory bird harvest are regulated through the number of hunting permits issued, season lenghts, and bag limits. Through these means, these populations are managed to remain within the carrying capacity of the Refuge, Yellow Creek Triangle area, Outlying Units, and surrounding area habitats. Management decisions are coordinated with the Missouri Department of Conservation (MDC). Crop depredation by Refuge, Yellow Creek Triangle, and Outlying Unit deer populations can cause significant damage to neighboring landowners, as well as to Refuge crops and other wildlife habitats.

As described above, direct impacts to Refuge habitats will be minor and short term in nature. The different type of impacts collectively will not cause negative impacts to Refuge habitats due to the fact they are all minor impacts, dispersed over a large area, and infrequent. The Refuge will develop Habitat Management Plans based on Adaptive Management processes. Any unanticipated impacts should be identified and addressed through these future monitoring activities.

4. B 2.3 Cumulative Impact on Wildlife

Any harvested game species on the Refuge are documented through various reporting methods such as MDC green cards (waterfowl and geese), MDC orange cards (dove), the HIP program, the state tele-check and internet checking system, and small game harvest surveys. This data is then utilized along with various wildlife population survey data to set season bag limits and other regulations. Therefore cumulative impacts to wildlife will be accounted for through these monitoring processes as explained in the sections that follow.

4. B 2.3.1 Cumulative Impact on Geese and Waterfowl

Waterfowl that utilize the Refuge are often the most sensitive wildlife species present during the hunting season. Approximately 130,000 waterfowl, 60,000 Canada geese, and 800,000 snow geese can stage on the Refuge during the fall and spring migration periods at peak times depending on weather patterns and habitat conditions.

There would be an estimated 1,368 waterfowl hunt visits to the Refuge under Alternative B. According to harvest data at nearby Fountain Grove Conservation Area, waterfowl hunters averaged a take of 1.89 waterfowl per visit (including ducks and geese). Based upon an estimated 1,368 hunt visits per year that average will result in a harvest of 2,585 waterfowl on the Refuge under Alternative B. In 2012, there were 445,000 waterfowl harvested in Missouri, 7,522,700 waterfowl harvested in the Mississippi Flyway, and 15,704,500 waterfowl harvested in the continental US (Raftovich et al., 2013).

Table 11: Swan Lake NWR Waterfowl (Including Ducks & Geese) Harvest Data and Estimates (Alternative B)

	# of Waterfowl Harvested During the 2012 Hunting Season	% of Total Nationwide Harvest	% of Total Flyway Harvest	% of Total Missouri State Harvest
Swan Lake Estimate for Alternative B	2,585	0.016%	0.03%	0.580%
Missouri	445,000	2.832%	5.915%	----------
Mississippi Flyway	7,522,700	47.902%	----------	----------
Total in US	15,704,500	----------	----------	----------

The harvest on the Refuge will be a small amount compared to the statewide harvest (see Table 11). Any cumulative impacts from waterfowl harvested on the Refuge are taken into consideration through the Adaptive Harvest Management program which takes data from nationwide and state harvests and compares it to Breeding Bird Surveys and other population surveys to help set future seasons and bag limits on a federal level as explained previously in Section 4.A2.3.1. The refuge waterfowl hunters will be required to turn in MDC harvest data green cards. Any cumulative impacts from waterfowl harvested on the Refuge will be accounted for in state and national harvest data utilized to determine future seasons and bag limits.

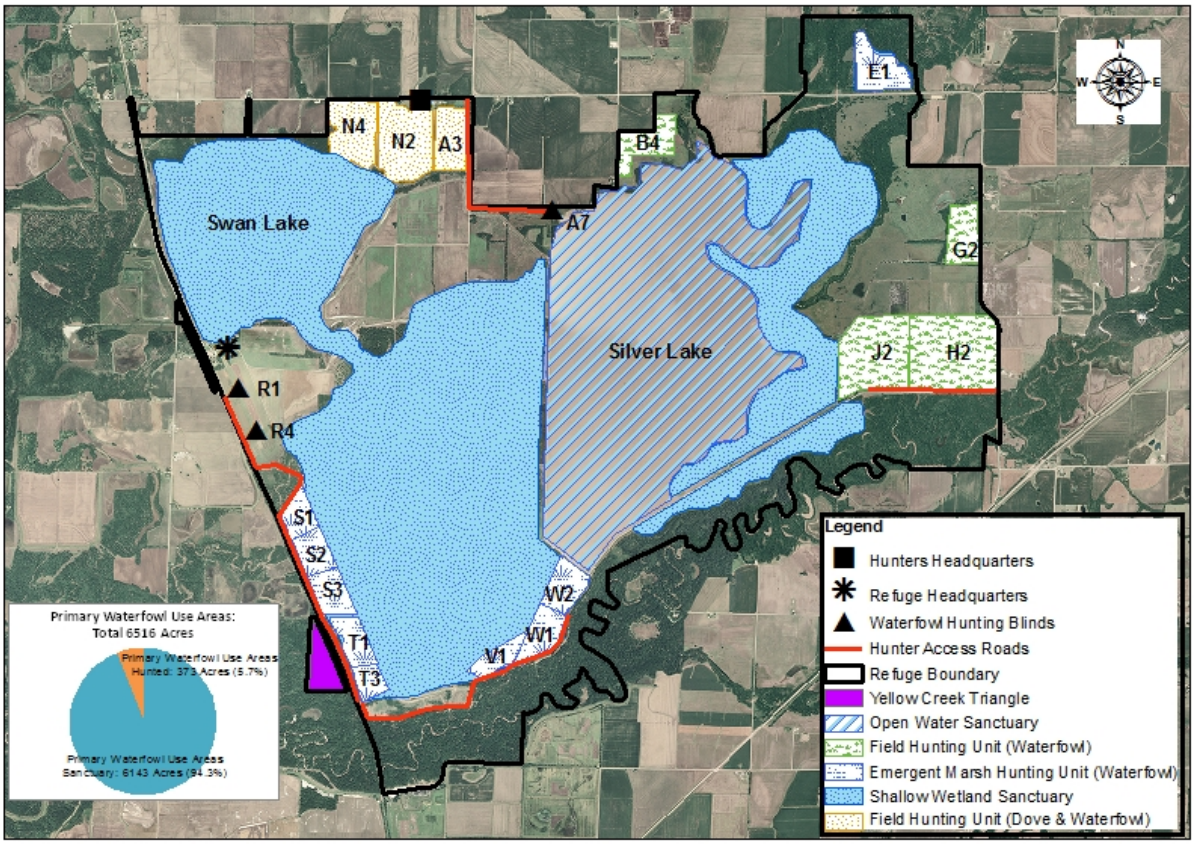

Figure 8: Swan Lake NWR Primary Waterfowl Use Areas and Hunting Units (Alternative B)

There would be no additional harvest of geese under Alternative B over what is harvested in Alternative A.

Other potential cumulative impacts from migratory bird hunting are the use of lead shot and lead poisoning to migratory birds. The hunting plan should require all hunters utilizing shot guns for small game, waterfowl, and dove hunting to utilize non-toxic shot.

Waterfowl Sanctuary Areas

To minimize potential impacts of waterfowl and goose hunting on waterfowl sanctuary areas, regulations limit the number of hunting sites (19), the number of hunters per site (4), the number of shotgun shells per hunter (25), and the days of hunting (4 per week). To further reduce the disturbance factor, hunting sites adjacent to water will be closed after 1:00 P.M. These

regulations coupled with the large area of the Refuge that will be closed to hunting (9,654 acres) ensure that disturbances to waterfowl sanctuary areas and other wildlife species will be kept far below levels that could cause significant stress or reduce the value of the Refuge for resting and feeding activities. Access roads to hunting units will be located away from waterfowl sanctuary areas to prevent disturbances to those areas from hunters accessing the hunting units.

Waterfowl counts are conducted on refuge wetlands every 2-3 weeks throughout the year and every 1-2 weeks during peak migration periods. These counts are conducted for each unit, which allows the refuge staff to monitor waterfowl use on the different wetland units throughout the Refuge. This information provides valuable monitoring information on waterfowl use, which will be useful for monitoring the impacts of hunting on waterfowl use on refuge wetlands and sanctuary areas.

4. B 2.3.2 Cumulative Impact on Mourning Dove

There are an estimated 150 mourning dove hunt visits to the Refuge under Alternative B. Mourning dove hunters during the 2012 dove hunting season that reported mourning dove harvest for the Report averaged 12.4 mourning doves harvested per hunter (Schulz et al., 2009). This average would result in roughly 375-450 mourning doves harvested on the Refuge under Alternative B. According to a report by MDC in 2012 there were 28,516 mourning doves harvested on roughly 2,172 acres comprising more than 260 managed shooting fields in 2012; these estimates are from 10 managed areas where mourning dove harvest was reported. In 2012, there were 296,600 mourning doves harvested in Missouri, 6,361,600 mourning doves harvested in the Central Management Unit, and 14,490,900 mourning doves harvested in the continental US (Raftovich et al., 2013).

