

**U.S. DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE**

DRAFT ENVIRONMENTAL ASSESSMENT

**For
Proposed Amendments to the 2016 – 2017 Hunting Chapter
Of The
Visitor Service Plan
Minnesota Valley National Wildlife Refuge,
Bloomington, Minnesota**

**Regional Director
U.S. Fish and Wildlife Service
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**ENVIRONMENTAL ASSESSMENT
FOR
PROPOSED AMENDMENTS TO 2016 – 2017 HUNTING CHAPTER
OF THE
VISITOR SERVICE PLAN
MINNESOTA VALLEY NATIONAL WILDLIFE REFUGE**

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1.0 PURPOSE OF THE PROPOSED ACTION

The Minnesota Valley National Wildlife Refuge (Refuge) was established by Congress in 1976 through the Minnesota Valley National Wildlife Refuge Act (*Public Law 94-466; October 8, 1976*) (Refuge Act). In general, its purposes are to (1) provide habitat for a large number of migratory waterfowl, fish, and other wildlife species; (2) provide environmental education, wildlife recreational opportunities, and interpretive programs for hundreds of thousands of Twin Cities residents; (3) protect important natural resource areas from degradation; and (4) protect the valley’s unique social, educational, and environmental assets.

The purpose of this Environmental Assessment (EA) is to evaluate alternatives for the purpose of updating the Hunting Chapter of the Refuge’s Visitor Service Plan. The Service’s Regional Director will review the recommendations assessed in this EA and select one of the Alternatives presented. In doing so, the Regional Director also will determine whether this EA is adequate to support a Finding of No Significant Impact or whether an Environmental Impact Statement (EIS) will need to be prepared.

2.0 NEED FOR THE ACTION

The National Wildlife Refuge Improvement Act of 1997 (Improvement Act) directs refuges to provide six priority public uses when compatible with the purposes of the Refuge and the mission of the National Wildlife Refuge System (System). These priority uses are hunting, fishing, wildlife photography, wildlife observation, environmental education, and interpretation. The need for action, therefore, revolves around hunting as a priority use. The U.S. Fish and Wildlife Service (Service) guidance for implementing the Improvement Act not only encourages Refuge Managers to provide hunting where compatible but also to promote use of refuges for special hunts for youth, physically challenged persons, or other underserved hunting populations (605 FW 1.9C, 2.7M, 2.7N, USFWS 2014a). Because hunting is one of six priority uses for the Refuge, the 2015 Hunting Chapter seeks to balance all of these uses over time and space.

The Service prepared its first hunting chapter for the Refuge shortly after the Refuge was established. That chapter included an EA that evaluated the possibilities and effects of a hunting program on all lands within the Refuge’s congressionally authorized acquisition boundaries. The Refuge’s Hunting Chapter and supporting documents were reviewed and updated in 1981, 1984,

1987, 1989, 1991, 2004, 2010, 2011, 2012 and 2015. Changes to the Refuge's hunting program were published in the Federal Register and the Code of Federal Regulations (50 CFR 32.42) as needed.

Since the first authorization in 1976 to establish a 9,500-acre Refuge, the approved acquisition boundary has been revised three times to total 26,018 acres. Currently, about 14,600 acres are managed by the Refuge (Figure 1). As the Refuge expands, lands are purchased from willing sellers. This has created interspersed ownership in some areas within the authorized acquisition boundary. In many instances the Service has been able to incorporate private lands within the acquisition boundary into Refuge programs via easements or other agreements.

In 2000, the Service reached a compensation agreement with the Metropolitan Airport Commission (MAC) for damages to the Refuge resulting from expansion of the Minneapolis/St. Paul International Airport. The MAC paid the Service approximately \$26 million in mitigation funds to compensate the Refuge for damages associated to Refuge facilities and programs, to be administered by the Minnesota Valley National Wildlife Refuge Trust, Inc. (Trust). These monies are being used to replace the public use and wildlife values affected by aircraft overflights, by developing facilities, programs, and new Refuge units outside the impact zone of the airport. Consequently, the Trust is actively purchasing new lands within the authorized Refuge boundary. The Trust holds these lands until they can be officially transferred to Service ownership. Meanwhile, the Service manages these lands as part of the Refuge under a formal MOU (USFWS 2013a). In 2016, the Service is taking ownership of an additional 319 acres of land located in the Bloomington Ferry, Louisville Swamp, and St. Lawrence Units of the Refuge.

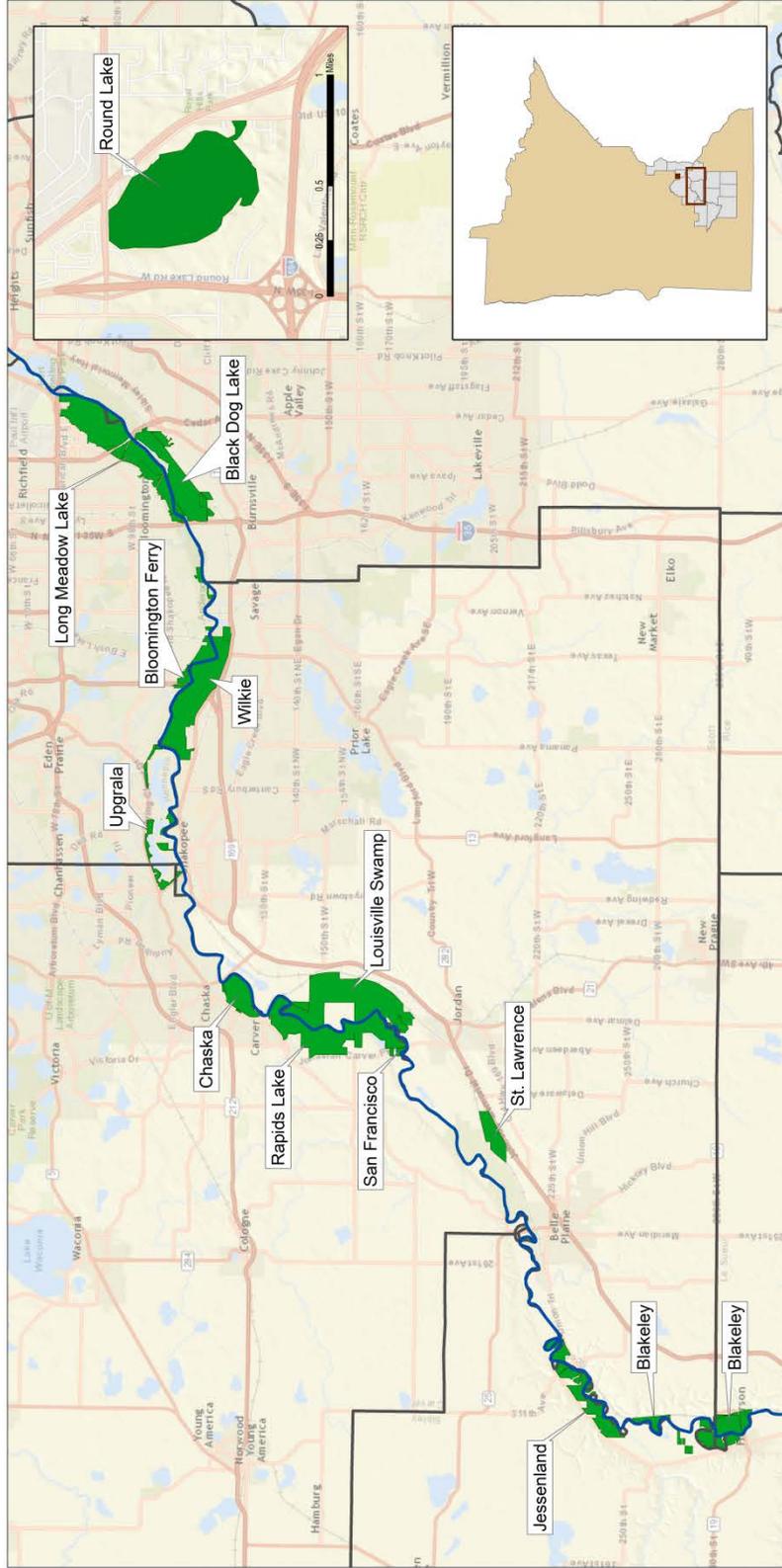
The 2016-2017 Hunting Chapter seeks to open these recently acquired lands to hunting under Service ownership. As directed by Service Policy (605 FW 2.7, USFWS 2014a) we plan, manage, conduct, and evaluate refuge hunting programs in coordination with State fish and wildlife agencies on a consistent basis, in ways that conserve fish and wildlife and their habitats, ensure hunter and visitor safety, comply with applicable State and Federal laws and regulations, and promote respect for the resource. In addition, our regulations strive to be consistent, to the extent practicable, with State regulations.

To initiate or expand hunting programs, the Service must publish in the *Federal Register* any proposed and final Refuge-specific regulations pertaining to hunting prior to implementing them (605 FW 2.9, USFWS 2014a). The regulations are only one element of a complete hunting program opening package which is comprised of the following documents: Refuge Hunting Chapter; compatibility determination; documentation pursuant to compliance with the National Environmental Policy Act of 1969, as amended (NEPA), and appropriate NEPA decision document; Endangered Species Act Section 7 evaluation; copies of letters requesting State involvement and the results of the request; draft news release; outreach plan; and draft Refuge-specific regulations to be included in 50 CFR Part 32.



U.S. Fish & Wildlife Service
Minnesota Valley National Wildlife Refuge
 Bloomington, Minnesota

Refuge Units



PRODUCED FOR: 2016 AT HUNT PLAN
 BLOOMINGTON, MINNESOTA
 MAP DATE: AUG. 2016
 CARTOGRAPHER: MATT MILLET
 SOURCES: MNMNR, MINNESOTA DNR, USGS, ESRI, DeLORNE

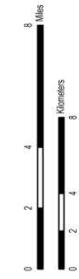


Figure 1: Minnesota Valley National Wildlife Refuge Units

This environmental assessment serves as the NEPA document which analyzes the impacts of the proposed changes to the hunting program at Minnesota Valley National Wildlife Refuge for 2016 and beyond. The Preferred Alternative, as presented in this EA, outlines proposed changes to the 2016-2017 Hunting Chapter. Proposed uses within the 2016-2017 Hunting Chapter have been determined to be appropriate and compatible with the mission of the Refuge System and purposes for which the Refuge was established

3.0 SCOPING AND PUBLIC PARTICIPATION

Previous to this 2016-2017 Hunting Chapter, the Refuge's hunting program has been developed in coordination with Minnesota Department of Natural Resources (MNDNR) regional and area managers, as well as with other metropolitan area public land managers. The general public also was included in some activities. Scoping and public participation included formal and informal meetings as well as through the Refuge soliciting comments on written hunting plans and supporting documents.

The Refuge's consultation with MNDNR and other land managers for the development of this 2016-2017 Hunting Chapter dates back to 1999 when the Refuge began a series of meetings to develop a vision for Refuge programs via the Comprehensive Conservation Plan (CCP) (USFWS 2004) process. Since then, the Refuge has continued informally consulting and coordinating with the State regarding Refuge hunting activities until a more formal effort was renewed in 2009 and 2010. A detailed description of the Refuge's scoping efforts with agencies and the public is provided in Appendix C.

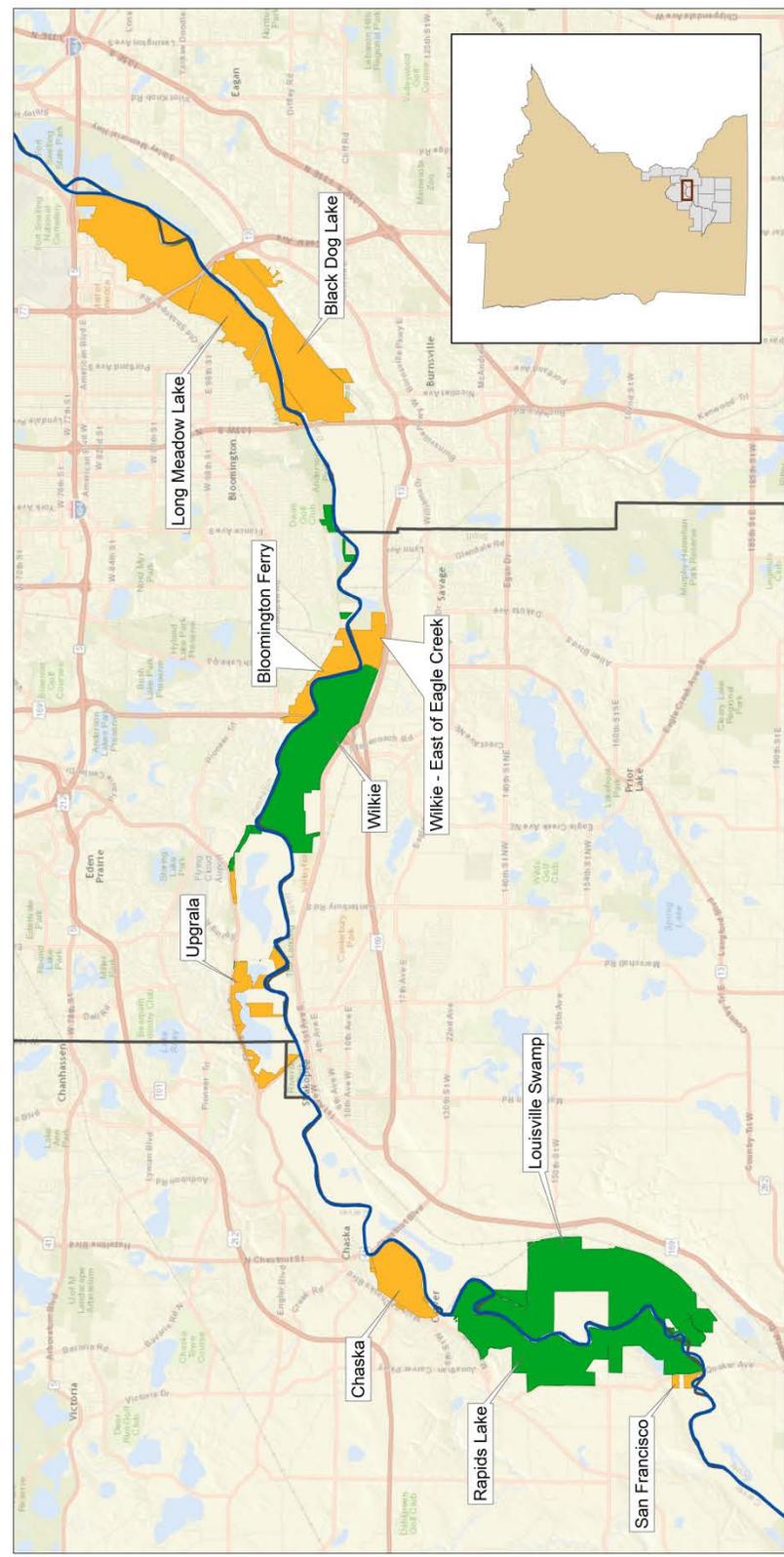
Topics of most concern to consulting agencies and the public that came out of scoping and coordination activities were as follows:

- (will be added after public comment period)

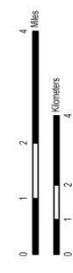


U.S. Fish & Wildlife Service
Minnesota Valley National Wildlife Refuge
 Bloomington, Minnesota

*Units Where Special Use Permits Are
 Required for General Public Hunting*



PRODUCED FOR: 2016/17 HUNT PLAN
 BLOOMINGTON, MINNESOTA
 MAP DATE: AUG. 2016
 CARTOGRAPHER: MATT MILLET
 SOURCES: MNWR, MINNESOTA DNR, USGS, ESR, DELORNE



- Refuge Units
- Special Use Permit Only Refuge Units
- Minnesota River
- County Boundaries

Figure 2: Refuge Units where a Special Use Permit is required to participate in general public hunts.

The Refuge solicited public comments on the Draft 2016 - 2017 Hunting Chapter and EA. The drafts were made available for a 30 day review and comment period which extended from August 17, 2016 through September 16, 2016. The availability of these documents was announced via a public notice to ten print media organizations whose coverage extends beyond the geographic limits of the Refuge. The notice also was sent directly to legislators, municipal officials, agency contacts, and non-governmental organizations (see Section 8.0). The availability of the draft Hunting Plan and EA were announced on the Service's Refuge, Regional, and National websites. During the comment period, Refuge staff were available at the Bloomington Education and Visitors Center during regular business hours to discuss the proposed Hunting Chapter and EA with any interested persons.

Following the Regional Director's review of the Hunting Chapter, this EA, and approval of the Finding of No Significant Impact, and other supporting documentation for opening hunting on the Refuge as described as the preferred alternative here, the Service will publish in the Federal Register a Proposed Rule that updates the hunting program on the Refuge. After the comment period closes for the Proposed Rule, a determination will be made whether to implement Refuge hunting as outlined in this Hunting Chapter. Subsequently, a Final Rule will be published outlining hunting on the Refuge. The Refuge is officially open for the hunting opportunities described here only after the effective date of the final rule. Following these approvals, the Refuge Manager will annually review refuge-specific hunting regulations and the Hunting Chapter to ensure continued compatibility and consistency of the visitor services program with existing laws and regulations.

4.0 PROPOSED ACTION AND THE ALTERNATIVES

One of the main purposes of the Refuge is to provide wildlife-dependent recreation and environmental education (*Public Law 94-466; October 8, 1976*). Hunting is a valuable means to meet this purpose. Toward that end, the Refuge has drafted an updated Hunting Chapter of its Visitor Services Plan. The 2016-2017 Hunting Chapter seeks to (1) expand general public hunting opportunities on Service lands with a Refuge Special Use Permit and (2) open new species to public hunting. Proposed uses within this Plan are appropriate and compatible with the mission and goals of the Refuge System and the purposes for which the Refuge was established (USFWS 2012).

The Service evaluated possible hunting program changes through three alternatives: (1) No Hunting, (2) Maintain Current Hunting Programs on Refuge Lands Previously Opened to Hunting, (3) Maintain Current Hunting Programs on Refuge Lands Previously Opened to Hunting and Open Recently Acquired Lands to Hunting.

4.1 Alternatives Considered But Not Developed

A potential alternative was considered but not carried forward for detailed analysis because it would not enable the Refuge to fulfill the purposes for which it was established.

4.1.1 No Hunting

A No Hunting alternative would require existing hunting activities to cease on the Refuge. Most lands presently managed as part of the Refuge were hunted upon prior to being included in the Refuge. With few exceptions those lands continued to be hunted upon after becoming part of the Refuge.

Numerous comments supporting the continuation of hunting were received during the scoping for the original EA supporting the establishment of the Refuge and the EIS (USFWS 1982) which was completed immediately after establishing legislation was passed in 1976 and which evaluated the proposed master plan for Refuge development. The Refuge hunting program has been reviewed several times since 1982 and there has been no public support for alternatives that eliminate hunting on Refuge lands.

The Improvement Act identifies hunting as one of six priority uses of lands within the Refuge System. To eliminate hunting on Refuge lands where it already has been determined to be compatible with Refuge purposes and the mission of the System would not meet the intent of the Improvement Act. The selected alternative in the Refuge's 2004 CCP (USFWS 2004) identified a hunting program that was expanded yet compatible and balanced with other priority Refuge uses.

4.2 Alternatives Developed For Detailed Analysis

Two alternatives, (1) maintain current hunting programs on refuge lands previously opened to hunting and (2) maintain current hunting programs on refuge lands previously opened to hunting and open recently acquired lands to hunting.

4.2.1 Elements Common to Developed Alternatives

Under both alternatives, hunting on the Refuge will be consistent with State regulations such as: (1) hunting hours, (2) license requirements, (3) possession rules and bag limits, (4) hunting firearms and bow requirements, and (5) blaze orange requirements. Both alternatives also follow State hunting seasons with a few exceptions. The Refuge uses February 28th as a cut-off date for the majority of hunting activities to ensure that bird migration and breeding is not disrupted.

Regulations pertaining to hunting on all National Wildlife Refuge System Lands would remain in effect with both alternatives. These regulations are identified in Title 50 of the Code of Federal Regulations (Sections 20.21 and 32.2) and in the Refuge Hunting Chapter associated with this document. Topics covered by these regulations include baiting, possession of alcohol, and use of nontoxic shot for migratory birds.

Refuge-specific regulations also would apply to both alternatives. These regulations are identified in Title 50 of the Code of Federal Regulations Section 32.42 and in the Refuge Hunting Chapter associated with this document. Refuge-specific regulations include hunting access hours, use of stands and boats, use of hunting dogs, and types of weapons and ammunition allowed for hunting. The Refuge currently requires non-toxic shot for migratory bird and upland game including turkey hunting but we encourage hunters to voluntarily use non-toxic projectiles for all types of hunting.

