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Environmental Assessment

White-tailed Deer, Mule Deer, and Feral Hog Youth Hunt Program

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Prepared by

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1.0 PURPOSE OF AND NEED FOR PROPOSED ACTION ALTERNATIVE

1.1 Introduction:

The United States Fish and Wildlife Service (Service) is proposing to open a youth hunting program on Buffalo Lake National Wildlife Refuge (Refuge). The hunt program will allow youth the opportunity to utilize a sustainable resource while assisting the Refuge in population and habitat management. Goals and objectives set forth by the Refuge's Comprehensive Conservation Plan call for the management and maintenance of priority habitats within the refuge that include both the grasslands and riparian zones that are utilized by migratory songbirds and the reason why the Refuge was created.

The purpose of this environmental assessment (EA) is to evaluate the effects of two alternatives for opening Buffalo National Wildlife Refuge to a youth hunting program for white-tailed deer, mule deer, and feral hogs. This includes a No Action alternative that would continue the current condition of no hunting, and the Service's proposed action, which is to provide youth hunting opportunities. This EA complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 CFR 1500-1509) and Department of the Interior (516 DM 8) and Service (550 FW 3) policies. NEPA requires examination of the effects of proposed actions on the natural and human environment.

1.2 Location:

Buffalo Lake NWR is located in the Panhandle of Texas, an area known as the Southern High Plains Ecoregion. It consists of short-grass prairie, riparian, marsh, woodland, and cropland habitats. The refuge is located 1.5 miles south of Umbarger, which is 10 miles west of Canyon, 15 miles east of Hereford, and 30 miles southwest of Amarillo (Figure 1). The Refuge consists of 7,667 acres and is situated in the southern corner of Randall County, Texas.

1.3 Background:

Buffalo Lake National Wildlife Refuge is located in the southern portion of High Plains, which is a native short and mixed grass prairie. Buffalo Lake was first developed in 1937 with the completion of Umbarger Dam, which was built as part of the Bankhead-Jones Farm Tenant Act of 1937 and was managed by the Soil Conservation Service (currently Natural Resource Conservation Service) for water conservation, recreation, and as a wildlife sanctuary. The United States Fish and Wildlife Service took over operation of the area on November 6, 1958 and the refuge was established on November 17, 1959 under secretarial order 2843, using the authority of the Migratory Bird Act (16 U.S.C 712d). Refuge purposes include:

“...for use as an inviolate sanctuary...for any other management purposes...for migratory birds.”
16 U.S.C. 712d (Migratory Bird Conservation Act)

“...for use and administration under applicable laws as a refuge for migratory birds and other wildlife...”

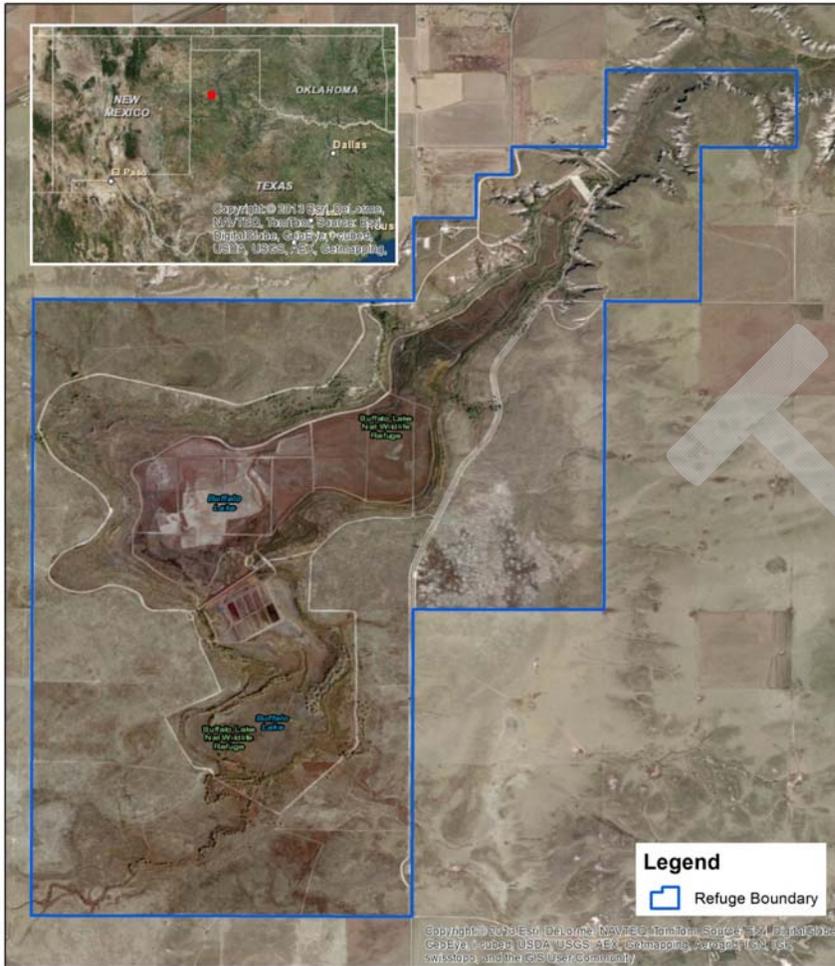


Figure 1. Vicinity Map of Buffalo Lake NWR. Peter Burck

Throughout the 1950's and 60's Buffalo Lake was widely used as a recreational area providing boating, fishing, and other water related activities and was referred to as the "Playground of the Panhandle." Visitor use, which occurs mainly in the spring and summer months, often exceeded one-half million people annually. Historically, Buffalo Lake provided habitat for millions of migrating and wintering waterfowl and other wetland-dependent wildlife. Waterfowl number began building up in late October and sometimes reached peak numbers in excess of one million ducks and 40,000 geese by mid-December (USFWS, 1962-1968).

Tierra Blanca Creek and other natural springs fed Buffalo Lake until the 1970's when irrigation and urban water pumping depleted the aquifers to the point that perennial surface water no longer existed. This draining of the aquifer was compounded by multi-year drought which lowered lake levels even further. Given these conditions, the flows into Tierra Blanca Creek eventually ceased and Buffalo Lake dried up.