Table 12: Swan Lake NWR Dove Harvest Data and Estimates (Alternative B)

	Estimated # of Dove to be Harvested	% of Total Nationwide Harvest	% of Total Central Unit Harvest	% of Total Missouri State Harvest
Swan Lake Estimate for Alternative B	450	0.003%	0.007%	0.152%
Missouri	296,600	2.047%	4.662%	----------
Central Management Unit	6,361,600	43.901%	----------	----------
Total in US	14,490,900	----------	----------	----------

Harvest on the Refuge will be a small take compared to the statewide harvest and harvest from other public lands open to mourning dove hunting (see Table 12). Any cumulative impacts from mourning doves harvested on the Refuge will be taken into consideration under protocols outlined in the Central Management Unit (CMU) Interim Harvest Management Strategies (Seamans et al., 2011). The Strategy provides individual states one of three hunting season options based on a composite trend of four different data streams; the North American Breeding Bird Surveys, National Dove Call Count Surveys (CCS) of birds heard CCS and birds seen CCS,

and populations estimates using banding data. The Refuge mourning dove season length and daily bag limits will follow statewide regulations outlined in the strategy, and the hunting season on the Refuge will be evaluated by including it in the mourning dove harvest monitoring program conducted annually by MDC. Hunters will be required to complete a MDC daily tag (orange cards) for reporting the number of doves killed, shots fired, hours hunted, and birds shot but not retrieved. Any cumulative impacts from dove harvested on the Refuge will be easily accounted for in this process.

4. B 2.3.3 Cumulative Impact on Small Game

As long as small game populations are hunted in accordance with state regulations, any cumulative impacts on those populations will be accounted for through adaptive harvest management. MDC manages statewide populations of small game species and monitors those populations. MDC collects harvest data of small game species from hunters on an annual basis through Small Game Harvest Surveys. Any cumulative impacts from small game hunting on Refuge lands would be accounted for in these annual surveys. This information would then roll up into statewide data utilized to determine small game hunting seasons and bag limits in Missouri. Alternative B would allow the Refuge to contribute to the overall management of these small game species through adaptive harvest management.

Table provides harvest data for small game species in Missouri for the 2012-2013 hunting season, which is the most recent survey (Reitz, 2013). It also provides estimates of small game species taken under Alternative B. Any take of small game species on the Refuge or Outlying properties will be insignificant portion to the statewide harvest data.

Table 13: Missouri Statewide Small Game Harvest Data and Swan Lake Harvest Estimates (Alternative B)

Species	Statewide Success Rates/ Hunter Visit 2012/13	Swan Lake Refuge Harvest Estimate		Outlying Units/YCT Harvest Estimate		Swan Lake Refuge and Outlying Units Total Harvest Estimate (% of Statewide Harvest)	Statewide Harvest 2012/13
		Estimated Hunter Visits	Total Harvest	Estimated Hunter Visits	Total Harvest		
Rabbit	1.1	0	0	16	18	18(.006%)	294,867
Squirrel	1.5	40	60	30	45	105(.012%)	807,979
Quail	1.4	0	0	8	11	11(.011%)	100,894
Pheasant	0.9	0	0	2	2	2(.010%)	19,748
Woodcock	0.7	0	0	0	0	0(0%)	2,676
Crow	3.0	0	0	3	9	9(.011%)	81,991
Groundhog	1.0	0	0	3	3	3(.015%)	20,546
Raccoon	0.8	4	3	5	4	7(.004%)	191,217
Gray Fox	0.2	0	0	2	1	1(.009%)	10,501
Red Fox	0.2	0	0	2	1	1(.006%)	16,778
Snipe	.5	3	1	4	2	3 (.37%)	800
Rail	2.0	3	6	3	6	12 (1.09%)	1,100
Coyote	0.3	0	0	2	1	1(.00003%)	295,318
Bobcat	0.05	0	0	2	1	1(.035%)	2,823
Opossum	0.5	0	0	2	1	1(.003%)	36,549
Badger	0.1	0	0	2	0	0(0%)	62
Striped Skunk	0.1	0	0	2	1	1(.221%)	451
Bull Frog/Green Frog	NA[a]	0	0	10-50[b]	20-200[b]	NA	NA

**Total Harvest is determined by Estimated Hunter Visits x Success Rate per Hunter Visit*

**Numbers of furbearer hunting are estimated low to none since access to the Refuge and Outlying Units is prohibited after dark when most of these species are harvested.*

**Estimated hunter visits are based upon common uses at area public lands such as Yellow Creek Conservation Area, Fountain Grove Conservation Area, and Grand Pass Conservation Area.*

[a] *There is no data for frog harvest rates.*

[b] *Estimated hunter visits and harvest ranges are based upon hunters that are expected to use the areas. The number of people that hunt frogs is very small and the population of Bull Frogs and Green Frogs is high enough that any take is insignificant to the frog populations.*

4. B 2.3.4 Cumulative Impact on Big Game

Cumulative impacts on white-tailed deer from Alternative B will be common to those in Alternative A and were summarized in Section 4.A1.3.2 of this EA. The additional managed archery hunt will not result in the harvest of any additional deer as the number of hunters will be factored into the total hunters of all managed deer hunts. There will be deer harvest allowed on Outlying Units under this alternative. Due to statewide management of deer populations, these impacts would be limited over time and provide an impact to the overall management of Missouri deer populations.

Table 114: Estimated white-tailed deer Harvest Alternative B

	Estimated # of Deer to be Harvested	**% of Total Statewide Harvest**	**% of Total County Harvest**
Swan Lake Estimate for Alternative B (Refuge)	73	0.060%	2.453%
Chariton County	2,976	2.465%	----------
Estimate for Outlying Units	95	0.079%	3.19%*
Missouri Statewide	120,731	----------	----------
*Cumulative of all 5 counties where the outlying units are located including Chariton, St. Clair, Henry, Cedar, and Bates			

Under this alternative, turkeys will be harvested on Refuge Outlying Units and the Yellow Creek Triangle, but these harvest impacts would be limited because they will be in accordance with state regulations and MDC harvest numbers. Hunting on these units will provide an impact to the overall management of the wild turkey population of Missouri.

Table 15: Estimated Turkey Harvest Alternative B

	Estimated # of Turkeys to be Harvested	**% of Total Statewide Harvest**	**% of Total County Harvest**
Estimate for Outlying Units for Alternative B	5	0.009%	1.458%*
Chariton County	343	0.607%	----------
Missouri Statewide	56,481	----------	----------
*Cumulative of all 5 counties where the outlying units are located including Chariton, St. Clair, Henry, Cedar, and Bates			

4. B 2.3.5 Cumulative Impact on Threatened and Endangered Species

All impacts from hunting under Alternative B to endangered and threatened species will be extremely rare as these hunting activities primarily occur when Indiana and northern long-eared bat and interior least tern have migrated out of the area. Upon the approval of this EA, a Section 7 Consultation will be conducted with USFWS Ecological Services. During this process any impacts will be identified and if necessary adjustments will be made. Through initial verbal consultations with the Ecological Services Office we do not anticipate any cumulative impacts with Alternative B regarding Threatened and Endangered Species.

4. B 2.3.6 Cumulative Impact on Other Wildlife

The largest impact to other wildlife species from this alternative is the disturbances caused by hunt activities. Short term displacement of many species may occur as hunters travel through areas inhabited by wildlife or when they discharge firearms.

The impacts of the disturbances to wildlife anticipated under Alternative B is moderated by the limited number of hunters, the timing of the hunts, specific Refuge regulations, and the large area of inviolate sanctuary closed to hunting.

The majority of hunting on the Refuge takes place in late fall and early winter. This is outside of the nesting and rearing season so any displacement caused by this activity will not cause significant impact for most species.

To minimize these potential impacts Refuge regulations limit the number of hunting sites (19), the number of hunters per site (4), the number of shells per hunter (25), and the days of hunting (4 per week). To further reduce the disturbance factor, hunting sites adjacent to water are closed after 1:00 P.M. These regulations coupled with the large area of the Refuge that is closed to hunting (9,654 acres) insure that disturbances to waterfowl and other wildlife species is kept far below levels that could cause significant stress or reduce the value of the Refuge for resting and feeding activities.

As many as three separate, two-day managed white-tailed deer hunts and one managed archery white-tailed deer hunt may occur under this alternative. The two-day managed hunts would take place over the entire 10,670 acres of the Refuge and some disturbance may occur to all wildlife present. The level of disturbance will be directly related to the total number of hunters, which will vary from year to year based upon deer populations. In the past, the number of hunters has averaged around 100 and has never caused significant disruptions to wildlife utilizing the refuge.

4. B 2.4 Cumulative Impact on Historic Properties and Cultural Resources

There are no historic properties located on Swan Lake NWR therefore impacts from goose and deer hunting are expected to have no negative effects to historic properties and cultural resource on the Refuge under this alternative.