With both alternatives, the Refuge is open to hunting for migratory birds (geese, ducks, merganser, coot, moorhen, rails, woodcock, common snipe, and mourning dove), upland game (ruffed grouse, ring-necked pheasant, gray partridge, gray squirrel, fox squirrel, snowshoe hare, cottontail rabbit, jackrabbit, American crow, Wild turkey, raccoon, opossum, coyote, red fox, and skunk) and big game (white-tailed deer). The Refuge is closed to hunting for species not listed as open even if those species have a season within state regulations. Species not open to hunting on the Refuge include swans, sandhill cranes, badgers, ground squirrels, and all other species not listed as open, including both protected and unprotected species as defined by the State of Minnesota.

Under both alternatives, parts of certain Refuge Units may be open to Refuge-specific special hunts. A Refuge-specific special hunt is an activity focused on certain populations of hunters to provide them with additional opportunities or methods of hunting through a Refuge approved program. The populations to be served with these hunts are youth hunters, physically challenged hunters, or other underserved hunter populations. Refuge-specific special hunts may be allowed for migratory birds, upland game, or big game and always will require Refuge-specific authorization. They are conducted within the framework of the State seasons and regulations for the species proposed to be hunted. Refuge-specific special hunts for the physically challenged and youth hunters will be administered on designated areas of the Refuge. Some of these designated areas would be closed to hunting by the general public during the time of the Refuge-specific special hunt. In administering special hunts, the Refuge Manager will consider the biological effects of proposed hunting activities as well as the hunts potential to conflict with concurrent non-hunting recreational activities.

4.2.2 Alternative A: Maintain Current Hunting Programs on Refuge Lands Previously Opened to Hunting (No Action)

Most units of the Refuge support populations of migratory birds, big game, and upland game. All units of the Refuge are open to the public for some type of recreational use; portions of 12 of the 13 Refuge Units have been previously opened to some type of hunting. Portions of some Units have areas that are closed to hunting to accommodate other recreational, biological, or administrative uses.

The current hunting program allows specific hunting activities on designated units or portions of units. This enables the Refuge to balance species needs and other recreational uses with hunting activities. Hunting is not allowed on the Round Lake Unit. The Long Meadow Lake, Black Dog, Bloomington Ferry, Upgrala, and Chaska Units are closed to general public hunting but are sometimes used for Refuge-specific special hunts by groups such as youth hunters and physically challenged hunters. Portions of the Wilkie, Louisville Swamp, and Rapids Lake, St. Lawrence, Jessenland, and Blakeley Units of the Refuge are open to hunting by the general public.

Hunting activities currently allowed on specific Refuge Units are as follows:

Round Lake Unit

Closed to all hunting including Refuge-specific special hunts.

Long Meadow Lake Unit

Open only to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

Black Dog Unit

Open only to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

Bloomington Ferry Unit

Open only to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

Wilkie Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

- Migratory Birds closed to State spring season light goose hunting.

East of Eagle Creek (i.e., Continental Grain Marsh)

- Open only to Refuge-specific special hunts.

West of Eagle Creek to Highway 169 (i.e., Rice Lake)

- Migratory Birds
 - Open only to hunting goose, duck, merganser, moorhen, coot, and rails.
 - Closed to hunting mourning dove, snipe, and woodcock.
- Upland Game
 - Closed to firearms hunting.
- Big Game
 - Closed to firearms hunting.

West of Highway 169 (including Fisher and Blue Lakes)

- Migratory Birds
 - Open only to Refuge-specific hunts.
- Upland Game
 - Closed to firearms hunting.
- Big Game
 - Closed to firearms hunting.

Upgrala Unit

Open only to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

Chaska Unit

Open only to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

Louisville Swamp Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

North of Middle Road

- Migratory Birds
 - Open only to Refuge-specific hunts.
- Upland Game
 - Closed to firearms hunting.
- Big Game
 - Closed to firearms hunting.

South of Middle Road

- Migratory Birds
 - Open to hunting according to State regulations.
- Upland Game
 - Open to hunting according to State regulations.
- Big Game
 - Open to hunting according to State regulations.

Rapids Lake Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

- Migratory Birds
 - Open to hunting according to State regulations.
- Upland Game
 - Open to hunting according to State regulations.
- Big Game
 - Open to hunting according to State regulations.

San Francisco Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

St. Lawrence Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.

- Migratory Birds
 - Open to hunting according to State regulations.
- Upland Game
 - Open to hunting according to State regulations.
- Big Game
 - Closed to firearms hunting.

Jessenland Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

- Migratory Birds
 - Open to hunting according to State regulations.
- Upland Game
 - Open to hunting according to State regulations.
- Big Game
 - Open to hunting according to State regulations.

Blakeley Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
 Open to population management hunting with a Special Use Permit.

- Migratory Birds
 - Open to hunting according to State regulations.
- Upland Game
 - Open to hunting according to State regulations.
- Big Game
 - Open to hunting according to State regulations.

Importantly, under this Alternative recently acquired lands that were previously hunted while privately owned will be owned by the Service in 2017. These lands would become closed to hunting per Service policy that requires an opening package be submitted and approved in order for lands to be open to hunting. On the Bloomington Ferry Unit, 22 acres will be closed in 2017 and beyond. On the Louisville Swamp Unit, 142 acres will be closed in 2017 and beyond. On the St. Lawrence Unit, 155 acres will be closed in 2017 and beyond.

4.2.3 Alternative B: Maintain Current Hunting Programs on Refuge Lands Previously Opened to Hunting and Open Recently Acquired Lands to Hunting (Preferred Alternative)

In this Alternative the Service is proposing to maintain current hunting programs on Refuge lands previously opened to hunting for current species and methods of hunting. In addition, the Service proposes to opening recently acquired lands to hunting. This Alternative would open 319 acres of recently acquired lands on three units to Refuge hunting programs. These units are the Bloomington Ferry, Louisville Swamp, and St. Lawrence (Appendix B). All of the recently acquired lands proposed to be opened for hunting have been hunted prior to Service ownership. These recently acquired lands will follow the same hunting regulations as the Units they are a part of.

Hunting activities proposed to be allowed on specific Refuge Units follow. Except for the Round Lake Unit, which is closed to hunting, maps identifying pertinent landmarks and Refuge Unit hunting areas are provided in Appendix B.

Round Lake Unit

Closed to all hunting including Refuge-specific special hunts.

Long Meadow Lake Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
 Open to population management hunting with a Special Use Permit.

Black Dog Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

Bloomington Ferry Unit

In 2016, Service land on the Bloomington Ferry Unit was expanded by 22 acres, increasing its size from 314 acres to 336 acres. Hunting activities proposed for these recently acquired lands will be the same as on the other Refuge lands in this Unit.

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

Wilkie Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

- Migratory Birds closed to State spring season light goose hunting.

East of Eagle Creek (i.e., Continental Grain Marsh)

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.

West of Eagle Creek to Highway 169 (i.e., Rice Lake)

- Migratory Birds
 - Open only to hunting goose, duck, merganser, moorhen, coot, and rails.
 - Closed to hunting mourning dove, snipe, and woodcock.
- Upland Game
 - Closed to firearms hunting.
 - Closed to hunting crow.
 - Closed to firearms hunting for “furbearers.”
- Big Game
 - Closed to firearms hunting.

West of Highway 169 (including Fisher and Blue Lakes)

- Migratory Birds
 - Open only to Refuge-specific hunts.
- Upland Game
 - Closed to firearms hunting.
 - Closed to hunting crow.
 - Closed to firearms hunting for “furbearers.”
- Big Game
 - Closed to firearms hunting.

Upgrala Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

Chaska Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

Louisville Swamp Unit

In 2016, Service land on the Louisville Swamp Unit was expanded by 142 acres, increasing its size from 2,483 acres to 2,625 acres. Hunting activities proposed for these recently acquired lands will be the same as on the other Refuge lands in this Unit.

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

North of Middle Road

- Migratory Birds
 - Open only to Refuge-specific hunts.
- Upland Game
 - Closed to firearms hunting.
 - Closed to hunting crow.
 - Closed to firearms hunting for “furbearers.”
- Big Game
 - Closed to firearms hunting.

South of Middle Road

- Migratory Birds
 - Open to hunting according to State regulations.
 - Closed to State spring season light goose hunting.
- Upland Game
 - Open to hunting according to State regulations.
 - Closed to hunting crow.
 - “Furbearers” open to hunting according to Refuge-specific regulations.
- Big Game
 - Open to hunting according to State regulations.

Rapids Lake Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

- Migratory Birds
 - Open to hunting according to State regulations.
 - Closed to State spring season light goose hunting.
- Upland Game
 - Open to hunting according to State regulations.
 - Closed to hunting crow.
 - “Furbearers” open to hunting according to Refuge-specific regulations.
- Big Game
 - Open to hunting according to State regulations.

San Francisco Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

St. Lawrence Unit

In 2016, Service land on the St. Lawrence Unit was expanded by 155 acres, increasing its size from 297 acres to 452 acres. Hunting activities proposed for these recently acquired lands will be the same as on the other Refuge lands in this Unit.

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

- Migratory Birds
 - Open to hunting according to State regulations.
 - Closed to State spring season light goose hunting.
- Upland Game
 - Open to hunting according to State regulations.
 - Closed to hunting crow.
 - Closed to firearms hunting for “furbearers.”
- Big Game
 - Closed to firearms hunting.

Jessenland Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

- Migratory Birds
 - Open to hunting according to State regulations.
 - Closed to State spring season light goose hunting.
- Upland Game
 - Open to hunting according to State regulations.
 - Open to crow hunting according to Refuge-specific regulations.
 - “Furbearers” open to hunting according to Refuge-specific regulations.
- Big Game
 - Open to hunting according to State regulations.

Blakeley Unit

Open to Refuge-specific special hunts for migratory birds, upland game, and big game.
Open to population management hunting with a Special Use Permit.

- Migratory Birds
 - Open to hunting according to State regulations.
 - Closed to State spring season light goose hunting.
- Upland Game
 - Open to hunting according to State regulations.
 - Open to crow hunting according to Refuge-specific regulations.
 - “Furbearers” open to hunting according to Refuge-specific regulations.
- Big Game
 - Open to hunting according to State regulations.

4.2.4 Comparison of Developed Alternatives

Table 4.2.4.1 presents a general comparison of the Alternatives. Table 4.2.4.2 presents a unit by unit comparison of hunting activities allowed for the Alternatives.

Table 4.2.4.1 – General Comparison of Alternatives.

Action	Alternative A (No action)	Alternative B (Preferred)
Species to be hunted	<p>Migratory Birds: goose, duck, merganser, coot, moorhen, rails, woodcock, common snipe, mourning dove</p> <p>Upland Game: ruffed grouse, gray partridge, ring-necked pheasant, gray squirrel, fox squirrel, cottontail rabbit, snowshoe hare, jackrabbit, wild turkey</p> <p>Big Game: white-tailed deer</p>	<p>No change</p> <p>No change</p> <p>No change</p>
Locations of hunts	<p>Units closed to all hunting: Round Lake</p> <p>Units open to Refuge-specific special hunts only: Long Meadow Lake, Black Dog, Bloomington Ferry, Wilkie-Continental Grain Marsh, Upgrala, Chaska, San Francisco.</p> <p>Units open to general public hunts only: None. (0 ac.)</p> <p>Units open to Refuge-specific special and general public hunts: Parts of Wilkie, Louisville Swamp, Rapids Lake, St. Lawrence, Jessenland, Blakeley.</p>	<p>No change</p> <p>Addition of 22 acres of property to the Bloomington Ferry Unit. 1% increase in acreage open to Refuge-specific special hunts only</p> <p>No change</p> <p>Addition of 155 acres to St. Lawrence Unit. Addition of 142 acres to Louisville Swamp Unit. 1% increase in acreage open to both special and general public hunts</p>
Huntable land base	<p>14,083 acres open to general public or Refuge-specific special hunts out of 14,235 acres of Refuge lands</p> <p>Maintain huntable acres at pre-Service ownership levels.</p> <p>Hunting within 100 ft. of marked trails or parking lots prohibited.</p>	<p>14,402 acres of open to general public or Refuge-specific special hunts out of 14,554 acres of Refuge lands</p> <p>No change</p> <p>No change</p>
Conflict between hunting and non-hunting activities	<p>Potential conflicts with biological, non-hunting public use, or administrative activities mitigated by spatial and temporal separation of activities.</p>	<p>No change</p>

Table 4.2.4.2 - Unit by unit comparison of hunting activities allowed for Alternatives.

Unit	Alternative A (No action)	Alternative B (Preferred)
Round Lake Unit	Closed to all hunting including Refuge-specific special hunts.	No change
Long Meadow Lake Unit	Open only to Refuge-specific special hunts for migratory birds, upland game, and big game. Refuge authorization required.	No change
	Open to population management hunting by general public with a Special Use Permit.	No change
Blackdog Unit	Open only to Refuge-specific special hunts for migratory birds, upland game, and big game. Refuge authorization required.	No change
	Open to population management hunting by general public with a Special Use Permit.	No change
Bloomington Ferry Unit	Open only to Refuge-specific special hunts for migratory birds, upland game, and big game. Refuge authorization required.	No change
	Open to population management hunting by general public with a Special Use Permit.	No change
Wilkie Unit	<p><u>Entire Unit</u></p> <p>Closed to State spring season light goose hunting.</p> <p>Open to population management hunting by general public with a Special Use Permit.</p> <p><u>East of Eagle Creek (i.e., Continental Grain Marsh)</u></p> <p>Open to Refuge-specific special hunts for migratory birds, upland game, and big game. Refuge authorization required</p> <p><u>West of Eagle Creek to Highway 169 (i.e., Rice Lake)</u></p> <p>Migratory Birds</p> <ul style="list-style-type: none"> • Open to hunting goose, duck, merganser, moorhen, coot, and rails only • Closed to hunting mourning dove, snipe, and woodcock. <p>Upland Game</p> <ul style="list-style-type: none"> • Closed to firearms hunting. <p>Big Game</p> <ul style="list-style-type: none"> • Closed to firearms hunting. 	<p><u>Entire Unit</u></p> <p>No change</p> <p>No change</p> <p><u>East of Eagle Creek (i.e., Continental Grain Marsh)</u></p> <p>No change</p> <p><u>West of Eagle Creek to Highway 169 (i.e., Rice Lake)</u></p> <p>No change</p> <p>No change</p> <p>No change</p> <p>No change</p>

Table 2. Unit by unit comparison of hunting activities allowed for Alternatives (Continued).

Unit	Alternative A (No action)	Alternative B (Preferred)
Wilkie Unit	<p><u>West of Highway 169 Bridge (including Fisher and Blue Lakes)</u> Migratory Birds</p> <ul style="list-style-type: none"> • Open only to Refuge-specific special hunts. Refuge authorization required <p>Upland Game</p> <ul style="list-style-type: none"> • Closed to firearms hunting. • Open to Refuge-specific special hunts. <p>Big Game</p> <ul style="list-style-type: none"> • Closed to firearms hunting. 	<p><u>West of Highway 169 Bridge (including Fisher and Blue Lakes)</u></p> <p>No change</p> <p>No change</p> <p>No change</p>
Upgrala Unit	<p>Open only to Refuge-specific special hunts for migratory birds, upland game, and big game. Refuge authorization required.</p> <p>Open to population management hunting by general public with a Special Use Permit.</p>	<p>No change</p> <p>No change</p>
Chaska Unit	<p>Open only to Refuge-specific special hunts for migratory birds, upland game, and big game. Refuge authorization required.</p> <p>Open to population management hunting by general public with a Special Use Permit</p>	<p>No change</p> <p>No change</p>
Louisville Swamp Unit	<p><u>Entire Unit</u> Open to Refuge-specific special hunts for migratory birds, upland game, and big game.</p> <p>Open to population management hunting with a Special Use Permit.</p> <p><u>North of Middle Road</u> Migratory Birds</p> <ul style="list-style-type: none"> • Only open to Refuge-specific special hunts. <p>Upland Game</p> <ul style="list-style-type: none"> • Closed to firearms hunting. • Open to Refuge-specific special hunts. <p>Big Game</p> <ul style="list-style-type: none"> • Closed to firearms hunting. <p><u>South of Middle Road</u> Migratory Birds</p> <ul style="list-style-type: none"> • Open to hunting according to State regulations. • Closed to State spring season light goose hunting. 	<p><u>Entire Unit</u> No change</p> <p>No change</p> <p><u>North of Middle Road</u> No change</p> <p>No change</p> <p>No change</p> <p><u>South of Middle Road</u> No change</p>

wildlife observation trails, and environmental education programs. Nationwide, about 40 million visitors annually hunt, fish, observe and photograph wildlife, or participate in educational and interpretive activities on refuges. The System is the most comprehensive system in the world of lands and waters managed specifically for the protection of wildlife and wildlife habitat.

The authorized boundary of the Refuge encompasses 26,018 acres. Nearly 14,600 acres presently are owned or managed as part of the Refuge. Some areas are not owned by the Service but are administered through management agreements. Presently, the Refuge consists of 13 Units; 12 of these Units are along a 70 mile reach of the Minnesota River located between historic Fort Snelling and the City of Henderson. The Refuge's Land Protection Plan (USFWS 2004) identifies goals for additional lands to be purchased or administered as part of the Refuge within this area. The Round Lake Unit, a 152-acre lake basin tract with an area of permanent wetland located in the City of Arden Hills, is a disjunct part of the Refuge.

Refuge lands are interspersed among lands owned by state agencies, local governments, and private corporations and citizens. The Refuge strives to enter management agreements with neighboring landowners to ensure that adjacent lands are managed in a way that complements the Refuge's activities.

During the early 1990's, the focus of habitat management on the Refuge changed dramatically from optimizing habitat edges aimed at a narrow group of game species to ecosystem management using native species and natural processes. This approach is based on restoring and maintaining naturally occurring, pre-European settlement native plant communities to the extent possible. Presently, animal populations and habitats are not being manipulated to maximize any particular species or group of species, but are allowed to vary over time within the capacity of the biotic and abiotic resources.

A detailed historical background and description of natural and cultural resources on the Refuge can be found in the CCP and Environmental Assessment for the Minnesota Valley National Wildlife Refuge and Wetland Management District (USFWS 2004). A summary of those resources follows.

5.1 Landscape Setting

The landscape encompassing the Refuge was formed 11,000 years ago. During the Pleistocene Epoch, an inland sea named Glacial Lake Agassiz formed from the meltwaters of the retreating eastern edge of the Des Moines Lobe of the Laurentide Ice Sheet. Lake Agassiz was 700 feet deep and covered over 100,000 square miles in Minnesota, North Dakota, and Manitoba. Torrential meltwater drainage from Lake Agassiz created the River Warren, which varied from one to seven miles wide and from 75 to 200 feet deep. In most of the lower river valley, the river carved out a very wide and deep channel. As the Ice Age diminished, the northern outlet to Hudson Bay developed and the levels of both Lake Agassiz and River Warren receded. The resulting underfit stream meandered through an extremely wide floodplain bordered by broad terraces of rock sand, and gravel. The higher terraces were rounded-off and dissected by erosion. These terraces form the bluffs of what is now the Minnesota River Valley. Today, the Minnesota River Valley is a corridor of floodplain, forest, and wetlands that extend across some of Minnesota's most productive and intensively cultivated agricultural lands. The Valley is

classified as a northern floodplain forest ecosystem that extends through the Big Woods, Mississippi Sand Plains, and the Southern Oak Barrens landscape regions of the State.

Over 90 percent of the current Refuge lands are located within the urban and suburban areas of the seven county Minneapolis-St. Paul (Twin Cities) Metropolitan Area. The Metropolitan Area had a population of nearly three million people in 2010 and is the country's 16th-largest metropolitan area. The Refuge is a green belt of marsh and woodland areas bordered by office buildings, highways, residential areas, and grain terminals. The Metropolitan Council, which has jurisdiction over the seven county Metropolitan Area, developed land use data for this area that encompasses most of the Refuge. Table 5.1 identifies the proportion of lands within the 1.9 million acre Metropolitan Area that fall within different land use categories (Metropolitan Council 2011).

The Refuge is comprised of 13 Units currently totaling about 14,600 acres, spanning 70 miles of the Minnesota River. Of the Refuge's 14,600 acres, about 14,000 lie within the seven county Twin Cities Metropolitan Area. These Refuge lands comprise less than 1% of the Twin Cities Metropolitan Area. Two Refuge Units, Jessenland and Blakeley, lie outside the Twin Cities Metropolitan Area in an area dominated by agriculture and rural development.

Table 5.1. Proportion of Lands within the Twin Cities Metropolitan Area by Use Type (2010 Data).