However, in 1978 a record flood within the Tierra Blanca Creek drainage filled Buffalo Lake to capacity. Shortly after filling, Umberger Dam was condemned resulting in the release of the all water within Buffalo Lake. In 1992, Umberger Dam was replaced with a modern flood control

structure able to withstand the torrential flooding known to occur within the area. When the lake fills, water quality suffers due to runoff from upstream confined cattle feeding operations. Given the potential health hazard when the lake floods, Buffalo Lake was closed to water activities such as swimming, boating, and fishing. Currently, the only public uses allowed on the Refuge are environmental education and interpretation, wildlife viewing, wildlife photography, and camping. The refuge was open to pheasant hunting in 1985, but because of severe declines in the pheasant population, hunting pheasants has been closed since 1992. Buffalo Lake NWR would like to extend public use by opening the Refuge to a youth hunt program for white-tailed, mule deer and feral hogs.

1.4 Purpose and Need for the Proposed Action:

The purpose of the EA is to evaluate the addition of white-tailed and mule deer and feral hog youth hunts to the hunting program on the refuge. This action is needed to provide compatible wildlife-oriented recreation for youth on the refuge and as a tool to help manage feral hog populations.

Feral hog rooting and digging is causing disturbance and harm to native wildlife and plants on the refuge. The expansion of feral hog hunting is being proposed to: (1) help reduce the number of hogs and the destruction caused by their foraging behavior; and (2) provide additional opportunities for priority, wildlife-oriented recreation on the refuge. A reduction in feral hog numbers would reduce negative impacts caused by feral hogs and help maintain the integrity of Refuge habitats.

Providing hunting opportunities is consistent with the Refuge Comprehensive Conservation Plan (CCP) (USFWS 2013) and U.S. Fish and Wildlife Service policies on wildlife dependent recreation and hunting as mandated by the National Wildlife Refuge System Improvement Act of 1997. This action is needed to implement goals and objective identified in the refuge CCP.

1.5 Decision to be Made:

This EA is an evaluation of the environmental impacts of the alternatives and provides information to help the Service fully consider these impacts and any proposed mitigation related to opening Buffalo Lake NWR to youth mule deer, white-tailed deer hunting, and feral hog hunting. Using the analysis in this EA, the Service will decide whether or not there are environmental consequences of any of the alternatives that would be significant and require an EIS, or decide to prepare a Finding of No Significant Impact to the selected alternative.

To initiate or expand hunting programs, the Service must publish in the Federal Register any proposed and final refuge-specific regulations pertaining to that use prior to implementing them. The regulations are only one element of a complete opening package, which is comprised of the following documents: hunting plan; compatibility determination; documentation pursuant to compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and appropriate NEPA decision document; Endangered Species Act section 7 evaluation; copies of

letters requesting State involvement and the results of the request; draft news release; outreach plan; and the draft refuge-specific regulations.

1.6 Regulatory Compliance:

National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS), the purposes of an individual refuge, Service policy, and laws and international treaties. Relevant guidance includes the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, Refuge Recreation Act of 1962, and selected portions of the Code of Federal Regulations and Fish and Wildlife Service Manual.

The mission of the Refuge System is:

“... to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57).

The goals of the Refuge System are to:

- *Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered;*
- *develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges;*
- *conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts;*
- *provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation); and*
- *foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.*

The NWRS Improvement Act of 1997 provides guidelines and directives for the administration and management of all areas in the NWRS. It states that national wildlife refuges must be protected from incompatible or harmful human activities to ensure that Americans can enjoy Refuge System lands and waters. Before activities or uses are allowed on a national wildlife refuge, the uses must be found to be compatible. A compatible use “... will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuges.” In addition, “wildlife-dependent recreational uses may be authorized on a refuge when they are compatible and not inconsistent with public safety.” The act also recognized that wildlife-dependent recreational uses involving hunting, fishing, wildlife observation,

photography, environmental education and interpretation, when determined to be compatible with the mission of the System and purposes of the Refuges, are legitimate and appropriate public uses of the NWRS and they shall receive priority consideration in planning and management.

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

- Administrative Procedures Act (5 U.S.C. 551-559, 701-706, and 801-808) as amended
- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996)
- Antiquities Act of 1906 (16 U.S.C. 431-433)
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Bald Eagle Protection Act (16 U.S.C. 668-668d) as amended
- Clean Air Act of 1972, as amended (42 U.S.C. 7401 *et seq.*)
- Clean Water Act of 1972, as amended (33 U.S.C. 1251 *et seq.*)
- Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*)
- Executive Order 12898, Federal Action Alternatives to Address Environmental Justice in Minority Populations and Low Income Populations, 1994.
- Executive Order 13112, Invasive Species (issued in February 1999)
- Fish and Wildlife Coordination Act of 1958, as amended (16 U.S.C. 661 *et seq.*)
- Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421)
- Floodplain Management (Executive Order 11988)
- Migratory Bird Treaty Act (16 U.S.C. 703-712 as amended)
- National Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended
- National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 *et seq.*)
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 *et seq.*)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 *et seq.*)
- Protection and Enhancement of the Cultural Environment (Executive Order 11593)
- Protection of Wetlands (Executive Order 11990)
- National Pollutant Discharge Elimination System, as amended (33 U.S.C. 1251 *et seq.*)
- Soil and Water Conservation Act of 1977 (16 U.S.C. 2001-2009) as amended

Further, this EA reflects compliance with applicable State of Texas and local regulations, statutes, policies, and standards for conserving the environment and environmental resources such as water and air quality, endangered plants and animals, and cultural resources. An ESA Section 7 Consultation was completed and approved prior to starting this EA.

1.7 Scoping/Public Involvement and Issues Identified:

On July 10, 2015, the Service announced its intent to prepare an Environmental Assessment of alternatives for the opening of a youth hunt program on Buffalo Lake National Wildlife Refuge. A 2-week scoping period from July 10, 2015 thru July 24, 2015 was established under that notice and the Service provided a news release announcing the scoping period for the development of this EA. The Refuge posted the news release at Buffalo Lake National Wildlife Refuge, Canyon, TX Post Office, and the Umbarger, TX Post Office.

During the scoping period the Service received 2 phone calls with comments that were considered as part of this analysis. One commenter stated that they were very much in favor of a youth hunt and thought it would help manage the deer population over the long term. The second commenter was also very much in favor of the youth hunt and stated that they thought there needed to be more hunts on federal lands. Internal scoping of refuge and regional office staff was also conducted to identify issues, concerns, and management opportunities. Based on internal and external scoping, the alternatives in Chapter 2 were developed and considered for this EA.

Based on internal and external scoping the following issues were identified:

- Concern about potential impacts to riparian habitat from overpopulation of mule deer and white-tailed deer;
- Feral hog competition with native wildlife and destruction of habitat;
- Refuge's desire to add another wildlife-dependent recreational opportunity and cooperate with TPWD.

The draft EA, Hunt Plan and Compatibility Determination will be available for a 30-day comment period from September 4 through October 5, 2014.

