

ENVIRONMENTAL ASSESSMENT

OPENING of HUNTING

on

Deep Fork National Wildlife Refuge
Okmulgee County, Oklahoma

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Fish and Wildlife Service

Environmental Assessment

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Deep Fork National Wildlife Refuge

Okmulgee County, Oklahoma

SUMMARY: This environmental assessment describes two action alternatives and a no-action alternative, and their impacts regarding hunting on Deep Fork NWR in Eastern Oklahoma. The preferred alternative is to provide limited public hunting. A no action alternative (i.e. no hunting) and an open hunting (i.e. open to state seasons and methods) are described. The refuge was established in 1993 and refuge hunting seasons were opened in the following manner: squirrel (1996), deer (1997), rabbit (1997), raccoon (1999), duck (2001), turkey (2005), feral hog and beaver (2005). The Fund for Animals/Humane Society lawsuit of 2003 listed Deep Fork NWR as one of the national wildlife refuges which had not provided a cumulative impact analysis when writing the environmental assessments for the Waterfowl, Big Game and Upland Game hunting, and Pest Management program. This revised environmental assessment provides a cumulative impact analysis for each of the alternatives. Refuge hunts have been operated as “limited” hunts, and refuge resources and programs have not been adversely affected by these hunts.

NOTE TO REVIEWERS AND RESPONDENTS

If you wish to comment on the environmental assessment, you may mail comments to the address below. Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. **If you wish us to withhold your name and/or address, you must state this at the beginning of your comment.** We will make all submissions from organizations or businesses and from individuals available for public inspection in their entirety.

Please send comments by April 5, 2007.

Address comments to:
Refuge Manager
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Introduction

Setting:

Land acquisition for Deep Fork NWR began in June 1993, with the purchase of 4,681 acres using Land and Water Conservation funds appropriated by Congress. The total approved acquisition boundary acreage is 18,359. All of the proposed land acquisition is located within Okmulgee County. Currently the Service has ownership of (acquired by purchase or donation) a total of 9,213 acres, but new lands are added to the refuge nearly every year. This Environmental Assessment addresses not only the current refuge lands, but also future acquisition tracts within the approved acquisition boundary.

The refuge is located largely in the floodplain of the Deep Fork of the North Canadian River, commonly known as the Deep Fork River, extending along approximately 34 miles of the river in a northwest-southeast direction. The Refuge is bounded on the west by the Okmulgee Wildlife Management Area and on the south by the Eufaula Wildlife Management Area, both of which are administered by the Oklahoma Department of Wildlife Conservation.

Today, Refuge lands are a mixture of regenerating bottomland forest, drained and natural wetlands, agricultural lands (mostly pastureland and pecan orchards with a small acreage of cropland), and some upland hardwood forest and prairie. Given time, protection, and proper management, the Refuge bottomlands should regain much of the character of a mature riparian forest ecosystem, including the diverse assemblage of plants and animals representative of these vanishing habitats.

Although relatively shallow coal deposits underlay a substantial portion of the county, only a small portion of the Refuge contains these deposits. All coal rights were purchased by the Service on Refuge lands.

Approximately 700 documented oil and gas wells have been drilled within the proposed refuge acquisition boundary. Only thirty active wells remain, but many of the remaining wells have not been plugged and are considered abandoned. Most of the wells are shallow, with depths around 2,000 feet.

The refuge has been conducting hunting on its lands since 1996.

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Chapter 1. Purpose and Need for Action

The purpose of this Environmental Assessment is evaluate the hunting program on the Deep Fork National Wildlife Refuge (NWR). The Refuge opened lands for hunting beginning in 1996 using the environmental assessment written for their comprehensive conservation plan (ccp). The Fund for Animals/Humane Society lawsuit of 2003 listed Deep Fork NWR as one of the national wildlife refuges which had not provided a cumulative impact analysis when writing the environmental assessments for the Waterfowl, Big Game and Upland Game hunting program. This revised environmental assessment provides a cumulative impact analysis for each of the alternatives. The Deep Fork NWR hunting program allows the refuge to provide the public with appropriate and compatible public recreation and to promote biological integrity of the refuge.

Privately owned land in Oklahoma accounts for 89.94% of all lands in the State. The Federal government (through multiple agencies and bureaus) owns and manages 2.7% of the lands, while the State owns and manages 2.15% of the lands. Other land owners/managers include counties (.21%) and Native American Nations (5%). Of the lands listed above, only 1 acre in 25 is available for outdoor recreation. (Oklahoma Tourism and Recreation Department. 2001). There are few lands in the region for the public to enjoy hunting while spending limited funds. Private land is leased for hunting, often costing a person \$500-\$2000/year for membership. This refuge is one of only a few public tracts open to hunting in eastern Oklahoma. Additionally, this would allow youth the opportunity to 1) experience a wildlife-dependant recreation; 2) gain an appreciation for and understanding of wildlife, the natural world and the environment; and 3) promote a land ethic and environmental awareness.

The deer population on the refuge is ever increasing. Carrying capacity for white-tailed deer in Oklahoma ranges from on deer per 15 acres on highly productive sites with rich soils to one deer per 125 acres on sites with shallow droughty soils. The average carrying capacity in Oklahoma is one deer per 35 acres. Food habits and browse preference studies indicate that white-tailed deer may eat over 100 different plant species in a given locality. Deer feed primarily on woody twig ends and leaves during most of the year but prefer to eat weeds during the spring. Heavy browsing of leaves and twigs by white-tailed deer can reduce plant vigor so that the plant is unable to manufacture food. Most plants can tolerate between 40 and 65% destruction of current annual growth. When deer begin eating foods such as eastern red cedar, adequate food is in short supply. (Shawn, M., Masters, R., and Bidwell, T.G. 2007). This is a good indication that there are more deer than a site can easily sustain without starvation, disease and other negative impacts.

Feral hogs have been very successful in expanding their range and increasing their numbers. The success can be attributed to introduction and reintroduction by hunters, water development in arid areas, improved range condition, and an ability to reproduce rapidly. They have also benefited from the increased disease control in domestic livestock. Feral hogs compete with native wildlife for food, cover, water and space.

They also negatively impact lands and vegetative communities as a result of feeding and/or rooting. Rooting, if severe enough, can alter plant community successional sequences. The effect these activities have on the vegetation varies from positive to negative depending on the area and type of vegetation. Negative effects may include soil erosion, consumption of native seed crops, consumption of threatened or endangered species, altered plant succession in monocultures or native rangeland and reduction of overall species diversity. (Stevens, R.L. 1996)

Chapter 2. Alternatives

This action is in response to the Fund for Animals/Humane Society lawsuit of 2003. This hunt program was opened in the following way; The upland game hunting plan was first approved in 1996 with the opening of squirrel season. Deer season was opened in 1997, rabbit in 1997, raccoon in 1999, waterfowl (ducks only) in 2001, turkey in 2005, and feral hog and various pest species (primarily beaver) in 2005. All of these openings included an environmental assessment, hunt plan, FONSI, Section 7, and compatibility determination. However, we are revising the environmental assessment of the hunting program at Deep Fork National Wildlife Refuge to include a cumulative impact analysis of our preferred alternative.