4. B 2.5 Cumulative Impact on Refuge Environment and Community

Refuge personnel expect no measureable adverse impacts by this proposed action on the refuge environment, which includes soils, vegetation, air quality, water quality, and solitude. Some disturbance to surface soils and vegetation would occur in the specified hunting areas; however these disturbances would be minimal. Most of the foot traffic would be during fall and outside of the growing season, and time and amount of access would be controlled to minimize habitat degradation.

The Refuge administers areas outside of the Refuge borders that are part of the NWR System. The Service's primary purpose for these lands is to provide for waterfowl production and endure the preservation of migratory birds, threatened and endangered species, and resident wildlife. An additional primary purpose established by the Service for these lands is to provide opportunities for the public to hunt, fish, observe and photograph wildlife, and increase public understanding and appreciation of the ecosystem.

As a result of this alternative, expenditures by visitors for meals, lodging, and transportation would increase slightly in the communities where these refuge lands are located. Municipalities and community organizations could bring additional tourism revenues into their economies by establishing partnerships with the Service to develop and promote the hunting opportunities that are available on all the lands managed by the Refuge.

Impacts of Alternative B on the refuge physical environment would have minimal to negligible effects. Some disturbance to surface soils, topography, and vegetation would occur in the selected hunting areas, and is expected to be minimal. Refuge regulations do not permit the use of vehicles off of designated refuge roads, and vehicles for hunters with disabilities would be confined to existing roads and parking lots. Impacts to the natural hydrology would also be negligible. The Refuge staff expects impacts to air and water quality to be minimal as well and only due to refuge visitor's use of automobiles on adjacent township and country public roads.

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 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.

4. B 2.6 Cumulative Impact on Past, Present, Proposed, and Reasonably Foreseeable Hunts and Anticipated Impact

Hunting has been allowed on Swan Lake NWR for 60 years. If public use levels expand in the future, 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 Project Leader will determine if such a tool is necessary to limit conflicts.

4. B 2.7 Cumulative Impact on 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 unique to minority or low-income populations in the affected area. The Proposed Action will not disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low-income populations.

The Refuge Recreation Act of 1962 (16 U. 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 and fishing 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).

Objective 3-2 of the recently approved Refuge Comprehensive Conservation Plan states that the currently existing goose and white-tailed deer hunts will be maintained and additional hunting programs which emphasize opportunities for youth and persons with disabilities would be proposed within two years.

The increase of the hunting program under this alternative will allow public user groups to continue to experience Refuge wildlife and habitats, promote and facilitate appreciation of Refuge and Service goals and objectives, and assist in maintenance of white-tailed deer, mourning dove, squirrel, and waterfowl populations at an appropriate level. The increased allowance of hunting on the refuge will expose public user groups to the various habitats at the Refuge and facilitate a better appreciation and understanding of the ecosystems. This will increase the success of conservation efforts and nurture a cooperative relationship with adjacent landowners by minimizing crop depredation and increasing hunting opportunities in the surrounding area.

Section 4. C Alternative C: Significant expansion of hunting opportunities – open 5,345 Refuge acres, the Yellow Creek Triangle, and the Outlying Units to hunting under state regulations.

Under Alternative C most hunting on the Refuge would be walk-in hunting. There would be a designated open season hunting unit that would include the entire eastern half of Swan Lake

NWR(see map on Figure 4: Alternative C Hunting Unit Map). This unit would be open to hunting in accordance with Missouri State Regulations with the exception of deer firearms hunting seasons. All deer firearms hunts would be completed through the MDC managed hunt program and draw system. All Outlying Units would be open to hunting in accordance with Missouri State Regulations. The Yellow Creek Triangle would be open to regulations consistent with the Yellow Creek Conservations Area which is statewide regulations with the exception of deer firearms season.

With no management controls over hunter use it is hard to estimate how many hunters would utilize the open season hunting area. Due to this fact the development of a Hunting Plan under this Alternative will need to include intensive monitoring built in to determine hunter use and impacts on Refuge resources. The Hunting Plan will need to be designed with some options to adapt the hunting program based upon hunting pressure so the Refuge management can limit impacts if they become too great from overuse by hunters.

4. C 1. Direct and Indirect Impacts

4. C 1.1 Infrastructure

Under Alternative C there would be an overall decrease of impacts on Refuge infrastructure since most of the hunting would be concentrated on the east side of the Refuge. There would need to be additional parking areas placed on the east side of the Refuge for hunters to access the open season hunting unit. There are limited roads on the east side and no trails. All hunting would occur within the unit and be primarily accessed by foot traffic.

There would be no impacts to the Outlying Units over what is discussed under Alternatives B and C.

4. C 1.2 Habitats

Under Alternative C the impacts to habitats would be the same as A and B but more concentrated in a specific area of the Refuge (east side) rather than distributed over a larger area as accomplished in Alternatives A and B.

4. C 1.3 Wildlife

4. C 1.3.1 Geese and Waterfowl

Alternative C would shift the hunting of waterfowl and geese to the east side of the Refuge. This would be walk-in hunting with no units specified for specific types of hunting. Due to the fact that the primary use areas for migratory birds are located on the west side of the Refuge, this would result in a lower quality hunt for geese and waterfowl.

As shown in Figure 9, under Alternative C, 47% of the Refuge would be open to statewide regulations allowing migratory bird hunting. This hunted area exceeds the amount of recommended Refuge land hunted for migratory birds, which is 40% under policy 605 FW 2.8.

Though 47% of the Refuge would be open to hunting, it is unlikely that the entire 47% would be hunted as much of the area is open water found in Silver Lake.

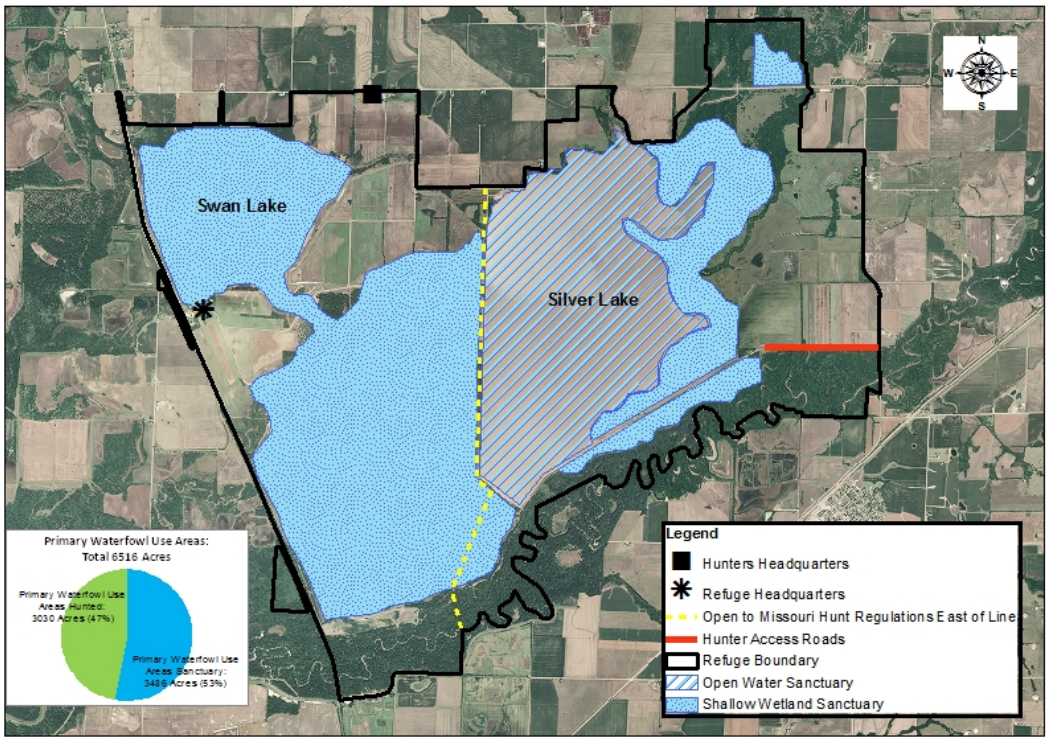

Figure 9: Swan Lake NWR Primary Waterfowl Use Areas and Waterfowl Hunting Units (Alternative C)

4. C 1.3.2 Mourning Dove

Alternative C would shift the hunting of mourning dove to the east side of the Refuge. This would be walk-in hunting with no units specified for mourning dove hunting. There would be very little difference in harvest of dove under Alternative C over Alternative B. This is due to the fact that there is about the same amount of agricultural fields that attract dove in each of the areas to be hunted under Alternative C as there are in Alternatives A and B. The Swan Lake NWR Comprehensive Conservation Plan does call for some of the agricultural fields to be restored to grasslands on the east side over the long term. This could result in a lower quality dove hunt over the long term once these restorations are completed.

4. C 1.3.3 Small Game

Small game species would be hunted under Alternative C on the east side of the Refuge, although there would not be significant harvest differences. Many small game species such as pheasants and rabbits are not present in significant numbers on Swan Lake NWR. However, they do occur and are open to hunting under state regulations.