2.0 ALTERNATIVES

This chapter discusses the alternatives considered for opening deer and feral hog hunting opportunities on the refuge.

2.1 Alternative A- No hunting of deer or feral hogs- Current Management

Under Alternative A, big game hunting would continue to be closed on Buffalo Lake NWR. The refuge is open to pheasant hunting but because of severe declines in the pheasant population, hunting pheasants has been closed since 1992. Currently, the only public uses allowed on the refuge are environmental education and interpretation, wildlife viewing, wildlife photography, and camping. There would be no extra cost to the refuge under this alternative. There would be no change in public use and wildlife management programs on the refuge. The refuge would also be closed to feral hog hunting. The potential for feral hogs on the refuge is increasing. Feral hogs are not indigenous to Texas and cause habitat destruction. As the feral hog population and home range continue to expand so does the potential for them to transmit diseases to wildlife, domestic animals, and humans. No additional tracts of land would be open to hunting.

2.2 Alternative B- Open Refuge to limited deer and feral hog hunting in accordance with state regulations and Refuge specific regulations --Proposed Action Alternative):

Under this alternative, limited participation of youth hunting at Buffalo Lake NWR would be implemented in the winter, under refuge specific regulations: restricting hunting to 2 youth hunts per year with each hunt including 3 youth hunters. The refuge is only allowing hunting for a total of 4 days during the year. During the hunts the refuge will be closed to the general public as a safety precaution. The refuge plans on posting the closure during hunts on the refuge web site, in local businesses, and on local radio channels.

All areas of the refuge that do not pose a safety concern may be opened for hunting for deer and feral hogs at the Manager's discretion and based on current population survey data. The refuge would be split into 3 hunting units (North, Middle, and South Units).

North Unit

The North Unit encompasses the area North of Campground Road to F.M. 168 and Grazing Units 11 and 12. This unit occupies 1,035 acres and consists of part of the old lake bottom, riparian areas, mixed grass prairie, and canyon breaks. Vegetation in this area includes a mixture of trees along the old lake edge, many grasses such as little blue stem, side oats grama, blue grama, buffalo , and western wheat grass. This area has canyon outcrops with rocky slopes.

Middle Unit

The Middle Unit encompasses the area south of Campground Road to Stewart dike and Grazing Units 1, 2, and part of Unit 3. This unit is 2,966 acres and area consists of the dry lake bed, riparian areas, and short grass prairie. Vegetation in this area includes trees along the north edge of the old lake bottom, forbs in the old lake bottom, and grasses such as little blue stem, side oats grama, blue grama, buffalo, and western wheat grass.

South Unit

The South Unit encompasses the area south of Stewart dike and south of Tour Road Wind Mill in Grazing Unit 3, Grazing Units 4, 5, 6, 7, and 8. This unit is 3,063 acres and consists of wooded areas along the old lake bottom edge and Tierra Blanca Creek. Grasses such as western wheat grass, little blue stem, sideoats grama, and buffalo grass. In some areas of this unit sage bush is present.

Hunters will be selected by lottery through the TPWD Public Hunting Lands Program. Lands entered in this program may specify hunt dates that suit purposed goals. Coordinating timing of the hunt with TPWD will allow maximum assistance in conducting hunt, collecting biological data, and assisting in law enforcement activities. The refuge is proposing 2 youth hunts per year, which will be held on two separate weekends during the State open mule deer and/or white-tailed deer seasons, which are typically in November and December of each year (exact dates to be determined in cooperation with TPWD). Each hunt will include 3 youth hunters. This would allow 6 youth hunters over the hunting season. After hunters are selected by TPWD, the refuge will issue a Special Use Permit (OMB form 3-1383G) that will be required to participate in the youth hunt. Hunters will be given a safety briefing and orientation prior to participating in the

hunt, a map of the general area as well as their assigned hunting unit. Refuge management goals and objectives may require occasional modifications to the hunting program as harvest data, public use pressure, and refuge programs, are developed. As currently proposed, it is estimated that Refuge costs would be about \$6,000 per year, for big game hunting for law enforcement from other neighboring refuges in New Mexico and Oklahoma to be present on refuge, program implementation, facility maintenance, and compliance checks under this alternative.

Currently, the refuge is in the Recreational Fee system, the cost to the refuge for the hunt program can be partially defrayed by using this funding source.

2.4 Comparison of Alternative

Action	Invasive species control (feral hog)	Population Management of deer and feral hogs	Habitat Management	Priority Public Use Accomplished
Alternative A – No Action	No change from current management	No change from current management	No change from current management	No
Alternative B - Proposed Action	Yes- removal of feral hogs	Yes	Yes- removal of some deer and feral hogs	Yes

2.5 Alternatives Considered But Dismissed From Detailed Analysis:

All comments and suggestions received during scoping were considered during alternative development. Alternatives that were determined to be infeasible are discussed below.

An alternative that would open the refuge to deer and feral hog hunting during state seasons in accordance with state regulations was considered. This alternative would allow virtually unrestricted deer hunting to all participants who show up at Buffalo Lake NWR during the state regulated season. The seasons, species, and bag limits would be within the framework of the Texas Parks and Wildlife Department regular state seasons and further regulated by refuge regulations according to Service policy. The State regulated season for mule deer both general and archery season lasts more than 40 days. The state regulated season for white-tailed deer is 110 days for general and archery season. Feral hog hunting would be opened year-round due to their exotic species status. There are no state bag or possession limits or closed seasons on exotic animals in Texas. This would result in the refuge being open to feral hog hunting by all interested hunters at any time from sunrise to sunset daily.

Under this alternative, it is likely that deer harvest rates will be high during the first hunting season. Thereafter, doe/buck ratios will become highly skewed toward doe deer, which

depending on the ratio, may affect the proceeding year's fawn population. Given the length of season in Randall County it is likely that hunting pressure could be intense of upward of 50 to 100 hunters per day. This many hunters would cause a safety issue for all hunters and refuge staff. The state season for white-tailed deer is 65 days with 14 days overlapping the mule deer season. Due to safety concerns and potential adverse impacts to deer populations, this alternative was determined to be infeasible.

3.0 AFFECTED ENVIRONMENT

Buffalo Lake NWR consists of 7,667 acres of native short grass prairie, riparian, marsh, woodlands, and croplands habitats. Management activities focus on resident and migratory wildlife species. A complete description of refuge resources can be found in the Buffalo Lake Comprehensive Conservation Plan (USFWS 2013). The following resources are not discussed in this EA because the proposed mule deer, white-tailed deer, and feral hog hunt will not have impacts on them: physiography, geology, minerals, visual resource, and wilderness. The resources described below are those that could be impacted by the alternatives discussed in this document.