2.1 No Action

Hunting would be closed on Deep Fork NWR. The refuge would return to the pre 1996/1997 hunting conditions by discontinuing the hunting program. The refuge would save \$15,000 in administrative cost, but may incur additional costs in other areas such as removing beaver dams to reduce damage to forests and roads.

2.2 Limited Hunting – Preferred Alternative

This alternative allows for limited hunting using restricted methods such as: limiting deer and turkey hunters through lottery draws; allowing only certain species to be hunted; limiting season length; limiting the days of the week and length of the day that a species could be hunted (i.e. ducks); limiting the areas open to hunting; and limiting the method of take (e.g. type of weapon). This alternative provides a recreational experience to the general public while maintaining a sustainable wildlife population. The seasons, species, and bag limits would be within the framework of the Oklahoma Department of Wildlife Conservation (ODWC) regular state seasons and further regulated by Refuge regulations according to Fish and Wildlife Service policy. A hunt held outside of the state framework would be conducted only with concurrence from the ODWC. The decision to open or close refuge lands to hunting would be based on the refuge management unit the property occurs. Units that would be open and closed to hunting are described in the Comprehensive Conservation Plan for DFNWR approved in 1999. Some closed areas could be opened to hunting at the manager's discretion if the take of species is required to protect refuge resources (e.g. take of feral hogs and beaver) or to protect the public (e.g. take of deer to reduce vehicle/deer impacts). Currently, hunting is permitted in five of the seven units of the refuge. However, closed areas exist in each unit of the five hunted units. Within the 9,213 acres of refuge, approximately 6,287 acres are open to limited hunting and 2,926 acres are closed to hunting. This unit management strategy would also apply to new acquisitions. Refuge hunting plans are reviewed annually and updated if necessary. The estimated cost to operate a limited hunting program is \$15,000 annually.

2.3 Open Hunting to State seasons

This alternative would allow hunting to all participants during the entire State regulated season. Additionally, the entire Refuge would be open to hunting. The seasons, species, and bag limits, and methods of take would be within the framework of the ODWC regular state seasons and further regulated by Refuge regulations according to Service policy. The estimated cost to operate an open hunting program on the refuge is \$35,000. This cost includes soliciting additional enforcement officers from neighboring refuges, printing of additional hunting brochures, and maintaining roads, parking lots and signs.

Chapter 3 Affected Environment

Land acquisition began in June 1993, with the purchase of 4,681 acres using Land and Water Conservation funds appropriated by Congress. The total approved acquisition boundary acreage is 18,359. All of the proposed land acquisition is located within Okmulgee County. Currently the Service has ownership of (acquired by purchase or donation) a total of 9,213 acres, but new lands are added to the refuge nearly every year. This Environmental Assessment addresses not only the current refuge lands, but also future acquisition tracts within the approved acquisition boundary. Currently, hunting is permitted in five of the seven units of the refuge. Within the 9,213 acres of refuge, approximately 6,287 acres are open to hunting and 2,926 acres are closed. However, closed areas exist in each unit of the five hunted units.

3.1 Physical Environment

The refuge is located largely in the floodplain of the Deep Fork of the North Canadian River, commonly known as the Deep Fork River, extending along approximately 34 miles of the river in a northwest-southeast direction. The Refuge is bounded on the west by the Okmulgee Wildlife Management Area and on the south by the Eufaula Wildlife Management Area, both of which are administered by the Oklahoma Department of Wildlife Conservation.

Historically, the bottomland hardwood forest community of the Deep Fork River was a complex, diverse, and interrelated association of plants and animals, created and maintained by periodic, natural flooding. However, years of development and habitat alteration by humans have significantly modified the dynamic and pristine floodplain ecosystem.

Today, Refuge lands are a mixture of regenerating bottomland forest, drained and natural wetlands, agricultural lands (mostly pastureland and pecan orchards with a small acreage of cropland), and some upland hardwood forest and prairie. Given time, protection, and proper management, the Refuge bottomlands should regain much of the character of a mature riparian forest ecosystem, including the diverse assemblage of plants and animals representative of these vanishing habitats.

Climate

Okmulgee County has a temperate, continental climate of the moist, subhumid type. As the movement of warm, moisture-laden air from the Gulf of Mexico alternates with the movement of either cool, dry air from the West Coast or cold, dry air from around the Arctic Circle, significant fluctuations in temperature, cloudiness, wind, and precipitation take place.

The average precipitation is 38 inches a year in the northwestern corner of the county and 41 inches in the southeastern part. The average annual precipitation in the City of Okmulgee is 40.68 inches. Approximately 32 percent of the precipitation occurs in

spring, 28 percent in summer, 25 percent in fall, and 15 percent in winter. Snowfall averages about 5 inches per year in the southern part of Okmulgee County, and about 6.3 inches in the northeastern part.

Air Quality

Air quality in east central Oklahoma is excellent, as would be expected in a primarily rural area that has limited industry. Accordingly, no permanent air monitoring stations have been established in Okmulgee County. The Refuge is designated as Class 1 land under the guidelines provided in the 1977 Clean Air Act, a classification that contains provisions to maintain high air quality.

Water

Wetland areas include the Deep Fork River, sloughs, oxbow lakes, and shallow wetlands, flooded scrub/shrub, and flooded woodlands.

The refuge has conducted an extensive and prolonged water quality monitoring program in the Deep Fork River. Baseline contaminants data was collected in the confluences of most of the major streams. The refuge participates in a program administered by the Oklahoma State Conservation Districts called “Blue Thumb.” The “Blue Thumb” program uses volunteers to collect and analyze water samples collected at various places along the river at monthly intervals. The refuge has also been involved in contaminant cases involving improper discharges into the Deep Fork River by a municipality and by a local food product manufacturer. Various illegal discharges into the river have resulted in significant mortality and stress of aquatic life at various times of the refuge history. Only the continual monitoring and possible enforcement action can help ensure high water quality in the river. Water quality in other wetlands in on the refuge has not been tested.

Geology

The geologic formations that are at the surface, or immediately beneath the soils in Okmulgee County, are of sedimentary nature. Except for recent alluvium and quaternary terrace deposits, these formations belong to the Pennsylvanian system.

Energy and Mineral Resources

Although relatively shallow coal deposits underlay a substantial portion of the county, only a small portion of the Refuge contains these deposits. All coal rights were purchased by the Service on Refuge lands.

Approximately 700 documented oil and gas wells have been drilled within the proposed refuge acquisition boundary. Only thirty active wells remain, but many of the remaining wells have not been plugged and are considered abandoned. Most of the wells are shallow, with depths around 2,000 feet.

Soils

Flooding patterns largely have determined the nature of soils in bottomland hardwood forest ecosystems. The floodplain soils associated with the Deep Fork River bottom are the Verdigris, Pulaski, Roebuck, and Lightning series.

Verdigris soils are deep soils that formed in recent alluvium under hardwood forest. Pulaski soils are deep soils that developed in fine, sandy loam under the hardwood forests of the Deep Fork River bottoms. Roebuck soils are deep, poorly-drained clays of the Deep Fork River floodplain. Lightning soils are deep, somewhat poorly drained, fertile soils on bottom lands.