4. C 1.3.4 Big Game

Under Alternative C, there would be a larger portion of deer taken with half of the Refuge open to walk in hunting during the archery deer season. This could double the number of archery hunters over what is estimated in Alternative B. Allowing archery only hunting does limit the refuge's ability to work with MDC on managing deer populations. Archery hunters typically do not harvest deer at high enough rates to afford deer herd management.

4. C 1.3.5 Threatened and Endangered Species

Cumulative impacts to threatened and endangered species under Alternative C would be similar to those discussed under Alternative B. Alternative C would result in more concentrated hunter use on the east side of the Refuge, which could pose more significant impacts than discussed in Alternative B. With infrequent occurrences of threatened and endangered species on the east side of the Refuge though, this should not pose a problem.

There would be no impacts to the Outlying Units over what is discussed under Alternative B.

4. C 1 3.6 Other Wildlife

The largest impact to other wildlife species from this alternative is the disturbances caused by hunt activities. Short term displacement of many species may occur as hunters travel through areas inhabited by wildlife or discharge firearms. Alternative C would concentrate these impacts to the east side of the refuge rather than distributing them out over a larger area. This alternative would also limit the refuge's ability to control the number of hunters and timing of hunts.

4. C 1.4 Historic Properties and Cultural Resources

This alternative will result in no significant ground disturbance or disturbance to standing structures. If any major ground disturbances or structural disturbances were to become necessary to carry out this hunting program a Review with the Regional Cultural Resources Officer would occur beforehand.

4. C 1.5 Refuge Environment and Community

Under this alternative, the number of hunters that would visit the Refuge and the outlying areas on an annual basis would increase significantly due to the addition of walk-in mourning dove, squirrel, white-tailed deer, and waterfowl hunting on the Eastern half of the Refuge. Despite the increase in Refuge traffic and visitation, Refuge personnel expect no significant adverse impacts on soils, vegetation, or natural hydrology. Impacts to the air quality, water quality, human health, and human safety are also anticipated to be negligible. The increased foot traffic, especially in the Yellow Creek Triangle Area, would be minimal and have an insignificant impact on the Refuge land due to the fact that most of the disturbances will be in the fall, after the growing season, and they will be in areas specified by the Refuge. There would be minimal impacts to Refuge infrastructure and an increased need for parking areas.

Given the large size of the Refuge, minimal impacts associated with solitude are expected from this alternative. However, with the walk-in hunting, a monitoring protocol and procedure would need to be put into place to ensure no hunting occurred on restricted parts of the Refuge or that went against MDC seasons and regulations.

Expenditures by visitors for meals, lodging and transportation in the communities around the Refuge would remain similar to those that have occurred in the past or significantly increase as a result of the increase in hunter visitation.

There is a potential to have some disturbance on the general public and nearby residents. The disturbance factor is considered slight however, as similar hunting programs have been in place for over 60 years. The Refuge is located in a rural area which has a rich hunting tradition and many local landowners view the hunts as a positive occurrence because they increase hunting opportunities on surrounding lands and reduce crop depredations through reduction of the deer herd.

4. C 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 unique to minority or low-income populations in the affected area. The Proposed Action will not disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low-income populations.

The Refuge Recreation Act of 1962 (16 U. 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 and fishing 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).

Objective 3-2 of the recently approved Refuge Comprehensive Conservation Plan states that the currently existing goose and white-tailed deer hunts will be maintained and additional hunting programs which emphasize opportunities for youth and persons with disabilities would be proposed within two years.

The maintenance and increase of the hunting program under this alternative will allow public user groups to continue to experience Refuge wildlife and habitats, promote and facilitate appreciation of Refuge and Service goals and objectives, and assist in maintenance of deer populations at an appropriate level.

4. C. 2 Cumulative Impact Analysis

4. C 2.1 Cumulative Impact on Infrastructure

Due to a decreased amount of impacts on Refuge infrastructure there would be no cumulative impacts on infrastructure over and above what has already been discussed in Alternatives A-B.

4. C 2.2 Cumulative Impact on Habitats

Hunting would be more concentrated in a specific area of the Refuge the cumulative impacts to those habitats could impact them more than in Alternatives A and B.

There would be no impacts to the Outlying Units over what is discussed under Alternative B.

4. C 2.3 Cumulative Impact on Wildlife

4. C 2.3.1 Cumulative Impact on Geese and Waterfowl

The number of waterfowl and geese harvested under Alternative C is expected to be less than Alternatives A and B. The decrease in harvest of waterfowl and geese is expected because the east side of the Refuge has a lower total number of agricultural fields and primary use areas of waterfowl and geese that would be hunted. Access will also be more difficult for waterfowl and goose hunters.

Table 16: Swan Lake NWR Waterfowl and Goose Harvest Data and Estimates (Alternative C)

	Waterfowl Harvest	% of Total Nationwide Harvest	% of Total Flyway Harvest	% of Total Missouri State Harvest
Swan Lake Estimate for Alternative C	1,200	0.008%	0.016%	0.270%
Missouri 2012 Harvest	445,000	2.834%	5.915%	----------
Mississippi Flyway 2012 Harvest	7,522,700	47.902%	----------	----------
Total US 2012 Harvest	15,704,500	----------	----------	----------
	Goose Harvest	**% of Total Nationwide Harvest**	**% of Total Flyway Harvest**	**% of Total Missouri State Harvest**
Swan Lake Estimate for Alternative C	15	0.0004%	0.001%	0.026%
Missouri 2012 Harvest	56,900	1.783%	5.575%	----------
Mississippi Flyway 2012 Harvest	1,020,700	31.985%	----------	----------
Total US 2012 Harvest	3,191,200	----------	----------	----------

Total cumulative impacts under Alternative C would be insignificant to the total flyway and statewide harvest totals for migratory waterfowl (see

Table).

4. C 2.3.2 Cumulative Impact on Mourning Dove

It is anticipated that mourning dove harvest would be about the same under Alternative C as in Alternative B (375-450). The long term harvest could be impacted as agricultural units are restored to more native habitats on the east side of the refuge. This could reduce the quality of mourning dove hunting in the future under this Alternative.

4. C 2.3.3 Cumulative Impact on Small Game

Small game harvest would not be significantly more than Alternative B but would cover a wider variety of species with those species being harvested during peak population times as they tend to be cyclic with limited numbers present on the refuge during most years. Table provides an estimate of small game harvest as compared to statewide harvest data under Alternative C.

Table 17: Missouri Statewide Small Game Harvest Data and Swan Lake Harvest Estimates (Alternative C)

Species	**Statewide Success Rates/ Hunter Visit 2010/2011**	**Swan Lake Refuge Harvest Estimate**		**Outlying Units/YCT Harvest Estimate**		**Swan Lake Refuge and Outlying Units Total Harvest Estimate (% of total statewide harvest)**	**Statewide Harvest 2010/11**
		Estimated Hunter Visits	Total Harvest	Estimated Hunter Visits	Total Harvest		
Rabbit	1.1	2	2	16	17	19(.006%)	294,867
Squirrel	1.5	40	60	30	45	105(.013%)	807,979
Quail	1.4	4	5	8	11	16(.016%)	100,894
Pheasant	0.9	3	3	2	1	4(.020%)	19,748
Woodcock	0.7	0	0	0	0	0(0%)	2,676
Crow	3.0	5	15	3	9	26(.032%)	81,991
Groundhog	1.0	0	0	3	3	3(.015%)	20,546
Raccoon	0.8	20	16	5	4	20(.010%)	191,217
Gray Fox	0.2	0	0	2	1	1(.047%)	2,137
Red Fox	0.2	0	0	2	1	1(.037%)	2,705
Coyote	0.3	10	3	2	1	4(.005%)	81,305

Snipe	.5	4	2	4	2	4(.5%)	800
Rail	2.0	6	12	3	6	18(1.6%)	1,100
Bobcat	0.05	5	1	2	1	2(.071%)	2,823
Opossum	0.5	5	3	2	1	4(.011%)	36,549
Badger	0.1	0	0	2	0	0(0%)	62
Striped Skunk	0.1	0	0	2	1	1(.222%)	451
Bull Frog/Green Frog	NA[a]	0	0	10-50[b]	20-200[b]	NA	NA

**Total Harvest is determined by Estimated Hunter Visits x Success Rate per Hunter Visit*
**Numbers of furbearer hunting are estimated low to none since access to the Refuge and Outlying Units is prohibited after dark when most of these species are harvested.*
**Estimated hunter visits are based upon common uses at area public lands such as Yellow Creek Conservation Area, Fountain Grove Conservation Area, and Grand Pass Conservation Area.*
[a] *There is no data for frog harvest rates.*
[b] *Estimated hunter visits and harvest ranges are based upon hunters that are expected to use the areas. The number of people that hunt frogs is very small and the population of Bull Frogs and Green Frogs is high enough that any take is insignificant to the frog populations.*

4. C 2.3.4 Cumulative Impact on Big Game

Deer harvest would be less controlled under this alternative due to the fact that hunters could just walk in and hunt. We anticipate this would result in a greater harvest of deer on the Refuge. Over the long term, Alternative C would result in a larger harvest of white-tailed deer. Based on the estimates from

Turkey's would be hunted on the Refuge and Outlying Units under this alternative. Based on the estimates fromError**! Not a valid bookmark self-reference.**8, there would be 10 Turkeys harvested annually in Alternative C. This would be an increase over other Alternatives as Turkeys would not be hunted on the Refuge in the other Alternatives.