Land Use	Percent	Acres
Residential	22	411,000
Commercial	2	37,000
Industrial	3	49,000
Institutional	2	36,000
Parks and Recreational	10	199,000
Major Roadways	2	30,000
Undeveloped	23	436,000
Agricultural	30	568,000
Open Water	6	125,000

5.2 Natural Resources

5.2.1 Habitats

The Refuge is located within the transition zone between the eastern broadleaf forest and the prairie parkland ecoregions as defined by Bailey (1983). Plant communities within this transition contain a mixture of hardwood forest, oak savanna, and mesic prairie. The many lakes, wetlands, streams, and springs of these ecoregions exhibit diverse emergent and submergent aquatic vegetation. The specific community types and their quality are dependent upon a number of factors including climate, soils, historical vegetation, previous disturbance, and habitat restoration and management activities.

The 12 river Units of the Refuge lie along the lower portion of the Minnesota River between historic Fort Snelling and the City of Henderson. Approximately 90 percent of the Refuge is located within the 100-year floodplain. The surrounding bluffs have slopes of 12-25 percent, or more, and at their rim average 100 feet elevation above the river valley. A natural levee along the river channel in several portions of the Refuge has created many wetlands and shallow lakes in the floodplain. These wetlands are very productive and of considerable importance to waterfowl and waterbirds. A significant portion of these floodplain wetlands are recharged from groundwater seeps and springs along the toe of the bluffs. Small feeder creeks and streams are also common in the floodplain on or near several Refuge Units. Consequently, the water quality of these wetlands is high where the natural flows and recharge areas have not been altered by development.

The Minnesota River is the largest tributary of the Upper Mississippi River. From its source near Big Stone Lake in western Minnesota, the Minnesota River flows southeast for 224 miles to Mankato, then northeast for 106 miles to its confluence with the Mississippi River at Fort Snelling, in the middle of the Minneapolis-St. Paul Metropolitan Area. The downstream boundary of the Refuge is about six river miles above the confluence. The river itself meanders very slowly through the valley and averages a grade of 0.8 foot per mile from Mankato to Carver. Its gradient is nearly level from Carver to its confluence with the Mississippi River. Along its course the surrounding land uses are typical of a rural to urban continuum.

Refuge Units contain a variety of wetlands ranging from shallow wet meadows and calcareous fens to permanently flooded mixed emergent marshes. The river Units are dominated by the latter where water is continuously present. Nearly all of these wetlands are spring fed and most of these large riverine basins are surrounded by mature cottonwood, willow, and silver maple dominated plant communities. Water control structures have been installed on several basins and water levels are manipulated to manage fish and improve the productivity of the aquatic communities. Many of these wetlands provide good quality production, brood rearing, feeding, or migration habitats for a host of resident and migratory species. They also provide good quality spawning and nursery habitat for fish that inhabit the Minnesota River.

Floodplain forests historically dominated much of the floodplain along the Minnesota River and its tributaries. Today, this plant community remains on several of the Refuge river Units. Typical tree species found in these seasonally flooded areas include silver maple, cottonwood, American elm, green ash, and box elder. The understory of these forests is generally open and in places the groundcover consists of wood nettle. In the past several years, former Refuge croplands that were historical floodplain forest have been replanted with species typical of this community with limited success.

Oak forests dominated by northern pin oaks and white oaks are the most common upland forest community on the Refuge. These stands occur on nutrient-poor hillsides and well-drained sandy soils along the Minnesota River Valley. They also contain overstory trees such as ash, elm, and maple. The shrub layer in these communities is frequently dense and commonly consists of American hazel, dogwood, and black raspberries. The control of European buckthorn, a prolific exotic in some of these plant communities, is a considerable challenge.

Oak savanna is critically imperiled throughout the Midwest. This plant community is characterized by scattered individuals and clumps of oaks growing with an understory dominated by prairie grasses and forbs. Many of today's oak forests were oak savanna prior to European settlement and the subsequent control of fires. Natural regeneration of this plant community without a natural fire regime is rare due to the inability of oak to reproduce under forest canopies. Many other historic savannas have been lost due to conversion to production agriculture or urbanization. Since 1994, several oak savanna restoration sites have been identified on the Refuge. Restoration has been initiated on these sites through a combination of mechanical treatment and prescribed burning. Initial results are encouraging as evidenced by the return of an understory of native grasses and forbs.

Remnant native prairie is some of the most diverse and important plant communities that exist in the Midwest. These rare and unique grasslands on Refuge Units include wet, mesic and dry prairie and they are frequently interspersed with woodland areas, especially those forested sites protected from periodic fires. Mesic prairie is dominated by tall grasses including big bluestem and Indian grass. Medium-height grasses such as little bluestem and sideoats grama dominate dry prairies. Both mesic and dry prairies found on the Refuge contain shrubs such as leadplant and wild rose. Pasque flower and purple prairie clover are also commonly found in both plant communities.

Native grassland restoration has occurred on upland sites of Refuge units, easements, and associated private lands for many years. Former croplands are typically planted to native grass mixtures consisting of big bluestem, little bluestem, switch grass, sideoats grama, and Canada wildrye. Mixtures of forbs also are planted to enhance the biological diversity of many of these sites.

Several small streams exist on the Refuge and some of these streams historically supported native brook trout. Some streams originate from springs within the bluff and bluff-floodplain transition zone of the Minnesota River. Several of these streams have a continual supply of cool, well-oxygenated ground water and support a variety of aquatic organisms. The streams also serve as a water source for many of the Refuge wetlands. The origins of the larger streams, such as Sand Creek, are in the watershed above the river valley, and are impacted by the dominance of agriculture throughout the watershed.

Horseshoe Lake on the Rapids Lake Unit is one of the deep water habitats on the Refuge. Historically, this lake was an oxbow of the Minnesota River, but it has since become disconnected from the main channel. The depth of this lake is unknown, as is the composition of its fishery. The Refuge shares ownership with private parties on Long Lake, the other deep water habitat on the Refuge, also on the Rapids Lake Unit. A 1998 fishery survey showed that 18 species of fish, and many large snapping turtles, occupied Long Lake. The most numerous species were black crappie, gizzard shad, black and brown bullhead, and common carp. Aquatic exchange with these lakes and the Minnesota River does occur nearly every year during spring flooding. The open water pools serve as a loafing area for waterfowl, marsh birds, and occasional seasonal habitat for shorebirds. The trees surrounding the lakes provide good perch sites for a number of species including herons, bitterns, and raptors such as the Bald Eagle and Red-tailed Hawk.

5.2.2 Wildlife

More than 260 species of birds use the area during migration and 100-150 of these species nest in the Minnesota River Watershed. Bald Eagles use the area for nesting and feeding throughout the year. Every year, 30,000-40,000 waterfowl congregate in the lower portion of the Minnesota River Valley prior to fall migration. This avian diversity is complemented by approximately 50 species of mammals and 30 species of reptiles and amphibians. At least 10 game fish species are found in the river and tributaries including walleye, northern pike, largemouth bass, and channel catfish.

5.2.2.1 Migratory Birds

Migratory birds on the Refuge include both game and nongame species. The Minnesota River and adjacent bottomlands and uplands serve as a major migratory corridor for these birds as they travel between their breeding and wintering grounds.

Waterfowl

The annual Waterfowl Population Status Report (USFWS 2015) includes data on the 2014 breeding population and production information available for waterfowl in North America and is a result of cooperative efforts by the Service, the Canadian Wildlife Service, various state and provincial conservation agencies, and private conservation organizations. These annual assessments are based on the distribution, abundance, and flight corridors of migratory birds. The 2015 report showed that in the traditional survey area, the total breeding duck population was 49.5 ± 0.8 (SE) million birds. This estimate is similar to the 2014 population estimate (49.2 ± 0.8 (SE) million birds) and 43% above the long term average (USFWS 2015).

Due to well below average rainfall in early spring, much of the state was classified under drought conditions and wetlands were extremely dry, although precipitation later in the breeding season improved wetland conditions. The number of permanent or semi-permanent wetlands decreased 36% compared to 2014, and the number of wetlands were 13% below the long-term averages. The estimated 2015 Minnesota mallard breeding population was 206,000, which was similar to the 2014 estimate of 257,000 mallards and 10% below the long-term average of 228,000. The estimate of total duck abundance in Minnesota for 2015, excluding scaup, was 524,000, which was higher than last year's estimate (474,400), but lower than the long-term average of 618,200 (USFWS 2015).

According to the MNDNR (Dexter 2015) Canada goose (*Branta canadensis*) population estimates were 267,488 in Minnesota, a slight increase from 2014 (261,623). The Mid-continent Population (which includes Minnesota) for light geese, snow geese (*Chen caerulescens*) and Ross's geese (*Chen rossii*), was 3,284,100 light geese (USFWS 2015). This was a 14% decrease from 2014, (3,284,100) but still similar to long term averages. The MNDNR recorded American coot (*Fulica americana*) populations as 9,888 for 2015, compared to the 2014 estimate of 18,984 (Dexter 2015).

Other Migratory Game Birds

American woodcock

The American woodcock (*Scolopax minor*) is a popular game bird throughout eastern North America. The management objective of the Service is to increase populations of woodcock to levels consistent with demands of consumptive and nonconsumptive users (USFWS 1990). The Singing Ground Survey for 2015 indicated that indices for singing American woodcock males in the Central Management Region (which includes Minnesota) are not significantly different from 2014 (Cooper & Rau 2015). The 10-year trend was not significantly different and the fourth straight year that the trend has remained stable (Cooper & Rau 2015).

Mourning dove

The mourning dove (*Zenaida macroura*) is one of the most abundant species in urban and rural areas of North America. The annual harvest is estimated to be between 5% and 10% of the population (Otis et al. 2008). Population assessments such as counts of doves heard are used to monitor mourning dove populations. The resulting information is used by wildlife administrators in setting annual hunting regulations (Seamans 2015). Over their entire range, there has been a dove decline in the last 49 years, but not the most recent 10 years (Seamans 2015). Overall abundance of doves in the Central Management Zone, of which Minnesota is a part, seemed to increase from 2013 to 2014 (Seamans 2015). In Minnesota the number of mourning doves observed in 2014 increased by 20% from 2013. The 2014 dove abundance was 23 % below the 10-year average, and 35% below the long-term average (Dexter 2015).

Other migratory game birds

The natural histories of rails, gallinules, and snipe make it difficult to estimate their populations. Breeding season data for rails and snipe, except Wilson's Snipe, in Minnesota and the Mississippi Flyway indicate that long term populations are more or less stable (Sauer et al. 2014). The 10-year trend for Sora shows a slight decrease, while the 10-year trend for Virginia rails is stable (non-significant increase) based on 2003-2013 data from Breeding Bird Survey (Sauer et al. 2014). Wilson's snipe (*Gallinago delicata*) has a significant decline in its population's trend (Sauer et al. 2014).

Non-Game Migratory Birds

Marsh and waterbirds frequently observed in the valley and surrounding areas include Great Egrets, Double-crested Cormorants, Great Blue Herons, Green Herons, and Black-crowned Night-Herons. Exposed mudflats on Refuge riverbanks and wetlands attract shorebirds including Greater and Lesser Yellowlegs and Spotted Sandpipers.

Neo-tropical migrants attracted to forested habitats include thrushes, vireos and warblers. Several species of grassland birds, including bobolinks, field sparrows, song sparrows, and Eastern bluebirds also use the Refuge. Year-round residents include Downy, Hairy, Pileated and Red-bellied Woodpeckers. Birds of prey inhabiting Refuge lands include Red-tailed Hawks, American Kestrels, Sharp-shinned Hawks and Cooper's Hawks.

5.2.2.2 Upland Game

The harvest management of small upland game which includes huntable small mammals (squirrel, rabbit, and hare) and upland game birds (pheasant, grouse, gray partridge) is based on the understanding that small game species produce a large number of young each year, most of which are available for harvest because they would naturally not survive the winter and add to the next season's breeding population. Hunting these species is considered a form of

compensatory mortality. It allows that a large portion of a species population could be harvested each fall because, if not taken by hunters, game species would likely die prior to the next breeding season from other causes. Compensatory mortality does not reduce subsequent spring breeding population size below what it would have been due to natural mortality. It follows that hunting mortality is compensated by a reduction in natural mortality. This concept of animal surplus relates especially well to r-selected species (i.e., small game animals having high potential for population increase with high annual mortality rates).

Data for small (upland) game is collected by MNDNR surveys. Annual population indices, 10-year averages, and historical information are used to determine statewide hunting seasons and bag limits for individual species. The 2015 August Roadside Survey found that population indices for the last few years are below the 10-year and long-term average (Dexter 2015). This trend was also similar in 2014. The MNDNR, however, has not proposed to modify hunting regulations for these species.

Wild turkey

Minnesota's wild turkey (*Meleagris gallopavo*) population has continued to expand since the first successful reintroduction in southeastern Minnesota in the 1960s. Turkey hunting is permitted in both the spring and fall; however hunting is closely regulated for continued population growth (Giudice et al. 2011). The 2006 statewide turkey population was estimated at 60,000 birds. The MNDNR's 2011 management goal is to establish and maintain the spring wild turkey population at or above 75,000 in suitable habitats to maximize hunting and viewing opportunities. This plan outlined actions for habitat management, hunting season management, population management, and information and education to ensure a successful program (MNDNR 2006). The 2010 Fall Wild Turkey Survey collected data from 13 Turkey Permit Areas in the state. The results showed an increase in the turkey population. The comparison of the distribution of turkeys sighted by deer hunters during fall 2010 suggests that the population is expanding specifically in northern and western Minnesota (Giudice et al. 2011). Although there are no formal population surveys for turkey in the Metropolitan Area near the Refuge, visitors and Refuge staff are observing increasing numbers of turkey on Refuge units.

Ring-necked pheasant

The ring-necked pheasant (*Phasianus colchicus*) competes with the ruffed grouse as the most popular upland game bird in Minnesota. Native in Asia, pheasants were introduced to Minnesota after the native prairie grouse declined in the late 1800s. According to a MNDNR plan, developed in cooperation with Pheasants Forever and other organizations, Minnesota is capable of sustaining high densities of pheasants (MNDNR 2005). Using harvest as an indicator, Minnesota consistently ranks in the top 8 states that have huntable populations of wild ring-necked pheasants. Since 1987, statewide fall population estimates have varied from 1.0 to 2.3 million birds. The majority of the Refuge units open to pheasant hunting are in the MNDNR's Central Region. This region contains 5% of the state's grassland habitat with approximately 311,000 acres. The average number of pheasants observed (40.7/100 mi) in the 2015 survey rose 33% from 2013 and was 39% below the 10-year average (Dexter 2015). The increase in the pheasant abundance can be partially attributed to both the mild winter temperatures and lack of deep snow cover allowing for more available food sources. The heavy rainfall in May could have also contributed to re-nests, but drier conditions during the brood rearing season probably improved survival rates of chicks. (Dexter 2015).

Ruffed grouse

The ruffed grouse (*Bonasa umbellus*) is one of the most popular upland game birds in Minnesota along with the ring-necked pheasant. The number of drum heard per stop (dps) was used as the survey index value. The 2015 average ruffed grouse drums averaged 1.1 dps, which is a 1% decline from last year. This decline was probably due to the relatively little snow cover for snow roosting combined with a very cold and wet spring (Dexter 2015). Few ruffed grouse are found on Refuge lands because the Refuge is on the edge of ruffed grouse range in Minnesota (MNDNR 2015a).

Hungarian partridge

In 2015, the Hungarian partridge (*Perdix perdix*) index (2.3 /100 mi) was 150% higher than last year, 44% below the 10-year average and 83% below the long term average. Hungarian partridge are more strongly affected by weather conditions during nesting and brood rearing than pheasants, so reproductive success is limited outside of arid and dry years. Agricultural practices of converting to more intense, less diversified land use has also reduced the amount of suitable habitat (Dexter 2014). Hungarian partridge are uncommon on Refuge lands because the Refuge is on the edge of their range in Minnesota.

Cottontail rabbit and jackrabbit

Eastern cottontail rabbit (*Sylvilagus floridanus*) index (7.1 /100 mi) in 2015 was 36% higher than in 2014, and 34% below the 10-year average. White-tailed jackrabbit (*Lepus townsendii*) index (0.1 /100 mi) was similar to last year and the 10-year average. The historic lows reflect the loss of preferred habitat (Dexter 2015).

Gray, fox, eastern red squirrel

The MNDNR has no published estimates or trends for fox, eastern red, and gray squirrels; however, Refuge staff has observed that they are abundant in suitable Refuge habitat.

Furbearer Species

Monitoring the abundance of furbearers can be important for documenting the effects of harvest, habitat change, and environmental variability on these species' populations. Due to the nature of furbearers, estimating abundance over large areas using traditional methods such as distance sampling is often ineffective. MNDNR utilizes scent station survey routes to measure furbearer populations. The scent stations consist of sifted soil with a fatty-acid scent tablet placed in the middle. Stations were checked for presence or absence of tracks after a certain amount of time. Scent stations are used to document long-term trends in populations (Dexter 2015).

Coyote

Coyotes (*Canis latrans*) are the most abundant large predator in Minnesota. Based off the 2015 scent station data, coyote had a route visitation rate of 22%. The coyote index is well above its long-term average although it has declined in the past two years in the Farmland Zone, which includes a percent of the Refuge. Part of the Refuge is also in the Transition Zone, which shows that the coyote index is unchanged from last year, and is at peak levels above the long-term average (Dexter 2015). Refuge staff, visitors, and neighbors are reporting increased sightings of coyotes on Refuge lands.

Red fox

Red fox (*Vulpes vulpes*) are the most common predator in Minnesota. Red fox, in 2015, had visitation rates at 29%. In the Farmland Zone the red fox index is well below its long-term average. In the Transition Zone, red fox index had climbed to near long term averages, but have recently declined to well below its long-term average (Dexter 2015).

Gray fox

Grey fox (*Urocyon cinereoargenteus*) is a close cousin of the Red fox, inhabiting a more southern range in Minnesota, closely tied to the Eastern Broadleaf Forest Province. Gray fox is classified as a furbearer in Minnesota and has associated hunting and trapping seasons; only an estimated 600 were harvested in 2014-2015 season (Dexter 2015).

Raccoon

According to MNDNR, there are an estimated 800,000 to one million raccoons (*Procyon lotor*) in Minnesota (MNDNR, 2015b). In 2015, raccoon had a route visitation rate of 33%. The raccoon index has generally remained above-average in recent years in the Farmland Zone. The raccoon index for the Transition Zone has remained near the long-term average (Dexter 2015). Raccoons are routinely observed on Refuge lands.

Striped skunk

Based on the 2015 scent station data, striped skunk (*Mephitis mephitis*) had a route visitation rate of 33%. In the Farmland Zone and Transition Zone, which includes the Refuge, the 2015 data showed that skunk index is near its long-term average (Dexter 2015).

Virginia opossum

Virginia opossum (*Didelphis virginiana*) are common in the southern United States, however are expanding their range north as climates warm and populations are increasing in Minnesota. The MNDNR allows for hunting of opossum, however there are currently not estimates of their populations in the state or of the annual hunting harvest (Dexter 2015). Approximately 2,000 – 8,000 are trapped in Minnesota annually (Dexter 2015).

5.2.2.3 Big Game

White-tailed deer

White-tailed deer (*Odocoileus virginianus*) represent one of the most important big game mammals in Minnesota. High deer population density can pose serious socio-economic and ecological challenges for wildlife managers, such as deer-vehicle collisions, crop depredation, and forest regeneration concerns (Dexter 2015). Based on annual harvest statistics and research, the MNDNR models deer population levels and develop harvest strategies, season frameworks, and season limits to meet target population goals by permit area. The MNDNR closely monitors the status of deer populations to determine appropriate harvest levels. The 2015 population index (21.2 /100 mi) of white-tailed deer for the entire state of Minnesota was similar to 2014, 33% above the 10-year average, and 98% above the long term average (Dexter 2015). The population rates continue to increase in the Southeast and Metro areas of the state, despite efforts to reduce populations (Dexter 2015). Metro Deer Management Area (601), which encompasses a large area of the Refuge, has no limit on antlerless deer for the 2016 hunting season. In 1989 federal, state, and local resource agencies formed a Minnesota Valley Deer Management Task

Force to address deer overpopulation on their interspersed lands. The Task Force set a population goal for the deer herd in the Minnesota River valley at 15-25 deer per square mile (Minnesota Valley Deer Management Task Force 1990).

Aerial surveys estimated deer density on the Long Meadow Lake Unit to be about 29 deer per square mile on January 2016. The same survey also estimated the Bloomington Ferry Unit to have a deer density around 21 deer per square mile. Aerial surveys for deer population density are normally conducted in the winter when deer are concentrated and there is less canopy cover. Deer densities can naturally fluctuate within a year due to deer mobility and seasonal behavior changes, which mean a single population density estimate is not always representative of an area's true deer density value. White-tailed deer densities have fluctuated over the years, but in more urban units like the Long Meadow Lake and Bloomington Ferry Units, the densities generally have been above target densities (Table 2). Other Refuge units near heavily developed areas show similar trends in deer numbers. Deer have not been surveyed every year, sometimes due to survey conditions (e.g., lack of snow cover) or budget constraints (Minnesota Valley Deer Management Task Force, unpublished).