Hydrology

The Deep Fork River drains a watershed of approximately 2,548 square miles. The River originates in western Oklahoma County, Oklahoma, and flows generally easterly for 230 miles through Lincoln, Creek, Okfuskee, and Okmulgee Counties to its confluence with the North Canadian River in Eufaula Reservoir in McIntosh County. At least thirteen named streams (i.e., Salt, Little Deep Fork, Negro, Honey, Okmulgee, Cussetah, Fourmile, Montezuma, Burgess, Moore, Coal, Wolf and Grave Creeks) feed the Deep Fork River within Okmulgee County.

The Deep Fork watershed is comprised of hilly terrain that accelerates runoff and causes frequent flooding. Reservoir construction, channelization, conversion of the floodplain to agricultural uses, and the addition of numerous, small floodwater-retarding structures have significantly moderated the natural flooding regime of the river. Major flooding along the Deep Fork occurs roughly once every five years, moderate flooding once every 1.5 years, and minor flooding twice per year.

Ground elevations on the Refuge range from nearly 900 feet above sea level on the highest upland site to 590 feet above sea level along the river channel in the bottoms near the southern Refuge boundary. Most of the Refuge is located within the 100-year floodplain, and over 80 percent of it floods at least once a year except during very dry periods. On some parts of the Refuge, watermarks on the trees are ten feet high.

Eufaula Reservoir, completed in 1964, inundated the southernmost reach of the Deep Fork River. The reservoir backs up into the southern part of the Refuge during floods as the water level approaches the limits of the reservoir's flood pool.

3.2 Vegetation

The bottomland hardwood forest ecosystem of eastern Oklahoma is characterized by a great diversity of plant species and communities. Woodlands in areas with regularly saturated soil contain a variety of water-tolerant species, including black willow, river birch, cottonwood, sycamore, swamp privet, and buttonbush. A complex mixture of oaks, black walnut, pecan, hickories, sugarberry, cottonwood, boxelder, green ash, and other hardwood species of all ages occupy somewhat higher ground. The vegetative communities present today have been altered from the mature hardwood forest ecosystem that once existed in the Deep Fork River floodplain. Today the river bottomlands are a mosaic of open river, streams, oxbows, sloughs, marshes, beaver ponds, bottomland hardwood forest, cut-over areas regenerating with dense brush, pastureland, and pecan groves.

Plant associations occurring on the Refuge currently consist of:

- (1) Emergent wetlands where floating aquatic vegetation, sedges, bulrushes and smartweed predominate, and buttonbush, swamp privet, and black willow comprise the woody component, usually growing around the edges of the wetlands.
- (2) Seasonally flooded areas with permanently saturated soils that support predominantly brushy species such as swamp privet, hawthorn, and buttonbush with a ground cover of sedges, smartweed, and water-tolerant grasses in some places.
- (3) Seasonally flooded bottomlands where soils are not permanently saturated that support a mix of hardwoods, shrubs, vines, and herbaceous plants typical of floodplain forests in the area.
- (4) Steep upland slopes dominated by post oak/blackjack oak forest.
- (5) Gently sloping or level sites above the floodplain that support grassland or grassland/oak savannah. Grasslands in the area are composed of species representative of the tallgrass prairie.

3.3 Fish and Wildlife Resources

Wildlife species found on the refuge are typical of bottomland hardwood forests, moist soils, upland post oak/blackjack oak forests, and tallgrass prairie. A total of 149 species of birds - nine game species and 140 nongame species - are known or thought to use the bottomland forests and associated habitats in eastern Oklahoma. The numerous sloughs and streams support large numbers of great blue, little blue, and great and snowy egrets. Four great blue heron rookeries are located on the Refuge; these rookeries are used by snowy egrets after the young herons fledge. Raptors, woodpeckers, and songbirds use the area in great numbers. The Refuge is a very important migration stop for many species of neotropical birds, and provides suitable nesting habitat for many others.

Wetlands nourished by the Deep Fork River are important wintering habitat for numerous waterfowl species, and are particularly important for wintering mallards. Depending on existing environmental conditions, particularly weather patterns, peak populations of wintering waterfowl using the Refuge have been estimated at 5,000-20,000 mallards, 1,000-5,000 wood ducks, and 1,000-2,000 other miscellaneous duck species. The sloughs, marshes, and overflow areas in the river bottoms also furnish vital nesting and rearing habitat for wood ducks.

Fifty-one species of mammals have been recorded in the Deep Fork River basin. Common game and furbearing mammals in the basin include white-tailed deer, gray and fox squirrels, beaver, eastern cottontail, swamp rabbit, raccoon, coyote, and opossum. Furbearer populations, especially those of the raccoon, are among the highest in the state. Swamp rabbits are regularly seen in the Deep Fork River bottoms.

Fifty-nine fish species have been identified from the river, streams, and reservoirs of the Deep Fork River basin, and many are likely to be found in Refuge waters. The Deep Fork River provides feeding and spawning habitat for many sport fish native to east central Oklahoma. The most important species to anglers are the channel catfish, flathead catfish, blue catfish (a.k.a. Mississippi white catfish), crappie, white bass, and largemouth bass.

Approximately 54 species of reptiles and 22 species of amphibians have been reported from Okmulgee County. Many of these likely occur on Refuge.

3.4 Threatened and Endangered Species

The threatened bald eagle is the only federally listed species known to occur on the Refuge. Migratory eagles from the northern states and Canada usually arrive in Oklahoma during November and depart by the end of February. Bald eagles forage from perches along the Deep Fork River. As many as six bald eagles have wintered on refuge land, but there are no known communal winter roosts on the Refuge. One active eagle nest occurs on the refuge each year.

There are no known records of the federally listed endangered American burying beetle from Okmulgee County; however, records exist for adjacent Tulsa County to the north and for counties to the east and south. Surveys for the beetle will be undertaken on the Refuge as funding and staffing levels permit.

3.5 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 Southeast Region, the cultural resource review and compliance process is initiated by contacting the Regional Historic Preservation Officer/Regional Archaeologist (RHPO/RA). The RHPO/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.

Creek Tribal government began in Okmulgee County in 1867. In 1907, Oklahoma became a state and the tribal government was dissolved. The tribal government was reinstated in 1971. The State archeologist has indicated that 13 archeological sites, 2 historic homesteads, 6 marked cemeteries, and other unmarked plots exist within the proposed Refuge boundary.

3.6 Socioeconomic Setting and Land Use

Okmulgee County encompasses 698 square miles of prairie, upland woodland, and bottomland forest in east central Oklahoma. The county is predominantly rural, and agriculture, particularly grazing, is the primary land use. In 1987, the county contained 1,009 farms averaging 248 acres in size. Roughly 62 percent of the farm operators in Okmulgee County reported that farming was their secondary occupation. The main cash crops, as determined by acres in production, were pecans, soybeans, and wheat. Prior to establishment of Deep Fork National Wildlife Refuge, most of the area was leased for private hunting and/or cattle grazing.

