

Environmental Assessment

Sport Hunting Plan

for

CRESCENT LAKE NATIONAL WILDLIFE REFUGE
Garden County, Nebraska

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April 2007

ENVIRONMENTAL ASSESSMENT

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Crescent Lake NWR

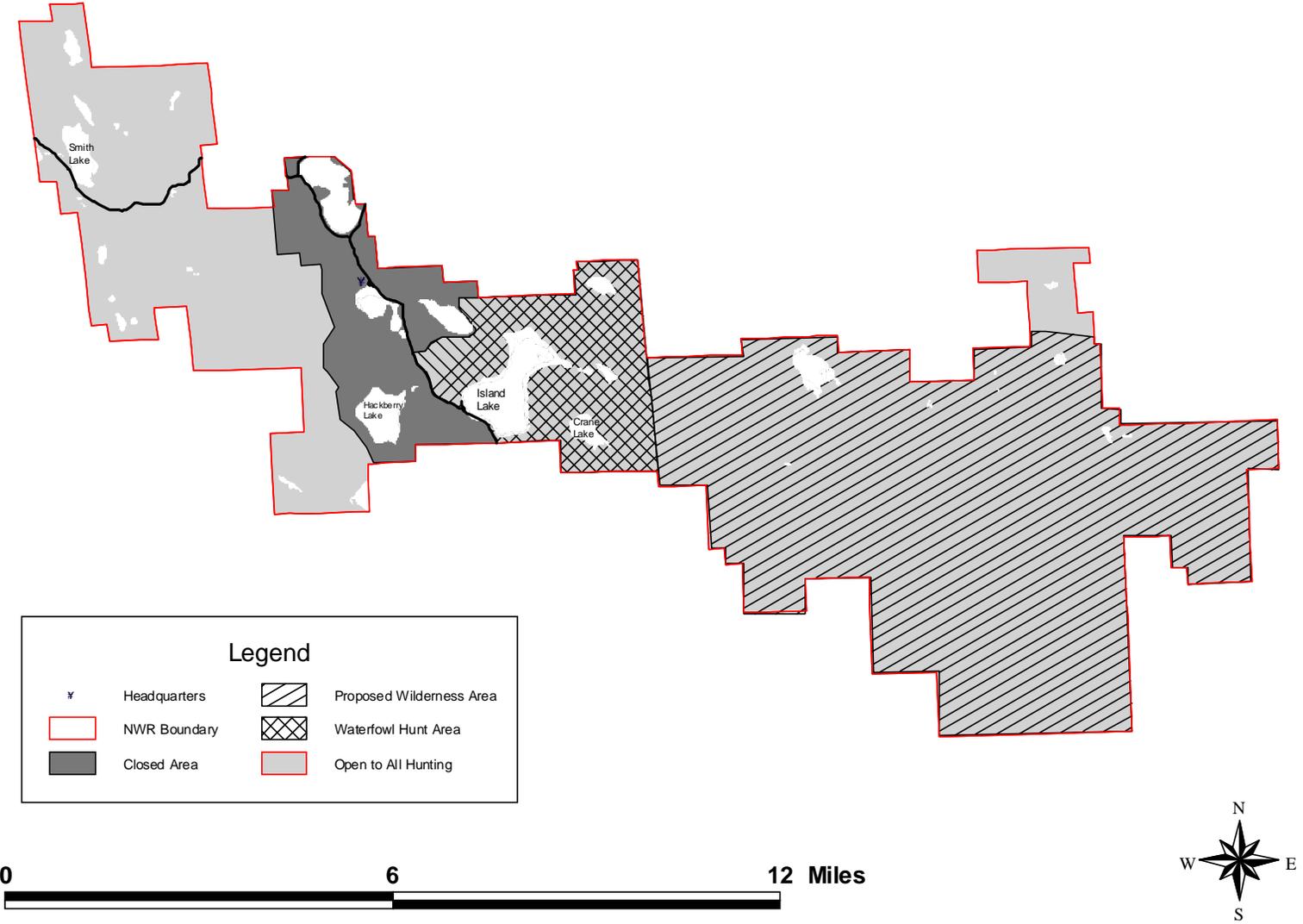


Figure 1. Areas Open and Closed to Hunting on Crescent Lake NWR

CHAPTER 1 PURPOSE AND NEED FOR ACTION

In response to a 2003 lawsuit filed by the Fund for Animals, the U.S. Fish and Wildlife Service (Service) will amend or rewrite environmental assessments that describe hunting programs at four national wildlife refuges located in the Mountain-Prairie Region. The new environmental assessments will address the cumulative impacts of hunting at all refuges which were named in or otherwise affected by the lawsuit. This document addresses the hunting program at Crescent Lake National Wildlife Refuge in Nebraska.

The Refuge has been open to hunting for mule and whitetail deer, prairie grouse and ring-necked pheasants for nearly 40 years. This environmental assessment evaluates four alternatives including the proposed action alternative to expand hunting opportunities on the Refuge. The number of acres open to public hunting will remain the same.

Expanded hunting opportunities identified in the approved 2003 Crescent Lake NWR Hunt Plan were implemented during the 2004 Nebraska hunting season. Experiences gained during the past three hunting seasons will be added throughout this document were applicable, to support maintaining this popular outdoor recreation activity.

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

The management focus of Crescent Lake National Wildlife Refuge (NWR) is to facilitate the restoration, maintenance and management of natural diversity including endangered species. Additionally, the Crescent Lake NWR Comprehensive Conservation Plan (CCP) facilitates continuity of management, and effective decision-making to achieve these ends. The CCP is intended to provide long-range guidance for the management of this Refuge based on careful consideration of the physical and biological characteristics of the land-base. It is designed to facilitate achievement of the Service mission and Refuge goals which center on the protection and enhancement of wildlife, their habitats and the provision of appropriate compatible public recreation. The Service has responsibility for stewardship over species that occupy Service lands and for the protection of cultural resources on these lands. Crescent Lake NWR, located in west-central Nebraska, is a unique and ecologically important component of the National Wildlife Refuge System. The Crescent Lake National Wildlife Refuge was established in 1931 for the following purpose:

“ . . . to provide as a refuge and breeding ground for birds

and wild animals, . . . ”

The CCP for the Refuge was approved on August 19, 2002. Through this planning process, which included comments from the general public and other stakeholders, it was determined that hunting does not pose significant environmental effects and is compatible with Refuge purposes. The CCP specifically identified expanding waterfowl hunting opportunities. During the process of developing a hunt plan to accommodate the CCP, other species have been identified to expand hunting opportunities on the Refuge. The proposed Hunting Plan is to serve as a step down management plan to the Refuge CCP.

The vast majority of land in western Nebraska is privately owned leaving very few remaining areas available for public hunting activities. Crescent Lake NWR is one of the largest public land holdings in western Nebraska and consequently, attracts hunters from throughout Nebraska as well as from several adjoining States.

For the purposes of this document, furbearers are defined under State law as bobcat, raccoon, Virginia opossum, long-tailed weasel, mink, red and gray fox, badger and striped skunk. Of these species, raccoon, mink, long-tailed weasel, badger and striped skunk are found on the Refuge. Only those species found on the Refuge will be evaluated in this document.

CHAPTER 2 PROPOSED ACTION AND THE ALTERNATIVES

This section discusses the alternatives considered for expanding hunting on Crescent Lake NWR. The preferred alternative is outlined in extensive detail in the Draft Hunting Plan.

Alternative 1: Continuation of the Current Hunting Program (No Action)

The no action alternative would continue the hunting program as is, which would include hunting of whitetail and mule deer, pheasant and prairie grouse in accordance with State regulations. This alternative would result in noncompliance with Refuge CCP objectives to “expand hunting to include limited waterfowl hunting” (Crescent Lake CCP-pg. 57).

