A. Literature Citations Buffalo Lake NWR

Allen, R. 1952. *The Whooping Crane: Research Report No. 3 of the National Audubon Society*. New York, NY: National Audubon Society.

Bailey, R. G. Description of the Ecoregions of the United States, www.fs.fed.us/land/ecosysmgmt/ Accessed on June, 2010.

Baker, S. K., R. A. Dynes, D. A. Henry and D. B. Purser. 1998. Objective specification of the quality of hays and fodder. Rural Industries Research and Development Corporation Report. Canberra, Australia.

Bierbaum RM, Holdren JP, MacCracken MC, Moss RH, Raven PH, editors. Washington, DC: United Nations Foundation; 2007. [[accessed 23 October 2007]]. Confronting Climate Change: Avoiding the Unmanageable, Managing the Unavoidable. Available: http://www.unfoundation.org/files/pdf/2007/SEG_Report.pdf.

Bolen, E. G., and Guthery, F. S., 1982. Playas, irrigation, and wildlife in west Texas. Trans-North American Wildlife and Natural Resources Conference 47:528-541

Clark, T.W., Campbell III, T.M., Socha, D.G., Casey, D.E., 1982. Prairie dog colony attributes and associated
vertebrate species. Great Basin Naturalist 42, 572–582.

Dai, X., Boutton, T. W., Hailemichael, M., Ansley, R. J., Jessup, K. E., 2006 Soil carbon and nitrogen storage in response to fire in a temperate mixed-grass savanna, Journal of Environmental Quality, 35(4), 1620-1628.

Dechant, J.A., M.L. Sondreal, D.H. Johnson, L.D.Ig1, C.M. Goldade, P.A. Rabie, and B.R. Euliss. 1999. Effects of management practices on grassland birds: Ferruginous Hawk. Northern Prairie Wildlife Research Center, Jarnestown, North Dakota.
Jarnestown, North Dakota: Northern Prairie Wildlife Research Center Home Page.
http://www.npwrc.usgs.gov/resource/lite~awk.htm.
February 12,2000.

Feely, R. A., C. L. Sabine, K. Lee, W. Berelson, J. Kleypas, V. J. Fabry and F. J. Millero, 2004. Impact of Anthropogenic CO_2 on the $CaCO_3$ System in the Oceans, Science, 305(5682), 362-366.

Finch, D. 1992. Threatened, Endangered, and Vulnerable Species of Terrestrial Vertebrates in the Rocky Mountain Region. United States Department of Agriculture Forest Service General Technical Report RM-215.

Graul, W. D. and L. E. Webster. 1976. Breeding status of the mountain plover. Condor 78:265-267.

Hall, R.S., R. L. Glinski, D. H. Ellis, J. M. Ramakka, and D. L. Base, 1988. Ferruginous Hawk., Proceedings of the Southwest Raptor Management Symposium and Workshop, National Wildlife Federation, 11:111-118

Harlow, D.L., and P.H. Bloom. 1989. Buteos and the Golden Eagle. Pp. 102-110 in B.G. Pendleton, ed. Proceedings of the western raptor management symposium and workshop. Natl. Wildl. Fed. Scien. Tech. Ser. No. 12.

Haukos, D.A. and L.M. Smith. 1997. The Common Flora of Playa Lakes. Texas Tech University Press. 196 pp.

Howe, W. H. 1986. Status of the Yellow-billed Cuckoo in New Mexico. Unpublished report, New Mexico Dept. Game and Fish, Santa Fe, NM.

Howell, S. and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press. Oxford, UK.

Hubbard, J.P., 1985. Interior Least Tern, Handbook of Endangered Species in New Mexico New Mexico Department of Game and Fish,

Hubbard, J.P. 1978. Revised check-list of the birds of New Mexico. New Mexico Ornithological Society Publication No. 6.

Hundertmark, C. A. 1974. Breeding range extensions of certain birds in New Mexico. Wilson Bull. 86:298-300.

IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

Irwin, R.J. and S. Dodson. 1991. Contaminants in Buffalo Lake National Wildlife Refuge, Texas. U.S. Fish and Wildl. Ser. Arlington, Texas. 90pp.

Jones, J. K, R. Manning, R. R. Hollander, and C. Jones. 1987. Annotated checklist of recent mammals on northwestern Texas. Occasional Papers, Museum of Texas Tech University Press, 111:1-14

Kotliar, N.B., Baker, B.W., Whicker, A.D., Plumb, G., 1999. A critical review of assumptions about the prairie dog as a keystone species. Environmental Management 24, 177–192.

Lutgen, F. K., and E. J. Tarbuck, 2001. The Atmosphere. 8th ed. Prentice Hall. 484pp.

Nymeyer L. 2012. Personal Communication throughout the CCP Process. Buffalo Lake NWR Refuge Manager

Mehlman, D. W. 1997. Change in avian abundance across the geographic range in response to environmental change. Ecological Applications 7:614-624.

NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009.

Neilsen-Gammon J.W. 2008. Chapter 2. The Changing Climate of Texs. The Impact of Global Warming on Texas. 33pp.

Olendorff, R. R. 1973. The ecology of the nesting birds of prey of northeastern Colorado. Grassland Biome: U.S. International Biological Program. Technical Report No. 211. Fort Collins, Colorado, USA. 19. 1993. Status, biology, and management of Ferruginous Hawks: a review. Raptor Research and Technical Assistance Center, Special Report. U.S. Department of the Interior, Bureau of Land Management, Boise, Idaho, USA.

Ryder R. A. 1967. Distribution, Migration and Mortality of the white faced ibis in North America. A Journal of Ornithological Invetigation Vol. XXXVIII No. 4. 21pp.

Schmutz, J. K. 1984b. Ferruginous and Swainson's Hawk abundance and distribution in relation to land use in southeastern Alberta. Journal of Wildlife Management 48(4):1180-1187.

Seyffert, K. D. 2001. Birds of the Texas Panhandle: their status, distribution, and history. Texas A & M University Press, College Station, 501 pp.

Shackelford, C. E. and M. W. Lockwood. 2000. The Birds of Texas: Occurrence and Seasonal Movements. PWD BK W7000-642 (8/00).

Smith, L. M., 2003, Playas of the Great Plains, University of Texas Press, Austin, TX

Stewart, R. E. 1975. Breeding birds -of North Dakota. Tri-College Center for Environmental Studies, Fargo, North Dakota. 295pp.

Stravers, J. A., and G. L. Garber. 1998. Nest site selection, reproductive success and territory reoccupation of Ferruginous Hawks in three regions in New Mexico. Unpublished report submitted to the Bureau of Land Management’s Socorro and Farmington Field Offices.

Terrell, B. L., P. N. Johnson, and E. Segarra. 2002. Ogallala aquifer depletion: Economic impact on the Texas High Plains Water Policy, 41(1): 33-46

Texas Histroical Association. 2010. Texas Almanac http://www.texasalmanac.com/topics/environment/aquifers-texas Accessed June 2012.

Texas Ornithological Society. 1995. Checklist of the birds of Texas. 3rd ed. Capital Printing, Austin, Texas, v + 166 pp.

Texas Parks and Wildlife Department, 1991. Black Footed Ferret reintroduction evaluation status survey Final Section 6 Report. Project NO E-1-3.

Texas Parks and Wildlife Department, 2006. Accessed January, 2008 http://www.tpwd.state.tx.us/publications/pwdpubs/pwd_rp_w7000_1442/sightings

Thompson M. C. and C. Ely. 1989. **Birds in Kansas.** Univ. of Kansas Mus. Nat. Hist., Lawrence, KS.

Titus, J. G. and V. K. Narayanan 1995. "The probability of sea level rise". Washington D.C., U.S. Environmental Protection Agency.

Union of Concerned Scientists. 2009. Citizens and Scientists for Environmental Soultions. Global Warming Science and Impacts. http://www.ucsusa.org/gulf/gcstatetex_cli.html. Accessed 1/20/2011

United States Fish and Wildlife Service, 1999. Endangered and Threatened Wildlife and Plants; Proposed Rule To Remove the Bald Eagle in the Lower 48 States From the List of Endangered and Threatened Wildlife, Federal Register, Vol. 64, No. 128

_____. 2006. Strategic Habitat Conservation: Final Report of the National Ecological Assessment Team, United States Fish and Wildlife Service and United States Geological Survey

_____. 2009. Post-delisting Monitoring Plan for the Bald Eagle (Haliaeetus leucocephalus) in the Contiguous 48 States. U.S. Fish and Wildlife Service, Divisions of Endangered Species and Migratory Birds and State Programs, Midwest Regional Office, Twin Cities, Minnesota. 75 pp.

_____. 2010. Rising to the Challenge: Strategic Plan for Responding to Accelerating Climate Change. U.S. Fish and Wildlife Service. Arlington, VA

U. S. General Accounting Office. 2001. GAO-02-64R Wildlife Refuge Oil and Gas Activity. Available at http://www.gao.gov/search?q=oil+and+gas+refuge.

U.S. Geological Survey. 2001. A Primer on Water Quality. Available at http://pubs.usgs.gov/fs/fs-027-01/.

Vogelmann, J. E., D. Helder, R. Morfitt, M. J. Choate, J. W. Merchant, and H. Bulley, 2001B. Effectsof Landsat 5 Thematic Mapper and Landsat 7 Enhanced Thematic Mapper Plus radiometric and geometric calibrations and corrections on landscape characterization, Remote Sensing of Environment 78:55-70

Zimmerman, E. G., & T. S. DeWalt. 1990. Status of the threatened Palo Duro mouse, Peromyscus truei comanche, in Texas. Report Submitted to Resource Protection Division, Texas Parks and Wildlife Dept., Austin, Texas, 1-32.

Zing, Z.H., R.E. Turner, T. Doyle, and K.K. Abdollahi. 2003. Preparing for a Changing Climate: Potential Consequences of Climate Variability and Change-Gulf Coast Region. 88 pp.

B. Key Legislation and Service Policies

Administrative Procedure Act (1966; 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 provisions for hearings, adjudications, rule making, and judicial and congressional review of Federal agency actions.

Agricultural Credit Act of 1987 (7 U.S.C. 5104; P.L. 100-233): Authorizes the Farmers Home Administration (FmHA) to transfer land to any Federal or State agency for conservation purposes (e.g., the FmHA can transfer fee title or assign interests in real estate to the U.S. Fish and Wildlife Service for the protection of floodplains, wetlands, and surrounding uplands).

American Indian Religious Freedom Act (1978): Directs agencies to consult with Native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Americans with Disabilities Act (1992): The Americans with Disabilities Act is the most comprehensive Federal civil-rights statute that prohibits discrimination on the basis of disability in employment, State and local government, public accommodations, commercial facilities, transportation, and telecommunications.

Antiquities Act of 1906 (16 U.S.C. 431-433): First United States law to provide general protection of cultural or natural resources. This act authorizes the scientific investigation of antiquities on Federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Archaeological and Historic Preservation Act (1974): Requires that Federal agencies provide for *"...the preservation of historical and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of...any alteration of the terrain caused as a result of any Federal construction project of Federally-licensed activity or program."*

Archaeological Resources Protection Act of 1979, as amended (16 U.S.C. 470aa-470mm): The Archaeological Resources Protection Act (ARPA) was enacted *"...to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals."* The main focus of ARPA is on regulation of legitimate archeological investigation on public lands and the enforcement of penalties against looting or vandalism of these resources. Protects materials of archaeological interest from unauthorized removal or destruction and requires Federal managers to develop plans and schedules to locate archaeological resources.

Appropriate Uses Policy (2006) 603 FW1: Describes procedures for Refuge Managers to follow when deciding if uses are appropriate on a refuge. Appropriate uses are either proposed or existing uses on a refuge that meet at least one of the following four conditions:

1) the use is a wildlife-dependent recreational use as identified in the 1997 Improvement Act; 2) the use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Improvement Act was signed into law; 3) the use involves the take of fish and wildlife under State regulations; or 4) the use has been found to be appropriate as described further in the Appropriate Refuge Uses policy. This policy applies to all proposed and existing uses in the Refuge System only where the Service has jurisdiction over the use. The policy does not apply in: 1) situations where reserved rights or legal mandates provide that the Service must allow the use, and 2) refuge management activities (e.g., fish and wildlife population or habitat management actions, including but not limited to: prescribed burns, water level management, invasive species control, routine scientific monitoring, law enforcement activities, and maintenance of existing refuge facilities).

Architectural Barriers Act (1968): Requires federally-owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

Bald and Golden Eagles Protection of 1940 (16 U.S.C. 668-668d; 54 Statute 250), as amended: Provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds.

Biological Integrity, Diversity, and Environmental Health (2001) 601 FW 3: As part of the comprehensive conservation planning process, this policy provides for the consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found on refuges and associated ecosystems. It provides Refuge Managers with an evaluation process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions and, where appropriate and in concert with refuge purposes and Refuge System mission, restore lost or severely degraded components.

Clean Air Act (1970; 42 U.S.C. 7401 et seq.), as amended: A comprehensive Federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizes the U.S. Environmental Protection Agency to establish National Ambient Air Quality Standards to protect public health and the environment.

Clean Water Act (1972); Federal Water Pollution Control Act: This is the principal law that governs pollution of the Nation's surface waters. The Clean Water Act employs several regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. Section 404 of the Clean Water Act requires permits (issued by the U.S. Army Corps of Engineers) for the discharge of dredged or fill material into waters of the United States, including wetlands.

Coastal Barrier Resources Act (1982; 16 U.S.C. 3501 et seq.), as amended: This act (CBRA) designated various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resources System. Areas so designated were made ineligible for direct or indirect Federal financial assistance that might support development, including flood insurance, except for emergency life-saving activities. Exceptions for certain

activities, such as fish and wildlife research, are provided, and national wildlife refuges and other, otherwise protected areas are excluded from the System.

Compatibility Policy (2000) 603 FW 2: Incorporates the compatibility provisions of the National Wildlife Refuge System Improvement Act of 1997, which amends the National Wildlife Refuge System Administration Act of 1966. The Compatibility Policy is for determining whether proposed and existing uses, which the Service has jurisdiction over and are occurring on national wildlife refuges, are compatible (i.e., will not detract from or materially interfere) with the purpose(s) of the refuge or with the Refuge System's mission. The policy is to ensure that we (the Service) administer proposed and existing national wildlife refuge uses according to laws, regulations, and policies concerning compatibility, and provides procedures for documentation and periodic review of existing refuge uses.

Comprehensive Conservation Plans (2000) 602 FW 3: As required by the National Wildlife Refuge System Improvement Act of 1997, Comprehensive Conservation Plans (CCPs) describe the desired future conditions of a refuge and provide long-range guidance and management direction to achieve refuge purposes; help fulfill the Refuge System mission; maintain and, where appropriate, restore the ecological integrity; and meet other mandates. The purpose of developing the CCP is to provide the Refuge Manager with a 15-year management plan for the conservation of fish, wildlife, and plant resources and their related habitats, while providing opportunities for compatible wildlife-dependent recreational uses.

Convention Between the United States of America and the Mexican States for the Protection of Migratory Birds and Game Mammals, 1936 (50 Statute 1311).

Convention of Nature Protection and Wildlife Preservation in the Western Hemisphere, 1940 (56 Statute 1354).

Convention Between the United States and Great Britain (for Canada for the Protection of Migratory Birds). (39 Statute 1702; TS 628), as amended.

Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (I.L.M. 11:963-976, September 1972, Ramsar Convention).

Cooperative Research and Training Units Act (1960; 16 U.S.C. 753a-753b), as amended: Authorizes the Secretary of the Interior to enter into cooperative agreements with colleges and universities, State fish and game agencies, and non-profit organizations for the purpose of developing adequate, coordinated, cooperative research and training programs for fish and wildlife resources.

Criminal Code Provisions of 1940 (18 U.S.C. 41), as amended: Provides for fines and penalties for the unlawful taking, disturbing, hunting, trapping, capturing of *"...any bird, fish, or wild animal of any kind whatever, or takes or destroys the eggs or nest of any such bird or fish, on any lands or waters which are set apart or reserved as sanctuaries, refuges or breeding grounds for such birds, fish, or animals under any law of the United States or willfully injures, molests, or destroys any property of the United States on any such lands or waters..."*

Disaster Relief Act of 1974 (42 U.S.C. 5121 et seq.), as amended: Provides authority for Federal agencies to assist State and local governments during Presidentially-declared emergencies.

Economy Act (1932; 31 U.S.C. 1535): Provides authority for Federal agencies to order goods and services from other Federal agencies and to pay the actual costs of those goods and services. The act was passed to obtain economies of scale and eliminate overlapping activities of the Federal government.

Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901-3932, as amended): The purpose of this act is to promote wetlands conservation for the public benefit and to help fulfill international obligations in various migratory bird treaties and conventions. The act authorizes the purchase of wetlands from Land and Water Conservation Fund monies; it also requires the Secretary of the Interior to establish a National Wetlands Priority Conservation Plan, requires the states to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers funds from import duties on arms and ammunition to the Migratory Bird Conservation Fund.

Endangered Species Act of 1973, as amended: The main purposes of the Endangered Species Act are to: 1) provide a means whereby ecosystems of threatened and endangered species may be conserved; and 2) provide a program for the conservation of threatened and endangered species. The provisions of the Endangered Species Act include but are limited to land acquisition, cooperative programs with the states, and interagency cooperation (Section 7). Section 7(a)(1) directs Federal agencies to carry out programs for the conservation of threatened and endangered species.

Environmental Education Act of 1990 (20 U.S.C. 5501-5510): Established the Office of Environmental Education within the Environmental Protection Agency, to develop and administer a Federal environmental education program. The Office is required to develop and support environmental programs in consultation with other Federal natural resource management agencies, including the Service.

Environmental Education Policy (2006) 605 FW 6: Provides the Service's policy governing the management of environmental education programs on units of the Refuge System. Environmental education is a priority appropriate use of the Refuge System when compatible. The policy encourages Refuge Managers to provide quality environmental education programs that can promote understanding and appreciation of natural and cultural resources and their management on all lands and waters in the Refuge System. The policy also emphasizes that refuge staff develop and take full advantage of opportunities to work with volunteers and partners who have an interest in conducting quality environmental education programs on refuges.

Executive Order 11514; Protection and Enhancement of Environmental Quality (1970): This directs that the *"...Federal Government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans, and programs so as to meet national environmental goals..."*

Executive Order 11644; Use of off-road vehicles on the public lands (1972): Requires that the Service designate areas as open or closed to off-highway vehicles in order to protect refuge resources, promote safety, and minimize conflict among the various refuge users; monitor the effects of these uses once they are allowed; and amend or rescind any area designation as necessary based on the information gathered.

Executive Order 11987; Exotic organisms (1977): Executive agencies shall, to the extent permitted by law, restrict the introduction of exotic species into the natural ecosystems on lands and waters which they own, lease, or hold for purposes of administration; and shall encourage the states, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States.

Executive Order 11988; Floodplain Management (1977): This directs that each Federal agency *"...shall provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains...,"* in carrying out its responsibilities.

Executive Order 11989; Off-Road Vehicles on Public Lands (1977): Requires the Service to close areas to off-highway vehicles when we determine that the use cause or will cause considerable adverse effects on the soil, vegetation, wildlife, habitat, or cultural or historic resources.

Executive Order 11990; Protection of Wetlands (1977): This directs that each Federal agency *"...shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities..."*

Executive Order 12996; Management and General Public Use of the National Wildlife Refuge System (1996): This spells out the mission of the Refuge System along with establishing guiding principles to help insure the long-term enjoyment of the Refuge System for present and future generations. The order directs the Secretary of the Interior to recognize compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation as priority general public uses on the Refuge System (i.e., the big six).

Executive Order 13007; Indian Sacred Sites (1996): Directs Federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites and where appropriate, maintain the confidentiality of sacred sites.

Executive Order 13112; Invasive Species (1999): This order was established to address the growing ecological and economic damage caused by invasive species. Executive Order 13112 requires Federal agencies to: 1) identify actions that might impact the status of invasive species and prevent introductions of invasive species; 2) not authorize, fund, or carry out actions likely to cause the introduction or spread of invasive species; 3) detect and respond rapidly to control invasive species populations; 4) monitor and conduct research on

invasive species; 5) restore native species and habitat conditions in ecosystems that have been invaded; and 6) promote public education on invasive species.

Executive Order 13158; Marine Protected Areas (2000): directs protection of the significant natural and cultural resources within the marine environment for the benefit of present and future generations by strengthening and expanding the Nation's system of marine protected areas (MPAs). An MPA is any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein. The Executive order directs Federal agencies to work together with states, territories, tribes and non-governmental partners to develop and maintain an effective national system of MPAs in the United States and to accomplish a variety of related tasks working with public and private partners. The "marine environment" is defined as those areas of ocean and coastal waters, the Great Lakes and their connecting waters, and submerged lands thereunder, over which the United States exercises jurisdiction, consistent with international law.

Executive Order 13186; Responsibilities of Federal agencies to protect migratory birds (2001): Provides guidance for Service programs relative to the management and conservation of migratory birds. Its purpose is to minimize the potential adverse effects of migratory bird take, with the goal of striving to eliminate take, while implementing our mission. This guidance includes but is not limited to: 1) integrating migratory bird conservation measures into our activities; 2) restoring and enhancing the habitat of migratory birds; 3) ensuring our actions/plans promote migratory bird conservation; 4) promoting inventory, monitoring, research, management studies, and information exchange related to migratory birds; 5) promoting education and outreach related to migratory birds; 6) identifying special migratory bird habitats; and 7) strengthening non-Federal partnerships to further bird conservation.

Executive Order 13443; Facilitation of Hunting Heritage and Wildlife Conservation (2007): Directs Federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management, including the Department of the Interior and the Department of Agriculture, to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

Farmland Protection Policy Act (7 U.S.C. 4201 et seq.): Requires Federal agencies to identify and take into account the adverse effects of their programs on the preservation of farmlands.

Federal Aid in Sport Fish Restoration Act (1950; 16 U.S.C. 777-777k), as amended: Commonly called the Dingell-Johnson Act or Wallop-Breaux Act, this provides Federal aid to the states for management and restoration of fish having *"...material value in connection with sport or recreation in the marine and/or fresh waters of the United States."* In addition, amendments to the act provide funds to the states for aquatic education, wetlands restoration, boat safety, and clean vessel sanitation devices (pumpouts), and a non-trailerable boat program. Funds are derived from a 10 percent excise tax on certain items of sport fishing tackle, a 3 percent excise tax on fish finders and electric trolling motors, import duties on fishing tackle, yachts and pleasure craft, interest on the account, and a portion of motorboat

fuel tax revenues and small engine fuel taxes. To participate in the Federal Aid in Sport Fish Restoration program, states are required to agree to this law and pass laws for the conservation of fish, which includes a prohibition against the diversion of license fees for any other purpose than the administration of the State fish department.

Federal Aid in Wildlife Restoration Act (1937; 16 U.S.C. 669-669i), as amended: Commonly called the "Pittman-Robertson Act," this provides Federal aid to states for management and restoration of wildlife. Funds from an 11 percent excise tax on sporting arms and ammunition are appropriated to the Secretary of the Interior and apportioned to states on a formula basis for paying up to 75 percent of the cost-approved projects. Project activities include acquisition and improvement of wildlife habitat, introduction of wildlife into suitable habitat, research into wildlife problems, surveys and inventories of wildlife problems, acquisition and development of access facilities for public use, and hunter education programs, including construction and operation of public target ranges.

Federal Environmental Pesticide Control Act of 1972 (7 USC 136-136y), as amended: This established, under the administrator of the EPA, a program for controlling the sale, distribution, and application of pesticides through an administrative registration process. The amendments provided for classifying pesticides for "general" or "restricted" use. "Restricted" pesticides may only be applied by or under the direct supervision of a certified applicator. Amendments to this act also authorized experimental use permits and provided for administrative review of registered pesticides and for penalties for violations of the statute. States were authorized to regulate the sale or use of any pesticide within a state, provided that such regulation does not permit any sale or use prohibited by the act. The Federal Environmental Pesticide Control Act of 1972 amended the **1947 Federal Insecticide, Fungicide, and Rodenticide Act** (FIFRA). The 1947 statute (FIFRA), prohibited the sale or distribution of "*economic poisons*," provided for the registration of such materials, and authorized penalties for violation of the act. The Endangered Species Act later amended FIFRA to define imminent hazard to include situations involving *unreasonable hazard to the survival of a species declared by the Secretary of the Interior to be endangered or threatened*.

Federal Fire Prevention and Control Act of 1974 (15 U.S.C. 2201 et seq.), as amended: This authorizes reimbursement to State and local fire services for costs incurred in firefighting on Federal property.

Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species and an interdisciplinary approach with the cooperation of other Federal and State agencies.

Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471-535), as amended: Sets forth requirements for the management and disposal of government property, including excess property (property under the control of any Federal agency, but which it no longer needs) and surplus property (excess property not required for the needs of any Federal agency).

Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j, not including 742 d-l), as amended: This established a comprehensive national fish and wildlife policy and broadened the authority for acquisition and development of refuges. The policy emphasizes the commercial fishing industry and includes a direction to administer the act with regard to the inherent right of every citizen and resident to fish for pleasure, enjoyment, and betterment, and to maintain and increase public opportunities for recreational use of fish and wildlife resources. Among other things, the act directs a program of continuing research, extension, and information services on fish and wildlife matters, both domestically and internationally. A 1974 amendment to the Fish and Wildlife Act of 1956 abolished the "Bureau of Sport Fisheries and Wildlife" and re-designated it as the "United States Fish and Wildlife Service"(Public Law 93-271). In 1978, the Fish and Wildlife Act was amended to allow the Service to accept donations of both real and personal property. In 1998, the Fish and Wildlife Act of 1956 was further amended to promote volunteer programs and community partnerships for the benefit of national wildlife refuges. This also required the Secretary of the Interior to develop refuge education programs to provide outdoor classroom opportunities for students to promote understanding of the Refuge System and to improve scientific literacy in conjunction with both formal and informal education programs.

Fish and Wildlife Conservation Act of 1980 ("Nongame Act") (16 U.S.C. 2901-2911), as amended: Authorizes financial and technical assistance to the states for the development, revision, and implementation of conservation plans and programs for non-game fish and wildlife. A 1988 amendment requires the Service to monitor and assess migratory non-game birds, determine the effects of environmental changes and human activities, identify those likely to be candidates for endangered species listing, identify appropriate actions, and report to Congress one year from enactment. It also requires the Service to report at five year intervals on actions taken.

Fish and Wildlife Coordination Act (1934), as amended: Authorizes the Secretary of the Interior to assist Federal, State, and other agencies in development, protection, rearing and stocking fish and wildlife on Federal lands and to study effects of pollution on fish and wildlife. The act also requires consultation with the U.S. Fish and Wildlife Service and the wildlife agency of any State wherein the waters of any stream or other water body are proposed to be impounded, diverted, channelized or otherwise controlled or modified by any Federal agency, or any private agency under Federal permit or license; with a view to preventing loss of, or damage to, wildlife resources in connection with such water resource projects. The act further authorizes Federal water resource agencies to acquire lands or interests in connection with water use projects specifically for mitigation and enhancement of fish and wildlife.

Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421; 92 Stat. 3110), as amended: Authorizes the Secretaries of the Interior and Commerce to establish, conduct, and assist with National training programs for State fish and wildlife law enforcement personnel. It also authorized funding for research and development of new or improved methods to support fish and wildlife law enforcement. The law provides authority to the Secretaries to enter into law enforcement cooperative agreements with State or other Federal agencies, and authorizes the disposal of abandoned or forfeited items under the fish, wildlife, and plant jurisdictions of these

Secretaries. It strengthens the law enforcement operational capability of the Service by authorizing the disbursement and use of funds to facilitate various types of investigative efforts.

Flood Control Act of 1944, as amended: This act, supplemented by other flood control acts and river and harbor acts, authorizes various Corps of Engineers water development projects. The Flood Control Act expressed congressional intent to limit the authorization and construction of navigation, flood control, and other water projects to those having significant benefits for navigation and which could be operated consistent with other river uses. This authorized the construction of numerous dams and modifications to previously existing dams. Several provisions of this act impact the responsibilities of the Service under the **Fish and Wildlife Coordination Act**.

Food Security Act of 1985 "Farm Bill" (99 Stat. 1354), as amended by the Food, Agriculture, Conservation, and Trade Act of 1990: This contains several provisions that contribute to wetland conservation. The "Swampbuster" provisions stated that farmers who produce an agricultural commodity on wetlands converted after enactment are ineligible for most farmer program subsidies. Administration of the program in the Department of Agriculture (USDA), which is required to consult with the U.S. Fish and Wildlife Service on matters relating to wetland identification, determination of exemptions to the wetland conservation provisions, issuance of implementing regulations, mitigation, and restoration of values and functions on converted wetlands. This act also authorized the Secretary of Agriculture to grant or sell conservation easements, which may include wetlands, to State or local governments or private non-profit organizations for conservation purposes. In addition, the 1985 act also established a Conservation Reserve program, providing incentives to private landowners (e.g., farmers) to return farmland to permanent vegetative cover and for applying soil conservation prescriptions such as wildlife habitat development. The program was expanded in 1988 by regulation to make cropped wetlands eligible for the program, with the intended result of wetland restoration (i.e., The Wetland Reserve Program).

Freedom of Information Act (1966; 5 U.S.C. 552): Requires all Federal agencies to make available to the public, for inspection and copying, administrative staff manuals and staff instructions, official, published and unpublished policy statements, final orders deciding case adjudication, and other documents. Special exemptions have been reserved for nine categories of privileged material, including but not limited to confidential matters relating to National defense or foreign policy, law enforcement records, and trade or commercial secrets. The act requires the party seeking the information to pay reasonable search and duplication costs.

Historic Sites, Buildings, and Antiquities Act (16 U.S.C. 461-462, 464-467), as amended: Also known as the Historic Sites Act, this declared it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provided procedures for designation, acquisition, administration, and protection of such sites. Among other things, National Historic and Natural Landmarks are designated under authority of this act. As of January 1989, 31 national wildlife refuges contained such sites.

Lacey Act of 1900 (16 U.S.C. 701), as amended: Makes it unlawful to import, export, sell, acquire, or purchase fish, wildlife or plants taken, possessed, transported, or sold: 1) in

violation of U.S. or Indian law, or 2) in interstate or foreign commerce involving any fish, wildlife, or plants taken possessed or sold in violation of State or foreign law. The Lacey Act covers all fish and wildlife and their parts or products, and plants protected by the Convention on International Trade in Endangered Species and those protected by State law. Commercial guiding and outfitting are considered to be a sale under the provisions of the act. The act also includes prohibitions on the importation of wild vertebrates and other animals listed in the act or declared by the Secretary of the Interior to be injurious to man or agriculture, wildlife resources, or otherwise, except under certain circumstances and pursuant to regulations. The Lacey Act includes penalties and fines for violations involving imports or exports or violations of a commercial nature.

Land and Water Conservation Fund Act (1965): Authorizes the use of the receipts from the sale of surplus Federal land, outer continental shelf oil and gas sales, and other sources for land acquisition. Section 7(a)(l) of this act provides authority to use Land and Water Conservation Fund money for acquisition of refuge areas under paragraph (5) of section 7(a) of the Fish and Wildlife Act of 1956.

Marine Mammal Protection Act (1972): The Marine Mammal Protection Act (MMPA) was enacted on October 21, 1972. All marine mammals are protected under the MMPA. The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.

Migratory Bird Conservation Act (1929; 16 U.S.C. 715-715d, 715e, 715f-715r), as amended: This established a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds.

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712), as amended: The Migratory Bird Treaty Act (MBTA) is one of the earliest Federal wildlife management laws enacted to protect migratory birds, which were rapidly declining from unregulated sport and commercial hunting. Specific provisions in the MBTA include the establishment of a Federal prohibition, unless permitted by regulations, to *"...pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention ...for the protection of migratory birds...or any part, nest, or egg of any such bird."*

Migratory Bird Hunting and Conservation Stamp Act (1934; 16 U.S.C. 718-718j), as amended: Known as the "Duck Stamp Act," this requires each waterfowl hunter 16 years of age or older to possess a valid Federal hunting stamp. Receipts from the sale of the stamp are deposited in a special Treasury account known as the Migratory Bird Conservation Fund and are not subject to appropriations. Funds appropriated under the Wetlands Loan Act (16 U.S.C. 715k-3 - 715k-5), as amended, are merged with duck stamp receipts and provided to the Secretary of the Interior for the acquisition of migratory bird refuges under provisions of

the Migratory Bird Conservation Act (16 U.S.C. 715 et seq), as amended, and since August 1, 1958, for acquisition of "Waterfowl Production Areas."

National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347), as amended: The National Environmental Policy Act (NEPA) requires that all Federal agencies prepare detailed environmental impact statements for "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment." NEPA stipulates factors to be considered in environmental impact statements, and requires that Federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unquantified environmental values are given appropriate consideration, along with economic and technical considerations.

National Historic Preservation Act of 1966 (16 U.S.C. 470-470b, 470c-470n), as amended: Provides for preservation of significant historical features (buildings, objects, and sites) through a grant-in-aid program to the states. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468-468d). The act established an Advisory Council on Historic Preservation, which was made a permanent independent agency in 1976. That act also created the Historic Preservation Fund. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register. As of January 1989, 91 historic sites on national wildlife refuges have been placed on the National Register, including Aransas NWR (Matagorda Island Lighthouse).

National Wilderness Preservation System (1964): Also known as the "Wilderness Act of 1964"; the purpose was to preserve and protect wild lands in their natural condition "*...to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.*" This act directed Federal agencies such as the U.S. Fish and Wildlife Service to survey their roadless lands for possible wilderness designation. Wilderness areas are protected from development and the operation of motorized equipment. A Wilderness Area is defined as an area with at least 5,000 acres of undisturbed, undeveloped land affected by the forces of nature and may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee. (Refuge Administration Act): Defines the National Wildlife Refuge System and authorizes the Secretary to permit any use of a refuge provided such use is compatible with the purposes for which the refuge was established. The Refuge Improvement Act clearly defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation); establishes a formal process for determining compatibility; established the responsibilities of the Secretary of Interior for managing and protecting the System; and requires a comprehensive conservation plan for each refuge by 2012. This act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

National Wildlife Refuge System Improvement Act (1997): Sets the mission and administrative policy for all refuges in the National Wildlife Refuge System. Clearly defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation); establishes the responsibilities of the Secretary of the Interior for managing and protecting the system; and requires a comprehensive conservation plan for each refuge by the year 2012. This act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

Native American Graves Protection and Repatriation Act (1990): Requires Federal agencies and museums to inventory, determine ownership of, and repatriate cultural items under their control or possession.

North American Wetlands Conservation Act (1989; 16 U.S.C. 4401-4412), as amended: Provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands between Canada, the U.S., and Mexico.

Protection Act (1922; 16 U.S.C. 594): Provides for the Secretary of the Interior to protect and preserve timber on the public lands owned by the United States from fire, disease, or the ravages of beetles or other insects.

Reciprocal Fire Protection Act of 1955 (42 U.S.C. 1856), as amended by the Wildfire Suppression Assistance Act of 1989 (102 Stat. 1615): Provides authority for Federal agencies to enter into mutual assistance agreements with foreign, State, and local governments for combating wildfires and to provide emergency assistance when no agreement exists.

Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4), as amended: Authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. The act provides for public use fees and permits, and penalties for violation of regulations. It also authorizes the acceptance of donations of funds and real and personal property to assist in carrying out its purposes. Amendments to the act authorize acquisition of lands and interests suitable for: 1) fish and wildlife-oriented recreation, 2) protection of natural resources, 3) conservation of endangered or threatened species, or 4) carrying out two or more of these stipulations. Such lands were required to be adjacent to or within an existing conservation area. Acquisition was not permitted with “duck stamp” receipts for these purposes.

Refuge Revenue Sharing Act of 1935 (16 U.S.C. 715s), as amended: Provides for payments to county governments in lieu of taxes, using revenues derived from the sale of products from refuges. Revenues received from refuge products, such as animals, timber and minerals, or from leases or other privileges, are required to be deposited in a special Treasury account and net receipts distributed to counties. Remaining monies are required to be transferred to the Migratory Bird Conservation Fund for land acquisition under provisions of the Migratory Bird Conservation Act. The act was later amended to expand the revenue sharing system to include National Fish Hatcheries and Service research stations. It also

included in the Refuge Revenue Sharing Fund receipts from the sale of salmonid carcasses. Payments to counties were established as: 1) on acquired land, the greatest amount calculated on the basis of 75 cents per acre, three-fourths of one percent of the appraised value, or 25 percent of the net receipts produced from the land; and 2) on land withdrawn from the public domain, 25 percent of net receipts and basic payment, in lieu of taxes on public lands. Amendments to the act authorized appropriations to make up any difference between the amount in the Revenue Sharing Fund and the amount scheduled for payment in any year. Counties are also required to pass payments along to other units of local government within the county that suffer losses in revenues due to the establishment of Service areas.

Refuge Trespass Act of 1948 (18 U.S.C. 41): This consolidated penalty provisions of various acts from 1905 through 1934, establishing and protecting fish and wildlife areas, and restated the intent of Congress to protect all wildlife within Federal sanctuaries, refuges, fish hatcheries, and breeding grounds.

Rehabilitation Act (1973): Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the Federal government to ensure that anybody can participate in any program.

Rivers and Harbors Act (1899; 33 U.S.C. 403): Section 10 of this act requires the authorization by the U.S. Army Corps of Engineers prior to any work in, on, over, or under a navigable water of the United States.

Secretarial Order No. 3226; Evaluating Climate Change Impacts in Management Planning (2001): The Department of the Interior Secretarial Order 3226 states that "there is a consensus in the international community that global climate change is occurring and that it should be addressed in governmental decision making…This Order ensures that climate change impacts are taken into account in connection with Departmental planning and decision making." Additionally, it calls for the incorporation of climate change into long-term planning documents such as the CCP.

Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b-d), as amended: This act provides that, upon a determination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency can be transferred without reimbursement to the Secretary of the Interior if the land has particular value for migratory birds or to a State agency for other wildlife conservation purposes.

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. 4601 et seq.), as amended: Establishes uniform land acquisition policies for all Federal agencies and establishes requirements for the uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal or federally-assisted programs, including land acquisition.

Volunteer and Partnership Enhancement Act (1998): This amended the Fish and Wildlife Act of 1956 to promote volunteer programs and community partnerships for the benefit of national wildlife refuges, and for other purposes.

Waterfowl Depredations Prevention Act (1956; 7 U.S.C. 442-445), as amended: This act authorizes the Secretary of the Interior to use surplus grain owned by Commodity Credit Corporation in feeding waterfowl to prevent crop damage. Findings regarding possible crop damage are to be made by the Secretary of the Interior, and grain is to be used to lure waterfowl away from crops while not exposing them to shooting over areas to which they have been lured. Such grain may be made available to Federal, State or local governments or private organizations or individuals. Appropriations are authorized to reimburse the Corporation for packaging and transporting such grain.

Water Resources Planning Act (1965), as amended: This established a Water Resources Council to be composed of Cabinet representatives, including the Secretary of the Interior. The council was empowered to maintain a continuing assessment of the adequacy of water supplies in each region of the U.S. In addition, the council was mandated to establish principles and standards for Federal participants in the preparation of river basin plans and in evaluating Federal water projects. Upon receipt of a river basin plan, the Council was required to review the plan with respect to agricultural, urban, energy, industrial, recreational, and fish and wildlife needs. This also established a grant program to assist states in participating in the development of related comprehensive water and land use plans.

Wetlands Reserve Program: The Wetlands Reserve Program (WRP) is a voluntary program. It provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private lands in an environmentally beneficial and cost-effective manner. The program provides an opportunity for landowners to receive financial incentives to restore, protect, and enhance wetlands in exchange for retiring marginal land from agriculture. There are three enrollment options for landowners: 1) permanent easement, 2) 30-year easement, and 3) a restoration cost-share agreement. The WRP was re-authorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill). The Natural Resources Conservation Service administers the program (**See also: Food Security Act of 1985).**

Wilderness Act of 1964 (16 U.S.C. 1131): This act directed the Secretary of the Interior to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems and to recommend to the President the suitability of each such area or island for inclusion in the National Wilderness Preservation System, with final decisions made by Congress. The act provides criteria for determining suitability and establishes restrictions on activities that can be undertaken on a designated area. It authorizes the acceptance of gifts, bequests, and contributions in furtherance of the purposes of the act and requires an annual report at the opening of each session of Congress on the status of the wilderness system.

Environmental Assessment

For the

Buffalo Lake National Wildlife Refuge
Comprehensive Conservation Plan

Prepared by

Refuge Staff
Buffalo Lake National Wildlife Refuge
Umbarger, Texas

&

National Wildlife Refuge System
Southwest Region
Division of Planning
Albuquerque, New Mexico

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United States Fish and Wildlife Service
Environmental Action Statement

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA), and other statues, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and determined that the action of implementing the Buffalo Lake National Wildlife Refuge Comprehensive Conservation Plan is found not to have significant environmental effects as determined by the attached *Finding of No Significant Impact* (following) and the *Comprehensive Conservation Plan and Environmental Assessment.*

for Joy E. Nicholopoulos
Dr. Benjamin N. Tuggle, Regional Director
U.S. Fish and Wildlife Service, Region 2

9/12/13
Date

Lynn A. Nymeyer
Lynn Nymeyer, Refuge Manager
Buffalo Lake National Wildlife Refuge

03-06-2013
Date

Aaron Archibeque
Aaron Archibeque, Regional Chief
NWR System, Region 2

9/11/13
Date

Carol A. Torrez
Carol Torrez, NEPA Coordinator
Division of Planning, Region 2

9/11/13
Date

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1.0 PURPOSE AND NEED FOR PROPOSED ACTION ALTERNATIVE

Photo C-1 Sunrise on the Refuge USFWS

1.1 Introduction

The United States Fish and Wildlife Service (Service) proposes to implement a Comprehensive Conservation Plan for the Buffalo Lake National Wildlife Refuge (NWR), which would guide management on the refuge for the next 15 years. This Environmental Assessment (EA) is being prepared to evaluate the effects associated with this proposal and 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 (see Section 1.7 for a list of additional regulations that this EA complies with). NEPA requires examination of the effects of proposed actions on the natural and human environment. In the following chapters, we describe three alternatives for future Refuge management, the environmental consequences of each alternative, and our proposed

management direction. Each alternative was designed to contain a reasonable mix of fish and wildlife habitat prescriptions and wildlife-dependent recreational opportunities consistent with the Refuge System Improvement Act and specific Refuge purposes.