Table 2: Estimated white-tailed deer population density (deer per square mile) based off aerial surveys.

	2000	2003	2005	2006	2007	2011	2013	2015
Long Meadow Lake Unit	39	20	31	66	40	37	43	29
Bloomington Ferry Unit	90	82	30	70	150	15	29	21

Other Mammals

Mammals attracted to aquatic habitats include mink, muskrat, and beaver. The Refuge supports relatively high populations of beaver. River otter, once nearly eliminated in this area, now frequently are seen using Refuge wetlands and river banks. Small mammals typical of Refuge grassland areas include short-tail shrew, deer mouse, thirteen-lined ground squirrel, and plains pocket gopher. Eastern chipmunks and white-footed mouse are commonly found in forested habitats. Both big and little brown bats use the Refuge and its associated lands.

Reptiles and Amphibians

Thirty species of reptiles and amphibians have been reported on the Refuge but little is known about their populations or their limiting factors. Many of these, such as the snapping and painted turtles, are associated with marsh and open waters while others, such as the common garter snake and the western hognose snake, occur in oak savanna and prairie. The singing of chorus frogs is prevalent throughout the Minnesota River Valley during the spring, and prairie skinks are observed in the savanna and grassland habitats.

Fish

The Minnesota River is inhabited by an array of fish including game species such as northern pike, largemouth bass, walleye, bluegill, and crappie. Other species include shovelnose sturgeon and catfish. Like most other fresh water systems in the United States, high populations of common carp inhabit the Minnesota River and adjacent wetlands. Carp are very abundant and threaten native species by competing for food and increasing the turbidity of the water they inhabit. Due to regular spring flooding, many of the Refuge wetlands contain a diversity of fish

that originate in the river. For some species, such as the northern pike these wetlands offer spawning and nursery habitat.

5.3 Threatened and Endangered Species

The only federally listed as threatened, endangered, proposed or candidate species in the areas of the Refuge proposed for hunting is the Northern long-eared bat (*Myotis septentrionalis*). The Northern long-eared bat occurs statewide in Minnesota. According to the Twin Cities Ecological Services Field Office there are no federally listed or candidate species in Carver, Scott, Sibley, and Le Sueur counties. Higgins eye pearl mussel (*Lampsilis higginsii*) is a federally Endangered species that exists in Dakota, Hennepin and Ramsey counties. However, this species range is limited to the Mississippi and St. Croix Rivers, neither of which are within the Refuge boundary. Prairie bush-clover (*Lespedeza leptostachya*), found on native prairie with well drained soils, is a federally threatened species whose range includes Dakota County. The Black Dog Unit is the only Refuge Unit in Dakota County and does not include habitat appropriate for prairie bush-clover.

5.4 Cultural Resources

Archeological records show evidence of all cultural periods spanning from the retreat of the glaciers to the present day on the Refuge. Known and potential sites include isolated prehistoric finds, camps, villages, subsistence and procurement stations, quarries, and mounds and human burials. Post Western culture contact Indian villages, trading posts, homesteads, farmsteads (buildings and land), other rural buildings and structures, cemeteries, trails, roads, and railroads, ferries, conservation projects, drainage ditches, open pit mines (e.g., gravel), sacred sites, cultural hunting and gathering areas, and battlefields also occur in the Refuge vicinity. Although American Indian peoples currently live in the vicinity of the Refuge, the Service does not own or manage any American Indian ceded lands.

5.5 Economic Resources

The Refuge lies within a heavily populated urban-suburban area. Recent Refuge expansion activities are moving into exurban-rural areas. Socioeconomic conditions are wide ranging and reflect the dynamic nature of development occurring within the Twin Cities Metropolitan Area and surrounding areas. A resilient economy is spread among agriculture, food processing, computing, printing and publishing, large and small-scale manufacturing, health care, arts and entertainment as well as medical instruments, education and finance. The Metropolitan area is home to about 2.85 million people, and is the 16th largest metropolitan area in the country (Metropolitan Council 2010). The area population increased by 11.8 percent from 1995 to 2005, compared with a 10.0 percent increase for the state of Minnesota and a 11.4 percent increase for the U.S. as a whole. Per capita income in the area is about \$42,500 per year. Income increased by 16.4 percent over the 1995-2005 period, while the state of Minnesota and the U.S. increased by 17.3 and 13.2 percent respectively (Metropolitan Council 2010).

The Refuge itself has an annual operating budget of about \$2.6 million and currently provides jobs for 25 full-time and part-time staff. This returns about 3.6 million dollars to the local economy (Carver and Caudill 2007). Based upon 2006 data (Carver and Caudill 2007), updated to reflect 2009 visitation levels and rates of inflation (U.S. Department of Labor 2010), resident and nonresident Refuge visitors annually spend about \$8.4 million dollars on Minnesota Valley

National Wildlife Refuge based recreational activities. These expenditures include food, drink, lodging, transportation, and equipment.

5.6 Recreational Opportunities

The Twin Cities Metropolitan Area hosts a rich natural environment. Each season offers ample opportunity to explore the natural world in a variety of contexts. Twin Cities parks and lakes are extensive with about 160,000 acres of parkland and 950 lakes in the metro area alone. The Twin Cities region is home to one of the country’s largest urban park systems, including 35 regional parks, 11 large regional park reserves, and 22 regional trails. Four state parks are within the region: William O’Brien, Fort Snelling, Afton, and the Minnesota Valley State Recreation Trail (Metropolitan Council 2010). Hiking, fishing, swimming, golfing, skiing, snow shoeing, boating, and bike riding are all popular and accessible recreational activities offered at some or all of these parks.

The focal points of the Refuge are its two Education and Visitor Centers. The Bloomington Visitor Center, located in the most downstream and urban portion of the Refuge in Bloomington, Minnesota, features 8,000 square feet of exhibit space, a 125-seat auditorium, two multi-purpose classrooms, a bookstore, an art gallery, and an observation deck. The Rapids Lake Education and Visitor Center, located about 34 river miles upstream in Carver, Minnesota, hosts an interpretive exhibit area, two multi-purpose classrooms, and a bookstore. Environmental education and interpretation are conducted from these facilities. Additional interpretive programs conducted by Park Rangers and volunteer naturalists are offered on numerous Refuge Units. With the exception of closures around administrative buildings and near nesting sites, the Refuge is open for wildlife-dependent uses including wildlife photography, environmental education, interpretation, hunting, fishing and wildlife observation. The Refuge has about 230,000 visitors annually. Hunting is the second most popular wildlife-dependent use of the Refuge following wildlife observation. The Refuge had about 17,300 hunting visits in 2014-2015 hunting season (Table 5.6) (USFWS 2013b).

Table 5.6: Number of hunt visits by hunting activity for 2014-2015 hunting season.

Hunting activity	Number of visits for the 2012-13 season
Waterfowl	7,500
Big game	5,300
Upland game	4,000
Other migratory birds	500

Non-Service lands are interspersed with Refuge lands throughout the Minnesota River Valley. Many are public lands that support outdoor recreation activities similar to the Refuge, as well as activities not allowed on the Refuge, such as mountain biking, horseback riding, and snowmobiling. Developed and proposed sections of the Minnesota Valley State Recreational Trail cross several Refuge Units.

Hunting, fishing, and related outdoor activities are popular pastimes throughout the state, even within the Twin Cities Metropolitan Area. Migratory bird hunting is in high demand on the Refuge because of its proximity to the urban population (MNDNR 2006b), allowing hunters to easily access these areas to hunt in the morning or after work. Portions of five Refuge Units are

open to the general public for waterfowl hunting. Pheasant and dove are very popular upland hunting pursuits. Turkey hunting continues to grow in popularity among Minnesotans. White-tailed deer are extremely abundant on the Refuge. Deer hunting by all methods accounted for 31% of Refuge hunting visits. Waterfowl hunters account for 43% and upland game hunters account for 23%. Turkey hunters account for two percent of Refuge hunting visits.

6.0 ENVIRONMENTAL CONSEQUENCES

This section evaluates the foreseeable environmental consequences of the alternatives described in Section 4.

6.1 Environmental Consequences Common to Developed Alternatives

6.1.1 Infrastructure

Providing hunting opportunities under either alternative will not adversely affect, temporarily or permanently, the Service's ability to meet land use goals on any of the units open to hunting. Any additional refuge facility development, such as trailheads or parking lots, will not be for the sole use of hunters and would be developed under either alternative. Parking areas and trailheads will be used by all users of the Refuge, including staff conducting day-to-day operations critical to the mission of the Refuge. There will be a change in wildlife habitat where parking lots and trails are developed as those areas are converted to short grass, gravel, or bare soil. These developed areas will be small relative to surrounding habitat and their development will not appreciably affect wildlife use of the areas.

6.1.2 Natural Resources

6.1.2.1 Habitats

The selection of either alternative would not have significant adverse effects on the quality of wildlife habitat or the natural environment. In either instance, the amount of habitat by type would not change from the current situation. With either alternative, some minor trampling of vegetation from hunters using areas other than established trails is expected. We estimate that any specific acre of Refuge land open to hunting is likely to receive two visits total from hunters per year.

Access throughout Refuge units for hunting is typically by foot. Occasionally hunters access some Refuge units via boat from the Minnesota River. This method of access presents no significant adverse impacts to Refuge lands. Some hunters ride bikes along authorized bike routes to access hunting areas. This does not cause significant adverse impacts. On occasion the Refuge allows vehicles beyond parking lots or trailheads to facilitate disability accessible or youth hunts which are strictly regulated by Special Use Permit (SUP). These permits restrict vehicles to existing trails, service roads, or designated routes and, therefore, cause no additional impacts to Refuge habitats.

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

Boating activity on the Refuge may occur with waterfowl hunting. When waterfowl hunting by boat, hunters would have limited dispersion and in most cases would stay in close proximity to the watercraft. Because Refuge users, including hunters are not allowed to use motorized boats there will be no impacts to air quality or solitude from hunting from boats.

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

With the exception of resident Canada geese and white-tailed deer, populations of hunted species are not at levels that could cause habitat damage. The Service has not observed goose damage to habitats on the Refuge. Geese grazing off the Refuge may cause minor problems in isolated areas; however, the Service has not linked Refuge flocks to specific damage or nuisance complaints. Neither Alternative includes actions to significantly change the number of geese taken via hunting.

When populations are high, deer may damage habitat on the Refuge or on nearby public and private lands. Deer have a central role influencing the absolute and relative abundance of both woody and herbaceous plant species. High deer densities can hamper the regeneration of several valuable hardwood and understory plant species by overgrazing (Waller et al. 1997). Long term studies on deer and woody plant species, such as upland beech-maple (*Fagus-Acer*), have concluded that deer browsing was an important environmental factor in determining seedling longevity and mortality (Waller et al. 1997; Horsley et al. 2003). Low vegetation diversity can reduce other wildlife diversity that share habitat with white-tailed deer (Horsley et al. 2003). The Service receives few complaints of deer damage from suburban landowners adjacent to the Refuge. Deer densities are above the desired level set by the Minnesota Valley Deer Management Task Force.

6.1.2.2 Wildlife

Hunting may have minor temporary impacts to the general population of animals, both game and non-game species. Some animals will be disturbed as hunters move through occupied habitat or discharge firearms. Disturbed animals will relocate to avoid hunters or flush and expend more energy than if they had remained at rest. Disturbance is not a long term threat to the population because the relocation is temporary and wildlife food is not a limiting factor on the Refuge so animals should be able to readily replace energy reserves. Individuals of game species will be removed from the population by hunter harvest. The impact of harvesting game animals to the population is regulated through bag limits and season length.

Hunting is a highly regulated activity compared to non-hunting activities and generally takes place at specific locations, times, and seasons. These regulations reduce the impact to non-hunted species. Non-hunted areas also are common on the Refuge and provide non-hunted species habitat undisturbed by hunters during the hunting season. Hunting is an appropriate wildlife management tool that can be used to manage harvestable game populations on a Refuge. Some wildlife disturbance will occur during the hunting season. However, when hunting is

implemented with proper zoning, regulations, and seasons, hunting impacts to non-hunted wildlife populations using the Refuge will be minimized.

In Minnesota, species to be hunted, hunting seasons, and the number of animals allowed to be taken are set by the MNDNR. In developing annual hunting regulations the MNDNR considers species population trends, the number of hunters pursuing species, and hunter success rate. Overall, wildlife residing on the Refuge exhibits the same population trends and responds to hunting pressure in the same manner as wildlife elsewhere throughout the State. Because Refuge lands are interspersed with lands where hunting is regulated by others and individual wildlife range freely across jurisdictions, the effect of hunting species on Refuge lands will follow statewide trends. For general public hunting activities, the Refuge has not required, and is not proposing to require, hunters to register to hunt Refuge lands or to report wildlife taken on the Refuge. Our best estimate of hunter activity comes from law enforcement contacts and staff contacts with hunters in the field and from car counts. This enables us to approximate hunter visits by general hunting categories but not actual number of hunters because not all hunters are contacted and some hunters are contacted multiple times over several visits.

In addition to firearms and archery, falconry is a hunting method of take that is legal in the State of Minnesota. According to the Minnesota Falconers Association, only 25 falconers in the metropolitan area of the Twin Cities use their birds for hunting. These falconers spend about 28 days each season hunting with the birds and sometimes hunt lands other than the Refuge. The Association estimates that 264 rabbits and squirrels are taken each year by falconers statewide. Falconers also take about 40 pheasants and 39 ducks annually. Rarely does a falconer go after any other migratory birds, since very few Minnesota falconers specialize in raptors that are capable of taking these other types of birds (Nezworski, 2011). The number of game animals taken by falconry are an insignificant part of the overall hunting harvest on the Refuge.

6.1.2.2.1 Hunted Migratory Birds

The Harvest Information Program (HIP) is an annual program in which hunters provide information that helps biologists manage North America's migratory game bird populations, including woodcock, ducks, geese, rails, snipe, and coot. Hunters' reports on the kind and number of migratory birds they harvest are used to develop reliable estimates of the total harvest of all migratory birds throughout the country. The information gathered by the harvest surveys assists state and federal biologists in making decisions about sustainable bag limits for future hunting seasons. Harvest information gathered through HIP helps ensure that hunting on the Refuge under either alternative will not significantly impact hunted migratory bird populations (Dexter 2015).

The harvest estimate, number of hunters, hunter success rate, and mean harvest per hunter during the 2014-15 season is indicated in Table 6.1.2.2.1 (Dexter 2015). About 93% of Refuge migratory bird hunters pursue waterfowl and account for about 7,000 hunter visits over a 60 day season. Season lengths and species limits for waterfowl are set at a flyway level to assist in preventing the overharvest of these species. The hunting framework for waterfowl is developed based on information collected by biologists across the country (in addition to HIP) for the purpose of estimating population levels of waterfowl. Waterfowl hunting on the Refuge under

either alternative is subject to the framework set by the flyways and therefore will not significantly affect waterfowl populations.

Table 6.1.2.2.1: Minnesota estimated migratory bird harvest, number of hunters, hunter success rate, and mean harvest per hunter for the 2014-15 season.

Species	Estimated harvest for 2014-15 State hunting season	Estimated number of 2014-15 statewide hunters	Hunter success rate (%)	Mean harvest per hunter
Ducks	699,620	75,170	85	11.0
Canada geese	221,620	48,240	69	6.6
Other geese	6,510	2,770	54	4.3
American coot	17,050	4,410	78	5.0
Common snipe	520	820	45	1.4
Rails/gallinules	80	300	25	1.0
American woodcock	25,810	9,650	64	4.2
Mourning dove	103,370	9,950	83	12.5

Woodcock and snipe are minor species for Refuge hunters and few birds are taken on the Refuge. Including woodcock and snipe as huntable species in the Refuge’s hunting program will have an insignificant effect on flyway populations. Mourning dove hunting was added in Minnesota in 2004 and the Refuge was opened to dove hunting in 2010. Dove seasons and limits are set under the national migratory bird hunting and adaptive management frameworks. Because Refuge dove hunting also is regulated within this framework, dove hunting on the Refuge will not have a significant effect on the local, flyway, or national populations. Rails and gallinules (moorhens) are also hunted in the State of Minnesota although large numbers of either species are not taken. The Service estimates that less than 10 hunter visits are devoted to rails, snipe and woodcock. As with all migratory birds, the Service and MNDNR monitor populations at local and flyway levels and adjust bag limits to prevent adverse effects to the populations of these species due to hunting.

6.1.2.2.2 Upland Game

The harvest management of small upland game which includes huntable small mammals (e.g., squirrel, rabbit) and upland game birds (e.g., pheasant, grouse, gray partridge) is based on the understanding that small game species produce a large number of young each year, most of which are available for harvest because they would naturally not survive the winter and add to the next season’s breeding population. Hunting these species is considered a compensatory form of mortality. It allows that a large portion of a species population could be harvested each fall because, if not taken by hunters, they would likely die prior to the next breeding season from other causes. Compensatory mortality does not reduce subsequent spring breeding population size below what it would have been due to natural mortality. It follows that hunting mortality is compensated by a reduction in natural mortality. This concept of animal surplus relates especially well to r-selected species (i.e., small game animals having high potential for population increase with high annual mortality rates). For example, the annual mortality rate for squirrels can be upwards of 0.40, and cottontail rabbits are known to have up to 0.80 annual mortality rates. Based on this, MNDNR, which administers small game hunting in Minnesota,

does not set limits on the overall harvest of huntable small mammals and resident birds, except turkey. The MNDNR does set daily bag limits and possession limits as the primary method of harvest regulation. Bag limits and possession limits do not vary for upland game regardless of method of take.

Turkeys

Turkey hunting is allowed in the State of Minnesota by permit only in both the spring and fall seasons. In the spring of 2015, 46,675 permits were issued statewide with hunters harvesting 11,734 birds statewide (Dexter 2015). In the previous fall (2014) 8,339 permits were issued statewide with 1,137 turkeys being harvested statewide.

The MNDNR has been increasing the number of permits in recent years as turkey populations have increased. They expect the turkey population to continue to increase in the Refuge vicinity because of the abundance of suitable habitat. In some areas of the state, the MNDNR has started to receive complaints about too many turkeys (MNDNR 2006a). The MNDNR bases the number of permits allotted to the Permit Areas that encompass the Refuge based upon the turkey and hunter populations (Dunton 2010a, Dunton 2010b), not the availability of Refuge lands open to hunting.

Most of the Refuge lies within Turkey Permit Area 510, except for the St. Lawrence, Blakeley, and Jessenland Units. In spring 2015, 2,382 turkey permits were issued for permit area 510 and hunters took 966 turkeys. The success rate in this area was approximately 27.7% (Dexter 2015). The previous fall (2014), 8,339 permits were issued in the state, with hunters reporting 1,137 harvested turkeys and a 13.6% success rate (Dexter 2015). In spring 2015, 2,665 turkey permits were issued for the Permit Area 505 encompassing the St. Lawrence, Blakeley and Jessenland areas and hunters took 1,001 turkeys. The success rate for spring turkey hunters in this area is approximately 36.5% (Dexter 2015). The Refuge provided about 90 turkey hunter visits in the fall 2010; with a 30 day season, these visits may have represented as few as 5 – 10 hunters and 1 – 3 turkeys harvested.

Considering that turkeys are a closely managed species, the number of permits issued for the Permit Area, and the relatively small proportion of the permit area that Refuge lands comprise, it is reasonable to conclude that hunting turkeys on the Refuge under either alternative has no significant adverse impact on local, regional, or state turkey populations. Bag limits and possession limits do not vary for turkey regardless of method of take.

Hunted Resident Birds

Most Refuge upland game hunters are pursuing resident game birds, primarily pheasant and gray partridge. The harvest estimate, number of hunters, hunter success rate, and mean harvest per hunter during the 2014-15 season is indicated in Table 6.1.2.2.2.1 (Dexter 2015). These upland game hunters account 23% of all hunting visits. The Long Range Plan for the Ring-necked Pheasant in Minnesota (MNDNR 2005) calls for increasing the pheasant harvest from its 2005 level of 360,000 roosters to 750,000 by 2025. This increase is linked to the MNDNR's goal to also increase new grassland habitat acres. Refuge pheasant and partridge hunters most likely are not as successful as the state average because pheasant and partridge densities, and hunting prospects, are ranked "poor or very poor" for the state region that includes the Refuge (MNDNR

2005). We do not anticipate many ruffed grouse being taken by hunters on the Refuge because we are out of the primary range of this species. Based on this information and the understanding that upland game hunting, which includes these upland game birds, is considered compensatory mortality; the hunting of pheasants, gray partridge, and ruffed grouse on the Refuge will not have an appreciable adverse effect on the species locally, regionally, or statewide.