3.1 Physical Environment:

Buffalo Lake NWR is located in Randall County, Texas. The refuge is located in the southern portion of High Plains. This is a native short and mixed grass prairie that once encompassed more than 350,000 square miles in 10 states, and stretched along the eastern slope of the Rocky Mountains from Canada to southwestern Texas. The refuge is in a portion of the High Plains called the Llano Estacado, a large non-mountainous geological region at the southern end of the High Plains. This area covers about 20 million acres and is characterized by a flat, featureless, relatively high plateau that was virtually devoid of trees prior to substantial development by man. Huge herds of bison and pronghorns roamed the plains, and prairie dogs numbered in the millions. This prairie was adapted to grazing and periodic fire, and developed under climatic conditions characterized by a small amount of precipitation.

Randall County is situated in the middle of the Texas Panhandle. The refuge is 1.5 miles south of Umbarger, 10 miles west of Canyon, and 15 miles east of Hereford, and approximately 30 miles southwest of Amarillo. All lands surrounding the refuge are in private ownership and mainly used for cattle ranching activities.

3.1.1 Air Quality:

The refuge is located in a rural environment. The ambient air quality within the boundaries of the refuge does not vary considerably. Buffalo Lake NWR or Hereford, Texas has not recorded ambient criteria pollutant concentrations that approach the maximum concentration permitted by the NAAQs (USFWS 2013).

3.1.2 Soils / Geology:

A total of 24 soil types have been identified on the refuge. The soils vary from clay to loam. The largest portion of the refuge is covered by the Potter clay loam soil type.

Buffalo Lake NWR is located in a shallow canyon cutting through the southern High Plains of Texas. The canyon was formed by the erosional forces of the intermittent Tierra Blanca Creek as it pursues its course by way of Palo Duro Creek. The underlying bedrock is covered by the Ogallala formation. The lake bed is covered by alluvial deposits of clay mixed with sand silt. Upland areas are covered by windblown sediments.

3.1.3 Water Quality and Quantity:

The Ogallala Aquifer Formation is a major regional aquifer that is the source of almost all of the irrigation water in the Texas Panhandle. Before irrigation, the water discharged at natural springs and seeps in the playa lakes and along caprock escarpments. Some springs have dried up because of the depletion of the groundwater and lowering of the water table.

Tierra Blanca Creek enters at the southwestern portion of the refuge. The creek is a viable way for surface water to enter onto the Refuge during heavy flooding events. The water would be held behind Umbarger Dam in such events.

Currently, the lake is dry. However, when flooding occurs after a storm event, the water often contains nutrient rich runoff from cattle feedlots located upstream which leaves it of poor quality and a health hazard if people come in contact with it.

3.2 Biological Environment:

Randall County, Texas is located in the center of the Panhandle. Temperatures average 23°F in January and 92 F in July. Average precipitation is 20.16 inches per year.

The biological environment of Buffalo Lake NWR includes a variety of habitats including native grassland, riparian, woodland, canyon escarpments, and marshland. The majority of the Refuge is native grassland.

3.2.1 Vegetative Communities:

The main vegetative community on the Refuge is short grass prairie. This system contain grass species such as sideoats grama, little bluestem, blue grama, and buffalo grass. The species richness and productivity of plant species within the system is controlled primarily by environmental conditions. Grazing and prescribed fire are important tools used in active management on the Refuge.

3.2.2 Wildlife:

The refuge supports a diversity of wildlife native to the Texas Panhandle as well as migratory birds. Approximately 345 species of birds use the refuge that consists mainly of grassland songbirds that include the Cassin's Sparrow, Scissor-tailed flycatcher, and Western Meadowlark. Around 51 species of mammals are found on the refuge that includes porcupine, white-tailed deer, mule deer, and eastern cottontail. About 47 species of reptiles and amphibians occur on the

refuge that consists of the prairie rattlesnake, plains leopard frog, and Texas horned lizard. A complete list of species that occur on the refuge can be found in the refuge CCP (USFWS 2013) and www.fws.gov/refuge/bufallo_lake/wildlife

White-tailed Deer

White-tailed deer populations have grown at such a rate in Randall County that TPWD has increased the limit of white-tailed deer to 3, with no more than 1 buck. The increase of white-tailed deer in Randall County and the Texas Panhandle appears to coincide with the increase in white-tailed deer on the refuge. The reason for this increase in the white-tailed deer population is unclear, but may be because of changes in land use, such as, increased suitable habitat (CRP and brush encroachment), and increased corridors. Beginning in 2010, the refuge started to monitor mule and white-tailed deer abundance.

Mule Deer

The mule deer population in Texas ranges from 150,000 to 250,000 depending on climatic cycles. In 2013, the statewide population estimate was 218,834 mule deer. Prior to a relocation effort by TPWD in 1949, a small population existed in the Panhandle. In 1949, Texas Game, Fish, and Oyster Commission relocated 89 mule deer to Armstrong and Randall Counties. In 2013, the population estimate for mule deer was 218,834 deer of which 62,268 were located in the Panhandle. A total of 8,386 mule deer were harvested in Texas in 2013-2014 (Gray 2014). Mule deer in the Texas Panhandle have access to energy-rich grain crops during the growing season (Sowell 1981). In winter, deer have access to high-protein food crops such as wheat and alfalfa (Cantu and Richardson). In 2013, the population estimate for the Texas Panhandle indicated a population of 62,268 mule deer (Gray 2014). The Refuge has conducted ungulate surveys on the refuge since 2010.

Feral Hog

Feral hogs are an extremely invasive species and not considered a game species by the State of Texas and are also considered a non-climate change stressor to other more sensitive species. There is an estimated population in excess of 1.5 million feral hogs in Texas (Taylor 2003). This is due in part to intentional releases, improved habitat, increased wildlife management, disease eradication, limited natural predators, and a high reproductive potential. Due to the fact that feral hogs are not a native species, there is no need or desire to sustain a population for any refuge objective. In fact, the removal of as many of these destructive, exotic, feral animals as possible would positively benefit the Refuge (and neighboring) habitat. Feral hog populations are not monitored per se but trapping/harvest numbers are recorded yearly. At this time, feral hogs are rare on the refuge. However, off refuge populations (Palo Duro Canyon and Caprock Canyon) have increased and feral hogs are moving west towards the refuge. Any harvest of feral hogs will be opportunistic at this time. As previously mentions, feral hogs can be very destructive to habitat and while total eradication is unlikely, our goal is keep the population as limited as possible.