The 1990 census reported the population of Okmulgee County to be 36,490 persons; roughly 37 percent of these lived in the City of Okmulgee. The per capita income was \$8,799.00. In 1990, the civilian labor force in the City of Okmulgee was estimated at 5,248, and of these, about 4,684 (roughly 89 percent) were employed.

3.7 Wildlife Dependent Recreation

Outdoor recreation is a significant aspect of the culture and tradition of the people in Eastern Oklahoma. A significant percentage of the local public around the refuge participate in outdoor activities such as hunting and fishing. The refuge also attracts a

significant amount of non-consumptive users. Activities such as hiking, wildlife observation, and photography are gaining popularity. The refuge receives about 25,000 visitors annually. The breakdown of average annual refuge visits for each use is as follows; hunting (2750), fishing (800), wildlife observation (3,000), and wildlife photography (200).

3.8 Facilities

The refuge has the following public use facilities:

(1) Cussetah Bottoms Wildlife Trail. This trail is the most significant facility for the non-consumptive refuge visitor. This trail is located in unit 5 and contains a 1200-foot elevated boardwalk that ends in a 20-foot by 30-foot observation platform. Also along the trail is an outdoor education wetland deck and education table. The trail head contains a stone/cedar information kiosk. Eight informational panels are located along the trail. The boardwalk is connected to other areas by 770 feet of asphalt trails. One 970-foot gravel trail leads to a cedar photography blind.

(2) Railroad Overlook. A half-mile gravel trail leads to a 10-foot by 25-foot elevated deck overlooking the Deep Fork River in unit seven.

(3) Montezuma Creek Recreation Area. This area is still being developed, but it currently contains a floating ADA-accessible fishing dock, a series of primitive trails, and an information kiosk at the trail head. This area is located along Highway 75 in unit 4.

(4) Parking lots. The refuge has fourteen public parking areas. Twelve of these parking areas are considered improved parking areas and contain a gravel parking surface, a brochure box, an informational sign, and are surrounded by a three-rail pipe fence with a walk-through area. Two of the parking lots are considered primitive and have dirt for a parking base and are not fenced.

(7) Primitive trails. The refuge has fifteen miles of primitive trails that the public uses to traverse the more remote parts of the refuge. These trails are maintained by mowing and dozing.

The refuge has the following non-public use facilities:

(1) A maintenance compound is located along highway 75 in unit four. This compound contains a machine shed, a small shop, and a gravel equipment yard.

(2) refuge roads. The refuge contains six miles of vehicle roads. The public is not allowed to drive on these roads.

(3) livestock fences. Approximately fifty miles of barbed-wire fences run along refuge boundaries. These fences are necessary in marking property lines and for excluding livestock.

Chapter 4. Environmental Consequences

This section addresses the potential environmental consequences of the three management alternatives. This section will also include a cumulative impacts analysis for the preferred alternative. When detailed information is available, a scientific and analytic comparison between alternatives and their anticipated consequences is presented, which is described as “impacts” or “effects.” When detailed information is not available, those comparisons are based on the professional judgment and experience of refuge staff and Service and State biologists

4.1 Effects Common to all Alternatives

4.1.1 Environmental Justice

Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” was signed by President Bill Clinton on February 11, 1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities access to public information and participation in matters relating to human health or the environment. This assessment has not identified any adverse or beneficial effects for either alternative unique to minority or low-income populations in the affected area. Neither alternative will disproportionately place any adverse environmental, economic, social, nor health impacts on minority or low-income populations.

4.1.2 Cultural Resources

Cultural resources would not be affected by any of the alternatives.

4.2 Summary of Affects

4.2.1 Physical Environment

No Action Alternative

Habitats may be subject to overbrowsing by deer if deer populations are not controlled by hunting and eventually exceed carrying capacity. Deer overbrowsing can change the structure and plant composition of a forest. The refuge has reforested approximately 200 acres with bottomland hardwood tree species in recent years. Young tree seedlings (1-9

years old) can be killed by overbrowsing. Bottomland hardwood forests are a threatened ecosystem. Failure to protect the forest ecosystem would have negative impacts on future resident and non-resident wildlife populations as well as the purpose of the refuge. Feral hogs are considered a threat to the biological integrity of the refuge. Hogs degrade and destroy wildlife habitats by rooting and wallowing (Stevens 1996). Damage includes erosion along waterways and wetlands and the loss of native plants. Beavers can kill thousands of acres of bottomland hardwood trees by damming sloughs and creeks. Forests inundated by water into the growing season quickly show signs of stress and trees eventually die. Beavers can have negative impacts on future resident and non-resident wildlife by killing large portions of the few remaining intact bottomland hardwood forests remaining in the United States.

Although hunters would not cause damage to individual plants by trampling vegetation, non-consumptive users would still trample vegetation and disturb soils throughout the refuge.

This alternative would have no effect on other physical resources such as geology, water, air quality, or hydrology.

Limited Hunting Alternative

The limited hunting of deer, beavers, and hogs would positively impact wildlife habitat by promoting plant health and diversity. Controlling hog numbers would reduce the negative effects of rooting and wallowing. Controlling deer numbers would protect plant communities from overbrowsing. Harvesting beavers would decrease their populations and reduce harmful flooding of forest habitats.

Hunters would cause trampling of vegetation, but the impacts to vegetation would be minor. Hunter density is estimated to be an average of 1 hunter/500 acres throughout the hunting season. Refuge-regulations would not permit the use of ATVs. Vehicles would be confined to county roads and refuge parking lots. Horses and mules would not be allowed during refuge hunts (e.g. raccoon hunting), thus trampling of soils and vegetation by equines would not be an issue.

Open Hunting Alternative

The amount of wildlife harvested under this alternative would increase. This may benefit refuge habitats by further reducing beaver and feral hog numbers, but this alternative is not needed to prevent deer overbrowsing due to overpopulation. Increased hunter traffic on roads may cause a minor decrease in air quality because of vehicle emissions and stirring of dust. Noise from increased vehicular traffic and from shooting would also increase. The allowing of horses and mules to hunt raccoons would cause additional trampling of soils and vegetation.

4.2.2 Impacts to Hunted Wildlife

No Action Alternative

Additional mortality of individual hunted animals would not occur under this alternative. Disturbance by hunters on hunted wildlife would not occur; however, other public uses that cause disturbance, such as wildlife observation and photography, would still be permitted.

Deer, turkey, squirrel, rabbit, raccoon, feral hog, and beaver populations could increase above the habitat's carrying capacity. The likelihood of starvation and diseases, such as bluetongue and EHD in deer, and distemper and rabies in raccoon, would increase as would vehicle-deer collisions. Feral hogs can harbor several infectious diseases, some of which can be fatal to wildlife. Additionally, feral hogs compete directly for food with deer, turkeys, squirrels and many other birds and mammals.

Limited Hunting Alternative

Additional mortality of individual hunted animals would occur under this alternative. The estimated maximum number of species that would be harvested is as follows: 75 deer, 400 ducks, 125 rabbits, 125 squirrels, 20 turkeys, 50 raccoons, 50 beavers, and 150 feral hogs. Hunting causes some disturbance to not only the species being hunted but other game species as well. However, time and space zoning established by refuge regulations would minimize incidental disturbance.