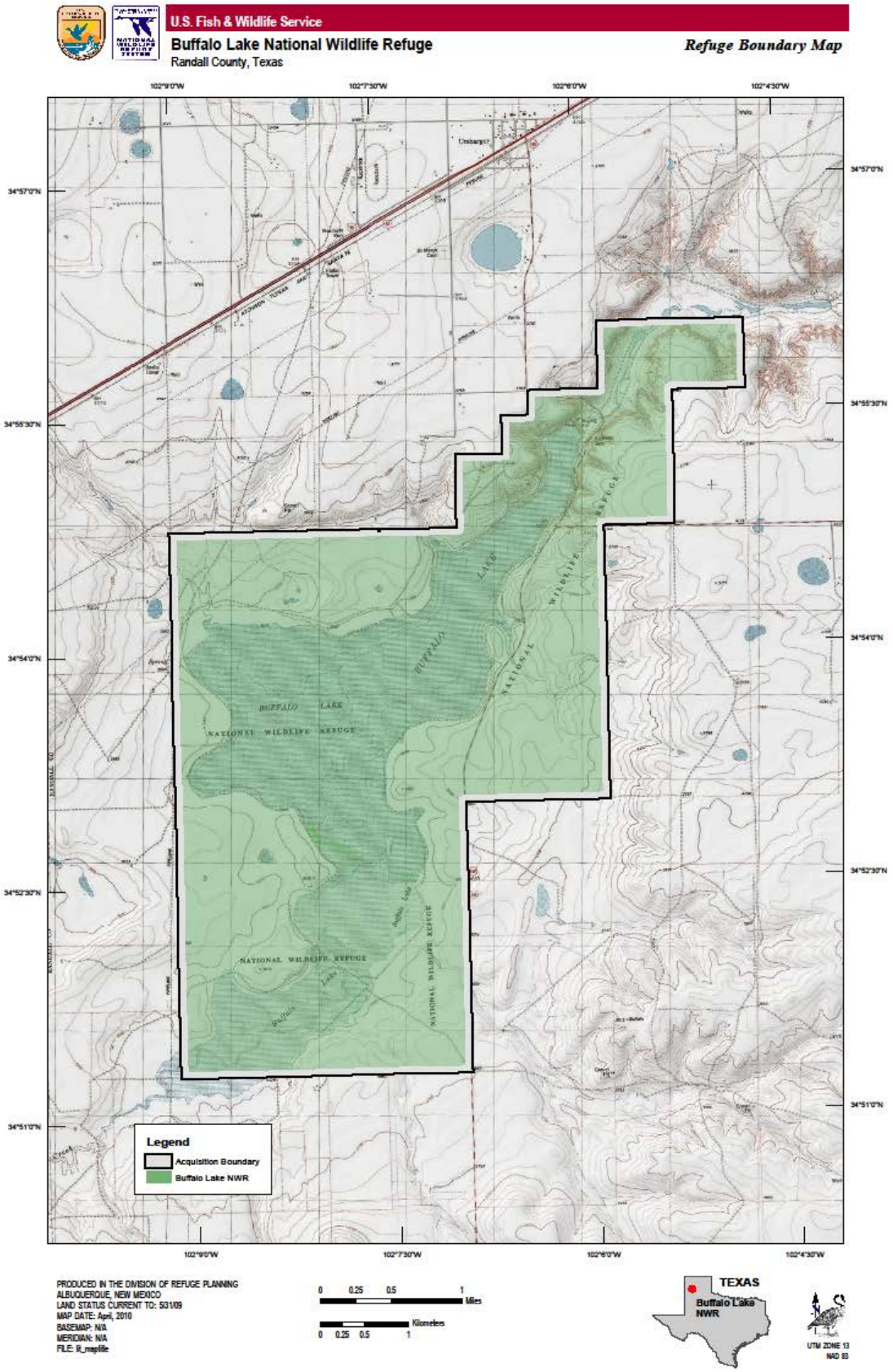
The environmental consequences of each alternative are described below and form the basis for selection of the proposed action for the Buffalo Lake NWR Comprehensive Conservation Plan which is a planning document that:

- Describes the desired future conditions of a Refuge or planning unit and provides long-range management direction to achieve the purposes of the refuge;
- Helps fulfill the mission of the Refuge System;
- Maintains and, where appropriate, restores the ecological integrity of the refuge and the Refuge System;
- Helps achieve the goals of the National Wilderness Preservation System; and
- Meets other mandates.

This Environmental Assessment was designed to cover the environmental consequences for most future management actions and current facilities on the Buffalo Lake NWR; however, some future actions such as the construction of major facilities will require further environmental documentation.

1.2 Location

Buffalo Lake NWR is located in the central part of the High Plains area of the Texas Panhandle, situated in the southern corner of Randall County, Texas. The refuge is made up of 7,677 acres of short-grass prairie, riparian, marsh, woodland, and cropland habitats. The refuge is 1.5 miles south of the small community of Umbarger, which is 10 miles west of Canyon, 15 miles east of Hereford, and approximately 30 miles southwest of Amarillo.


U.S. Fish & Wildlife Service
Buffalo Lake National Wildlife Refuge
Randall County, Texas
Refuge Boundary Map
102°9'0"W
102°7'30"W
102°6'0"W
102°4'30"W
34°57'0"N
34°55'30"N
34°54'0"N
34°52'30"N
34°51'0"N
Legend
Acquisition Boundary
Buffalo Lake NWR
PRODUCED IN THE DIVISION OF REFUGE PLANNING
ALBUQUERQUE, NEW MEXICO
LAND STATUS CURRENT TO: 5/31/09
MAP DATE: April, 2010
BASEMAP: N/A
MERIDIAN: N/A
FILE: lil_mapfile
0 0.25 0.5 1 Miles
0 0.25 0.5 1 Kilometers
TEXAS
Buffalo Lake NWR
UTM ZONE 13
NAD 83

1.3

1.3 Background

The National Wildlife Refuge System Improvement Act of 1997 requires each national wildlife refuge to have a Comprehensive Conservation Plan (Plan). The mandate is to develop and implement a Plan for the Buffalo Lake National Wildlife Refuge. The purpose of the Plan is to determine management direction for the refuge that best achieves the purposes, vision, and goals; contributes to the National Wildlife Refuge System (Refuge System) mission; addresses the significant issues and relevant mandates; and is consistent with principles of sound fish and wildlife management. The CCP will identify a set of goals, objectives, and strategies for refuge management for the next 15 years.

The area that now comprises the Buffalo Lake NWR was originally purchased in 1937 by the Soil Conservation Service, U.S. Department of Agriculture's former National Resource Conservation Service (NRCS), under provisions of the Bankhead-Jones Farm Tenant Act which authorized the Department of Agriculture to purchase sub marginal agriculture lands for uses such as forestry, grazing, and public recreation. The land that makes up Buffalo Lake NWR was purchased under provisions of this Act. First known as the Tierra Blanca Water Conservation Project, the area was acquired to provide flood control and aquatic recreation for the south-central Texas Panhandle. These parcels were considered to be infertile land with such a low level of productivity that they became no longer profitable.

Shortly after completion of the earthen Umbarger Dam that impounded the 2,300-acre Buffalo Lake reservoir, the area was turned over to the U.S. Forest Service and renamed the Buffalo Lake Conservation Area. The project was later transferred from the Forest Service to the U.S. Fish and Wildlife Service (Service) on November 6, 1958, by Executive Order 10787. Buffalo Lake NWR was established on November 17, 1959, under Secretarial Order 2843, using the authority of the Migratory Bird Conservation Act (16 U.S.C. 712d). Refuge purposes include:

- "...for use as an inviolate sanctuary... for any other management purposes… for migratory birds." (Migratory Bird Act)

- "…for use and administration under applicable laws as a refuge for migratory birds and other wildlife…"
- (Secretarial Order 2843)

It has been managed as a component of the National Wildlife Refuge System since that time.

Historically, Buffalo Lake provided habitat for millions of migrating and wintering waterfowl and other wetland-dependent wildlife. Waterfowl numbers 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). Simultaneously, the lake was a popular attraction for locals and visitors who referred to the lake as "the Playground of the Panhandle." Visitor use, the majority of which occurred in the late spring and summer months, often exceeded one-half

million people annually. The lake's primary source of water, however, was runoff from precipitation and discharges of natural springs carried by Tierra Blanca Creek, which soon presented a problem.

During the 1970s, rainfall patterns declined and construction of numerous upstream impoundments on the Tierra Blanca watershed significantly reduced the water flows into Buffalo Lake. Simultaneously, cattle feed yard operations located upstream were seriously affecting the water quality of the area. The Ogallala Aquifer dropped in excess of fifty feet as a result of this decreased rainfall combined with agricultural and urban pumping. This drop in the aquifer resulted in drying of the natural springs that originally fed Tierra Blanca Creek. Therefore, Tierra Blanca Creek no longer carries permanent water flow and water reaches Buffalo Lake only during significant rain run-off events. Major storms occasionally flood Tierra Blanca Creek and deposit organic contaminants from upstream resulting in questionable water quality conditions.

During 1978-79, a major rainfall event filled Buffalo Lake to capacity and flooded the surrounding area. As a result, Umbarger Dam was condemned, and the lake was drained. The condemned earthen dam was eventually replaced with a compacted cement flood control structure in 1992. Due to reduced and infrequent water flow and questionable water quality, the water entering Buffalo Lake is released and the dry lake bed is managed for wildlife.

Buffalo Lake NWR is one of the 159 national wildlife refuges and waterfowl management units located in the Central Flyway. The Central Flyway is a regular migration route for many bird species that stretches from Alaska and central Arctic Canada to South America. The flyway spans eleven U.S. states, including Alaska, Montana, North Dakota, South Dakota, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Oklahoma, and Texas. It is made up of 7,664 acres of short grass prairie, riparian, marsh, woodland, and cropland habitats. The dried lakebed of Buffalo Lake comprises 581 acres of the refuge.

The management activities of this refuge contribute to the objectives of the Central Flyway Management Program and the Playa Lakes Joint Venture. The refuge serves the objectives of its establishment by providing quality habitat to maintain the health and condition of wintering birds. The bird's condition over the winter months affects their spring migration and reproductive success. Many factors within the lands of the Central Flyway can affect migratory bird resources. Conversely, management activities that occur on refuges can have wide ranging effects on the bird populations of the entire Central Flyway. Factors influencing the bird use of this area include the activities of other countries, regional farming practices, the activities of Federal and State agencies, private organizations, local governments, the influence of treaties affecting wildlife and wild lands, and natural factors such as climate and local precipitation.

Conservation efforts on the refuge began focusing on species other than migratory waterfowl after the lakebed dried. While Buffalo Lake NWR and other nearby refuges (Muleshoe and Grulla) were established as habitat for migrating waterfowl, these areas also provide habitats for other migratory, resident, and threatened or endangered species which in many cases have now become management priorities. Buffalo Lake NWR provides over 4,000 acres of short grass prairie habitat in public ownership. Private land stewardship initiatives, like the High Plains Partnership and Playa Lakes Joint Venture, have recently become the focus of agencies like the Service as the key to protecting and possibly restoring water resources and habitat values of the native short and mixed grass prairies and preventing fish and wildlife declines in the High Plains region.

1.4 Purpose

The mission of the National Wildlife Refuge System, as written in the National Wildlife Refuge System Improvement Act of 1997, 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 Unites States for the benefit of present and future generations of Americans"

As such, the purpose of the proposed action is to specify a management direction for Buffalo Lake NWR over the next 15 years. The purpose of the EA is to:

- Select a management direction for the Refuge that best achieves the Refuge's purposes, vision, and goals;
- Contributes to the mission of the National Wildlife Refuge System;
- Ensure consistency with principles of sound fish and wildlife management;
- Addresses relevant mandates and major issues during scoping.

The proposed management direction is described in detail through a set of goals, objectives, and strategies in the Comprehensive Conservation Plan (Plan).

1.5 Need for Action

The CCP is needed to provide guidance and rationale for management actions. Management is now guided by various general policies, short-term plans, and step-down management plans that do not reflect current conditions or recent scientific knowledge. The action is also needed to address current management issues and to satisfy the legislative mandates of the National Wildlife Refuge System Improvement Act of 1997, which requires that each refuge is managed

to fulfill the mission of the National Wildlife Refuge System and the purposes for which the individual refuge was established.

1.6 Decision to be Made

The Regional Director for the Southwest Region (Region 2 of the U.S. Fish and Wildlife Service) will make two decisions based on this EA: (1) select which alternative the Refuge will implement, and (2) determine if the selected alternative is a major Federal action significantly affecting the quality of the human environment, thus requiring preparation of an Environmental Impact Statement (EIS), or whether implementation of the Proposed Action can proceed. The planning team has recommended Alternative B, Proposed Action, to the Regional Director. Assuming no significant impact is found the final Plan will include a Finding of No Significant Impact (FONSI), a statement explaining why the selected alternative will not have a significant effect on the quality of the human environment. This determination takes into consideration the Service and Refuge System mission, the purpose(s) for which the Refuge was established, and other legal mandates. Once the FONSI is signed, the Plan will be implemented, monitored annually, and revised when necessary.

1.7 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 Plan's overriding consideration is to carry out the purpose for which the Refuge was established. Refuge purposes are stated in the laws that established the Refuge and provided the funds for acquisition. Fish and Wildlife management is the first priority in refuge management, and the Service allows and encourages public use (wildlife-dependent recreation) as long as it is compatible with, or does not detract from, Refuge purposes.

This EA was prepared by the Service and represents compliance with applicable Federal statutes, regulations, Executive Orders, and other compliance documents. Appendix A of the Plan contains a list of the key laws, orders and regulations that provide a framework for the proposed action.

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.

Comprehensive Conservation Plans include a review of the appropriateness and compatibility of existing refuge uses and of any planned future public uses. An appropriate use is a proposed or existing wildlife-dependent recreational use as identified in the 1997 Refuge System Improvement Act or a use that contributes to the fulfillment of the refuge purpose, the Refuge System mission, or goals and objectives described in a refuge management plan. A compatible use is an appropriate use that will not materially interfere with or detract from the purposes of the refuge or the National Wildlife Refuge System mission.

If a use is determined to be an 'Appropriate Refuge Use' by a refuge manager, it is then taken through the 'Compatibility Determination' process. This process culminates in a determination on whether or not the use will materially interfere with or detract from the purposes of refuge or the National Wildlife Refuge System mission. Compatibility determinations have been completed for the following activities and are provided in Appendix D of the Plan. For more information on Appropriate Refuge Uses and Compatibility Determinations, including a list of currently approved CDs, see Chapter 5, of the Plan.

1.8 Scoping/Public Involvement and Issues Identified:

In accordance with Service guidelines and NEPA recommendations, public involvement has been a crucial factor throughout the development of the Draft Plan and EA. Formal scoping began with publication of a Notice of Intent to prepare a Comprehensive Conservation Plan and Environmental Assessment in the Federal Register on June 19, 1998. At this time, a fact sheet stating the history, goals, objectives, and long-range plans of the refuge was distributed at Refuge Headquarters and to interested parties. It was originally determined that holding an open house at the refuge was not necessary.

The Service uses scoping as a process for identifying the "scope of issues" to be addressed by the Comprehensive Conservation Plan. The scoping process involves participation by Federal, State, and local agencies as well as private organizations and individuals. The agency must offer an opportunity to provide feedback to interested individuals or organizations that may be affected by the agency action. Issues may include:

- An initiative;
- Opportunity;
- Resource management problem;
- Threat to the resources of the unit;

- Conflict in uses;
- Public concern; or
- The presence of an undesirable resource condition.

After changes in staff and new guidance on the development of Plans, the refuge revisited their scoping efforts in 2004. At that time, information sheets were distributed to the public by mail, and news releases were sent to nine area newspapers to request public involvement during the scoping period. Twelve written comments and one telephone comment were submitted to the Refuge in response. In addition, a news article on http://amarillo.com featured the development of the management plan for Buffalo Lake NWR, and two opinion pieces followed. Twelve individuals wrote comments on that website in response to these articles.

Also in 2004, a letter was sent to individuals at Texas Parks and Wildlife Department (TPWD) formally inviting them to participate in the development of the CCP. In September 2004, TPWD replied with a letter providing input into the planning process.

In November 2009, an additional request for comments was sent out in a planning update distributed to the refuge's mailing list. Approximately 40 comments were received during this effort, and each response was considered during Plan development. The Service also used public open house meetings to gather further input for the development of the Plan.

A public meeting was held at the refuge on December 15, 2009. Despite advertising for the open house, very few individuals attended the meeting. The discussion was focused horseback riding.

All of the feedback provided during the public scoping period identified concerns from a variety of stakeholders. The issues and concerns provided the basis for developing the refuge's management direction and played a role in determining desired conditions for the refuge. The issues for the refuge to address are divided into four categories:

1. Habitat Management
2. Wildlife Management
3. Public Use
4. Facilities

1.8.1 Habitat Management

Climate Change

Two members of the public expressed concerns about climate change. One of those individuals described the need to address climate change in management planning, and the other expressed concern regarding potential effects of climate change on the Refuge, recommending minor management changes. The refuge acknowledges that climate change can alter the distribution of habitat types in Texas and the rest of the world, also impacting the wildlife species that inhabit

them. Although the refuge can do little to resolve this issue, it can recognize when change is occurring, document changing conditions through data collection, and adapt management to reflect changes in hydrology and plant communities. Concerns regarding climate change also indicate the need to develop baseline data on refuge habitat resources so that the refuge can appropriately respond to changing conditions.

Habitat Fragmentation

Much of the land surrounding the refuge is used for agricultural purposes, thereby reducing or fragmenting the amount of short-grass prairie habitat. Five members of the public provided comments expressing concern over habitat loss associated with development, and one individual requested that the refuge work on preventing fragmentation both on its land and on surrounding lands. The refuge has an opportunity to increase habitat restoration practices beyond its current borders by working with adjacent landowners and acquiring additional lands.

Wind Energy Research

There is one company assessing the idea of placing wind farm generators adjacent to the refuge and staff is concerned on how such developments may impact migratory birds. In anticipation of possible construction of wind turbines near the refuge, refuge staff has been conducting diurnal avian activity surveys to better understand how wind energy developments may affect migratory birds. The refuge views this development as a potential partnership opportunity and has initiated acoustic monitoring with a current wind energy developer. Refuge staff maintains knowledge of future projects through partnerships with wind energy developers in order to track and anticipate potential changes in habitat fragmentation and wildlife behavior.

Prairie Management and Restoration

Buffalo Lake NWR provides 4,373 acres of native short grass prairie in an area where much of this habitat has been lost through development and fragmentation. Members of the public and refuge staff are concerned with protecting this remaining native short grass prairie habitat. The refuge recognizes the need to enhance the quality of existing prairie habitat through restoration efforts.

Prescribed burning and grazing are the primary management tools used to maintain and restore native prairie. When properly managed, grazing and prescribed fire serve to maintain and encourage native grasses and forbs and to cycle nutrients through the ecosystem. The refuge currently leases livestock grazing on the refuge.

The public wants to see the continued use of both grazing and prescribed fire on the refuge to enhance forage types and deter noxious weeds. Specifically, members of the public suggested the use of intensive rotational or patch grazing and burning, recommending that Buffalo Lake

NWR mimic the grazing patterns used at Muleshoe NWR. One member of the public requested an in-depth review of the grazing rights and fees associated with the refuge.

Invasive Flora Species

One threat to the refuge is the presence of invasive plant species; however, it is estimated that only 2 percent of the refuge has been encroached upon. The primary invasive species on the refuge include salt cedar, Siberian elm, Russian olive, kochia, and musk thistle. These plant species out-compete native plant and reduces habitat quality. The majority of the non-native trees are located within or around the edges of the lake bottom and along Tierra Blanca Creek, but they are not spreading at an alarming pace due to the lack of reliable flooding. Historically, encroachment of woody species into grasslands was minimized by periodic fires characteristic of short grass prairie ecosystems. Nearby farming, fire suppression, and introduction of exotic species continue to threaten the short grass prairie. The refuge and the public identified the need for eradication of certain invasive species through grazing and prescribed burning.

Moist Soil Management

The refuge contains 10 individual four-acre ponds in the Tierra Blanca Creek floodway, which were constructed to compensate for the lack of migratory bird habitat due to the receding water table and subsequent drying of Buffalo Lake. The moist soil units are watered as necessary to provide succulent emergent vegetation to be used as food for ducks in late winter and early spring. These moist soil units have become the fundamental resource bringing migratory birds to the refuge, thereby serving the purpose of Buffalo Lake NWR. Refuge staff will continue providing this integral habitat for migratory birds in order to continue serving the purpose of the refuge.

Lakebed Management

The 2,818-acre dry lakebed of Buffalo Lake contains high concentrations of organic contaminants including nitrogen and nitrates that have been deposited over the years from upstream cattle feedlots. One commenter expressed the desire for the lake to be decontaminated, the dam repaired, and the lake refilled so that humans and waterfowl alike could enjoy it. Because of the high contamination levels and the lack of water, the refuge is limited in their abilities to manage the lakebed. Current management options do not include re-establishing the lake with an un-limited water supply, the potential for spread of disease due to insufficient flows and subsequent stagnant water conditions, as well as the financial commitment necessary to implement. The Refuge is considering management options for the dam that best meets the mission for which the refuge was established and will initiate a separate decision document with an associated public review period to help formulate feasible alternatives.

Since it was last drained, the lakebed reverted to monotypic, dense stands of kochia, a non-native invasive plant. These stands restrict native vegetative growth and increase the threat of wildfire,

presenting a management problem for refuge staff. Cooperative farming is used to reduce organic contaminants in the soil, break up monotypic stands of kochia, and reduce woody encroachment of salt cedar, while simultaneously providing desirable wildlife food sources.

Water Quality

The refuge is located downstream from multiple cattle operations in Hereford, Texas. The area surrounding the refuge experiences significant flood events during periods of heavy rainfall that affect water quality. These events carry contaminated run-off that is deposited into the Buffalo Lakebed. As a result, the surface run-off during flood events contains a high amount of fecal coli form contamination that, if not removed from the flood waters, is transported through the refuge and into the watershed. This is an issue recognized by refuge staff and members of the public. The current Standard Operating Procedure and Emergency Plan for the management of the Hazardous Umbarger Dam require the gate to be left open one inch to allow all water to continue downstream. This carries these high amounts of fecal coliform bacteria downstream threatening the people of Canyon and others. The refuge needs to develop the means to contain the water keeping the fecal coliform contained and away from contact with the public. If water levels rise to dangerous levels behind Umbarger Dam the gates can be opened in an emergency situation.

Receding Water Table

The tapping of the Ogallala aquifer for residential and commercial uses has caused the water table to drop substantially, causing the natural springs that fed Tierra Blanca Creek to dry. Buffalo Lake has gone dry, and the refuge has a limited water supply for management purposes. Multiple members of the public are concerned about the current water shortage and the potential for continued decrease of the water table. One individual suggested that the refuge adapt its management to the drier habitat, and another person wrote that, without water, the refuge may have no value.

1.8.2 Wildlife Management

Native Fauna

While many members of the public expressed their general support for the refuge's management of wildlife, concerns regarding native fauna were focused on deer, prairie dogs, bison, gophers, and coyotes. The refuge staff and the public recognize that certain native species, including deer and prairie dogs, have the potential to become overpopulated on the refuge. The public is concerned about habitat damage and the potential for overpopulated species to spread onto neighboring lands causing crop damage. Other concerns regarded wildlife disease and balancing wildlife management while simultaneously providing public use opportunities. One individual suggested reintroducing bison on the refuge due to their historic presence prior to their eradication in 1880's. A member of the public also expressed concern over the spread of gophers. Another member of the public commented that the refuge is too focused on protecting coyotes.

Invasive Fauna

There has been a rapid increase in the population of feral hogs across the panhandle of Texas in recent years. Feral hogs can cause massive habitat destruction by rooting into soils when digging for food, subsequently leaving the disturbed soils highly vulnerable to the spread of invasive flora. Although feral hogs are not currently present on the refuge, the refuge recognizes the importance of not letting this invasive species become established on refuge land. Members of the public also commented with concern about the looming threat of feral hogs.

Shift Refuge Emphasis

The refuge was originally established to provide habitat for migratory birds. At that time, the lake provided habitat for millions of migrating and wintering waterfowl along with other wetland-dependent wildlife. As discussed in Section 1.3 (Background) and 1.8.1 (Ecosystem-Related Management), the lake has since dried up, thereby decreasing the amount of migratory waterfowl habitat available on the refuge. Members of the public also expressed concern over water availability to attract waterfowl. Suggested remedies included keeping water in the lake, the Stewart Marsh area, and behind the dikes, as well as creating a small wetland. Another commenter requested the refuge shift their emphasis from waterfowl to grassland wildlife due to the water shortage.

1.8.3 Visitor Services

Through the Refuge Improvement Act of 1997, the Service established six wildlife-dependent recreational uses of national wildlife refuges that are to be considered a priority during the planning process. These include hunting, fishing, wildlife observation, wildlife photography environmental education, and interpretation. The public provided feedback regarding hunting, environmental education, and wildlife observation, as well as other potential recreational activities including horseback riding, camping, and bicycling.

Hunting

Although one individual provided a comment requesting that the refuge remain closed to hunting, others commented in support of hunting. The refuge is not currently open to hunting, but this activity may provide an opportunity to assist in wildlife management.

Fishing

The refuge identified the opportunity to provide young visitors to participate in fishing. Staff identified the need to consider this opportunity in the Plan despite receiving only two comments on the topic. One comment was in favor of allowing fishing and one specifying that the refuge should add more wetlands but not allow fishing.

Environmental Education and Interpretation
Comments regarding environmental education and interpretation requested an increase in efforts catering to local schools and area teachers. The refuge currently has an annual education day for surrounding schools and maintains an area on the refuge dedicated to environmental education and interpretation programs, but staff would like to expand these programs.

Wildlife Observation and Photography
The public was generally in support of existing wildlife observation opportunities and requested an increase in the area open to birding and hiking.

Camping
Many public comments were received suggesting that the refuge add camping opportunities, including fee-based camping in designated areas and RV camping. The refuge currently offers primitive camping, which has been determined a compatible use. Many campers have also initiated star gazing activities in the campground and often set up personal astronomy equipment.

Bicycling
Two comments were received requesting the refuge allow bicycling in designated areas. Bicycling has been permitted on the auto tour route; however, cross country or off-road uses of bicycles are prohibited.

Horseback Riding
A local horseback riding group requested to allow horseback riding on the refuge. Though the refuge never officially allowed horseback riding, the activity was allowed by previous management. Horseback riding has been declared incompatible with the purpose of the refuge and was officially discontinued in 1998 after natural flooding removed all trails and structures from the refuge. Horseback riding will not be considered as an alternative during this planning process.

1.8.4 Facilities Management

Administrative Facilities
The refuge headquarters complex is situated on 85 acres and consists of a small office building, which is also used as a Visitor Contact Center, a maintenance building, two equipment storage buildings, a refuge house with vehicle garage and storage building, two cooperative trailer quarters, an oil storage building, a small storage building, two sign storage bin buildings, a water well pumping house, and a supply yard storage building. The current refuge headquarters is located in an old, small, and congested building serving the purposes of providing all administrative offices and a visitor contact center. This arrangement does not portray the informative and professional image that the refuge should be able to provide to refuge visitors. Shop facilities are also too small for routine equipment maintenance and repair to be conducted indoors. Therefore, the Refuge has determined that the existing administrative complex is not

meeting the needs of current staff or the public. Staff has identified the need to add a new permanent Refuge Headquarters with biology lab and a larger shop facility to maintain and repair the heavy equipment used on the refuge.

Public Use Facilities
Currently, the refuge allows public access to 1,301 acres or 17 percent of the refuge where visitors can participate in wildlife-dependent recreation. Many of the public comments received described the desire for an increase both in the amount of refuge land open to public use and in the refuge's hours of operation, which are currently Monday through Friday 8:00 am to 6:00 pm from October 1 through March 31 and 8:00 am to 8:00 pm from April 1 through September 31. The refuge feels the amount of land open to the public is adequate. Areas that are "closed" to the public are utilized as areas of conservation, management and habitat restoration for wildlife.

Individuals also requested that the refuge add new trails and picnic areas and update existing kiosks and restrooms. Since the time of the public comment period, the refuge has added a grassland trail, an ADA accessible prairie dog town trail, and has replaced one of the old restrooms in the camping area. Many comments described the need to lengthen refuge hours, which the refuge recognizes as a potential opportunity to increase visitation. Some individuals commented on the presence of trash and vandalism on the refuge, which the refuge addresses through routine maintenance and partnerships with local organizations that assist in trash collection. Other comments requested that the Service consider changing Buffalo Lake NWR's name due to the altered hydrology of the former lake.

Quality and Safety of Refuge Roadways
In addition, the refuge is concerned about the current condition of all refuge roadways and parking areas. These roadways and parking areas are gravel, which increases the time and money required for maintenance and limits the safety, efficiency, and quality of refuge visitation.

Chapter 2 – Description of Alternatives

2.1 Formulation of Alternatives

Alternatives are different approaches or combinations of management actions designed to achieve a refuge's purposes and vision, the goals identified in the Plan, the goals of the Refuge System, and the mission of the Service. Based on the issues, concerns, and opportunities heard during the public scoping process, the Planning Team developed three alternative management scenarios that could be implemented at Buffalo Lake NWR.

This EA considers all three alternatives in detail (see section 2.4), which cover a reasonable range of alternatives. In addition, there was one alternative that was considered but eliminated from detailed analysis for the reasons listed below (see section 2.3). These alternatives represent different approaches or management scenarios for the future protection, restoration, and management of the Refuge fish, wildlife, plants, habitats, and other resources, as well as compatible wildlife-dependent recreation. Refuge staff assessed the biological conditions of Refuge habitats and analyzed the external relationships affecting each Refuge unit. This information contributed to the development of Refuge goals and, in turn, helped formulate the alternatives.

2.2 Alternatives Considered but Dismissed from Detailed Analysis

The alternatives development process under NEPA and the Improvement Act are designed to allow the planning team to consider the widest possible range of issues and develop feasible management solutions that respond to these issues. These management solutions are then incorporated into one or more alternatives evaluated in the EA process and considered for inclusion in the CCP.

Actions and alternatives that are not feasible or may cause substantial harm to the environment are usually not considered in an EA. Similarly, an action (and therefore, an alternative containing that action) should generally not receive further consideration if:

- It is illegal (unless it is the No Action Alternative, which must be considered to provide a baseline for evaluation of other alternatives, even though it may not be capable of legal implementation).
- It does not fulfill the mission of the National Wildlife Refuge System.
- It does not relate to or help achieve one of the goals of the Refuge.
- Its environmental impacts have already been evaluated in a previously approved NEPA document.

However, if such actions or alternatives address a controversial issue or an issue on which many public comments were received, they may be considered in detail in a NEPA document to demonstrate clearly, why they are not feasible or would cause substantial harm to the environment.

During the alternatives development process, the planning team considered a wide variety of potential actions on the Refuge. The following actions were ultimately rejected and excluded from the alternatives proposed here because they did not achieve Refuge purposes or were incompatible with one or more goals.

2.2.1 Habitat Management

Receding Water Table

The Ogallala aquifer continues to decrease due to withdrawal from local residential, commercial and agricultural use. This issue is outside the scope of the Plan and will not be considered in the analysis.

2.2.2 Wildlife Management

Reintroduction of Native Fauna

The refuge considered reintroducing bison and pronghorn on Buffalo Lake NWR. Currently, there are no bison or pronghorn on the refuge, although historic populations did exist. The American bison was extirpated from the region in 1880. In 1924, only 10 pronghorn were recorded in Randall County, Texas, where the refuge is located. As these species have not been present on refuge lands for nearly a century, the staff would have to make substantial changes to the refuge to re-establish them. Extensive fence work would need to be conducted to protect the safety of animals and visitors. Furthermore, pronghorn require habitat where they can see and run long distances, and the refuge is too small to meet their requirements. Therefore, the refuge considered this action but determined that it would not relate to or help achieve refuge goals.

2.2.3 Visitor Services

Horseback Riding

Allowing horseback riding was also considered by refuge staff. Historically, this activity was permitted. A recent Compatibility Determination (CD), however, showed that such activity was detrimental to the quality of natural habitats and wildlife activity on the refuge. The action would cause disturbance to wildlife and conflicts between existing visitor service activities, such as birding and photography. Furthermore, the CD found that this action would potentially result in increased soil erosion, introduction and spread of invasive plant species, and grassland degradation. Between the exorbitant construction, maintenance, and monitoring costs associated with this use and the potential impacts documented in the CD, the refuge concluded that horseback riding is not a compatible use. This action materially interferes with and does not satisfy the purpose and need for which this EA is being prepared.

Shift Refuge Emphasis

The refuge considered the public suggestion that Buffalo Lake NWR shift their emphasis completely from waterfowl to grassland wildlife. The refuge, however, manages both sets of habitats equally to provide for all birds and wildlife species. This balanced approach to management is consistent with the purpose of the refuge. Switching the management focus to grassland wildlife would not help the refuge achieve its goals. Ultimately, the refuge manages for migratory birds, including waterfowl, neotropical migrants, and grassland-dependent species; therefore, this action was not considered in detail.

Comparison of Alternatives

Issue Topic	Alternative A: Current Management	Alternative B: Proposed Action	Alternative C
Habitat Management			
Climate Change	No current management direction	Establish a baseline dataset for refuge resources. From this dataset, a decision-based research and monitoring program will be developed to track any potential impacts climate change may have on the refuge.	Same as Alternative B.
Habitat Fragmentation	Limit the amounts and types of all new infrastructures such as roads and trails on the refuge.	Same as Alternative A, plus the development of a Land Protection Plan of an additional 20,000 acres would guide land acquisition for the refuge and further conservation efforts in the area and reduce human encroachment on the refuge.	Same as Alternative B.
Wind Energy Research	Conduct a diurnal avian activity survey and acoustic monitoring in order to track any changes in habitat and wildlife.	Same as Alternative A, plus actively track wind energy development projects in and around Randal County to assist the refuge in anticipating potential changes in habitat and wildlife.	Same as Alternative B.
Prairie Management and Restoration	Use grazing and prescribed fire to promote and maintain prairie habitat.	Same as Alternative A, plus the refuge would supplement current management with reseeding parts of the refuge with native short grasses.	Cease using grassland leasing for livestock grazing and permit native fauna species, whose populations would be permitted to increase under this alternative, to graze freely without competition on the refuge. The 7-year prescribed fire program as described in Alternative A would continue.
Invasive Flora Species	Remove invasive flora through chemical means.	Same as Alternative A, plus the refuge would utilize additional chemical treatment on invasive species through the use of aircraft application, followed by the mechanical removal of aboveground systems.	Same as Alternative B.
Moist Soil Management	Maintain 40 acre Moist Soil Unit.	Same as Alternative A, plus the addition of three -40-acre moist soil units and the related pumping infrastructure. The water source, like the current moist soil units, will be a well from the Santa Rosa Aquifer	Developed sufficient moist soil units to maintain the level which was available to wildlife prior to the Ogallala Aquifer receding due to human activity and use.

Comparison of Alternatives

Issue Topic	Alternative A: Current Management	Alternative B: Proposed Action	Alternative C
		baffles to insure no Ogallala water is used.	
Lakebed Management	Cooperatively farm 581 acres of the dry lakebed.	Reduce all farming activities to approximately half of current management; this would limit farming activities to no more than 300 acres. Additionally, previously farmed lands would be converted back to natural vegetation.	Remove all farming activity from the refuge and convert farming lands to native vegetation.
Water Quality	Continue to utilize the current water retention structure at Umbarger Dam.	Same as Alternative A, plus the installation of bio-filters and necessary groundwater pump infrastructure in order to remove coli forms from surface and ground water flowing from adjacent and nearby cattle operations. This infrastructure would be located on the Refuge.	Same as Alternative A.
Wildlife Management			
Native Fauna	Maintain current levels of prairie dogs, mule deer and white tailed deer.	Same as Alternative A	Same as Alternative A.
Invasive Fauna	Manage invasive fauna throughout the refuge.	Same as Alternative A	Same as Alternative A.
Visitor Services			
Hunting	There is currently no hunting permitted on the refuge and a hunt plan has not been developed.	Introduce hunting to the refuge to assist in controlling invasive fauna species as well as control the populations of native fauna species	Same as Alternative B.
Fishing	Currently, no fishing in the refuge.	Construct a 6+/-acre public fishing pond-near existing viewing blind by the lake bed and Stewart Marsh.	Same as Alternative B.
Environmental Education and Interpretation	The refuge hosts and annual education day for school children from surrounding communities. Refuge staff maintains an environmental	Same as Alternative A plus increase the number of education days (as requested) to a maximum of one per month. The refuge would also develop and construct 20 interpretive panels. Expansion of existing auto tour route would open areas of the refuge that are closed to the public due to safety concerns.	Same as Alternative B.

Comparison of Alternatives

Issue Topic	Alternative A: Current Management	Alternative B: Proposed Action	Alternative C
	education area for education/interpretation programs; both the education area and the staff are available upon request to provide environmental education and interpretation presentations. Maintain interpretation on the auto-tour route and self-guided hiking trails.		
Wildlife Observation and Photography	Maintain hiking trails and the auto-tour route, observation decks, viewing blinds and scenic overlooks. The refuge maintains two viewing blinds, one at Stewart Marsh and another overlooking the prairie dog town.	Same as Alternative A, plus the installation of six additional blinds near moist soil units, prairie dog town and Unit 12 (for deer).	Same as Alternative B.
Camping	The refuge currently permits primitive camping in a designated 25-site campground that has picnic tables and restroom facilities.	Same as Alternative A.	Same as Alternative A.
Facilities Management			
Administrative Facilities	Maintain headquarters and Visitors Center.	Same as Alternative A plus develop an Administrative Complex to include headquarters, Visitors Center, biological lab, maintenance and storage facility.	Same as Alternative B, plus increase infrastructure to provide the refuge with sufficient water sources to mimic the amount as historically provided by the natural spring. This would provide

Comparison of Alternatives			
Issue Topic	**Alternative A: Current Management**	**Alternative B: Proposed Action**	**Alternative C**
			the same habitat that was available to wildlife prior to the Ogallala Aquifer receding due to human activity and use.
Public Use Facilities	Limited public use facilities include photo blinds, four parking lots, six vault toilets	Same as Alternative A, plus expand construction and maintenance of two additional hiking trails, one near the Prairie Dog town and the other through grassland prairie habitat near the campground. The refuge would also replace and/or rehabilitate the existing chemical toilet facilities adjacent to the campground with facilities that can remain open year round.	Same as Alternative B.
Quality and Safety of Refuge Roadways	Maintain current road infrastructure.	Same as Alternative A, plus the rehabilitation of the entrance road from F.M. 168 to headquarters with a two lane paved road with adequate shoulders. Resurfacing of the remaining refuge roads with new caliche.	Same as Alternative B.

Table C-1 Comparison of Alternatives

2.3 Management Direction Common to All Alternatives

Although the alternatives differ in many ways, there are similarities among them; several elements of refuge management are common to all alternatives. These common management activities are listed below to reduce the length and redundancy of the individual alternative descriptions.

2.3.1 Habitat Management

Umbarger Dam

Section 3.6.1 of the CCP discusses the history of Umbarger Dam. Since the inception of the dam, water flowing over the spillway occurred in 1941, 1951, and again in 1960. The first time the dam completely dried out was in April of 1971, since that time it has filled within 5 feet of the spillway in a four hour period in 1978, and filled up to 12% capacity in 1998 (PC Niemeyer). The rest of the time the lakebed has remained dry. Since the dam has held water for short periods of time only 3 times in the last 30 years, management of the lakebed has remained relatively unchanged. Habitat features provided by water in the dam have been few and far

between dictating the Refuge to manage the dry lakebed using farming methods to best manage the needs of migrating waterfowl.

With the initial problems of the dams engineering documented in 1941 shortly after its completion it was not modified until 1993. Now similar improvements are needed as were completed in 1993. Since these improvements are very expensive and short lived the Service is currently considering alternatives for the dam to best meet the Refuge's vision for the future, the purpose of establishment , and the habitat, wildlife and visitor service goals identified in the CCP. Once the Service has decided on the preferred direction on future management of the dam it will include National Environmental Policy Act standards and guidelines including an associated decision document (i.e. Finding of No Significant Impact) and related documents accompanied with a public review period. In the meantime, management direction for the dam will be common to all alternatives with detailed analysis included in lakebed management in section 2.4.

Wildland Fire

All wildland fires will be suppressed. Suppression strategies range from monitoring the fire while allowing it to burn itself out (as in the case where no life, property, or resources are threatened and/or smoke management is not an issue of concern), to full suppression (if life, property, and resources are threatened and/or smoke management is an issue of concern).

The Buffalo Lake NWR will use a decision support process to guide and document wildfire management decisions. The process will provide situational assessment, analyze hazards and risks, define implementation actions, and document decisions with corresponding rationale. When needed, the refuge would manage wildland fires for more than one objective, and objectives can change as the fire moves across the landscape. Objectives are affected by changes in fuels, weather, topography; varying social understanding and tolerance; and involvement of other governmental jurisdictions having different missions and objectives (NIFC 2012). Initial action on human-caused wildfire will be to suppress the fire at the lowest cost with the fewest negative consequences with respect to firefighter and public safety. Fire management strategies will consider current landscape conditions and spatial and temporal components of the fire regime.

2.3.2 Wildlife Management

The refuge provides habitat for approximately 345 species of birds, 51 species of mammals, 47 species of reptiles and amphibians. Although the refuge does not actively manage species populations, refuge habitat management activities typically are designed to benefit many of these species. Wildlife management efforts are not anticipated to change across any of the alternatives.

Threatened and Endangered Species

The purpose of the Endangered Species Act (ESA) of 1973 (Endangered Species Act 1973) is to conserve "the ecosystems upon which endangered and threatened species depend" and to conserve and recover listed species. Under the law, species may be listed as either "endangered (E)" or "threatened (T)." Endangered means a species is in danger of extinction throughout all or a significant portion of its range; threatened means a species likely to become endangered within the foreseeable future. Proposed species means any species of fish, wildlife, or plant that is proposed in the Federal Register to be listed under section 4 of the ESA. A total of two listed species have been identified as having potential to occur in Randall County, Texas including the whopping crane and the interior least tern and are identified on Table 3-1 of the CCP. No federally listed plant species are documented on the refuge. The actions proposed in the CCP are not likely to adversely affect threatened or endangered species, or their habitats.

Native Fauna

The refuge would continue to manage prairie dog populations through the use of barrier fences and the establishment of raptor perches around the existing prairie dog town to limit population growth. The refuge currently does not have any management programs in place that would assist in controlling population levels of mule-deer and white-tailed deer; collared dove, ring-necked pheasant and starling.

Invasive Fauna

Currently, the refuge does not have a problem with feral hogs but does have potential habitat. The refuge will continue to remove feral hogs if they are observed on the refuge. Staff will maintain a "shoot on site" policy of feral hogs is observed on the refuge to minimize the possibility of hog establishment. If feral hogs signs are observed on the refuge , staff will also initiate trapping to remove as soon as possible. The same applies for feral dogs and cats.

Wind Energy Research

In anticipation of possible construction of wind turbines near the refuge, refuge staff currently works with a regional wind energy developer to conduct a diurnal avian activity survey and acoustic monitoring. These efforts are conducted in order to better understand the impacts of wind energy developments on migratory birds. Under the no action alternative, these partnership efforts would continue allowing the refuge to track any changes in habitat and wildlife as a result of new developments.

2.3.3 Visitor Services

Camping

The refuge would continue to allow primitive camping in designated campgrounds that are equipped with picnic tables and a pull-in parking area with restroom facilities nearby. The campground contains 25 camp sites plus a group site. Open fires are prohibited, but the use of propane cook stoves are allowed.

Bicycling
Bicycling will continue to be permitted on the auto tour route; however, cross country or off-road uses of bicycles are prohibited.

Refuge Name Change
As suggested by the public, the refuge considered the possibility of changing the name of the Buffalo Lake NWR. The refuge was established under this name in 1959, and has been managed under this name ever since. Confusion occurs due to visitors arriving expecting to view a lake that is now dry, and buffalo that are now extirpated. Further confusion lies with Buffalo Springs Park in Lubbock and in addition there is a Buffalo Lake National Wildlife Refuge in the Dakotas. The suggestion is to change the name of the refuge to Tierra Blanca National Wildlife Refuge while retaining the name Buffalo Lake for the lake bed dry or wet.

2.3.4 Facilities Management

Cultural Resources
The refuge would continue to identify, protect, and manage all significant cultural resources for the benefit of future generations. The refuge would administer, preserve, and protect these resources in such a manner that sites, buildings, structures, and other objects of cultural value are preserved and maintained for scientific study and public appreciation and use. The refuge would ensure that during the appropriate stages of decision-making affecting these resources such as construction, land use, or resource planning, and land acquisition or disposal, full consideration is given to cultural resources. The refuge will ensure that prior to any ground disturbing activities, archeological surveys will be conducted according to State Historical Preservation Office (SHPO) standards. The refuge will also ensure that if new sites are discovered, they will be secured, recorded, and archived according to SHPO standards.

Oil and Gas Operations
The refuge does not own any mineral rights. The refuge does not currently have any active oil or gas well sites or production facilities, and only a slight possibility exists of any new discoveries. There are currently over 8 miles of pipelines located through various refuge units. Except for pipeline construction projects within existing right-of-ways, the remaining pipelines were in place before the inception of the refuge. Although very rare, occasional spills or blow-outs could occur in pipes, causing damage to habitat and wildlife. Mitigation measures will be incorporated to all special use permits allowing any activities relating to oil and gas development and require operators to submit a “Development and Operations Plan” for approval by the Refuge Manager.

Service policy 612 FW 2 states that the objectives of oil and gas management on Service lands are to protect wildlife populations, habitats, and other resources and to provide for the exercise of non-Federal oil and gas rights while protecting Service resources to the maximum extent possible. In accordance with 50 CFR 29.32, persons holding mineral rights shall, to the greatest

extent practicable, conduct all exploration, development, and production operations in such a manner as to prevent the damage, erosion, pollution, or contamination to the lands, waters, facilities, and vegetation of the area. Such operations must also be conducted without interference with the operation of the refuge or disturbance to wildlife and would be subject to prior approval by the Service. All operations would be required to operate under current local, State, and Federal regulations and policies.

Operators would be required to prevent, to the maximum extent possible, releases of hazardous materials and substances, crude oil, and produced water. Each operator and/or facility operator would have a current Oil Discharge Prevention and Contingency Plan, outlining procedures for securing and clean-up of accidental releases. Sampling, remediation, and restoration of contaminated sites would be the responsibility of the operator and/or facility operator and would occur in consultation with the Service and the appropriate State agency. All sites no longer being used by industry would be sampled for contaminants at the operator's expense to ensure proper disposal of material and that refuge staff and/or the visiting public are not exposed to contaminants.