Alternative 2: Discontinue Hunting on the Refuge

This alternative would not comply with the National Wildlife Refuge System Improvement Act of 1997 by failing to provide opportunities for the six priority wildlife-dependant recreational uses on National Wildlife Refuges (hunting, fishing, wildlife observation and photography, environmental education and interpretation). Implementation of this alternative would result in noncompliance with Refuge CCP objectives to “expand hunting to include limited waterfowl hunting” (Crescent Lake CCP-pg. 57).

Alternative 3: Open the Refuge to the Taking of all Species Allowed by Nebraska State Hunting Regulations

This alternative would open hunting for all species on the Refuge, similar to the surrounding area, as defined by Nebraska State Hunting Regulations. The Refuge would not have specific regulations for hunting on the Refuge. This would severely limit the Refuge’s ability to manage the Refuge in accordance with the approved CCP and its defined objectives. It would limit Refuge management’s ability to ensure refuge visitors are enjoying a quality hunting experience and that hunting is carried out in manner compatible with other refuge public uses.

Alternative 4: Expand Hunting Opportunities Within Limitations to Refuge Specific Regulations (Proposed Action Alternative)

This alternative is the Service’s preferred alternative and would enable Crescent Lake NWR to manage Refuge wildlife resources and public uses in accordance with establishing authorities. This alternative would give the Refuge the ability to comply with the CCP by expanding hunting opportunities. This alternative would comply with the National Wildlife Refuge System Improvement Act of 1997, by providing visitors with priority public use opportunities defined for National Wildlife Refuges. This alternative would permit the Refuge to expand hunting opportunities to those game species that can be determined to have huntable populations on the Refuge as determined by population surveys conducted by Refuge staff. This alternative will provide Refuge management the ability to ensure that a quality hunt experience is enjoyed by hunters and that hunting is carried out in a manner that is compatible with other Refuge public uses.

This alternative includes the following management strategies that would carry out the

Refuge Hunting Program:

- *Development and implementation of a new Hunting Plan guided by the CCP and this alternative action.
- *Concurrence with the Nebraska Game and Parks Commission (NGPC) in the development of the Hunting Plan.
- *Public comments on the Hunting Plan.
- *Coordination with the NGPC in collecting harvest data for those species hunted on the Refuge.
- *Monitoring of wildlife populations that might be affected by hunting or other public use activities.
- *Ensure that all new hunting activities are compatible with the Refuge purpose and mission and are carried out in a compatible manner.
- *Ensure that hunters are afforded a quality hunting experience with regards to preventing excessive hunter numbers, maintaining environmental aesthetics, and ensuring hunt quality with regards to game availability and hunter/visitor safety.
- *Ensure that hunting activities do not negatively impact other Refuge public uses.
- *All areas currently closed to public use will not be affected by hunting activities.

The Crescent Lake NWR Sport Hunting Decision Document was approved in 2003 and included the four alternatives listed above. As a result, the proposed action alternative was implemented in 2004 and included hunting opportunities for waterfowl, coyotes, rabbits and furbearers. Specific Refuge regulations regarding harvest parameters, season length and harvest methods were also incorporated to ensure compatibility with the mission of the Refuge and to avoid conflict with other public use programs.

CHAPTER 3 AFFECTED ENVIRONMENT

Crescent Lake National Wildlife Refuge lies on the southwestern edge of the 19,300 square-mile Nebraska Sandhills, the largest sand dune area in the Western Hemisphere and one of the largest grass-stabilized regions in the world. The Sandhills are characterized by rolling, vegetated hills and inter-dunal valleys which are oriented in a northwest to southeast direction. Many shallow lakes and marshes are interspersed in the lower valleys. Native grasses predominate. Wildlife diversity, except large ungulates and their predators, is relatively unchanged since early settlement.

Approximately 177,000 acres of open water lakes, shallow marsh and fens, and nearly 1,130,000 acres of wet meadows remain in the Sandhills. Most wetlands are freshwater with about 10 percent alkaline. Wetlands range in size from 0.1 to 2,300 acres with 80 percent less than 10 acres. Many wetlands have been drained in attempts to increase hay production. Estimates of the numbers of wetlands drained range from 15 percent to 46 percent (USFWS1986). Wetland drainage continues to this day.

Under the Fish and Wildlife Service's (1994) "ecosystem approach to resource management," Crescent Lake NWR is located within the Platte-Kansas Rivers Ecosystem.

Climate of the Sandhills is characteristic of the central Great Plains - cold winters, hot summers, and frequent thunderstorms from spring to late summer. Annual precipitation ranges from 17 to 23 inches, and is coupled with high evapo-transpiration rates. The Refuge has operated a National Weather Service weather station since 1935. Precipitation on the Refuge averages 16.8 inches and temperatures have ranged from minus 46 to 109 degrees Fahrenheit. Since 1976, relatively high precipitation has resulted in positive net moisture balances (annual precipitation minus open pan evaporation) in most years.

A. Refuge History:

The 45,849-acre Crescent Lake National Wildlife Refuge was established on March 16, 1931, and is located 28 miles north of Oshkosh, Nebraska in Garden County. The Refuge is also located within the Central Flyway and lies in the southwestern corner of the Nebraska Sandhills. It is administered by the U. S. Fish and Wildlife Service as part of the Crescent Lake/North Platte National Wildlife Refuge Complex. The Complex headquarters is located 100 miles to the west in the city of Scottsbluff, Nebraska.

The initial Refuge acquisition of 36,920 acres was acquired primarily from one large ranch. Additional lands were acquired between 1932 and 1937. Most lands were acquired or exchanged under the authority of the Migratory Bird Conservation Act (45 Stat. 1222) with an additional 2,566 acres acquired under the Resettlement Administration (Executive Order 7027, April 30, 1935), a drought and depression relief program.

The earliest government actions on the Refuge included tree plantings and small construction projects by the Civilian Conservation Corps (CCC) and the Works Projects Administration

(WPA). The CCC also built several buildings and the WPA constructed roads, fences, and other facilities such as the fire towers.

All lands around the Refuge are in private ownership except for a small ranch on the southwest boundary purchased in 1984, by the Nature Conservancy for preservation of the blowout penstemon (an endangered plant). The only other public land in Garden County is Ash Hollow State Park, located 50 miles to the southeast.

Currently, the Refuge consists of the following areas that require special attention when considering and implementing land management and public use activities:

1. Proposed Wilderness Area: The 24,502-acre proposed wilderness area, until accepted or rejected by Congress, must be managed by policy, as if it was officially designated as a wilderness area; only “minimum tools” may be used. As stated in the Crescent Lake Comprehensive Conservation Plan (CCP), “all authorized public uses may occur within the wilderness to the extent they can be conducted without the use of motorized vehicles. However, solitude and primitive recreation is the overriding theme. Hiking, photography, and wildlife viewing will be permitted but trails will not be provided. Signs and interpretive facilities will be on the perimeters, outside the proposed wilderness boundary. Hunting is also permitted, however fishing is not available due to a lack of available lakes.”

2. Research Natural Areas: The two officially designated RNAs (1,076 acres) were established by Director’s Order in 1955, and are to remain free of human disturbance including habitat management and public use. Both RNA’s are located within the closed area of the refuge as identified in C below.

3. Closed Area: This area includes the 2 RNA’s and consists of approximately 4,550 acres that are closed to all public use including, hunting and fishing activities. Note: A 2.5 mile nature trail is located near the Refuge headquarters and is open to the public only for hiking, wildlife viewing and photography (on or directly adjacent to the trail only).

B. Habitat:

Habitat types found on the refuge are primarily broken down into the following categories:

Wetlands: There are 21 wetland complexes on the Refuge totaling approximately 8,251 acres or about 18 percent of the total area. Wetlands on Crescent Lake National Wildlife Refuge are for the most part, surface expressions of the groundwater table. These basins were formed when scouring action of the wind removed sand from the swales and deposited it on the dunes. Where the swales dipped below the water table, sub-irrigated meadows, marshes and lakes were formed. Drought cycles subjected lake bottoms to wind erosion and were undoubtedly important in preventing the lakes from becoming filled with sand. With a shift in the prevailing wind direction valleys were blown closed, clogged by the same sand that created them. In most cases, stream systems do not exist between wetlands. Many lakes are maintained solely by underground water sources, often including springs and tend to be at least slightly alkaline.