Open Hunting Alternative

Opening hunting up to State seasons would have a detrimental effect to many species, but especially deer and turkey. Allowing deer to be hunted during the nine days of the state primitive season and the sixteen days of the state rifle season would dramatically increase the take of deer and would significantly increase wildlife disturbance. Turkey would also be subjected to significant harvest and disturbance if opened to State seasons. The current turkey population could not sustain this type of hunting pressure. Feral hog and predator hunting (i.e. coyotes) is allowed year-round in Oklahoma and is increasing in popularity among hunters. Refuge wildlife would experience disturbance by these activities on a routine basis throughout the year. Running raccoons with trailing dogs is also allowed State-wide year-round. This would also create a routine disturbance to refuge wildlife. The refuge does not have the law enforcement staff to ensure the protection of game species under this alternative.

4.2.3 Impacts to Non-hunted Wildlife

No Action Alternative

Raccoons may become overpopulated, depreddating on ground-nesting birds, reptiles,

amphibians, and small mammals at high rates. Feral hog populations would increase dramatically. Feral hogs are predators of small mammals and deer fawns as well as ground-nesting birds such as turkeys (Stevens 1996).

Increased disturbance to non-hunted wildlife would not occur, however, non-consumptive users would still be permitted to access this land, which might cause disturbance to wildlife.

Limited Hunting Alternative

Depredation of non-game animals by raccoons and feral hogs would decrease. Disturbance to non-hunted wildlife would increase slightly. However, significant disturbance would be unlikely for the following reasons. The refuge has estimated current hunter density on peak days to be no more than 1 hunter per 160 acres. During the vast majority of the hunting season, hunter density is much lower (1 hunter/500 acres). Refuge regulations further mitigate possible disturbance by hunters to non-hunted wildlife. Vehicles are restricted to county roads and the harassment or taking of any wildlife other than the game species legal for the season would not be permitted. Disturbance to birds by hunters would probably be similar to that caused by non-consumptive users.

Open Hunting Alternative

Disturbance to non-hunted wildlife would increase significantly. The density of hunters would increase and disturbance to all forms of wildlife would increase. The long and sometimes year-round seasons allowed by the State for some species would also result in a prolonged disturbance throughout the year.

4.2.4 Impacts to Endangered and Threatened Species

No Action Alternative

Although the effects by hunters would be eliminated, the number of non-consumptive users on the refuge is increasing and could impact these species as much or even more than hunters.

Limited Hunting Alternative

A potential disadvantage of this alternative is its effect on threatened and endangered species on the refuge such as the bald eagle. However, Section 7 Evaluations were conducted for the various hunting plans (i.e. big game, upland game, waterfowl, and pest management), and it was determined that the proposed actions were not likely to adversely affect these species. Currently the only bald eagle nest is located in a unit that is closed to hunting.

Open Hunting Alternative

Bald Eagles would be more likely to experience disturbance by hunters under this alternative.

4.2.5 Wildlife Dependent Recreation

No Action Alternative

The public would not have the opportunity to harvest a renewable resource, participate in wildlife-oriented recreation that is compatible with the purposes for which the refuge was established or have an increased awareness of Deep Fork NWR and the National Wildlife Refuge System. The Service would not meet public use demand. Public relations would not be enhanced with the local community or in the State of Oklahoma.

Limited Hunting Alternative

Under this alternative, the public would be allowed to harvest a renewable resource, and the refuge would be promoting a wildlife-oriented recreational opportunity that is compatible with the purpose for which the refuge was established. The public would have an increased awareness of Deep Fork NWR and the National Wildlife Refuge System and public demand for more hunting would be met. The public would also have the opportunity to harvest a renewable resource in a traditional manner, which is culturally important to the local community. This would also allow the public to enjoy hunting at little cost in a region where private land is leased for hunting, often costing a person \$500-\$2000/year for membership. Ninety percent of land in Oklahoma is privately owned. This refuge is one of only a few public tracts open to hunting in eastern Oklahoma. Additionally, this would allow youth the opportunity to 1) experience a wildlife-dependant recreation; 2) gain an appreciation for and understanding of wildlife, the natural world and the environment; and 3) promote a land ethic and environmental awareness.

As public use levels expand across time, unanticipated conflicts between user groups may occur. Experience has proven that time and space zoning (e.g., establishment of separate use areas, use periods, and restrictions on the number of users) is an effective tool in eliminating conflicts between user groups. This alternative allows for many user groups to use many tracts throughout the year.

Open Hunting Alternative

This alternative would be similar to the limited hunting alternative with one major exception; hunting would dominate all other wildlife dependent recreational activities. Conflicts between consumptive and non-consumptive would likely occur since state seasons would occur on most of the refuge. Conflicts would likely occur between hunter groups as well. For example, rabbit hunters using dogs would likely disrupt deer hunters.

As public use levels increase over time, unanticipated conflicts between user groups may occur. Time and space zoning (e.g., establishment of separate use areas, use periods, and restrictions on the number of users) is an effective tool in eliminating conflicts between user groups. Squirrel, rabbit, and duck hunting is not allowed until after the last deer hunt to ensure conflicts do not arise. Raccoon hunting (which the State allows to be open all year) is limited to nighttime hours only in December and January. This limits conflicts between raccoon hunters and other hunters. This also limits disturbance to wildlife during the spring and summer when most species reproduce. Turkey hunts coincide with no other hunt season.

Conflicts between hunters and non-consumptive users does occasionally occur, but is usually mitigated by time (non-hunting season) and space zoning. The refuge focuses non-consumptive use (mainly birdwatching and other wildlife viewing) in the areas that are closed to hunting.

The public is allowed to harvest a renewable resource, and the refuge is promoting a wildlife-oriented recreational opportunity that is compatible with the purpose for which the refuge was established. The public would have an increased awareness of Deep Fork NWR and the National Wildlife Refuge System and public demand for more hunting would be met. The public also has the opportunity to harvest a renewable resource in a traditional manner, which is culturally important to the local community. This alternative would also allow the public to enjoy hunting at no or little cost in a region where private land is leased for hunting, often costing a person \$300-\$2000/year for membership. This alternative would allow youth the opportunity to experience a wildlife-dependant recreation, instill an appreciation for and understanding of wildlife, the natural world and the environment and promote a land ethic and environmental awareness.

4.2.6 Refuge Facilities

No Hunting Alternative

Under this alternative, existing facilities would still require some maintenance throughout the year for non-consumptive recreational users. Beavers may damage wooden structures such as kiosks and boardwalks near wetlands and could cause excess flooding of trails and roads if they are not controlled. Hogs could damage trails and roads by rooting and wallowing activities. Other non-consumptive facilities such as building and fences would not be affected.

Limited Hunting Alternative

Under this alternative, maintenance of existing facilities (i.e. parking areas, roads, trails, and signs) will require maintenance during high use times by hunters. These areas are also maintained for use by other recreational users throughout the year. Damage by hogs and beavers to trails, roads, kiosks and boardwalks would decrease.