All oil and gas activities conducted on the refuge require the use of "best management practices" as defined in the Operational Plan and/or Special Use Permit. Efforts to minimize environmental impacts in wetland habitats include special conditions such as timing of activity, types of equipment used, and use of on-site environmental monitors, as well as habitat restoration requirements, if needed. Best management practices and mitigation measures are discussed and agreed upon before the initiation of any seismic, drilling, or production activities.

The Service would request, on a case-by-case basis, that wells, roads, pipelines, and associated infrastructure and facilities not needed to support ongoing operations be removed and the sites restored to the satisfaction of the Refuge Manager.

2.4 Alternatives Analyzed in Detail

The following alternatives were developed to comply with NEPA and to provide ways to address a number of issues, concerns, and opportunities that were identified during the public and internal scoping process. Though the alternatives may have different emphases, habitat maintenance, restoration, and preservation are common elements of each alternative. The alternatives are intended to provide a range of public uses and access, and respond to significant issues or concerns identified during the planning process.

2.4.1 Alternative A – No Action (Current Management):
2.4.1.1 Habitat Management

Climate Change
In order to minimize the refuge's impact on climate change, refuge personnel actively recycles plastic, paper, printer cartridges and motor oil. Refuge staff collects plastic, paper and other recyclables and transports them to Canyon, Texas recycling dumpsters monthly. While the refuge does not address climate change in the environmental education program, it has installed solar panels, planted native trees, and recycles in an effort to reduce the carbon footprint.

Habitat Fragmentation
Currently, all of the refuge facilities are necessary for day-to-day operations and no new construction projects are proposed. Under the no action alternative, the refuge would continue to limit the creation of new roads and infrastructure (e.g., fences) in order to protect habitat integrity and promote the natural movement of wildlife. Existing fences, roads, fire breaks, utility right-of-ways, and trails would continue to be maintained regularly as they are necessary to carry out the current management programs for the refuge.

Prairie Management and Restoration
Grazing
The refuge has been using grazing as a management tool since 1959. Prior to refuge establishment, grazing was permitted during management by the U.S. Forest Service. From 1959 through 1984, grazing on the refuge took place annually in the fall, spring and summer. Grazing permits were issued to multiple permit holders each grazing season. In 1963, no summer grazing took place and summer grazing was cut from the annual grazing regime. In 1969, the Bureau of Land Management, the refuge and the Palo Duro Soil and Water Conservation District developed a plan for future guidelines of land use on the refuge. In the plan, a six month grazing program was established in which grazing could take place from October 1 to March 31. Animal Units and Animal Use Months that utilized the grazable units of the refuge were dependent upon range conditions. For example, if the area was in a drought and range conditions poor, fewer (or no) animal units were allowed to graze. If conditions were good, more animal units were allowed to graze. In 1986, competitive bids were sought from qualified livestock operators within a 30-mile radius of the refuge; the minimum bid was set at $8.30/AUM. No grazing took place on the Refuge during the following years: 1994, 1995, 1998, 2001, and 2002 due to extended drought conditions and poor growing seasons.

Currently, permit selection for refuge grazing is conducted by sealed bid. To be eligible to bid, a bidder must be a current livestock operator and have at least a portion of their livestock operation within a 30-mile radius of the refuge. Other regulations include no sub-leasing of cattle; a bidder must own at least fifty-one percent of the cattle that are to be grazed on the refuge. If the bidder desires some other person(s) cattle to help make up all or part of the remaining forty-nine percent

of livestock needed to equal the total AUMs that are required, the bidder can select whomever they choose; however, the bidder can only collect from that person the same dollar amount per AUM as was awarded on the bid. The bidder would be solely responsible for the livestock grazed, the amount paid and all grazing regulations. Additional AUMs may be allowed dependent upon the grassland conditions; switching cattle is not permitted once grazing has started and all livestock will be marked (branded or ear-tagged) so as to identify the bidder as the owner. Overall care of livestock is the responsibility of the bidder, no insecticides may be used on livestock while they are on the refuge and the permit holder is restricted to designated access routes and areas of travel within the refuge. If the permit holder must be on the refuge before or after dark, refuge personnel must be notified prior to going onto the refuge. The permit holder will also maintain all fences and stock watering facilities and is liable for any damages to refuge facilities such as fences, water tanks, and other property caused by livestock. The refuge manager reserves the right to discontinue grazing on any or all pastures at any time should conditions change and if continued grazing is not meeting wildlife or habitat objectives. Should grazing be terminated due to environmental change, the fee the bidder has paid for unused AUMs will be refunded. Any violations of the grazing regulations will result in the immediate cancellation of grazing on the refuge. Bid forms are mailed to interested cattle owners/operators and bid are accepted in sealed envelopes. On a preselected date the envelopes are opened and the highest bidder gets the permit to graze.

Grazing on the refuge is used as a valuable habitat management tool and the grazing strategies are designed to mimic the historical grazing of bison. Controlled livestock grazing helps keep the grassland in natural conditions; the removal of dead vegetation and hoof action are beneficial to the grassland by aerating the soil and re-seeding native vegetation which prevents plant stagnation and promotes plant succession. Improved range conditions from effective grazing practices can provide habitat conditions that promote wildlife diversity.

In 2011, grazing units 5 and 6 were bid out for grazing. A total of 522 AUMs were bid for 5 months. Grazing starts on May 15 and continues through October 15. Under Alternative A, grazing would continue as a prairie management and restoration tool.

Prescribed Fire

Each of the 7 existing fire lanes would continue to be maintained by refuge staff while the Zone Fire Crew would remain stationed at the Wichita Mountains Wildlife Refuge. Refuge fire lanes consist of approximately 113 acres and the actual burning takes place in the spring months each year.

The current Fire Management Plan (FMP) for the Refuge was written in 2009. The purpose of this FMP includes the following:

1) To meet and supplement policies, objectives, and standards for fire management presented in the Department Manual (620 DM), Service Manuals (095 FW 3, 232 FW 6, 241 FW 3, and 241 FW 7) and Fire Management Handbook (621 FW 1-5)
2) To help achieve resource management objectives to maintain the highest quality short grass prairie possible, reduce invasion of woody and invasive species and provide habitats for the largest variety of migratory birds and waterfowl.
3) To provide refuge staff written guidance in carrying out fire management operations.

Fire represents an ecological factor very important in the development and structure of nearly every terrestrial ecosystem in North America. It has been well established that plains and hardwood timber ecosystems historically experienced frequent, fast running, short duration fires. Recorded accounts of early European explorers and settlers indicate that fires were a common occurrence on the plains and were often ignited by lightning activity during the late spring to early autumn seasons.

This FMP implements these guiding principles of federal wild land fire policy:

- Firefighter and public safety is the first priority in every fire management activity.
- The role of wild land fire as an essential ecological process and natural change agent has been incorporated into the planning process. Federal agency land and resource management plans set the objectives for the use and desired future condition of the various public lands.
- Fire management plans, programs, and activities support land and resource management plans and their implementation.
- Sound risk management is a foundation for all fire management activities. Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity.
- Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.
- Fire management plans and activities are based upon the best available science.
- Fire management plans and activities incorporate public health and environmental quality considerations.
- Federal, State, tribal, local, interagency, and international coordination and cooperation are essential.

Standardization of policies and procedures among federal agencies is an ongoing objective. This FMP meets the direction in the National Fire Plan because it emphasizes the following primary goals of the *10-Year Comprehensive Strategy and Cohesive Strategy for Protecting People and Sustaining Natural Resources*:

- Improving fire prevention and suppression,
- Reducing hazardous fuels,
- Restoring fire-adapted ecosystems, and
- Promoting community assistance.

Invasive Flora Species

The primary invasive species on the refuge include salt cedar, Siberian elm, Russian olive, kochia, and musk thistle. These species out-compete native plant species and reduce the quality and quantity of refuge habitat. Currently, these species have encroached upon 2 percent of the refuge. The majority of the non-native trees are located within or around the edges of the lake bottom and along Tierra Blanca Creek; currently their rate of spread is limited due to the lack of reliable flooding and refuge management actions.

The refuge is currently using 100 gallon pump sprayers to treat Salt Cedar and occurs from May through September, weather permitting. Kochia and musk thistle is treated using a 50 gallon pump/boom sprayer. Kochia is treated spring and summer depending on available staff while musk thistle is usually treated in April and May while they are in rosette stage. The products that are used to treat invasive species include Roundup Pro, Glyfos X-Tra, Garlon 4, Garlon 3A, Habitat, and the corresponding surfactants. All products are used following the label instructions.

The refuge would continue to remove invasive species, including salt cedar, Russian olive, and musk thistle, by manually-applied chemical means. This management is guided by the refuge's Integrated Pest Management Plan completed in 2001. As part of the no action alternative, refuge staff would continue to chemically treat 30 to 50 acres (less than 0.01 percent of the refuge's 7,664 acres) for invasive species each year between April and September. The refuge would continue to monitor the spread of salt cedar and Russian olive annually to determine appropriate management strategies as these species may take several years to eradicate.

Moist Soil Management

Historically, Buffalo Lake provided 2,818 acres of wetland habitat. Since the lake has dried, the refuge has used moist soil management units to mimic this historic habitat. Currently, the refuge provides wetland habitat to migratory waterfowl, shorebirds, and wading birds on a total of 40 acres (less than 0.01 percent of the refuge's 7,664 acres) comprised of ten, four-acre ponds. Wetland habitat, then, makes up only 1.4 percent of the original habitat provided by Buffalo Lake. This management would continue under Alternative A. Each of the ten ponds would continue to be watered in the fall and spring to maintain moist soils that promote naturally-occurring aquatic food plants such as curly dock, pine smart weed, bulrush and barnyard grass. These plants provide calories required for migration for waterfowl and shorebirds as well as providing an additional food source for numerous species of wading birds. Units are flooded

during migration and wintering periods to accommodate populations of waterfowl and wetland-dependent wildlife

Lakebed Management

When the dam was constructed in 1938 on upper Tierra Blanca Creek, it created an artificial reservoir with a capacity of 18,150 acre-feet. In the 1950's, a severe drought adversely impacted the area and coupled with irrigation practices on farm and ranchlands in the area, the water table has considerably decreased. By the 1970's the lake was beginning to dry because of irregular water inflow. Today, the lake is usually dry unless a large rain event occurs over the watershed. The lake usually receives water every 5 to 10 years which is retained if there is enough rainfall.

Under Alternative A, 581 acres of the dry lakebed (2,818 acres total) would continue to be managed through a cooperative farming program. Farming is currently conducted to reduce nitrogen and phosphate loads, decrease invasive weed species and woody vegetative encroachment into the lake, provide wildlife food, and reduce fire danger. Under this alternative, the lakebed would continue to be planted in winter wheat, milo, and sorghum. The cooperative farming agreement specifies that the cooperator may harvest two-thirds of the crop but must leave one-third of the crop in the field to provide food and habitat for wildlife in the fall and winter. Plowing and subsequent planting would continue to occur between mid-August and October, and harvests would occur between mid-May and mid-July. Buffalo Lake NWR does not permit the use of genetically modified crops (GMCs) in their farming program.

The rest of the lakebed is not farmable due to encroachment of salt cedar. As discussed previously, the refuge plans to eradicate this invasive flora through chemical methods. The refuge does not actively plant native grasses in the lakebed and relies on natural seeding of grasses and succession for the spread of native vegetation.

Water Management

The refuge retains surface water during flood events by using the Umbarger Dam. Water retention continues to permit fecal coli forms originating from off-refuge cattle operations (dairy farms) to settle on the lake bed. The water then either percolates downward entering the groundwater or flows through the dam during periods of excess rainfall and moves down the watershed. Currently the Standard Operating Procedure and Emergency Action Plan calls for the gate at Umbarger Dam to remain open one inch and allow this contaminated water down the watershed into habited areas. This is not acceptable and now the water is contained retaining the contamination and providing exceptional water habitat for wildlife not affected by the pollution.

2.4.1.2 Visitor Services

Photo C-2 Refuge Display Panel

Hunting

The refuge currently does not have an approved hunt plan in place. Under the no action alternative, no hunting would occur on the refuge.

Fishing

The refuge does not currently offer fishing opportunities because there is no fishery habitat available on the refuge. Fishing occurred on the refuge prior to the 1960s before high nitrates and coli form counts from adjacent land uses (cattle operations) prohibited individuals from taking fish out of the lake for human consumption. Under the no action alternative, fishing would not occur on the refuge.

Environmental Education and Interpretation

Opportunities for interpretation are provided on the refuge through the use of the 5-mile auto tour route and 2.25 miles of self-guided hiking trails. The auto-tour route has nine kiosks that offer refuge visitors an opportunity to learn about the refuge. The Cottonwood Canyon Birding Trail also has six interpretive kiosks but limited space in the existing office and visitor center restrict the use of interpretive displays; however, refuge brochures are located in the office as well as the entry kiosk. Environmental education is offered on the refuge during an annual

education day and on an as-needed basis when local schools request a course on the refuge. In the past, the refuge has provided environmental education opportunities to West Texas A&M University, Texas Tech, and various clubs such as Amarillo Astronomy Club. The refuge participates in other educational events, such as speaking at Kiwanis and Lion's Club meetings, Girl and Boy Scout groups as well as local school events.

The current environmental education and interpretation programs would continue under Alternative A. The refuge would continue to host an annual education day for surrounding schools who are invited to the refuge to learn about its purposes and the natural processes and wildlife that exist on and around Buffalo Lake NWR. Refuge staff also would continue to maintain an environmental education area for hosting similar programs, and staff would remain available upon request to provide environmental education and interpretation presentations.

Wildlife Observation and Photography

The refuge offers a variety of opportunities for wildlife observation and photography by providing walking and birding trails, an auto tour route, observation decks, and scenic overlooks. Two trails exist on the refuge: Cottonwood Canyon Birding Trail and the Prairie Dog Town Walking Trail. The Cottonwood Canyon Birding Trail is one-half mile long and features restrooms, benches, and an interpretive trail head sign. The Prairie Dog Town Walking Trail offers information on the prairie dog town ecosystem. The auto tour road, however, is the most convenient way to observe wildlife and habitats. The auto tour route takes visitors through grasslands, introduced woodlands which include cottonwood trees and elm plantings, dry playas, farm fields, and the "Windmill for Wildlife" exhibit. The route begins with a rangeland interpretive display and ends at the Stewart Marsh observation deck and photo blind for a total of approximately 5 miles. Within the woodlands, elm and cottonwood trees were planted and in the farm fields a visitor can see winter wheat, milo, or hay depending upon the time of year.

Photo C-3 Refuge Photo Blind. USFWS

Under the no action alternative, the refuge would maintain its existing wildlife observation and photography opportunities. The refuge would maintain two viewing blinds for the purposes of wildlife observation and photography. The first blind at Stewart Marsh overlooks the moist soil units and provides an opportunity to view shorebirds and waterfowl. The second blind is at the prairie dog town, which allows the public to view the unique ecosystem that these prairie dogs create along with the other wildlife species that live in or use the prairie dog town. The refuge also would continue to maintain its approximately 5-mile auto tour route and 4 miles of hiking trails with easily observed signage in accordance with current Service standards. Under Alternative A, no new opportunities would be pursued or provided.

2.4.1.3 Facilities Management

Administrative Facilities

The current facilities would continue to be maintained under the no action alternative. These include the Refuge Headquarters and existing 1,412 square foot shop facilities. Work on heavy equipment would continue to be conducted outdoors when weather allows as equipment does not fit into the current shop. Necessary tools and shop equipment also are not present causing many repairs and maintenance needs to be conducted off site despite the skill and knowledge of existing refuge staff.

In addition, under the current management, the refuge would continue to maintain the six existing windmills that pump groundwater to be used as a water source for wildlife.

Public Use Facilities

The refuge would continue to allow public access on 1,301 acres, or 17 percent of the refuge. The remaining 6,417 acres would remain closed to the public to preserve wildlife and their habitats, ensure public safety, and provide for the primary mission of the National Wildlife Refuge System.

Facilities would retain their existing public use hours under the no action alternative. Refuge headquarters would be open from 8:00 am to 4:30 pm Monday through Friday year-round. The refuge itself would be open from 8:00 am to 6:00 pm from October 1 through March 31 and from 8:00 am to 8:00 pm from April 1 through September 31. The refuge would continue to maintain the existing restroom facilities throughout the refuge and Visitors Center. Vault toilets would remain open year-round while flushable toilets would be closed during the winter.

Quality and Safety of Refuge Roadways

The refuge has 9.5 miles of public roads include the entrance and tour road, camping road, and birding routes. Roads are maintained year-round as they are gravel, which tends to pit out and wash away during periods of heavy use or inclement weather. This maintenance would continue under Alternative A.

2.4.2 Alternative B – Proposed Action:

2.4.2.1 Habitat Management

Climate Change

Under the proposed action, the refuge would establish a baseline dataset for refuge resources. To do so, the refuge would use technologies including historical imagery and tabular data, existing maps and records, contemporary ortho-rectified imagery, ground truthing, and on-screen digitizing. From this baseline dataset, the refuge would develop a decision-based research and monitoring program to track potential impacts from climate change on the refuge.

Habitat Fragmentation
Management would continue as described in Alternative A, plus the refuge would develop a Land Protection Plan of an additional 20,000 acres to guide land acquisition for the refuge, further conservation efforts in the area, and reduce human encroachment on the refuge.

Wind Energy Research
Management would be the same as Alternative A, plus the refuge would continue to develop partnerships with state, federal, and private entities to actively track wind energy development projects in and around Randall County. This step-down plan would assist the refuge in anticipating and reacting to potential changes in habitat and wildlife.

Prairie Management and Restoration
Methods to manage and restore prairie habitat would be the same as Alternative A coupled with reseeding parts of the refuge with native short grasses. Seeding would occur in areas on an as-needed basis by refuge staff and/or a contracting agency with seeds bought from local suppliers. The use of prescribed fire and grazing would continue.

Invasive Flora Species
Same as Alternative A, plus the refuge would chemically treat invasive species through the use of aircraft-application. Application would be followed with the mechanical removal of above ground systems. Aerial application of invasive fauna will increase the acres that can be treated annually. This will help speed up the process of restoring habitat on the refuge. Aerial treatment of invasive species has not been applied to the area. With advances in treatment techniques and lower cost it would be beneficial and cost effective to incorporate aerial application.

Moist Soil Management
Same as Alternative A, plus the refuge would add three 40-acre moist soil units along with related pumping infrastructure. The water source, like the current moist soil units, would be a well with filters from the Santa Rosa Aquifer, ensuring that no water from the Ogallala Aquifer is used.

Lakebed Management
Under Alternative B, the refuge would reduce all cooperative farming activities in the dry lakebed to approximately half of the current management, or no more than 300 acres. Previously farmed lands would be converted back to natural prairie grasses. Under this alternative the refuge would plant areas of the dry lakebed with native grasses and shrubs providing improved habitat for all species of migratory birds and resident wildlife.

Water Management
Same as Alternative A, accompanied with the installation of bio-filters and necessary groundwater pump infrastructure designed to remove coli forms from surface and ground water. In addition, the refuge would develop and construct added windmills and subsequent infrastructure for the purposes of pumping water from the Santa Rosa Aquifer for use on the refuge.

2.4.2.2 Visitor Services

Hunting
The Refuge strives to maintain native wildlife populations at a reasonable level so as not to exceed carrying capacity. Under Alternative B, the refuge would develop a step-down management plan to introduce hunting to the refuge to assist in controlling invasive fauna species as well as control the populations of native fauna species, the growth of which might eventually exceed the carrying capacity of the refuge. The species which would be impacted by the hunt plan are mule and white-tailed deer but may also include collared dove, ring-necked pheasant and starling should population numbers become excessive.

Fishing
Through the proposed action, the refuge would construct a 6-acre public fishing pond utilizing water pumped from one of the proposed windmills discussed under "Water Management" above. The pond will be constructed near the existing viewing blind by the lakebed and Steward Marsh.

Environmental Education and Interpretation
The refuge will increase the number of education days to a maximum of one per month. The refuge would also develop and construct interpretive panels explaining why certain areas of the refuge are closed to the public highlighting the hazardous environment surrounding the spillway. These panels would also provide information on the effects of human encroachment on migratory birds. Under this alternative, the auto tour route would also be expanded into areas of the refuge that are currently closed to the public.

Wildlife Observation and Photography
The refuge would install an additional 6 blinds near the moist soil units, prairie dog town, and Unit 12. These additional blinds will provide the public with increased opportunities for wildlife observation on the refuge.

2.4.2.3 Facilities Management

Administrative Facilities
The refuge would develop a new integrated administrative complex within the existing administrative boundary. The complex would include a new headquarters, visitor center, dedicated biological lab, and a refurbished paved parking lot. The refuge would also replace the existing shop facilities with a 3,000 square foot facility complete with more equipment bays for

repair and maintenance of heavy equipment. The new shop would include equipment and elements necessary to facilitate the refuge's self-sufficiency; elements may include larger bays, a heavy duty crane, wood-working areas, welding areas, and a paint shop.

Public Use Facilities

The refuge would expand the headquarters operation hours to include Saturday and Sunday from 8:00 am to 4:30 pm. The refuge would construct and maintain two additional hiking trails, one near the Prairie Dog Town and one through grassland prairie habitat near the campground. The refuge would also hire a dedicated law enforcement officer for the refuge to protect against trash and vandalism on the refuge. The refuge would replace or rehabilitate the existing chemical restroom facilities to increase the availability of restrooms during winter months. The refuge would also rehabilitate the entrance road from F.M. 168 to headquarters with a two-lane paved road and adequate shoulders. Under this alternative, the refuge would resurface the remaining refuge roads with new caliches sufficiently engineered to support heavy vehicle use and visitor traffic.

2.4.3 Alternative C

2.4.3.1 Habitat Management

Prairie Management and Restoration

The refuge would eliminate livestock grazing from the existing prairie management and restoration program. In its place, the refuge would permit native fauna, whose populations would be permitted to increase under this alternative, to graze freely without livestock competition. The refuge would still monitor grassland habitat to ensure that overgrazing does not occur; should it be determined that a unit is being overgrazed, the refuge hunting program would allow for additional native fauna to be taken.

Moist Soil Management

Under this alternative, restoration efforts would restore moist soil units to a similar acreage which was available to wildlife prior to the Ogallala Aquifer receding due to human activity and utilization. This would require subsequent development of three- 40 acre moist soil units, along with another well to help fill the moist soil units. This addition would help mimic the amount of water historically provided by the original natural spring that fed Buffalo Lake through the 1970's.

Lakebed Management

Under Alternative C, all farming activity would be removed from the refuge and lands converted back to native vegetation. Native vegetation would then be managed accordingly in order to reduce nitrogen and phosphate loads, decrease invasive weed species and woody vegetative encroachment into the lake, provide wildlife food and habitat, and reduce fire danger.

2.4.3.2 Facilities Management

Administrative Facilities

Alternative C would be the same as Alternative B but would need to increase necessary water supply infrastructure to meet the additional water needs of the Moist Soil Management and Lakebed Management sections described under Alternative C. This infrastructure including an additional well would be designed to provide the refuge with sufficient water sources from the Santa Rosa Aquifer to become available to migratory waterfowl. This would include drilling a new well in order to provide the water to the additional moist soil units as described in alternative B.

3.0 Chapter 3 – Affected Environment

For information regarding the affected environment, see Chapter 3 of the CCP.

4.0 Chapter 4 – Environmental Consequences

This section analyzes and discusses the potential environmental effects or consequences that can be reasonably expected by the implementation of each of the three alternatives described in Chapter 2 of this EA. For each alternative, the expected outcomes are portrayed through the 15-year life of the CCP.

This chapter identifies, describes, and compares the impacts of implementing the three alternatives proposed in this EA on the refuge's physical, biological, and socio-economic environment. Current management (Alternative A, the No Action Alternative) provides the basis for comparing the effects of the action alternatives (Alternatives B and C). The direct, indirect, and cumulative effects of each alternative are analyzed in this chapter, as defined in section 4.1.

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 effects may result from singularly minor but collectively significant actions taking place over a period of time.

An analysis of the effects of management actions on the physical environment has been conducted for air quality, water resources, and soils. Analysis of the effects of management actions on the biological environment have been conducted for vegetation/habitat, wildlife, and species of special concern (e.g., threatened and endangered species). Although all plant, animal, and fish species on the refuge are important, many species are not expected to experience any change as a result of implementing any of the alternatives. Therefore, the only species discussed are those that may be impacted. An analysis of the effects of management actions on the socio-economic environment were conducted for cultural resources, local populations and economy, public use opportunities, aesthetic/visual resources, and visitor use facilities.

Potential impacts are described in terms of type, duration, intensity, and context (scale). General definitions are as follows.

4.1 Definition of Terms

A list of definition used in used in this analysis is provided below:

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 quality 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 possible 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; impacts are so small that they would not be measureable.

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; impacts are detectable but would only affect a small area.

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; effects would be readily apparent and would occur over a relatively large area but are not extreme or excessive.

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; effects would be readily apparent and would substantially change the characteristics of the resource.

Scale of Impact

Site-specific effects are those impacts that occur solely within the project area.

Local impacts are those that would occur within and immediately surrounding the project area.

Refuge-wide effects are those that would occur across the entire refuge landscape.

Widespread impacts are those that would occur beyond the refuge landscape.

4.2 Effects Common to All Alternatives

Some potential effects will be the same or very similar under each alternative and will be very similar under each alternative, as summarized in this section.

Climate Change

Carbon sequestration is climate-related impact to be considered in planning. Vegetated land is a tremendous factor in carbon sequestration. Terrestrial biomes of all sorts, grasslands, forests, wetlands, tundra, and desert, are effective both in preventing carbon emission and acting as biological “scrubber” of atmospheric CO2 (U.S. Department of Energy 1999).

Conserving the prairie grasslands is the main management focus for this CCP. The actions proposed in this CCP would conserve or restore land and habitat, and would thus retain existing carbon sequestration efforts on the refuge and help mitigate human-induced global climate change.

One potential refuge activity in particular, prescribed burning, releases CO2 directly into the atmosphere from the biomass consumed during combustion. The refuge prescribed fire program is primarily limited to maintain natural fire regimes of prairie and grassland habitat. Overall, there should be little or no net change in the amount of carbon sequestered at the refuge from any of the proposed management alternatives. The use of green technology and products would reduce the refuge's carbon footprint.

Predicted long-term climate-change-related impacts would occur regardless of which of the management alternatives under consideration here is ultimately selected by the Service. Over the 15-year life of the CCP, impacts associated with climate change are likely to be adverse, minor to moderate, and widespread.

General Impacts of Herbicide Use

Chemical herbicides are one of the main methods the Service uses to control invasive plants on national wildlife refuges. Herbicides can efficiently and effectively suppress or kill unwanted plants and used in such a manner as to minimize adverse effects on non-target resources. An herbicide suppresses or kills plants by decreasing their growth, seed production, and competitiveness (USFWS 2009).

The benefits of herbicides in controlling invasive plants must be weighed against the potential for exposure and impacts to human health, non-target organisms, and the environment. The Federal and State governments regulate herbicides to ensure that they do not pose unreasonable risks. The Environmental Protection Agency (EPA) requires extensive test data from herbicide producers to show that their products can be used safely. EPA scientists and analysts carefully review these data to determine whether to register (license) an herbicide and whether certain restrictions on use are needed (USFWS 2009). More information about EPA registration and re-registration of chemicals can be found at: http://www.epa.gov/pesticides.

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EPA evaluates both exposure and toxicity to determine the risk associated with the use of a given herbicide. People, non-target flora and fauna, water, and soil may all be exposed directly or indirectly to herbicides during applications and subsequent movement; this exposure can be minimized or avoided by following proper instructions and labels. For wildlife and humans, herbicides may enter the body through the skin, by swallowing, and by breathing. Once herbicides have been applied, the potential for exposure is further influenced by the many biotic (living) and abiotic (non-living) processes that affect the fate of herbicides in the environment.

Herbicide use on national wildlife refuges must be in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and other federal laws and authorities. The use of herbicides and other pesticides on refuges is governed by the U.S. Department of Interior Integrated Pest Management Policy (517 DM 1), the USFWS Pest Management Policy and Responsibilities (30 AM 12), and the USFWS Refuge Manual (7 RM 14).

USFWS policies and Refuge Manual state that refuges will use herbicides only after full consideration of management alternatives including chemical, biological, physical, and no action. If after considering all of these factors managers determine that herbicides will be used to meet invasive plant management objectives, then the least hazardous, most effective herbicides will be used to meet those objectives (USFWS, 2009).

Refuge staff must complete a Pesticide Use Proposal (PUP) whenever a pesticide is used on a refuge, including applications by staff, volunteers, contractors, or in association with a right-of-way easement or a Special Use Permit. The PUPs are usually completed and submitted by individuals with duties related to plant management and knowledge and experience with herbicides. Depending on the type of pesticide and conditions listed in the PUP, the Project Leader may review and approve the PUP or it may require review and approval by the Regional Office or even the Washington Office (WO). The National Integrated Pest Management Coordinator works with a national team to determine the appropriate level of review and approval that each pesticide requires. PUP reviewers examine each PUP for compliance with regulations to ensure that employees use the most specific and effective pesticides with the least risk to manage the target pests.

As outlined in 569 FW 1.9 J (USFWS 2010), Refuge Managers or Project Leaders must ensure that:

- Pest management decisions are consistent with all applicable policies, laws, and regulations.
- Integrated Pest Management (IPM) plans are developed and include strategies consistent with resource management goals and objectives.
- IPM practices are promoted to land owners and others whose pesticide use may affect Service lands and resources.
- Anyone applying pesticides, releasing biological control agents, and conducting other Integrated Pest Management (IPM) activities has the appropriate training and equipment necessary to protect their safety and health.
- Pesticides are applied only after the appropriate reviewer approves the PUP.
- Threshold levels of damage for pest populations are established according to Service or field station goals and objectives and applicable laws.
- Staff must verify that damage levels for pest populations exceed threshold levels at potential treatment sites prior to treatment.
- After treatment, staff determines whether the pest management action achieved the desired results and whether there were any unanticipated or non-target impacts.
- Staff store, handle, and dispose of pesticides and pesticide containers in accordance with the label and in a manner that safeguards human, fish, and wildlife health and prevents soil and water contamination.
- Submit annual reports documenting pesticide use and efficacy into the online PUPS database (USFWS, 2009).

In addition to Service policy, the approved PUPs include measures to minimize environmental impacts through the following best management practices:

- Calibrate application equipment
- Application must be in accordance with chemical label
- Field scouting/monitoring before pesticide application
- Use pesticide application buffers around sensitive areas
- Use lowest effective application rate,
- Herbicides will not be applied within 100 feet of wetlands,
- Foliar applications will not be made if wind speeds are in excess of 10 mph,
- Pesticides will not be applied after a moderate/heavy rain or if significant rainfall is forecast within 6 hours.

Each of the alternatives would follow the same procedures and each would use the same herbicides and have approximately similar rates of application. Under Alternative B, the refuge

would increase chemical treatment through the use of aircraft application followed by mechanical removal of the above ground systems of salt cedar. Environmental impacts associated with herbicide use throughout the refuge would be both adverse and beneficial. Adverse impacts may occur from localized toxicity of non-target organisms (plant and animal) and would be short-term to long-term (short-term for any given application, but long-term if the applications are repeated regularly). Herbicides would also have negligible, short-term adverse impacts on water quality. They may potentially leach into and pollute groundwater and may be flushed into surface water if improperly applied. However, proper application under conditions specified on product labels and the use of best management practices minimizes movement of herbicides from their intended targets.

Overall, during their use across both alternatives, pesticides are expected to produce minor, short-term adverse impacts but localized to the site of application. Short term adverse impacts include localized toxicity of non-target plants and animals with the use of herbicides, water quality issues if herbicides leach into or pollute ground water if improperly applied. Following label directions, proper application, and management practices would minimize the impacts. Once the invasive species are treated and subsequently reduced to manageable numbers, there is expected to be moderate, long-term beneficial impacts to the refuge as a whole.

Beneficial impacts from herbicide application would also occur under each alternative. Benefits would result from control of invasive plants that threaten to infest large areas, displacing native species of flora and fauna; these beneficial effects would be long-term, refuge-wide, and of moderate intensity.

Table 4-1 contains a list of approved chemical herbicides that are used on the refuge to control invasive plants. Each alternative would continue to allow for the use of these herbicides.

Table C-2. Herbicides Used on Buffalo Lake NWR

Active Ingredient	Brand Name	Target Species	Application	Purpose
Isopropylamine salt of Imazapyr	Habitat, Imazapyr	Saltcedar; Tamarisk, Russian Olive	Foliar	Eradicate invasive flora in woodlands and waterways
Triisopropanolammonium salt og 2-pyridine carboxylic acid, 4-amino-3,6-dichloro	Milestone	Musk Thistle Ragweed	Foliar	Eradicate invasive flora in rangelands
Glyphosate	Rodeo, Glyfos x-tra Roundup pro	Johnsongrass Musk thistle Rag weed	Foliar	Eradicate invasive flora in rangelands

Active Ingredient	Brand Name	Target Species	Application	Purpose
Triclopyr	Garlon 4	Salt bush Salt Cedar Dandelion Ragweed Mustard	Foliar, basal bark	Eradicate invasive flora rangelands and waterways
Dimethylamine salt of 2, 4-Dichloro-phenoxyacetic acid	Amine 4 2,4-D	Cocklebur Dandelion Annual broad leaf weeds Puncturevine	Foliar	Eradicate invasive flora in rangelands And parking areas
Triclopyr	Remedy	Saltcedar Dandelion Mustard Yucca	Foliar	Eradicate invasive flora in rangelands and parking areas

Petroleum Development Impacts

Currently no oil and gas drilling or production is occurring on the refuge. If and when drilling/extraction seems likely to occur on the refuge, the companies involved will be required to present the Refuge Manager with a Plan of Operations for those activities. Each operator and or facility operator must have a current Oil Discharge Prevention and Contingency Plan outlining procedures for accidental release. Sampling, remediation, and restoration of contaminated sites would be the responsibility of the operator and or facility operator and would occur in consultation with the Service and the appropriate State agency. All sites no longer in use must be sampled for contaminants at the operator's expense to ensure proper disposal of material and that the refuge staff and or the visiting public are not exposed to contaminants. The Service may request that wells, roads, pipelines, and associated infrastructure and facilities not needed to support ongoing operations be removed and the sites restored to the satisfaction to the Refuge Manager.

Reasonable restrictions may include but are not limited to seasonal restrictions designed to minimize wildlife disturbance and restriction on equipment such as to include low-pressure tired vehicles and small drilling equipment in the grasslands and around sensitive areas. Locations of the productions lines and temporary and permanent storage of equipment and facilities will be negotiated prior to drilling. All oil and gas operations must hire an environmental monitor at the operator's expense that would report to the Refuge Manager to help ensure minimal habitat damage. In Texas, refuges may accept payment for restoration work required after the operations are completed. The refuge will then conduct restoration and monitoring efforts utilizing those funds.

Petroleum exploration, extraction, and facilities operations would affect each alternative equally if initiated on the refuge. These impacts would be adverse, long-term, site-specific, and of negligible to minor intensity.

Cultural Resources

The Service is responsible for managing archeological and historic sites found on national wildlife refuges. Undertakings initiated on the refuge, as well as any ground disturbing activities, have the potential to impact cultural resources. The consequences for cultural resources would be the same under each management alternative. All refuge undertakings and ground disturbing activities to occur on the refuge are subject to Section 106 of the National Historic Preservation Act and must include consent from the State Historical Preservation Office (SHPO).

The Refuge Manager, during early planning, will provide the Regional Historic Preservation Officer (RHPO) with:

1. a description and location of all projects, activities, routine maintenance, and operations that affect ground and structures;
2. requests for permitted uses; and
3. alternatives being considered.

The RHPO analyzes these undertakings for potential to affect historic properties and enters into consultation with the SHPO and other parties as appropriate.

The Refuge Manager will ask the public and local government officials to identify concerns about impacts caused by the undertaking in a notification that is at least equal to, and preferably with, the public notification carried out for NEPA and compatibility.

Impacts on cultural resources associated with each alternative would at most be negligible to minor, site-specific, and long-term.

Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority and Low-Income Populations; February 11, 1994) was designed to focus the attention of Federal agencies 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 and environmental effects of their programs, policies, and activities on minority and low-income populations. The order intends to promote nondiscrimination in Federal programs substantially affecting human health and the environment and to provide minority and low-income communities with access to public information and opportunities for participation in matters related to human health and the environment.

None of the three management alternatives described in this EA would disproportionately place any adverse environmental, economic, social, or health impacts on minority and low-income populations. Implementation of any alternative that includes public use and environmental

education is anticipated to provide a benefit to the residents residing in the surrounding communities.

Indian Trust Assets

No Indian Trust Assets have been identified in the proposed acquisition boundary of the refuge. 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 either alternative described in the EA.

Other Common Effects

None of the alternatives would have more than negligible or, at most minor, effects on topography, noise levels, transportation, waste management, human health and safety, or visual resources.

Environmental Resource	Alternative A Current Management	Alternative B Proposed Action	Alternative C
Air Quality	*Prairie Management and Restoration* Minor short-term adverse impacts locally. *Multiple Management Actions* Minor short-term adverse impacts at the site scale through exhaust gas and fugitive dust resulting from vehicular traffic	*Same as Alternative A plus:* *Invasive Flora Species* Minor short-term adverse impacts at the refuge scale. *Multiple Management Actions* Minor, short-term adverse impacts on air quality at the site scale through exhaust gas emissions and fugitive dust from any machinery that may be used during construction	*Prairie Management and Restoration* Short-term beneficial impact at the site scale. *Invasive Flora Species* Short-term beneficial impact at the site scale. *Lakebed Management* Short-term beneficial impact at the site scale.
Water Quality and Quantity	*Prairie Management and Restoration* Minor to moderate short-term adverse impact on the Refuge scale *Invasive Flora Species* Potential short-term minor adverse impacts at the site scale. *Moist Soil Management* Major short-, medium- and long-term beneficial impacts at the refuge scale. *Lakebed Management* Short-, medium- and long-term beneficial impacts at the site scale.	*Same as Alternative A plus:* *Water Quality* Major short-, medium and long-term beneficial impacts at the refuge scale *Native Fauna* Moderate long-term beneficial impact at the refuge scale.	Same as Alternative B plus: *Moist Soil Management* Major short-, medium-, and long-term beneficial impacts at the refuge scale *Lakebed Management* Some short-term adverse impacts during the transition to moderate or major medium- and long-term beneficial impacts

Environmental			
	Water Quality Major short-, medium- and long-term beneficial impacts to water quality at the site of treatment and downstream *Native Fauna* Potential for moderate adverse impacts at the refuge scale *Multiple Management Actions* Potential to produce a short-term minor adverse impact at the local scale		
Soils	*Prairie Management and Restoration* Minor short-term beneficial impacts at the site *Invasive Flora Species* Potential to produce a short-term moderate adverse impact at the site *Moist Soil Management* Moderate short-, medium- and long-term beneficial impacts at the site *Lakebed Management* Moderate short-, medium- and long-term beneficial at the site *Native Fauna* Potential for moderate long-term adverse impacts at the refuge scale	*Same as Alternative A plus:* *Prairie Management and Restoration* Potential to produce minor short-term adverse impacts at the site scale *Moist Soil Management* Major long-term beneficial impact at the refuge scale. *Lakebed Management* Potential for short-term adverse impacts at the site scale. *Native Fauna* Moderate long-term beneficial impact at the refuge scale *Multiple Management Actions* Minor short-term adverse impact to soils at the site scale during construction activities	*Same as Alternative B plus:* *Prairie Management and Restoration* Moderate long-term adverse impact at the site *Invasive Flora Species* Moderate long-term beneficial impact to soils at the site *Moist Soil Management* Major long-term beneficial impact at the site *Lakebed Management* Potential to produce short-, medium- and long-term adverse impacts during transition to producing short-, medium-, and long-term beneficial impacts at the site *Native Fauna* Major long-term adverse impacts at the refuge scale
Habitat	*Prairie Management and Restoration* Minor to moderate long-term beneficial impact at the site *Invasive Flora Species* Short-term, and potentially long-term, major adverse impacts at the refuge scale *Moist Soil Management*	*Same as Alternative A plus:* *Prairie Management and Restoration* Moderate long-term beneficial impacts at the refuge scale *Invasive Flora Species* Potential to produce major long-term adverse impacts at the site *Moist Soil Management*	*Same as Alternative A plus:* *Prairie Management and Restoration* Medium- to long-term moderate adverse impacts at the refuge scale *Invasive Flora Species* Moderate long-term adverse impacts but with potential for moderate long-term beneficial impacts at the site *Moist Soil Management* Major long-term beneficial impacts at

Environmental Resource	Alternative A Current Management	Alternative B Proposed Action	Alternative C
	Moderate short-, medium- and long-term beneficial impact at the site *Lakebed Management* Moderate short-, medium- and long-term adverse impacts at the site *Native Fauna* Potential for moderate long-term adverse impacts to at the refuge scale	Moderate short-, medium- and long-term beneficial impacts at the site *Lakebed Management* Moderate short-, medium- and long-term beneficial impacts at the site *Native Fauna* Moderate short-, medium- and long-term beneficial impacts the Refuge scale *Multiple Management Action* Minor short-term adverse impacts at the site scale during construction	the Refuge scale *Lakebed Management* Potential for moderate short-term adverse impacts at the site scale during the transition between farming use and restoration of historical conditions *Invasive Fauna* Mixed impacts at the site
Wildlife	*Prairie Management and Restoration* Moderate long term beneficial impacts at the site *Invasive Flora Species* Short-term adverse impact at the site	*Same as Alternative A plus:* *Invasive Flora Species* Minor short-term adverse impact at the site *Moist Soil Management* Moderate short-term adverse impacts at the site *Lakebed Management* Moderate long-term beneficial impacts at the site *Water Quality* Minor short-term adverse impact at the site *Native Fauna* Moderate short-, medium- and long-term beneficial impacts the refuge scale *Hunting* Moderate short-, medium- and long-term beneficial impacts the Refuge scale *Administrative Facilities* Moderate short-term adverse impacts at the site *Public Use Facilities*	*Same as Alternative A plus:* *Prairie Management and Restoration* Major medium- to long-term beneficial impacts at the site *Moist Soil Management* Major medium- to long-term beneficial impacts at the site *Lakebed Management* Major medium- to long-term beneficial impacts at the site *Native Fauna* Minor to moderate short-term adverse impacts at the refuge scale leading to moderate long-term beneficial impacts to at the refuge scale *Invasive Fauna* Minor long-term adverse impacts at the refuge scale *Hunting* Minor to moderate short-term adverse impacts at the refuge scale leading to moderate long-term beneficial impacts at the refuge scale *Fishing* Moderate to major medium- to long-term beneficial impacts at the site

Environmental Resource	Alternative A Current Management	Alternative B Proposed Action	Alternative C
		Moderate short-term adverse impacts at the site *Quality and Safety of Roadways* Moderate short-term adverse impacts at the site	
Threatened and Endangered Species	No expected beneficial or adverse impacts as a result of the management action described	*Same as Alternative A*	*Same as Alternative A*
Cultural Resources	No anticipated direct or indirect impacts to the cultural environment and no ground disturbance is anticipated to occur near or around the 27 documented historic and prehistoric sites located on the Refuge	*Same as Alternative A*	*Same as Alternative A*
Socioeconomics	The economic and social condition of the area would remain the same	*Same as Alternative A*	*Same as Alternative A*
Aesthetic and Visual Resources	The aesthetic and visual resources of the refuge would remain the same.	*Same as Alternative A*	*Same as Alternative A*

Table C-3 Alternatives

4.3 Analysis of Impacts by Resource

This section analyzes the direct, indirect, and cumulative environmental and social impacts or consequences that can be reasonably expected by the implementation of each of the alternatives with respect to: the Physical Environment (Air Quality, Water Management and Quality, and Soils), the Biological Environment (Habitat and Wildlife) and the Human Environment (Public Use Opportunities, Socioeconomics, Cultural Resources, and Scenic Resources).

4.3.1 Physical Environment

4.3.2 Impacts on Air Quality

Each of the alternatives would implement the following mitigation measure to protect air quality:

- For prescribed burning, the following precautions would be in place: habitat management involving prescribed burning will occur only under ideal weather conditions, and smoke management practices will be implemented during all burning events; an approved prescribed Burn Plan, favorable weather conditions, and adequate firefighting resources all work together to prevent pervasive air pollution and prevent adverse effects to air quality.
- Foliar applications of all herbicides will not be made in wind speeds greater than 10 miles per hour.