Annual precipitation, evaporation and long-term wet and dry cycles naturally maintain the majority of the Refuge's wetlands. However, with the Sandhills becoming more stabilized there is an increased chance of these lakes filling over the long term and becoming meadows.

The Refuge also has water management capability for a chain of lakes and wetlands, with the majority located in the Moore Valley. Management of these areas is conducted using a series of earthen embankments and water control structures to benefit migrating waterfowl and shorebirds.

Sub-irrigated Meadows: These sites are typically characterized by their close relationship to ground water where soil moisture can support deep-rooted, warm season native grasses even during drought. They make up about 9 percent of the Refuge and are dominated by tallgrass species such as switchgrass, Indiangrass and sand bluestem.

Sand and Choppy Sand Sites: These sites include the gently undulating sandhills and characteristic dunes for which the Nebraska Sandhills are named. These sites comprise approximately 73 percent of the Refuge. Predominate grasses within the Sands sites include both cool season species such as needle-and-thread and western wheat grass as well as warm season species such as prairie sandreed, sand bluestem, sand love grass and sand dropseed. Common forb species include prairie sunflower, yucca, lead plant and prairie rose.

Choppy Sand sites support a wide variety of vegetation but also contain many, relatively small, unvegetated areas commonly called "blowouts." Blowouts are caused by wind erosion and vary with terrain. The blowout penstemon (*Penstemon haydenii*), a federally listed endangered species, is endemic to the Sandhills and its characteristic habitat includes the blowouts and adjacent open sand areas. Predominate grasses include blue gramma, sand bluestem, sand dropseed, blowout grass, sand love grass, little bluestem and Sandhills muhly. Forb species include yucca, sand cherry, prairie rose and prairie sunflower.

C. Wildlife Resources:

The Nebraska Sandhills is one of the few large native prairie areas in the United States that has not been substantially converted to farmland or otherwise modified. Thus, most of the plant and animal species present when settlement began are still present today. Surveys and census activities are limited by staffing and funding. Most are broad-scale sampling, which works well for large numbers of highly visible species but yields erratic and questionable results for species which are less visible or occur in smaller numbers.

Endangered and Threatened Species: Bald eagles (*Haliaeetus leucacephalus*) use the refuge during migration and have successfully nested on Crescent Lake Refuge since 1994. A second pair began nesting on Crane Lake in 2003. Eagles use the wooded area directly adjacent to Hackberry and Crane Lakes. This area has fewer trees than ordinarily used by bald eagles. The eagles feed on fish from lakes on and off the Refuge. Eagles arrive on the Refuge in February to nest. Shortly after fledging in June/July, the eagles will leave and periodically return for a short time in the early fall.

Whooping cranes are occasionally seen during migrations but are considered only casual, infrequent flyover visitors.

The yellow mud turtle (*Kinosternon flavescens*) is a candidate species of special interest and will be treated as a listed species for planning purposes. The primary population estimated at 4,000-5,000, is located at Gimlet Lake, with a second unknown number at Goose Lake and a few historic records on Roundup and Hackberry Lakes. There is also a population off Refuge at Rush Lake. The turtles spend the winter in the hills primarily on south facing hills. Males emerge in late April and move down to the lake. Females and young follow in May. During mid to late June, females return to the hills to lay their eggs.

Blowout Penstemon is the only endangered endemic plant in Nebraska. The refuge has been inventoried for blowout penstemon since 1987. Numbers have declined since the inception of the survey, until transplanting began in 1997. Native plants have decreased to 329 plants from a high of 1959 in 1987. Transplanting has gone well and resulted in an additional 1431 plants through 2005. The total population for 2005 was 1760 plants. Habitat has been identified and several sub-units will be managed specifically for this endangered plant.

Birds: Nebraska includes 413 species on its official bird list, 279 of which occur on Crescent Lake National Wildlife Refuge.

Shorebirds, Gulls, Terns and Allied Species: Thirty-one shorebird species, 7 gull species, and 5 tern species occur on the Refuge. Of these, 11 species nest on the Refuge. The most abundant species in this group include: American avocet, lesser yellowlegs, Northern phalarope, Baird's sandpiper and long-billed dowitcher.

Spring migration begins in April with a few hundred birds counted in surveys. Migration peaks in early May with 4,000 to 5,000 birds per day, then dropping off in late May to 1,500 to 2,000 birds. Yellowlegs begin returning in July, with a fall migration peak in late August of about 1,000 birds a day.

Waterfowl: Thirty-two species of waterfowl use the Refuge during some portion of the year including 15 species which nest on the Refuge. Historically, between 1,000 and 3,500 ducks are hatched per year from pair counts that average 650 –700 pairs. An additional, 150-175 Canada goose goslings are hatched from an estimated 80-100 nesting pairs.

Peak numbers during the fall migration occur in October and averaged 15,115 per day, during the most recently sampled timeframe. Peak numbers during the spring migration occur in April and averaged 12,600 over the same period. Table 1, illustrates the average daily fall population by species.

Table 1. Average Daily Waterfowl Populations by Species, During Fall Migration, 1988-97 (* Nests on the Refuge).

<u>Species</u>	<u>Average Daily No.</u>
*Trumpeter swan	14
*Canada goose	244
*Mallard	2051
*Gadwall	1653
*Pintail	565
*Green-winged teal	399
*Blue-winged teal	988
*Cinnamon teal	13
*American widgeon	1258
*Northern shoveler	1679
*Redhead	1074
Ring-necked duck	528
*Canvasback	1631
*Lesser scaup	855
Common goldeneye	88
*Bufflehead	721
*Ruddy duck	1589
Common merganser	205
*Wood duck	23
Hooded merganser	10

Marsh and Water Birds: Eared grebes nest on Goose and Deer Lakes. Numbers vary considerably from year to year and during the last 10 years ranged from 446 adults and 290 nests to 1,194 adults and 656 nests.

There is a long-standing double-crested cormorant rookery on Goose Lake and nesting also occurs on Smith and Gimlet Lakes. The number of nests over the last ten years averaged between 40 and 100.

Great-blue herons have historically used the Refuge for nesting on Crane Lake until 2003 when a bald eagle pair established a nest, effectively displacing the rookery. Since that time, the Refuge still receives heavy forage use however, the location of the new rookery is presently not known. Historic nest numbers ranged from 43 to 127 with production estimates from 94 to 125 young hatched.

Black-crown night herons have traditionally nested at Smith Lake with the exception of a few years when Goose Lake was the preferred location. The nesting population on Smith Lake consists of 50-70 pairs.

White-faced Ibis historically nested on Smith until 1993. Birds are still present during the breeding season however, the current nesting sight is unknown.

American bitterns were first surveyed in 1996 (a breeding male song survey on Smith, Goose,

Gimlet and Island Lakes). From 1996 to 2005, the number of males averaged from 1-20.

A rail call survey was initiated in 1997 and yields only trend information. Virginia rail calls average 9-36 birds per survey while sora rails averaged 0-6 from 1997 to 1999.

American pelicans do not use the Refuge for nesting, however, approximately 100-300 birds feed on Refuge lakes throughout the summer.

Raptors: The open grasslands of the Sandhills, interspersed with small areas of trees, provide excellent habitat and food sources for raptors. Twenty-seven species have been recorded on the Refuge. Table 2, presents breeding survey results from 1998-2005.

Table 2. Raptor Breeding Survey Results -1998-2005.

Species	Average Breeding Pairs	Average No. Young
Red-tailed hawk	3	4
Swainson's hawk	3	7
Bald eagle	2	2
Great horned owl	2	3
Northern harrier	8	20
American kestrel	4	12
Barn owl	24	110

Non-migratory Birds: Prairie grouse, a significant component of the Nebraska Sandhills, are declining throughout their range. Currently, Crescent Lake NWR has observed stable to slightly increasing populations. However, when compared to peak historical highs of the 1980's, sharp-tailed grouse have declined in both numbers of leks and number of males. Sharp-tailed grouse lek surveys from 2000 to 2005 indicate an average of 29 active leks and 232 dancing males, as compared to the 1980's when lek numbers averaged 41 and over 300 males.