Table , there would be 47 more deer harvested annually in Alternative C as compared to estimates of deer harvest in Alternative A or B. Over a 10 year period this would result in an increased harvest of 470 deer.

Turkey's would be hunted on the Refuge and Outlying Units under this alternative. Based on the estimates from**Error! Not a valid bookmark self-reference.**8, there would be 10 Turkeys harvested annually in Alternative C. This would be an increase over other Alternatives as Turkeys would not be hunted on the Refuge in the other Alternatives.

Table 18: Deer Harvest Estimates (Alternative C)

	Estimated # of Deer Harvested	**% of Total Statewide Harvest**	**% of Total County Harvest**

Swan Lake Estimate for Alternative C	120[a]	0.042%	5.168%
Swan Lake Estimate for either Alternative A or B	27.2[a]	0.009%	1.171%
Chariton County	2,322[b]	0.808%	----------
Missouri Statewide	287,438[b]	----------	----------

[a] Harvest estimates based upon previous refuge hunter success rates.
[b] Harvest based upon past MDC estimates.

Table 19: Turkey Harvest Estimates (Alternative C)

	Estimated # of Turkeys to be Harvested	**% of Total Statewide Harvest**	**% of Total County Harvest**
Estimate for Outlying Units and Refuge for Alternative C	10[a]	0.017%	2.92%*
Chariton County	343[b]	0.607%	----------
Missouri Statewide	56,481[b]	----------	----------
*Cumulative of all 5 counties where the outlying units are located including Chariton, St. Clair, Henry, Cedar, and Bates			

[a] Harvest estimates based upon past hunter success rates on MDC Areas.
[b] Harvest based upon past MDC estimates.

4. C 2.3.5 Cumulative Impact on Threatened and Endangered Species

Due to limited impacts from hunting in the area where Indiana bats, northern long-eared bats, and interior least tern are present, there would be no cumulative impacts to these species from Alternative C.

4. C 2.3.6 Cumulative Impact on Other Wildlife

Cumulative impacts to other wildlife under Alternative C would come from disturbances of hunters accessing the area and noise from gunshots while hunting. Under this alternative, these impacts would be concentrated on the east side of the Refuge. Over the long term this could cause wildlife to vacate these areas during times of high hunting pressure and utilize the west portion of the refuge or surrounding private lands more intensely.

4. C 2.4 Cumulative Impact on Historic Properties and Cultural Resources

There are no historic properties on Swan Lake NWR, the Yellow Creek Triangle, or Outlying Units so this alternative will not effect any historic properties.

4. C 2.5 Cumulative Impact on Refuge Environment and Community

Refuge personnel expect no measureable adverse impacts by this proposed action on the refuge environment, which includes soils, vegetation, air quality, water quality, and solitude. Some disturbance to surface soils and vegetation would occur in the specified hunting areas; however these disturbances would be minimal. Most of the foot traffic would be during fall and outside of the growing season, and time and amount of access would be controlled to minimize habitat degradation.

The Refuge administers areas outside of the Refuge borders that are part of the NWR System. The Service's primary purpose for these lands is to provide for waterfowl production and endure the preservation of migratory birds, threatened and endangered species, and resident wildlife. An additional primary purpose established by the Service for these lands is to provide opportunities for the public to hunt, fish, observe and photograph wildlife, and increase public understanding and appreciation of the ecosystem.

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. Municipalities and community organizations could bring additional tourism revenues into their economies by establishing partnerships with the Service to develop and promote the hunting opportunities that are available on all the lands managed by the Refuge.

Impacts of Alternative C on the refuge physical environment would have minimal to slight effects. Some disturbance to surface soils, topography, and vegetation would occur in the selected hunting areas, and is expected to be minimal. Refuge regulations do not permit the use of vehicles off of designated refuge roads, and vehicles for hunters with disabilities would be confined to existing roads and parking lots. Impacts to the natural hydrology would also be negligible. The Refuge staff expects impacts to air and water quality to be minimal as well and only due to refuge visitor's use of automobiles on adjacent township and country public roads.

4. C 2.6 Cumulative Impact on Other Past, Present, Proposed, and Reasonably Foreseeable Hunts and Anticipated Impacts

Hunting has been allowed on Swan Lake NWR for 60 years. If public use levels expand in the future, 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 Project Leader, will determine if such a tool is necessary to limit conflicts.

4. C 2.7 Cumulative Impact on 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 unique to minority or low-income populations in the affected area. The Proposed Action will not disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low-income populations.

The Refuge Recreation Act of 1962 (16 U. 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 and fishing 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).

Objective 3-2 of the recently approved Refuge Comprehensive Conservation Plan states that the currently existing goose and white-tailed deer hunts will be maintained and additional hunting programs which emphasize opportunities for youth and persons with disabilities would be proposed within two years.

The increase of the hunting program under this alternative will allow public user groups to continue to experience Refuge wildlife and habitats, promote and facilitate appreciation of Refuge and Service goals and objectives, and assist in maintenance of deer, mourning dove, squirrel, and waterfowl populations at an appropriate level. The increased allowance of hunting on the refuge will expose public user groups to the various habitats at the Refuge and facilitate a better appreciation and understanding of the ecosystems. This will increase the success of conservation efforts and nurture a cooperative relationship with adjacent landowners by minimizing crop depredation and increasing hunting opportunities in the surrounding area.

CHAPTER 5 REGULATORY COMPLIANCE

The Refuge Recreation Act of 1962 (16 U.S.C 460k) authorizes the Secretary of the Interior to administer National Wildlife Refuges for public recreation as an appropriate incidental or secondary use (1) to the extent that is practicable and consistent with the primary objectives for which an area was established, and (2) provided that funds are available for the development, operation, and maintenance of permitted recreation.

Providing compatible wildlife-dependent recreation and education activities on units of the National Wildlife Refuge System (NWRS) is a priority of the U. S. Fish and Wildlife Service (Service). The National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd et seq.) provides

authority for the Service to manage the Refuge and its wildlife populations. In addition it declares that compatible wildlife-dependent public uses are legitimate and appropriate uses of the Refuge System that are to receive priority consideration in planning and management. There are six wildlife-dependent public uses: hunting, fishing, wildlife observation, wildlife photography, environmental education and interpretation. The Act directs managers to increase recreational opportunities, including hunting, on National Wildlife Refuges (NWR) when compatible with the purposes for which the Refuge was established and the mission of the NWRS.

Swan Lake National Wildlife Refuge (Refuge) was established in 1937 by Franklin D. Roosevelt through executive order. The legal mandates that established or describe the purposes of the Refuge include: “as a refuge and breeding ground for migratory birds and other wildlife” (Executive Order 7563), “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” (16 U.S.C. ¤ 715d) and “... particular value in carrying out the national migratory bird management program.” (16 U.S.C. ¤ 667b).

Increasing hunting opportunities on portions of the fee title lands administered by the Refuge will allow management of wildlife populations at acceptable levels, provide more wildlife-dependent recreational opportunities for the public, and promote a better understanding and appreciation of Refuge habitats and their associated fish and wildlife resources Implementation of the proposed actions will be consistent and compatible with the Refuge Recreation Act, Refuge Administration Act, the Swan Lake NWR Refuge Hunting Compatibility Determination (Hunting CD 2011), and the Swan Lake NWR Comprehensive Conservation Plan (USFWS 2011).

CHAPTER 6 LIST OF PREPARERS

Submitted By:

_____ _____
Project Leader Date

Concur:

_____ _____
Complex Project Leader Date

_____ _____
Refuge Supervisor Area 2 Date

_____ _____
Regional Chief Date
National Wildlife Refuge System

Approved:

_____ _____
Regional Director Date
Region 3, U.S. Fish & Wildlife Service

CHAPTER 7 CONSULTATION AND COORDINATION WITH OTHERS

3.0 Scoping and Public Participation

Original public discussions of the refuge hunt program took place during the recent CCP process. The first public scoping event for the CCP was held on January 11, 2007 and attended by 75 people. The following comments related to the hunting program were received at the refuge open house and during a 30 day public comment period.

More public scoping related to the hunt program was completed during the public comment period of the CCP in which two different 30 day comment periods were held, one in June 2010 and a second in September 2010. In addition, the refuge hosted an open house on June 22, 2010 which was attended by approximately 385 people. This scoping involved more than 500 citizens and non-governmental organizations as well as governmental partners such as the Missouri Department of Conservation and Missouri Department of Natural Resources.

A public scoping meeting specific to this plan was held on September 24, 2011 in which feedback was received from the public with regards to the alternatives discussed in the EA. Twelve people attended that meeting and 134 comments received during the scoping period.