3.2.3 Threatened and Endangered Species and Other Special Status Species

The refuge provides habitat for the state endangered Texas horned lizard but no federally listed species are known to use the refuge.

3.3 Human Environment:

3.31 Cultural Resources

There are 27 historic and prehistoric sites throughout the refuge in the form of transitory camps and hunting sites by early Native American tribes along the edge of the dry Buffalo Lake bed. Cultural sites on the refuge are not advertised or marked to prevent collecting by visitors.

3.3.2 Socioeconomic Resources:

The refuge is located in Randall County which in 2013 had a population estimate of 126,474 (US Census Bureau website, April 2014). The city of Canyon (13,857 residents) is located approximately 15 miles east of the refuge. Umbarger is a rural community located 1.5 miles north of the Refuge. Predominate land use in the vicinity of the refuge are cattle grazing and farming. Median age of the residents in Randall County is 35 years with a median household income of \$60,801. The average household size is 2 people. For more information on Randall County visit www.randallcounty.org

With an estimated 3,000 visitors annually, the Refuge plays a small role in the local economy. The refuge employees typically live in the community, own property and support local businesses through routine purchases.

3.3.3 Visitor Services/Activities:

The refuge actively participates on 2 of the Big 6 use outlined by the NWRS Improvement Act of 1997. They include wildlife observation and photography. The refuge receives over 3,000 visitors annually and provides opportunities for the public to observe, photograph, and learn about the unique Short Grass Prairie ecosystem. The refuge has a camping/picnicking area, hiking trails, and an auto tour route for public enjoyment. Visitors can bird, hike and drive appropriate areas of the refuge during daylight hours.

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter analyzes and discusses the potential environmental effects or consequences that can reasonably be expected by the implementation of the alternatives described in Chapter 2.0 of this EA. An analysis of the effects of management actions has been conducted on the physical environment (air quality, water quality, and soils); biological environment (vegetation, wildlife, and threatened and endangered species); and socioeconomic environment (cultural resources, socioeconomic features including public use/recreation, and visual and aesthetic resource). The direct, indirect, and cumulative impacts of each alternative are considered. Direct effects are the impacts that would be caused by the alternative at the same time and place as the action. Indirect effects are impacts that occur later in time or distance from the triggering action. Cumulative

effects are incremental impacts resulting from other past, present, and reasonably foreseeable future actions, including those taken by federal and non-federal agencies, as well as undertaken by private individuals. Cumulative impacts may result from singularly minor but collectively significant actions taking place over a period of time.

It has been determined that none of the alternatives would have impacts on hydrology, geology, mineral resources, visual/aesthetic resources or threatened and endangered species; therefore there will be no further discussion of these resources in the analysis. Potential impacts on other physical, biological, and socioeconomic resources are addressed in the sections below. Potential impacts are described in terms of type, duration, intensity and context (scale). General definitions are defined in Appendix A.

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 residents access to public information and participation in matters relating to human health or the environment. This EA has not identified any adverse or beneficial effects for any alternative unique to minority or low-income populations in the affected area. Additionally, none of the alternatives will disproportionately place any adverse environmental, economic, social, or health impacts on minority or low-income populations.

4.1.2 Climate Change:

Climate change is already affecting fish, wildlife, plants and their habitats around the globe. The Service's Southwest Region has been working with the U.S. Geological Survey, the academic community, and other natural resource management agencies and interest groups to translate available and emerging science into concrete actions that reduce the impacts of a changing climate on the broadly diverse ecosystems in Arizona, New Mexico, Oklahoma and Texas. The Refuge believes that its hunt program will have negligible impacts on Climate Change; however, much is unknown about this subject. The Service has recently addressed the subject of Climate Change with the issuance of the publication “Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change.” This five year plan calls for developing long-term processes and protocols for biological planning and conservation at broad, landscape scales. This five year action plan calls for baseline data to be established. Refuges to date have no information or data regarding their carbon footprint. This subject will be further addressed as future direction is developed and provided on how to step this Strategic Plan down to the field level.

4.1.3 Cultural Resources:

Hunting, regardless of method or species targeted, is a consumptive activity that does not pose any threat to historic properties on and/or near the Refuge. In fact, hunting meets only one of the two criteria used to identify an “undertaking” that triggers a federal agency’s need to comply with Section 106 of the National Historic Preservation Act. These criteria, which are delineated in 36 CFR Part 800, state:

1. An undertaking is any project, activity, or program that can alter the character or use of an archaeological or historic site located within the “area of potential effect;” and
2. The project, activity, or program must also be either funded, sponsored, performed, licenses, or have received assistance from the agency.

Consultation with the pertinent State Historic Preservation Office and federally recognized Tribes is, therefore, not required.

4.1.4 Threatened and Endangered Species

Currently, no threatened or endangered species are known to occur on the refuge, so there would be no impact for any of the alternatives.

4.2 Physical Environment:

4.2.1 Impacts on Air Quality:

Alternative A--No Action Alternative/Current Management:

Under Alternative A, no additional impacts to air quality are expected from the continuation of current management. Emission and dust from visitors would continue to produce negligible short-term impacts on local air quality. The current use on the refuge does not appear to be impacting air quality.

Alternative B-- Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative

Under Alternative B, no additional impacts to air quality are expected because the refuge would be closed to other visitors on the days of the hunts for safety purposes. It is expected to have less traffic per day because only up to 3 privately owned vehicles will be allowed on refuge during each hunt. The low amount of vehicle traffic is expected to have insignificant and no changes to air quality are anticipated.

4.2.2 Impacts on Water Quality

Alternative A-- No Action Alternative/Current Management:

Under this alternative, current management has no direct impacts on water quality or quantity. This alternative could potentially have negative effects if feral hogs would damage areas such as ponds, playas, levees, and moist soil management areas found on the refuge. Current management of deer populations has no impacts to water quality on the refuge.

Alternative B-- Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative:

Under this alternative, limited youth hunting of deer has no impacts to water quality on the refuge. As the potential for feral hogs decrease because of hunting on the refuge, water quality would be expected to increase. Fewer hogs would mean less damage to ponds, playas, levees, and moist soil management areas resulting in a positive long-term result.

4.2.3 Impacts on Soils:

Alternative A-- No Action Alternative/Current Management:

Under this alternative, the only potential for impacts to the soil is from feral hog activity. Compaction of soils from foot traffic has not been documented as a result of current activities.

Alternative B-- Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative:

Under this alternative, the refuge is not expecting any adverse impacts from hunting. Since hunter densities will be low (3 or less/hunt) foot compaction should be low. The reduction of potentially removing feral hogs on the refuge is expected to have a positive long-term impact because rooting and feeding behaviors of hogs will be reduced.