The following analysis assumes implementation of this mitigation measure to protect air quality.

Alternative A: No Action Alternative

Actions and activities associated with Alternative A that could potentially affect air quality include prescribed fire, livestock grazing and associated infrastructure, equipment and vehicle operation, and landscape conservation.

The refuge will continue with a small prescribed fire program burning seven units at approximately 113 acres each. Prescribed fires take place in the spring of each year and are designed to mimic historic natural fire regimes.

Prairie Management and Restoration

Prescribed fire would have generally minor, sometimes moderate, adverse impacts that are short-term in duration at the local to widespread scales due to smoke emitted from burning vegetation. Prescribed fire would be used on the refuge as a management tool to enhance or restore habitat, reduce hazardous fuels, and maintain small isolated pockets of grasslands. Smoke consists of particulate matter, aerosols, soot, and a variety of gases, all of which degrade air quality. Prescribed burns will be conducted according to stipulations identified in Fire Management Plans where suitable weather conditions exist to dissipate smoke where air masses are not stagnant, and smoke will rise and disperse, minimizing impacts on ground level air quality, visibility, and human health.

Not utilizing prescribed fire as a grassland habitat restoration technique on the refuge would result in major long-term adverse impacts at the refuge-wide scale due to the propagation and inevitable spread of invasive woody plant species. If allowed to thrive, their presence would result in increased potential for wildfires to burn hotter, spread faster and pose a greater threat to human lives and infrastructure.

Dust and emissions produced by equipment and vehicle operation associated with construction such as road maintenance would be minor and localized. Performing work during times of low to no wind would abate blowing dust. Most construction occurs as maintenance to already existing facilities or infrastructure that is small scale and localized.

Grazing activities will continue to occur on the refuge. The purpose of grazing is to mimic the natural process of bison as they historically inhabited the region. It is expected that the grazing activity itself will result in a major beneficial impact in the medium and long terms at the local scales. Since livestock must be transported to and from the grazing lands, there are expected

short-term minor adverse impacts on the site-specific scale as a result of this transportation. These impacts include air quality reduction in the form of vehicle emissions and dust as well as excessive trampling of native vegetation during cattle round-ups. Placing, rotating, and removing livestock on the refuge as well as checking livestock, watering sources and associated infrastructure related daily maintenance of a livestock operation would also be minor and localized.

Invasive Flora Species
Herbicides are an important management tool used to gain an upper hand on the invasion of aggressive non-native flora. There is the potential for spray drift resulting from chemical control of invasive species. Herbicide applications are primarily dispersed through 50 and 100 gallon pump sprayers targeting species such as salt cedar, Siberian elm, and Russian olive, kochia and musk thistle.

Current management activities through chemical means of invasive flora species control would produce impacts to the air quality on the refuge. Any overspray of chemicals would enter the air, but should quickly dissipate. As such, it is expected that the chemicals used will generate a short term, minor adverse impact on the site which they are used. Once chemical spraying is completed, the adverse impact is largely halted as well. No spraying will be used in adverse weather conditions such as high winds (over 10 mph) or precipitation in the forecast.

Lakebed Management
Current refuge farming activities produce minor short-term adverse impacts at the site scale through exhaust gas and fugitive dust produced by the use of agricultural machinery (e.g., tractors and plows). Performing work during times of low to no wind would abate blowing dust and limit exhaust gas emissions to the site scale. Participating in these activities during periods of high winds would likely spread these effects to the local scale; however, as soon as the farming activity is completed, the adverse impacts are similarly halted and are expected to subside within a matter of minutes.

Dust and emissions produced by equipment and vehicle operation associated with maintenance would be minor and localized. Performing work during times of low to no wind would abate blowing dust. Furthermore, most construction occurs as maintenance to already existing facilities or infrastructure that is small scale and localized.

Continuation of management activities in Alternative A would produce adverse air quality effects that would be short-term, direct, negligible, and occur at the local scale. Vehicle use in parking areas would be negligible.

No other refuge management activities and public uses are expected to adversely affect air quality to any measurable degree.

Important beneficial impacts from Alternative A on regional air quality would accrue from the refuge's continuing management of grassland prairies. The extensive habitat throughout the refuge serve as air filters, filtering out particulates, aerosols, and other pollutants, thus improving air quality in the region.

In summary, Alternative A would entail both adverse and beneficial impacts on air quality on the refuge. Impacts from vehicular operation would be adverse, short-term, negligible, and localized. The beneficial impact of Alternative A on air quality would be minor, direct/indirect, long-term, and widespread.

Alternative B: Proposed Action

Invasive Flora Species

An increase of the annual average use of herbicides on invasive species would occur with the addition of aircraft application of herbicides. The additional herbicides as well as the use of aircraft would improve efficiency and long-term impacts of invasive species. Gas emissions, emissions of carbon dioxide, nitrous oxide and volatile organic compounds from aviation are highly uncertain, but do not contribute to national totals as compared to automotive uses; instead, aircraft emissions are primarily considered local pollutants (Federal Aviation Administration Office of Environment and Energy, 2005). These impacts to air quality in terms of chemical overspray would be limited to the times during, and immediately following, the application of chemical herbicides. Further, limiting application to days when winds are insufficient to cause overspray onto areas that are specifically targeted for treatment will assist in the mitigation of these adverse impacts.

The potential for spray drift resulting from chemical control of invasive species through aircraft application is greater than through 50 and 100 galloon pump sprayers would still have a direct, adverse effect on air quality resulting in short term duration and a moderate impact on a widespread scale.

The mechanical removal of invasive flora species is also expected to generate a minor adverse impact on the site that it is implemented; however, the duration of this impact may vary depending on the method used for mechanical removal, though is still expected to be short-term. For example, if mechanical removal can be accomplished by hand or small power tools (ex, chainsaw), then the dust and engine emissions that are put into the air is significantly different than if heavy machinery must be used. Regardless of the method used, the impact to air quality will halt once the management activity is completed; any dust and engine emissions will dissipate within a matter of minutes or hours. Limiting mechanical removal of invasive species during periods of wind or precipitation will keep the overall impact on the site rather than spread to the local scale.

Visitor Services

Under this alternative, the amount of inventory and monitoring would also increase, along with visitor services increasing the amount of vehicular traffic on the refuge. Paving the road to Champion Lake, rehabilitation of the lodge, and construction of a maintenance shop and equipment storage area at Champion Lake would be initiated

Under this alternative, additional units will be opened for wildlife-dependent public use activities such introducing hunting and fishing to the refuge as well as increasing environmental education and interpretation by increasing the number of interpretation days and placement of 20

interpretive panels and expanding the auto tour route as well as installing six additional photo blinds.

These activities may have a greater adverse impact on air quality. Impacts would be due to increased dust and emissions produced by equipment, particulate matter from prescribed burning, vehicle operations associated with more public uses, maintenance of more trails and parking areas, and larger scale construction projects. Although the adverse impacts would be slightly greater, those impacts would be considered direct, short-term, minor, and occur at the local scale.

Even though the farming activities under Alternative B are identical to those under Alternative A, they are significantly scaled back (approximately half from 581 acres to 300 acres) from those in Alternative A, a corresponding decrease in adverse impacts are expected. As a result, the overall effect is reduced even though the impact analysis exhibits identical results.

Alternative B would conserve and restore additional habitat acreage, with a focus prairies and grasslands. By providing for additional habitat and filtering foliage, this alternative would be slightly more beneficial for air quality than Alternative A.

Alternative C:
The effects of Alternative C are expected to be similar to Alternative B; however, the elimination of livestock grazing, the removal of farming activities would have less impacts on air quality than alternative B but would continue to decrease even though the impact analysis exhibits identical results.

4.3.3 Impacts on Water Resources

Each of the alternatives benefits water resources, both in terms of quality and quantity, simply by maintaining and conserving large areas of healthy, vegetated habitats that protect soils and waters. These vegetated habitats filter out contaminants; minimize erosion, turbidity, and sedimentation; and regulate water flows by serving as “sponges” that soak up rainfall and slowly release moisture back into the system.

Each of the alternatives would implement the following mitigation measures to further protect water quality:

- Spraying herbicides will not occur after a moderate/heavy rain or if significant precipitation is forecasted within six hours to reduce the chances of run-off and herbicide delivery to water resources;
- Agency-approved application practices and guidelines will be implemented during all prescribed burn events and under an approved plan to prevent or minimize effects to water quality; and
- Conduct water sampling throughout the refuge.

The analysis below assumes implementation of these mitigation measures to protect water quality.

Alternative A: No Action Alternative

The following activities that would continue under Alternative A could potentially have impacts on water quality include invasive species control, herbicide use, farming, livestock grazing, prescribed fire and oil and gas operations.

Prairie Management and Restoration

Prescribed fire has potential to produce a minor to moderate short-term adverse impact on the refuge scale in the form of sediment and deposition into the watershed. Since prescribed burning removes vegetative litter and grasses, it also removes the anchoring systems of the soil. As a result, should any precipitation occur before native vegetation can be re-established, the soil can be eroded and enter into the watershed.

Invasive Flora Species

Herbicides have the potential of leaching into and polluting groundwater and getting flushed into surface water if improperly applied. Proper application under conditions specified on product labels as well as refuge-specific mitigation measures with the use of best management practices minimizes movement of herbicides from their intended targets. Therefore, impacts on water quality are expected to be negligible to minor, localized, and short-term. Habitat conservation efforts throughout the refuge would have beneficial, moderate, long-term, and widespread effects on water quality (extending beyond the boundaries of the refuge).

Lakebed Management

The presence of farming activities in Alternative A on the old lake bottom produces short-, medium- and long-term beneficial impacts at the site scale to water quality. Farming activities occur on the refuge to provide a food source to wildlife with emphasis on waterfowl and reduce the nitrogen and phosphate loads in the soil, both of which can enter the watershed during period of torrential rain through surface water runoff.

Under current management, the presence of moist soil units on the refuge provides major short-, medium- and long-term beneficial impacts at the refuge scale to water quality and quantity. The moist soil units contribute to the filtering ability of refuge surface water during torrential rain events in terms of fecal coli form percentages. Further, the existence of moist soil units provide habitat to refuge wildlife.

Water Quality

Current management produces major short, medium, and long-term beneficial impacts to water quality at the site of treatment and downstream as that water continues through the watershed. By permitting fecal coli forms to drop out of suspension on the refuge, the water quality is dramatically improved; the water that is released into watershed is vastly improved over the water that is entering the refuge from off-site cattle operations.

The use of Umbarger Dam by the refuge to allow fecal coli forms originating from off-refuge sources to drop out of surface water run-off is expected to result in major beneficial impacts at all durations (short- to long-term) at the regional scale. Fecal coli forms are not hazardous to migratory waterfowl; however, they are extremely dangerous to humans in large quantities because they tend to increase water-borne pathogens, possibly leading to ear infections,

dysentery, typhoid fever, viral and bacterial gastroenteritis, and Hepatitis A (Fresno County Department of Public Health. Fresno, CA. 2009). In addition, aerobic decomposition of fecal coli forms in water reduce the level of dissolved oxygen which results in a much lower oxygen level, killing fish and other aquatic life.

Overpopulation of native fauna species has the potential to produce a moderate adverse impact the refuge water quality and quantity in the long term at the refuge scale. As populations increase, they begin to place a strain on the refuge's water resources through consumption (i.e., reducing the quantity). Additionally, fauna species could produce a degradation of water quality through defecation and death; excessive amounts of either have the potential to reduce the water quality on the refuge.

The existing windmills on the refuge exist to provide a clean water supply to the refuge, which is experiencing drought conditions as a result of the receding water table and the drying of Buffalo Lake and the springs that feed the watershed. Even though it is a man-made source of water, the presence of these windmills produce short, medium- and long-term moderate beneficial impacts at the refuge scale by providing water sources for wildlife and habitats.

Refuge roadways have the potential to produce a short-term minor adverse impact at the local scale in the form of runoff during period of precipitation. Heavy rains allow particulates to enter the watershed via run off from the dirt and gravel roadways on the refuge. These adverse impacts are very short term and persist during the precipitation event.

Alternative B: Proposed Action

Prairie Management and Restoration

Under Alternative B, livestock grazing would be eliminated from the refuge which would slightly reduce the potential for sedimentation in the watershed by not removing herbaceous species from the refuge and from the reduction of hoof action and soil compaction.

Invasive Flora Species

Under Alternative B, additional invasive treatments would include aerial application of herbicides followed with mechanical removal of invasive flora.

Moist Soil Management

The addition of three 40 acre moist soil units in the dry lakebed as well as eliminating farming would be beneficial to water resources on the refuge.

Lakebed Management

The reduction of farming activities to approximately half their current management would produce a minor short term beneficial impact at the site scale for water quantity in the form of a reduction of the water necessary for the irrigation of farming crops.

The management action listed in Alternative B would produce major short-, medium and long-

term beneficial impacts on water quality and quantity at the refuge scale. The installation of bio-filters will assist greatly in improving the water quality at the point that it enters the refuge by removing fecal coli forms from both surface and groundwater originating at nearby cattle operations.

Hunting
Under Alternative B, overpopulation of native fauna species is restricted through a hunting program. As such, Alternative B has the potential to produce a moderate beneficial impact the refuge water quality and quantity in the long term at the refuge scale. Since native flora populations are kept at a sustainable level, the strains on water resources in Alternative A would not occur.

Quality and Safety of Refuge Roadways
Under Alternative B, refuge roadways have the potential to produce short-term minor beneficial impacts at the local scale when compared to Alternative A. The rehabilitation of the refuge entrance road with a paved road and the resurfacing of the remaining Refuge roads with caliche are expected to reduce the amount of particulates entering suspension during period of rain.

Alternative C
Moist Soil Management
Under Alternative C, the refuge would produce a major short-, medium-, and long-term beneficial impacts to the refuge water resources by significantly increasing the number of moist soil units to equal historic levels. Not only would this produce more moist soil habitat and open water availability, but this would also significantly decrease the amount of contaminant (fecal coli forms) by the ongoing increase in the filtering process.

Management action under Alternative C, while having some short-term adverse impacts during the transition from farming to native vegetation, has the potential to produce moderate to major medium- and long-term beneficial impacts to refuge water resources though restoration of current farmland to native habitat, namely moist soil units and open water. This would significantly increase both water quantity and quality on the refuge (see “development of additional moist soil units” above).

4.3.4 Impacts on Soils

Each of the alternatives would implement the following mitigation measure to protect soils:

- Erosion fences will be established on construction sites when erosion is a concern.

The analysis below assumes implementation of this mitigation measure to protect soils.

Alternative A: No Action Alternative

The following activities that would continue under Alternative A could potentially impact refuge soils: maintenance activities, road and trail maintenance, prescribed fire, livestock grazing, farming and fire suppression, public use facilities, and habitat conservation. All of these activities, with the exception of habitat conservation, would have adverse effects on soils; habitat conservation would have a beneficial effect.

Construction activities (including excavation), road maintenance, and some fire suppression and prescribed fire activities all have the potential to disturb, compact, or initiate soil movement. Soil movement can occur through bulldozer blades, front-end loaders, tractor discs, hand held tools from fire fighters, or by means of treads or tires. It could also be initiated through grazing and farming activities. These activities remove vegetation and expose soils to potential wind and water erosion; however, the flat topography of the refuge minimizes the risk of erosion and soil loss. When protective vegetation is stripped away and even more when soils are altered, they are then exposed to the erosive forces of wind and water. On generally flat terrain, water will have little or no velocity and will tend to pond rather than flow. Thus, the various cited activities would probably result in minimal actual erosion and soil loss.

Prairie Management and Restoration

Under Alternative A, grazing and prescribed fire will continue to be used to promote and maintain prairie grassland habitat. The use of prescribed fire may produce minor short-term adverse impacts to soils by removing vegetation and exposing soils to wind and water erosion. This potential impact would continue until vegetation becomes re-established and maintains its soil holding capabilities and then becoming a beneficial impact to soils and associated grassland herbaceous species.

The refuge will continue to utilize prescribed fire throughout the refuge. Low intensity prescribe fires are designed to minimize impacts on soils in contrast to wildfires that generally burn at higher temperatures, during drought conditions during higher ambient air temperatures which all affect soils and soil response to fire which affect vegetation response and eventually alters wildlife habitat. Both wildfires and prescribed fires temporarily eliminate vegetation, leaving soils vulnerable to both wind and water erosion. Prescribed fires are generally more advantageous to soils than wildfires because prescribed fires are designed to promote refuge resources including soils. Ignition patterns, weather conditions, slope, vegetation and terrain are built into prescribed fire burn plans to maximize soil and vegetative response to prescribed fire.

Grazing on the refuge is designed to mimic the historical grazing of Bison. Controlled moderate livestock grazing helps keep the grassland in natural conditions. The removal of dead vegetation and hoof action are beneficial to the grassland by aerating the soil and re-seeding native vegetation which prevents plant stagnation and promotes plant succession. Improved range conditions from effective grazing practices can provide habitat conditions that are desirable for diversity of animal populations.

Invasive Flora
Alternative A will continue to remove invasive flora through chemical means. Limited hand application of herbicides occurs refuge-wide on scattered, small, and isolated populations to control invasive flora. This alternative has the potential to produce a short-term moderate adverse impact to soils at the site on which they are applied in the form of pesticides entering the soil and being stored there until either they decompose or enter ground water. It is anticipated that the use of herbicides will promote soil conditions by replacing nonnative flora species with native vegetation that has better soil holding capacities and provide superior wildlife values as native vegetation is more palatable to native wildlife species.

Moist Soil Management
The maintenance of 40 acres of moist soil units as described in Alternative A provides for moderate short-, medium- and long-term beneficial impacts to refuge soils on the site which they occur. This management action has restored moist soil areas which, historically, would have been maintained through the naturally occurring springs on the refuge that are now dry from excessive human use of the Ogallala Aquifer.

Lakebed Management
Currently, the management actions under Alternative A will continue to cooperatively farm 581 acres of the dry lakebed. Alternative A produces moderate short-, medium- and long-term beneficial impacts to soils at the site scale through the reduction of nitrogen and phosphate loads on the old lake bottom.

Alternative B: Proposed Action

The following activities proposed under Alternative B could potentially have additional impacts on the refuge soils: re-seeding parts of the refuge with native short grass species, additional chemical treatments of invasive species through aerial application followed by the mechanical removal of above ground systems, an additional three 40- acre moist soil units, the reduction of farming activities, the construction of a 6+ acre public fishing pond, and the addition of Administrative Complex and two additional hiking trails as well as paving the entrance road.

The management action listed in Alternative B have the potential to produce minor short-term adverse impacts on soils at the site scale but results of management actions may result in minor long term, beneficial impacts refuge wide if management objectives are met. Beneficial effects broadly outweighing adverse effects overall because proposed management would largely maintain and conserve vegetative cover and associated soils throughout the refuge.

Invasive Flora Species
Under this alternative additional herbicide application will occur via aircraft application. This will increase the acreage treated but will not have any additional negative impacts on soils. The result of additional treatments will presumably promote desirable native vegetation resulting in

beneficial impacts on soils.

Moist Soil Management
Under this alternative an additional 40 acre moist soil unit will be added to the refuge. This will result in additional hydrophilic vegetation which has even better soil holding capabilities than upland herbaceous species resulting in long term beneficial impacts in and around the new moist soil unit.

Lakebed Management
Under Alternative B, the Refuge will discontinue farming activities on approximately half the acreage of current management. As such, the reduction of farming activities in Alternative B on the old lake bottom produces short -term adverse impacts at the site scale. The reason farming activities are present on the refuge is to reduce the nitrogen and phosphate loads in the soil, both of which can enter the watershed during period of torrential rain through surface water runoff. Since farming activities will be reduced, less nitrogen and phosphate will be removed from the soil compared to Alternative A until native vegetation is matured.

Native Fauna
Management action in Alternative B would produce a moderate long-term beneficial impact at the refuge scale to soils when compared to Alternative A. The overpopulation of native fauna species, if left unchecked as in Alternative A, could over-consume refuge vegetation and could lead to a reduction in the flora's ability to anchor soils in place with their root systems; wind and water erosion of soils would result. By limiting native fauna species to the carrying capacity of the refuge, this negative impact would not occur.

Invasive Fauna
Under Alternative B, there would be a minor short-term adverse impact to soils at the site scale through the use of machinery used in the construction of new windmill, shop facilities and related infrastructure. This impact is expected to be minimal and can be mitigated by the development and use of a soil/habitat restoration plan post-construction.

Public Use Facilities
Under Alternative B, there would be a minor short-term adverse impact to soils at the site scale through the use of machinery used in the construction of new restroom facilities. This impact is expected to be minimal and can be mitigated by the development and use of a soil/habitat restoration plan post-construction.

Alternative B would lead to both adverse and beneficial effects on soils. Adverse effects from re-seeding, aerial application of herbicides followed by mechanical removal of above ground systems of invasive flora, the establishment of additional moist soil units, and the construction of a fishing pond would tend to be direct, minor, short-term, and localized. The beneficial impact

of Alternative B such as the result of treating additional no native flora and the resulting native vegetation which would tend to provide better soil holding capabilities as well as the additional moist soil units would be direct, minor, direct/indirect, long-term, and localized.

Alternative C

The following activities proposed under Alternative C could potentially have additional impacts on the refuge soils: eliminate livestock grazing, additional moist soil units, converting all farmlands to natural habitat, additional infrastructure to increase water to historic levels prior to reductions from the Ogallala aquifer.

Prairie Management and Restoration

The elimination of livestock grazing under Alternative C will result in moderate long-term adverse impacts to vegetation and soils if there are not sufficient amounts of grazing wildlife to graze on the refuge. The short grass prairie ecologically requires grazing by large herbivores (bison) and periodic fire. The herbivores through their feeding and trampling remove litter aerate the soils and through these actions rejuvenated and maintain short grass prairies.

Invasive Flora Species

Management action listed in Alternative C would result in a moderate long-term beneficial impact to soils at the site scales by allowing vegetation of all types to grow and provide the parent organic material necessary for soil formation.

Moist Soil Management

Management action found in Alternative C would bring major long-term beneficial impact to soils at the site scales through the restoration of soils and habitat to the historical conditions.

Lakebed Management

Under Alternative C, the refuge will discontinue farming activities. As such, has the potential to produce short-, medium- and long-term adverse impacts at the site scale. The reason farming activities are present on the refuge is to produce winter browse for waterfowl as well as reduce the nitrogen and phosphate loads in the soil, both of which can enter the watershed during period of torrential rain through surface water runoff. Since farming activities will be eliminated, less nitrogen and phosphate will be removed from the soil compared to Alternative B.

Conversely, since lands currently used for farming activities will be converted back to native vegetation and habitat, there is also potential to produce short, medium, and long-term beneficial impacts at the site scale. Even though farming activities are eliminated, the growth of native vegetation and restoration of historical habitat on these lands also have the potential to reduce nitrogen and phosphate loads in the soil.

Since lands currently used for other activities will be converted back to native vegetation and

habitat, there is also potential to produce short-, medium-, and long-term beneficial impacts to soils at the site scale; the growth of native vegetation and restoration of historical wetland habitat on these lands will provide the organic material necessary for soil formation.

Alternative C would lead to both adverse and beneficial effects on soils. Adverse effects would occur from the development of additional moist soil units, and construction activities increasing the infrastructure to provide additional water sources. The beneficial impact of Alternative C eliminating livestock grazing if there are sufficient numbers of native large grazing mammals to replicate historical grazing conditions the development of moist soil units. These activities would tend to provide better soil holding capabilities, would be direct, minor, long-term, and localized.

4.4 Biological Environment

Photo C-4 Bald Eagle flying over Refuge. USFWS

4.4.1 Impacts on Habitat and Wildlife

Alternative A: No Action Alternative

Under Alternative A, the current levels and type of management activities for prairie grasslands and native wildlife would continue. Current management includes the use of grazing and

prescribed fire to maintain prairie habitat as well as utilizing cooperative farming on the dry lake bed and maintaining a 40 acre moist soil unit. These activities support native wildlife populations and diversity. Continuing to treat invasive flora species would emphasize the benefits of native species that offer compensation to wildlife. Invasive species would also be controlled to prevent them from displacing and out-competing natives.

Habitat Fragmentation

The existing roads and trails have been deemed sufficient to carry out the day to day operations of the refuge and similar infrastructure is not being planned. This willingness for the refuge to limit the creation of new roads, trails and infrastructure assists in maintaining existing habitat integrity which promotes the natural movement of wildlife. As such, there are no impacts to wildlife under the management action listed in Alternative A.

Prairie Management and Restoration

Under Alternative A, the use of prescribed fire and livestock grazing will continue maintain prairie habitat. These activities may produce minor to moderate long-term beneficial impacts to refuge vegetation/habitat and wildlife through the introduction of nutrients resulting from the burning of vegetation into the topsoil; these impacts are limited to the site burned. These nutrients are then used to stimulate new growth in native vegetation. Prescribed fires; although carefully controlled, have the potential to produce some significant short-term adverse impacts to wildlife at the site scale by displacing or killing wildlife. As with the natural fire process, wildlife tend to return quickly once the fire has passed.

High intensity wild fires can create hydrophobic soils that contribute to excessive run-off and prolong intervals of herbaceous species recovery prolonging vulnerability to soil degradation. The elimination of vegetation and other processes thereby create soils that will not absorb moisture. These effects are typically short-term and adverse. In these situations the refuge would consider rehabilitation to reduce the impacts. Vegetative type conversion could occur from high intensity fires, such as forest to early succession. These effects would be long-term and adverse, but typically only occur within small perimeters of the burn area.

Prescribed fires would continue to be used to help maintain and restore prairie grasslands. The refuge would continue to utilize prescribed fire to mimic natural fire occurrence and promote historic habitat conditions to sustain natural biological diversity.

Controlled livestock grazing helps keep the grassland in natural conditions; the removal of dead vegetation and hoof action are beneficial to the grassland by aerating the soil and re-seeding native vegetation which prevents plant stagnation and promotes plant succession. Improved range conditions from effective grazing practices can provide habitat conditions that are desirable for diversity of animal populations. Light to moderate grazing on the refuge may produce minor to moderate long-term beneficial impacts to refuge habitat by maintaining the

grassland in natural conditions. Effective grazing practices can provide habitat conditions that are desirable for diversity of wildlife.

Invasive Flora Species

Under Alternative A, there are some short-term, and potentially long-term, major adverse impacts to refuge vegetation/habitat at the refuge scale if current management of invasive species control through chemical removal is ineffective. The spread of invasive flora species through refuge habitat can displace native flora species. Further, invasive flora species, if permitted to permanently establish a presence on the refuge, will reduce the amount of habitat available for native wildlife.

Currently, there is between 30 and 50 acres of invasive vegetation consisting primarily of salt cedar, Russian olive and musk thistle. The use of chemicals between April and September has a tendency to temporarily displace wildlife through the presence of staff and equipment. In addition, the chemicals themselves may contribute to this displacement which results in a short term adverse impact to wildlife at the site where these chemical treatments are conducted.

Moist Soil Management

The maintenance of 40 acres of moist soil units as described in Alternative A provides for moderate short-, medium- and long-term beneficial impacts to refuge vegetation/habitat on the site which they occur. This promotes the growth of naturally occurring vegetation which provides migrating waterfowl and shorebirds the calories and energy reserves required for migration.

The 40 acres of moist soil units on the refuge currently provides a small degree of wetland habitat. This habitat promotes naturally occurring aquatic food plants insects and invertebrates, all of which provides waterfowl and shorebirds the calories they require for their migration. These moist soil units are the only areas on the refuge in which these food sources are provided. If they are not watered in the fall and spring each year, the refuge will not have these areas as a resource for migratory birds.

Lakebed Management

The management described in Alternative A provides a moderate short-, medium- and long-term adverse impacts to refuge vegetation/habitat on the site scale. By definition, farming activity displaces native habitat to grow what is essentially non-native species but for the benefit of migrating birds.

Water Quality

The water retention structure will continue to be used at Umbarger Dam under this alternative. There are no impacts to vegetation/habitat under the management action in Alternative A. Water quality issues would continue with accumulated amounts of fecal coli from upstream livestock

yards. These contaminants would continue to have a long term, adverse impacts to habitat quality, and wildlife throughout the floodplain of Umbarger Dam.

Native Fauna
Under current management the refuge would maintain current levels of prairie dogs, mule deer, and white-tailed deer which have the potential to reach and exceed carrying capacity.

Public Use Facilities
Under Alternative A, public use facilities would be limited to the existing structures such as photo blinds, parking lots and vault toilets, no additional structures would be implemented.

Overall effects from Alternative A on habitat and wildlife on the refuge would be both adverse and beneficial. However, the beneficial effects exceed the adverse effects by providing undisturbed habitat over the majority of the refuge. Adverse effects from controlling invasive flora (including the use of herbicides), would be moderate, long-term, and localized to refuge-wide. Beneficial effects of maintaining prairie habitat would be long term and refuge wide.

Alternative B: Proposed Action

Prairie Management and Restoration
Under this Alternative the refuge will re-seed parts of the refuge in addition to the ongoing prescribed burning program to enhance the recovery and establishment of prairie grassland habitat. Seeding would be with both warm and cool season native herbaceous species that benefit a vast variety of wildlife including deer, small mammals, and migratory birds. Seeding will have a long term beneficial impact on the refuge scale since seeding individual units of the refuge will promote the general trend and diversity of the entire refuge landscape.

Invasive Flora Species
The refuge would utilize additional chemical treatments on invasive species to promote native vegetation and wildlife through aircraft application of herbicides. The idea of increased acreage is to initially treat large acreages at a time allowing native vegetation to re-establish and eventually out-compete invasive species, resulting in better native plant diversity and improved wildlife habitat. This approach is anticipated to have long term moderate beneficial impacts on habitat and wildlife refuge wide.

Aerial spraying also has the potential to produce major long-term adverse impacts to vegetation/habitat on the site scale. If the chemical treatment is misapplied and/or is applied at such a time when the chemical is transported off its intended target by prevailing winds, the pesticides could interact and kill unintended native flora species. The impact would last until the vegetation is re-grown. Mitigation measures taken to avoid non target areas and species as with

ground spraying is to not spray with any moisture or in the forecast will not be made in surface wind speeds greater than 10 miles per hour.
Under Alternative B, a minor short-term adverse impact at the site scale would be occur to wildlife during the times of chemical application due to the noise emitted and presence of the aircraft and mechanical equipment used in treating invasive species which may temporarily displace wildlife. Any impact that does occur is restricted only to the times and places such treatment is taking place; once treatment is completed.

Moist Soil Management
Management action is carried forth from Alternative A; therefore, any impacts are identical to those found in Alternative A.

The management action listed in Alternative B would have moderate short-, medium- and long-term beneficial impacts to vegetation/habitat on the site scale through the restoration of moist soil units. The proposed development of three 40-acre moist soil units would be placed in areas that were historically wetlands; therefore, the management action listed in Alternative B mark the return of these wetlands.

The management action listed in Alternative B would produce moderate short-term adverse impacts to wildlife at the site scale due to the noise emitted and presence of the mechanical equipment used in construction which may temporarily displace wildlife. Impacts are limited to the times and places construction is taking place. Additionally, once development of the moist soil unites are completed, it is expected that moderate long-term beneficial impacts would occur on wildlife at the site scale through the restoration of wetlands which would provide additional habitat for wildlife.

Lakebed Management
Under this Alternative all farming activities would be reduced from 581 acres to no more than 300 acres farmed on the refuge. The remaining acreage would be allowed to re-establish as native prairie and grassland habitat. Management action listed in Alternative B would have moderate short-, medium- and long-term beneficial impacts to vegetation/habitat and wildlife on the site scale through the restoration of historical habitat.

Native Fauna
Management action in Alternative B would produce moderate short-, medium- and long-term beneficial impacts to vegetation/habitats at the refuge scale through the maintenance of native fauna species to a sustainable level. Therefore, the stress that overpopulation of native fauna species would place on vegetation/habitat would not occur.

Hunting

Under Alternative B, hunting would be introduced on the refuge to control invasive fauna as well as to mange populations of native populations to sustainable levels. Currently feral hogs are not occupying the refuge but are a constant threat in many areas surrounding the refuge and if they become established on the refuge, hunting is a potential option to reducing the opportunities for establishing viable populations. Native wildlife species such as mule deer are not currently exhibiting excessive numbers beyond carrying capacity but seem to be slightly increasing as observed by the refuge biologist. If hunting is undertaken on the refuge, it would be used as a management tool to enhance healthier populations of deer and to decrease opportunities of feral hog establishment.

If this alternative would be utilized a separate NEPA process would have to be initiated evaluating specific characteristics of any proposed hunts. The administration of a proposed hunt would also require substantial commitment of staff and resources to initiate and perform a positive hunting experience as related to wildlife dependent recreation opportunities provided by the refuge. Management action listed in Alternative B would result in some minor to moderate short-term adverse impacts to wildlife at the Refuge scale while native fauna species acquire a balance with their surrounding environment. Without human interference in the life-cycle of native fauna species, wildlife species are expected to slightly increase on the refuge.

Fishing

Under Alternative B, a 6 acre public fishing pond near existing viewing blind by the lake bed and Steward Marsh would be built. This would produce moderate to major short term adverse impacts to wildlife at the site scale through the use of heavy equipment and working crews building the pond, with loss of habitat and displacement of wildlife. Eventually the pond would result in beneficial long term and moderate impacts to the refuge by providing an additional family oriented wildlife dependent recreational opportunity. Potential impacts to wildlife would be through additional impacts of fisherman once established. These impacts would include an increased human presence which could harass wildlife. Nearby suitable habitat would be available immediately surrounding project area for wildlife to utilize.

Environmental Education and Interpretation

Under Alternative B, the number of education days would increase up to one additional day per month. The refuge would also develop and construct 20 new interpretive panels and expand the existing auto tour route and open areas of the refuge currently closed to public access. This would produce minor short term adverse impact to wildlife at the site scale through the use of hand held equipment and working crews placing panels and expanding the auto tour route. These activities would temporarily displace wildlife but impacts would be the same once construction activities are finalized since an auto tour route already exists. Additional education days and additional panels would not have any additional impacts on wildlife once established.

Wildlife Observation and Photography
Under Alternative B, wildlife observation and photography opportunities would be expanded to include six additional blinds. . This would produce minor short term adverse impact to wildlife at the site scale through the use of construction equipment and working crews building and placing these additional blinds.

Administrative Facilities
Alternative B would produce moderate short-term adverse impacts to wildlife at the site scale due to the noise emitted and presence of the mechanical equipment used in the construction of the new Administrative Complex to include headquarters, visitor's center, biological lab, and maintenance and storage facility. Other activities could also have similar impacts on wildlife are construction of wells and windmills needed to increase infrastructure to provide refuge with sufficient water sources. Any impact that does occur is restricted only to the times and places construction is taking place; once construction is completed, the adverse impact to wildlife is expected to discontinue.

The existence of the new facilities is also expected to produce minor long-term adverse impacts to wildlife at the site scale through the impact felt by the facilities footprint as it displaces existing habitat for wildlife.

Public Use Facilities
Management action under Alternative B would produce moderate short-term adverse impacts to wildlife at the site scale due to the noise emitted and presence of the mechanical equipment used in the construction of new restroom facilities as well as construction activities establishing new trails on the refuge which may temporarily displace wildlife. Any impact that does occur is restricted only to the times and places construction is taking place; once construction is completed, the adverse impact to wildlife is expected to discontinue. Since the new facilities will be replacing the existing facilities, no loss of wildlife habitat is expected.

Conversely, once construction is completed, the new restroom facility should produce a negligible impact to vegetation/habitat since the facility will be built on the same site as the existing facility.

Quality and Safety of Roadways
Under this alternative, rehabilitation of the entrance road from F.M. 168 to the headquarters with a two lane paved road with adequate shoulders. Re-surfacing of the remaining refuge roads with new caliche would also occur. The management action listed in Alternative B would produce moderate short-term adverse impacts to wildlife and habitat at the site scale due to the noise emitted and presence of the mechanical equipment used in construction which may temporarily displace wildlife. Any impact that does occur is restricted only to the times and places

construction is taking place; once construction is completed, the adverse impact to wildlife is expected to diminish.

Alternative C

Prairie Management and Restoration

Alternative C would result in a medium to long term moderate adverse impacts to vegetation/habitat at the refuge scale through the cessation of livestock grazing and the lack of grazing by native wildlife. Controlled livestock grazing helps keep the grassland in natural conditions; the removal of dead vegetation and hoof action are beneficial to the grassland by aerating the soil and re-seeding native vegetation which prevents plant stagnation and promotes plant succession. Improved range conditions from effective grazing practices can provide habitat conditions that are desirable for diversity of animal populations. Removing livestock grazing without replacing it with a similar management tool can alter the natural processes of short grass prairie habitat.

The elimination of grazing on the refuge would produce moderate to major medium- to long-term beneficial impacts to wildlife refuge wide and allow native wildlife to graze without competition throughout the refuge. With no grazing activities permitted on the refuge, additional habitat will be available for wildlife.

Moist Soil Management

Management action under Alternative C would result in major long-term beneficial impacts at the refuge scale to vegetation/habitat. Native vegetation would return to historical conditions due to the restoration of moist soil units to a level which was historically available. This would increase the available habitat for native fauna species. Management action listed in Alternative C would produce moderate to major medium- to long-term beneficial impacts to wildlife refuge wide. By restoring native habitat to its historical moist soil conditions will in turn restore historical habitat for native fauna species.

Lakebed Management

Under Alternative C, all farming activity would be removed from the refuge and lands would be managed to return to all native vegetation representative of prairie grasslands. Management action under Alternative C would result in major long-term beneficial impacts at the refuge scale to vegetation/habitat. Native vegetation would return due to the restoration of farming lands to historical habitat for native fauna species.

There is potential for moderate short-term adverse impacts to vegetation/habitat and wildlife at the site scale during the transition between farming use and restoration of historical conditions as the vegetation availability to wildlife will be sparse until native vegetation establishes.

Management action listed in Alternative C would produce moderate to major medium- to long-term beneficial impacts to wildlife at the site scale. With farming activities no longer permitted on the refuge, the historical conditions of the refuge would be restored back to native grasslands, moist soil units and open water thereby making habitat available for native flora, fauna and migratory species.

4.5 Human Environment

4.5.1 Impacts on Socioeconomics

Alternative A: No Action Alternative

The economic and social condition of the area would remain the same. The refuge will continue to be one of the area's main attractions. The presence and operation of the refuge provides economic benefits to the surrounding communities within a 30 mile radius in several ways. The refuge attracts local, national, and some international visitors and by attracting visitors to the area, the refuge generates revenue for the local economy. Much of the refuge's annual budget is recycled into local businesses through refuge staff, purchases of equipment and supplies, as well as contracts for local labor to accomplish refuge projects.

Alternative B: Proposed Action

Under this alternative, there are slightly greater direct or indirect impacts to the local population and economy since many of the visitor service activities such as fishing, wildlife observation, wildlife photography, environmental education and interpretation are expanding. With the expansion of these activities visitation should increase to the refuge increasing the direct and indirect advantages on the socioeconomic impacts to the communities surrounding the refuge.

The proposed action may have a positive impact on the local economy through the purchase of pesticides, rental of machinery and some contract work sought; however, the overall effect will be negligible and have very little influence on the local population and economy.

Alternative C

Under this alternative, there are no anticipated direct or indirect impacts to the local population and economy is anticipated to occur.

4.5.2 Impacts on Aesthetic and Visual Resources

Photo C-5 Shorebirds Landing on the Refuge. USFWS

Alternative A: No Action Alternative

Under Alternative A where all current management actions are continued, there are no expected changes to the existing visual landscape of the refuge

Alternative B: Proposed Action

Management action listed in Alternative B would not result in a significant impact (either positive or negative) in the Refuge's aesthetic and/or visual resources. The only expected impacts originate from the replacement of existing restroom facilities, the development of a new visitor's center and heavy equipment shop as well as the addition of windmill infrastructure for water supply. The restroom and visitor's center would produce a moderate long-term beneficial impact at the site scale in the form of replacing old, worn structures with new one which better meet the needs of the refuge visitors. In terms of the shop facility, there is also potential for long-term beneficial impact at the site scale; however, this depends greatly on the architectural design and placement of the facility. If poorly designed and placed, a shop facility has the potential to greatly impact the refuge's visual resources. As such, there is also potential for moderate long-term adverse impact at the site scale if designed and placed poorly. Windmill infrastructure could similarly have an adverse impact to the visual resources; however, no complaints have been made about the existing windmills on the refuge.

The other management actions largely are oriented toward providing refuge visitors better opportunity to view the Refuge's aesthetic resources, but do not directly necessarily impact aesthetic resources.

Alternative C

Management action that is carried forth from Alternative B will have identical impacts to those found in Alternative B.

Management action in Alternative C that is in addition to Alternative B will tend to significantly increase the refuge's visual and aesthetic resources in the medium- and long-term. The additional habitat provided to wildlife through the elimination of farming and restoration of those areas to native vegetation will provide fauna areas in which to subsist. Additionally, the restoration of Buffalo Lake itself is anticipated to revitalize the refuge as a primary stop-over site for migratory birds. In totality, management action found in Alternative C, while expensive, will revitalize the refuge as "the Playground of the Panhandle" and significantly increase its ability to support the massive numbers of migratory birds to numbers experienced in the 1950's through the early 1970's before the water table dropped and the natural springs which fed Tierra Blanca Creek subsequently began to reduce its water supply.

4.6 Assessment of Cumulative Impacts

The following section addresses the potential cumulative effects for all the alternatives and is intended to consider the activities on the refuge in the context of other actions on a larger spatial and temporal scale. The impacts of past and present actions that have taken place on the refuge are reflected in the current resource conditions (Affected Environment) as described in Chapter 3 of the CCP. The impacts of proposed future actions (for all alternatives) are discussed in earlier parts of this EA. The adverse direct and indirect effects of current refuge management and the proposed actions (all alternatives) on air, water, soil, habitat, wildlife, the local economy and population, and aesthetic/visual resources are expected to be mostly negligible to moderate and short-term to long-term. The benefits to habitat, wildlife, and public use that the Proposed Action would achieve greatly outweigh any of the adverse impacts discussed in this document. The Service also considered past, present, and future planned actions on other State, Federal, and private lands surrounding the refuge. The Service is not aware of any refuge management actions that when added to other past, present or future proposed actions, would result in significant cumulative impacts. The analysis area for potential cumulative effects on each resource and a summary of those potential impacts is provided below.

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, present, and 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. Accurately summarizing cumulative effects is difficult in that while one action increases or improves a resource in an area, other unrelated actions may decrease or degrade that resource in another area.

As stated in the Service Manual (550 FW 1 and 2), in an EA, a cumulative impact assessment should be conducted if it is determined necessary through scoping to make a determination of significance of the Proposed Action. When a cumulative effects analysis is included in an EA, the analysis need only be sufficient for the decision maker to reach a conclusion on the significance of the impact in order to determine if the preparation of an EIS is required.

Buffalo Lake NWR exits within a matrix of ranching and farming land uses. The refuge is mainly surrounded by privately owned cattle ranches and a small community to the north about 3 miles. There is currently no trend toward subdividing the surrounding lands. However, urbanization is occurring toward Canyon (15 miles east of the refuge).

Alternative A

Cumulative Impacts on Physical Resources:

Air Quality

The refuge is located approximately 30 miles southwest of Amarillo, Texas which is the 14th largest city in the state. The population as of 2010 was 190,695 which included both Randall and Potter Counties. The metropolitan area has an estimated population of 236,113 in four counties (U.S. Census Bureau. 2011).

The metropolitan of Amarillo, agricultural and livestock land uses and developmental pressures can contribute to air pollution and have negative impacts on air quality. A big impact to air quality would be infrequent grass wildfires and dust storms.

Refuge actions will have minimal effects on air quality based primarily on weather and wind conditions. All alternatives would essentially have the same effects to refuge air quality, even with the prescribed burning program, construction activities, and increased visitor use. Each alternative would cause both minor and beneficial air quality impacts. Continued refuge acquisition and preservation of native prairie habitat would be a long-term benefit to air quality by reducing local development and increasing carbon sequestration. These adverse and beneficial impacts, however, would not be cumulatively significant.

Water Quality and Quantity

An increasing population in the region, along with greater urban, industrial, and agricultural development, would tend to increase the extent of adverse effects on water quality in and around the refuge by increasing discharges from point and non-point sources of water pollutants and contaminants. In addition, as the area grows and develops, there will be an increased demand for water, and water table drawdown could be a potential problem in the area. The livestock community of Hereford, Texas just upstream from the refuge contains several stockyards where 2 to 3 million head of livestock are routed through per year. Large torrential rains often contribute to poor water quality by transporting fecal coli contaminants, high concentrations of nitrogen and phosphate loads into the lakebed and watershed.