Open Hunting Alternative

Under this alternative, *additional parking facilities* would have to be constructed in addition to regular maintenance of existing facilities. Many refuge tracts have no or very limited parking. Damage by hogs and beavers to trails, roads, kiosks and boardwalks would decrease.

4.2.7 Public Health and Safety

Alternative 1: No Hunting

Under this alternative there is only a very slight chance of a hunting accident. This would most likely be from a hunter hunting on adjacent private property. However, the health benefits from hunting such as exercise would not occur.

Alternative 2: Limited Hunting

Under this alternative there is a chance of a hunting accident. Hunting does have inherent dangers such as accidental shootings and falling from deer stands. All hunters born after December 31, 1971 must have completed a hunter safety course to hunt deer with a firearm in Oklahoma. Hunter education is not required for other forms of hunting, but the trend is that more hunters are receiving the education and hunting accidents have decreased dramatically. The risk of accidents is further reduced on the refuge by limiting the number of deer and turkey hunters through a lottery process, and by not allowing centerfire rifles. Some areas are closed to hunting in order to prevent accidental shootings. These areas include the boardwalk, photoblind, and by homes near the refuge boundary. Hunter numbers and season lengths are very restrictive relative to state seasons under this alternative. Hunters that use the refuge would experience the health benefits derived from hunting activities.

Alternative 3: Open Hunting

Under this alternative there would be higher chance of a hunting accident. Essentially all refuge tracts would be open with a greater number of hunters hunting over a longer time period. Nearby houses and refuge visitors using trails and facilities would not be as protected from shooting activity. The use of centerfire rifles would increase the danger of an accidental shooting.

4.3 Cumulative Impacts Analysis

4.3.1 Anticipated Direct and Indirect Impacts of Preferred Alternative on Wildlife Species.

4.3.1.1 Migratory Game Birds

Under the preferred Alternative 2, Deep Fork NWR estimates a maximum of 400 ducks would be harvested each year. This harvest impact represents 0.15% of Oklahoma's four-year average harvest of 256,417 ducks, (Kruse 2006 and 0.016% of the Central flyway harvest of 2,516,189 ducks). Waterfowl hunting occurs on 4000 acres or 43.4% of the 9,213 acre refuge.

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. Deep Fork NWR is within the Central Flyway.

The process for adopting migratory game bird hunting regulations, located in 50 CFR part 20, is constrained by various 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. As an example of how migratory bird data are collected and summarized to inform the regulations setting process is referenced in "Waterfowl Status 2006"(USFWS 2006). Bird monitoring data, including harvest information, are available through the Service's Division of Migratory Bird Management Website (<http://mbdcapps.fws.gov>).

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 Deep Fork River NWR, season length is much more restrictive for waterfowl hunting than the State allows. Currently, duck hunting does not begin on the refuge until December 1, while the state season usually opens in early November. The refuge season also closes during the state split and ends when the state season ends. Hunting days are limited to Friday through Monday and duck hunting ceases at 1:00 pm. The early state blue-winged teal season and goose hunting are not open on the refuge. The amount of refuge land open to duck hunting is also limited. Duck hunting is not allowed in “closed areas”, “waterfowl sanctuaries”, and “no hunting zones”. This represents about acres of land not open for duck hunting.**

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.

4.2.1.2 Resident Big Game

White-tailed deer hunting does not have regional population impacts due to restricted home ranges. The average home range of a male deer in Mississippi is $1,511 \pm 571$ S.D hectares. (Mott *et al.* 1985). Therefore, only local impacts occur. Mississippi has similar bottomland hardwood forests to that of this refuge.

The annual harvest of white-tailed deer (bucks and does combined) averaged over the last fifteen years for Okmulgee County is 948 deer (ODWC 2006). The refuge lacks good records of deer harvested between 1997 and 2000 due to the fact that refuge hunters checked their deer at state check stations. From 2001 until present, hunters have been required to report deer harvested directly to the refuge. The average number of deer harvested on the refuge annually between 2001 and 2006 is 43 deer (range: 32 to 58). Based on this information, the refuge harvest accounts for 3.4% of the deer harvested in Okmulgee county. The estimated deer density on the refuge is approximately 1 deer per 15 acres. This equates to 250 plus deer on the 4000 acres of refuge open to hunting. The rate of harvest on the refuge's 4000 acres open for hunting is 1 deer per 125 acres. Essentially only about 13% of the refuge deer herd is harvested annually. ODWC and refuge observations in the area indicate that the deer herd has not been negatively impacted in the area. In fact, observations by refuge staff and personal communications with local state game biologists indicate the deer herd is at an all-time high, and that reductions in the antlerless populations would improve the overall health of the herd.

The refuge limits deer hunting in the following ways; 1) the number of deer hunters are limited by a lottery system, 2) the season length is limited in length, 3) certain hunting methods are not allowed, such as the use bait or decoys, 4) centerfire weapons are not allowed, 5) off-road vehicle use is not allowed, 6) deer hunting is not allowed in some units of the refuge and in other areas, such as the waterfowl sanctuary.

4.2.1.3 Feral Hogs

Executive Order 13112, Invasive species, issued in February, 1999 instructs Federal Agencies to:

(a) Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law,

(1) identify such actions:

(2) subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them.

Feral hogs are an extremely invasive, non-native species and not considered a game species by the State of Oklahoma. No bag limits or set seasons are established for feral hogs. Hunting of feral hogs provides the refuge with another management tool in reducing this detrimental species, and at the same time, is widely enjoyed by local hunters. Cumulative effects to an exotic, invasive species should not be of concern because the refuge would like to extirpate this species on refuge lands. Hunting of hogs is not considered detrimental to the biological integrity of the refuge, is not likely to create conflict with other public uses and is within the wildlife dependant public uses to be given priority consideration. Since hogs are exotic, they are a priority species for refuge management only in terms of their negative impacts on refuge biota and need for eradication. They are a popular game species though, and the public interest would best be served by allowing this activity on the refuge. However, even with hunting, feral hogs are likely to always be present because they are prolific breeders. Hogs were first discovered on the refuge in 2001, and have increase dramatically. The refuge began allowing the public to take hogs during hunts for other species and with the weapon allowed for that particular season. The refuge also issues special use permits to the public to trap hogs. The amount of hogs harvested annual varies considerably, but usually is less than 20 animals harvested annually. However this number is expected to increase if hog numbers increase. The refuge averages only one trapping permit per year, but the number of permits issued may also increase if hog numbers increase. The refuge also allows the use of trailing dogs to hunt hogs by special use permit only. This activity is only allowed in situations where all trapping efforts have been exhausted and the use of dogs is the only remaining method to remove trap-shy hogs. The removal of hogs is also necessary for the refuge to remain on good terms with neighbors. Feral hogs often move from the sanctuary of the refuge on to adjacent private land and inflict damage to crops and pastures. Refuge neighbors rely on the refuge's feral hog control program to limit damage to their property.