Public comments on this document and the Draft Hunt Plan were solicited from October 5, 2012 through November 5, 2012. We received 23 comments from individuals. Nineteen of these comments were positive in favor of the Alternative 2 (Preferred Alternative) and four were in opposition to the preferred alternative and in favor of the No Change Alternative.

A letter of support was received from the Mississippi Valley Duck Hunters Association. This letter was signed by the organizations officers as well as eight other members. A letter was received from a group of landowners that surround the Schmitt Unit expressing concerns about deer management. As the plan goes forward we will pass those concerns on to the Missouri Department of Conservation- Deer Biologist and move the deer hunting program forward in consultation with the State.

A letter of support was received from the Missouri Department of Conservation. It did have a few specific comments about the conduct of the hunt and wording on some of the regulations that can easily be addressed in the Hunting Plan. This letter also expressed concerns about protecting the integrity of the inviolate sanctuary for waterfowl on the Refuge. As the hunting plan moves forward and is implemented the refuge will work in close consultation with the Missouri Department of Conservation on the hunt program to limit these disturbances as called for in this EA and the Hunting Plan. There were also comments made about the Hunting Plan addressing the issue of Feral Hogs if that issue ever arises on the Refuge. In the future, the Refuge will develop a contingency plan to deal with the issue of feral animals, including hogs.

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Appendix A: Species List

Swan Lake NWR Amphibian List			
Species	**Scientific Name**	**Presence in 2003 Frog and Toad Breeding Survey**	**State Status**
Frogs			
Blanchard's Cricket Frog	*Acris crepitans blanchardi*	X	
Gray Treefrog	*Hyla versicolor*	X	
N. Spring Peeper	*Pseudacris crucifer crucifer*	X	
W. Chorus Frog	*Pseudacris triseriata triseriata*	X	
Plains Leopard Frog	*Rana blairi*	X	
S. Leopard Frog	*Rana sphenocephala*	X	
Green Frog	*Rana clamitans*	X	
Bullfrog	*Rana catesbeiana*	X	
Northern Crawfish Frog	*Rana areolata*		Vulnerable
Toads			
American Toad	*Bufo americanus*	X	
Woodhouse's Toad	*Bufo woodhousei woodhousei*	X	
Fowlers Toad	*Bufo woodhousei fowleri*		
Great Plaions Toad	*Bufo cognatus*		Status Unknown
Eastern Narrow-mouthed Toad	*Gastrophyrne carolinensis*		
Plains Spadefoot Toad	*Scaphiopus bombifrons*		
Salamanders			
Eastern Tiger Salamander	*Ambystoma tigrinum*		Status Unknown
Small-mouthed Salamander	*Ambystoma texanum*		

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Loons							
Common Loon		r		u			
Grebes							
Pied-billed Grebe		c	o	c			
Horned Grebe		o		o			
Eared Grebe		r		r			
Pelicans							
American White Pelican		c	u	a			
Cormorants							
Double-crested Cormorant		u	o	o			
Herons and Bitterns							
American Bittern		u	u	u			critically imperiled
Least Bittern		r	u	r			vulnerable
Great Blue Heron	X	c	a	c	u		
Great Egret		c	c	c			vulnerable
Snowy Egret		o	o	r			imperiled
Little Blue Heron		r	o	o			vulnerable
Cattle Egret		o	o	o			
Green Heron	X	o	o	o			
Black-crowned Night Heron		u	u	o			vulnerable
Yellow-crowned Night Heron	X	o	o	r			
Swans, Geese, and Ducks							
Tundra Swan		r		r	r		
Trumpeter Swan		r		r	r		
Greater White-fronted Goose			r	o	c		
Snow Goose		r	r	c	a		

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Ross's Goose				r	o		
Canada Goose	X	a	u	a	a		
Wood Duck	X	u	c	c	o		
Green-winged Teal		c	o	c	u		
American Black Duck		r		r	r		
Mallard	X	o	u	c	a		
Northern Pintail		c	o	a	c		
Blue-winged Teal		c	u	a	o		
Cinnamon Teal		r		r	r		
Northern Shoveler		c	o	a	o		
Gadwall		c		c	u		
American Wigeon		u		c	u		
Canvasback		u		r	o		
Redhead		o		o	u		
Ring-necked Duck		c	r	u	c		
Lesser Scaup		c		o	c		
Greater Scaup		r		r	r		
Common Goldeneye		u		u	u		
Bufflehead		o		o	o		
Hooded Merganser		o	u	u	o		
Common Merganser		o		u	u		
Red-breasted Merganser		o		r	r		
Ruddy Duck		c	r	o	o		
Kites							
Mississippi Kite		r		r			
Vultures							
Turkey Vulture		c	c	c			
Hawks and Eagles							

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Osprey		r	r	r			status unknown
Bald Eagle		o	r	c	c		vulnerable
Northern Harrier	X	c	o	c	c		imperiled
Sharp-shinned Hawk		u	o	u	u		vulnerable
Cooper's Hawk	X	o	u	o	o		
Northern Goshawk				r	r		
Red-shouldered Hawk		u	u	u	u		
Broad-winged Hawk		o		c			
Swainson's Hawk		r		r			imperiled
Red-tailed Hawk	X	c	c	c	c		
Rough-legged Hawk		o		u	u		
Golden Eagle		r		r	r		
Falcons							
American Kestrel	X	c	u	c	c		
Merlin		o		o	r		
Peregrine Falcon		u		u	r		critically imperiled
Upland Game Birds							
Ring-necked Pheasant		u	u	u	u		
Wild Turkey	X	u	u	u	u		
Northern Bobwhite	X	c	c	c	c		
Rails and Coots							
King Rail	X	r	r				critically imperiled
Virginia Rail		u	r	r			imperiled

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Sora		u	r	c			imperiled
American Coot		a	u	a	r		
Common Moorhen		r	r	r			imperiled
Cranes							
Sandhill Crane		r	r	r			status unknown
Shorebirds							
Black-bellied Plover		u	r	o			
American Golden Plover		c	r	c			
Semipalmated Plover		c	u	o			
Piping Plover		r		r		endangered	
Killdeer	X	c	c	c	o		
American Avocet		r	r	r			
Greater Yellowlegs		c	u	c			
Lesser Yellowlegs		a	c	a			
Solitary Sandpiper		u	c	o			
Willet		c	r	u			
Spotted Sandpiper	X	c	u	u			
Upland Sandpiper	X	o	o	o			
Whimbrel		o	r	r			
Hudsonian Godwit		u		o			
Marbled Godwit		r		r			
Ruddy Turnstone		u		o			
Red Knot		o		o			
Sanderling		u	u	o			
Semipalmated		c	u	c			

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Sandpiper							
Western Sandpiper		r		u			
Least Sandpiper		c	u	c			
Baird's Sandpiper		u	r	u			
Pectoral Sandpiper		a	c	a			
Dunlin		o		c			
Stilt Sandpiper		u	o	c			
Buff-breasted Sandpiper		o	r	o			
Short-billed Dowitcher		c	u	c			
Long-billed Dowitcher		c	u	c			
Wilson’s Snipe		c	u	c	r		
American Woodcock		o	u	u	r		
Wilson's Phalarope		u	r	u			
Red-necked Phalarope		r		r			
Gulls and Terns							
Franklin's Gull		c	u	c	r		
Bonaparte's Gull		o	r	c	r		
Ring-billed Gull		c	c	c	o		
Herring Gull		r	r	o	o		
Caspian Tern		u	r	u	r		
Common Tern		o	o	o			
Forster's Tern		u	o	c			
Least Tern		r	r	r		Endangered	critically imperiled
Black Tern		c	c	u			SX
Doves							
Rock Dove	X	o	c	c	o		

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Mourning Dove	X	c	a	c	o		
Cuckoos and Roadrunners							
Black-billed Cuckoo	X	u	u	u			
Yellow-billed Cuckoo	X	c	c	o			
Owls							
Common Barn Owl		r	r	r	r		vulnerable
Eastern Screech Owl	X	u	u	u	u		
Great Horned Owl	X	c	c	c	c		
Snowy Owl				r			
Barred Owl	X	c	c	c	c		
Short-eared Owl		o	r	o	o		imperiled
Long-eared Owl		r	r	r	o		status unknown
Nighthawks and Nightjars							
Common Nighthawk	X	u	u	u			
Whip-poor-will	X	u	u	u			
Swifts							
Chimney Swift	X	u	o	u			
Hummingbirds							
Ruby-throated Hummingbird	X	u	c	c			
Kingfishers							
Belted Kingfisher	X	u	c	o	o		
Woodpeckers							
Red-headed Woodpecker	X	c	c	c	o		
Red-bellied Woodpecker	X	c	c	c	c		
Yellow-bellied		o	r	o	r		