Table 6.1.2.2.1: Minnesota estimated hunted resident bird harvest, number of hunters, hunter success rate, and mean harvest per hunter for the 2014-15 season.

Species	Estimated harvest for 2014-15 State hunting season	Estimated number of 2014-15 statewide hunters	Hunter success rate (%)	Mean harvest per hunter
American Crow	56,020	7,400	87	8.7
Ring-necked pheasant	152,800	57,590	61	4.3
Ruffed grouse	301,190	83,020	71	5.1
Gray partridge	3,590	2,540	32	4.4

Hunted Small Mammals

The harvest estimate, number of hunters, hunter success rate, and mean harvest per hunter during the 2014-15 season is indicated in Table 6.1.2.2.2 (Dexter 2015). Hunters pursuing squirrels and rabbits account for about 100 hunter visits to the Refuge which comprise about 1% of all hunting visits on the Refuge. Hunters rarely take hares or jackrabbits on the Refuge. Based on this information and the understanding that small mammal hunting is considered compensatory mortality, hunters of rabbits and squirrels are not substantially adversely affecting those populations on the Refuge.

Table 6.1.2.2.2: Minnesota estimated small mammal harvest, number of hunters, hunter success rate, and mean harvest per hunter for the 2014-15 season.

Species	Estimated harvest for 2014-15 State hunting season	Estimated number of 2014-15 statewide hunters	Hunter success rate (%)	Mean harvest per hunter
Gray squirrel	91,250	21,240	78	5.5
Fox squirrel	40,840	12,240	75	4.3
Eastern cottontail	38,820	13,790	73	4.1
White-tailed jackrabbit	1,050	1,350	44	1.8

Non-hunted Resident Wildlife and Migratory Birds

Non-hunted wildlife include non-hunted migratory birds such as songbirds, wading birds, raptors, and woodpeckers; small mammals such as voles, moles, mice, and shrew; reptiles and amphibians such as snakes, skinks, turtles, lizards, salamanders, frogs, and toads; and invertebrates such as butterflies, moths, other insects and spiders. Except for migratory birds and

some species of migratory butterflies and moths, these species have very limited home ranges and hunting does not effectively impact their populations regionally.

Disturbance to non-hunted wildlife under either alternative is minimal. Small mammals such as voles and mice are generally nocturnal or secretive. Both of these qualities make hunter interactions with small mammals very rare. Hibernation or torpor of cold-blooded reptiles and amphibians also limits their activity during most of the hunting season when temperatures are low. Hunters would rarely encounter reptiles and amphibians during most of the hunting season. Some species of butterflies and moths are migratory and will not be present for most of the Refuge's hunting season. Resident invertebrates are not active during cold weather and would have few interactions with hunters during the hunting season. Impacts to these species due to habitat disturbance related to hunting are negligible at the local and flyway levels.

Direct impacts to non-hunted non-migratory birds such as most woodpeckers and some songbirds including nuthatches, finches, and chickadees are negligible. Secondary impacts to this group of species are also minimal and do not appreciably reduce their numbers at the population level. Shorebirds would not be impacted by hunting since, in most cases, they have already migrated through the area prior to the fall hunting season. Disturbance by hunting to non-hunted migratory birds would not have substantial negative secondary impacts because the majority of hunting does not coincide with the nesting season except in the case of spring turkey hunting. Because turkey hunting is strictly apportioned by quotas within a lottery system and of relatively short duration (30 days) any disturbance to non-hunted species would be minimal. Other disturbance to these species by hunters afield would be temporary in nature. The Refuge has identified important resting and feeding areas for migratory water birds and has designated them as no hunting zones.

Migratory birds of prey (eagles, hawks, etc.) are on the Refuge during hunting season but disturbance is minimal. Disturbance to the daily wintering activities, such as feeding and resting, of residential birds might occur but are insignificant because such interactions are infrequent and of short duration when they do occur. Non-toxic ammunition is required for migratory bird and upland game hunting. This reduces the potential of lead poisoning to birds of prey. Avian predators and scavengers are susceptible to lead poisoning when they ingest lead fragments or pellets in the tissues of animals killed or wounded by lead ammunition. Lead poison may weaken raptors and increase mortality rate by leaving them unable to hunt or more susceptible to vehicles or power line accidents (Kramer and Redig 1997).

Overall, hunting impacts to non-hunted species and their habitats and impacts to the biological diversity of the Refuge will be insignificant.

6.1.2.2.3 Big Game

A total of 139,442 white-tailed deer were harvested in Minnesota for the 2014 deer hunting season. For 2014, hunters from deer permit areas that include the Refuge (areas 291, 338, and 601) harvested 1,791 deer (989, 98, and 704, respectively) (Dexter 2015). Overall, Refuge Units open to deer hunting comprise less than 10% of these permit areas. Deer hunters comprise about 31% of Refuge hunting visits; this amounted to about 5,300 hunter visits in 2014-2015 hunting season. These deer hunter visits were spread across the 104 days for which the portions of

Refuge are open to deer hunting, and is inclusive of the 23 day regular firearms season, the additional 16 days outside this season for special firearms seasons (i.e., 2 days early antlerless season and 14 days for muzzleloader season), and the 104 day archery season, which overlaps the aforementioned firearms seasons. Archers represent about 73 % of deer hunting visits. Having the Refuge open to deer hunting does not result in a change in the number of antlerless permits issued by MNDNR because these permits are administered on a much larger scale.

The desire of the Minnesota Valley Deer Management Task Force is to reach a population goal for the deer herd in the Minnesota River valley at 15-25 deer per square mile (Minnesota Valley Deer Management Task Force 1990). Currently the Metro Deer Management Area (MNDNR Permit Area 601) has no limit on the number of antlerless deer that can be harvested. The majority of the Refuge is located in this Permit Area. Due to the urban nature of this Permit Area, which limits hunter access to deer; even this permissive level of regulation has not been able to reduce the deer population to a point where this species no longer negatively impacts the existing natural habitat.

6.1.3 Threatened and Endangered Species

It is the policy of the Service to protect and preserve all native species of fish, amphibians, reptiles, birds, mammals, invertebrates, and plants, including their habitats, which are designated threatened or endangered. The Northern long-eared bat (*Myotis septentrionalis*) is proposed as Endangered and may be found in Carver, Dakota, Hennepin, Le Sueur, Scott, and Sibley Counties. The Northern long-eared bat hibernates in caves and mines-swarming in surrounding wooded areas in the autumn. It also roosts and forages in upland forests during the spring and summer. The greatest threat to this species is from habitat alteration. No habitat will altered specifically to implement activities identified in this plan.

Higgins eye pearl mussel (*Lampsilis higginsii*) is a federally Endangered species that exists in Dakota, Hennepin and Ramsey counties. However, this species range is limited to the Mississippi and St. Croix Rivers, neither of which are within the Refuge boundary. Prairie bush-clover (*Lespedeza leptostachya*), found on native prairie with well drained soils, is a federally threatened species whose range includes Dakota County. The Black Dog Unit is the only Refuge Unit in Dakota County and does not include habitat appropriate for prairie bush-clover.

No Federally-listed, proposed, or candidate species would be affected by either alternative. The Refuge completed an Intra-Service Section 7 evaluation as required by Service policy for compliance with the Endangered Species Act (Appendix E).

6.1.4 Cultural Resources

Impacts to historical or cultural resources would not be significantly different under either Alternative. While historical or cultural resources occur throughout the Refuge Units open to hunting, the Refuge has not documented any adverse effect attributed to hunting activities. While most hunters are focused on the hunt itself, it is likely that some hunters come across historical foundations and buildings located on some of the Refuge Units while hunting and may pause at signs or features that interpret these resources. Past vandalism at these sites has not been ascribed to hunters. The cultural resources that occur on the Refuge are below ground and

not readily identified. Since hunting activities do not include ground disturbing actions, these resources will remain intact.

6.1.5 Social and Economic Impacts

Hunting activities on the Refuge can affect the local or regional economy in two ways. First, the Refuge expends funds for staff and resources to implement the hunting program. Second, visitors engaging in hunting activities provided by the Refuge generate economic activity for local businesses.

It is estimated that the Refuge spends about \$66,000 per year for staff and operations related to the hunting program. These monies mostly are spent in the region and produce a multiplier effect for local businesses valued at about \$109,600 (Carver and Caudill 2007, U.S. Department of Labor 2010).

The 2006 report, “Banking on Nature: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation” (Carver and Caudill 2007) identified average daily expenditures for different types of hunting in the USFWS Midwest Region. The expenditures included food, drinks, lodging, transportation, equipment, and other expenses. Based upon expenditures updated to reflect 2009 values (U.S. Department of Labor 2010) and visitation rates for Minnesota Valley National Wildlife Refuge (USFWS 2009), Refuge hunters accounted for 18,125 visitor days and spent about \$430,000.

Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” was signed by President 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. None of the management alternatives described in this EA will disproportionately place any adverse environmental, economic, social or health impacts on minority and low income populations.

6.1.6 Recreational Opportunities

The implementation of either hunting program alternative will have minimal adverse effect on the non-hunting priority public uses for the Refuge (i.e., fishing, wildlife observation and photography, environmental education and interpretation). Most non-hunting recreational activities are separated from hunting activities over time for the seven months of the year when hunting is not offered. In addition, hunting activities are separated through space on certain areas of the Refuge. Hunting is not allowed on all Refuge Units or on all areas of units that are open to hunting. Hunting is not allowed near parking lots, trails, or areas designated for outdoor education or interpretation. Further, Refuge-specific regulations have been established with the intent of reducing conflicts between these user groups and emphasizing safety for all visitors.

Brochures and interpretive signs allow visitors to know where and when hunting is taking place on the Refuge to allow visitors to make informed choices for their recreational activities. Some visitors may decide to change where they pursue their non-hunting recreational activities or decide to come back outside the hunting season.

Only non-toxic shot may be used or possessed on the Refuge when hunting migratory birds and upland game, including wild turkey, with either Alternative. The Refuge encourages hunters to voluntarily use non-toxic ammunition for all hunting activities. Alternatives to lead-based ammunition are copper, steel, tungsten, tin and bismuth ammunition. Non-toxic ammunition is becoming more available as the demand for non-toxic ammunition increase (Kelly et al. 2011). Copper ammunition is a good alternative since it is less toxic and frangible than lead ammunition (Hunter et al. 2006). Popular hunting periodicals routinely have articles on why and how hunters can shift to non-toxic ammunition. Overall the cost differential for using non-toxic verses toxic ammunition for hunting on the Refuge is insignificant and will not affect Recreational opportunities overall.

With either Alternative, falconry is allowed on all Refuge Units that are open to general public hunting according to State regulations. Recreational falconry activities on the Refuge will not be significantly affected by either Alternative.

Secondary adverse effects to non-hunting recreational activities are insignificant because neither alternative will significantly reduce the numbers of wildlife available for priority public use.

6.1.7 Cumulative Impacts

The implementation of either alternative has no significant cumulative impacts on the wildlife populations, either hunted or non-hunted species; the natural environment; cultural resources; social and economic resources; or recreational opportunities. This determination is based on an analysis of potential environmental impacts of hunting on the Refuge together with other projects and actions.

6.1.7.1 Infrastructure

No infrastructure, on the Refuge or off the Refuge, will be modified solely to accommodate the Refuge's hunting program. Implementing a hunting program as described in either Alternative A or Alternative B will have minimal direct or indirect impacts on public or private infrastructure. Therefore, there will be negligible cumulative impacts to infrastructure at the local, regional, or national level due to administering the hunting program at the Minnesota Valley National Wildlife Refuge as described in either alternative.

6.1.7.2 Natural Resources

Habitats

The Refuge Act identified the purposes for which the Refuge was established (Section 1.0). The Refuge's CCP (USFWS 2004) further refines those purposes and identifies goals and strategies that would enable the Refuge to fulfill its mission. In implementing the CCP the Service conducts habitat management actions that favor healthy and functional ecological communities on Refuge lands. This approach benefits all wildlife species, including species traditionally

hunted. Refuge habitats are not managed to favor hunted species over other species and are managed to maintain healthy populations of all species. In addition, Refuge regulations are devised to minimize any damage to habitats created by hunters and other Refuge visitors. The implementation of either alternative does not result in significant direct, indirect, or cumulative effects to habitats at any scale due to hunting activities.

There are only a few localities on the Refuge or in the vicinity of the Refuge where densities of wildlife populations are at a level that could result in habitat damage. These areas potentially damaged by geese or deer, for example, are not significant on the local scale or in the regional or national context. With such minor impacts based on few animals, any change in animal populations on the Refuge will be inconsequential in a larger context. If nuisance populations of geese or deer become managed by a coordinated effort of organizations at all levels of government in the area, then there may be some improvement in habitat conditions at specific locales. It is not likely that such actions, while positive from a habitat perspective, will result in a significant cumulative impact on any area.

Wildlife

Refuges, including Minnesota Valley National Wildlife Refuge, conduct hunting programs within the framework of State and Federal regulations. Population estimates of huntable species are developed at a regional, state, flyway, and continental scale. Hunting frameworks and take limits are set based upon these estimates. The proposed Refuge hunting program rules will be the same as, or more restrictive than, hunting regulations throughout the State of Minnesota. By maintaining hunting regulations that are the same as or more restrictive than the State, individual Refuges ensure that they are maintaining seasons which are supportive of management on a more regional basis. Such an approach also provides consistency with large scale population status and objectives. The Refuge consistently coordinates with the State about the hunting program. As a result, changes or additions to hunting on the Refuge will have minor effects on wildlife species in Minnesota. Although the Preferred Alternative will increase hunting opportunities slightly compared to the No Action Alternative, the slight increase in hunter activity will not rise to a significant cumulative effect locally, regionally, or nationally.

Migratory Birds

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 Migratory Bird Hunting Frameworks from which States may select season dates, bag limits, shooting hours, and other options for each migratory bird hunting season. The Frameworks are permissive in that hunting of migratory birds would not be permitted without them. Thus, Federal regulations both allow and limit the hunting of migratory birds.

National Environmental Policy Act (NEPA) (Council on Environmental Quality 1969) 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. The Service published Notice of Availability in the Federal Register on June 16, 1988 (53 FR 22582), and Record of Decision on

August 18, 1988 (53 FR 31341). Annual NEPA considerations for waterfowl hunting frameworks are covered under a separate Environmental Assessment and Finding of No Significant Impact. Further, in a notice published in the September 8, 2005, Federal Register (70 FR 53776); 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).

Waterfowl populations throughout the United States are managed through an administrative process known as flyways. The Refuge is located in the Mississippi Flyway. In North America, the process for establishing waterfowl hunting regulations is conducted annually. In the United States, the process involves a number of scheduled meetings (Flyway Study Committees, Flyway Councils, Service Regulations Committee, etc.) in which information regarding the status of waterfowl populations and their habitats is presented to individuals within the agencies responsible for setting hunting regulations. In addition, public hearings are held and the proposed regulations are published in the Federal Register to allow public comment.

Annual waterfowl assessments are based upon the distribution, abundance, and flight corridors of migratory birds. An Annual Waterfowl Population Status Report is produced each year and includes the most current breeding population and production information available for waterfowl in North America (USFWS 2010a). The Report is a cooperative effort by the Service, the Canadian Wildlife Service, various state and provincial conservation agencies, and private conservation organizations. An Annual Adaptive Harvest Management Report (AHM) provides the most current data, analyses, and decision making protocols (USFWS 2010b). These reports are intended to aid the development of waterfowl harvest regulations in the United States for each hunting season. In Minnesota, the MNDNR selects season dates, bag limits, shooting hours, and other options using guidance in these reports. Their selections can be more restrictive, but cannot be more liberal than the AHM allows. Thus, the level of hunting opportunity afforded each State increases or decreases each year in accordance with the annual status of waterfowl populations.

Hunting of migratory birds other than waterfowl is assessed in a similar manner in that species population trends are monitored throughout their range. Via cooperative efforts of public and private partners, populations are monitored when birds are most effectively surveyed. Depending on the species, this may be while they are in their wintering areas, breeding areas, or while migrating. These data are combined with harvest information, such a HIP, and evaluated to ensure an appropriate annual hunting framework throughout the species range.

Each National Wildlife Refuge considers the cumulative impacts to hunted migratory species through the Migratory Bird Frameworks published annually in the Service's regulations on Migratory Bird Hunting. Season dates and bag limits for National Wildlife Refuges open to hunting are never longer or larger than the State regulations.

Upland game

Harvest management of upland game except turkey is based on the compensatory mortality model. In this model the concept is that these hunted species will not suffer adverse impacts under typical hunting frameworks. Population impacts may become additive, and adverse, if

some mortality factor significantly increases. There is no natural or human-induced mortality factor rising to the additive level for upland game to be hunted at the Refuge that would result in significant cumulative impacts in the local or regional context.

Turkey populations are increasing locally and throughout the state. There is no adverse impact to turkeys due to either hunting or non-hunting factors. Hunting turkeys on Refuge lands will not result in any factors changing in a manner that results in cumulative impacts.

White-tailed Deer

White-tailed deer in the vicinity of the Refuge move freely across property boundaries. In the vicinity of rural Refuge Units, deer population densities are relatively close to desired densities compared to the more urban Refuge Units where deer hunting is limited. Hunting on rural Units may be contributing to overall population management goals -- a desirable cumulative effect. On urban Refuge Units, deer population densities are much higher than desired densities. Although it currently does not appear at this time that deer on urban Refuge Units are significantly stressed due to overpopulation, an adverse density-dependent population response is possible in the future.

Nongame

Non-hunted species of vertebrate or invertebrate wildlife are not significantly directly nor indirectly affected by hunting. With no direct or indirect adverse impacts to non-hunted species there will be no cumulative impacts resulting from the implementation of either hunting Alternative on the Refuge.

6.1.7.3 Threatened and Endangered Species

No threatened or endangered species occur in areas where Refuge hunting would take place so no cumulative impacts will occur.

6.1.7.4 Cultural Resources

Refuge hunting activities do not affect cultural resources under either alternative so there will be no cumulative impacts to such resources.

6.1.7.5 Social and Economic Resources

Economic activity estimated at about \$450,000 annually is associated under either alternative. This economic activity, while important to the communities near Refuge Units (Section 6.1.5), is minor in the larger context of the Twin Cities Metropolitan Area with its billions of dollars of economic activity.

The Refuge's presence in the Metropolitan Area increases the quality of life for some area residents. Even though hunting accounts for the second most user visits, it accounts for less than 10% of use activity. There are no other hunting-specific activities undertaken by the Service on the Refuge that have significant beneficial or adverse effects when compared to or combined with other socially important activities in the area. Refuge hunting activities under either Alternative do not produced significant cumulative effects.

6.1.7.6 Recreational Opportunities

A hunting program implemented under either Alternative evaluated by this EA will provide recreational opportunities for Refuge visitors. These opportunities, while fully appreciated by refuge users wishing to hunt, are important in the urban context where hunting opportunities are limited. In a regional or statewide context, hunting on the Refuge Units provides only a small percentage of hunting opportunities.

Hunting is not allowed near or around the Bloomington Visitor Center or the Rapids Lake Education & Visitor Center. Other “no hunting” areas have been established. There is no hunting allowed on, across, or within 100 feet of any road, parking lot or marked trail to minimize conflicts between users. Areas on several Refuge Units are closed to hunting and provide space for non-hunting visitors to explore and enjoy the Refuge year round. This helps to reduce or eliminate conflicts between hunters and other user groups.

Non-hunting wildlife-dependent recreational opportunities are available on a variety of other public or private lands locally. There are 14 National Wildlife Refuges in Minnesota and thousands of other public spaces in the state that provide a variety of wildlife habitat suitable for fishing, wildlife observation, photography, environmental education, and interpretation activities. Some non-hunting recreational activities may increase slightly with the transfer of the lands from private ownership to public ownership. However, the increase is not expected to be significant due to the absence of trails and other facilities on those lands. On lands currently under Service ownership, conflicts between recreational user groups are minimal and are expected to remain so. Hunting programs at the Refuge under either Alternative will not result in significant adverse effects at any scale, either by themselves or when combined with non-service actions because of the large amounts of parks and other non-hunted public lands available for non-hunting wildlife-dependent recreation.

6.2 Environmental Consequences of Alternative A: Maintain Current Hunting Programs on Refuge Lands Previously Opened to Hunting and Not Open Recently Acquired Lands to Hunting (No Action)

Hunting Program to remain as it currently exists on Service lands previously opened to hunting. No recently acquired lands would be open to hunting under Service ownership. Because approximately 297 acres of the 319 acres recently acquired they have been previously hunted under private ownership, 297 acres of Refuge, in effect, will be closed to hunting. No additional Refuge-specific special hunts would be provided.