The refuge produces major short-, medium- and long-term beneficial impacts to water quality at the lakebed and downstream where water continues through the watershed. By permitting fecal coli forms to drop out of suspension on the refuge, the water quality is dramatically improved; the water that is released into watershed is vastly improved over the water that is entering the refuge from off-site cattle operations. In addition, the presence of moist soil units on the refuge contributes to this filtering process.

Initial farming activities around the refuge focused on beets but now are more concentrated on milo, corn, cotton and hay grazer. Irrigating these crops have occurred from drawing into the Ogallala Aquifer and water pumped for both farming and local drinking water has resulted in a thirty foot drop in the past forty years. As the area continues to grow and develop the demand for water will continue to increase and the continued pressures on the Ogallala aquifer may become a limiting factor to future farming and development around the refuge.

Lastly, the presence of farming activities on the old lake bottom reduces nitrogen and phosphate loads in the soil which has the potential to enter the watershed during periods of torrential rain. To put water into the lake it takes approximately 6 inches of rain in the watershed around Hereford which results in localized mass flooding. In terms of water quantity, the existing windmills on the refuge exist to provide a clean water supply to the Refuge, which is experiencing drought conditions as a result of the receding water table and the drying of Buffalo Lake as well as the springs that feed the watershed.

Under each Alternative, there is expected short-term minor adverse impacts at the site scale through the use of chemicals during invasive flora species control activities that occur adjacent to open water. Should an accident happen and a significant quantity of chemicals is inadvertently released into the water source, there is potential for major long-term adverse impacts at the local scale.

Prescribed fire programs also have the potential for adverse impacts due to its removal of vegetative litter and grasses; should a heavy rain event occur before native vegetation can be re-established, the soil can be eroded and enter into the watershed.

All of the described activities, actions, and trends have had adverse implications for water quality and quantity in the area. These large detrimental influences work against and offset the refuge's largely beneficial impacts on water quality and quantity, from promoting prairie habitat. In view of these increasing adverse pressures on water quality and quantity, which are likely to continue to increase in the foreseeable future, the refuge's positive effects on water resources become even more important. Overall, at the close of the planning period (15 years), the overall condition of water resources on the refuge as a result of cumulative effects is likely to be somewhat more beneficial than at present, with proposed projects benefitting a vast variety of refuge resources.

Soils

Historically, soil conditions on the refuge were rich and fertile and produced a vast variety of cool and warm season grasses consistent with a highly functional high plains ecoregion. Grass species such as blue gramma, buffalo grass, little bluestem and wheat grass sustained the American bison. Bison historically migrated through this areas known as El Llano Estacado following local rain patterns and areas of higher production. In addition to bison, soils were influenced by infrequent prairie wildfires reducing litter and duff and cycling nutrients through the system promoting a highly functional and productive grassland habitat. With the extirpation of bison, cattle were introduced to the areas in and surrounding the refuge. The refuge uses livestock to fill in the role bison were used to maintain a functional grassland habitat. With the combination of prescribed fire and livestock grazing the refuge is simulating natural conditions that existed on the refuge prior to the arrival of Europeans.

After the creek was dammed and the lakebed established, soils along the creek and within the lake were altered and the quality was reduced primarily from the upstream stock yards. This refuse consistently resulted in nitrate and phosphate concentration in the soil in and around the riparian areas and wetlands.

Past, present, and foreseeable future area impacts to soils include ground disturbance, which can result in erosion, sedimentation, and nutrient loss. Impacts are caused by activities such as construction, farming, livestock grazing, feral hogs, and oil and gas development both on and off the refuge.

The use of prescribed fire may produce minor short-term beneficial impacts to soils through the introduction of nutrients resulting from the burning of vegetation into the topsoil; these impacts are limited to specifically the site burned. These nutrients are then used by native vegetation for

fresh growth. The maintenance of 40 acres of moist soil units as described in Alternative A provides for moderate short-, medium- and long-term beneficial impacts to refuge soils on the site which they occur. This management action has restored moist soil areas which, historically, would have been maintained through the naturally occurring springs on the Refuge that are now dry from excessive human use of the Ogallala Aquifer. Farming produces moderate short-, medium- and long-term beneficial impacts to soils at the site scale through the reduction of nitrogen and phosphate loads on the old lake bottom.

Overall, cumulative effects on soils (from all alternatives) would be a mix of minor adverse and minor to moderate, beneficial effects. Adverse cumulative effects would probably occur to those soils that are regularly or continually subjected to some form of disturbance. These adverse effects are not anticipated to be major.

Minor to moderate, beneficial effects on soils would be expected to occur at those sites constituting the great majority of the area of the refuge, whereupon undisturbed soils would continue to develop (slowly increasing in depth as well as fertility) as a result of nearly continuous vegetative cover. These adverse and beneficial impacts, however, would not be cumulatively significant.

Cumulative Impacts on Biological Resources:

Habitat

The willingness of the refuge to restrict the construction of new roads and fences has a direct effect on the mitigation of habitat fragmentation. As such, this management practice leads to moderate beneficial impacts in all durations across the entire refuge. The single exception to this is the existence of barrier fences surrounding the prairie dog town for the purposes of restricting the population to a manageable level; this alone results in a beneficial impact for the refuge for, without the existence of this barrier fence, the prairie dog population would expand uncontrollably and become a significant drain on the habitat. The use of prescribed fire may produce minor moderate-term beneficial impacts to refuge vegetation/habitat through the introduction of nutrients resulting from the burning of vegetation into the topsoil; these impacts are limited to specifically the site burned. These nutrients are then used by native vegetation for fresh growth. Additionally, the maintenance of 40 acres of moist soil units as described in each Alternative provides for moderate short-, medium- and long-term beneficial impacts to refuge vegetation/habitat on the site which they occur. This promotes the growth of naturally occurring vegetation which provides migrating waterfowl and shorebirds the calories they require during migration.

The refuge is surrounded by private agricultural and/or livestock lands, and such use could offer an array of threats to habitats, including invasive plants, crop monocultures, and habitat fragmentation. Planting on the dry lakebed may lead to increased opportunities for invasive species that can spread to adjacent lands. Past conversion of lands resulted in apparent loss of

prairie habitat in the region. The increased potential for rural residential development further increases the potential for habitat fragmentation and may create pest management problems. In addition, increased urbanization has the potential to dramatically reduce or inhibit refuge habitat management activities. As more homes surround the refuge, prescribed burning becomes more expensive and more difficult to conduct safely.

Overall, cumulative effects on habitat would be a mix of beneficial and adverse impacts. Lands set aside for habitat in the region are rare and include State Wildlife Management Areas and other national wildlife refuges. Other private and public prairie conservation and restoration efforts in the region contribute to beneficial impacts on prairie habitats. The refuge's and other conservation areas' efforts to restore and maintain healthy grasslands would benefit the grassland communities; however, future development could have adverse impacts. The refuge would continue to monitor habitat and use prescribed burning, grazing, prairie restoration, and invasive species control to manage prairie habitats. These management activities result in beneficial impacts to prairie habitat. Although the refuge's contribution is relatively small in acreage, preservation of this rare habitat in this region is invaluable.

Wildlife

Off-Refuge throughout the State, management of migratory birds is a large undertaking on the part of other public land managers. There are twenty other national wildlife refuges in the State of Texas. Texas Mid-Coast National Wildlife Refuge Complex (NWRC), Aransas NWRC, and Texas Chenier Plain NWRC are located along the Texas gulf and were established for migratory birds. The Texas Parks and Wildlife Department manages some State Parks and Wildlife Management Areas in the same ecoregion as Buffalo Lake NWR.

In combination, all of the foregoing efforts should improve the prospects for many migratory birds species at all scales, from local to widespread. However, these efforts confront a wide variety of threats to migratory birds. Most of these are threats to habitats where the birds breed in the spring and summer months (in more northerly areas) and where they winter (in more southerly areas), as well as crucial stopover habitats that migratory birds need when they are in transit between summer and winter ranges. Habitat conversion, degradation, and fragmentation from diverse human activities, including urbanization, agriculture, logging and forestry, mining, and hydroelectric development, all on a vast scale, threaten populations of migratory birds species.

Agricultural and/or livestock land uses exist around the refuge which could offer an array of threats to fish, wildlife, and their habitats, including feral animals, pathogens (i.e., avian cholera), and pollutants. Even though threats are present, croplands can also provide some benefit for migratory waterfowl. The method in which farming occurs in the area results in wetland habitat, which benefits wetland-dependent wildlife by providing habitat.

Some refuge management activities may adversely impact some wildlife (predator control, trapping, etc); however, on private lands surrounding the refuge, there is ample habitat available for common species. Therefore, the refuge's contribution to adverse impacts on those species throughout the region is expected to be negligible.

Cumulative Impacts on the Human Environment:

Beneficial cumulative impacts from the refuge's socio-economic environment would be direct, long-term, minor to moderate, and local. As the refuge grows, it is becoming a better-known eco-tourism destination, which is a plus to the local community. Additionally, refuge staff and management operations directly purchase numerous supplies in the area. There would also be cumulative adverse impacts due to a slight increase in road traffic where public use facilities are located. These adverse impacts would be direct, short-term, negligible, and site-specific. Based on the analysis presented earlier in this chapter, the Service has concluded that there would be no significant cumulative impacts on the human environment from proposed refuge management actions, when considered in context with other State, Federal, and private actions.

Public Use Opportunities

The refuge provides opportunities for the public that are somewhat rare in the State of Texas since most of the State is privately-owned and grassland habitat has been significantly reduced. To limit disturbance to the refuge, public use is limited to wildlife photography, observation, interpretation, environmental education, camping and hiking. Recreational fishing, hunting and swimming occurs at other public areas surrounding the refuge such as Lake Meredith National Recreation Area and Lake Greenbelt.

Under Alternative A, staffing and visitor use facilities would generally remain the same with increasing demand for recreation and public use opportunities on the refuge. If visitation continues to increase but staff does not, facilities and programs would tend to decrease in both quality and quantity. The cumulative beneficial impact of Alternative A on refuge public use opportunities would be greater if facilities and staffing could keep pace with increased visitation. Cumulative impacts of Alternative A on the Refuge's public use opportunities would be minor and beneficial.

Both Alternative B and C would invest more in facilities, infrastructure, maintenance, programs and staffing. These two alternatives would tend to maintain cumulative benefits that are moderately beneficial, long-term and widespread. Overall, both would be better than Alternative A. In a state with a limited number of areas and facilities set aside for public outdoor recreation, Alternatives B and C would be more likely to keep up with increasing demand.

Cultural Resources

Under all alternatives, there are no anticipated direct or indirect impacts to the cultural environment and no ground disturbance is anticipated to occur near or around the 27 documented

historic and prehistoric sites located on the refuge. None of the alternatives will significantly affect any site listed in, or eligible for listing in, the National Register of Historic Places, nor will they cause loss or destruction of significant scientific, cultural, or historic resources.

It is possible that new sites could be discovered in and around the refuge.

Socioeconomic Resources

The economic and social condition of the area would remain the same. The refuge will continue to be one of the area's main attractions. The presence and operation of the refuge provides economic benefits to the surrounding communities within a 30 mile radius in several ways. The refuge attracts local, national, and some international visitors and by attracting visitors to the area, the refuge generates revenue for the local economy. Much of the refuge's annual budget is recycled into local businesses through refuge staff, purchases of equipment and supplies, as well as contracts for local labor to accomplish refuge projects. All three alternatives would have cumulative socioeconomic effects that are minor to moderately beneficial, long-term, and localized to widespread.

Aesthetic and Visual Resources

Aesthetic and visual resources in the region surrounding the refuge remain relatively unchanged. The refuge is still surrounded by primarily ranching and farming as during the inception. Ranching continues to be the primary occupation surrounding the refuge and maintaining aesthetic resources associated with short grass prairie habitats. Management would not substantially change the character or quality of its scenic resources under any of the alternatives.

Climate Change

Area industry contributes negatively to climate change. The refuge may be a negligible to minor contributor to climate change; however, the benefit it provides in keeping land in a predominantly natural or undeveloped state far outweighs the impact. Vegetative communities serve to sequester carbon. Therefore, under all alternatives, the refuge would have beneficial cumulative impacts on climate change. As the refuge begins experiencing greater effects from climate change, the need for adaptive management will increase. More scientific data on when and where these changes may occur along with what they may entail is necessary before determining how to counteract or adapt to a changing climate.

Table C-5- Summary of Environmental Effects by Alternative

Environmental Resource	Alternative A Current Management	Alternative B	Alternative C
Air Quality	*Prairie Management and Restoration* Minor short-term adverse impacts locally. *Multiple Management Actions* Minor short-term adverse impacts at the site scale through exhaust gas and fugitive dust resulting from vehicular traffic	*Same as Alternative A plus:* *Invasive Flora Species* Minor short-term adverse impacts at the refuge scale. *Multiple Management Actions* Minor, short-term adverse impacts on air quality at the site scale through exhaust gas emissions and fugitive dust from any machinery that may be used during construction	*Prairie Management and Restoration* Short-term beneficial impact at the site scale. *Invasive Flora Species* Short-term beneficial impact at the site scale. *Lakebed Management* Short-term beneficial impact at the site scale.
Water Quality and Quantity	*Prairie Management and Restoration* Minor to moderate short-term adverse impact on the Refuge scale *Invasive Flora Species* Potential short-term minor adverse impacts at the site scale. *Moist Soil Management* Major short-, medium- and long-term beneficial impacts at the refuge scale. *Lakebed Management* Short-, medium- and long-term beneficial impacts at the site scale. *Water Quality* Major short-, medium- and long-term beneficial impacts to water quality at the site of treatment and downstream *Native Fauna* Potential for moderate adverse impacts at the refuge scale *Multiple Management Actions* Potential to produce a short-term minor adverse impact	*Same as Alternative A plus:* *Water Quality* Major short-, medium and long-term beneficial impacts at the refuge scale *Native Fauna* Moderate long-term beneficial impact at the refuge scale.	Same as Alternative B plus: *Moist Soil Management* Major short-, medium-, and long-term beneficial impacts at the refuge scale *Lakebed Management* Some short-term adverse impacts during the transition to moderate or major medium- and long-term beneficial impacts

Environmental Resource	Alternative A Current Management	Alternative B	Alternative C
	at the local scale		
Soils	*Prairie Management and Restoration* Minor short-term beneficial impacts at the site *Invasive Flora Species* Potential to produce a short-term moderate adverse impact at the site *Moist Soil Management* Moderate short-, medium- and long-term beneficial impacts at the site *Lakebed Management* Moderate short-, medium- and long-term beneficial at the site *Native Fauna* Potential for moderate long-term adverse impacts at the refuge scale	*Same as Alternative A plus:* *Prairie Management and Restoration* Potential to produce minor short-term adverse impacts at the site scale *Moist Soil Management* Major long-term beneficial impact at the refuge scale. *Lakebed Management* Potential for short-term adverse impacts at the site scale. *Native Fauna* Moderate long-term beneficial impact at the refuge scale *Multiple Management Actions* Minor short-term adverse impact to soils at the site scale during construction activities	*Same as Alternative B plus:* *Prairie Management and Restoration* Moderate long-term adverse impact at the site *Invasive Flora Species* Moderate long-term beneficial impact to soils at the site *Moist Soil Management* Major long-term beneficial impact at the site *Lakebed Management* Potential to produce short-, medium- and long-term adverse impacts during transition to producing short-, medium-, and long-term beneficial impacts at the site *Native Fauna* Major long-term adverse impacts at the refuge scale
Habitat	*Prairie Management and Restoration* Minor to moderate long-term beneficial impact at the site *Invasive Flora Species* Short-term, and potentially long-term, major adverse impacts at the refuge scale *Moist Soil Management* Moderate short-, medium- and long-term beneficial impact at the site	*Same as Alternative A plus:* *Prairie Management and Restoration* Moderate long-term beneficial impacts at the refuge scale *Invasive Flora Species* Potential to produce major long-term adverse impacts at the site *Moist Soil Management* Moderate short-, medium- and long-term beneficial impacts at the site	*Same as Alternative A plus:* *Prairie Management and Restoration* Medium- to long-term moderate adverse impacts at the refuge scale *Invasive Flora Species* Moderate long-term adverse impacts but with potential for moderate long-term beneficial impacts at the site *Moist Soil Management* Major long-term beneficial impacts at the Refuge scale

Environmental Resource	Alternative A Current Management	Alternative B	Alternative C
	Lakebed Management Moderate short-, medium- and long-term adverse impacts at the site *Native Fauna* Potential for moderate long-term adverse impacts to at the refuge scale	*Lakebed Management* Moderate short-, medium- and long-term beneficial impacts at the site *Native Fauna* Moderate short-, medium- and long-term beneficial impacts the Refuge scale *Multiple Management Action* Minor short-term adverse impacts at the site scale during construction	*Lakebed Management* Potential for moderate short-term adverse impacts at the site scale during the transition between farming use and restoration of historical conditions *Invasive Fauna* Mixed impacts at the site
Wildlife	*Prairie Management and Restoration* Moderate long term beneficial impacts at the site *Invasive Flora Species* Short-term adverse impact at the site	*Same as Alternative A plus:* *Invasive Flora Species* Minor short-term adverse impact at the site *Moist Soil Management* Moderate short-term adverse impacts at the site *Lakebed Management* Moderate long-term beneficial impacts at the site *Water Quality* Minor short-term adverse impact at the site *Native Fauna* Moderate short-, medium- and long-term beneficial impacts the refuge scale *Hunting* Moderate short-, medium- and long-term beneficial impacts the Refuge scale *Administrative Facilities* Moderate short-term adverse impacts at the site *Public Use Facilities* Moderate short-term adverse impacts at the site	*Same as Alternative A plus:* *Prairie Management and Restoration* Major medium- to long-term beneficial impacts at the site *Moist Soil Management* Major medium- to long-term beneficial impacts at the site *Lakebed Management* Major medium- to long-term beneficial impacts at the site *Native Fauna* Minor to moderate short-term adverse impacts at the refuge scale leading to moderate long-term beneficial impacts to at the refuge scale *Invasive Fauna* Minor long-term adverse impacts at the refuge scale *Hunting* Minor to moderate short-term adverse impacts at the refuge scale leading to moderate long-term beneficial impacts at the refuge scale

Environmental Resource	Alternative A Current Management	Alternative B	Alternative C
		Quality and Safety of Roadways Moderate short-term adverse impacts at the site	*Fishing* Moderate to major medium- to long-term beneficial impacts at the site
Threatened and Endangered Species	No expected beneficial or adverse impacts as a result of the management action described	*Same as Alternative A*	*Same as Alternative A*
Cultural Resources	No anticipated direct or indirect impacts to the cultural environment and no ground disturbance is anticipated to occur near or around the 27 documented historic and prehistoric sites located on the Refuge	*Same as Alternative A*	*Same as Alternative A*
Socioeconomics	The economic and social condition of the area would remain the same	*Same as Alternative A*	*Same as Alternative A*
Aesthetic and Visual Resources	The aesthetic and visual resources of the refuge would remain the same.	*Same as Alternative A*	*Same as Alternative A*

4.7 Short-Term Uses Versus Long-Term Productivity

The habitat protection and management actions under the proposed alternative are dedicated to maintaining the long-term productivity of refuge habitats. The benefits of this plan for long-term productivity far outweigh any impacts from short-term actions, such as the construction of an administrative complex, or creation of new trails. While these activities would cause short-term negative impacts, the educational values and associated public support gained from the improved visitor experience would produce long-term benefits for the refuge's entire ecosystem.

The key to protecting and ensuring the refuge's long-term productivity is to find the threshold where public uses do not degrade or interfere with the refuge's natural resources. The plans proposed have been carefully conceived to achieve that threshold. Therefore, implementing the proposed alternative would lead to long-term benefits for wildlife protection and land conservation that far outweigh any short-term impacts.

4.8 Unavoidable Adverse Effects and Mitigation Measures

All action alternatives may have some unavoidable adverse impacts. Most impacts are minor and/or short-term in duration. The refuge would attempt to minimize these impacts wherever possible. The following sections describe the measures the refuge would employ to mitigate and minimize the potential impacts that could result from implementation of the Proposed Action.

Water Quality from Soil Disturbance and Use of Herbicides
Foot traffic on new and existing trails will have a negligible impact on soil erosion. To minimize the impacts from public use, the refuge would include informational signs that request trail users to remain on the trails to avoid causing potential erosion problems.

Long-term herbicide use for exotic plant control could result in a slight decrease in water quality in areas prone to exotic plant infestation. Through the proper application of herbicides, however, this will have a minor impact on the environment, with a greater over all benefit of reducing or eliminating exotic plant infestations.

Wildlife/Habitat Disturbance
Disturbance to wildlife is an unavoidable consequence of any public use program, regardless of the activity involved. Planning and monitoring would be used to avoid unacceptable levels of impact from public use activities or construction. The refuge would minimize these impacts by installing informational signs that request users to stay on trails. This is expected to be a minor, short-term impact. All of the public use activities proposed under Proposed Action would be designed to minimize levels of impact.

Other Unavoidable and Adverse Impacts
Adverse impacts from development of buildings, parking lots, trails, and other improvements would be direct, short-term, minor, and site-specific to local to habitat, soils, and some wildlife species. All construction activities would comply with the requirements of Section 404 of the Clean Water Act; the National Historic Preservation Act; Executive Order 11988, Floodplain Management; and other applicable regulatory requirements.

4.9 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 heavy equipment and vehicles. Also, management actions in this document will require a commitment of funds that would then be unavailable for use on any other Service projects. At some point, commitment of funds to these projects would be irreversible, and once used, these funds would be irretrievable. The Proposed Action would result in some unavoidable harm or harassment to some wildlife. The Service would implement best management practices to minimize potential impacts.

The Propose Action alternative will require additional staffing and funding for full implementation.

5.0 CONSULTATION, COORDINATION AND DOCUMENT PREPARATION

Document prepared by Refuge Staff, Buffalo Lake National Wildlife Refuge, U.S. Fish and Wildlife Service. A list of preparers and consulting agencies can be found in the Appendix of the CCP.

6.0 References

Federal Aviation Administration Office of Environment and Energy. 2005. Aviation & Emissions A Primer.

Fresno County Department of Public Health. Fresno, CA (2009)."E. coli or Fecal Coliform Bacteria Contamination in Your Water Supply." Notice distributed to private well owners.

National Interagency Fire Center. 2012. Guidance for Implementation of Federal Wildland Fire Management Policy (February 2012).

U.S. Census Bureau. 2011. "State & County QuickFacts". Retrieved September 15, 2012.

U.S. Fish and Wildlife Service. 2009. U.S. Fish and Wildlife Service, National Wildlife Refuge System. Managing Invasive Plants: Concepts, Principles and Practices. Available online at:http://www.fws.gov/invasives/staffTrainingModule/methods/chemical/practice.html

U.S. Fish and Wildlife Service. 2010 Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change. 36pp.

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT OF THE BUFFALO LAKE NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN U.S. FISH AND WILDLIFE SERVICE

The U.S. Fish and Wildlife Service (Service) has developed a Comprehensive Conservation Plan (Plan, CCP) and Environmental Assessment (EA) for the Buffalo Lake National Wildlife Refuge (NWR) located in Randall County, Texas. The CCP provides management direction to present and future Refuge managers for the next 15 years. It will achieve the Refuge's vision for the future and the purposes for which the Refuge was originally established. The CCP describes management activities that occur on the Refuge and provides management goals, measurable objectives, and specific management strategies designed to protect and restore wildlife habitat, conserve "trust resources" such as migratory birds and threatened and endangered species, enhance compatible wildlife-dependent recreation opportunities, and related facilities.

An EA was completed to fulfill the requirements of the National Environmental Policy Act (NEPA) of 1969 and to inform the public of the possible environmental consequences of implementing the CCP. A total of three alternatives were evaluated and analyzed for potential impacts on the human environment. The EA was prepared to provide a decision-making framework that 1) explores a reasonable range of alternatives to meet project objectives, 2) evaluates potential issues and impacts to the Refuge, resources and values, and 3) identifies mitigation measures to minimize the degree or extent of these impacts.

ALTERNATIVES CONSIDERED AND ANALYZED

Alternative A: Current Management (No Action Alternative)

Alternative A, the No Action Alternative, assumes no change from management programs that have been in place, and/or have been initiated over time, since the Refuge's establishment. Alternative A is considered the baseline to compare other alternatives against. Under this alternative, the primary management of the Refuge would continue to preserve shortgrass prairie and associated wildlife. The Refuge would continue to provide existing levels of public use, visitor services, ecological enhancements and overall improvements. Current management efforts would continue to focus on grazing, prescribed fire, invasive species control and cooperative farming to maintain and restore short grass prairie habitat.

The Refuge wildlife program consists of providing habitat for short-grass prairie dependent species and conducting a limited amount of monitoring. Current habitat management practices would continue, including the conservation and restoration of short-grass prairies, restoring native flora and managing native nuisance flora and fauna.

The Refuge would maintain the current level of wildlife dependent recreational opportunities (wildlife observation, wildlife photography, environmental education and interpretation) and initiate hunting and fishing opportunities in the near future. Recreational opportunities would

continue to be limited to traditional programs including camping and picnicking. The refuge will maintain wildlife observation and photography opportunities as well as continue to host an annual education day for school children while maintaining the environmental education area for requested programs and sustain the auto tour route.

Under this alternative no improvements would be initiated. Viewing opportunities for wildlife would be limited to the existing roads and trails that are open to the public. Improvements to roads and administrative facilities would continue according to current capabilities; however, no new improvement or expansion efforts would take place. No improvements to the headquarters would be initiated and no visitor's center or biological lab would be implemented.

Alternative B: Proposed Action

Under Alternative B, the Refuge would initiate expansion of habitat management and restoration activities, combined with expanded public use and infrastructure identified in the CCP. Under Alternative B, management direction would generally be the same as described in Alternative A with the addition of expanded habitat management activities, maintaining and enhancing short-grass prairie habitat, expand visitor services programs and public use facilities, and the use of adaptive management strategies to contribute to ongoing monitoring. Existing areas of short-grass prairie would be further protected and enhanced through planned management strategies such as seeding, and the use of herbicides to control non native flora.

Under this alternative, the Refuge's wildlife program would include inventories of wildlife species and habitat conditions, which would improve the Refuge's baseline biological information. This would allow staff to better evaluate habitat management decisions in the future and adjust management actions to benefit wildlife using adaptive management strategies throughout the life of the CCP. The Refuge would initiate a new Land Protection Plan for an additional 20,000 acres of potential acquisition opportunities in an attempt to further conservation efforts in the area and reduce human encroachment on the refuge. The Refuge would expand active habitat management practices such as the use of aircraft application followed by mechanical removal of invasive flora. With the addition of prescribed fire and controlled livestock grazing management the refuge would initiate a seeding program with native short grass species. The Refuge will add three 40 acre moist soil units utilizing the Santa Rosa aquifer and refrain from using the rapidly declining Ogallala aquifer. These management strategies will accelerate restoration of native short-grass prairie habitat.

This alternative would improve and develop additional visitor service programs on the Refuge by expanding the environmental education and interpretation programs as well as outreach efforts to meet the increasing visitation and interest in Refuge resources. Under this alternative the refuge will initiate a hunting opening package on the refuge to assist in controlling invasive fauna as well as to control populations of native fauna species. The refuge would also construct a 6+ acre public fishing pond near the existing viewing blind the lakebed and Steward Marsh. The refuge would also install six additional blinds to promote an increase in wildlife photography and wildlife viewing opportunities.

Improvements in facilities management would be develop an Administrative Complex to include headquarters, visitor center, biological lab as well as a maintenance and storage facility. Improvements to public use facilities would include two additional hiking trails as well as replace and/or rehabilitate the existing chemical toilet facilities adjacent to the campground with facilities that can function on an annual basis. The quality and safety of the Refuge roadways would be improves with the rehabilitation of the entrance roadway from FM 168 to the headquarters with a two lane paved road with adequate shoulders as well as resurfacing of the remaining refuge roads with new caliche.

Alternative C

This alternative would incorporate the habitat and wildlife management direction called for in Alternative B; however, this alternative would eliminate livestock grazing on the refuge and permit wildlife populations to increase and graze freely without competition on the refuge. The refuge would develop sufficient moist soil units on the refuge to maintain water use levels which were available to wildlife prior to the receding of the Ogallala aquifer due to continuous increase for agriculture purposes throughout the aquifer. Under this alternative the refuge would also remove all farming activities and convert all farming lands back to native vegetation representative of native prairie grasslands.

This alternative would incorporate the visitor's service direction and include public use facilities described under Alternative B.

DECISION: THE SELECTED ALTERNATIVE

Alternative B was selected over the other alternatives because it best meets the Refuge's vision for the future, the purposes for which the Refuge was established, and the habitat, wildlife, and visitor service goals identified in the CCP. This alternative is the basis for the CCP and describes how habitat objectives will be accomplished through a combination of management activities to encourage ecological integrity, promotes maintenance and restoration of short-grass prairie habitat. This alternative will not adversely impact trust resources, including threatened and endangered species, or their habitat. Opportunities for wildlife-dependent recreation activities, such as hunting, fishing, wildlife observation, photography, environmental education, and interpretation will be enhanced. Future management actions will have a neutral or positive impact on the local economy and the recommendations in the CCP will ensure that refuge management is consistent with the mission of the National Wildlife Refuge System.

SUMMARY OF EFFECTS

Implementation of the Service's decision would be expected to result in environmental, social and economic effects as described in the CCP/EA and summarized here. The CCP describes habitat management, population management, and land conservation objectives that would result in improved short grass prairie habitat conditions. The proposed visitor service management activities would result in enhanced prospects for wildlife dependent recreational opportunities.

Refuge management activities (farming, invasive species control, etc.) would result in short-term, minor, negative impacts to soils, air, water, habitat and wildlife as described in the EA; however, the long-term impacts are expected to be beneficial. These habitat management activities would result in the creation and improvement of native short grass prairie habitat, improvements in the biological program would focus management efforts on local and regional threats to the ecosystem.

Opportunities for wildlife-dependent activities such as hunting, fishing, wildlife observation, photography, environmental education, and interpretation would be enhanced. There would be a permanent loss of a small amount of habitat through the establishment of an administrative complex to include a visitor center, biological lab, as well as a maintenance and storage facility, the construction of a 6+ acre fishing pond, the addition of moist soil units, the placement of 20 additional interpretive panels and the expansion of the existing auto tour route. This would also result in short-term disturbance to wildlife, but we have determined that these impacts are minimal and will eventually be outweighed by the benefits provided by improved visitor service programs.

Disturbance to wildlife at some level is an unavoidable consequence of any public use program, regardless of the activity involved. Obviously, some activities innately have the potential to be more disturbing than others. The management actions to be implemented have been carefully planned to minimize unavoidable levels of impact. As currently proposed, the known and anticipated levels of disturbance associated with management actions are considered minimal and well within the tolerance levels of know wildlife species and populations present in the area. Implementation of the visitor services program would take place through carefully controlled time and space zoning and placement of trail and other facilities would avoid direct contact with sensitive areas, such as nesting habitat. All hunting activities (season lengths, bag limits, number of hunters) would be conducted within the constraints of sound biological principles and refuge-specific regulations established to restrict illegal or non-conforming activities and will be accompanied with a separate NEPA process. Monitoring activities through wildlife inventories and assessments of public use levels and activities would be utilized and visitor use programs would be adjusted as needed to limit disturbance.

The increased opportunities for wildlife dependent recreational opportunities on the Refuge would also have beneficial impacts on the local economy through increased visitation and revenue. Partnerships with county, state and federal agencies, private landowners, and conservation groups would enable the Refuge to achieve goals and objectives, minimize costs, and strengthen relationships.

Implementing the Service's management action is not expected to have any significant adverse effects on wetlands and floodplains, pursuant to Executive Order 11990 and 11988, because there would be no development of refuge facilities within wetlands or floodplains. There would be no effect on threatened, endangered, proposed or candidate species and/or critical habitat, as documented in the intra-service Section 7 (Endangered Species) Consultation completed with the

Ecological Services Field Office in Arlington, TX and signed on November 27, 2012. In addition, archeological and/or historical resources would not be impacted.

The Service considered other past, present or reasonably foreseeable future planned actions that could result in significant cumulative impacts to resources in the project area. However, the proposed action (implementation of the CCP) will not add to those impacts. Any adverse direct and indirect effects of the proposed action on air, water, soil, habitat, wildlife and aesthetic/ visual resource values, as described in the EA, are expected to be minor and short-term. The benefits to long-term ecosystem health that the proposed action will accomplish will outweigh any of the short-term impacts.

PUBLIC OUTREACH, REVIEW AND COMMENT

Development of the Buffalo Lake NWR Comprehensive Conservation Plan has been thoroughly coordinated with all interested and/or affected parties. Public scoping was initiated when a Notice of Intent to prepare a Comprehensive Conservation Plan was published in the Federal Register (Volume 63, Number 118, pp 693-694) on June 19, 1998. A public meeting was announced through a planning update mailing and a public notice and was held on December 15, 2009. This was followed by a Notice of Availability in the Federal Register (77 No. 206; October 24, 2012) that the Draft Plan/EA was available for 30 days of public review. Subsequently, the Draft Plan/EA was made available for public review starting on October 24, 2012 through November 23, 2012, at the Refuge, at the Deaf Smith County Library, Canyon Public Library and the Amarillo Southwest Library, and at the Regional Office in Albuquerque, New Mexico. The refuge hosted an open house public meeting on November 6, 2012 to review the Draft CCP and EA with members of the public at the refuge headquarters office. Although no one attended the open house meeting a 5 page letter was submitted as well as a total of thirty seven (37) written comments were submitted to the Refuge/Regional Office. All comments were considered and addressed in Appendix I of the CCP.

FINDINGS

Based on the analysis documented in the environmental assessment and with due consideration given to comments from the public and through consultation with the State of Texas, it is my determination that the proposed action does not constitute a major Federal action that will have a significant effect on the quality of the human environment under the meaning of Section 102 (2) (C) of the National Environmental Policy Act of 1969 (as amended). As such, it is my conclusion that an environmental impact statement is not required for this plan and the selected alternative may be implemented as soon as practicable. This determination is based on the following factors (40 C.F.R. 1508.27), as addressed in the attached Environmental Assessment, which is attached.

1. Both beneficial and adverse effects have been considered and this action will not have a significant effect on the environment. (Environmental Assessment, pages C-1-37 through C-1-70)

2. The actions will not have a significant effect on public health and safety. (Environmental Assessment, pages C-1-79 through C-1-83)

3. The project will not significantly affect any unique characteristics of the geographic area such as proximity to historical or cultural resources, wild and scenic rivers, or ecologically critical areas. (Environmental Assessment, page C-1-45 – C-1-150)

4. The effects on the quality of the human environment are not likely to be highly controversial. (Environmental Assessment, page C-1-77)

5. The actions do not involve highly uncertain, unique, or unknown environmental risks to the human environment. (Environmental Assessment, pages C-1-83 through C-1-84)

6. The actions do not establish a precedent for future actions with significant effects nor do they represent a decision in principle about a future consideration. (Environmental Assessment, pages C-1-30 through C-1-49).

7. There will be no cumulatively significant impacts on the environment based on any of the alternatives. Cumulative impacts have been analyzed with consideration of other similar activities on adjacent lands, in past action, and in foreseeable future actions. (Environmental Assessment, pages C-1-71 through C-1-82).

8. The actions will not significantly affect any site listed in, or eligible for listing in, the National Register of Historic Places, nor will they cause loss or destruction of significant scientific, cultural, or historic resources. (Environmental Assessment, pages C-1-80).

9. The actions are not likely to adversely affect threatened or endangered species, or their habitats. (Environmental Assessment, page C-1-22; Appendix C and Appendix G Intra Service Section 7 Consultation).

10. The actions will not lead to a violation of federal, state, or local laws imposed for the protection of the environment. (Environmental Assessment, pages C-1-29 through C-1-39).

It is the intent of the Service to revisit questions of significant environmental consequences in accordance with NEPA upon consideration of the implementation of site specific proposals call for and discussed in the CCP.

SUPPORTING REFERENCES

U.S. Fish and Wildlife Service, 2012. Draft Comprehensive Conservation Plan and Environmental Assessment for the Buffalo Lake National Wildlife Refuge, Randall County, Texas. U.S Department of the Interior, Fish and Wildlife Service, Southwest Region.

U.S. Fish and Wildlife Service, 2013. Comprehensive Conservation Plan and Environmental Assessment for the Buffalo Lake National Wildlife Refuge, Randall County, Texas. U.S Department of the Interior, Fish and Wildlife Service, Southwest Region.

Recommended: Lynn A. Nymeyer 03-06-2013

Lynn Nymeyer, Refuge Manager — Date
Buffalo Lake NWR

Approved: for Joy E Nicholopoulos 9/12/13

Dr. Benjamin N. Tuggle, Regional Director — Date
U.S. Fish and Wildlife Service, Region 2

BUFFALO LAKE NATIONAL WILDLIFE REFUGE

COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL ASSESMENT

APPENDIX D

COMPATABILITY DETERMINATIONS

WILDLIFE OBSERVATION AND WILDLIFE PHOTOGRAPHY

ENVIRONMENTAL EDUCATION

INTEPRETATION

LIVESTOCK GRAZING

SCIENTIFIC RESEARCH AND MONITORING

CAMPING

COMPATIBILITY DETERMINATION

USE:
Wildlife Observation and Wildlife Photography

REFUGE NAME:
Buffalo Lake National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITIES:
Secretarial Order #2843
Executive Order #10787
Bankhead-tenant Act 7 V. 5.C. 1011

REFUGE PURPOSE(S):
"...for use as an inviolate sanctuary, …for any other management purposes, …for migratory birds." 16 U.S.C. 712d (Migratory Bird Conservation Act)

"..shall be administered by him (Secretary of Interior) directly or in accordance with cooperative agreements…and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife resources thereof, and its habitat thereon,…" 16 U.S.C. 664 (Fish and Wildlife Coordination Act)

"…for the development, advancement, management, conservation, and protection of fish and wildlife resources…" 16 U.S.C. 742f(a)(4)

"…for the benefit of the United States Fish and Wildlife Service in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

NATIONAL WILDLIFE REFUGE SYSTEM (NWRS) MISSION:
The mission of the 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 Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:
(a) What is the use?
Buffalo Lake National Wildlife Refuge proposes to continue and expand wildlife observation and photography in designated areas of the Refuge that are compatible with Refuge purposes. These activities are wildlife-dependent, priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997.

(b) Where is the use conducted?

The refuge provides a unique opportunity for wildlife viewing of many hawks, deer, and other wildlife people find interesting. Wildlife observation and photography are popular at the refuge. Visitors can view wildlife from the auto tour road and along the trails. It is possible for visitors to photography the wildlife and the scenery. The refuge provides opportunities that support wildlife observation and photography through the use of observation decks and blinds, trails, and the auto tour road.

(c) When is the use conducted?

Visitors are welcome to engage in wildlife observation and photography in the area of the refuge open to public use every day of the year, from sunrise to sunset.

(d) How is the use conducted?

Auto Tour Route:

Visitors can drive the auto tour route in their automobile and use it as a mobile "blind" to view and photograph wildlife. The current auto tour route takes visitors through a variety of refuge habitats. From the tour route, visitors may also view neighboring private lands that are often in agricultural production. The auto tour route takes visitors through grasslands, introduced woodlands, dry playas, farm fields and the "Windmill for Wildlife" exhibit. The route begins with a rangeland interpretive display and ends at the Stewart Marsh observation dock and photo blind.

Wildlife Observation Trails:

Two designated hiking trails give visitors access to native habitat types found on the refuge. Each trail is maintained by refuge staff and visitors can expect to see a variety of wildlife and native vegetation.

(e) Why is this use being proposed?

Wildlife observation and photography are existing Refuge uses and are identified as wildlife dependent priority public uses for the National Wildlife Refuge System. Appropriate development of facilities for visitors to photograph and observe wildlife enhances the opportunity for high quality wildlife observation and photography experiences.

AVAILABILITY OF RESOURCES:

Direct annual costs to administer these programs and facilities are primarily in the form of staff time, as well as directional and interpretive signage and the expense associated with operating a visitor contact station at the refuge headquarters. The development of any new facilities and opportunities, as well as the maintenance and upkeep of existing facilities, will be additional costs associated with expanded wildlife observation and photography opportunities on the refuge.

ANTICIPATED IMPACTS OF THE USE:

The potential impacts of the Buffalo Lake NWR wildlife observation and photography program and the USFWS' ability to achieve Refuge purposes and the National Wildlife Refuge System mission are evaluated here.

Threatened and Endangered Species:

No significant impacts to Federally-listed T&E species are expected to occur due to wildlife observation and photography on the refuge.

Migratory Birds and other Biological Resources:

Primary means of access to areas on the Refuge used for wildlife observation and photography include motorized vehicles on Refuge roads open to the public and walking on trails. A very small number of visitors use bicycles on public roads. Impacts associated with wildlife observation and photography vary based on mode of access. Pedestrians, vehicles, and bicycles all have the potential to disturb wildlife and influence wildlife distribution and habitat use. Disturbance of wildlife by visitors is likely to be greatest in concentrated areas of use, including along trails and roads. While some species appear to acclimate to vehicular traffic, and even the presence of visitors on trails, other species are less tolerant of disturbance. Overall it is likely that species composition and abundance is decreased in areas supporting these recreational uses. However, by concentrating disturbances to these designated areas which constitute a very small portion of the Refuge, large and extensive tracts of undisturbed habitat remain available for wildlife throughout the Refuge.

Disturbance impacts caused by wildlife photographers tend to be greater than other wildlife observation techniques as photographers are much more likely to leave their vehicles and approach wildlife on foot. Other impacts include the potential for photographers to remain close to wildlife for extended periods of time in an attempt to habituate the wildlife subject to their presence and the tendency of casual photographers with low power lenses to get much closer to their subject than other activities would require.

Litter improperly discarded by visitors can entangle wildlife or be ingested, potentially resulting in injury or death. Efforts to educate the public about such issues are incorporated into outreach efforts and interpretive events.

The above impacts are minimized on the refuge by locating public use facilities away from sensitive areas, restricting public access to existing roads and trails, and through the strategic location of trails and observation blinds. While some disturbance impacts occur along these linear corridors, extensive tracts of undisturbed habitats remain available for wildlife in areas adjacent to public use facilities and throughout the refuge. Additionally, impacts are minimized through development and active enforcement of refuge-specific rules and regulations, including emergency closures if warranted, and through educational materials made available to the visiting public.

As a result of active management of these wildlife-dependent recreational uses, direct, indirect and cumulative impacts to migratory birds and other biological resources from these uses remain at acceptable levels and will not affect the viability of the wildlife populations on the refuge.

PUBLIC REVIEW AND COMMENT:

During public scoping for the preparation of the CCP, verbal and written were solicited from members of the general public on all aspects of current management through public meetings, special mailings, and local media outlets. This compatibility determination was published and made available for public review and comment concurrent with the Draft CCP and EA released

in the federal register on October 24, 2012 and closed on November 23, 2012. Public notification included a notice in the federal register, media announcements in local newspapers, local radio stations, as well as public notices posted throughout the local communities and a public meeting.

DETERMINATION (CHECK ONE BELOW):
_____Use is Not Compatible
_X____Use is Compatible with Following Stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:
The Refuge will implement the following stipulations to ensure that camping remains a compatible use:

1. Designated Refuge public use areas are open during daylight hours only.
2. Although wildlife observation and photography occur via several different modes of access, all users are strongly encouraged to stay on designated roads and trails and are restricted to the public use area only.
3. All-terrain vehicles and off-road vehicle travel are prohibited.
4. Bicycling in support of wildlife observation is permitted on gravel roads only.
5. Playing electronic recordings to attract wildlife is prohibited.
6. Collection of plants or animals, or feeding or disturbing wildlife, is prohibited.
7. Pets must be leashed at all times.
8. Public use trends and associated impacts from human activity will continue to be monitored. If significant increases in use occur, and/or if impacts to resources are determined significant, the program will be reevaluated and modified as necessary to ensure compatibility.

JUSTIFICATION:
These programs are determined to be compatible with the establishment purposes of the Refuge and the mission of the National Wildlife Refuge System. Wildlife observation and photography are wildlife-dependent, priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997. The USFWS strives to provide priority public uses when compatible with the purpose of the Refuge and the mission of the System. Facilities and activities related to wildlife observation and photography occur in designated areas of the refuge, leaving large areas of undisturbed habitat available for wildlife.

The stipulations outlined above are specifically designed to and should minimize potential impacts of these activities. The refuge will continue to monitor uses and adjust programs as necessary to protect Refuge resources. The awareness, enjoyment and education gained from these activities are expected to outweigh their associated impacts. Buffalo Lake National Wildlife Refuge has determined that wildlife observation and photography, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the Refuge. Instead, providing opportunities for wildlife observation and photography has given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving habitat, thereby further contributing to the overall mission of the National Wildlife Refuge System.