4.3 Biological Environment:

4.3.1 Impacts on Habitat:

Alternative A-- No Action Alternative/Current Management:

Under this alternative, current management would not minimize adverse biological effects to flora and fauna, leading to minor long-term adverse impacts. Due to continued increase in deer populations resulting would lead to habitat destruction. Competition between deer and other wildlife would increase. Feral hog activities on the refuge would destroy habitat utilized by other native wildlife species.

Alternative B-- Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative:

Under Alternative B, disturbance to habitat would be minimal due to the limited number of hunters. There would be desired population management impacts to the animals being hunted but overall would have little impact on other wildlife and would benefit the remaining deer by reversing habitat degradation resulting in a long-term beneficial effect on habitat and a healthy deer population.

4.3.2 Impacts on Wildlife:

Alternative A-- No Action Alternative/Current Management:

Under this alternative, impacts to other wildlife species could be adverse because of the increasing deer population and their over utilization of the habitat and increased competition for resources. Direct adverse impacts would be expected if feral hogs are not controlled on the

refuge because of their opportunistic predation behavior on other wildlife species and habitat destruction.

Alternative B-- Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative:

Under this alternative, harvesting of deer and feral hogs by hunters would occur. Disturbances to other wildlife species would be negligible because of the limited number of hunters within a limited season (a total of six youth for a total of four days).

Long term effects are expected to be positive because of the reduced competition and elimination of an invasive species and reduced impact by deer on native vegetation.

4.4 Human Environment:

4.4.1 Impacts on Socioeconomics

Alternative A-- No Action Alternative/Current Management:

Under this alternative, small businesses in the area would not benefit from hunters buying supplies, food, or gas due to a no increase in activity in the area.

Alternative B-- Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative:

The proposed action would have a positive impact on the local economy through small business such as hotels, grocery stores, and gas stations by hunters purchasing lodging, food, and fuel.

4.4.2 Impacts to Visitor Services/Recreation Opportunities

Alternative A-- No Action Alternative/Current Management:

Under Alternative A, there would be no change in the existing visitor services and recreation opportunities on the refuge. The average breakdown of the approximately 3,000 annual visitor use days over the past 3 years is as follows: wildlife observation ~90% and wildlife-dependent photography~60%.

Alternative B-- Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative:

Under this alternative, both beneficial and adverse impacts to visitor services/recreational opportunities would occur. There would be a hunting opportunity which would be a positive impact because the state has limited hunting opportunities for the public. Hunters would benefit from the opportunity to hunting, however given the limited number of hunters for the hunt; the quality of the hunt would be good. Overall, impacts to visitor services/recreation opportunities are considered short-term, minor and local since all of the refuge available for use by non-hunters (other wildlife-dependent recreation users) would be closed for 4 days.

4.4.3 Impacts on Public Health and Safety

Alternative A-- No Action Alternative/Current Management:

Under current management public health and safety risks are minimal because the refuge employs multiple safety rules and regulations (CFR Reference).

Alternative B-- Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative:

Under this alternative, impacts to public health and safety would be similar to Alternative A; since the refuge will be closed to other uses during the proposed hunts, safety issues will be minimal.

4.4.4 Impacts on Refuge Facilities

Alternative A-- No Action Alternative/Current Management:

Damages to roads and parking facilities from visitor use would continue at the current level, which requires some road grading a couple of times per year. Visitors would also continue to use refuge facilities, thereby necessitating periodic maintenance throughout the year. Other facilities and fences would not be affected.

Alternative B - Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative:

Under this alternative impacts would be similar to Alternative A. With the addition of the new hunt there would be no measurable impact from the road traffic of 1-3 vehicles for an additional 4 days per year.

4.4.5 Humaneness and Animal Welfare Concerns:

Alternative A-- No Action Alternative/Current Management:

Under Alternative A, there would be no hunter caused mortalities. Poaching on the refuge is very rare. There has only been 3 incident(s) documented that occurred adjacent to /on the refuge (Personal communication Frank Niemiec). However, there has been other evidence that points to poaching taking place on the refuge in the form of spent ammunition shells.

Alternative B - Open refuge to limited deer and feral hog hunting in accordance with state regulations and refuge specific regulations --Proposed Action Alternative:

Under Alternative B, mortality of white-tailed and mule deer and feral hogs would occur. Accurate, clean shots are expected. The target should be within the effective range of the firearm or ammunition and the skills of the hunter; and a humane kill is likely.

4.5. Cumulative Impacts Analysis:

A cumulative impact is defined as an impact on the environment that results from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future action regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Cumulative impacts are the overall, net effects on a resource that arise from multiple actions. Impacts can “accumulate” spatially, when different actions affect different areas of the same resource. They can also accumulate over the course of time, from actions in the past, the present, and the future. Occasionally, different actions counterbalance one another, partially cancelling out each other’s effects on a resource. But more typically, multiple effects add up, with each additional action contributing an incremental impact on the resource.

4.5 .1 Anticipated Direct and Indirect Impacts of Proposed Action Alternative on Wildlife Species.

4.5.1.1 Resident Wildlife

White-tailed deer:

Regional Analysis

In Texas, the white-tailed deer population was estimated at 3,804,500 deer in 2013 (Cain 2014). An estimated 625,577 white-tailed deer were harvested in 2013-2014, of which 1,625 were in the High Plains (Purvis 2014). Anticipated annual deer harvest on the Refuge and other national wildlife refuges open to deer hunting is an extremely small percentage of the state’s annual harvest and just a fraction of the national population. TPWD estimated 1,625 white-tailed deer were harvested in High Plains Ecoregion of the State during the 2013-2014 hunting season (Purvis 2012).

Local Analysis

White-tailed deer populations have grown at such a rate in Randall County that TPWD has increased the limit of white-tailed deer to 3, with no more than 1 buck. The increase of white-tailed deer in Randall County and the Texas Panhandle appears to coincide with the increase in white-tailed deer on the Refuge. The reason for this increase in the white-tailed deer population is unclear, but may be because of changes in land use, such as, increased suitable habitat (CRP and brush encroachment), and increased corridors.

Mule deer:

Regional Analysis

The mule deer population in Texas ranges from 150,000 to 250,000 depending on climatic cycles. In 2013, the statewide population estimate was 218,834 mule deer. Prior to a relocation effort by TPWD in 1949, a small population existed in the Panhandle. In 1949, Texas Game, Fish, and Oyster Commission relocated 89 mule deer to Armstrong and Randall Counties. In 2013, the population estimate for mule deer was 218,834 deer of which 62,268 were located in the Panhandle. A total of 8,386 mule deer were harvested in Texas in 2013-2014 (Gray 2014).