6.2.1 Natural Resources

6.2.1.1 Wildlife

With this alternative, hunting mortality would be zero on the 319 acres of recently acquired lands. Some of these lands have been hunted under private ownership for decades. Therefore, “zero mortality” is, in effect, a decrease in hunting mortality compared to the when the lands were being hunted under private ownership. Some species may increase slightly in local areas; however, it is likely that other compensatory population factors and environmental conditions would prevent significant changes in overall wildlife populations.

Migratory Birds

Under this alternative migratory bird populations will not change appreciably. Without hunting mortality, populations will experience fluctuations from naturally occurring environmental conditions on the lands not hunted with this alternative.

Upland game

Resident birds and mammals such as turkey, pheasant, rabbit, and squirrel populations are not expected to change appreciably. Populations would experience fluctuations from naturally occurring environmental conditions. Populations may increase slightly on the 319 acres closed to hunting; however, some individuals not taken by hunting would die from other compensatory mortality factors.

Big Game

The white-tailed deer populations on the 319 acres not hunted would experience population fluctuations based on weather and other naturally occurring environmental factors.

6.2.2 Recreational Opportunities

Lands adjacent to the Louisville Swamp and St. Lawrence Units that are proposed to be opened with the Preferred Alternative presently are open to hunting under private ownership. The 22 acre tract adjacent to the Bloomington Ferry Unit was not open to hunting under previous ownership. With the lands being recently acquired and transferred to Service ownership, they are closed to hunting. This results in the loss of hunting opportunities on 319 acres of land under Refuge management.

6.2.3 Cumulative impacts

A hunting program implemented under the No Action Alternative will have minor positive and negative direct effects overall. None the less, such effects are insignificant beyond the local area and immediate timeframe. As presented earlier, the effects will not be significant when added to other expected activities. With the recently acquired lands being closed to hunting, there would be no secondary or cumulative impacts accruing offsite to adjacent lands, or larger landscape units.

6.3 Environmental Consequences of Alternative B: Maintain Current Hunting Programs on Refuge Lands Previously Opened to Hunting and Open Recently Acquired Lands to Hunting (Preferred Alternative)

With this Alternative the hunting program would be modified to open 319 acres of recently acquired lands on the Bloomington Ferry, Louisville Swamp, and St. Lawrence Units to hunting.

6.3.1 Natural Resources

6.3.1.1 Wildlife

In this section we present estimates of hunting mortality (i.e., take) for several species. These estimates assume that the opened lands have average numbers of huntable individuals, receive average hunting pressure, and hunters experience average success rates. For some species, such as pheasant and dove, we know that these assumptions likely are not reasonable because the

lands support less than average habitat quality. For the waterfowl species, it is likely that using averages overestimates the number of animals taken because of the relatively inaccessibility of some waterfowl habitats.

Lands adjacent to the Louisville Swamps and St. Lawrence Units that are to be opened to hunting have been hunted under private ownership for decades. The 22 acre tract of land adjacent to the Bloomington Ferry Unit was not hunted under previous ownership, however presents little opportunity for harvest of animals under the proposed regulations for the site. Because the majority of the land proposed to be opened was previously hunted under private ownership, the estimates provided below should be evaluated in the context of hunting under private ownership. We estimate that hunting mortality under private ownership could have been as little as 15 – 20 percent. This is as much as 50 percent of our estimates for hunting mortality under public ownership, depending on which species is being considered.

Migratory Birds

Waterfowl populations would not experience a significant increase in hunting mortality because lands were previously hunted under private ownership, and waterfowl hunting would remain open under our preferred alternative. We estimate that opening these lands under Service ownership would result in the taking of about 120 ducks and about 110 geese. Large areas closed to public hunting, but open to private hunting, are immediately adjacent to some of the lands to be opened so waterfowl could easily move to areas with less hunter pressure. Additionally, the Minnesota River Valley has large areas closed to all hunting where waterfowl could move to avoid hunting pressure all together.

With this Preferred Alternative about 200 acres of habitat where moorhen, mourning dove, rails, woodcock, and snipe currently receive relatively low hunting pressure are likely to receive slightly more hunting pressure. That amount of acres is insignificant in the local landscape context because a much larger amount of acres will not be open to public hunting. Based upon statewide averages for hunting pressure and success, opening these lands may result in up to about 60 dove, 0 rails and moorhen, and 1 woodcock or snipe being taken per year.

Upland game

The harvest of small upland game (all species excluding turkey) would increase very slightly over the Refuge as a whole. As with waterfowl and big game, small upland game is likely to receive slightly more hunting pressure. However, the size of areas likely subject to increased hunting pressure is small relative to areas already open so the increase in hunting mortality will not be significant. We estimate that an additional 60 squirrels and rabbits may be taken per year and about 10 more pheasants. Upland game populations would continue to experience fluctuations from naturally occurring environmental conditions. The removal of certain individuals from the populations due to hunting will have minor effects.

The number of turkeys harvested on the Refuge will probably increase slightly by about 1 to 3 birds per year. However, this is not expected to appreciably affect the overall number of turkeys harvested in the MNDNR turkey management zones that encompass the Refuge or the overall population of turkeys in these areas. This is because the number of permits issued is strictly regulated by a lottery system administered by MNDNR based on sustainability of the harvest by

the local turkey population. Additionally, due to the small area we are proposing to open, any increase in hunting mortality from Refuge hunting activities will be not be significant at the zone, regional, or state levels.

Big Game

White-tailed deer harvest likely would not change significantly because the majority of the lands being opened to hunting under Service ownership are already open to deer hunting under private ownership. We estimate that about 8 deer will be taken annually from the lands opened under this Alternative. The number of additional deer taken would be an insignificant proportion of the local population.

6.3.2 Recreational Opportunities

Opening these lands to hunting would increase the Refuge's hunting land base by about 0.5%. However, due to the types, quality, and accessibility of the habitats, we do not expect all hunting activities to increase by that amount. Opening these lands would likely increase the number of waterfowl hunting visits by about 1%, upland game hunting visits by about 2%, and big game hunting visits by about 2%.

Under this alternative, impacts to other wildlife-dependent priority recreational uses on the Refuge are expected to be minimal. Non-hunting uses are generally highest in spring, summer and early fall. The majority of hunting opportunities take place in fall and winter. However, some impacts to other uses may occur. Visitors using the Refuge during hunting seasons and rural residents near Refuge lands may experience a minor increase in firearms noise disturbance. Non-hunting visitors that snowshoe and/or cross country ski may come across hunters in the field. Some visitors may plan their visits to avoid coinciding with hunting activities. The quality of the visitor experience, including hunter's experiences, would not be significantly altered under this alternative.

6.3.3 Cumulative impacts

A hunting program implemented under the Preferred Alternative will have minor positive and negative direct effects. None the less, such effects are insignificant beyond the local area and immediate timeframe. Considering that context, the effect of opening these areas to hunting will have an insignificant effect on flyway and national populations of these migratory species. As presented earlier, the effects will not be significant when added to other expected activities

6.4 Summary of Environmental Consequences by Alternative

A summary of environmental consequences by alternative are presented in Table 6.4

Table 6.4 – Comparison of Environmental Impact by Alternative

Resource Impact	Alternative A (No Action)	Alternative B (Preferred)
Compatible with the goals of the Refuge	Yes	Yes
Habitat	Impacts such as trampling of vegetation in off-trail areas, although minor, would occur. Amounts of undisturbed, resting and feeding areas for waterfowl and other wetland wildlife would remain the same.	Impacts such as trampling of vegetation in off-trail areas, although minor, would occur over a slightly larger area. Amounts of undisturbed, resting and feeding areas for waterfowl and other wetland wildlife would remain the same based on the administration of Refuge-specific hunting regulations.
Migratory Birds	Populations fluctuate primarily in response to natural cycles not hunting.	Estimated no slightly increase in hunter harvest from Refuge lands. Populations fluctuate primarily in response to natural cycles not hunting.
Upland Game	Populations fluctuate in response to natural cycles not hunting.	Estimated no slightly increase in hunter harvest from Refuge lands. Populations fluctuate primarily in response to natural cycles not hunting.
Big Game	Populations fluctuate in response to natural cycles, including habitat damage and disease, not hunting.	Estimated to slightly increase in hunter harvest from Refuge lands. This increase will fluctuate over time based on deer population cycles. Populations fluctuate primarily in response to natural cycles not hunting.
Threatened and Endangered Species	No impact.	No impact.
Historic and Cultural Resources	No impact.	No impact.

Table 6.4 – Comparison of Environmental Impact by Alternative (Continued)

Resource Impact	Alternative A (No Action)	Alternative B (Preferred)
Provides for priority public uses	Yes, satisfies the mandates of the 1997 Refuge Improvement Act.	Yes, satisfies the mandates of the 1997 Refuge Improvement Act.
Provides for simultaneous hunting and non-hunting activities	Yes	Yes
Recreational Use	<p>User conflicts are uncommon and mitigated through management actions.</p> <p>Non-hunting recreational use will remain the same.</p> <p>Hunting recreational use will remain the same or decrease.</p> <p>Does not meet public desire for increase in overall hunting opportunities.</p> <p>Opportunities (land base) for Special Use Permit hunts remain the same.</p>	<p>User conflicts are uncommon and mitigated through management actions.</p> <p>Non-hunting recreational use will remain the same.</p> <p>Hunting recreational use will have minor increase due to the addition of additional lands for hunting opportunities.</p> <p>Would slightly increase hunting opportunities.</p> <p>Opportunities (land base) for Special Use Permit hunts increase.</p>
Meets the needs of partners and desires of the public	<p>Would not meet the preference of the state and hunting public to increase hunting opportunities.</p> <p>Would not reduce the deer population in urban portions of the Refuge via sport hunting.</p> <p>Does not increase opportunities for youth and hunters with disabilities.</p>	<p>Would meet the preference of the state and hunting public to increase hunting opportunities.</p> <p>Would reduce the deer population in urban portions of the Refuge via sport hunting.</p> <p>Does not increase opportunities for youth and hunters with disabilities.</p>

7.0 PREPARERS

The following individuals cooperated in the preparation of this document:

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8.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS CONTACTED

Communities, Conservation Groups and Partner Organizations

Audubon Minnesota
Capable Partners
Carver County Administrator
Carver County Parks
City of Arden Hill Community Development
City of Belle Plaine Administration
City of Bloomington Parks and Recreation
City of Bloomington Planning
City of Burnsville City Manager
City of Burnsville Parks, Recreation, and Natural Resources
City of Chanhassen City Manager
City of Chanhassen Park and Recreation
City of Carver Administrator
City of Carver Parks and Recreation Supervisor
City of Chaska Administrator
City of Chaska, Parks and Recreation Supervisor
City of Eagan Administrator
City of Eagan Parks & Recreation
City of Eden Prairie City Manager
City of Henderson Administrator
City of Jordan Administrator
City of Savage Administrator
City of Shakopee Administrator
City of Shakopee Director of Parks and Recreation
Dakota County Commission
Ducks Unlimited
Friends of the Minnesota Valley
Friends of the Mississippi River
Hennepin County Administrator
Hennepin County Commission
Izaak Walton League of America
Le Sueur County Commission
Metro Bowhunters Resource Base
Minnesota Deer Hunters Association
Minnesota Land Trust

Minnesota Deer Hunters Association
Minnesota Department of Natural Resources
Central Region Headquarters
Division of Wildlife
Division of Parks and Trails
Ecological Services
Minnesota Valley National Wildlife Refuge Trust, Inc.
Minnesota Waterfowl Association
National Wild Turkey Federation
Pheasants Forever
Refuge Friends, Inc.
Scott County Administrator
Scott County Natural Resources Director
Sibley County Commission
The Nature Conservancy
Three Rivers Park District
Trust for Public Land

Print Media

Carver County News
Chaska Herald
Henderson Independent
Jordan Independent
Minnesota Outdoor News
Saint Paul Pioneer Press
Shakopee Valley News
Star Tribune
The Belle Plaine Herald

Federal, State, and Local Elected Officials

U.S. Representative Collin Peterson
U.S. Representative Tim Waltz
U.S. Representative Erik Paulsen
U.S. Representative Michele Bachmann
U.S. Representative Betty McCollum
U.S. Senator Amy Klobuchar
U.S. Senator Al Franken
Representative Jim Abeler, District 35
Representative Peggy Scott, District 35
Representative Joyce Peppin, District 34
Representative Kurt Zellers, District 34
Representative Bob Gunther, District 23
Representative Tony Cornish, District 23
Senator Warren Limmer, District 34
Senator Branden Peterson, District 35
Senator Julie Rosen, District 23

9.0 APPROVALS

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APPENDIX A – REFERENCES

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APPENDIX B – ADDITIONAL FIGURES

The following maps show the recently acquired lands that are proposed to be opened to hunting under the preferred Alternative. Only maps of the affected lands and their associated Refuge Unit are shown. Refuge specific regulations on these proposed lands to be open to hunting are the same as the regulations of the Unit they are adjacent to.

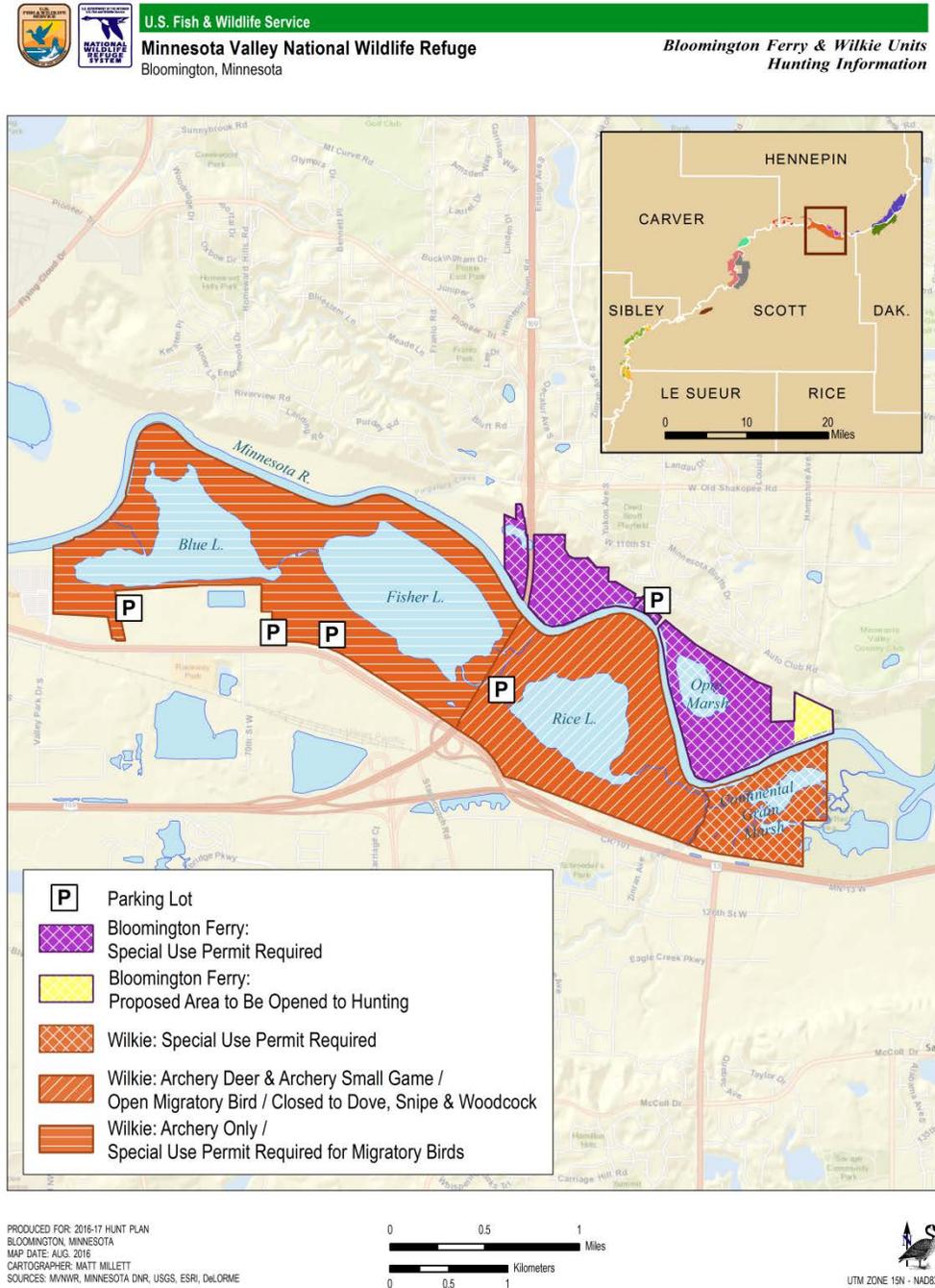


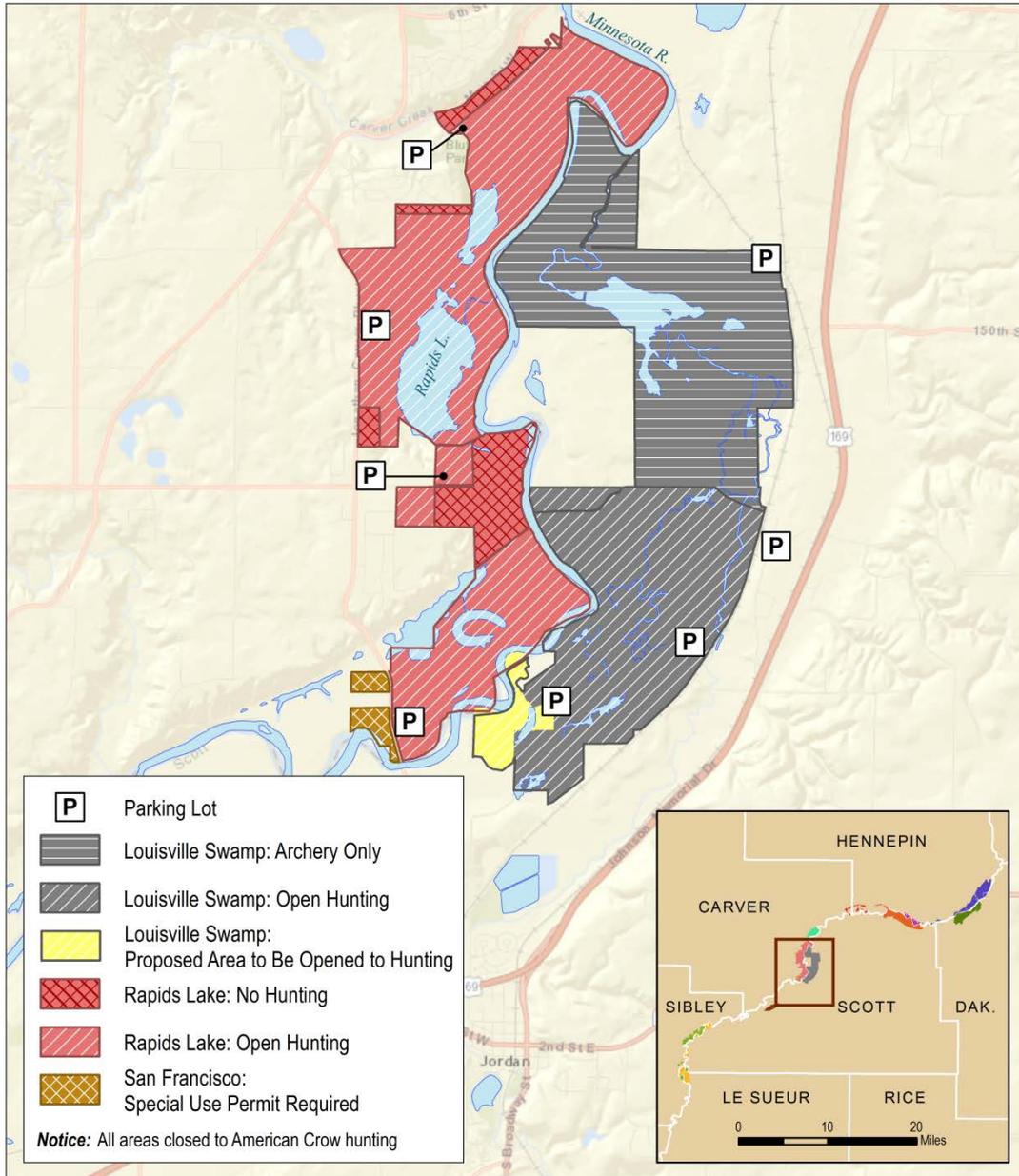
Figure B-1: Bloomington Ferry Unit Lands Proposed to be Open to Hunting.