The Refuge is on the western edge of the range of the greater prairie chicken. This species has not been present with regularity since the 1950's, and even then, numbers seldom exceeded 100. Reintroduction projects in the 1970s and 1980s were unsuccessful. An average of 4-6 males have been observed or heard annual between 2000 and 2005 during lek counts. There is also an active lek located approximately 1/8 mile from the eastern Refuge boundary.

Ring-necked pheasants continue to do well with overall increases in population during the past few years. Even though this popular game bird occurs in relatively small numbers, harvest totals have been near or exceed 100 birds annually for the past several years, including 116 roosters harvested in 2005, establishing a new record harvest. The average breeding population from 1987 to 2006 was 385.

Mammals: The Sandhills provide habitat for a variety mammals. Pre-settlement mammalian

fauna included 59 species. Ten carnivores and ungulates were probably extirpated by 1900, including the bison, elk and big horn sheep. Ten mammals have been introduced or their natural ranges extended, including the black-tailed jackrabbit and raccoon.

Whitetail deer and mule deer are both present. The most recent population estimates are from 2004-2006, when aerial and spot-light surveys were conducted. Estimated average populations during this period were 150-200 mule deer and 100-250 whitetail deer. The Refuge has witnessed population fluctuations with mule deer (70%) being more abundant than whitetail (30%) at the current time (2007). The largest harvests since the hunter check station was initiated in 1981 occurred in 1998 and 2005 when 66 and 56 deer were checked respectively. The average harvest since 1981 is 36.

Because of their historic economic importance and because they can alter wetland habitat, muskrats have been surveyed by counting houses in winter since the Refuge was established. Population peaks occurred in 1950 (934 houses), 1989 (1,929 houses), and 1996 (742 houses). During the last peak, considerable opening of cattail marshes was noted.

Coyote scat counts were initiated in 1997 and supply population trends which have been stable during the survey period. At this time, estimated populations totals are not available.

Jackrabbit and cottontail rabbit populations appear to be stable to increasing based upon data collected and casual observation. Data collected during fall deer spotlight surveys, recorded increases in jackrabbit numbers in both 2004 and 2005.

The Refuge does not collect data to develop population trends of any additional mammal species.

Amphibians and Reptiles: The most common reptiles and amphibians are the box turtle, bullsnake, tiger salamander and garter snake. The yellow mud turtle is considered a Refuge species of special interest and is discussed under the endangered/threatened species portion of this document.

Fishery Resources: Fisheries have been cooperatively managed by the Nebraska Game and Parks Commission under an agreement with the Refuge since 1991. Island Lake has been open to sport fishing since 1931. Carp were recently eliminated in 2005, and the lake has been restocked with warm water species including: largemouth bass, bluegill and yellow perch. Fishing opportunities are currently limited due to the recent restocking efforts however, we anticipate this to change as fish mature and grow.

Smith Lake is open for fishing from November 1-February 15. These dates were developed to reduce disturbance to migratory bird species using this portion of the Refuge. Smith Lake supports an excellent bass and panfish fishery. The presence of a small carp population may be the start of a more serious problem in the future.

Crane Lake is the only other lake with sport fishery potential and was stocked with yellow perch

in 2000. Exceptionally low water levels during the past several years, has greatly reduced the probability of fish survival in this lake. At present time, it is unlikely that any perch from the original stocking have survived. The Refuge will evaluate the possibility of restocking when water levels return to normal levels.

Several of the Refuge lakes also boast a healthy fathead minnow population. Minnows were stocked in several lakes during the 1970's in an attempt to provide additional forage for fish-eating bird species.

D. Public Use:

Crescent Lake NWR offers a variety of public use opportunities including hunting, fishing, wildlife observation, wildlife photography, environmental education and interpretation. Approximately 7,000 to 9,000 people visit the Refuge on an annual basis, a drop of over 30 percent from the 13,000 recorded in 1987. Counting methods varied somewhat throughout this timeframe and may be the reason for this decline.

Most visitors engage in more than one activity but the primary reason for visits in recent years can be broken down as follows:

Hunting	50 %
Fishing	20 %
Wildlife viewing and photography	29 %
Education/Interpretation	1 %

The vast majority of land in western Nebraska is privately owned leaving very few remaining areas available for public hunting activities. Crescent Lake NWR is one of the largest public land holdings in western Nebraska and consequently, attracts hunters from throughout Nebraska as well as from several adjoining States. The Refuge has traditionally been open to hunting for mule and whitetail deer, prairie grouse and ring-necked pheasants. Antelope hunting was closed in 1989, the result of low Refuge and State populations. This season remains closed. The five year average for deer hunting is 350 visits, while the average for upland game is 500 visits. Some hunters hunt for both deer and upland game during the same visit. Trapping is also permitted on the Refuge via a Special Use Permit issued by the Refuge Manager. In recent years, very few individuals have trapped on the Refuge.

Fishing on Island and Smith Lakes has historically been the most popular use of the Refuge. However, recent drought conditions and restocking efforts in Island Lake have resulted in a severe downturn in the number of fishermen using the Refuge. In past years, fishing visits averaged about 5,000 annually, of which 20 percent occurred during the winter months. Supporting facilities are limited to three graveled boat ramps and two fishing piers on Island Lake. Boats are only allowed on Island Lake and gas powered engines are prohibited. Possession of minnows is prohibited on all Refuge lakes.

Formal education/interpretation facilities are limited to one auto tour route along the County road which bisects the Refuge and modest information kiosks and displays at entrance points to the Refuge as well as the headquarters. The Refuge is available as an outdoor classroom but the isolated location, sparse local population and distances to schools limits use to about 100 students per year.

E. Cultural Resources:

The body of federal historic preservation laws has grown dramatically since the enactment of the Antiquities Act of 1906. Several themes recur in these laws, their promulgating regulations, and more recent Executive Orders. They include: 1) each agency is to systematically inventory the “historic properties” on their holdings and to scientifically assess each property’s eligibility for the National Register of Historic Places; 2) federal agencies are to consider the impacts to cultural resources during the agencies’ management activities and seek to avoid or mitigate adverse impacts; 3) the protection of cultural resources from looting and vandalism are to be accomplished through a mix of informed management, law enforcement efforts, and public education; and 4) the increasing role of consultation with groups, such as Native American tribes, in addressing how a project or management activity may impact specific archaeological sites and landscapes deemed important to those groups. The U.S. Fish and Wildlife Service, like other federal agencies, are legally mandated to inventory, assess, and protect cultural resources located on those lands that the agency owns, manages, or controls. The Service’s cultural resource policy is delineated in 614 FW 1-5 and 126 FW 1-3. In the FWS’s Mountain-Prairie Region, the cultural resource review and compliance process is initiated by contacting the Regional Archaeologist (RA). The RA will determine whether the proposed undertaking has the potential to impact cultural resources, identify the “area of potential effect,” determine the appropriate level of scientific investigation necessary to ensure legal compliance, and initiates consultation with the pertinent State Historic Preservation Office (SHPO) and federally recognized Tribes.

An archeological overview and assessment of Crescent Lake NWR was completed in 1999 by the Midwest Archeological Center of the National Park Service (Burgett and Nickel). Summaries of this work add clarity to the fact that the Sandhills have been inhabited to varying degrees, for thousands of years and that artifacts associated with these periods likely lie within the hills of sand. In addition, this work also indicates that the Refuge is likely to contain archeological features from early Euroamerican settlement associated with numerous “homestead” acts. Conclusions drawn from the summaries, state that locating these resources in this ever shifting and changing environment is difficult at best. Opportunistic discoveries will more likely be the norm as isolated blowing and shifting sand expose new discoveries.