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Sapsucker							
Downy Woodpecker	X	c	c	c	c		
Hairy Woodpecker	X	u	u	u	u		
Northern Flicker	X	c	c	c	c		
Pileated Woodpecker	X	u	u	u	u		
Flycatchers							
Olive-sided Flycatcher		o	r	u			
Eastern Wood Pewee	X	u	c	u			
Acadian Flycatcher	X	u	u	r			
Least Flycatcher		c		c			
Willow Flycatcher	X	u	u	r			
Eastern Phoebe	X	c	c	c			
Great Crested Flycatcher	X	u	c	o			
Western Kingbird		r		r			
Eastern Kingbird	X	c	c	c			
Larks							
Horned Lark	X	c	c	u	u		
Swallows							
Purple Martin	X	o	o	r			
Tree Swallow	X	c	c	c			
Northern Rough-winged Swallow	X	c	c	a			
Bank Swallow	X	c	c	c			
Cliff Swallow	X	u	o	u			
Barn Swallow	X	c	c	c			
Jays, Magpies							

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
and Crows							
Blue Jay	X	c	c	c	c		
American Crow	X	c	c	a	c		
Chickadees and Titmice							
Black-capped Chickadee	X	c	c	c	c		
Tufted Titmouse	X	c	c	c	c		
Nuthatches							
Red-breasted Nuthatch		r		r	o		
White-breasted Nuthatch	X	u	u	u	u		
Creepers							
Brown Creeper		u		u	u		status unknown
Wrens							
Carolina Wren	X	r	r	r	r		
House Wren	X	c	c	c			
Winter Wren					r		
Sedge Wren	X	o	c	o			
Marsh Wren	X	o	o	u			vulnerable
Kinglets, Bluebirds, and Thrushes							
Golden-crowned Kinglet		c		c	u		
Ruby-crowned Kinglet		u		u	u		
Blue-gray Gnatcatcher	X	u	u	r			
Eastern Bluebird	X	c	u	c	r		
Gray-cheeked Thrush		o					
Swainson's Thrush		u	r	u			

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Hermit Thrush		u		u			
Wood Thrush	X	u	o	u			
American Robin	X	c	c	c	o		
Mimics							
Gray Catbird	X	c	c	c			
Northern Mockingbird	X	u	u	u	r		
Brown Thrasher	X	c	c	c			
Pipits							
American Pipit		u		u			
Waxwings							
Cedar Waxwing		c	u	c	u		
Shrikes							
Loggerhead Shrike	X	u	u	u	u		imperiled
Starlings							
European Starling	X	c	c	c	c		
Vireos							
White-eyed Vireo	X	r	r	r			
Bell's Vireo	X	u	u	u			
Blue-headed Vireo	X	o		o			
Yellow-throated Vireo	X	u	u	r			
Warbling Vireo	X	c	c	u			
Red-eyed Vireo	X	c	c	c			
Warblers							
Blue-winged Warbler		u	r	u			
Golden-winged Warbler		u		u			
Tennessee Warbler		u		u			
Nashville Warbler		u		u			
Northern Parula	X	u	u	r			

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Yellow Warbler	X	u	u	r			
Chestnut-sided Warbler		u		u			vulnerable
Magnolia Warbler		u		u			
Yellow-rumped Warbler		c		c	o		
Blackburnian Warbler		u		u			
Blackpoll Warbler		u		o			
Black-and-white Warbler		u		u			
American Redstart	X	c	u	c			
Prothonotary Warbler	X	u	r	r			
Ovenbird	X	u	r	u			
Louisiana Waterthrush	X	u	r	u			
Kentucky Warbler	X	u	u				
Mourning Warbler		u		r			
Common Yellowthroat	X	c	c	c			
Wilson's Warbler		u		u			
Yellow-breasted Chat	X	o		o			
Tanagers							
Summer Tanager	X	o	o	o			
Scarlet Tanager		u		u			
Sparrows, Buntings, and Grosbeaks							
Northern Cardinal	X	c	c	c	c		

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Rose-breasted Grosbeak	X	u	u	u			
Indigo Bunting	X	c	c	c			
Dickcissel	X	a	a	c			
Eastern Towhee	X	c	c	c			
American Tree Sparrows		u		u	c		
Chipping Sparrow	X	u	u	u	r		
Field Sparrow	X	u	u	u	r		
Vesper Sparrow		u	r	u			
Lark Sparrow	X	u	o	r			
Savannah Sparrow		c	r	c			
Grasshopper Sparrow	X	c	u	c			
Le Conte's Sparrow		o		o			
Sharp-tailed Sparrow		r		r			
Fox Sparrow		u		u	r		
Song Sparrow	X	c	c	c	u		
Lincoln's Sparrow		o		o	r		
Swamp Sparrow		u	o	u	u		
White-throated Sparrow		c		c	u		
White-crowned Sparrow		u		u	u		
Harris' Sparrow		o		o	r		
Dark-eyed Junco		u		u	c		
Lapland Longspur		u		u	o		
Snow Bunting					r		
Blackbirds and Orioles							
Bobolink		u	r	u			

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Red-winged Blackbird	X	a	a	a	c		
Eastern Meadowlark	X	c	c	c	c		
Western Meadowlark		r	r	r	u		
Yellow-headed Blackbird		r		r			vulnerable
Rusty Blackbird		u		u	o		
Brewer's Blackbird		o		o			
Common Grackle	X	a	c	a	c		
Brown-headed Cowbird	X	c	c	c	u		
Orchard Oriole	X	c	c	o			
Baltimore Oriole	X	c	c	o			
Finches							
Purple Finch		c		c	u		
Pine Siskin		r		r	r		
Common Redpoll		r		r	r		
American Goldfinch	X	c	c	c	c		
Old World Sparrows							
House Sparrow	X	c	c	c	c		
Accidental Birds							
Tricolored Heron							
Ferruginous Hawk							
White-faced Ibis							
Glossy Ibis							
Sprague's Pipit							
Roseate							

Swan Lake NWR Bird Checklist							
Common Name	**Nest On/Near Swan Lake NWR**	**Seasonal Presence**				**Status**	
		Spring (Mar-May)	**Summer (Jun-Aug)**	**Fall (Sep-Nov)**	**Winter (Dec-Feb)**	**Federal**	**State**
Spoonbill							
Prairie Warbler							
Surf Scoter							
Lark Bunting							
Great-tailed Grackle							
Western Grebe							

Swan Lake NWR Butterflies	
Species	**Scientific Name**
Roadside Skipper	*Amblyscirtes vialis*
Least Skipper	*Ancyloxpha numitor*
European Cabbage Butterfly	*Artogeia rapae*
Red-spotted Purple	*Basilarchia arthemis astyanax*
Wood Nymph	*Cercyonis pegala*
Gorgone Checkerspot	*Charidryas gorgone carlota*
Alfalfa Butterfly	*Colias eurytheme*
Clouded Sulphur	*Colias philodice philodice*
Monarch	*Danaus plexippus*
Eastern-tailed Blue	*Everes comyntas comyntas*
Buckeye	*Junonia coenia*
Black Swallowtail	*Papilio polyxenes asterius*
Cloudless Sulphur	*Phoebis sennae eubule*
Common Sooty Wing	*Pholisora catullus*
Pearl Crescent	*Phyciodes tharos*
Comma	*Polygonia comma*
Tiger Swallowtail	*Pterourus glaucus glaucus*
Little Sulphur	*Pyrisitia lisa lisa*
Great Spangled Fritillary	*Speyeria cybele cybele*
Red Admiral	*Vanessa atalanta rubria*

Swan Lake NWR Fish Species						
Species	**Scientific Name**	**Federal Status**	**State Status**	**1996 Silver Lake Fish Survey**	**Found in Past Surveys But Not in 1996 Survey.**	**Missouri Natural Heritage Database Imperiled Fish Species that Occur In the Lower Grand River Watershed**
Black Bullhead	*Ameirus melas*			X		
Yellow Bullhead	*Ameirus natalis*			X		
Freshwater Drum	*Aplodinotus grunniens*			X		
River Carpsucker	*Carpiodes carpio*				X	
Quillback Sucker	*Carpiodes cyprinus*			X		
Blue Sucker	*Cyleptus elongatus*		vulnerable			X
Red Shiner	*Cyprinella lutrensis*			X		
Common Carp	*Cyprinus carpio*			X		
Gizzard Shad	*Dorosoma cepedianum*			X		
Mooneye	*Hiodon tergisus*		vulnerable			X
Western Silvery Minnow	*Hybognathus argyritis*		imperiled			X
Plains Minnow	*Hybognathus placitus*		imperiled			X
Channel Catfish	*Ictalurus punctatus*			X		
Smallmouth Buffalo	*Ictiobus bubalus*			X		
Bigmouth Buffalo	*Ictiobus cyprinellus*			X		
Longnose	*Lepisosteus*				X	

Swan Lake NWR Fish Species						
Species	**Scientific Name**	**Federal Status**	**State Status**	**1996 Silver Lake Fish Survey**	**Found in Past Surveys But Not in 1996 Survey.**	**Missouri Natural Heritage Database Imperiled Fish Species that Occur In the Lower Grand River Watershed**
Gar	*osseus*					
Shortnose Gar	*Lepisosteus platostomus*			X		
Green Sunfish	*Lepomis cyannelus*			X		
Bluegill	*Lepomis macrochirus*			X		
Silver Chub	*Macrhybopsis storiana*		vulnerable			X
Largemouth Bass	*Micropterus salmoides*			X		
Golden Shiner	*Notemigonus crysoleucas*				X	
Trout-perch	*Percopsis omniscomycus*		critically imperiled			X
White Crappie	*Pomoxis annularis*			X		
Black Crappie	*Pomoxis nigromaculatus*			X		
Flathead Catfish	*Pylodictis olivaris*				X	
Pallid Sturgeon	*Scaphirhynchus albus*	Endangered	Endangered			X