SIGNATURE: **Refuge Manager** 03-06-2013
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION Date: 2028

COMPATIBILITY DETERMINATION

USE:
Environmental Education

REFUGE NAME:
Buffalo Lake National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITIES:
Secretarial Order #2843
Executive Order #10787
Bankhead-tenant Act 7 V. 5.C. 1011

REFUGE PURPOSE(S):
"... for use as an inviolate sanctuary, …for any other management purposes, …for migratory birds." 16 U.S.C. 712d (Migratory Bird Conservation Act)

"..shall be administered by him (Secretary of Interior) directly or in accordance with cooperative agreements…and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife resources thereof, and its habitat thereon,…" 16U.S.C. 664 (Fish and Wildlife Coordination Act)

"…for the development, advancement, management, conservation, and protection of fish and wildlife resources…" 16 U.S.C. 742f(a)(4)

"…for the benefit of the United States Fish and Wildlife Service in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

NATIONAL WILDLIFE REFUGE SYSTEM (NWRS) MISSION:

The mission of the 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 Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:
(a) What is the use?

Environmental education is a wildlife-dependent, priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997

Environmental education occurs in many forms. Whenever possible, students (both youth and adults) are encouraged to participate in environmental education on the refuge so they can fully appreciate the native prairie and refuge efforts to restore and maintain native wildlife habitat. On-refuge programs may include staff or teacher-led investigations, presentations and hands-on learning through the collection of data or materials that allow the students to connect the principles and theories behind conservation. Currently, education programs on-refuge are led by refuge staff.

These programs involve tours and talks followed by classroom discussion.

Off-refuge education programs usually involve refuge staff speaking to classes about conservation, restoration and endangered species. Talks are geared toward addressing specific priorities or curriculum for those classes in order to help them meet education goals.

(b) Where is the use conducted?
Areas that are used for environmental education are along the refuge auto tour route, hiking trail and group site to provide students a first-hand experience on environments at the refuge. Motorized vehicles are restricted to hard gravel roads designated as open to public travel. Foot traffic is permitted on all open roads, hiking trails, and fire lanes of the refuge. Environmental education also occurs off-site at schools or other centers where it is appropriate for staff to bring materials and presentations to the students.

(c) When is the use conducted?
Environmental education programs are conducted on an as-needed basis, generally during normal work hours, year round. Occasionally, programs will be delivered on weekends or evenings. The use is primarily conducted during the school year with on-site activities occurring throughout the spring, winter, and fall.

(d) How is the use conducted?
Structured, curriculum-based environmental education activities comply with Service policy (605 FW 6), which are aligned with State and national environmental education criteria. Environmental education programs typically involve groups of students of varying ages participating in on-site activities led by staff or docents about the geological, biological, or ecological topics regarding the site.

Programs are available on request as time permits and refuge staff work closely with schools and teachers to tailor a visit to the refuge that will meet requirements in the student's curriculum.

(e) Why is this use being proposed?
Environmental education provides a way for people to connect with nature through a hands-on approach and provides educational experiences that are not easily gained in a classroom setting. Texas mandates that a significant percentage of science education be in the form of lab and field investigations, and the refuge program is a perfect fit for these types of field-based experiences. The program meets local and State of Texas education standards, allows professional development for teachers, provides community-based service organization programs, meets youth group merit badge requirements, and instills a sense of stewardship and understanding of conservation issues. The environmental education program also improves the quality of the visitor's experience and provides them with a better understanding of the benefits, issues, and challenges of natural resource conservation in the coastal ecosystem. The program expansion is proposed to serve additional students, though the expansion is limited by the number of available docents as well as the carrying capacity of the environment.

Environmental Education is an existing refuge use and is identified as one of the six wildlife dependent priority public uses for the National Wildlife Refuge System. Developing an educational program for visitors to enhance their knowledge of how Buffalo Lake NWR and the NWRS in order to increase support for conservation efforts.

AVAILABILITY OF RESOURCES:

Direct annual costs to administer these programs and facilities are primarily in the form of staff time. The development of new facilities, programs and materials, as well as their maintenance and upkeep, are the primary costs associated with environmental education but are shared with other projects on the refuge.

The activities follow all applicable laws, regulations and policies, including: Migratory Bird Conservation Act, Title 50 Code of Federal Regulations, National Wildlife Refuge System Manual, National Wildlife Refuge System goals and objectives, and Refuge goals and objectives.

Approximately one full-time equivalent (FTE) position would be required to administer and manage this activity adequately (in conjunction with interpretation program). In addition, maintenance and improvement of trails, parking lots, and kiosk displays will periodically be required. The total estimated cost per year would range from $60,000 to $80,000. Based on a review of the refuge budget allocated for EE, there is currently no funding to ensure an increase in compatibility or to administer and manage any additional activities. Strategies to initiate the EE program have been identified and would require hiring another FTE to capture the potential for this area.

The Comprehensive Conservation Plan (CCP) recommends additional staffing and facilities to improve the EE program. Many local students would learn about, and benefit from, the refuge with additional staff and educational materials. Additional staff would be able to provide teacher workshops and refuge orientations, and would help develop site-specific curricula, materials, and activities linked to State standards. Students and teachers would also be able to participate in coordinated research projects through long-term monitoring studies.

ANTICIPATED IMPACTS OF THE USE:

Short and Long-term Impacts

Environmental education has a beneficial effect on Refuge purposes as well as the mission of the NWRS by developing a refuge based curriculum to meet national and/or State educational standards for 4th and 7th grades. The refuge serves as an information resource and outdoor classroom for post secondary schools throughout the area.

Environmental education has a beneficial effect on Refuge goals and objectives by striving to enhance opportunities and the quality of the visitor's experience, allowing program participants to demonstrate learning through refuge-specific stewardship tasks and projects. Environmental education activities strive to promote understanding and appreciation of natural and cultural resource management throughout the Refuge.

There may be some minimal disturbance to wildlife resulting from larger groups of students visiting the refuge and/or school bus traffic bringing students to the refuge, but the level of disturbance is unlikely to interfere with production or population maintenance as environmental education makes up only a fraction of Visitor Service contacts. In addition, school groups that travel among trails during environmental education programs may cause trampling, erosion and plant damage, thus resulting in habitat degradation.

Most interpretation activities will occur at, or be directed to, existing and future facilities in strategic locations, providing quality opportunities while limiting wildlife and habitat

disturbance. These activities are usually predictable in timing (such as daylight hours) and in a given geographical location (such as on a trail). School buses and personal vehicles would utilize developed roads and parking areas to access trails which are already in place. Self-guided interpretation would be sporadic, by small groups of people, and at established trails and kiosks. This may cause short term disturbance as well, but would have minimal impact. In addition, the Refuge teaches students the prohibitions on picking wildflowers and removing bird feathers. Students are taught the importance of good wildlife observation techniques, including moving slowly and quietly to produce the least possible disruption to the environment.

The overall impacts to refuge resources resulting from the EE program are minimal due to the conservation emphasis on courses occurring on the refuge. The proposed development of a new refuge visitors center will result in some disturbance of wildlife during the construction phase; however, once the visitors center is completed, it is expected that disturbance to wildlife will be no greater than it is currently.

Due to the level of the use and facilitation of the program by the refuge staff, these impacts are likely to be minimal and short-term, occurring only in close proximity to existing public use facilities. Offering these activities does not alter the Refuge's ability to meet habitat goals and helps support several of the primary objectives of the Refuge.

The continuation of the environmental education program ultimately continues to provide a benefit to local residents by developing a higher level of environmental knowledge and awareness among students. The program also provides long-term benefits for the refuge by promoting environmental stewardship in students.

Cumulative Impacts

It is unlikely that the environmental education program will incrementally add to resource impacts when combined with all past, present, and reasonably foreseeable future projects. Other public uses such as wildlife observation and wildlife photography occur at the same sites used for environmental education but it is not anticipated to be of any significance to cause cumulative impacts.

Beneficial cumulative impacts may occur, however, through the spread of an environmental stewardship philosophy resulting in students who partake in environmental education. Ultimately, this will benefit the overall mission of the National Wildlife Refuge System by fostering knowledge of the Service as well as environmental awareness and natural resource conservation.

PUBLIC REVIEW AND COMMENT:

During public scoping for the preparation of the CCP, verbal and written were solicited from members of the general public on all aspects of current management through public meetings, special mailings, and local media outlets. This compatibility determination was published and made available for public review and comment concurrent with the Draft CCP and EA released in the federal register on October 24, 2012 and closed on November 23, 2012. Public notification included a notice in the federal register, media announcements in local newspapers, local radio stations, as well as public notices posted throughout the local communities and a public meeting.

DETERMINATION (CHECK ONE BELOW):

_____Use is Not Compatible

_X____Use is Compatible with Following Stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The refuge has the following stipulations to ensure that environmental education remains a compatible use:

1. Individuals or organizations that bring clients to the refuge for environmental education purposes and charge a fee or tuition for their services are required to have a Special Use Permit issued by the refuge. This requirement ensures that private businesses are not unfairly making a profit from public lands and provides a mechanism for the refuge to regulate where and when commercial activities occur.
2. Environmental education will only take place when and where the refuge approves the use. All activities are to occur under the guidance of a refuge staff member to assure minimal disturbance to wildlife, minimal vegetation damage, and minimal user conflict between other public uses.
3. Environmental education programs will avoid sensitive sites and vulnerable wildlife populations and will be held at or near established facilities so that impacts may be minimized.
4. Evaluations of sites and programs will be conducted periodically to assess if objectives are being met and that natural resources are not being adversely impacted.
5. Wildlife impacts will be carefully monitored. If impacts are detected, adaptive strategies will be developed, such as the creation of approach-zones, or moving program locations and times to reduce wildlife disturbance.

JUSTIFICATION:

As defined by the National Wildlife Refuge System Improvement Act of 1997, wildlife-dependent recreational uses may be authorized on a refuge when they are compatible and not inconsistent with public safety. Environmental education is included as one of these six activities, which are to receive enhanced and priority consideration in Refuge planning and management. Interactive environmental education as described above and consistent with the management direction provided in the Comprehensive Conservation Plan increases the public's awareness, understanding and appreciation of fish and wildlife resources. This activity will not conflict with any of the other priority public uses or adversely impact biological resources. Therefore, through the compatibility determination process, Buffalo Lake National Wildlife Refuge has determined that environmental education, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the Refuge.

SIGNATURE: **Refuge Manager** 03-06-2013
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION DATE: 2028

COMPATIBILITY DETERMINATION

Use:
Interpretation

Refuge Name:
Buffalo Lake National Wildlife Refuge

Establishing and Acquisition Authorities:
Secretarial Order #2843
Executive Order #10787
Bankhead-tenant Act 7 V. 5.C. 1011

Refuge Purpose(s):

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

"..shall be administered by him (Secretary of Interior) directly or in accordance with cooperative agreements…and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife resources thereof, and its habitat thereon,…" 16U.S.C. 664 (Fish and Wildlife Coordination Act)

"…for the development, advancement, management, conservation, and protection of fish and wildlife resources…" 16 U.S.C. 742f(a)(4)

"…for the benefit of the United States Fish and Wildlife Service in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

National Wildlife Refuge System (NWRS) Mission:
The mission of the 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 Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

Description of Use:
(a) What is the use?

Interpretation is an existing wildlife-dependent recreational opportunity occurring on Buffalo Lake National Wildlife Refuge. The refuge communicates the most important fish, wildlife, habitat, and resource issues to visitors of all ages and abilities through effective interpretation. Interpretation is a communication process that forges emotional and intellectual connections between the interests of the audience and the inherent meanings in the resource (i.e., more than information). Interpretation occurs in less formal activities with refuge staff and volunteers or through exhibits, signs, brochures, elements of special events, and tours.

Buffalo Lake National Wildlife Refuge proposes to continue to provide environmental interpretation, an existing wildlife-dependent recreational opportunity, in designated areas of the refuge.

(b) Where is the use conducted?
People may encounter interpretive opportunities within any public use areas provided on the refuge including but not limited to the kiosks, trails, and the observation deck and blinds. The interpretive signs exist on the auto tour road, the prairie dog trail, and the grassland trail.

(c) When is the use conducted?
Interpretation occurs year-round through the visitor contact station and interpretative panels located in the Public Use Area of the refuge. Expanded interpretive opportunities on the weekends and/or holidays may occur depending on staff availability.

(d) How is the use conducted?
The Refuge provides multiple means for refuge visitors to experience the interpretive program. All interpretive panels are accessible, easy to read and understand and staff is available during regular business hours at the visitor contact station to answer questions. Typical use is by individuals, family groups, and school groups and for varying degrees of duration from two to eight hours.

(e) Why is this use being proposed?
Interpretation enhances opportunities for a quality visitor experience on the refuge. It also promotes visitor understanding for America's natural resources by providing safe, enjoyable, and accessible interpretive opportunities, products, and facilities. Many visitors do not realize the distinction between national wildlife refuges and a park or Federal or State agency lands that are managed for different purposes. Increased efforts are needed to help people better understand the role of national wildlife refuges and the Service mission, and to have a heightened awareness of conservation and stewardship concepts. Interpretation at the refuge could provide opportunities for visitors to make their own connection with resources by promoting outdoor family oriented activities.

Interpretation is an existing Refuge use and expanding this program will enhance opportunities for a high quality visitor experience on the Refuge. It promotes visitor understanding for America's natural resources by providing safe, enjoyable, and accessible interpretative opportunities. Developing and enhancing opportunities for people to learn about wildlife and habitat recovery and maintenance efforts, the refuge, and the NWRS as a whole will increase support for conservation efforts.

Availability of Resources:
Direct annual costs to administer this program and facilities are primarily in the form of staff time. The development of new facilities, programs and materials, as well as their maintenance and upkeep, will be the primary costs associated with interpretation offered on the refuge. In addition, staff time to deliver programs adds to the expense of interpretation.

The CCP recommends additional staffing and facilities to expand interpretation. Greater numbers of people would learn about, and benefit from, the Refuge with additional staff and interpretative materials. Additional staff would be able to provide additional interpretation programs and develop new or replace existing panels and literature.

Anticipated Impacts of the Use:

Short and Long-term Impacts:

The overall impacts to the Refuge and its associated wildlife populations from interpretation would be minimal. Most interpretive activities will occur at, or be directed to, existing and future facilities in strategic locations, providing quality opportunities while limiting wildlife and habit disturbance. These activities are usually predictable in timing (such as daylight hours) and in a given geographical location (such as on a trail). Potential impacts to wildlife and the environment include short term disturbance, minor soil compaction on existing trails and vegetative impacts in the immediate vicinity of the activity. Disturbance is typically short- term and should only temporarily displace wildlife. Adequate habitat is usually available for wildlife nearby. Personal vehicles would utilize developed roads and parking areas to access trails which are already in place. Self-guided interpretation would be sporadic, by small groups of people, and at established trails and kiosks. This may cause short term disturbance as well, but would have minimal impact.

Long-term impacts: Anticipated long-term impacts are beneficial to the refuge, as these activities promote a conservation ethic in the local community. This use would increase in the future if a new Visitor Center area is added and an additional staff position with visitor services responsibilities is added as proposed in the CCP. As improvements are made, there may be some additional short-term, localized disturbance, but use would continue to be in existing developed areas.

Cumulative Impacts: No cumulative or indirect effects are anticipated to occur as a result of the Refuge interpretation program. Evaluations of sites and programs will be conducted periodically to assess if objectives are being met and that natural resources are not being adversely impacted.

Interpretation occurs in conjunction with other wildlife-dependent activities including; wildlife observation, environmental education and photography. Providing an opportunity for people to learn among natural habitats and view native wildlife provides wide-scale beneficial environmental impacts. Although interpretation and associated wildlife-dependent uses may increase over time, it is not anticipated to be significant enough to cause cumulative impacts. The cumulative impacts of educating the public about conservation issues would be beneficial to meeting the Service mission and Refuge purposes.

The above impacts are minimized on the Refuge by locating public use facilities away from sensitive areas, restricting public access to existing roads and trails, and through the strategic location of trails. While some disturbance impacts occur along these linear corridors, extensive tracts of undisturbed habitats remain available for wildlife in areas adjacent to public use facilities and throughout the Refuge. Additionally, impacts are minimized through development and active enforcement of refuge-specific rules and regulations, including emergency closures if warranted, and through educational materials made available to the visiting public.

As a result of active management of this wildlife-dependent recreational use, direct, indirect and cumulative impacts to migratory birds and other biological resources remain at acceptable levels and will not affect the viability of habitats and wildlife populations on the refuge.

Public Review and Comment:
During public scoping for the preparation of the CCP, verbal and written were solicited from members of the general public on all aspects of current management through public meetings, special mailings, and local media outlets. This compatibility determination was published and made available for public review and comment concurrent with the Draft CCP and EA released in the federal register on October 24, 2012 and closed on November 23, 2012. Public notification included a notice in the federal register, media announcements in local newspapers, local radio stations, as well as public notices posted throughout the local communities and a public meeting.

Determination (check one below):
___ Use is Not Compatible
_X_Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility:
The refuge has the following stipulations to ensure that environmental education remains a compatible use:

1. Only authorized interpretive programs will be allowed.
2. Collection of plants or animals, or feeding or disturbing wildlife without a special use permit, is prohibited.
3. Public use trends and associated impacts from human activity will be continually monitored by refuge staff. If significant increases in use occur, and/or if impacts to resources are determined significant, the program will be reevaluated and modified as necessary to ensure compatibility.
4. Harassment of wildlife or excessive damage to vegetation is prohibited.
5. Adequate staffing and funding must be available to ensure a safe experience.

Justification:
As defined by the National Wildlife Refuge System Improvement Act of 1997, wildlife-dependent recreational uses may be authorized on a refuge when they are compatible and consistent with public safety. An interpretative program is determined to be compatible with the establishment purposes of the Refuge and the mission of the National Wildlife Refuge System. Interpretation is one of the six wildlife-dependent, priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997. The USFWS strives to provide priority public uses when compatible with the purpose of the refuge and the mission of the System. Facilities and activities related to interpretation occur in designated areas of the refuge, leaving large areas of undisturbed habitat available for wildlife. The stipulations outlined above are specifically designed to and should minimize potential impacts of these activities. The refuge will continue to monitor uses and adjust programs as necessary to protect Refuge resources. The educational benefits gained from these interpretative activities are expected to outweigh their associated impacts. Buffalo Lake National Wildlife Refuge has determined that interpretation, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge

System mission or the purposes of the refuge. Instead, providing and enhancing opportunities for interpretation will give many people a deeper appreciation of wildlife and a better understanding of the importance of conserving habitat, thereby further contributing to the overall mission of the National Wildlife Refuge System.

Signature: Refuge Manager 03-06-2013
(Signature and Date)

Concurrence: Regional Chief 4/4/13
(Signature and Date)

Mandatory 10- or 15-year Re-Evaluation Date: 2028

COMPATIBILITY DETERMINATION

USE:
Grazing by Domestic Livestock

REFUGE NAME:
Buffalo Lake National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITIES:
Secretarial Order #2843
Executive Order #10787
Bankhead-tenant Act 7 V. 5.C. 1011

REFUGE PURPOSE(S):

"... for use as an inviolate sanctuary, …for any other management purposes, …for migratory birds." 16 U.S.C. 712d (Migratory Bird Conservation Act) "..shall be administered by him (Secretary of Interior) directly or in accordance with cooperative agreements…and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife resources thereof, and its habitat thereon,…" 16U.S.C. 664 (Fish and Wildlife Coordination Act) "…for the development, advancement, management, conservation, and protection of fish and wildlife resources…"

16 U.S.C. 742f(a)(4) "…for the benefit of the United States Fish and Wildlife Service in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

NATIONAL WILDLIFE REFUGE SYSTEM (NWRS) MISSION:
The mission of the 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 Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:
(a) What is the use?
The continuance of private party leases of refuge lands for grazing of domestic livestock in designated areas of the Refuge. Grazing is an economic use which contributes to an important habitat management tool (native prairie restoration) by mimicking bison grazing.

(b) Where is the use conducted?
The refuge grazing program consists of 12 grazing units totaling 4,156 acres on the refuge that are periodically grazed by domestic livestock.

(c) When is the use conducted?
Units are grazed get deferred from grazing the following 2 years in order to allow adequate recovery time of the grassland. Stocking rates, areas to be grazed, and seasons to be grazed are determined by refuge staff.

(d) How is the use conducted?
The 12 grazing units consist of grasslands that are grazed for management purposes and to enhance wildlife habitat for grassland species such as mountain plovers, northern bobwhite quail, scaled quail, chipping sparrow, field sparrow, grasshopper sparrow, meadow larks, horned larks, and numerous other bird species. All units have a water source to provide clean fresh water for the livestock. The stock tanks provide water for livestock as well as wildlife species and are filled either via windmill or through a network of pipes. Grazing units are grazed according to the Natural Resource Conservation Service (NRCS) take half leave half regime.

Fencing, watering, husbandry, and control of livestock will be the responsibility of the cooperative private party. Frequency and control of livestock will be based on site-specific evaluation of the grassland unit being managed.

(e) Why is this use being proposed?
Grazing is used as a tool to manage grasslands in an attempt to mimick historic grazing conditions utilized by American bison. Grazing systems are designed to mimick bison grazing in a short duration, high intensity grazing system.

AVAILABILITY OF RESOURCES:
Developing grazing agreements and monitoring compliance and biological effects requires some service resources. Grazing cost such as but not limited to, fencing, husbandry, and control of livestock is assumed by the permitee.

The refuge has 12 grazing units consisting of 4,156 acres that could potential be used to graze. The grasslands consist primarily of buffalo grass-blue grama short-grass prairie. Other grasses that can be found in the units include: sideoats grama, western wheat grass, sand dropseed, little blusestem, and other grasses. The refuge utilizes a graze/rest rotation. If an area is grazed one year the following 2years the grazed portion is deferred (rested). Cattle numbers will be evaluated annually based upon range site conditions for each pasture being grazed. Cattle numbers will utilize the animal use month system and be based on requirements to remove 50 percent of annual forage production. With changing environmental conditions, cattle numbers may vary considerably from year to year and grazing will be terminated if livestock grazing is not meeting resource objectives.

ANTICIPATED IMPACTS OF THE USE:
Short-term impacts:
Grazing by domestic livestock has severe short-term impacts on grassland communities. Many of the impacts are desirable and designed to maintain the biological integrity of the grasslands. Impacts such as removal of standing vegetation and trampling of vegetation are necessary for grassland production and ecosystem health.

Long-term and Cumulative impacts:
Continuing the current grazing program is projected to have positive benefits to uplands, threatened and endangered species, other wildlife and plant species as well as socio-economics. In general, light to moderate grazing results in an increased species richness of both plants and animals (Kantrud and Kologiski 1982, Archer and Smeins 1991). It must be noted however, that while grazing is a viable tool for managing wildlife habitat (Lehmann 1941; Kessler 1978a,b; Ryder 1980; Bryant et al. 1982; Kantrud and Kologiski 1982), not all wildlife species have the same habitat requirements. Therefore, not all species respond similarly to grazing (Phillips 1936, Ryder 1980, Kantrud and Kologiski 1982, Hanley and Page 1982, Clark et al. 1989).

Grazing generally results in adverse impacts to watershed hydrologic parameters such as infiltration and run-off (Gifford and Hawkins 1978, Blackburn et al. 1982). Gifford and Hawkins (1978) indicated that on average soils, light to moderate grazing decreases infiltration by approximately 25% as compared to the ungrazed condition; heavy grazing decreased infiltration by 50%. Gifford and Hawkins (1978) and Blackburn et al. (1982) concluded that there was little difference in the infiltration rates of lightly and moderately grazed areas. Infiltration rates are influenced by plant biomass, especially that of bunchgrass species (McGinty et al. 1979, McCalla et al. 1984a). Run-off and sedimentation also increase with grazing pressure (Sharp et al. 1964, Rauzi and Hanson 1966, McGinty et al. 1979, Wood and Blackburn 1981, McCalla et al. 1984b). In terms of water quality impacts, the major pollutant from grazed watersheds is sediments (Thurow 1991). However, Wood and Blackburn (1981) noted that even on heavily grazed areas, sediment production was extremely small when compared to annual tolerance levels of croplands. Due to the generally flat topography of the Refuge, sedimentation, although a potential impact of grazing, is not expected to affect water quality in the area.

Water quantity is not expected to be impacted based on cattle consumption since water is taken from aquifers; even then, intake by cattle is minimal, especially in comparison to irrigated agricultural production in the surrounding areas.
As a result, grazing is not expected to have indirect or cumulative negative impacts to migratory birds, the viability of any fish, wildlife, plant populations, or other biological resources.

PUBLIC REVIEW AND COMMENT:
During public scoping for the preparation of the CCP, verbal and written were solicited from members of the general public on all aspects of current management through public meetings, special mailings, and local media outlets. This compatibility determination was published and made available for public review and comment concurrent with the Draft CCP and EA released in the federal register on October 24, 2012 and closed on November 23, 2012. Public notification included a notice in the federal register, media announcements in local newspapers, local radio stations, as well as public notices posted throughout the local communities and a public meeting.

DETERMINATION (CHECK ONE BELOW):
_____Use is Not Compatible
_X____Use is Compatible with Following Stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:
The Refuge will implement the following stipulations to ensure that grazing remains a compatible use:

1. Evaluation of activities is conducted periodically to determine:
    a. If impacts have become unacceptable, and
    b. If objectives are not being met.
2. The Refuge annually conducts vegetation transect monitoring to determine acceptability and stocking rates. If evidence of unacceptable adverse impacts appears or objectives are not being met, the Refuge Manager reserves the right to modify stocking rates as necessary to meet refuge management objectives.

JUSTIFICATION:
Numerous research studies have documented the beneficial impacts of carefully managed grazing on grassland habitat. Grazing by domestic livestock will directly benefit the refuge wildlife, plants, and their habitat through removal of standing vegetation. Grazing will help increase and maintain the biodiversity and integrity of the grassland ecosystem found on the refuge.

Buffalo Lake National Wildlife Refuge has determined that grazing, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the refuge. The refuge will continue to monitor this use and adjust the program as necessary to protect and enhance refuge resources. The benefits of the grazing program, if implemented properly, are expected to outweigh associated impacts.

SIGNATURE: **Refuge Manager** 03-06-2013
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION Date: 2028

COMPATIBILITY DETERMINATION

USE:
Scientific Research and Monitoring

REFUGE NAME:
Buffalo Lake National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITIES:
Secretarial Order #2843
Executive Order #10787
Bankhead-tenant Act 7 V. 5.C. 1011

REFUGE PURPOSE(S):
"... for use as an inviolate sanctuary, …for any other management purposes, …for migratory birds." 16 U.S.C. 712d (Migratory Bird Conservation Act)

"..shall be administered by him (Secretary of Interior) directly or in accordance with cooperative agreements…and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife resources thereof, and its habitat thereon,…"

16U.S.C. 664 (Fish and Wildlife Coordination Act)"…for the development, advancement, management, conservation, and protection of fish and wildlife resources…" 16 U.S.C. 742f(a)(4)

"…for the benefit of the United States Fish and Wildlife Service in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

NATIONAL WILDLIFE REFUGE SYSTEM (NWRS) MISSION:
The mission of the 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 Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:
(a) What is the use?
Buffalo Lake National Wildlife Refuge receives periodic requests to conduct scientific research and/or monitoring on refuge lands by various governmental and non-governmental entities. Research and monitoring is occasionally conducted by outside authorities in accordance with Refuge regulations and goals and objectives. All outside requested activities are evaluated on a case-by-case basis before approval is granted to ensure compatibility.

(b) Where is the use conducted?
This management function takes place across the entire Buffalo Lake NWR; specific sites are identified in the research proposal at the time it is submitted to the Refuge for review and subsequent approval and issuance of a special use permit.

(c) When is the use conducted?
This varies depending on the proposed research, but has been historically throughout the calendar year. Actual timeframes for this use will vary depending on the request, and restrictions

on when the use can be conducted will be described in the individual Special Use Permits.

(d) How is the use conducted?
Research and monitoring applicants would be required to submit a proposal summarizing:

1) Objectives of the study
2) Justification of the study
3) Detailed study methodology and schedule
4) Potential impacts on refuge wildlife and or habitats, including the short-term and long-term disturbance, injury, and mortality that might occur during research
5) Status of necessary permits
6) Costs to the refuge and refuge staff time requested if any
7) Anticipated end products such as reports, publications

(e) Why is this use being proposed?
While research and monitoring is not identified as a primary public use, they can benefit the refuge resources and help support the purpose of the Service. Both activities can contribute to the enhancement, protection, use, preservation, and management of wildlife populations and habitat on the refuge and provides valuable opportunities to the Refuge for study on various components of the refuge environment and wildlife in a more comprehensive manner than Service staff time and funding allows. Research and monitoring activities provide expertise in various fields to refuge staff that can assist the refuge in management planning. Such activities can also provide educational opportunities to schools and universities which are not available at other locations.

AVAILABILITY OF RESOURCES:
There is very little Refuge staff or budgetary resources required to oversee scientific research. The resources that are necessary to provide and administer this use are already available within current and anticipated Refuge budgets. Staff time associated with the administration of this use is primarily related to interactions with individuals who request the use, issuance of Special Use Permits, and monitoring the impacts of the use on Refuge resources. Proposals would be reviewed by refuge staff or others in the appropriate field.

ANTICIPATED IMPACTS OF THE USE:
The impacts of research would be dependent upon the type of research being conducted and will be analyzed at the time the research proposal is submitted to the Refuge.

Short and Long-term Impacts:

Research and monitoring proposals with the potential for adverse impacts to refuge resources are not approved. Thus, the projects that occur on the refuge generally are limited to those with no or negligible effects. While the action may still have the potential to result in some level of disturbance to wildlife, the very low frequency and duration of this use will not result in any measurable resource impacts.

Cumulative Impacts:
There are no anticipated adverse cumulative impacts resulting from scientific research and monitoring. Ultimately, this activity will add to the diversity of public use opportunities on the refuge, which, in combination, will result in beneficial cumulative impacts on the human environment.

PUBLIC REVIEW AND COMMENT:
During public scoping for the preparation of the CCP, verbal and written were solicited from members of the general public on all aspects of current management through public meetings, special mailings, and local media outlets. This compatibility determination was published and made available for public review and comment concurrent with the Draft CCP and EA released in the federal register on October 24, 2012 and closed on November 23, 2012. Public notification included a notice in the federal register, media announcements in local newspapers, local radio stations, as well as public notices posted throughout the local communities and a public meeting.

DETERMINATION (CHECK ONE BELOW):
_____Use is Not Compatible
_X____Use is Compatible with Following Stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:
Research and monitoring projects would contribute to the enhancement, protection, use and preservation, and management of the refuges' wildlife populations and habitat. Current and future projects will be evaluated on a case-by-case basis to determine if the project supports refuge and Service goals and whether the project will be beneficial to Refuge purposes. Permits will not be issued to those projects not fulfilling these criteria.

JUSTIFICATION:
Research and monitoring by outside authorities provides valuable opportunities to the refuge for study on various components of the refuge environment and wildlife in a more comprehensive manner than Service staff time and funding allows. These projects provide expertise in various fields that can assist the refuge in management planning. Outside research and monitoring projects also provide educational opportunities to schools and universities which are not available other locations.

Regulated scientific research and monitoring has little impact to wildlife or habitat since few people participate and the refuge only approves projects with little to no adverse impact on resources; therefore, this activity will not conflict with any of the other priority public uses or adversely impact biological resources. Therefore, through the compatibility determination process, Buffalo Lake Wildlife Refuge has determined that scientific research and monitoring will not interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the refuge.

SIGNATURE: **Refuge Manager** Lynn R. Tymeyer 03-06-2013
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION Date: 2028

COMPATIBILITY DETERMINATION

USE:
Camping

REFUGE NAME:
Buffalo Lake National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITIES:
Secretarial Order #2843
Executive Order #10787
Bankhead-tenant Act 7 V. 5.C. 1011

REFUGE PURPOSE(S):
"... for use as an inviolate sanctuary, …for any other management purposes, …for migratory birds." 16 U.S.C. 712d (Migratory Bird Conservation Act)

"..shall be administered by him (Secretary of Interior) directly or in accordance with cooperative agreements…and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife resources thereof, and its habitat thereon,…" 16 U.S.C. 664 (Fish and Wildlife Coordination Act)

"…for the development, advancement, management, conservation, and protection of fish and wildlife resources…" 16 U.S.C. 742f(a)(4)

"…for the benefit of the United States Fish and Wildlife Service in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

NATIONAL WILDLIFE REFUGE SYSTEM (NWRS) MISSION:
The mission of the 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 Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:
(a) What is the use?
Camping is an existing recreational use on Buffalo Lake National Wildlife Refuge. Although this use is not one of the priority public uses, camping is supportive of wildlife-dependent recreation.

Camping has also been used on the refuge as a tool for experiencing amateur astronomy where individuals and small groups have set up telescopes in the campground in order to view stars, planets and other celestial bodies.

(b) Where is the use conducted?
The only designated camping site on the refuge is near the dry lake bottom within the Public Use

Area.

(c) When is the use conducted?
The Refuge offers camping opportunities year-round. Prime camping season extends from mid-March to late June, with a second peak occurring in September and October when the weather cools. There are usually no more than 2 camping spaces in use at one time.

The Buffalo Lake main gates are open during the following hours:

	8 AM – 8 AM	8 AM – 8 AM
	8 AM – 6 PM	8 AM – 6 PM

(d) How is the use conducted?
The Buffalo Lake NWR campground has 25 individual sites and 1 group site. All campsites have access to picnic tables, potable water, vault toilets and a flushable toilet. The vault-style restroom facilities are closed during the winter months due to the nature of their operation. No campsites have electricity. Camp sites are open to the general public on a first come, first served basis.

The refuge has a 7 day camping limit within the regular refuge times.

(e) Why is this use being proposed?
Camping opportunities on the refuge provide a chance for regional residents and visitors to experience nature in the unique setting that the refuge offers. These individuals travel to the refuge to enjoy the outdoors while also gaining an understanding of how the natural world and human activities are intertwined. While not a wildlife-dependent recreational use, camping is compatible with the purpose of the refuge.

The use of this area would primarily be used by visitors; including Boy and Girl Scout groups, teachers and educators, and campers. Individuals or organizations that bring clients to the refuge to camp and charge a fee for their service are required to have a Special Use Permit issued by the refuge.

AVAILABILITY OF RESOURCES:
Refuge staff maintains the campground by mowing the area during the growing season to reduce vegetation height in the area.

ANTICIPATED IMPACTS OF THE USE:
Impacts to wildlife and service land are minimal since camping and picnicking are confined to one area. Wildlife tends to avoid the area when campers and picnickers are present but return when they have left, and the disturbance has ceased.

<u>Short and Long-term Impacts:</u>
Camping has the potential to impact the physical, biological, and human environment at the site-specific areas where the use is allowed. Camping may result in disturbance to wildlife, especially during prime camping seasons; however, it is likely that wildlife species on the refuge have acclimated to human presence in designated camping areas where the use has occurred for many

years. Nevertheless, individuals who wander off trail in areas nearby designated camping facilities may cause soil compaction, trampling of vegetation, plant destruction, illegal trail establishment, trail deterioration, and production of litter. These on-the-ground conditions may result in impacts to soils, habitat, and water quality; however, the refuge enforces regulations and ensures that campgrounds are patrolled to help defray any potential negative impacts.

Camping may also result in long-term beneficial impacts to the visitor experience and the mission of the National Wildlife Refuge System. Camping is supportive of wildlife-dependent recreational uses allowed on the refuge, which will increase public awareness and conservation issues. Camping may draw more visitors to the refuge who participate in other wildlife-dependent recreational uses or those available on nearby lands. Camping may provide short-term benefits to the socioeconomics of the community. This use may also increase the viewers' understanding and appreciation of wildlife and their habitat needs as well as the role of the National Wildlife Refuge System in resource conservation.

Cumulative Impacts:
There are no anticipated adverse cumulative impacts resulting from camping. Ultimately, this activity will add to available public use opportunities on the refuge, which, in combination, will result in beneficial cumulative impacts on the human environment. The wide variety of public use opportunities available on the refuge will increase public awareness about conservation issues and the National Wildlife Refuge System. This will benefit the Service's overall mission and the refuge purpose.

PUBLIC REVIEW AND COMMENT:
During public scoping for the preparation of the CCP, verbal and written were solicited from members of the general public on all aspects of current management through public meetings, special mailings, and local media outlets. This compatibility determination was published and made available for public review and comment concurrent with the Draft CCP and EA released in the federal register on October 24, 2012 and closed on November 23, 2012. Public notification included a notice in the federal register, media announcements in local newspapers, local radio stations, as well as public notices posted throughout the local communities and a public meeting.

DETERMINATION (CHECK ONE BELOW):
_____Use is Not Compatible
_X____Use is Compatible with Following Stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:
The Refuge will implement the following stipulations to ensure that camping remains a compatible use:

1. Possession of alcoholic beverages is prohibited on the Refuge, including the camping areas.

2. Fires must be built in grates and grills provided for that purpose. Dead, fallen timber may be used. Fires must not be left unattended and must be completely extinguished before leaving the area. During periods of very high fire danger, wood fires may be prohibited.

3. Campers may not trench around tents or level off tent sites.

4. All garbage must be placed in trash receptacles.

5. Individuals or organizations that bring clients to the Refuge for the purpose of interpretation and charge a fee or tuition for their service are required to have a Special use Permit issued by the refuge. This requirement ensures that private businesses are not unfairly making a profit from public lands and provides a mechanism for the refuge to regulate where and when commercial activities occur.

6. Pets are permitted at campgrounds if confined or kept on a leash. All livestock are prohibited.

JUSTIFICATION:
Camping enhances the wildlife experience by allowing the visitor a better chance to view and interact with wildlife. Camping is a vehicle for legitimate wildlife-oriented recreational pursuits such as wildlife photography, bird watching, fishing, etc. This limited camping is consistent with Service policy to permit activities that are clearly in support of or needed to sustain approved wildlife/wildlands oriented recreational activity.

Disturbance of wildlife is limited by the location at which these activities occur. Campers are limited to a consecutive seven day camping limit and littering in the area is prohibited.

The campground allows visitors to camp at a central location at night while participating in other wildlife-dependent recreational pursuits throughout the day. Regulated camping as described above and consistent with the management direction provided in the Comprehensive Conservation Plan will provide the visitor with a chance to experience the refuge in a high-quality, safe, wholesome and enjoyable recreational experience. This activity will not conflict with any of the priority public uses or adversely impact biological resources. Therefore, through the compatibility determination process, Buffalo Lake National Wildlife Refuge has determined that camping, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the refuge.

SIGNATURE: **Refuge Manager** 03-06-2013
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION Date: 2028

E. Species List

This appendix contains a list of over 642 species identified on Buffalo Lake National Wildlife Refuge, including approximately 53 mammals, 330 birds, 10 amphibians, 28 reptiles, 37 invertebrates, and 184 vascular plants.