Land management practices on and around the Refuge for the past 100 years have generally gravitated toward stabilization of the Sandhills as a result of increased compaction by cattle, which in turn increases grass stem densities. This practice has slowed the shifting of sands and healed blowouts resulting in less exposed sand, making the likelihood of finding buried artifacts

much more difficult.

In addition, the Refuge was also the site of a Civilian Conservation Corps camp located near Hackberry Lake in 1934. The CCC was responsible for the construction of many structures still present of the Refuge today. These structures include the fire watch towers, water control structures and several of the public use roads. The two fire watch towers are listed as structures of historic significance on the National Historic Register.

One other Refuge structure known locally as the “old bunkhouse”, is also listed on the National Historic Registry. This structure was originally a ranch house prior to the establishment of the Refuge and later became the refuge manager’s residence. Today, the structure is still in use housing seasonal employees and researchers.

F. Socio-Economic:

Garden County is rural in nature with an economy based heavily upon farming and ranching. Agricultural crops include, corn, winter wheat, soybeans and alfalfa. The majority of crops are irrigated with only a small percent produced through dry-land methods. Based upon U.S. Census Bureau data collected in 2000, Garden County has a population of 2,292 and a median annual household income of \$26,458.

Hunting is a traditional form of outdoor recreation for many people in Garden County. Crescent Lake NWR is the only available public land in the County that provides hunting opportunities. Hunting opportunities on the Refuge attract hunters from throughout Nebraska and other neighboring states and provides some additional economic benefits to the community of Oshkosh. The level of economic benefit is difficult to measure and is not likely to significantly impact the overall economy.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This section evaluates the foreseeable environmental consequences of implementing the management alternatives described in Chapter 2. Whenever available, detailed scientific information is presented regarding the potential “impacts” or “effects” of implementing each alternative. When science-based information is unavailable, those comparisons are based upon the professional judgment and experience of Refuge staff and Service and State biologists.

All four potential alternatives were considered. However, because alternative 2 failed to meet National Wildlife Refuge System public use policy mandates for compatible public uses and deviated substantially from the goals and objectives of the Refuge Comprehensive Conservation Plan, the environmental consequences of this alternative were ultimately not evaluated. Alternative 3 provides for hunting and satisfies public use mandates however, proposing to open the Refuge to all species available under state law without Refuge specific regulations, fails to adequately address the needs of priority wildlife and the mission of the Refuge. The potential to adversely impact wildlife species and conflict with other public use programs significantly increases, without Refuge specific regulations. Therefore, this alternative was considered but the environmental consequences of this alternative were ultimately not evaluated.

Summary of Effects

A. Effects Common to Both Alternatives

Public Health and Safety

Each alternative has virtually identical impacts to public health and safety resulting in negligible impacts.

Refuge Physical Environment

Impacts of each alternative on the physical environment of the Refuge would be very similar. These effects have proven to be minimal and frequently result in less impact than some routine Refuge management operations. Some disturbance to surface soils and vegetation does occur however, these effects are minimal.

Impacts to natural hydrology and air and water quality have been unchanged since the implementation of expanded hunting opportunities in 2004. Due to the remote nature and low visitation of the Refuge, impacts to the solitude and overall enjoyment of the Refuge by all visitor groups, is likely to remain unaffected.

Cultural Resources

Effects to cultural resources have remained unchanged and anticipated future impacts will

also likely remain low or unchanged. Hunting by nature does not pose any threat to cultural resources or historic properties.

Facilities

Existing facilities are used by a host of visitor groups enjoying the Refuge. It is difficult to assess any increased maintenance directly attributed to this proposal. Our experience has indicated that maintenance of existing facilities (roads, parking areas and boat ramps) has not increased due to the expansion of additional hunting opportunities.

B. Impacts to Habitat

No Action Alternative

Under this alternative, those portions of the Refuge currently available for public hunting would remain open. Hunting opportunities for deer species, pheasant and prairie grouse would still be available. Impacts to habitat directly attributed to hunting are minor in nature and are typically associated with trampling, which may cause damage to individual plants as hunters traverse across the Refuge. Our experience during the past several decades has indicated that impacts to habitat caused by hunting are no greater than those caused as a result of implementing other non-consumptive public use programs.

Proposed Action Alternative

Impacts to the habitat condition of the Refuge have not changed since the implementation of expanded hunting opportunities on the Refuge in 2004. Increases in the number of hunters using the Refuge have been small and somewhat localized. However, these impacts are no different than one might expect from increases in other areas of our public use program. For example, a similar increase in the number of bird watchers would likely have the same impact to Refuge habitats.

Additional acreage was not opened to accommodate the additional hunts and hunters are still required to follow Refuge specific regulations regarding, parking and the use of Refuge roads.

C. Impacts to Hunted Wildlife

No Action Alternative

Under this alternative, hunting for deer species, pheasants and prairie grouse would continue. This form of hunting has taken place on the Refuge for nearly 40 years and has been found compatible with Refuge purposes as well as other public use programs.

Mortality to individual hunted species would still occur under this alternative. Disturbance by hunters to hunted wildlife would also continue to occur as would, disturbance caused by other public use activities. Even with limited hunting opportunities, the Refuge would fail to maximize public use opportunities requested by the visiting public and other entities.

Proposed Action Alternative

Under this proposal, hunting for waterfowl, coyote, furbearer and rabbit will continue. Additional mortality specifically directed at these wildlife species has been documented. Casual hunter and law enforcement contacts have indicated the annual harvest for these species as follows: waterfowl (ducks 75-100, Canada geese 0-5 and coots 0-5), furbearers (all species 0-5), coyote 5-12, rabbit (whitetail jackrabbit 0-2, blacktail jackrabbit 0-2, eastern cottontail 0-2).

Disturbance to wildlife associated specifically with these hunts is minimal however, when combined with other hunting opportunities the disturbance levels are even less apparent. Increased public use associated with this proposal has been minimal thus far. However, in the future as more visitors become aware of the available hunting opportunities and access to private land becomes more difficult, additional increases are anticipated.

D. Impacts to Non-Hunted Wildlife

No Action Alternative

Impacts to non-hunted wildlife species does occur as a result of the Refuge's historic hunting program. However, the closed area of the Refuge does provide wildlife with a sanctuary were disturbances related to public uses are non-existent. Hunter numbers are typically very low (1-10 individuals) on an average daily basis resulting in very little overall disturbance across the Refuge. Non-consumptive public uses would likely result in a similar disturbance to wildlife.

In addition, large portions of the Refuge are limited either by access or Refuge specific regulation. For instance, the Refuge has a 24,502 acre proposed wilderness area that is accessible to foot traffic only. Due to the size of this area and challenging sandy terrain, the majority of public use including hunting, takes place along the edges of the unit, leaving thousands of acres undisturbed.

Hunter interaction with small mammals, reptiles and amphibians is typically low since many of these species are either nocturnal or tend to be less prevalent during cool or cold weather periods.

Proposed Action Alternative

Disturbance to non-hunted wildlife species has virtually mimicked those impacts described in the No Action Alternative. The closed area and proposed wilderness area will continue to provide an adequate buffer for wildlife even during high public use periods (50-75 individuals) per day.

Expanded hunting opportunities for coyotes and furbearers may contribute to decreased predation rates for snapping turtles, songbirds and other migratory bird species and their nests.

E. Impacts to Endangered and Threatened Species.

No Action Alternative

Impacts to threatened and endangered species are very minimal primary because hunting activities and critical life cycle requirements of these species do not coincide.

Bald eagles typically begin nest initiation in mid-February after hunting seasons have ended with young birds fledged and out of the nest prior to the start of any hunting seasons.

Whooping cranes are occasionally seen during migrations but are considered only casual, infrequent flyover visitors.

The yellow mud turtle (candidate species) is found only in Refuge lakes that are located in closed portions of the Refuge. This species emerges from Refuge lakes in mid-May through late June and lays eggs in the soft sandhills directly adjacent to the lakes. Adult turtles return to the lakes shortly after egg laying and remain there until the following spring.