4.2.1.4 Small Game (squirrel, rabbit, raccoon, and beaver)

Small game species such as squirrel, rabbit, raccoon and beaver cannot be affected regionally by refuge hunting because of their limited home ranges. The State of Oklahoma does not keep harvest data on small game. Squirrel hunting was initiated in

1996, rabbit hunting in 1997, raccoon hunting in 1999, and beaver trapping in 2003. Since these hunts were initiated the refuge has acquired harvest data through routine law enforcement bag checks for squirrel, rabbit and raccoon and through a special use permitting process for beavers. The refuge harvest averaged 66 squirrels annually over 11 years, 75 rabbits annually over 10 years, 12 raccoons annually over eight years, and 12 beaver annually over four years. These harvest numbers are far less than the total number of these species on the refuge. Law enforcement checks have also revealed that few hunters take the state legal daily bag limit of 10 squirrels or 10 cottontail rabbits or three swamp rabbits. The average number of raccoons taken annually (i.e. 12) by refuge hunters is less than the state season bag limit of 30 allowed for a single individual. Anecdotal surveys by refuge biologists indicate that there is no shortage of these species on the refuge as they are all prolific breeders. Additionally, the refuge is more restrictive than the state season. Rabbit and squirrel hunting is not permitted in October or November in order to prevent conflicts with refuge deer hunts. In addition the rabbit season ends on January 31, whereas the state season ends on March 15. The closure of the refuge squirrel season does coincide with the state season closure of January 31. Raccoon is during the state season of December 1 through January 31, but the year-round chasing of raccoons with dogs is not allowed on the refuge as it is under state regulations. The refuge also does not allow the use of horses and mules for hunting, and limits raccoon hunting to nighttime hours only in order to prevent conflicts with other users. The state allows the year-round take of beavers. The refuge allows beaver trapping by special use permits. These permits are typically issued after the raccoon, rabbit, and squirrel seasons close in order to prevent conflicts. Beaver trappers are also confined to trapping in parts of the refuge that are experiencing significant beaver damage. Beaver trappers must also submit the number of beaver taken as part of the special conditions of their permit. Off-road vehicle use is not allowed during any of small game hunting activities.

4.2.1.5 Wild Turkey

Turkeys are non-migratory and therefore hunting only impacts the local population. Proposed turkey hunting on the refuge is currently limited to a 2 ½-day youth hunt and a 2 ½-day adult hunt during the spring. Hunters are drawn through the ODWC's controlled hunt drawing process. The number of hunters allowed on each hunt will vary according to the condition of the turkey population. Currently the number of hunters is seven for the youth hunt and five for the adult hunt. According to ODWC Rio Grande turkey population estimates (ODWC 2006), the turkey population in Okmulgee county averaged 640 birds annually over the past three years. These records also indicate significant increase in the turkey population over the past nineteen years. In 1993 the population in Okmulgee county was 100 birds, in 2006 it was 700 birds. ODWC records indicate that an average of 147 birds were harvested annually in Okmulgee County over the past three years. The refuge harvests less than 12 birds. If eight birds were to be harvested on the refuge, this is only eight percent of the entire average harvest in the county. During the past two years of youth hunting the harvest has been six birds in 2005 and five in 2006. The first adult turkey hunt will be held in spring 2007. The refuge has an estimated 150 turkeys on the refuge. Although turkey numbers will vary from year to year, this

population estimate has remained consistent over the past three years. The restrictive nature of the refuge turkey hunts and the fact that county turkey populations are increasing indicates that turkey hunting on the refuge will have a negligible impact on local turkey populations.

Besides limiting the number of hunters and the length of hunting through the lottery system, the refuge also limits the areas that may be hunted. Hunters may only take one tom and must use non-toxic shot only. All harvested turkeys must be checked at the refuge check station to allow the refuge to collect harvest information.

4.2.1.6 Non-hunted Wildlife

Non-hunted wildlife would include non-hunted migratory birds such as songbirds, wading birds, raptors, and woodpeckers; small mammals such as voles, moles, mice, shrews, and bats; 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 bats, butterflies and moths, 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 migratory birds could have regional, local, and flyway effects. Regional and flyway effects would not be applicable to species that do not migrate such as most woodpeckers, and some songbirds including cardinals, titmice, wrens, chickadees, etc. Disturbance by hunting to non-hunted migratory birds should not have cumulative negative impacts for the following reasons. Hunting season would not coincide with the 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 birds might occur. Disturbance to birds by hunters would probably be commensurate with that caused by non-consumptive users.

Disturbance by hunting to non-hunted wildlife would be the most likely negative cumulative impact. However, disturbance would be unlikely for the following reasons. Small mammals, including bats, are inactive during winter when hunting season occurs. These species are also nocturnal. Both of these qualities make hunter interactions with small mammals very rare. Hibernation or torpor by cold-blood reptiles and amphibians also limits their activity during the hunting season when temperatures are low. Hunters would rarely encounter reptiles and amphibians during most of the hunting season. Encounters with reptiles and amphibians in the early fall are few and should not have cumulative negative effects on reptile and amphibian populations. Invertebrates are also not active during cold weather and would have few interactions with hunters during the hunting season. The refuge has estimated current hunter density on peak days to be no more than 1 hunter per 160 acres. During the vast majority of the hunting season, hunter density is much lower (1 hunter/500 acres). Refuge regulations further mitigate possible disturbance by hunters to non-hunted wildlife. Vehicles and ATV's are restricted to county roads and the harassment or taking of any wildlife other than the game species

legal for the season is not permitted.

Although ingestion of lead-shot by non-hunted wildlife could be a cumulative impact, it is not relevant to Deep Fork NWR because the use of lead shot would not be permitted on the refuge for any type of 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 Eastern Oklahoma by peak hunting season in Nov-Jan. Some hunting occurs during September and October when these species are migrating; however, hunter interaction would be commensurate with that of non-consumptive users.

4.2.1.5 Endangered Species

As discussed in 4.2.4, activities by hunters will have negligible effects on endangered and threatened species that utilize the refuge. A Section 7 Evaluation was conducted in association with the initial assessment for opening hunting on Deep Fork NWR. It was determined that Alternative 2 (limited hunting) would not likely adversely affect these endangered species.

4.2.2 Anticipated Direct and Indirect Impacts of Preferred Action on Refuge Programs, Facilities, and Cultural Resources.

4.2.2.1 Wildlife-Dependant Recreation

As public use levels expand across time, unanticipated conflicts between user groups may occur. The refuge’s visitor use programs would be adjusted as needed to eliminate or minimize problems and provide quality wildlife-dependent recreational opportunities. Experience has proven that time and space zoning (e.g., establishment of separate use areas, use periods, and restrictions on the number of users) is an effective tool in eliminating conflicts between user groups. This would continue under Alternative 2.

The refuge would control access under the preferred Alternative 2 to minimize wildlife disturbance and habitat degradation, while allowing compatible wildlife-dependent recreation. Some areas, such as waterfowl sanctuaries or rookeries, would be closed seasonally to minimize disturbances by hunters or other recreational users.