Local Analysis:

Mule deer in the Texas Panhandle have access to energy-rich grain crops during the growing season (Sowell 1981). In winter, deer have access to high-protein food crops such as wheat and alfalfa (Cantu and Richardson). In 2013, the population estimate for the Texas Panhandle indicated a population of 62,268 mule deer (Gray 2014).

Feral Hogs

Regional Analysis:

Feral hogs are an extremely invasive species and not considered a game species by the State of Texas and are also considered a non-climate change stressor to other more sensitive species. There is an estimated population in excess of 1.5 million feral hogs in Texas (Taylor 2003). This is due in part to intentional releases, improved habitat, increased wildlife management, disease eradication, limited natural predators, and a high reproductive potential. Due to the fact that feral hogs are not a native species, there is no need or desire to sustain a population for any refuge objective. In fact, the removal of as many of these destructive, exotic, feral animals as possible would positively benefit the refuge (and neighboring) habitat. Feral hog populations are not monitored per se but trapping/harvest numbers are recorded yearly. At this time, feral hogs are rare on the Refuge. However, off refuge populations (Palo Duro Canyon and Caprock Canyon) have increased and feral hogs are moving west towards the refuge. Any harvest of feral hogs will be opportunistic at this time. As previously mentions, feral hogs can be very destructive to habitat and while total eradication is unlikely, our goal is keep the population as limited as possible.

Local Analysis:

The refuge has not directly studied habitat competition between the target species and other wildlife. However, population management of hogs is expected to reduce intra- and interspecies competition within available habitat. Feral hogs compete with native wildlife for food, cover, water, and space. They are highly adaptable, have high reproductive capabilities, and can be found in a wide range of habitat types. Rooting and digging activities negatively impact vegetative communities, soil properties and plant successional patterns (Stevens 2010). Feral hogs are opportunistic omnivores and compete with game and non-game wildlife species for available food resources. Tate (1984) found that feral hogs compete with deer, turkey, squirrels, waterfowl and other wildlife species for food resources. Feral hogs can impact ground-nesting species, more specifically quail and turkey, through nest destruction and predation. Beach (1993) also found that feral hogs prey on fawns and ground nesting birds.

The hunting of feral 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-dependent public uses to be given priority consideration. In fact, the removal of as many of these destructive, exotic, feral animals as possible would positively benefit the refuge (and neighboring) habitat.

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.

Other Resident Wildlife

Other resident wildlife species are also present on the refuge, including songbirds, wading birds, and raptors; 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. Most of these species are common and widespread. In general these species are broadly distributed throughout the region and have limited home ranges. Hunting is not expected to affect any wildlife populations regionally. Some wildlife disturbance (increased human presence and sounds of gunshots) will occur locally during the hunting season. These impacts are expected to be minor because collectively, the refuge will only be open to hunting for a total of 4 days per year. There should be minor direct disturbance to resident wildlife by hunters. Indirect effects are minimized due to the use of non-toxic shot by hunters (Haig, et al, 2014).

4.5.1.2 Migratory Species

Migratory species present on the refuge (over 345 species) include waterfowl, other waterbirds, neotropical migrant birds, and raptors. There may be incidental disturbance to other migratory species found within the designated hunt unit from hunters coming into an area occupied by them or from noise from firearm discharge (Pease, M.L. et al, 2005). However, this effect should be negligible, given the amount of habitat that is available on the refuge outside of the hunt unit. With the use of non-toxic shot there is no risk of lead poisoning through incidental direct ingestion (Haig, et al, 2014) or secondary ingestion by raptors (McBride, et al, 2004).

4.5.1.3 Endangered Species

It is the policy of the Service to protect and preserve all native species of fish, wildlife, and plants, including their habitats, which are designated as threatened or endangered with extinction.

No threatened or endangered species are known to occur on the refuge, so no impacts are anticipated.

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

4.5.2.1 Other Wildlife-Dependent Recreation

The refuge has other public use wildlife-dependent opportunities that can be affected by the hunt program. During the various hunting seasons, there is the potential for non-hunting activities to be impacted by hunting. These impacts are the closure of the refuge to non-hunting activities during the 4 days of the hunt season. These conflicts are temporary and short-term. The quality of the hunts would be good.

4.5.2.2 Refuge Facilities

The Service defines facilities as: “Real property that serves a particular function(s) such as buildings, roads, utilities, water control structures, raceways, etc.”

Because the refuge will be closed during the proposed hunt dates negligible impacts to refuge infrastructure are anticipated; the only infrastructure at risk of impact due to the proposed action would be to the access road, the parking area, and the hunter sign-in station.

4.5.2.3 Cultural Resources

Hunting, regardless of method or species targeted, is a consumptive activity that does not pose any threat to historic properties on and/or near the refuge. In fact, hunting meets only one of the two criteria used to identify an “undertaking” that triggers a federal agency’s need to comply with Section 106 of the National Historic Preservation Act. These criteria, which are delineated in 36 CFR Part 800, state:

1. An undertaking is any project, activity, or program that can alter the character or use of an archaeological or historic site located within the “area of potential effect;” and
2. The project, activity, or program must also be either funded, sponsored, performed, licenses, or have received assistance from the agency.

Consultation with the pertinent State Historic Preservation Office and federally recognized Tribes is, therefore, not required.

4.5.3 Anticipated Impacts of Proposed Hunt on Refuge Environment and Community

Negative impacts to the refuge environment associated with the proposed hunting activities will be negligible. Impacts to air quality, soils and vegetation from the proposed hunt are also negligible.

Lands adjacent to the refuge are predominantly agricultural and sparsely populated, and hunting is a common past time in the area, so the brief increase in activity on the refuge would have little effect on the public and nearby residents. Refuge visitors would be impacted temporarily for 4 days while hunting occurred.

The economic impact of the proposed hunt program would increase with a slight increase in sales of licenses or ammunition.

4.5.4 Other Past, Present, Proposed and Reasonably Foreseeable Hunts (and Other Activities) and Anticipated Impacts

Past

Pheasant hunting was initiated on the refuge in 1985. Since 1992, pheasant hunting has been reserved because of a decline in the population of the game bird.

Present

Currently no hunting programs are occurring on the refuge. Other current recreational uses include wildlife viewing and photography, camping, hiking, and environmental education programs. Refuge management actions include a cooperative agricultural program and a grassland management program that includes prescribed burning and grazing.