Hunters do have a reasonable opportunity of coming in contact with blowout penstemon plants. However, the majority of penstemon plants are found growing in sand blowouts which typically do not harbor many if any, hunted wildlife species. Since the habitat requirements of blowout penstemon do not coincide well with the habitat requirements of any of the Refuge's hunted wildlife, the probability of any impacts are minimal. In all likelihood, the only disturbance caused by a hunter is possible trampling as a result of, traversing through a blowout in search of game species in neighboring habitats.

Proposed Action Alternative

Hunter disturbance and impacts to threatened and endangered species as a result of implementing the expanded hunting opportunities have been very minimal and have not

resulted in any additional conflicts over and above those mentioned as part of the No Action Alternative. Hunting associated with this proposal occurs concurrently in the same portions of the Refuge as other historical hunts.

Prior to implementing these hunts in 2004, a Section 7 consultation was prepared and evaluated to determine any possible impact to threatened and endangered species. The final assessment of that document indicated that the proposed hunts did not adversely affect these species.

F. Impacts to Refuge Facilities (roads, trails, parking lots, boat launch)

No Action Alternative

Impacts to Refuge facilities under this alternative have been minor. The majority of public use roads and trails are graveled or sand and can, during extremely wet conditions, become damaged by normal travel. However, precipitation during the hunting season (September-January) is typically less than other months and Refuge roads tend to freeze during the winter months making them more resistant to damage.

Other public use enthusiasts and Refuge visitors are also permitted to utilize these same facilities, placing them at the same level of risk for detrimental impacts.

Under this alternative, fisherman would provide the largest impact to boat launch facilities at Island Lake. Historically, fishing accounts for the largest user group on the Refuge however, recent drought conditions accompanied by poor fishing and fisheries renovation work, have resulted in a significant reduction in the number of fisherman.

Proposed Action Alternative

Past experience has indicated that any additional impacts to Refuge facilities caused as a result of implementing this proposal are very small. Many hunters use Refuge roads and trails for access to hunt multiple species resulting in no appreciable increase attributed directly to this proposal.

Hunters using the boat launch site on Island Lake are significantly less than the number of fisherman using this facility. The majority of waterfowl hunting takes place along the shore of the lake by hunters that typically carry in their equipment without the aid of a boat. Impacts to this facility are negligible.

G. Impacts to Wildlife Dependent Recreation

No Action Alternative

The vast majority of land in western Nebraska is privately owned leaving very few remaining areas available for public hunting activities. Crescent Lake NWR is one of the largest public land holdings in western Nebraska and consequently, attracts hunters from throughout Nebraska as well as from several adjoining States. This alternative satisfies some of the public's demand for public hunting however, it falls short in providing this opportunity to the broadest spectrum of the public.

Hunting is enjoyed by a large portion of the neighboring public. This statement is supported by our public use documentation which indicates that 50% of the public use that takes place on the Refuge evolves around hunting. In addition, CCP scoping meetings with the public and other interested entities indicated a strong desire for additional public hunting opportunities on Crescent Lake NWR.

Hunting under this alternative provides the public with a quality wildlife oriented experience. Hunters have also reported having an enjoyable experience where overcrowding is not an issue. Other public uses typically do not coincide with peak hunting periods which occur in late October through early November when cold temperatures are the norm. Peak periods for fishing and wildlife observation typically occur during the spring and early summer months prior to the extreme summer heat. This separation in time seems to resolve the majority of conflicts however, at times conflicts may still arise between user groups. The closed area of the Refuge also helps provides limited non-consumptive use opportunities by the public. In addition to a separation in time, the closed area also provides a separation in space, to further reduce conflicts between users.

Proposed Action Alternative

Since implementing this alternative three years ago, we have observed only a small increase in the overall number of hunters using the Refuge. One point of interest is that new clientele have been attracted to the Refuge to participate specifically in these new hunts. As a result, a broader spectrum of the public has been exposed to Crescent Lake NWR and the National Wildlife Refuge System.

Public response to these hunts has been very positive. Relations between neighboring cattle ranchers and the Refuge have improved with the addition of coyote hunting. This proposal has also created opportunities for additional youth participation on the Refuge through waterfowl hunting by observing the State youth waterfowl season. This alternative appears to have satisfied the majority of public demand for hunting at Crescent Lake NWR.

Inevitably, unanticipated conflicts between public uses and user groups may occur. Our

experience has indicated that at current hunter levels, increased conflicts are highly improbable due to the mitigating circumstances described in the No Action Alternative. Future increases in the number of hunters attributed directly to this proposal are unlikely due to the remote nature and limited access of the Refuge. However, should significant increases in hunter numbers or additional conflicts between or within user groups occur; the Refuge will evaluate solutions to resolve conflicts and maintain a high quality public use program for all user groups.

Cumulative Impacts Analysis

A. Anticipated Direct and Indirect Impacts of Proposed Hunt on Wildlife Species

Migratory Birds (ducks, geese, coots)

Under the proposed action alternative, Crescent Lake NWR estimates a maximum of 100 ducks, 5 American coots and 5 Canada geese would be harvested each year. This harvest represents an additive increase of 0.05% for ducks and 0.006% for Canada geese when averaged over the past 7 year harvest (1999-2005) of 195,421 ducks and 84,292 Canada geese for Nebraska (USFWS 2005). Cumulative impacts drop significantly when Refuge harvest rates are evaluated at the Central Flyway level (0.004% for ducks and 0.0008% for Canada geese) (USFWS 2006).

Coot harvests are not calculated at either the State or Central Flyway levels. However, using data collected for the local coot population at Crescent Lake NWR, population (1988-1997) and harvest data indicate an additive increase in the number of coots harvested at 0.07%. Professional biological opinions concur that the cumulative impacts to the coot population become even less apparent when viewed at the State or Flyway levels.

Estimated duck production rates for Crescent Lake NWR during a 53 year period, (1947-2000) indicate that an average of 1,804 ducks are produced annually, with blue-winged teal and mallards having the highest annual production. Production estimates for Canada geese from 1997-2006 indicate that an average of 159 goslings are also produced annually.

Table 3, illustrates average Refuge waterfowl production and the cumulative estimated increase in waterfowl harvested at the State and Central Flyway levels as a result of opening Crescent Lake NWR to waterfowl hunting.

Table 3. Cumulative Impact Data for Hunting Waterfowl on Crescent Lake National Wildlife Refuge.

	Est. annual Refuge duck production 1947-2000	*Expected annual range of harvest		Nebraska Harvest	Range in percent increase in harvest		Central Flyway Harvest	Range in percent increase in harvest	
Mallard	373	14	30	109,777	0.013	0.027	999,404	0.001	0.003
Gadwall	215	9	15	16,793	0.054	0.089	495,283	0.002	0.003
Pintail	153	4	6	4,682	0.085	0.128	94,094	0.004	0.006
Green Wg Teal	50	4	12	24,341	0.016	0.049	320,325	0.001	0.004
Blue Wing Teal	532	9	15	17,386	0.052	0.086	280,687	0.003	0.005
Cinnamon Teal	0	0	2	**	0	**	**	0	**
American Widgeon	33	8	12	10,861	0.074	0.110	198,795	0.004	0.006
Northern Shoveler	149	11	15	4,248	0.259	0.353	110,260	0.010	0.014
Wood Duck	4	0	2	5,088	0	0.039	93,590	0	0.001
Redhead	129	5	8	2,167	0.231	0.369	64,880	0.008	0.012
Ring-neck duck	16	0	1	2,199	0	0.045	79,797	0	0.001
Canvasback	52	1	3	319	0.627	0.940	15,728	0.006	0.019
Lesser Scaup	32	1	2	1,649	0.061	0.121	66,080	0.002	0.003
Common Goldeneye	0	1	2	497	0.201	0.402	6,966	0.014	0.029
Bufflehead	60	1	2	**	0	**	**	0	**
Ruddy Duck	220	0	1	184	0	0.543	3,641	0	0.027
Canada Goose	159	0	5	84,292	0	0.006	647,901	0	0.0008
Am. Coot (Refuge***)	**	0	5	6,789***	0	0.074	**	0	**