U.S. Fish & Wildlife Service

Minnesota Valley National Wildlife Refuge
Bloomington, Minnesota

Rapids Lake, Louisville Swamp
& San Francisco Units
Hunting Information



PRODUCED FOR: 2016-17 HUNT PLAN
BLOOMINGTON, MINNESOTA
MAP DATE: AUG. 2016
CARTOGRAPHER: MATT MILLETT
SOURCES: MWNWR, MINNESOTA DNR, USGS, ESRI, DelORME

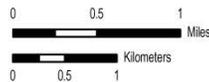


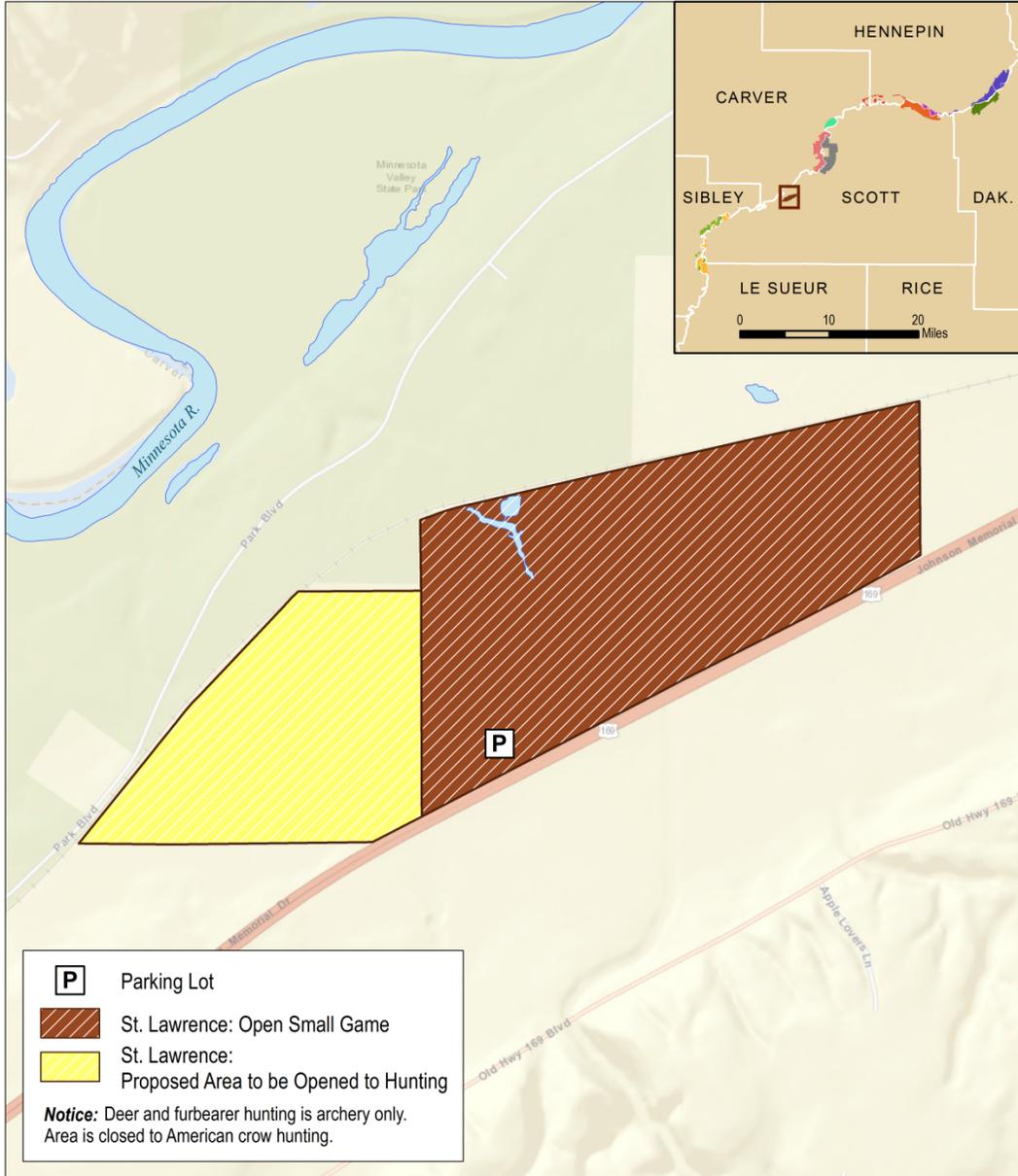
Figure B-1: Louisville Swamp Unit Lands Proposed to be Open to Hunting.



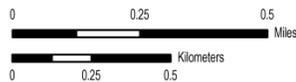
U.S. Fish & Wildlife Service

Minnesota Valley National Wildlife Refuge
Bloomington, Minnesota

St. Lawrence Unit
Hunting Information



PRODUCED FOR: 2016-17 HUNT PLAN
 BLOOMINGTON, MINNESOTA
 MAP DATE: AUG. 2016
 CARTOGRAPHER: MATT MILLETT
 SOURCES: MWNWR, MINNESOTA DNR, USGS, ESRI, DeLORME




 UTM ZONE 15N - NAD83

Figure B-3: St. Lawrence Unit Lands Proposed to be Open to Hunting.

The following maps show landmarks, parking lots, and hunting activities for Refuge Units under the preferred Alternative. The Round Lake Unit is not shown because it is closed to hunting.

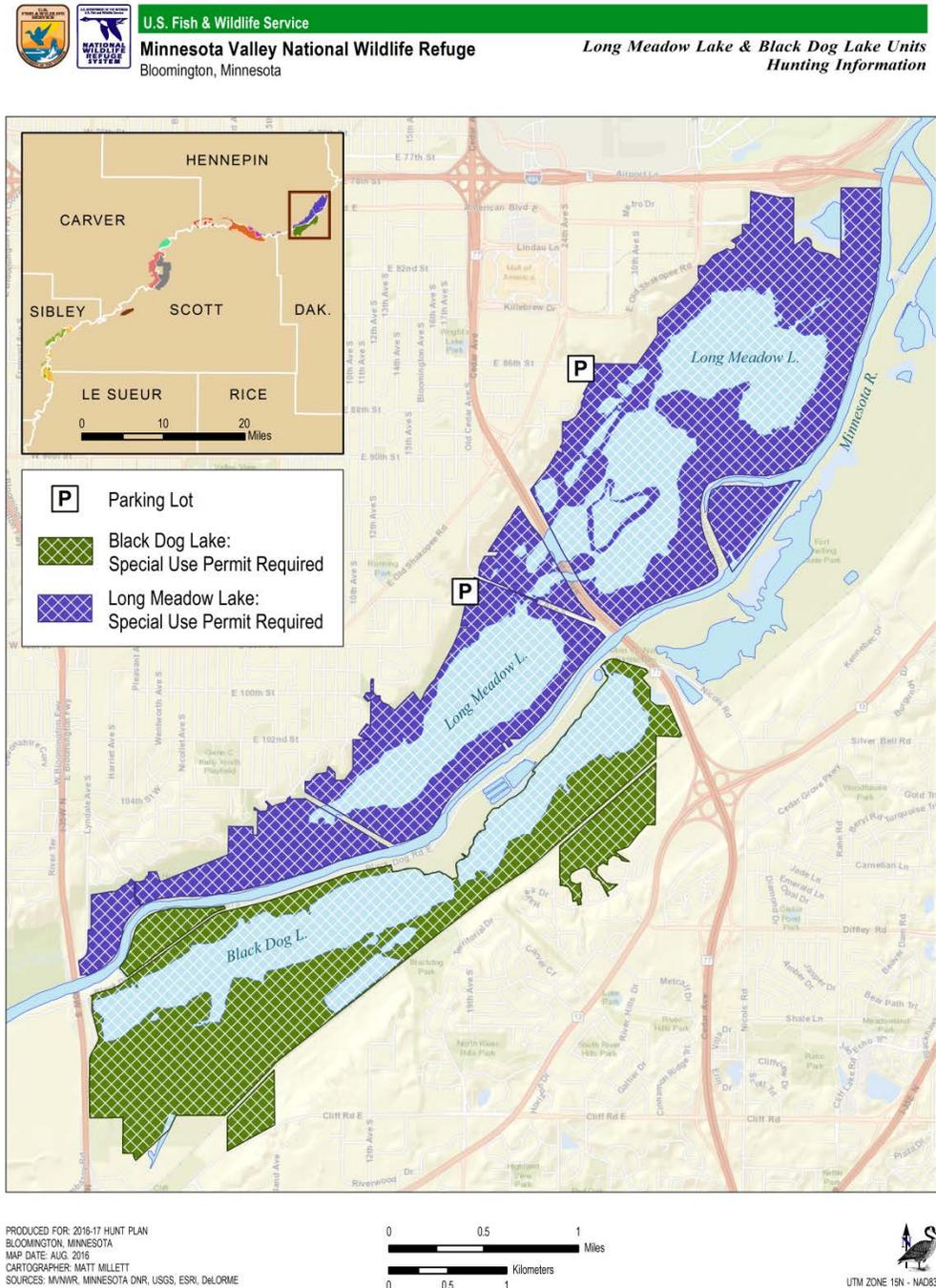
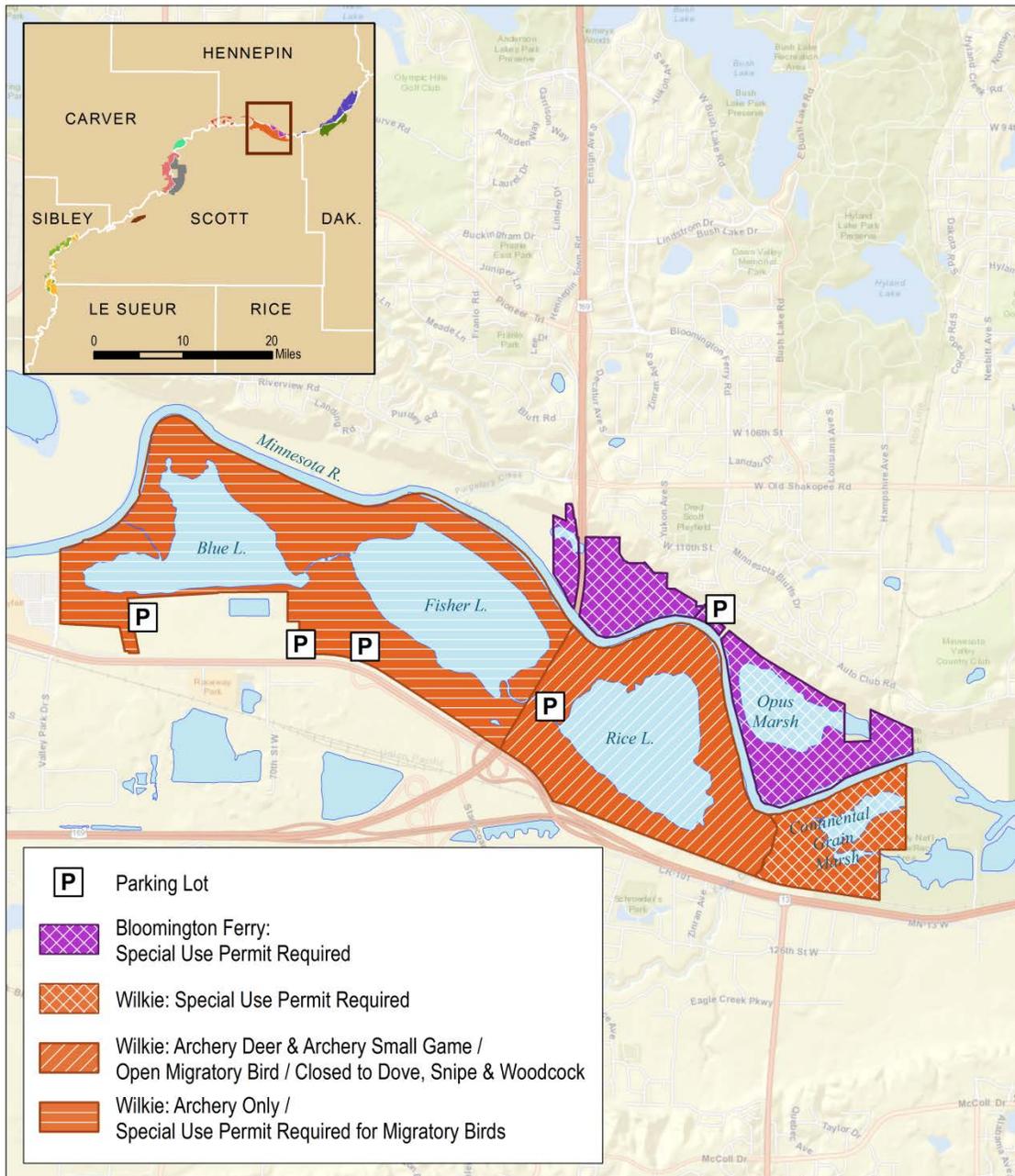


Figure B-4: Long Meadow and Black Dog Unit Hunting Opportunities.



PRODUCED FOR: 2016-17 HUNT PLAN
 BLOOMINGTON, MINNESOTA
 MAP DATE: AUG. 2016
 CARTOGRAPHER: MATT MILLETT
 SOURCES: MWNWR, MINNESOTA DNR, USGS, ESRI, DeLORME

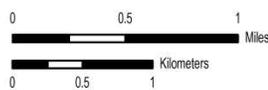
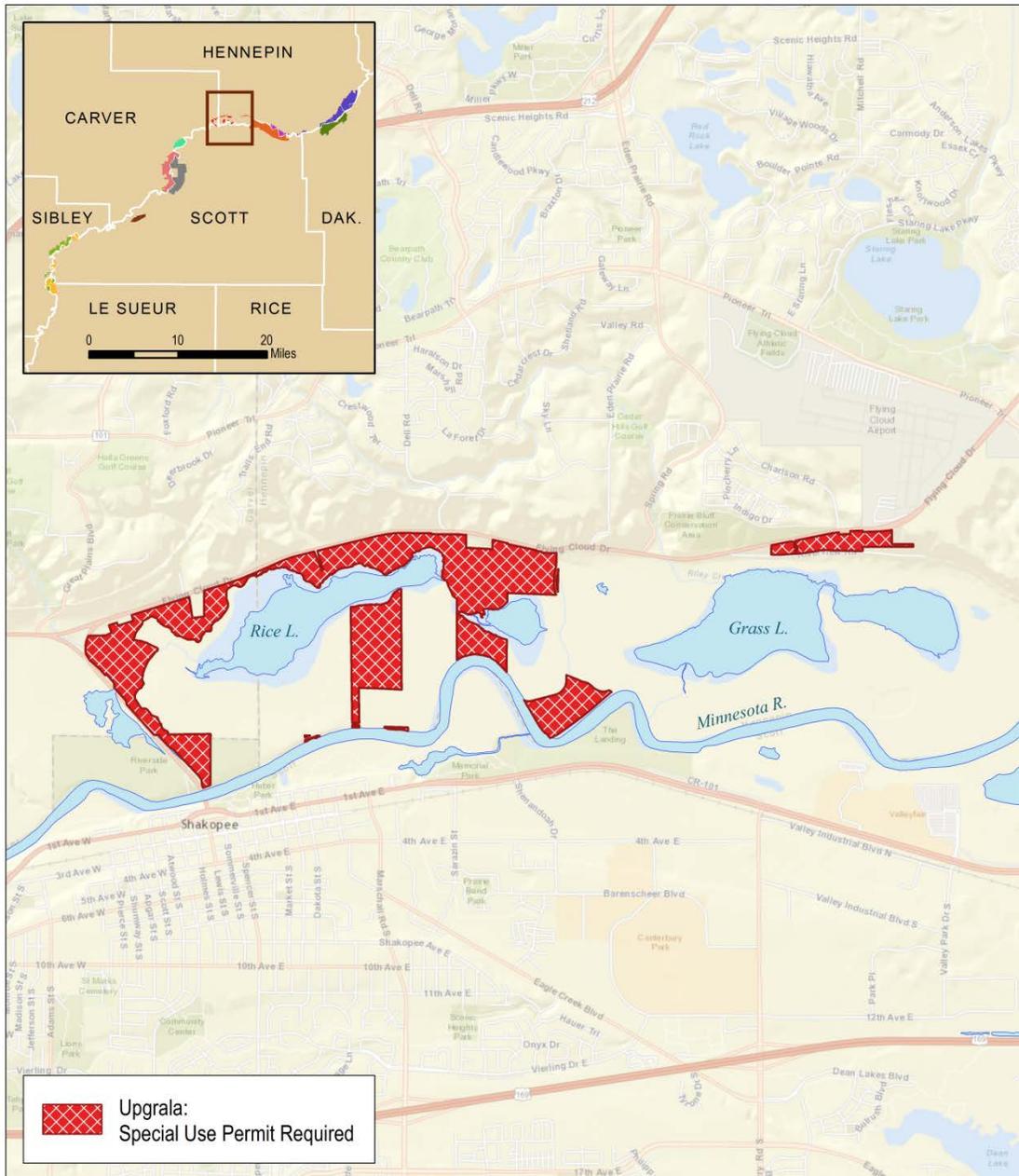


Figure B-5: Wilkie and Bloomington Ferry Units Hunting Opportunities.



PRODUCED FOR: 2016-17 HUNT PLAN
 BLOOMINGTON, MINNESOTA
 MAP DATE: AUG. 2016
 CARTOGRAPHER: MATT MILLETT
 SOURCES: MWNWR, MINNESOTA DNR, USGS, ESRI, DeLORME

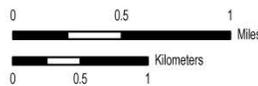
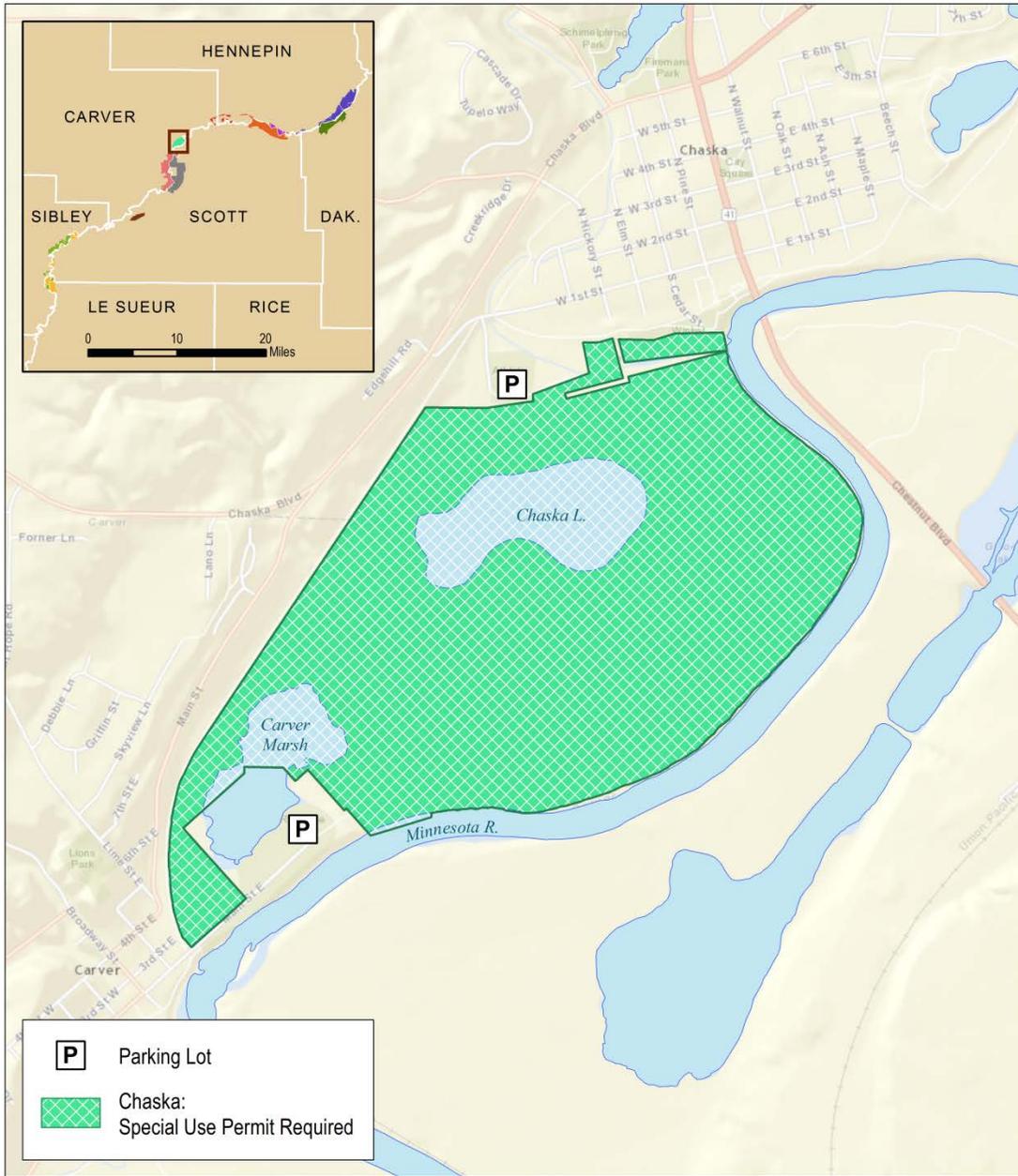


Figure B-6: Upgrala Unit Hunting Opportunities.