Future

The proposed alternative of opening the refuge to big game hunting (mule deer, white-tail deer, and feral hog) is expected provide the youth with an additional outdoor recreational opportunity. No other activities are proposed on the refuge in the future. The refuge is surrounded by private agricultural and range lands. There is one wind farm approximately five miles from the refuge, so there is potential for future wind energy development.

4.5.5 Anticipated Impacts if Individual Hunts are Allowed to Accumulate

The Service has concluded that there will be negligible cumulative impacts on the refuge's wildlife populations, either hunted or non-hunted species. The Service has also concluded that the proposed action will not cumulatively impact the refuge environment or refuge programs. This determination was based upon a careful analysis of potential environmental impacts of hunting on the refuge together with other projects and/or actions. Hunting is an appropriate wildlife management tool that can be used to manage wildlife populations. Some wildlife disturbance will occur during the limited hunting seasons. Proper zoning, regulations, and refuge seasons will be designated to minimize any negative impacts to wildlife populations using the refuge.

Field checks by refuge law enforcement officers will be planned, conducted, and coordinated with staff and other agencies to maintain compliance with regulations and assess species populations and numbers harvested.

4.5.6 Summary of Cumulative Effects

These actions would have both direct and indirect effects (e.g., species open to hunting would result in increased public use, thus increasing vehicular traffic, disturbance, etc.); however, these would be negligible. The refuge would be closed to other wildlife-dependent recreation during hunting periods. The refuge would conduct hunting programs within the framework of State and Federal regulations. By maintaining hunting regulations that are as, or more, restrictive than the State, individual refuges ensure that they are maintaining seasons which are supportive of management on a regional basis.

4.6 Indian Trust Assets

No Indian Trust Assets have been identified within the Buffalo Lake NWR boundary and there are no reservations or ceded lands present. Because resources are not believed to be present, no impacts are anticipated to result from implementation of the preferred alternative described in the EA.

4.7 Unavoidable Adverse Effects

There would be no adverse effects under Alternative A. As proposed under Alternative B, implementation of deer and feral hog hunting on the Refuge may result in some negligible adverse impacts. Some deer and feral hogs would be harvested; however, both are a renewable resource and there would be no discernable effect on the general deer population in the Panhandle of Texas. Under Alternative C, a larger harvest of deer and hogs would be expected. This would work well with eliminating hogs but would cause adverse impacts to the deer population. There would also be some short-term disturbance to other resident wildlife under alternatives B and C but these impacts are expected to be minimal.

4.8 Irreversible and Irretrievable Commitment of Resources:

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that this use could have on future generations. Irreversible effects primarily result from the use or destruction of specific resources that cannot be replaced within a reasonable time frame, such as energy or minerals. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action, such as extinction of a threatened or endangered species or the disturbance of a cultural resource. None of the alternatives would result in a large commitment of nonrenewable resources. Project implementation would require the irretrievable commitment of fossil fuels (diesel and gasoline), oils, and lubricants used by vehicles. The Proposed Action would result in negligible harm or harassment to some wildlife. The Service would implement best management practices to minimize potential impacts.

4.9 Table 2 - Summary of Environmental Effects by Alternative:

Impact Topics	Alternative A No Action	Alternative B Limited Hunting <i>PREFERRED ALTERNATIVE</i>
<i>Impacts to Air Quality</i>	<i>No new impacts.</i>	<i>Negligible short term</i>
<i>Water Quality and Quantity</i>	<i>No effect for deer hunting; possible adverse long term if feral hogs inhabit the refuge</i>	<i>No effect for deer hunting; potential beneficial for reduction of feral hogs</i>
<i>Impacts to Soil</i>	<i>long-term adverse</i>	<i>Negligible short-term negative; long</i>

	<i>impact from hogs</i>	<i>term beneficial</i>
<i>Impacts to Habitat</i>	<i>long term adverse from hogs</i>	<i>Negligible short term negative and long term beneficial</i>
<i>Impacts to Wildlife</i>	<i>long term adverse from hogs</i>	<i>Harvesting of deer and feral hogs; Negligible disturbance to other wildlife ; long term beneficial for native wildlife</i>
<i>Visitor Services</i>	<i>No change</i>	<i>Increase short term beneficial</i>
<i>Socioeconomic Resources</i>	<i>No benefit to area economy.</i>	<i>Minor benefit to area economy.</i>
<i>Cultural Resources</i>	<i>No impact</i>	<i>No impact</i>

5.0 CONSULTATION, COORDINATION AND DOCUMENT PREPARATION

Document prepared by refuge staff, Buffalo Lake National Wildlife Refuge, U.S. Fish and Wildlife Service, Umbarger, Texas.

5.1 Agencies and individuals consulted in the preparation of this document include:

Texas Parks and Wildlife Department

Juli Niemann, Region 2, Division of Visitor Services

Carol Torrez, Region 2, NEPA Coordinator for Refuges

5.2 References

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6.0 APPENDICIES

Appendix A

DEFINITION OF TERMS

Effects

Direct effects are the impacts that would be caused by the alternative at the same time and place as the action.

Indirect effects are impacts that occur later in time or distance from the triggering action.

Cumulative effects are incremental impacts resulting from other past, present, and reasonably foreseeable future actions, including those taken by federal and non-federal agencies, as well as undertaken by private individuals. Cumulative impacts may result from singularly minor but collectively significant actions taking place over a period of time.

Impact Type

Beneficial impacts are those resulting from management actions that maintain or enhance the quality and/or quantity of identified refuge resources or recreational opportunities.

Adverse impacts are those resulting from management actions that degrade the quality and/or quantity of identified refuge resources or recreational opportunities.

Duration of Impacts

Short-term impacts affect identified refuge resources or recreational opportunities; they occur during implementation of the management action but last no longer.

Medium-term impacts affect identified refuge resources or recreational opportunities that occur during implementation of the management action; they are expected to persist for some time into the future though not throughout the life of the CCP.

Long-term impacts affect identified refuge resources or recreation opportunities; they occur during implementation of the management action and are expected to persist throughout the life of the Plan and possibly longer.

Intensity of Impact

Negligible impacts result from management actions that cannot be reasonably expected to affect identified refuge resources or recreational opportunities at the identified scale.

Minor impacts result from a specified management action that can be reasonably expected to have detectable though limited effect on identified refuge resources or recreation opportunities at the identified scale.

Moderate impacts result from a specified management action that can be reasonably expected to have apparent and detectable effects on identified refuge resources or recreation opportunities at the identified scale.

Major impacts result from a specified management action that can be reasonably expected to have readily apparent and substantial effects on identified refuge resources and recreation opportunities at the identified scale.

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