* Maximum average annual duck harvest =100 (all combinations =100)

** Data is unavailable

*** Refuge data only

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

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

The process for adopting migratory game bird hunting regulations, located in 50 CFR part 20, is constrained by three primary factors. Legal and administrative considerations dictate how long the rule making process will last. Most importantly, however, the biological cycle of migratory game birds controls the timing of data-gathering activities and thus the dates on which these results are available for consideration and deliberation. The process of adopting migratory game bird hunting regulations includes two separate regulations-development schedules, based on "early" and "late" hunting season regulations. Early hunting seasons pertain to all migratory game bird species in Alaska, Hawaii, Puerto Rico, and the Virgin Islands; migratory game birds other than waterfowl (e.g. dove, woodcock, etc.); and special early waterfowl seasons, such as teal or resident Canada geese. Early hunting seasons generally begin prior to October 1. Late hunting seasons generally start on or after October 1 and include most waterfowl seasons not already established. There are basically no differences in the processes for establishing either early or late hunting seasons. For each cycle, Service biologists and others gather, analyze, and interpret biological survey data and provide this information to all those involved in the process through a series of published status reports and presentations to Flyway Councils and other interested parties (USFWS 2006).

Because the Service is required to take abundance of migratory birds and other factors in to consideration, the Service undertakes a number of surveys throughout the year in conjunction with the Canadian Wildlife Service, State and Provincial wildlife-management agencies, and others. To determine the appropriate frameworks for each species, the Service considers factors such as population size and trend, geographical distribution, annual breeding effort, the condition of breeding and wintering habitat, the

number of hunters, and the anticipated harvest. After frameworks are established for season lengths, bag limits, and areas for migratory game bird hunting, migratory game bird management becomes a cooperative effort of State and Federal Governments. After Service establishment of final frameworks for hunting seasons, the States may select season dates, bag limits, and other regulatory options for the hunting seasons. States may always be more conservative in their selections than the Federal frameworks but never more liberal. Season dates and bag limits for National Wildlife Refuges open to hunting are never longer or larger than the State regulations. In fact, based upon the findings of an environmental assessment developed when a National Wildlife Refuge opens a new hunting activity, season dates and bag limits may be more restrictive than the State allows. At Crescent Lake NWR, season length is more restrictive for Canada geese than the State allows.

NEPA considerations by the Service for hunted migratory game bird species are addressed by the programmatic document, “Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds (FSES 88– 14),” filed with the Environmental Protection Agency on June 9, 1988. We published Notice of Availability in the Federal Register on June 16, 1988 (53 FR 22582), and our Record of Decision on August 18, 1988 (53 FR 31341). Annual NEPA considerations for waterfowl hunting frameworks are covered under a separate Environmental Assessment, “Duck Hunting Regulations for 2006-07,” and an August 24, 2006, Finding of No Significant Impact. Further, in a notice published in the September 8, 2005, Federal Register (70 FR 53376), the Service announced its intent to develop a new Supplemental Environmental Impact Statement for the migratory bird hunting program. Public scoping meetings were held in the spring of 2006, as announced in a March 9, 2006, Federal Register notice (71 FR 12216). More information may be obtained from: Chief, Division of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, MS MBSP-4107-ARLSQ, 1849 C Street, NWR, Washington, DC 20240.

Resident Hunted Wildlife (coyotes, furbearers, rabbits)

Coyote, rabbit (includes cottontails and jackrabbits) and furbearers (includes raccoon, long-tailed weasel, mink, badger and striped skunk), cannot be affected regionally by Refuge hunting due to their limited home ranges. Only local impacts will be discussed. Cumulative adverse impacts to these species are unlikely considering 1) the remote nature and limited access of the Refuge and, 2) studies have shown that small game/furbearers are not affected by hunting, but rather are limited by food resources. After consulting with biologists from the Nebraska Game and Parks Commission and evaluating our experiences through the past three hunting seasons, Crescent Lake NWR has determined the cumulative impacts to coyote, rabbit and furbearers to be negligible. Table 4, illustrates the cumulative impacts and increased harvest of these species as a result of implementing the proposed action alternative.

Table 4. Cumulative Impact Data for Hunting Furbearer and Small Game on Crescent Lake National Wildlife Refuge.

	Avg. Annual Statewide Harvest	Expected Annual Refuge Harvest	% Increase in Statewide Harvest
Mink	6,719*	<2	0.029
Cottontail	233,294	<2	0.0009
Jackrabbit	37,372	<3	0.008
Badger	1,493*	<1	0.070
Striped Skunk	9,674*	<1	0.010
Coyote	16,869	<12	0.071
Raccoon	60,310*	<2	0.003

*The majority of these species are harvested, statewide, through trapping. Trapping is not included in this proposal.

Coyote populations are monitored through spotlight and winter scat count surveys. Coyote scat counts on the Refuge were initiated in 1997 and supply population trends which have indicated a stable population during the survey period (1997-2005). At this time, estimated Refuge populations are anticipated to be higher than off-Refuge populations due to habitat management practices and an expanded prey base. Due to their relatively small impact on overall wildlife and habitat management planning, furbearer populations are monitored primarily through casual observation and while monitoring migratory bird nest success.

Coyote and furbearer harvest is monitored through law enforcement and casual hunter contacts. Harvest estimates for coyotes off-Refuge are significantly higher with many ranches participating in State and federal (USDA) programs to control coyote populations due to their perceived impacts to cattle operations.

Coyote and furbearer hunting may assist the Refuge with predator control efforts. Predator control may contribute to migratory bird nest success as well as other species. To provide less impact to Refuge law enforcement resources and to be consistent with other Refuge public uses, coyote/furbearer hunting will be limited to daylight hours and may not be hunted with the assistance of dogs.

Rabbit harvest is also monitored through casual observation and law enforcement contacts. Only jackrabbit populations are monitored via fall spotlight surveys and population trends indicate a stable to increasing population.

Resident Non-Hunted Wildlife

Non-hunted wildlife would include migratory birds (shorebirds, songbirds, etc.); small

mammals (voles, moles, mice, etc.); reptiles and amphibians; and invertebrates (insects). Except for migratory birds and some species of migratory bats and insects, these species have very limited home ranges and hunting could not affect their populations regionally, thus, only local effects will be discussed.

Disturbance to non-hunted wildlife has increased slightly. However, significant disturbance has not occurred and is unlikely to occur, based upon the following rationale. Prior to the implementation of expanded hunting opportunities in 2004, hunting for deer and upland game species had occurred on the Refuge for close to 40 years. Expanded hunting opportunities occur in the same areas of the Refuge where hunting has previously occurred and at relatively the same intensity. Since the inception of the new hunt program additional disturbance has been localized in the case of waterfowl hunting, and light to imperceptible for all other species. Overall increase in the number of hunters has been approximately 5% with waterfowl hunters accounting for the majority of the increase.

Disturbance to migratory birds could have local, regional and flyway impacts. However, disturbance by hunting to migratory birds should not have cumulative negative impacts for the following reasons. Hunting seasons would not coincide with breeding and nesting seasons. Long-term future impacts that could occur if reproduction was reduced by hunting are not relevant for this reason. Disturbance to the daily wintering activities, such as feeding and resting, of birds might occur. However, the majority of shorebirds and wading bird species will have migrated. Disturbance to birds by hunters would probably be commensurate with that caused by non-consumptive users.

Although ingestion of lead-shot by non-hunted wildlife could be a cumulative impact, it is not relevant to Crescent Lake NWR because only non-toxic shot is permitted for shotgun hunting.

Some species of bats, butterflies and moths are migratory. Cumulative effects to these species at the “flyway” level should be negligible. These species are in torpor or have completely passed through the area before the start of the hunting season. Hunting occurs during September and October when these species are migrating; however, hunter interaction would be commensurate with that of non-consumptive users.