E.1 MAMMALS

ORDER DIDELPHIMORPHA – Marsupials

FAMILY DIDELPHIDAE
Virginia Oppossum *(Didelphis virginiana)*

ORDER XENARTHRA – Edentates

FAMILY DASYPODIDAE
Nine-banded Armadillo *(Dasypus novemcinctus)*

ORDER INSECTIVORA – Insectivores

FAMILY SORICIDAE
Desert Shrew *(Notiosorex crawfordi)**
Least Shrew *(Cryptotis parva)*

ORDER CHIROPTERA – Bats

FAMILY VESPERTILIONIDAE
Big Brown Bat *(Estesicus fuscus)*
Western Pipistrelle Bat *(Pipistrellus hesperus)*
Eastern Red Bat *(Lasiurus borealis)*
Hoary Bat *(Lasiurus cinereus)*
California Myotis bat (Myotis californicus)
Western Small-footed Myotis Bat (Myotis ciliolabrum)
Cave Myotis Bat (Myotis velifer)
Silver-haired Bats *(Lasionycteris noctivagans)*
Southeastern Myotis Bat (*Myotis austroriparius)*
Townsend's Big-eared Bat (Plecotus townsendii)
Pallid Bat (Antrozous pallidus)

FAMILY MOLOSSIDAE
Brazilian Free-tailed Bat (Tadarida brasiliensis)
Big Free-tailed Bat (Nyctinomops macrotis)*

ORDER CARNIVORA – Carnivores

FAMILY CANIDAE

Coyote *(Canis latrans)*
Gray Fox *(Urocyon cinereoargenteus)**
Red Fox *(Vulpes vulpes)**
Swift (Kit) Fox (*Vulpes velox*)*

FAMILY PROCYONIDAE
Raccoon *(Procyon lotor)*
Ringtail (*Bassariscus astutus*)*

FAMILY MUSTELIDAE
Eastern Spotted Skunk *(Spirogale putorius)**
Striped Skunk *(Mephitis mephitis)*
American Badger (*Taxidea taxus*)

FAMILY FELIDAE
Bobcat *(Felis rufus)*
Mountain Lion (*Felis concolor*)*

ORDER ARTIODACTYLA – Ungulates

FAMILY CERVIDAE
White-tailed Deer *(Odocoileus virginianus)*
Mule Deer (*Odocoileus hemionus*)

ORDER RODENTIA – Rodents

FAMILY SCIURIDAE
Spotted Ground Squirrel *(Spermophilus spilosoma)**
Thirteen-lined Ground Squirrel *(Spermophilus tridecemlineatus)*
Black-tailed Prairie Dog *(Cynomys ludovicianus)*

FAMILY GEOMYIDAE
Yellow-faced Pocket Gopher*(Cratogeomys castanops)*
Plains Pocket Gopher *(Geomys bursarius)*

FAMILY MURIDAE
Cotton Mouse *(Peromyscus gossypinus)*
Deer Mouse *(Peromyscus maniculatus)*
Brush Mouse (Peromyscus boylii)
Plains Harvest Mouse *(Reithrodontomys montonus)*
Western Harvest Mouse *(Reithrodontomys megalotis)*
Southern Plains Woodrat *(Neotoma micropus)*
White-throated Woodrat *(Neotoma albigula)*
Hispid Cotton Rat *(Sigmodon hispidus)*

White-footed Mouse *(Peromyscus leucopus)*
Northern Pygmy Mouse *(Baiomys taylori)*
Northern Grasshopper Mouse (*Onychomys leucogaster*)

FAMILY HETEROMYIDAE
Plains Pocket Mouse (*Perognathus flavescens*)
Hispid Pocket Mouse (*Chaetodipus hispidus*)
Ord's Kangaroo Rat (*Dipodomys ordii*)

FAMILY ERTHIZONTIDAE
Porcupine (*Erethizon dorsatum*)

ORDER LAGOMORPHA – Lagomorphs

FAMILY LEPORIDAE
Eastern Cottontail (*Sylvilagus floridanus)*
Desert Cottontail *(Sylvilagus audubonii)* *
Black-tailed Jackrabbit (Lepus californicus*)*

E.2 BIRDS

ORDER PODICIPEDIFORMES

FAMILY PODICIPEDIDAE – Grebes
Pied-billed Grebe* (*Podilymbus podiceps)*
Horned Grebe (*Podiceps auritus)*
Eared Grebe* (*Podiceps nigricollis)*
Western Grebe (*Aechmophorus occidentalis)*

ORDER PELECANIFORMES

FAMILY PELECANIDAE – Pelicans
American White Pelican *(Pelecanus erythrorhynchos)*
Brown Pelican *(Pelecanus occidentalis)*

FAMILY PHALACROCORACIDAE – Cormorants
Double-crested Cormorant *(Phalacrocorax auritus)*

FAMILY ANHINGIDAE – Anhingas
Anhinga *(Anhinga anhinga)*

ORDER CICONIFORMES

FAMILY ARDEIDAE – Bitterns, Herons, Egrets

American Bittern *(Botaurus lentiginosus)*
Great Blue Heron (*Ardea herodias)*
Great Egret *(Ardea alba)*
Snowy Egret *(Egretta thula)*
Little Blue Heron *(Egretta caerulea)*
Cattle Egret *(Bubulcus ibis)*
Black-crowned Night Heron *(Nycticorax nycticorax)*
Green Heron (*Butorides virescens)*

FAMILY THRESKIORNITHIDAE – Ibises
Roseate Spoonbill *(Platalea ajaja)*
White-faced Ibis *(Plegadis chihi)*

ORDER ANSERIFORMES

FAMILY ANATIDAE – Waterfowl
Greater White-fronted Goose *(Anser albifrons)*
Snow Goose *(Chen caerulescens)*
Ross's Goose *(Chen rossii)*
Canada Goose (*Branta canadensis*)
Tundra Swan (*Cygnus columbianus*)
Trumpeter Swan (*Sygnus buccinators*)
Wood Duck *(Aix sponsa)*
Green-winged Teal *(Anas crecca)*
Mallard *(Anas platyrhynchos)*
Northern Pintail *(Anas acuta)*
Blue-winged Teal *(Anas discors)*
Northern Shoveler *(Anas clypeata)*
Gadwall *(Anas strepera)*
American Wigeon *(Anas americana)*
Ring-necked Duck *(Aythya collaris)*
Canvasback Duck (*Aythya valisineria*)
Lesser Scaup *(Aythya affinis)*
Redhead Duck *(Aythya americana)*
White-Winged Scoter (*Melanitta fusca*)
Long-Tialed Duck (*Clangula hyemalis*)
Black Scoter (*Melanitta nigra*)
Surf Scoter (*Melanitta perspicillata*)
Buffelhead (*Bucephala albeola*)
Common Goldeneye (*Bucephala clangula*)
Barrow's Goldeneye (*Bucephala islandica*)
Hooded Merganser *(Lophodytes cucullatus)*
Common Merganser *(Mergus merganser)*
Red-Breasted Merganser *(Mergus serrator)*
Ruddy Duck *(Oxyura jamaicensisz)*

ORDER FALCONIFORMES

FAMILY CATHARTIDAE – VULTURES
Turkey Vulture *(Cathartes aura)*

FAMILY ACCIPITRIDAE – Hawks
Osprey *(Pandion haliaetus)*
Mississippi Kite (*Ictinia mississippiensis*)
Bald Eagle *(Haliaeetus leucocephalus)*
Northern Harrier *(Circus cyaneus)*
Sharp-shinned Hawk *(Accipiter striatus)*
Cooper's Hawk *(Accipiter cooperii)*
Red-shouldered Hawk *(Buteo lineatus)*
Broad-winged Hawk *(Buteo platypterus)*
Red-tailed Hawk *(Buteo jamaicensis)*
Swainson's Hawk *(Buteo swainsoni)*
Northern Goshawk *(Accipiter gentilis)*
Ferruginous Hawk *(Buteo regalis)*
Rough-Legged Hawk *(Buteo lagopus)*
Golden Eagle *(Aquila chrysaetos)*

FAMILY FALCONIDAE – Falcons
American Kestrel *(Falco sparverius)*
Merlin *(Falco columbarius)*
Peregrine Falcon *(Falco peregrines)*
Prairie Falcon *(Flaco mexicanus)*

ORDER GALLIFORMES

FAMILY PHASIANIDAE – Turkey
Wild Turkey *(Meleagris gallopavo)*
Ring-necked Pheasant* *(Phasianus colchicus)*
Scaled Quail *(Callipepla squamata)*
Northern Bobwhite*(*Colinus virginianus)*

ORDER GRUIFORMES

FAMILY RALLIDAE – Rails & Coots
American Coot *(Fulica americana)*
Common Moorhen *(Gallinula chloropus)*
Sora *(Porzana Carolina)*
Virginia Rail *(Rallus limicola)*

ORDER CHARADRIIFORMES

FAMILY CHARADRIIDAE – Plovers
Killdeer *(Charadrius vociferous)*
Black-bellied Plover (*Pluvialis squatarola)*
American Golden Plover (*Pluvialis dominica)*
Snowy Plover* (*Charadrius alexandrines)*
Semipalmated Plover *(Charadrius semipalmatus)*
Mountain Plover (*Charadrius montanus)*

FAMILY SCOLOPACIDAE – Sandpipers
Greater Yellowlegs (*Tringa melanoleucus)*
Lesser Yellowlegs *(Tringa flavipes*
Solitary Sandpiper (T*ringa solitaria)*
Willet (*Catoptrophorus semipalmatus)*
Spotted Sandpiper* (*Actitis macularius)*
Upland Sandpiper (*Bartramia longicauda)*
Whimbrel (*Numenius phaeopus)*
Long-billed Curlew (*Numenius americanus)*
Hudsonian Godwit (*Limosa haemastica)*
Marbled Godwit *(Limosa fedoa)*
Ruddy Turnstone (*Arenaria interpres)*
Red Knot (*Calidris canutus)*
Sanderling (*Calidris alba)*
Semipalmated Sandpiper (*Calidris pusillus)*
Western Sandpiper (*Calidris mauri)*
Least Sandpiper (*Calidris minutilla)*
White-rumped Sandpiper (*Calidris fuscicollis)*
Baird's Sandpiper (*Calidris bairdii)*
Pectoral Sandpiper (*Calidris melanotos)*
Dunlin (*Calidris alpine)*
Stilt Sandpiper (*Calidris himantopus)*
Buff-breasted Sandpiper (*Tryngites subruficollis)*
Short-billed Dowitcher (*Limnodromus griseus)*
Long-billed Dowitcher (*Limnodromus scolopaceus)*
Common Snipe (*Gallinago gallinago)*
Wilson's Phalarope (*Phalaropus tricolor)*
Red-necked Phalarope *(Phalaropus lobatus)*

FAMILY LARIDAE – Gulls & Terns
Parasitic Jeager (*Stercorarius parasiticus)*
Franklin's Gull (*Larus pipixcan)*
Bonaparte's Gull (*Larus Philadelphia)*
Ring-billed Gull (*Larus delawarensis)*
Herring Gull (*Larus argentatus)*
Glaucous Gull (*Larus hyperboreus)*
Black-legged Kittiwake (*Rissa tridactyla)*
Sabine's Gull (*Xema sabini)*

Caspian Tern (*Sterna caspia)*
Common Tern (*Sterna hirundo)*
Forster's Tern (*Sterna forsteri)*
Least Tern (*Sterna antillarum)*
Black Tern (C*hlidonias niger)*

FAMILY GRUIDAE – Cranes
Sandhill Crane *(Grus canadensis)*
Whooping Crane *(Grus Americana)*

FAMILY RECURVIROSTRIDAE – Stilts
Black-necked Stilt *(Himantopus mexicanus)*
American Avocet *(Recurvirostra americana)*

ORDER GUVIIFORMES

FAMILY GAVIIDAE
Common Loon *(Gavia immer)*
Pacific Loon *(Gavia pacifica)*

ORDER COLUMBIFORMES

FAMILY COLUMBIDAE – Pigeons
Eurasian Collared Dove *(Streptopelia decaocto)*
Inca Dove *(Columbina inca)*
Mourning Dove *(Zenaida macroura)*
White-winged Dove *(Zenaida asiatica)*
Rock Pigeon *(Columba livia)*
Band-tailed Pigeon *(Patagioenas fasciata)*
Common Ground Dove *(Columbina passerina)*

ORDER CUCULIFORMES

FAMILY CUCULIDAE – Cuckoos
Yellow-billed Cuckoo *(Coccyzus americanus)*
Black-billed Cuckoo *(Coccyzus erythropthalmus)*
Greater Roadrunner *(Geococcyx californianus)*

ORDER STRIGIFORMES

FAMILY STRIGIDAE – Typical Owls
Barn Owl*(*Tyto alba)*
Eastern Screech Owl (*Megascops asio)*
Great Horned Owl* (*Bubo virginianus)*
Burrowing Owl* (*Athene cunicularia)*
Long-eared Owl* (*Asio otus)*

Short-eared Owl (*Asio flammeus)*
Northern Saw-whet Owl *(Aegolius acadicus)*

ORDER CAPRIMULGIFORMES

FAMILY CAPRIMULGIDAE – Goatsuckers
Common Nighthawk *(Chordeiles minor)*
Common Poorwill (*Phalaenoptilus nuttallii)*
Chuck-will's-widow (*Caprimulgus carolinensis)*
Whip-poor-will (*Caprimulgus vociferous)*

ORDER APODIFORMES

FAMILY APODIDAE – Swifts
Chimney Swift *(Chaetura pelagica)*

FAMILY TROCHILIDAE – Hummingbirds
Black-chinned Hummingbird (*Archilochus alexandri)*
Broad-tailed Hummingbird (*Selasphorus platycercus)*
Rufous Hummingbird (*Selasphorus rufus)*

ORDER CORACIIFORMES

FAMILY CERYLIDAE – Kingfishers
Belted Kingfisher *(Ceryle alcyon)*
Green Kingfisher *(Chloroceryle americana)*

ORDER PICIFORMES

FAMILY PICIDAE – Woodpeckers
Lewis' Woodpecker (*Melanerpes lewis)*
Red-headed Woodpecker (*Melanerpes erythrocephalus)*
Golden-fronted Woodpecker (*Melanerpes aurifrons)*
Red-bellied Woodpecker (*Melanerpes carolinus)*
Yellow-bellied Sapsucker (*Sphyrapicus varius)*
Williamson's Sapsucker (A) (*Sphyrapicus thyroideus)*
Red-naped Sapsucker (*Sphyrapicus nuchalis)*
Ladder-backed Woodpecker* (*Picoides scalaris)*
Downy Woodpecker (*Picoides pubescens)*
Hairy Woodpecker (*Picoides villosus)*
Northern Flicker* (*Colaptes auratus*)

ORDER PASSERIFORMES

FAMILY TYRANNIDAE – Flycatchers
Olive-sided Flycatcher (*Contopus cooperi)*
Western Wood-Pewee (*Contopus sordidulus)*
Eastern Wood-Pewee (*Contopus virens)*
Willow Flycatcher (*Empidonax spp.)*
Least Flycatcher (*Empidonax minimus)*
Dusky Flycatcher (*Empidonax oberholseri)*
Gray Flycatcher (*Empidonax wrightii)*
Black Phoebe (*Sayornis nigricans)*
Eastern Phoebe (*Sayornis phoebe)*
Say's Phoebe (*Sayornis saya)*
Vermillion Flycatcher (*Pyrocephalus rubinus)*
Ash-throated Flycatcher* (*Myiarchus cinerascens)*
Great Crested Flycatcher (*Myiarchus crinitus)*
Cassin's Kingbird (*Tyrannus vociferans)*
Western Kingbird* (*Tyrannus verticalis)*
Eastern Kingbird* (*Tyrannus tyrannus)*
Scissor-tailed Flycatcher* (*Tyrannus forficatus)*

FAMILY PTILOGONATIDAE – Silkiy Flycatchers
Phainopepla *(Phainopepla)*

FAMILY ALAUDIDAE - Larks
Horned Lake *(Ereophila alpestris)*

FAMILY AEGITHALIDAE - Bushtits
Bushtits *(Psaltriparus minimus)*

FAMILY HIRUNDINIDAE – Swallows
Purple Martin *(Progne subis)*
Tree Swallow *(Tachycineta bicolor)*
Northern Rough-winged Swallow *(Stelgidopteryx serripennis)*
Bank Swallow *(Riparia riparia)*
Cliff Swallow *(Petrochelidon pyrrhonota)*
Barn Swallow *(Hirundo rustica)*
Violet-green Swallow (*Tachycineta thalassina)*

FAMILY CORVIDAE – Jays/Crows
Blue Jay *(Cyanocitta cristata)*
American Crow *(Corvus brachyrhynchos)*
Western Scrub-Jay (*Aphelocoma californica)*
Pinyon Jay (*Gymnorhinus cyanocephalus)*
Chihuahuan Raven (*Corvus cryptoleucus)*
Common Raven* (*Corvus corax)*

FAMILY PARIDAE – Chickadees/Titmice
Carolina Chickadee *(Poecile carolinensis)*
Tufted Titmouse *(Baeolophus bicolor)*

FAMILY SITTIDAE – Nuthatches
Red-breasted Nuthatch *(Sitta canadensis)*
White-breasted Nuthatch *(Sitta carolinensis)*

FAMILY CERTHIIDAE – Creepers
Brown Creeper *(Certhia americana)*

FAMILY TROGLODYTIDAE – Wrens
Cactus Wren (*Campylorhynchus brunneicapillus)*
Rock Wren* (*Salpinctes obsoletus)*
Canyon Wren (*Catherpes mexicanus)*
Carolina Wren *(Thryothorus ludovicianus)*
Bewick's Wren *(Thryomanes bewickii)*
House Wren *(Troglodytes aedon)*
Winter Wren *(Troglodytes troglodytes)*
Sedge Wren *(Cistothorus platensis)*
Marsh Wren *(Cistothorus palustris)*

FAMILY REGULIDAE – Kinglets
Golden-crowned Kinglet *(Regulus satrapa)*
Ruby-crowned Kinglet *(Regulus calendula)*

FAMILY TURDIDAE – Thrushes
Eastern Bluebird *(Sialia sialis)*
Western Bluebird (*Sialia Mexicana)*
Mountain Bluebird* (*Sialia currucoides)*
Townsend's Solitaire (*Myadestes townsendi)*
Veery (*Catharus fuscescens)*
Gray-cheeked Thrush (*Catharus minima)*
Swainson's Thrush (*Catharus ustulata)*
Swainson's Thrush (A) (*Catharus ustulata)*
Hermit Thrush (*Catharus guttata)*
Wood Thrush (*Hylocichla mustelina)*
American Robin* (*Turdus migratorius)*

FAMILY SYLVIIDAE – Gnatcatchers
Blue-gray Gnatcatcher *(Polioptila caerulea)*

FAMILY MIMIDAE – Mockingbirds/Thrashers
Gray Catbird *(Dumetella carolinensis)*
Northern Mockingbird *(Mimus polyglottos)*

Brown Thrasher *(Toxostoma rufum)*
Sage Thrasher *(Oreoscoptes montanus)*
Curve-billed Thrasher * *(Toxostoma curvirostre)*

FAMILY BOMBYCILLIDAE – Waxwings
Cedar Waxwing *(Bombycilla cedrorum)*

FAMILY LANIIDAE – SHRIKES
Loggerhead Shrike *(Lanius ludovicianus)*
Northern Shrike *(Lanius excubitor)*

FAMILY STURNIDAE – Starlings
European Starling *(Sturnus vulgaris)*

FAMILY VIREONIDAE – Vireos
Bell's Vireo (*Vireo bellii)*
Solitary Vireo (*Vireo solitaries)*
Yellow-throated Vireo (*Vireo flavifrons)*
Warbling Vireo * (*Vireo gilvus)*
Philadelphia Vireo (*Vireo philadelphicus)*
Red-eyed Vireo (*Vireo olivaceus)*

FAMILY PARULIDAE – Warblers
Tennessee Warbler *(Vermivora peregrina)*
Orange-crowned Warbler *(Vermivora celata)*
Nashville Warbler (*Vermivora ruficapilla)*
Virginia's Warbler (*Vermivora virginiae)*
Yellow Warbler *(Dendroica petechia)*
Chestnut-sided Warbler *(Dendroica pensylvanica)*
Magnolia Warbler (*Dendroica magnolia)*
Cape May Warbler (*Dendroica tigrina)*
Black-throated Blue Warbler (*Dendroica caerulescens)*
Black-throated Gray Warbler (*Dendroica nigrescens)*
Townsend's Warbler (*Dendroica townsendi)*
Black-throated Green Warbler (*Dendroica virens)*
Yellow-rumped Warbler *(Dendroica coronata)*
Blackburnian Warbler *(Dendroica fusca)*
Yellow-throated Warbler *(Dendroica dominica)*
Pine Warbler *(Dendroica pinus)*
Prairie Warbler (*Dendroica discolor)*
Palm Warbler (*Dendroica palmarum)*
Bay-breasted Warbler (*Dendroica castanea)*
Blackpoll Warbler (*Dendroica striata)*
Cerulean Warbler (*Dendroica cerulean)*
Black-and-white Warbler *(Mniotilta varia)*
Kentucky Warble *(Oporornis formosus)*

Mourning Warbler *(Oporornis philadelphia)*
MacGillivray's Warbler (*Oporornis tolmiei)*
Hooded Warbler *(Wilsonia citrina)*
Wilson's Warbler *(Wilsonia pusilla)*
Prothonotary Warbler *(Protonotaria citrea)*
Worm-eating Warbler (*Helmitheros vermivorum)*
Ovenbird (*Seiurus aurocapilla)*
Northern Parula *(Parula americana)*
American Redstart *(Setophaga ruticilla)*
Northern Waterthrush *(Seiurus noveboracensis)*
Louisiana Waterthrush *(Seiurus motacilla)*
Common Yellowthroat *(Geothlypis trichas)*
Yellow-breasted Chat *(Icteria virens)*
Canada Warbler *(Wilsonia canadensis)*

FAMILY EMBERIZIDAE – Towhees, Sparrows, and allies
Green-tailed Towhee (*Piplo chlorurus)*
Spotted Towhee (*Pipilo masculatus)*
Canyon Towhee (*Piplo fuscus)*
Cassin's Sparrow* (*Aimophila cassinii)*
Rufous-crowned Sparrow* (*Aimophila ruficeps)*
American Tree Sparrow (*Spizella arborea)*
Chipping Sparrow *(Spizella passerina)*
Clay-colored Sparrow (*Spizella pallid)*
Brewer's Sparrow (*Spizella breweri)*
Field Sparrow *(Spizella pusilla)*
Sage Sparrow (*Amphispiza belli)*
Lark Sparrow* (*Chondestes grammacus)*
Lark Bunting* (*Calamospiza melanocorys)*
Savannah Sparrow *(Passerculus sandwichensis)*
Baird's Sparrow (*Ammodramus bairdii)*
Grasshopper Sparrow* (*Ammodramus savannarum)*
Le Conte's Sparrow *(Ammodramus leconteii)*
Fox Sparrow *(Passerella iliaca)*
Song Sparrow (*Melospiza melodia)*
Lincoln's Sparrow *(Melospiza lincolnii)*
Swamp Sparrow *(Melospiza georgiana)*
Vesper Sparrow *(Pooecetes gramieus)*
White-throated Sparrow *(Zonotrichia albicollis)*
White-crowned Sparrow (*Zonotrichia leucophrys)*
Harris' Sparrow (*Zonotrichia querula)*
McCown's Longspur (*Calcarius mccownii)*
Lapland Longspur (*Calcarius lapponicus)*
Smith's Longspur (*Calcarius pictus)*
Chestnut-collared Longspur (*Calcarius ornatus)*
Dark-eyed Junco *(Junco hyemalis)*

FAMILY THRAUPIDAE – Tanagers
Summer Tanager *(Piranga rubra)*
Scarlet Tanager *(Piranga olivacea)*
Western Tanager *(Piranga ludoviciana)*

FAMILY CARDINALIDAE – Cardinals, Grosbeaks & Buntings
Northern Cardinal *(Cardinalis cardinalis)*
Rose-breasted Grosbeak *(Pheucticus ludovicianus)*
Blue Grosbeak *(Guiraca caerulea)*
Indigo Bunting *(Passerina cyanea)*
Painted Bunting *(Passerina ciris)*

FAMILY ICTERIDAE – Blackbirds & Orioles
Red-winged Blackbird (*Agelaius phoeniceus)*
Eastern Meadowlark *(Sturnella magna)*
Western Meadowlark *(Sturnella neglecta)*
Brewer's Blackbird *(Euphagus cyanocephalus)*
Yellow-headed Blackbird *(Xanthocephalus xanthocephalus)*
Rusty Blackbird *(Euphagus carolinus)*
Great-tailed Grackle *(Quiscalus mexicanus)*
Common Grackle *(Quiscalus quiscula)*
Brown-headed Cowbird *(Molothrus ater)*
Orchard Oriole *(Icterus spurius)*
Baltimore Oriole *(Icterus galbula)*
Bullock's Oriole *(Icterus bullockii)*
Scott's Oriole *(Icterus parisorum)*

FAMILY FRINGILLIDAE – Finches
Purple Finch *(Carpodacus purpureus)*
House Finch *(Carpodacus mexicanus)*
Red Crossbill (Loxia curvirostra)
Common Redpoll (Carduelis flammea)
Pine Siskin *(Carduelis pinus)*
Lesser Goldfinch *(Carduelis psaltria)*
American Goldfinch *(Carduelis tristis)*
Evening Grosbeak *(Coccothraustes vespertinus)*

FAMILY PASSERIDAE – Weaver-finches
House Sparrow *(Passer domesticus)*

FAMILY MOTACILLIDAE – Pipits
American Pipit *(Anthus rubescens)*
Sprague's Pipit *(Anthus spragueii)*

E.3 AMPHIBIANS

ORDER CAUDATA – Salamanders

FAMILY AMBYSTOMATIDAE
Barred Tiger Salamander (*Ambystoma tigrinum tigrinum*)

ORDER ANURA – Frogs & Toads

FAMILY BUFONIDAE
Great Plains Toad *(Bufo cognatus)*
Western Green Toad *(Bufodebilis debilis)*
Woodhouse's Toad (*Bufo w. woodhousii*)
Red Spotted Toad (*Bufo punctatus*)
Texas Toad (*Bufo speciosus*)

FAMILY HYLIDAE
Northern Cricket Frog *(Acris crepitans)*
Spotted Chorus Frog (Psuedocris clarkia)
Northern Spring Peeper *(Psuedocris crucifer crucifer)*

FAMILY RANIDAE
Plains Leopard Frog (Tana blairi)

E.4 REPTILES

ORDER TESTUDINES – Tortoises and turtles

FAMILY KINOSTERNIDAE
Yellow Mud Turtle (*Kinosternon flavescens flavescens)*

FAMILY EMYDIDAE
Ornate Box Turtle (*Terrapene scripta elegans*)

FAMILY TRACHEMYS
Red-eared Slider (*Trachemys scripta elegans*)

ORDER SQUAMATA – Snakes and Lizards

FAMILY SCINCIDAE – Skinks
Great Plains Skink (*Eumeces obsoletus*)

FAMILY CROTAPHYTIDAE –Collared lizards
Eastern Collared Lizard (*Crotaphytus collaris collaris*)

FAMILY PHRYNOSOMATIDAE – Earless, side-blotched, and horned lizards
Texas Earless Lizard (*Cophosaurus texasnus texanus*)
Lesser Earless Lizard (*Holbrookia maculata*)
Texas Horned Lizard (*Phynosoma cornutum*)
Southern Prairie Lizard (*Sceloporus undulates consobrinus*)

FAMILY TEIIDAE – Whiptails and racerunners
Praire Racerunner (*Cnemidophorus sexlineatus viridis*)

SNAKES

FAMILY LEPTOTYPHLOPIDAE- blind snakes
Texas Blind Snake (*Leptotypholps dulcis dissectus*)

FAMILY COLUBRIDAE – Colubrid Snakes – Advanced
Yellow-bellied Racer (*Coluber constrictor*)
Prairie ringneck Snake (*Diadophis punctatus arnyi*)
Great Plains Rat Snake (*Elaphe guttata emoruyi*)
Plains Hognose Snake (*Heterodon nasicus nasicus*)
Desert King Snake (*Lampropeltis getulus splendida*)
Western Coachwhip (*Masticophis flagellum testaceus*)
Bullsnake (*Pituophis melanoleusus*)
Texas Longnose Snake (*Rhinocheilus lecontei tesselatus*)
Plains Blackhead Snake (*Tantilla nigriceps*)
Checkered Garter Snake (*Thamnophis marcianus marcianus*)
Arid land Ribbon Snake (*Thamnophis proximus diabolicus*)
Texas Garter Snake (*Thamnophis sirtalis annectens*)
Western Ribbon Snake (*thamnophis proximus proximus*)
Lined Snake (*Tropidoclonion lineatum)*
Ground Snake (*Sonora semiannulata*)
SNAKES (Venomous)

FAMILY VIPERIDAE – Pitviper Snakes
Western Diamondback Rattlesnake *(Crotalus altrox)*
Prairie Rattle Snake (*Crotalus viridis*)

E.5 INVERTEBRATES

ORDER ODONTA

FAMILY AESHNIDAE
Green Darner (*Anax junius*)
Blue-eyed Darner (*Anx multicolor*)

FAMILY LIBELLULIDAE
Tenspot Skimmer (*Libellula pulchella*)
Eatern Pondhawk (Erythemis simplicollis)
Widow Skimmer (Libellula luctuosa)
Twelve-spotted Skimmer (Libellula pulchella)
Flame Skimmer (Libellula saturate)
Blue Dasher (Pachydiplaz longipennis)
Wandering Glider (Pantala flavascens)
Eastern Amberwing (Perithemis tenera)
Variegated meadowhawk (Sympetrum corruptum)
Black Saddlebags (Tramea lacerate)

FAMILY CALOPTERYGIDAE
American Rubyspot Damselfly (Hetaerina Americana)

FAMILY COENAGRIONIDAE
Familiar Bluet (Enallagma civile)
Easter Forktail (Ishnura verticalis)

ORTHOPTERA

FAMILY ACRIDIDAE
Aphia sp.

HEMIPTERA
FAMILY BELOSTOMATIDAE
Gaint Water Bug (Belostoma sp.)

FAMILY LYGAEIDAE
Seed Bug

FAMILY PENTATOMIDAE
Stink Bug

FAMILY RHOPALIDAE
Scentless Plant Bug (Leptocoris sp.)

FAMILY REDUVIIDAE
Assassin and Ambush Bugs (Phymata sp.)

HOMOPTERA
FAMILY CICADIDAE
Cicadas

COLEOPTERA

FAMILY CANTHARIDAE
Chauliognathus sp.

FAMILY CARABIDAE
Ground Beetle (*Amara* sp.)
Bombardier Beetle (*Brachinus* sp.)

FAMILY CURCULIONIDAE
Weevils

FAMILY DYTISCIDAE
Predaceous Diving Beetles

FAMILY MELOIDAE
Blister Beetles

DIPTERA

FAMILY ASILIDAE
Robber Flies

FAMILY BOMBYLIIDAE
Bee Flies

FAMILY CULICIDAE
Mosquitos

FAMILY TACHINIDAE

HYMENOPTERA

FAMILY ICHNEUMONIDAE
Ichneumon Wasps

FAMILY POMPILIDAE
Spider Wasps

FAMILY SPHECIDAE
Thread-waisted Wasps (*Ammopila* sp.)

LEPIDOPTERA

FAMILY LIBYTHEIDAE
Snout Butterfly (*Libytheana bachmanni)*

E.6 VASCULAR PLANTS

ORDER ASPERAGALES

FAMILY AGAVCEAE
Soap Weed Yucca (*Yucca angustifolia*)

ORDER OPUNTIALES

FAMILY CACTACEAE
Hedgehog Cactus (*Echinocereus albispinus*)
Prickly Pear Cactus (*Opuntia compressa*)
Walking Stick Cholla (*Opuntia imbricate*)

ORDER COMMENLINALES

FAMILY COMMELINACEAE
Erect Dayflower* (*Commelina erecta*)

ORDER PINALES

FAMILY CUPRESSACEAE
One-Seeded Juniper (*Juniperous monosperma)*

ORDER PROTEALES

FAMILY ELAEAGNACEAE
Russian Olive (*Elaeagnus angustifolia)*

ORDER EQUISETALES

FAMILY EQUISETACEAE
Horsetail (*Equisetum kansanum*)

ORDER MALPIGHIALES

FAMILY EUPHORBIACEAE
Green Poinsettia (*Euphorbia dentate*)
Milkweed (*Euphorbia glyptosperma*)

Snow-On-The-Mountain (*Euphorbia marginata*)

ORDER ZYGOPHYLLALES

FAMILY ZYGOPHYLLACEAE
Puncture Vine (*Tribulua terrestris*)

ORDER LILIALES

FAMILY LILIACEAE
Sand Lily * (*Mentzelia nuda*)
Wild Onion (*Allium Canadense var. Drommond mobilense*)

ORDER ASTERALES

FAMILY ASTERACEAE – Sunflower
Annual Aster (*Aster subulatus)*
Arkansas Lazy Daisy (*Aphanostephus skirrhobasis)*
Bitterweed *(Hymenoxys acaulis)*
Bitterweed *(Hymenoxys odorata)*
Broom Snakeweed (*Xanthocephalum sarothrae)*
Cockle Bur *(Xanthium struimarium)*
Common Broomweed (*Xanthocephalum dracunculoides)*
Common Sunflower (*Helianthus annuus)*
Curly Gumweed *(Grindelia squarrosa)*
Dotted Gayfeather *(Liatris punctata)*
Dwarf Crownbeard (*Verbesina nana)*
Easter Daisy (*Townsendia exscapa)*
Engelmann's Sunflower *(Engelmannia pinnatifida)*
Featherleaf Spine Aster *(Machaeranthera spinulosa)*
Fine Leaf Wooly-white *(Hymenopappus filifolius)*
Fragrant Gaillardia (*Gaillardia suavis)*
Goatsbeard *(Trapopogon dubius)*
Green Mexican Hat (*Ratibida tagetes)*
Green-thread (*Theleslperma filifolium)*
Indian Blanket* (*Gaillardia pulchella)*
Lyreleaf Green Eyes (*Berlandiera lyrata)*
Handleleaf Coneflower (*Echinacea angustefolia)*
Ironweed (*Vernonia baldwinii)*
Missouri Goldenrod (*Solidago missouriensis)*
Pineapple Weed (*Grendelia aphanactis)*
Plains Blackfoot (*Melampodium leucanthum)*
Plains Fleabane *(Erigeron modestus)*
Plains Psilosterphe (*Psilosterophe villosa)*

Plains Zinnia (*Zinnia grandiflora)*
Prickly Lettuce (*Lactusa serriola)*
Rayless Greenthread (*Thelseperma megapotamicim)*
Red Spike Mexican Hat *(Ratibida columnaris)*
Sand Aster (*Leucelene ericoides)*
Sand Sage (*Artemisia filifolia)*
Silvery Golden Aster (*Chrysopsis villosa)*
Skeleton Plant (*Lygodesmia texana)*
Tansy Aster (*Machaeronthera tanacetefolia)*
Texas Thistle (*Cirsium texanum)*
Threadleaf Groundsel (*Senecio douglasii)*
Western Rag Weed (*Ambrosia psilostachya)*
White Sage (*Artemisia ludoviciana)*
Wild Lettuce (*Lactuca villosa)*
Willow Baccharis (*Baccharis salicina)*

ORDER GENTIANALES

FAMILY ASCLEPIADACEAE – Milkweed
Antelope-Horns (*Asclepias asperula)*
Broad-Leaf Milkweed (*Asclepias latifolia)*
Engelmann's Milkweed (*Asclepias engelmannian)*
Plains Milkweed (*Asclepias pumila)*
Showy Milkweed (*Asclepia speciosa)*

ORDER LAMIALES

FAMILY BORAGINACEAE – Borage
Puccppm (Lithospermum incisum)

FAMILY LAMIACEAE – Mint
Beebalm (*Monarda citriodora)*
Coast Germander (*Teucrium cubense)*
Henbit* (*Lamuim amplexicaule)*

FAMILY VERBENACEAE – Vervain
Northern Frogfruit (*Phyla lanceolata)*
Pink Verbain (*Verbena pumila)*
Texas Frog Fruit (*Phyla incise)*

ORDER PLANTAGINALES

FAMILY PLANTAGINACEAE – Plantain

Plantain *(*Plantago patagonica var.gnaphaliodes*)

ORDER SCROPHULARIALES

FAMILY PEDALLACEAE
Pale Devil's Claw (*Proboscidea louisianica*)

FAMILY SCROPHULARIACEAE – Figwort
Downy Paintbrush (*Castilleja sessiliflora*)
Redline Penstemon (*Penstemon albidus*)

ORDER SOLANALES

FAMILY CONVOLVULACEAE – Morning Glory
Bush Morning Glory (*Ipomoea leptophylla)*
Texas Bindweed *(Convolvulus equitans)*

FAMILY HYDROPHYLLACEAE – Waterleaf
Tiny Tunia (*Nama hispidum)*

FAMILY POLEMONIACEAE – Phlox
Blue Gilia *(Gilia rigidula)*

FAMILY SOLANACEAE – Nightshade
Buffaloburr (*Solanum rostratum)*
Clammy Ground Cherry (*Psysalis heterophylla)*
Green False Nightshade (*Chamaesaracha coronopus)*
Ground Cherry (*Physalis hispida)*
Purple Ground Cherry (*Quincula lobata)*
Silver Leaf Nightshade (*Solanum elaeagnifolium)*

ORDER CARYOPHYLLALES

FAMILY AMARANTHACEAE – Amaranth
Green Amaranth (*Amaranthus retroflexus)*

FAMILY CARYOPHYLLACEAE – Pink
Broom Whitlow-wort (P*aronychia virgini)*

FAMILY CHENOPODIACEAE – Goosefoot
Kochia (*Kochia scoparia)*
Lamb's Quarters (*Chenopodium album)*
Russian Tumbleweed (*Salsola kali)*

FAMILY NYCTAGINACEAE (Four-o-clock)
Ribbon Four-O'clock *(Mirabilis linearis)*

FAMILY PORTULACACEAE – Purlane
Springbeauty *(Claytonia virginica)*

FAMILY POLYGONACEAE – Buckwheat
Egg Leaf Eirogonium (*Eriogonum ovalifolium)*
Curly Dock (*Rumex cripus)*
Heart-sepal Wild Buckwheat (E*riogonum multiflorum)*
James Eriogonum *(Eriogonum jamesii)*
Lady's Thumb (*Polygonum persicaria)*
White Milkwort (*Polygala alba)*

FAMILY TAMARICACEAE
Salt Cedar (*Tamarix pentandra*)

ORDER CAPPARALES

FAMILY BRASSICACEAE – Mustard
Fendlers Bladderpod (*Lesquerella fendleri)*
Flixweed (*Descurainia Sophia)*
Tansy Mustard (*Descurainia pinnata)*
White Bladderpod (*Lesquerella ovalifolia*)

ORDER MALVALES

FAMILY MALVACEAE – Mallow
Alkali Mallow (*Sida hederacea)*
Caliche Globe-mallow (*Sphaeralcea coccinea)*
Copper-mallow (*Spaeralcea angustifolia)*

ORDER SALICALES

FAMILY SALICACEAE – Willow
Plains Cottonwood *(Populus sargentii)*
Coyote Willow *(Silax exigua)*

ORDER VIOLALES

FAMILY CUCURBITACEAE – Gourd
Buffalo Gourd (*Cucurbita foetidissima*)

ORDER URTICALES

FAMILY ULMACEAE – Elm
Common Hackberry *(Celtis occidentalis)*
Chinese Elm *(Ulmus pumila)*

ORDER RANUNCULALES

FAMILY RANUNCULACEAE – Buttercup
Prairie Larksper (*Delphinium virescens*)

ORDER EUPHORBIALES

FAMILY EUPHORBIACEAE – Spurge
Green Poinsettia (*Euphorbia dentate)*
Milkweed (*Euphorbia glyptosperma)*
Snow-on-the-Mountain (*Euphorbia marginata)*

ORDER FABALES

FAMILY FABACEAE – Legume
American Licorise (*Glycyrrhiza lepidota)*
Bearded Dalea (*Dalea pogonathera)*
Feathered Dalea (*Dalea frutescens)*
Fendlers Penstemons (*Penstemon fendleri)*
Golden Dalia (*Dalea aurea)*
Ground Plum (*Astragalus crassicarpus)*
Honey Mesquite* (*Prosopis grandulosa)*
Indian Rush Pea (*Hoffmanseggia glauca)*
James Rush Pea (*Caesalpinia jamesii)*
Locoweed (*Oxytropis lambertii var. articulate)*
Milk Vetch (*Astragalus racemosus)*
Missouri Locoweed (Astragalus missouriensis)
Purple Clover* (*Trifolium pretense)*
Purple Prairie Clover (*Petalostemum purpureum)*
Scurfy Pea (*Psoralea tenuiflora)*
Sensitive Briar (*Schrankia uncinata)*
Texas Bluebonnet (*Lupinus texensis)*
Texas Prairia Acacia (*Acacia angustissima)*
White Locoweed (*Sophora nuttalliana)*
White Prairie Clover (*Dalea candida)*
White Sweet Clover (*Melilotus albus)*
Wooly Locoweed (*Astragalus mollissimus)*
Yellow Sweet Clover* (*Melilotus officinalis)*

ORDER MYRTALES

FAMILY ONAGRACEAE – Evening Primrose
Fluttermills (*Oenothera missouriensis)*
Lizard-tail Gaura (*Gaura parviflora)*
Prairie Evening Primrose* (*Oenothera albicaulis)*
Scarlet Gaura (*Gaura coccinea)*
Yellow Evening Primrose (*Calylophus serrulatus)*

ORDER RHAMNALES

FAMILY VITACEAE – Grape
Panhandle Grape *(Vitis acerifolia)*

ORDER SAPINDALES

FAMILY ANACARDIACEAE – Cashew
Desert Sumac* *(Rhus microphylla)*
Skunkbush (*Rhus aromatic*)

ORDER ZYGOPHYLLALES

FAMILY KRAMERIACEAE
Sandbur (*Krameria lanceolata*)

ORDER MALPIGHIALES

FAMILY LINACEAE
Blue Flax (*Linum pratense*)
Stiff-Stem Flax (*Linum rigidum var. Berlandieri*)
Yellow Prairie Flax (*Linum sulcatum*)

ORDER CORNALES

FAMILY LOASACEAE
Praire Stickleaf (*Mentzelia reverchonii*)

ORDER POALES

FAMILY POACEAE

Alkali Sacaton *(Sporobolus airoides)*
Big Bluestem (*Andropogon gerardi)*
Blue 3-awn (*Aristida glauca)*
Blue Grama (*Bouteloua gracilis)*
Buffalo Grass (*Buchloe dactyloides)*
Burrograss (*Scleropogon brevifolius)*
Canada Wildrye (*Elymus Canadensis)*
Eastern Gama Grass* (*Tripsacum dactyloides)*
Fluff Grass (*Erioneuron pulchellum)*
Gummy Lovegrass* (*Eragrostis curtipedicellata)*
Hairy Erioneuron (*Erioneuron pilosum)*
Hairy Grama (*Bouteloua hirsute)*
Halls Panicum (*Panicum hallii)*
Japanese Brome* (*Bromus japonecus)*
Johnson Grass* (*Sorghum halepense)*
Knotroot Bristlegrass* (*Setaria geniculata)*
Little Bluestem (*Schizachyrium scoparium)*
Longleaf Squirreltail (*Elymus longifolius)*
New Mexico Feathergrass (*Stipa neomexicana)*
Plains Bristlegrass (*Setaria leucopila)*
Plains Foxtail (*Setaria macrostachya)*
Purple Lovegrass* (*Eragrostis spectabilis)*
Red 3-awn *(Aristida longiseta)*
Rescue Grass (*Bromus unioloides)*
Sand Dropseed (*Sporobolus cryptandrus)*
Showy Chloris (*Chloris virgata)*
Sideoats Grama (*Bouteloua curtipendula)*
Silver Bluestem (*Bothreochola saccharoides)*
Switch Grass (*Panicum virgatum)*
Tumble Grass* (*Schedonnardus paniculatus)*
Vine mesquite (*Panicum obtusum)*
Western Wheatgrass (*Agropyron smithii)*
Windmill Tumblegrass (*Chloris verticillata)*
Yellow Indian Grass (*Sorghastrum nutans)*

ORDER UMBELLALES

FAMILY UMBELLIFERAE
American Wild Carrot (*Daucus pusillus*)

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1.0 Introduction

Wilderness Reviews (Reviews) are a required element of Comprehensive Conservation Plans (CCPs), and each refuge must follow the review process outlined in 602 FW 1-3 and 610 FW 1-4. The process includes interagency and tribal coordination, public involvement, and National Environmental Policy Act (NEPA) compliance (610 FW 4.4 A). The purpose of the review is to identify lands and waters that merit inclusion in the National Wilderness Preservation System and recommend suitable lands for congressional designation (610 FW 4.4 A).

There are three phases to the review process: (1) inventory; (2) study; and (3) recommendation. During the inventory phase, we identify lands and waters that meet the minimum criteria for Wilderness designation (610 FW 4.4 B). Lands and waters that meet the minimum criteria for designation are called Wilderness Study Areas (WSAs). In the study phase, we assess a range of management alternatives to determine if a WSA is suitable for Wilderness designation and corresponding management or if management under an alternate set of goals and objectives is more appropriate (610 FW 4.12 A). The findings of the study phase determine whether we will recommend a WSA for designation in the final Plan. If we determine that the Refuge contains lands and/or waters that are suitable for Wilderness designation, we report the recommendation from the Director through the Secretary and the President to Congress in a subsequent Wilderness Study Report (610 FW 4.4).

The following team was assembled to perform the Buffalo Lake NWR Wilderness Review.

Table 1. Wilderness Review Team

Team Member	Title/Affiliation	Email
Lynn Nymeyer	Refuge Manager	Lynn_Nyemeyer@fws.gov
Melanie Hartman	Refuge Wildlife Biologist	Melanie_hartman@fws.gov
Jeffrey Missal	Natural Resource Planner	jeffrey_missal@fws.gov

2.0 Wilderness Inventory

Section 2 (c) of the Wilderness Act states that Wilderness is an area that is “untrammeled by man, where man himself is a visitor who does not remain.” The act identifies the minimum criteria that an area must meet to be eligible for Wilderness. Service policy states that we use the act’s minimum criteria to identify potential Wilderness areas. These criteria include size, apparent naturalness, and outstanding opportunities for solitude or primitive recreation. Supplemental values are evaluated and documented but are not required for a WSA. The Buffalo Lake NWR Wilderness Review Team met on January 12, 2011, to perform the inventory phase of the review.

2.1 Identification of Lands that Meet the Size Criteria

First, the team reviewed the refuge for any lands that meet the size criteria outlined by 610 FW 4.8 and described as follows:

- An area with more than 5,000 contiguous acres. State and private lands are not included in making this acreage determination.
- A roadless island of any size. A roadless island is defined as an area surrounded by permanent waters or that is markedly distinguished from the surrounding lands by topographical or ecological features (610 FW 1.5 Z).
- An area of less than 5,000 contiguous acres that is of sufficient size as to make practicable its preservation and use in an unimpaired condition, and of a size suitable for wilderness management.
- An area of less than 5,000 contiguous Federal acres that is contiguous with a designated wilderness, recommended wilderness, or area under wilderness review by another Federal wilderness managing agency such as the U.S. Forest Service, National Park Service, or Bureau of Land Management.

After reviewing refuge maps and filling in the Minimum Criteria Inventory, the team found that no areas meet the size criteria as to make practicable its preservation and use in an unimpaired condition, and of size suitable for wilderness management. The refuge maintains its road and trails and all public use infrastructure as well as areas identified for specific management purposes such as treatment areas for non native flora species and prescribed burning areas, livestock grazing and associated infrastructure etc. There are no roadless areas or islands of any sufficient size as to make feasible its preservation for wilderness management.

2.2 Evaluation of the Naturalness Criteria

Section 2 (c) of the Wilderness Act defines Wilderness as an area that "…generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable." In addition to the size criteria, Service policy states that an inventory unit must meet the naturalness criteria to qualify as a WSA. Although the area must appear natural to the average visitor, policy does not require that the land is in a pristine historic state (610 FW 4.9 A).

During the inventory phase, the team evaluated each inventory unit for the naturalness criteria and determined that based on numerous roads, trails and fences cross the refuge at regular intervals and habitat management activities such as prescribed fire and grazing management are present throughout the refuge. As a result, no areas are able to be defined as regions that have not been impacted by human activities. Because Buffalo Lake NWR does not contain any inventory units that meet the naturalness criteria, the planning team concluded that no areas would be suitable to initiate a Wilderness Study Area.

2.3 Evaluation of Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation

In addition to meeting the size and naturalness criteria, an inventory unit must provide outstanding opportunities for solitude or primitive recreation to qualify as a WSA. The Wilderness Act does not define what was intended by solitude or a primitive and unconfined type of recreation. The Service, however, defines solitude as "a state of mind, a mental freedom that emerges from settings where visitors experience nature essentially free of the reminds of society, its inventions, and conventions; privacy and isolation are important components, but solitude is enhanced by the absence of distractions, such as large groups, mechanization, unnatural noise and light, unnecessary managerial presence (such as signs), and other modern artifacts (610 FW 1.5 AA)." The Service defines primitive and unconfined recreation as "activities that provide dispersed, undeveloped recreation and do not generally require permanent facilities (610 FW 1.5 R)." According to 610 FW 4.10, an area does not need to have outstanding opportunities for both solitude and primitive recreation nor does the area need to have outstanding opportunities on every acre.

During the inventory process, the Wilderness Review Team found that none of the units within the refuge qualified for opportunities for solitude or primitive and unconfined recreation.