Swan Lake NWR Mammals						
Species	**Scientific Name**	**Status**		**2004 species list**	**Species on the 1979 List But Not Recently Seen**	**Species Listed as Captured in 2003 Bat Survey Report**
		Federal	**State**			
Pouched Mammals						
Virginia Opossum	*Didelphis virginiana*			X		
Insectivores						
Short-tailed Shrew	*Blarina brevicauda*			X		
Least Shrew	*Cryptotis parva*			X		
Masked Shrew	*Sorex cinereus*			X		
Southeastern Shrew	*Sorex longirostris*			X		
Eastern Mole	*Scalopus acquaticus*			X		
Bats						
Little Brown Bat	*Myotis lucifugus*			X		X
Big Brown Bat	*Epesicus fuscus*			X		X
Eastern Red Bat	*Lasiurus borealis*			X		X
Hoary Bat	*Lasiurus cinereus*			X		X
Evening Bat	*Nycticeius humeralis*			X		X
Indiana Bat	*Myotis sodalis*	Endangered	Endangered	X		X
Northern Long-eared Bat1,3	*Myotis septentrionalis*			X		X
Eastern Pipistrelle	*Pipistrellus subflavus*			X		X
Lagomorphs						
Eastern Cottontail	*Sylvilagus floridanus*			X		
Rodents						
White-footed Mouse	*Peromyscus leucopus*			X		
Deer Mouse	*Peromyscus*			X		

Swan Lake NWR Mammals						
Species	**Scientific Name**	**Status**		**2004 species list**	**Species on the 1979 List But Not Recently Seen**	**Species Listed as Captured in 2003 Bat Survey Report**
		Federal	**State**			
	maniculatus					
Meadow Jumping Mouse	*Zapu hudsonius*			X		
Western Harvest Mouse	*Reithrodontomys megalotis*			X		
Woodchuck	*Marmota monax*			X		
Beaver	*Castor canadensis*			X		
Muskrat	*Ondatra zibethicus*			X		
Prairie Vole	*Microtus ochrogaster*			X		
Meadow Vole	*Microtus pennsylvanicus*			X		
Southern Bog Lemming	*Synaptomys cooperi*			X		
Plains Pocket Gopher	*Geomys bursarius*				X	
Southern Flying Squirrel	*Glaucomys volans*			X		
Eastern Gray Squirrel	*Sciurus carolinensis*			X		
Fox Squirrel	*Sciurus niger*			X		
Franklins Ground Squirrel	*Spermophilus franklinii*		Imperiled		X	
Eastern Chipmunk	*Tamias striatus*				X	
Hispid Cotton Rat	*Sigmodon hispidus*				X	
Norway Rat	*Rattus norvegicus*				X	
Carnivores						
Raccoon	*Procyon lotor*			X		
Long-tailed	*Mustela frenata*		Imperiled	X		

Swan Lake NWR Mammals						
Species	**Scientific Name**	**Status**		**2004 species list**	**Species on the 1979 List But Not Recently Seen**	**Species Listed as Captured in 2003 Bat Survey Report**
		Federal	**State**			
Weasel						
Least Weasel	*Mustela nivalis*		Apparently Secure	X		
Mink	*Mustela vison*			X		
Badger	*Taxidea taxus*			X		
Coyote	*Canid latrans*			X		
Red Fox	*Vulpes vulpes*			X		
Bobcat	*Lynx rufus*			X		
River Otter	*Lutra canadensis*			X		
Striped Skunk	*Mephitis mephitis*			X		
Eastern Spotted Skunk	*Spilogale putorius*		Endangered		X	
Gray Fox	*Urocyon cenereoargenteus*				X	
Deer						
~~White-tailed deer~~white-tailed deer	*Odocoileus virginianus*			X		

Swan Lake NWR Mussels		
Species	**Scientific Name**	**State Status**
Flat Floater	*Anodonta suborbiculata*	Imperiled
Giant Floater	*Anodonta grandis spp.*	
Squaw Foot	*Strophitus undulatus*	
White heel-splitter	*Lasmigona complanata*	
Maple Leaf	*Quadrula quadrula*	
Pond-horn	*Uniomerus tetralasmus*	
Pink heel-splitter	*Potamilusalatus spp.*	
Sandshell sp.	*Lampsilis teressp.*	
Liliput shell	*Toxolasma parvus*	
Paper Floater	*Anodonta imbecilis*	
Fragile Paper Shell	*Leptodea fragilis*	
List based on 1997 survery of Swan Lake NWR waters		

Swan Lake NWR Odonates	
Species	**Scientific Name**
Common Green Darner	*Anax junius*
Blue-fronted Dancer	*Argia apicalis*
Powdered Dancer	*Argia moesta*
Halloween Pennant	*Celithemis eponina*
Familiar Bluet	*Enallagma civile*
Prince Baskettail	*Epicordulia princeps*
Eastern Pondhawk	*Erythemis simplicicollis*
Citrine Forktail	*Ischnura hastate*
Fragile Forktail	*Ischnura posita*
Eastern Forktail	*Ischnura verticalis*
Common Spreadwing	*Lestes disjunctus*
Slender Spreadwing	*Lestes rectangularis*
Spangled Skimmer	*Libellula cyanea*
Widow Skimmer	*Libellula luctuosa*
Twelve-spotted Skimmer	*Libellula pulchella*
Blue Dasher	*Pachydiplax longipennis*
Wandering Glider	*Pantala flavescens*
Eastern Amberwing	*Perithemis tenera*
Common Whitetail	*Plathemis lydia*
Riverine Clubtail	*Stylurus plagiatus*
Blue-faced Meadowhawk	*Sympetrum ambiguum*
Variegated Meadowhawk	*Sympetrum corruptum*
Saffron-winged meadowhawk	*Sympetrum costiferum*
Black Saddlebags	*Tramea lacerata*
List compiled from 2003 Refuge Survey	

Swan Lake NWR Rare Plants		
Species	**Scientific Name**	**State Status1**
A Barnyard Grass	Echinochloa walteri	critically imperiled
An Umbrella Sedge	Cyperus flavicomus	critically imperiled
A Sedge	Carex arkansana	vulnerable

Swan Lake NWR Reptiles					
Species	**Scientific Name**	**Status**		**11999 Snake Inventory Report**	**22003-2004 Drift Fence Survey**
		Federal	**State**		
Snakes					
Diamondback Watersnake	*Nerodia rhombifer*			X	X
Yellowbelly Watersnake	*Nerodia erythrogaster flavigaster*			X	X
Blotched Watersnake	*Nerodia erythrogaster transversa*			X	
Northern Watersnake	*Nerodia sipedon sipedon*			X	
Rough Greensnake	*Opheodrys aestivus*			X	
Graham's Crayfish Snake	*Regina grahamii*			X	X
Northern Redbelly Snake	*Storeria occipitomaculata occipitomaculata*			X	
Midland Brown Snake	*Storeria dekayi wrightorum*			X	
Western Ribbon Snake	*Thamnophis proximus proximus*			X	X
Eastern Plains Garter Snake	*Thamnophis radix radix*			X	X
Red-sided Garter Snake	*Thamnophis sirtalis parietalis*			X	X
Easter Yellowbellied Racer	*Coluber constrictor flaviventris*				X
Speckled Kingsnake	*Lampropeltis getula holbrooki*				X
Prairie Kingsnake	*Lampropeltis calligaster calligaster*				X
Prairie Ring-necked Snake	*Diadophis punctatus arnyi*				X
Eastern Hog-nosed Snake	*Heterodon platirhinos*				X
Eastern	*Thamnophis sirtalis*				X

Swan Lake NWR Reptiles					
Species	**Scientific Name**	**Status**		**11999 Snake Inventory Report**	**22003-2004 Drift Fence Survey**
		Federal	**State**		
Snakes					
Gartersnake	*sirtalis*				
Lined Snake	*Tropidoclonion lineatum*				X
Western Spiny Softshell	*Apalone spinifera hartwegi*				X
Black Rat Snake	*Elaphe obsoleta obsoleta*				
Western Massasauga	*Sistrurus catenatus tergeminus*		Concern		X
Turtles					
Red-eared Slider	*Trachemys scripta elegans*				
Common Snapping Turtle	*Chelydra serpentina serpentina*				
Western Painted Turtle	*Chrysemys picta bellii*				
Three-toed Box Turtle	*Terrapene carolina triunguis*				
Ornate Box Turtle	*Terrapene ornata ornata*				
Midland Smooth Softshell Turtle	*Apalone mutica mutica*				