Hunters would rarely encounter small mammals, reptiles or amphibians during most of the hunting season. These species are either primarily nocturnal or will be very inactive or hibernating as a result of cold temperatures during traditional peak hunting periods. The Refuge has estimated hunter density on peak days to be approximately 1 hunter per 540 acres. During the vast majority of the hunting season, hunter density is much lower at 1 hunter per 2,700 acres. Refuge regulations further mitigate possible disturbance by hunters to non-hunted wildlife. Vehicles are restricted to roads and the harassment or taking of any wildlife other than legal game species is not permitted.

Threatened and Endangered Species

Endangered and threatened species that utilize, or may potentially utilize the Refuge are the bald eagle, blowout penstemon, whooping crane and yellow mud turtle (candidate species). A Section 7 consultation was conducted in 2003, evaluating expanded hunting on Crescent Lake NWR. It was determined that the proposed alternative would not likely adversely affect these species.

The bald eagle is a federally listed threatened species which, at this writing, has been nominated for delisting. The Refuge is home to two pairs of breeding and nesting bald eagles adjacent to Hackberry and Crane Lakes. Breeding and nesting occurs outside of the hunting season.

Disturbance to bald eagles could have local, regional and flyway effects. However, disturbance by hunting to bald eagles should not have cumulative negative impacts for the following reasons. Hunting seasons would not coincide with the breeding and nesting season. Long-term future impacts that could occur if reproduction was reduced by hunting are not relevant for this reason. Disturbance to the daily wintering activities, such as feeding and resting, of eagles are unlikely to occur, since eagles are typically not present during this timeframe when food sources are scarce. Disturbance during critical life periods is more likely to be caused by non-consumptive users.

Whooping cranes, a federally listed endangered species, have not been observed on the Refuge but are infrequently sighted during fall migrations.

The primary yellow mud turtle population is located at Gimlet Lake with a secondary population at Goose Lake and a few historic records on Roundup and Hackberry Lakes. These populations all occur within a portion of the Refuge closed to hunting. Cumulative negative impacts should not occur as a result of this proposal.

Hunters do have a reasonable opportunity to come in contact with blowout penstemon plants. Approximately 2.7% of the Refuge has blowout penstemon or has the potential to have the plant. This area is open to all public use activities. Long-term cumulative negative impacts associated with this proposal are likely to be commensurate with non-consumptive public use programs for the following reasons. The majority of blowout penstemon plants are found growing in sand blowouts which typically do not harbor many if any, hunted wildlife species. Since the habitat requirements of blowout penstemon do not coincide well with the habitat requirements of any of the Refuge's hunted wildlife, the probability of any cumulative impacts is minimal. In all likelihood, the only disturbance caused by a hunter or other non-consumptive user, is the possibility of trampling.

B. Anticipated Direct and Indirect Impacts of Proposed Action on Refuge Programs, Facilities and Cultural Resources

Wildlife Dependent Recreation

As public use levels expand across time, unanticipated conflicts between user groups may occur. Other public uses typically do not coincide during peak hunting periods which occur in late October through early November when cold temperatures are the norm. Peak periods for fishing and wildlife observation typically occur during the spring and early summer months. Experience has proven that time and space zoning (e.g., separate use areas and use periods) is an effective tool in eliminating conflicts between user groups. This also limits hunting disturbance to wildlife during the spring and summer when most species reproduce. Conflicts between hunters and other consumptive and non-consumptive users might occur but would be mitigated by time (non-hunting season, reduced visitation and Refuge specific regulations) and space. The Refuge focus for non-consumptive use (mainly bird watching and other wildlife viewing) occurs primarily during the spring and summer when the Refuge is closed to hunting.

Refuge Facilities

The Service defines facilities as: “real property that serves a particular function(s) such as buildings, roads, utilities, water control structures, etc.” Under the proposed action those facilities most utilized by hunters are: roads, parking lots, and signage. Maintenance or improvement of existing facilities will cause minimal short term impacts to localized soils and may cause some wildlife disturbances and damage to vegetation. The facility maintenance and improvement activities described are periodically conducted to accommodate daily Refuge management operations and general public uses. These activities will be conducted at times (seasonal and/or daily) to cause the least amount of disturbance to wildlife. Cumulative impacts to Refuge facilities as a result of this proposal are anticipated to remain commensurate with other public uses.

Cultural Resources

Hunting, regardless of method or species targeted, is a consumptive activity that does not pose any threat to historic resources or properties on and/or near the Refuge. Hunting on Refuges is not a federal undertaking that requires compliance with Section 106 of the National Historic Preservation Act. Consultation with the pertinent State Historic Preservation Office is not required. Cumulative impacts to Refuge cultural resources as a result of this proposal are anticipated to remain commensurate with other public uses.

C. Anticipated Impacts of Proposed Hunt on Refuge Environment and Communities.

Adverse cumulative impacts of the proposed action alternative to the Refuge environment which

consists of soils, vegetation, air quality, water quality and solitude have not emerged and are unanticipated in the future. Long-term impacts caused by hunters are expected to be no different than one might expect from increases in other areas of our public use program. For example, a similar increase in the number of bird watchers would likely have the same impact to the Refuge environment.

The Refuge expects impacts to air and water quality to be minimal and only due to Refuge visitors' automobile emissions. The effect of these Refuge-related activities, as well as other management activities on overall air and water quality in the region, are anticipated to be negligible.

Impacts associated with solitude are expected to be minimal given time and space zone management techniques used to avoid conflicts among user groups. The remote location and difficult access to large portions of the Refuge, also play a roll in preserving the esthetic quality and solitude.

The Refuge will continue to work closely with private partners and neighbors to minimize impacts to adjacent lands resulting from Refuge operations and public programs. As a result, no indirect or direct impacts have been noticed nor are anticipated. It is expected that the new hunts will result in a net gain of public hunting opportunities positively impacting the general public, nearby residents and Refuge visitors. The Refuge expects increased visitation and tourism to bring additional revenues to the local community but not a significant increase in overall revenue in any area.

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

Cumulative impacts on the environment result from smaller incremental impacts of proposed actions when these are added to other past, present, and reasonably foreseeable future actions. While cumulative effects may result from individually minor actions, they may when viewed as a whole, become substantial over time. The hunt plan has been designed to be sustainable through time given relatively stable conditions. Changes in Refuge conditions, such as sizeable increases in Refuge acreage or public use, are likely to change the anticipated impacts of the current plan and would trigger a new hunt planning and assessment process.

The implementation of the proposed alternative described in this assessment includes actions defined in the Refuge hunt program (Hunting Plan, 2003). These actions would have both direct and indirect impacts however, the cumulative effects of these actions are not expected to be substantial. The historic Refuge hunting program is similar to the proposed alternative, in season length and open hunting areas. The Refuge does not foresee any changes to the proposed action in the way of increasing the intensity of hunting in the future.

E. Anticipated Impacts if Individual Hunts are Allowed to Accumulate

National Wildlife Refuges conduct hunting programs within the framework of State and Federal regulations. As proposed, the Crescent Lake NWR hunting program would be more restrictive than the State of Nebraska. By maintaining hunting regulations that are equally or more restrictive than the State, individual Refuges ensure that they are maintaining seasons which are supportive of wildlife biology and management on a more local and regional basis. The hunt plan has been reviewed and is supported by the Nebraska Game and Parks Commission. Additionally, Refuge staff coordinate with NGPC officials annually, to maintain regulations and programs that are consistent with the State management program.

CHAPTER 5 CONSULTATION AND COORDINATION WITH OTHERS

The Nebraska Game and Parks Commission (NGPC) concur and fully support the regulated consumptive public use of the natural resources associated with the Crescent Lake NWR. The U.S. Fish and Wildlife Service also provided an in depth review by Regional Office personnel and staff biologists. Numerous contacts were made throughout the area surrounding the Refuge, soliciting comments, views and ideas during the development of the 2003 Hunting Plan.

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APPENDIX A LITERATURE CITED/REFERENCES

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