PRODUCED FOR: 2016-17 HUNT PLAN
 BLOOMINGTON, MINNESOTA
 MAP DATE: AUG. 2016
 CARTOGRAPHER: MATT MILLETT
 SOURCES: MWNWR, MINNESOTA DNR, USGS, ESRI, DeLORME

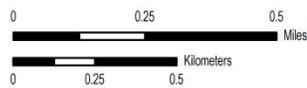
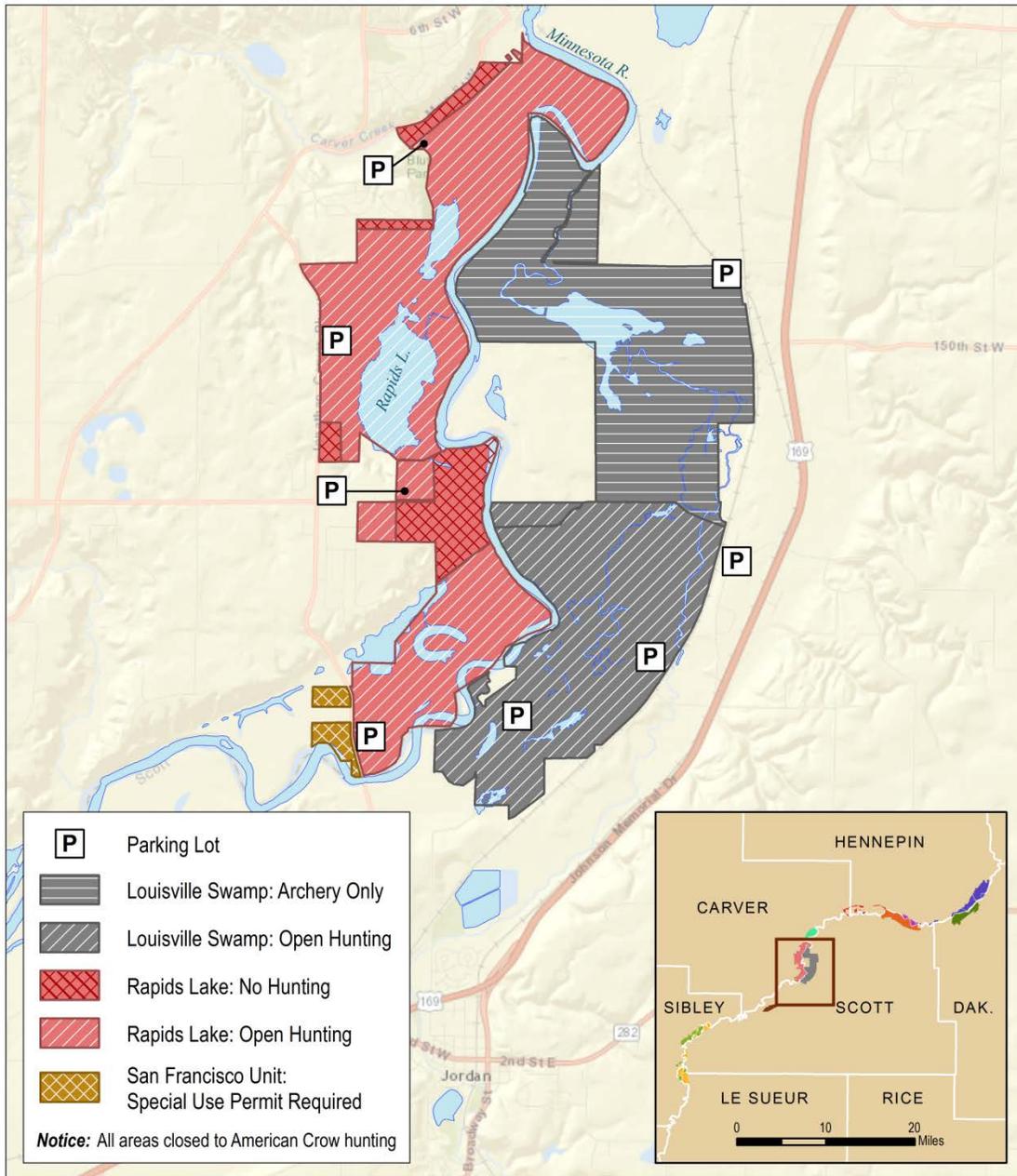


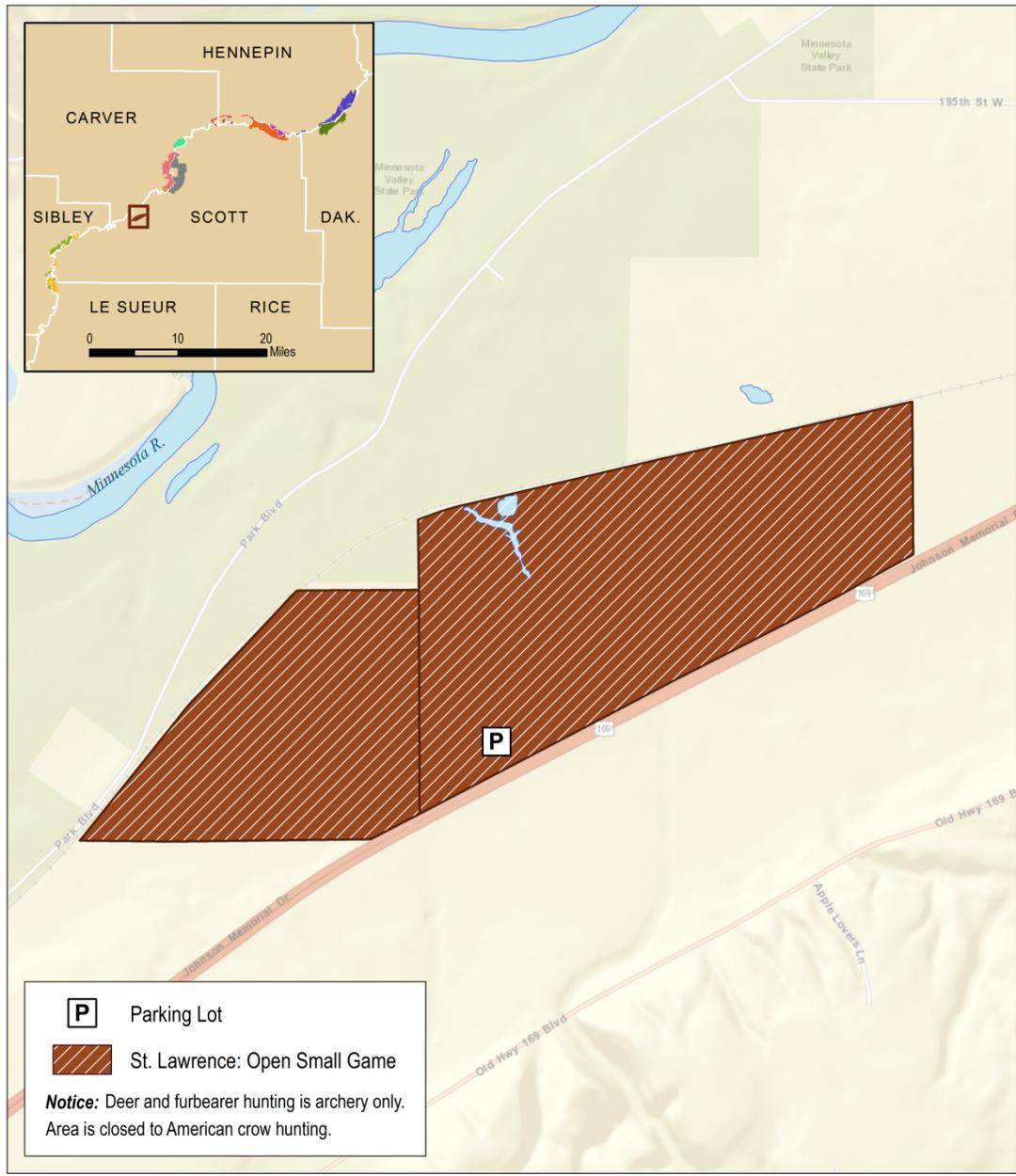
Figure B-7: Chaska Unit Current Hunting Opportunities.



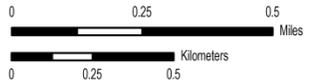
PRODUCED FOR: 2016-17 HUNT PLAN
 BLOOMINGTON, MINNESOTA
 MAP DATE: AUG. 2016
 CARTOGRAPHER: MATT MILLETT
 SOURCES: MWNWR, MINNESOTA DNR, USGS, ESRI, DeLORME



Figure B-8: Rapids Lake and Louisville Swamp Units Hunting Opportunities.



PRODUCED FOR: 2016-17 HUNT PLAN
 BLOOMINGTON, MINNESOTA
 MAP DATE: AUG. 2016
 CARTOGRAPHER: MATT MILLETT
 SOURCES: MWNWR, MINNESOTA DNR, USGS, ESRI, DeLORME




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Figure B-9: St. Lawrence Unit Hunting Opportunities.

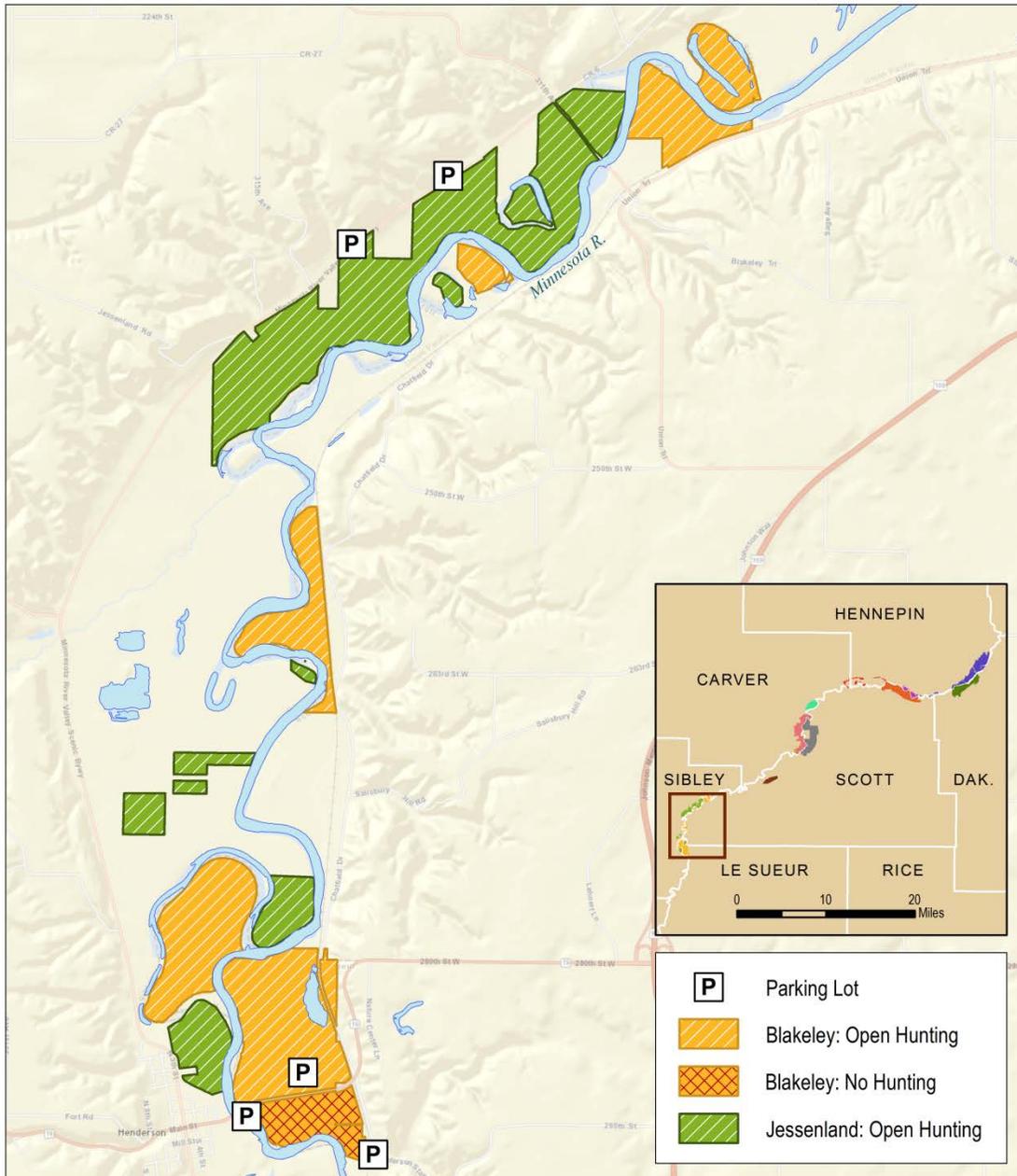


Figure B-10: Jessenland and Blakeley Units Hunting Opportunities.

APPENDIX C - CONSULTATION AND COORDINATION WITH OTHERS

The following consultation and coordination efforts were conducted in the preparation of this document:

In preparation for the Refuge's CCP, issue-based focus groups were established to discuss specific Refuge issues. One of these groups, the Recreational Users Focus Group, was made up of individuals representing neighboring counties and cities, State agencies, and other groups such as the Minnesota Wildlife Federation, Minnesota Waterfowl Association, Minnesota River Valley Audubon Chapter, and several public user groups. This group discussed all recreational uses including hunting on the Refuge. Seven open houses were also conducted during 1999 with the primary purpose of obtaining public input into the future direction of the Refuge and the District. Both the focus groups and public meetings led to the development of goals for the draft CCP. A public review period followed the release of the draft plan. In September 2004, the final CCP for the Refuge was approved. A goal of the CCP for the Refuge and District is to provide no less than 14,000 quality hunting experiences for a variety of populations per year. Seventy-five percent of the hunters will report no conflicts with other users, a reasonable harvest opportunity and satisfaction with the overall experience.

In 2004, Refuge staff proposed changes to the current Hunting Plan. In March 2004, Hunting Chapter scoping was conducted with staff from the MNDNR Parks and Wildlife offices to get input on the proposed alternatives for hunting programs on the Refuge and the Refuge began to develop a new Hunting Plan. Since then, the Refuge continued consulting and coordinating with the State regarding Refuge hunting activities on an informal basis.

On March 3, 2005, Refuge staff met with their counterparts from the MNDNR to gather input on the proposed changes to the hunt program. The following staff was in attendance: Diana Regenscheid and Tim Bremicker (Wildlife), Chuck Kartak, Mark Cleveland, and Frank Knoke (Parks), and Scott Carlson (Law Enforcement). Several concerns were raised. A second meeting was held in November and a comment letter was received during March, 2006.

During June of 2005, Londell Pease, Planner for the City of Bloomington, was contacted and provided information on proposed deer hunting in the Bloomington Ferry and Long Meadow Lake Units. He had no concerns with the proposal but asked a proposal be submitted to the City Council for their review and comment.

In November, 2005, the Service again met with staff from MNDNR Parks and Wildlife offices to discuss and gather input on the proposed alternatives for the hunting programs of the Refuge.

During December, 2005, the Service contacted staff from the City of Bloomington concerning the proposed alternatives for hunting on the Refuge within the city.

During May, 2006, the Service contacted staff from the City of Carver concerning the proposed alternatives for hunting on the Refuge.

During July, 2006, a letter was sent to the Administrator of the City of Carver, Jim Elmquist, asking if a variance could be granted to the Service to exempt Refuge lands within the city limits from permit requirements and use of single projectiles for hunting. The City did not grant the variance. On October 16, 2006, the Refuge Manager met with the Carver City Council and City Administrator concerning a request to grant an exemption to the Service to specific City ordinances concerning hunting on Refuge lands that fall within City limits.

In July 2006, Refuge staff met with Dave Guzzi, from Capable Partners Inc., on the Bloomington Ferry Unit where hunting for persons with disabilities is proposed. He said the site would work fine for their program and recommended we move ahead with the proposal to open the area to hunting for turkey, deer and upland game for hunters with disabilities. The Refuge has continued its partnership with Capable Partners.

In the fall of 2007 and 2008, the Refuge met with the City of Bloomington, MNDNR, and Three Rivers Park District to coordinate collection of deer population data. The four agencies also developed plans for a deer culling program focused on natural areas within the City of Bloomington. The culling program was implemented by agency staff without the participation of the general public. From 2009 – 2011 the Refuge has continued to monitor deer populations on its urban units but has not participated in any removal activities.

As in previous years, from 2008 - 2010, the Refuge annually coordinated a Young Waterfowlers program in partnership with the Minnesota Waterfowl Association.

In 2009 the Refuge renewed its efforts to develop a new Hunting Chapter and moved forward with a 2010 Hunting Chapter based upon earlier formal coordination with the MNDNR as well as the intervening informal discussions. The Refuge solicited comments regarding this Hunting Chapter from the MNDNR, as well as resource managers from local units of government. Favorable comments were received on the 2010 Hunting Chapter.

In 2010, the Draft 2011 Hunting Chapter and supporting Draft EA were sent to MNDNR Area and Regional Managers in the Divisions of Fish and Wildlife and in the Division of Parks and Trails. The MNDNR strongly supported the proposed changes to the Hunting Chapter.

In 2011, the Draft 2012 Hunting Chapter and supporting Draft EA were sent to MNDNR Area and Regional Managers in the Divisions of Fish and Wildlife and in the Division of Parks and Trails. As in previous years, the MNDNR strongly supported the proposed changes to the Hunting Chapter.

In 2014, the Draft 2015 Hunting Chapter and supporting Draft EA were sent to MNDNR Area and Regional Managers in the Divisions of Fish and Wildlife and in the Division of Parks and Trails. The MNDNR strongly supported the proposed changes to the Hunting Chapter. The Refuge also consulted informally with the Cities of Bloomington and Burnsville regarding the use of population management hunts in their respective jurisdictions while developing the concept forwarded in this plan. Both cities formally reviewed the Draft Hunting Chapter and supporting documents.

In 2016, the Draft 2016 - 2017 Hunting Chapter and supporting Draft EA were sent to MNDNR Area and Regional Managers in the Divisions of Fish and Wildlife and in the Division of Parks and Trails. The MNDNR strongly supported the proposed changes to the Hunting Chapter. The Refuge also consulted informally with the local municipalities. Formal comments from this coordination are presented in Appendix D.

Following the adoption of this Hunting Plan, consultation and coordination with the MNDNR and others regarding its annual implementation will be a combination of formal and informal activities based upon the nature of the issues to be addressed.

APPENDIX D – RESPONSE TO COMMENTS ON THE HUNTING CHAPTER AND ENVIRONMENTAL ASSESSMENT

The Refuge solicited comments on the draft 2016 -2017 Hunting Chapter and this supporting Environmental Assessment (EA). The drafts were made available for a 30 day review and comment period which extended from _____, 2016. The availability of these documents was announced via a public notice to ten print media organizations whose coverage extends beyond the geographic limits of the Refuge. The notice also was sent directly to legislators, municipal officials, agency contacts, and non-governmental organizations (see Section 8.0). The availability of the draft Hunting Plan and EA were announced on the Service’s Refuge, Regional, and National websites. Refuge staff was available to discuss the proposed Hunting Chapter and EA with any interested persons during regular work hours at the Bloomington Visitor center.

Summary of Comments

The Refuge received a total of __ responses from agencies, municipalities, non-profit organizations, and private citizens.

Response to Comments

Comment:

Response:

APPENDIX E – POLICY COMPLIANCE AND SUPPORTING DOCUMENTATION

The Refuge completed an Intra-Service Section 7 evaluation as required by Service policy for compliance with the Endangered Species Act.

The Northern long-eared bat (*Myotis septentrionalis*) is proposed to be listed as Endangered and may occur in the areas the Refuge is proposing to hunt. The Northern long-eared bat hibernates in caves and mines-swarms in surrounding wooded areas in the autumn. It also roosts and forages in upland forests during the spring and summer. Although the Northern long-eared bat may be present in habitat open to hunting, the proposed hunting of migratory birds, upland game, or big game on Refuge Units would have no beneficial or adverse effects on the Northern long-eared bat or its critical habitat. This determination is based upon an assessment that no habitat will be altered specifically to implement activities identified in this plan.

The Refuge informally consulted with the Regional Archeologist (Kluth 2009) regarding the need to initiate a cultural resources consultation with the State Historic Preservation Officer (SHPO). Because there is no ground disturbing or construction activities resulting from any alternatives proposed in the 2015 Hunting Chapter, no formal consultation with the SHPO is required.