4.2.2.2 Refuge Facilities

No additional facilities would be needed under the preferred alternative. Maintenance or improvement of existing facilities (i.e. parking areas, roads, trails, and boat ramps) will cause minimal short term impacts to localized soils and waters 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 other recreational users. These activities will be

conducted at times (seasonal and/or daily) that cause the least amount of disturbance to wildlife. During times when roads are impassible due to flood events or other natural causes those roads, parking lots, trails and boat ramps impacted by the event will be closed to vehicular use. The control of hogs and beavers would likely decrease damage by hogs and beavers to trails, roads, kiosks and boardwalks.

4.2.2.3 Cultural Resources

The preferred alternative does not pose any threat to historic properties on and/or near the refuge.

4.2.2.4 Anticipated Impacts of Hunt on Refuge Environment and Community.

The refuge expects no significant adverse impacts of the proposed action on the refuge environment which consists of soils, vegetation, air quality, water quality and solitude. Some disturbance to surface soils and vegetation would occur in areas selected for hunting; however impacts would be minimal. The refuge would also control access to minimize habitat degradation.

Impacts associated with solitude are expected to be minimal given time and space zone management techniques, such as seasonal access and area closures, used to avoid conflicts among user groups.

The refuge would work closely with State, Federal, and private partners to minimize impacts to adjacent lands and its associated natural resources; however, no indirect or direct impacts are anticipated. The refuge expects some increased visitation and tourism to bring additional revenues to local communities.

4.2.2.5 Other Past, Present, Proposed, and Reasonably Foreseeable Hunts and Anticipated Impacts

Cumulative effects on the environment result from incremental effects of a preferred action when these are added to other past, present, and reasonably foreseeable future actions. While cumulative effects may result from individually minor actions, they may, viewed as a whole, become substantial over time. The proposed hunt plan has been designed so as 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 preferred alternative described in this assessment includes actions relating to the previously approved refuge hunt program for waterfowl, upland and big game, and pest management. This action would have both direct and indirect effects; however, the cumulative effects of these actions are not expected to be substantial.

The refuge expects many changes in the foreseeable future to the hunt program. Assume the hunt program doubled everything from acres, to number of hunters and animals harvested. Based on figures noted in this assessment, impacts would still be negligible when limitations are imposed on the hunters. We expect a far larger increase in numbers and percentages in wildlife dependent recreational users not related to hunting activities.

Chapter 5 Consultation and Coordination with Others

The ODWC concurs and fully supports the regulated consumptive public use of the natural resources associated with the Deep Fork NWR (Refer to Letters of Concurrence in original proposals). The Fish and Wildlife Service also provided an in-depth review by the Regional Office personnel and staff biologists. Numerous contacts were made throughout the area of the refuge soliciting comments, views, and ideas into the development of refuge hunting plans.

Chapter 6 Regulatory Compliance

In order to meet specific refuge and other broader U. S. Fish and Wildlife Service (Service) directives, the following purposes were established for Deep Fork NWR:

Executive Order 13112, Invasive species, issued in February, 1999 instructs Federal Agencies to:

- (a) Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law,
 - (1) identify such actions:
 - (2) subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them.

Administrative Procedure Act (5 U.S.C. 551-559, 701-706, and 801-808) as amended: Contains procedures that Federal agencies must follow, including public information, open meetings, and privacy of information requirements, and provision for hearings, adjudications, rule making and judicial and congressional review of agency actions.

Antiquities Act of 1906 (16 U.S.C 431-433): It is illegal for a person to appropriate, excavate, injure or destroy an historic or prehistoric run or monument, or an object of antiquity, situated on lands owned or controlled by the U.S., without permission of the Secretary of the department with jurisdiction over the Land.

Bald Eagle Protection Act (16 U.S.C. 668-668d) as amended: Prohibits the taking (includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb) or possession of and commerce in bald and golden eagles, with limited exceptions.

Clean Air Act (42 U.S.C. 7401-7671q) as amended: Establishes Federal standards for air pollutants from stationary and mobile sources and to work to regulate polluting emissions. The Act was designed to improve air quality.

Emergency Wetlands Act of 1986: Provides for the conservation of wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions.

Endangered Species Act of 1973 (16 U.S.C. 1531-1544) as amended: Provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the U.S. or elsewhere.

Federal Lands Recreation Enhancement Act (REA), 16 U.S.C. 6803(c), Consolidated Appropriations Act (PL 108-447): This law grants the Secretary authority to collect recreation fee revenues for public recreation and rescinds the collection authorities in the Emergency Wetland Resources Act and those provided by the Land and Water Conservation Fund Act. REA replaces the Recreation Fee Demonstration Program (Fee Demo) and authorizes the Recreation Fee Program for 10 years (through 2014).

Fish and Wildlife Act of 1956 (16 U.S.C. 742a -754j-2) as amended: Directs the Secretary of the Interior to develop the policies and procedures necessary for carrying out fish and wildlife laws and to research and report on fish and wildlife matters. The Act establishes the Fish and Wildlife Service within the Department of the Interior.

Fish and Wildlife Conservation Act (16 U.S.C. 2901-2911) as amended: Encourages states to develop conservation plans for nongame fish and wildlife of ecological, educational, aesthetic, cultural, recreational, economic, or scientific value. Also directs the Secretary to undertake certain activities to research and conserve migratory nongame birds.

Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 742l): Authorizes the Secretary of the Interior to assist in training of state fish and wildlife enforcement personnel to cooperate with other federal or state agencies for enforcement of fish and wildlife laws and to use appropriations to pay for rewards and undercover operations. Also allows for disposal of property abandoned or forfeited under federal fish, wildlife or plant laws administered by the Secretary in a manner deemed appropriate by the Secretary.

Migratory Bird Treaty Act (16 U.S.C. 703-712) as amended: Implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under this Act, taking, killing, or possessing migratory birds is unlawful. The Secretary of the Interior may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling purchasing, shipping, transporting, or exporting of any migratory bird, part, nest or egg will be allowed.

Migratory Bird Conservation Act (16 U.S.C. 715d): Establishes refuges as an inviolate sanctuary, or for any other management purposes, for migratory birds.

National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended: Provides for the administration and management of the national wildlife refuge system including wildlife refuges, areas for the protection and conservation of fish and wildlife threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas. This Act also authorizes 6 priority public uses when deemed compatible and appropriate with the mission of the site. Hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation are these priority uses.

Recreational Hunting Safety and Preservation Act of 1994 (16 U.S.C 5201-5207): Provides for civil penalties to be assessed against a person who intentionally and significantly hinders a lawful hunt.

Refuge Recreation Act (16 U.S.C. 460K-460k-4) as amended: Authorizes the Secretary of the Interior to allow public recreation in federal conservation areas when compatible with the purposes of these areas.

Sikes Act (16 U.S.C. 670a-670o) as amended: Authorizes the Secretary to develop cooperative plans for conservation and rehabilitation programs. The Secretary , in cooperation with state agencies and in accordance with comprehensive plans, is to plan, develop, maintain and coordinate programs for conservation and rehabilitation of wildlife, fish and game under his jurisdiction.

Soil and Water Resources Conservation Act of 1977 (16 U.S.C. 2001-2009) as amended: Provides for a continuing appraisal of U.S. soil, water and related resources, including fish and wildlife habitats, and a soil and water conservation program to assist landowners and land users in furthering soil and water conservation.

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