3.0 Wilderness Inventory Summary

After completing the inventory phase of the Wilderness Review, the team did not find any lands that meet the minimum criteria for a Wilderness Study Area based primarily on the variety of ongoing management and associated infrastructure throughout the refuge. Therefore, the team does not recommend that the Wilderness Study portion of the review be performed. This concludes the Wilderness Review process at this time. The process will be replicated in accordance with policy at the time of the next Plan revision.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
2005 NE Green Oaks Blvd., Suite 140
Arlington, Texas 76006

November 27, 2012

Memorandum

To: Refuge Manager, Buffalo Lake NWR, Umbarger, TX

From: Field Supervisor, FWS, Ecological Services, Arlington, TX

Subject: Comprehensive Conservation Plan for Buffalo Lake NWR

Enclosed is an Intra-Service Section 7 Biological Evaluation Form for the Comprehensive Conservation Plan for Buffalo Lake NWR. Upon review of the information provided, we concur with your determination that actions proposed within the Comprehensive Conservation Plan "may affect, but are not likely to adversely affect" federally listed species occurring at Buffalo Lake NWR and I have included my concurrence signature.

If you need any additional information or have questions, please contact Mr. Sean Edwards of this office.

Tom Cloud

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person:
Lynn Nymeyer
Telephone Number:
806-499-3382
Date:
11-30-2012
02ETAROO-2013-I-0044

I. Region: Southwest

II. Service Activity (Program):
Refuges: Buffalo Lake National Wildlife Refuge (BLNWR)

III. Pertinent Species and Habitat:

A. Listed species and/or their critical habitat within the action area:

Whooping Crane *(Grus americana)*

Interior Least Tern *(Sterna antillarum athalassos)*

Black-footed Ferret *(Mustela nigripes)*

Gray Wolf *(Canis lupes)*

Black Bear (Ursus americanus)

B. Proposed species and/or proposed critical habitat within the action area:
None

C. Candidate species within the action area:
None

IV. Geographic area or station name and action:
The proposed action is to implement a Comprehensive Conservation Plan for Buffalo Lake NWR, Randall County.

V. Location: Buffalo Lake NWR

A. Ecoregion Number and Name:
High Plains Ecoregion, Shortgrass Prairie Ecoregion

B. County and State:
Randall County, Texas (Buffalo Lake NWR)

C. Section, township, and range (or latitude and longitude):
35° 53'11" N 102°07'11" W

D. Distance (miles) and direction to nearest town:
The refuge is located approximately 30 miles southwest of Amarillo, Texas, in Umbarger, Texas, on U.S. 60 between Hereford and Canyon, Texas.

E. Species/habitat occurrence: See Figure 3.4 in the Plan
Whooping Crane and Interior Least Turn locations on the Refuge tend to vary on a daily and seasonal basis. Black Footed Ferret's have been extirpated from the state of Texas but historical habitat locations are throughout the shortgrass prairie particularly those locations in which prairie dogs are found. Gray wolves have been extirpated from the state and black bear is listed through similarity of appearance.

VI. Description of proposed action (attach additional pages as needed):

The proposed action is to implement the Comprehensive Conservation Plan for Buffalo Lake NWR over the next 15 years. The plan is divided into a series of goals, objectives, and strategies that will be implemented throughout the 15-year term of this Plan.

Specific goals associated with the CCP are:

- Manage and enhance the natural diversity, abundance, and ecological functions of Buffalo Lake NWR's habitats in support of national and regional plans with special emphasis on restoration and conservation of shortgrass prairie habitats.
- In support of national and regional plans, promote management actions that will maintain healthy and viable native wildlife and fish population's representative of the High Plains Ecoregion, with special emphasis on waterfowl, other migratory birds, and threatened and endangered species.

- Provide the public with opportunities for quality wildlife-dependent recreation, environmental education and interpretation that leads visitors to a greater understanding and enjoyment of fish, wildlife and their habitats on Buffalo Lake NWR and throughout the National Wildlife Refuge System.
- Develop and maintain both administrative and public use facilities which reduces human impacts on the natural environment in support the Refuge purposes, goals and objectives.

VII. Determination of effects:

A. Explanation of effects of the action on species and critical habitats in items III: A, B, and C:

Whooping Crane *(Grus americana)*
The historic wintering grounds in the southwest included the Gulf Coast of Texas, interior west Texas, and the highlands of northern Mexico. Whooping cranes are a common winter resident in Aransas and Matagorda Counties where the largest wild population of this endangered species seems to be slowly increasing. Otherwise, whooping cranes are very rare in Texas other than during migration where they utilize a narrow corridor north of their primary wintering areas. A few rare sightings have been reported at Buffalo Lake NWR, but no documentation exists of this species on the refuge. When reported at Buffalo Lake NWR they inhabit the Western Great Plains depressional wetland system. No critical habitat for this species exists on the refuge.

Because of the rarity of this species on the refuge as well as the lack of critical habitat being present on the refuge, there are no anticipated impacts to this species as a result of the proposed management actions listed in this CCP.

Interior Least Tern *(Sterna antillarun athalassos)*
The interior least tern is considered very rare in the western third of northern Texas. It is a casual to rare migrant in the western third of Texas, and a rare local summer resident in the eastern Panhandle and along the Red River. Generally, the habitat on the refuge is not available for them unless the water levels of the lake are low and would likely be found in the western Great Plains depressional wetland system. There has only been one documented record of the interior least tern on the refuge. No critical habitat for this species exists on the refuge.

Because of the rarity of this species on the refuge as well as the lack of critical habitat being present on the refuge, there are no anticipated impacts to this species as a result of the proposed management actions listed in this CCP.

Black-footed Ferret *(Mustela nigripes)*
Central mixed grass prairie would be suitable for Black-footed ferrets on the Refuge. Wild populations exist in Wyoming, South Dakota, and Montana. With the existence of a healthy and expanding prairie dog colony complex on the refuge, it is possible that ferrets could be supported in the area depending on future recovery efforts and priorities. The black-footed ferret was last observed in Texas (Bailey County) in the 1960's (TPWD, 2000). Additionally, no critical habitat for this species exists on the refuge.

Because of the rarity of this species on the refuge as well as the lack of critical habitat being present on the refuge, there are no anticipated impacts to this species as a result of the proposed management actions listed in this CCP.

Gray wolf *(Canis lupus)*
Gray wolves are considered extirpated form the state and the proposed project will not affect this species.

Black Bear *(Ursus americanus)*
Black bears are listed through similarity of appearance and implementing the CCP will not affect this species.

Habitat and Wildlife Management
Restoration and maintenance of prairie habitat using management tools such as prescribed fire, exotic species management, planting, and harvesting native prairie seed and all other actions identified in the CCP will not have any negative impacts on any of the listed species in and around the refuge boundaries.

Public Use
The proposed increase in public use opportunities, such as new trails, and photo blinds promoting wildlife observation and wildlife photography, as well as additional programs to increase environmental education and interpretation, will not have any negative impacts on any listed species. Increased opportunities in all public use programs will be designed to avoid any potential impacts to any listed species.

Facilities/Infrastructure
The proposed increase in infrastructure, such as new trails, new signs and exhibits, as well as livestock grazing infrastructure will not have any negative impacts on any listed species. Additional opportunities in facilities and infrastructure will be designed to avoid any potential impacts to any listed species.

Overall, no significant adverse impacts to federally listed threatened and endangered species are expected to occur due to the management direction proposed in the Comprehensive Conservation Plan.

B. Explanation of actions to be implemented to reduce adverse effects:
The refuge will prohibit or restrict activities in areas where listed species occur or have the potential to occur as a specific mitigation measure protecting all listed species in and around refuge boundaries.

VIII. Effect determination and response requested: [* = optional]

A. Listed species/designated critical habitat:

Determination	Response requested
no effect to species/critical habitat(species/unit: *Whooping Crane (Grus americana), Interior Least Tern (Sterna antillarum athalassos), Black-footed ferret (Mustela nigripes), gray wolf (Canis lupus)and black bear (Ursus americanus)*	X *Concurrence
may affect, but is not likely to adversely affect species/critical habitat (species/unit: n/a)	____Concurrence
may affect, and is likely to adversely affect species/critical habitat (species/unit: n/a)	___Formal Consultation

B. Proposed species/proposed critical habitat:

Determination	**Response requested**
no effect on proposed species/proposed critical habitat (species/unit: n/a)	____*Concurrence
is not likely to jeopardize proposed species/ adversely modify proposed critical habitat (species/unit: n/a)	____Concurrence
is likely to jeopardize proposed species/ adversely modify proposed critical habitat (species/unit: n/a)	____Conference

C. Candidate species:

Determination	**Response requested**
no effect (species: none)	____*Concurrence
is not likely to jeopardize candidate species/ (species: none)	____Concurrence
is likely to jeopardize candidate species (species: none)	____Conference

Signature
Refuge Manager, Buffalo Lake NWR

11-27-2012
Date

IX. Reviewing ESO Evaluation:

A. Concurrence___✓___ **Non-concurrence_____**

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

F. Remarks (attach additional pages as needed):

Signature

11-27-2012
Date

H. List of Preparers

U. S. Fish and Wildlife Service Employees

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Buffalo Lake NWR

Contributors:

James Hartman	Editing
Steve Kettler	GIS Mapping
Art Needleman	Design

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BUFFALO LAKE NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL ASSESMENT

APPENDIX I

MEDIA DISTRIBUTION LIST

Distribution - 11/9/2012 1:40:43 PM

Distribution Name	Distribution - 11/9/2012 1:40:43 PM
Method Sent	E-Mail
Media Contact Count	275
Media Outlet Count	46
Individual Count	0
Organization Count	0
Media Contact Lists Used	Buffalo Lake NWR
Media Outlet Lists Used	Buffalo Lake NWR
Individual Lists Used	
Organization Lists Used	

Media Contact	Media Outlet
Abuchaibe, Jessica	KFDA-TV
Abuchaibe, Vanessa	KTMO-TV (Telemundo Amarillo)
Aguilera, Alex	KGRW-FM
Aguilera, Alex	KQFX-FM
Albracht, Chris	West Texas Catholic
Albracht, Jacob	KFDA-TV

Albracht, Jacob	NewsChannel 10 News at 6 PM - KFDA-TV
Albracht, Jacob	NewsChannel 10 News at 10 PM - KFDA-TV
Allison, Ali	NewsChannel 10 Early Show - KFDA-TV
Allison, Ali	KFDA-TV
Andrews, Rick	KIXZ-AM
Andrews, Rick	KATP-FM (Blake FM)
Andrews, Rick	KMXJ-FM (Mix 94.1)
Andrews, Rick	KPRF-FM
Anglin, Russell	Amarillo Globe-News
Arnold, Sally	Briscoe County News
Austen, Emily	KAMR-TV
Austen, Emily	News at 6 PM Saturday - KAMR-TV
Austen, Emily	News at 10 PM Weekend - KAMR-TV
Baker, Lee	KVII-TV
Baker, Lee	Pronews at 6 PM - KVII-TV
Baker, Lee	Pronews at 10 PM - KVII-TV
Baker, Lee	KVIH-TV
Barrington, James	Canyon News
Bartlett, Melissa	KGNC-AM
Bartlett, Melissa	KGNC-FM
Beilue, Jon Mark	Amarillo Globe-News
Benavides, Bob	KJNZ-FM
Bennett, Adam	Fox 14 News at 9 PM Weekend - KCIT-TV
Bennett, Adam	KCIT-TV
Berry, Michelle	Borger News-Herald
Blackmon, Jeff	Castro County News
Blevins, Marshal	KXSS-FM
Bryant, Mollie	Pampa News
Buckner, Dale	Dale Buckner's Financial Clinic - KGNC-AM
Burton, Donna	Groom/McLean News, The
Butler, Tim	KGNC-AM
Campbell, Jim	American Quarter Horse Journal, The
Cantrell, Don	Accent West
Cantrell, Liz	Accent West
Carpenter, Brandon	KVII-TV

Carr, Ron	Star
Cathey, James	Panhandle Greenhouse Garden Hour - KGNC-AM
Caudill, Andrea	American Quarter Horse Journal, The
Cervantes, Bobby	Amarillo Globe-News
Chamberlain, Richard	American Quarter Horse Journal, The
Chandler, Chip	Amarillo Globe-News
Clark, Lani	KGNC-FM
Clark, Patrick	KGNC-FM
Collier, Meaghan	KAMR-TV
Collier, Meaghan	Studio 4 - KAMR-TV
Collins, Wayne	KDHN-AM
Crawford, Diana	KFDA-TV
Crofford, Lori	KMXJ-FM (Mix 94.1)
Decker, Daye	KVII-TV
Dietrich, Veronica	KFDA-TV
Dowling, John	Entrenched Internet Program
Eddins, Katie	KGNC-FM
Edwards, Brice	KGNC-AM
Edwards, Brice	KGNC-FM
Ehrle, Mike	KGRO-AM
Ehrle, Mike	KOMX-FM
Element,	KQIZ-FM
Estlack, Roger	Clarendon Enterprise
Formby, Chip	KPAN-AM
Frank, Brian	KACV-FM
Geller, Heather	KFDA-TV
Godoy, Andrea	Ranger
Gonzales, Tony	KTNZ-AM
Gonzalez, Christina	KBZD-FM
Griffin, Emily	KFDA-TV
Griffin, Laura	Quitaque Valley Tribune
Grisham, Glenda	La Voz Hispana
Grover, George	KQTY-AM
Grover, George	KQTY-FM
Grover, George	New & Refurbished Morning Show - KQTY-FM, The
Guthrie, James	KIXZ-AM
Gwyn, Allan	KFDA-TV
Gwyn, Allan	NewsChannel 10 Early Show - KFDA-TV

	KFDA-TV
Hamilton, Christine	American Quarter Horse Journal, The
Hamilton, Matt	KFDA-TV
Hamilton, Matt	NewsChannel 10 News Weekend Evening Edition - KFDA-TV
Hamilton, Matt	NewsChannel 10 News 10 PM Weekend - KFDA-TV
Harris, John	News at 5 PM - KAMR-TV
Harris, John	News at 6 PM - KAMR-TV
Harris, John	News at 10 PM - KAMR-TV
Harris, John	KAMR-TV
Harris, John	KCIT-TV
Haynes, Mike	Ranger
Hazelwood, Ryan	KVII-TV
Henry, David	Amarillo Globe-News
Hill, Mike	NewsDay Amarillo - KGNC-AM
Hill, Mike	KGNC-FM
Hill, Mike	KGNC-AM
Hinton, Carol	KEFH-FM
Howard, Walt	NewsChannel 10 News at 5 PM - KFDA-TV
Howard, Walt	NewsChannel 10 News at 6 PM - KFDA-TV
Howard, Walt	KFDA-TV
Howard, Walt	NewsChannel 10 News at 10 PM - KFDA-TV
Huff, Tara	Eagle Press, The
Hunley, Terrence	Amarillo Globe-News
Hunt, James	KGNC-AM
Hunt, James	KGNC Agribusiness and Information Hour - KGNC-AM
Hutchison, Matthew	Amarillo Globe-News
James, Brian	Pronews at 6 PM - KVII-TV
James, Brian	Pronews at 10 PM - KVII-TV
James, Brian	KVII-TV
Jameson, Dana	Hereford Brand
Janner, Jessica	KCIT-TV
Janner, Jessica	Fox 14 News at 9 PM - KCIT-TV
Janner, Jessica	KAMR-TV
Joiner, Jami	Ranger
Justus, Andy	Studio 4 - KAMR-TV
Justus, Andy	KAMR-TV

Justus, Andy	News at 10 PM - KAMR-TV
Justus, Andy	News at 6 PM - KAMR-TV
Justus, Andy	News at 5 PM - KAMR-TV
Karr, Jamey	KXGL-FM
Karr, Jamey	Jamey and Morgan - KXGL-FM
Keller, Meredith	KVII-TV
Keller, Meredith	Midday - KVII-TV
Keller, Meredith	Daybreak - KVII-TV
Kersh, Steve	Daybreak - KVII-TV
Kersh, Steve	Pronews at 6 PM - KVII-TV
Kersh, Steve	Pronews at 10 PM - KVII-TV
Kersh, Steve	Pronews at 5 PM - KVII-TV
Kersh, Steve	KVII-TV
Kingston, Jackie	KAMR-TV
Kingston, Jackie	News at 5 PM - KAMR-TV
Kingston, Jackie	News at 6 PM - KAMR-TV
Kingston, Jackie	News at 10 PM - KAMR-TV
Lahnert, Lance	Amarillo Globe-News
Land, Brad	A.M. Interview - KPAN-FM
Langowski, Michelle	NewsChannel 10 News at 5 PM - KFDA-TV
Langowski, Michelle	KFDA-TV
Langowski, Michelle	NewsChannel at Noon - KFDA-TV
Langston, Aaron	KAMR-TV
Langston, Aaron	KCIT-TV
Lee, Kyndel	KVII-TV
Lee, Tom	KFDA-TV
Lemmons, Larry	KFDA-TV
Lemmons, Larry	NewsChannel 10 Early Show - KFDA-TV
Leon, Skip	Hereford Brand
Lilja, Nick	KAMR-TV
Lilja, Nick	Today in Amarillo - KAMR-TV
Lyn, Mary	KATP-FM (Blake FM)
Marose, Kelly	KFDA-TV
Martin, Chris	News at 10 PM Weekend - KAMR-TV
Martin, Chris	News at 6 PM Saturday - KAMR-TV
Martin, Chris	KAMR-TV
Mayer, Jacob	Amarillo Globe-News
McAffrey, Michele	Amarillo Magazine

McBride, Jim	Amarillo Globe-News
McCarty, Warren	My Passion is Football - KPUR-AM
McWilley, Ryan	KATP-FM (Blake FM)
Meinhart, Ken	KEFH-FM
Miriam, Sister	KDJW-AM
Montgomery, Jessica	Claude News
Myers, Steve	Pronews at 5 PM - KVII-TV
Myers, Steve	KVII-TV
Nation, Kris	KFDA-TV
Nation, Kris	NewsChannel 10 News Weekend Evening Edition - KFDA-TV
Nation, Kris	NewsChannel 10 News 10 PM Weekend - KFDA-TV
Newell, Becky	American Quarter Horse Journal, The
Nichols, Ny Lynn	KCPN-TV
Nichols, Ny Lynn	KCIT-TV
Nichols, Ny Lynn	KAMR-TV
Oliver, Dave	KFDA-TV
Oliver, Dave	NewsChannel 10 News at 5 PM - KFDA-TV
Oliver, Dave	NewsChannel 10 News at 6 PM - KFDA-TV
Oliver, Dave	NewsChannel 10 News at 10 PM - KFDA-TV
Oliver, Dave	NewsChannel at Noon - KFDA-TV
Pair, Steve	KVII-TV
Pair, Steve	Amarillo CW
Paredez, Ashley	KFDA-TV
Parsons, Don	KDDD-AM
Parsons, Don	KDDD-FM
Peeler, James	KNNK-FM
Perez, Angelina	KFDA-TV
Pfeil, Diana	KPDR-FM
Pfeil, Jeremy	KPDR-FM
Pfeil, Rick	KASV-FM
Pfeil, Ricky	KJRT-FM
Pfeil, Ricky	KPDR-FM
Phillips, Mel	Southwest Outdoors with Mel Phillips - KGNC-AM
Phillips, Mel	KGNC-AM
Pitner, Linda	KACV-FM
Pomper, Rob	Farwell State Line Tribune

Proud, Bob	KXSS-FM
Ranaivo, Yann	Amarillo Globe-News
Rangel, Enrique	Amarillo Globe-News
Ricci, Jay	Pronews at 10 PM - KVII-TV
Ricci, Jay	Pronews at 6 PM - KVII-TV
Ricci, Jay	KVII-TV
Richerson, Brittney	Ranger
Ricks, Lois	White Deer News
Ridling, Maxine	KFDA-TV
Rios, Jonas	KVII-TV
Robertson, Chuck	KEFH-FM
Robertson, Ellen	Face to Face - KACV-TV
Robertson, Ellen	KACV-TV
Roden, Mike	Sportstalk Amarillo - KGNC-AM
Roden, Mike	KGNC-AM
Roden, Mike	KGNC-FM
Roden, Mike	NewsDay Amarillo - KGNC-AM
Rodriguez, Mike	KIJN-AM
Rogers, Amanda	Canyon News
Rohrback, Darcy	Farwell State Line Tribune
Roman, Maury	KTMO-TV (Telemundo Amarillo)
Ross, Eric	KFDA-TV
Saenz, Jorge	KTNZ-AM
Sagan, Greg	Amarillo Globe-News
Sakai, Stacy	KFDA-TV
Sakai, Stacy	NewsChannel 10 News at 6 PM - KFDA-TV
Sakai, Stacy	NewsChannel 10 News at 10 PM - KFDA-TV
Samarripas, Mari	KVII-TV
Schmidt, Lisa	KVII-TV
Schmidt, Lisa	Pronews at 10 PM - KVII-TV
Schmidt, Lisa	Pronews at 6 PM - KVII-TV
Schumacher, Michael	Amarillo Globe-News
Schwarz, George	Amarillo Independent, The
Sehorn, Darrell	KOMX-FM
Sehorn, Darrell	KGRO-AM
Senior, Taji	KVII-TV
Sites, Shelly	Midday - KVII-TV
Sites, Shelly	Pronews at 5 PM - KVII-TV
Sites, Shelly	Pronews at 5:30 PM Sunday - KVII-TV

Sites, Shelly	Pronews at 10 PM Sunday - KVII-TV
Sites, Shelly	Pronews at 6 PM Saturday - KVII-TV
Sites, Shelly	Pronews at 10 PM Saturday - KVII-TV
Sites, Shelly	KVII-TV
Slayter, Eric	KPUR-FM
Slayter, Eric	KARX-FM
Slayter, Eric	KZRK-FM
Slayter, Eric	KZRK-AM
Smith Welch, Karen	Amarillo Globe-News
Spencer, Michael	KAMR-TV
Spencer, Michael	News at 6 PM - KAMR-TV
Spencer, Michael	News at 10 PM - KAMR-TV
Steed, Kale	KVII-TV
Stephens, Lindsey	KDDD-FM
Stiner, Lindsey	KVII-TV
Stiner, Lindsey	Pronews at 6 PM Saturday - KVII-TV
Stiner, Lindsey	Pronews at 5:30 PM Sunday - KVII-TV
Stiner, Lindsey	Pronews at 10 PM Saturday - KVII-TV
Stiner, Lindsey	Pronews at 10 PM Sunday - KVII-TV
Stow, Skip	KXSS-FM
Tanner, Morgan	KXGL-FM
Tanner, Morgan	Jamey and Morgan - KXGL-FM
Tanner, Steve	KRGN-FM (Family Life Radio)
Taylor, Quincy	Vega Enterprise
Tinsley, Ben	Pampa News
Turk, Dana	American Quarter Horse Journal, The
Vaughn, Craig	KARX-FM
Vaughn, Craig	KPUR-FM
Vaughn, Craig	KQIZ-FM
Vaughn, Craig	KPUR-AM
Venhaus, Shawn	KFDA-TV
Wait, Darrell	KDDD-FM
Wait, Darryl	KDDD-AM
Watson, Rose	Tri-State Ag News
Watson, Rose	Moore County News-Press

Welch, Kayla	KVII-TV
Welch, Kayla	Midday - KVII-TV
Welch, Kayla	Pronews at 5 PM - KVII-TV
Welch, Kevin	Amarillo Globe-News
Williams, Neoma	Pulse, The
Wink, Shaun	Panhandle Herald
Wink, Shaun	White Deer News
Winkler, Bri	KAMR-TV
Winkler, Bri	Today in Amarillo - KAMR-TV
Wright, Heather	KATP-FM (Blake FM)
Wright, Michael	Moore County News-Press
Zerby, Drew	Amarillo Magazine
Zuniga, Bert	KTNZ-AM

Media Outlet

Accent West

Amarillo Globe-News

Amarillo Independent, The

American Quarter Horse Journal, The

Canyon News

Claude News

Entrenched Internet Program

KACV-FM

KACV-TV

KAMR-TV

KAMT-TV

KARX-FM

KASV-FM

KATP-FM (Blake FM)

KBZD-FM

KCIT-TV

KCPN-TV

KDJW-AM

KEYU-TV

KFDA-TV

KGNC-AM

KGNC-FM

KGRW-FM

KIXZ-AM

KJRT-FM

KMXJ-FM (Mix 94.1)

KPDR-FM

KPRF-FM

KPUR-AM

KPUR-FM

KQFX-FM

KQIZ-FM

KRGN-FM (Family Life Radio)

KTNZ-AM

KVIH-TV

KVII-TV

KWTS-FM

KXGL-FM

KXSS-FM

KZIP-AM

KZRK-AM

KZRK-FM

La Voz Hispana

Panhandle Herald

Ranger

West Texas Catholic

J. Service Response to Public Comment

This appendix summarizes the comments that were received on the Draft Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) for Buffalo Lake National Wildlife Refuge. The Draft CCP/ EA was released for public review and comment from October 24, 2012 to November 23, 2012 through the federal register notice. Post cards were also sent to each member of the refuge mailing list, as well as a press release that went out to print and broadcast journalists within a 60 mile radius of Amarillo, TX (Appendix I) requesting comments through November 30, 2012. Since the press release and the postcards identified the comment period ending November 30, 2012 all comments were accepted to that date to be incorporated into the Final CCP. The public was notified of the release of the Draft CCP and EA with a Notice of Availability in the *Federal Register* on October 24, 2012, (Volume 77, Number 206, pp. 65011-65015).

A CD-rom version of the document was sent to approximately 75 individuals, organizations, elected officials, and local, state, and federal agencies; and an electronic copy was made available on the Service's website. An open house was held during the comment period (November 7, 2012) at the Refuge headquarters, providing the public with an opportunity to discuss the plan with Service staff. Despite advertisement efforts, nobody attended the open house public meeting. The Service received two comment letters, and over 30 emails. Summaries of the comments received in each letter and the Service's responses follow.

The following comment was received from Kenneth Scivally, Stephen Reid Scivally, CSW Cattle Co., LLC, SRS Cattle Co., LLC, and Happy West Cattle Co., LLC.

Kenneth Eugene Scivally, Stephen Reid Scivally, CSW Cattle Co., LLC, SRS Cattle Co., LLC, and Happy West Cattle Co., LLC own lands in Southwest Randall County and Southeast Deaf Smith County either adjoining or in close proximity to Buffalo Lake NWR in a East, South, and West direction. The method of operation and possible expansion of Buffalo Lake NWR has and will have significant impact on the use of the resources on our private lands. We would ask that you give due consideration to the following comments:

Climate Change:
To achieve the goal set by the USFWS to achieve carbon neutrality by 2020 the USFWS should give consideration to the wind resources in SW Randall County and SE Deaf Smith County. The mitigation of our carbon footprint from development of these wind resources which are some of the highest in North America and are rapidly gaining accessibility to transmission would be exponentially higher than any mitigation derived from the operation of Buffalo Lake NWR. We would urge the Buffalo Lake NWR to cooperate with the development of the area wind resources and for wind developers to adjust their projects to have a minimal impact on the current operation of Buffalo Lake NWR. It is possible that a partnership between the two could result in Buffalo Lake NWR being credited with some of the carbon mitigation from the wind energy production or perhaps other incentives to improve the Buffalo Lake NWR. There should be some areas of partnership since climate change is listed as a strategic challenge by the USFWS.

Response: Buffalo Lake NWR, has been cooperating with wind companies that would like to develop wind energy within the area. Refuge and regional staff have attended several meetings with wind developers in an attempt to minimize impacts of the operation on refuge resources as well the entire Texas Panhandle ecosystem. The Refuge views this development as a potential partnership opportunity and has initiated acoustic monitoring with current wind energy developers. The Refuge will continue to collaborate with wind energy developers in an attempt to track and anticipate potential changes in habitat fragmentation and wildlife behavior.

Habitat Fragmentation:
The Scivally Family owns and operates approximately 28,000 acres in SW Randall County and SE Deaf Smith County, some of which adjoins Buffalo Lake NWR. With the exception of controlling the prairie dog population and their infestation of the private lands in the area, we consider the Buffalo Lake NWR and its management to be good neighbors. However, we would oppose any expansion of the Buffalo Lake NWR footprint in the area, either by land acquisition or conservation efforts, with the possible exception of some type of cooperation in conjunction with wind energy production. We are aware that there has been movement to develop a large block of land in SW Randall County to possibly attempt to introduce ferrets to the area. We would vigorously oppose any artificial introduction of any endangered or potentially endangered species on current lands of Buffalo Lake NWR or on any new lands acquired either through acquisition or easements.

Response: The Proposed Action includes the development of a Land Protection Plan (LPP) that would incorporate an additional 20,000 acres to increase conservation efforts, conserving additional acreage and minimizing encroachment surrounding the refuge. Chapter 4 under Habitat Goal 4.1, Objective 5, describes an updated LPP and associated NEPA (including public comment periods) within 5 years of the signing of the CCP. A LPP is also identified in Chapter 5 of the CCP as a Step Down Management Plan providing the Service the opportunity to acquire surrounding properties from willing sellers that promote strategic habitat conservation.

The CCP does not propose the reintroduction of any endangered species.

Wind Energy Research:
We support any effort by Buffalo Lake NWR that works toward the coexistence of wind energy production and the mission of the USFWS, one of which is to reduce carbon emissions.

Response: Please see response under Climate Change above.

Prairie Management and Restoration:
We support Alternative A using grazing and prescribed farming. We suggest from our experiences, that grazing the Refuge from October 15 to January 15 and deferring for the balance of the year is the best alternative for resurrecting the native pastures.

Response: The Refuge appreciates your suggestion based on your experience. Grazing activities are designed to encourage optimal habitat conditions to promote wildlife diversity. The Refuge currently utilizes a grazing program from May to October with a rest/rotation system during the summer growing season to promote habitat conditions for wildlife dependent on short grass prairies.

Invasive Flora Species:
We would support an aggressive effort to remove any invasive flora species by using all the methods in Alternative B.

Response: Thank you for your support of Alternative B.

Moist Soil Management:
We support Alternative A, maintaining the current 40-acre Moist Soil Unit. Unfortunately, the Lake, as noted throughout the CCP, is an entirely different resource than when it was made a Federal Wildlife Refuge. It should be operated at minimal cost as it exists in its current state, and this does not include drilling more groundwater wells to pump water to create artificial wetlands.

Response: Thank you for your support of Alternative A but the Service has selected Alternative B as the preferred alternative which includes the addition of three 40 acre moist soil units. Moist soil units are a management tool designed to provide habitat for wetland dependent species. Currently, only 1.4 percent of the refuge consists of wetlands. Each moist soil unit will be managed to promote naturally occurring aquatic food plants such as curly dock, pine smartweed, bulrush and barnyard grass specifically targeting calorie requirements of migrating waterfowl. This supports the refuge purpose as well as contributes to the objectives of the central flyway management program by providing quality habitat to maintain the health and condition of the birds migrating through and wintering on the refuge.

Lakebed Management:
We support the return of as much of the Buffalo Lake NWR to native grasses to the extent possible. If the Lake Bed cannot be returned to natural vegetation, then continued farming may be the only option.

Response: The Refuge appreciates your support to return the lakebed back to natural vegetation which is consistent with the selected alternative.

Water Quality:
We support Alternative A, continuation of current practices. The resources of Buffalo Lake NWR should be accepted as they currently exist. It is hard to believe that there is a cost efficient way to improve groundwater quality or surface water quality.

Response: Thank you for your support of Alternative A but the Service has selected Alternative B as the preferred alternative which will continue to use the best available science to minimize coli forms from surface and groundwater throughout the Refuge.

Native Fauna:
We support alternative A, maintaining current level of wildlife with the exception of prairie dogs. It is our understanding that the current infestation of prairie dogs in SW Randall County and SE Deaf Smith originated from the introduction of a prairie dog colony at Buffalo Lake NWR. We would strongly support elimination of prairie dogs at Buffalo NWR, however if this is not possible we would ask that they be contained to a designated area and any infestation on other parts of the Refuge be eliminated. We would also request that the designated prairie dog area be enclosed by a fence sufficient to contain the prairie dogs. The USFWS is accommodating landowners in other locations and projects with elaborate prairie dog fences and they should do the same for the private landowners in SW Randall County and SE Deaf Smith. We would also remind the USFWS that prairie dogs are declared "A Public Nuisance" under Texas State Law. We would also ask that if the USFWS continues to raise prairie dogs and cannot contain them to a designated area, that they compensate the private landowners in the area for the cost of prairie dog infestation management.

Response: The preferred alternative is to maintain current numbers of prairie dogs throughout the refuge. The CCP is not proposing to increase numbers of prairie dogs or eliminating them from the Refuge. The Service recognizes the value of prairie dogs in grassland ecosystems and appreciates their value of attracting a variety of other species and their role in contributing to diversity in grassland habitats.

Invasive Fauna:
We support the Refuge Management in its effort to keep the Refuge free of any feral hog population. We also suggest that the coyote population be kept under control. The coyotes can be a problem during calving season.

Response: The refuge appreciates your support for feral hog control. Coyote control is not considered in this CCP.

Hunting:
We do not think the Refuge is isolated enough to allow rifle hunting, however we do not see any problem with black powder or bow hunting.

Response: Alternative B includes a proposal to introduce hunting to the Refuge to control invasive fauna as well as to control the population numbers of native fauna. Any future hunt proposals will include a separate NEPA analysis including a separate public comment period.

Fishing:
We support Alternative A, no fishing because that resource does not exist.

Response: Thank you for your support of Alternative A but the Service has selected Alternative B as the preferred alternative which includes constructing a 6+/- acre public fishing pond.

Wildlife Observation:
We support Alternative A

Response: Thank you for your support of Alternative A but the Service has selected Alternative B as the preferred alternative which includes installation of additional blinds.

Environmental Education:
We support Alternative A

Response: Thank you for your support of Alternative A but the Service has selected Alternative B as the preferred alternative which includes an increase of education days as well as to develop and construct additional interpretive panels and expanding the auto tour route.

Camping:
We support Alternative A

Response: Thank you for your support of Alternative A which is consistent with the preferred alternative.

Facilities:
We support Alternative A

Response: Thank you for your support of Alternative A but the Service has selected Alternative B as the preferred alternative which is to promote additional amenities in both administrative and public use facilities.

Public Use Facilities:
We support Alternative A

Response: Thank you for your support of Alternative A but the Service has selected Alternative B as the preferred alternative which is to expand construction and maintenance of two additional hiking trails and improve the campground toilet facilities.

Quality and Safety of Refuge Roadways:
We support Alternative A

Response: Thank you for your support of Alternative A but the Service has selected Alternative B as the preferred alternative which includes the rehabilitation of the entrance road and improving the remaining refuge roads.

SUMMARY
We support the continued operation of Buffalo Lake NWR with the specific suggestions and concerns as listed above. We do not support any increased footprint or use of increased amounts of federal funds to mitigate the Buffalo Lake NWR because it is not the resource that it was when the Buffalo Lake NWR was established. If the Resources of the Refuge were the same in 1959 as it exists today, it is doubtful it would have been established as a National Wildlife Refuge. If sufficient Federal Funds are not available to continue to operate the Buffalo Lake NWR, then we would support returning the 7667 acres to the Forest Service to be operated as a National Grassland and giving the proper federal entity an easement to operate the flood control dam.

Response: The Refuge appreciates your summary.

Several email comments regarding possible hunting on the Refuge were received. Those comments and associated response follow.

1. I'm writing to encourage the addition of hunting on the Buffalo Lake National Wildlife Refuge. The plan I have read seems to make it feasible to add hunting to the mix of conservation methods.

   On a personal note, I would probably utilize the refuge if waterfowl hunting were added. Thank you.

2. Please open Buffalo Lake to hunting. This public hunting resource is badly needed in the Texas High Plains.

3. As a citizen of Texas, I believe in the importance of proper land and wildlife management. Hunting these lands needs to become a part of that management.

4. Dear Mr. Lujan: I grew up in Dimmitt, close to Buffalo Lake and it is one of the most sacred places of my childhood I can remember. I am now 65 years old and cannot imagine hunters on that lake! What in the world does WILDLIFE REFUGE mean to you? Will it be changed to WILDLIFE SLAUGHTER? Please do not open that lake up to hunters... I live in Capitan, New Mexico area now and that is all you see is hunters, hunters, hunters, etc..... Should include most of them are Texans.... LOL!

   Thank you for at least reading this transmittal...

5. I moved from my home state of Colorado to Amarillo Tx in 1981. Hunting was a big part of my life back home & I tried to continue that tradition here in Texas. Within three years

however hunting was basically over for me due to lack of public hunting opportunity. Since Buffalo Lake was drained (well before I moved here) the area has been for all intents and purposes an unused resource. I fully support opening the Buffalo lake area to public hunting

6. IF THE BIRDS ARE TO BE TRULY "PROTECTED" THEN YOU NEED TO BAN FROM THIS SITE THE GUNW ACKO BIRD MURDERERS WHO WANT TO COME IN TO KILL AND MURDER BIRDS AND OTHER SPECIES. THEY SHOULD BE BANNED FROM THIS SITE OWNED BY NATIONAL TAXPAYER/CITIZENS. IT ALSO APPEARS AS IF YOU DO NOT INTEND TO TRULY GET THE OPINIONS OF NATIONAL TAXPAYERS WHO OWN THIS PROPERTY, JUST LOCAL YOKEL WILDLIFE MURDERERS WHO YOU SEEM TO BE FEASTING WITH.

   IT IS TIME TO GET THE GUN WACKO WILDLIFE MURDERERS OUT OF OUR NATIONAL SITES THAT ALL 300 MILLION OF US PAY TAXES TO SUPPORT. WE ARE SICK AND TIRED OF PROVIDING SPACE FOR THEIR SMALL SELF INTERESTED KILLING MEMBERS.

   THE PEOPLE OF THE USA BELIVE ALL COMMENTS BY ANY MEMBER OF THE PUBLIC ARE "SUBSTANTIVE" AND THAT THE USA IS GOVERNMETN BY THE PEOPEL FOR THE PEOPLE. WHEN DID MR LUJAN CHANGE IT TO GOVT BY THE GOVT FOR THE BENEFIT OF THE GOVT? WHEN DID THAT HAPPEN OR IS LUJAN JUST A SELF IMPORTANT GOVT BUREAUCRAT WHO CONSIDERS HIS OWN OPINION TO BE THE ONLY ONE THAT COUNTS, BUT HE CAN TAX EVERYBODY IN THIS NATION TO SUPPORT THIS SITE? WHAT THE HELL IS GOING ON WITH OUR GOVT THAT THIS KIND OF GOVT OFFICIOUSNESS EXISTS?

   HUNTING SHOULD NOT BE PERMITTED ANYWHEERE IN THIS SITE. BRINGING IN HUNTERS CONSIGNS A SITE TO ECONOMIC DEPRESSION, SINCE WILDLIFE WATCHERS OUTSPEND HUNTERS 20 TO 1. THEY ARE THE TRUE SPENDERS OF OUR NATIONAL SITES. THAT NEEDS TO BE CONSIDERED HERE. THIS COMMENT IS FOR TH EPUBLIC RECORD. JEAN PUBLIC

   Response: Refuges are specifically closed to hunting unless open through a Code of Federal Regulations (CFR). The Refuge will have to go through the process of opening hunting in the future. Prior to opening hunting on the refuge, a separate environmental assessment; which when completed, will include a Hunt Opening Package that is submitted to the Washington Office and published in the Federal Register. A public comment period will be instilled into the process and will give the public an opportunity to comment on the specifics of the proposed hunting plan at that time.

   The selected alternative is to introduce hunting to the refuge to assist in controlling invasive fauna species as well as control the populations of native fauna species. Goal 4.4 in Visitors Services in chapter 4 of the CCP is to provide the public with

opportunities for quality wildlife dependent recreational opportunities. Objective 1 is to initiate hunting on the refuge and Strategies 1 through 4 promote hunting opportunities on the Refuge. Chapter 5 also identifies a Habitat Management step down plan. In order for hunting to be initiated an opening package would commence with a Hunt Management Plan, an Environmental Assessment and associated decision document (ie. Finding of No Significant Impact), a section 7 Consultation, a Compatibility Determination, and other associated documents accompanied with a public review period will eventually determine if hunting is allowed on the refuge.

Several email comments regarding equestrian use on the Refuge were received. Those comments and associated response follow.

7. I would like to submit a comment about Buffalo Lake NWR, specifically about allowing equestrian use. I have lived in the area since 1995, and now own a business in Umbarger. When I first moved here, horses were welcome and riders were encouraged to ride and camp at Buffalo Lake. From reading the CCP, I understand that in 1998, flooding disrupted the roads and trails that were for equestrian use, so riding was prohibited. Also there was concern of riders going off trail, bringing in exotic species of vegetation, and safety of other visitors (which there were NO specific incidences). It has been 14 years, I'm assuming the fire road has been restored and suitable horse trails are again available. The issue of going off trail could also include pedestrians or proposed bicyclists and hunters. As for introducing exotic plant species, there are certified weed-free forages that can be fed on site if necessary, many other federal lands open to riders require horses to be fed only these feeds on site.

8. In response to the article in the Amarillo-Globe News, I would like to see trail riding available at Buffalo Lake once again.

9. As mentioned in the CCP in Chapter 2 under horseback riding, the greatest issue presented at the meeting held a few years back was the restoration of equestrian activities. This is still true today. There are many in the equine community that not only use public lands to ride, such as in Palo Duro Canyon or Plum Creek, but also volunteer their time to keep these areas and trails maintained for all to use. It seems like the regulatory authorities and staff see equestrian use only as destructive and dangerous, and fail to consider the potential of increased revenues from entry/use fees and volunteer support of maintaining and monitoring trails and their use. Please consider re-opening Buffalo Lake NWR to equestrian use.

10. I am not sure what you need but if it is just to hear from a # of people I would like to say Yes I would like to ride my horse at Buffalo Lake in Umbarger. I recently moved to Canyon from Las Cruces, NM and I can say I miss the riding along the bar ditches and at the river. Besides the canyons here (which are wonderful places to ride) there are no other public trail riding parks that are close to Canyon/Amarillo. I would love to see Buffalo Lake reopened to Horse riders.

11. As a member of the Crown of Texas Arabian Club and Panhandle Trail riders and the Vice-President of the Randall County Sheriff's Posse I ask you to consider opening the Buffalo Lake area to horseback riding. In my experience with these clubs, the members are a fantastic group of conscientious horse riders who treasure and take care of the areas we ride in. Thank you for this consideration.

12. I would like for you to consider opening Buffalo Lake up for horseback riding. As a horsewoman, I can tell you that we appreciate the opportunity to witness the wonder of wildlife that most don't get to see. It is something to walk up on deer, turkey, hogs or even to see the beautiful wildflowers. We take pride in the trails around the Panhandle. We have several associations that work and contribute time to help maintain them as well. Also, we have an equine search and rescue group that could us the area for training.

    Please consider opening Buffalo Lake up to horsemen and women. We will do our best to keep it a West Texas Treasure.

    Thank you for your time,

13. Hi there Joseph. I recently got an email from a "horsey" group I belong to regarding a public comment opportunity about the upcoming environmental assessment. Of course, the email was promoting the interests of those who want to be allowed to trail ride at the refuge. I am an avid rider, but my opinion is that the NWR System is meant for wildlife management and conservation, first and foremost. I love trail riding, and have enjoyed doing so at both PDCSP and at Plum Creek. However, if opening of the refuge is not in the best interest of management for the native animals and plants, then I urge you to keep the area closed to equestrian use.

14. I would love to see Buffalo Lake open to horses and trail riding. Thank you.

15. I am a resident of Canyon, TX. I have been to the Buffalo Lake Wildlife Refuge one time with my adult children. We were the only vehicle in the park. It was winter time. We did not see geese, but we did see a bald eagle. I understand the concern of maintaining the prairie grasses and wildlife. I also think you need community support to do that. I am an equestrian and I think it would be a lovely place to ride. Riders are generally conscientious and careful about picking up after themselves and caring for the environment. I think allowing equestrians on designated horse trails within the park could greatly boost the use of the park and the concern for maintaining this piece of land so near Canyon and Amarillo as a refuge. As it is, the park does not seem to have many visitors or much community interest. Wouldn't it be wonderful to see the wildlife enjoyed and the park utilized to its fullest? Equestrian trails would bring people and interest to the refuge.
    Thank you for your consideration of this idea.

16. I am a member of the Randall County Sheriff's Posse, we have a mounted search and rescue team. Buffalo Lake would be a great place for us to train. Please consider re-opening it to horseback riding. Thank you.

17. Carriage tours would be much better for conservation then Auto tours. Horses do much less damage then cars, and fertilize the soil as the go.

18. My spouse and I would like to see Buffalo Lake opened up to trail riding. It was often used that way in the late 80's and early 90's. We have ridden many miles there and love the facility. Please consider allowing horse use again.

19. I am not sure what you need but if it is just to hear from a # of people I would like to say Yes I would like to ride my horse at Buffalo Lake in Umbarger.

20. I recently moved to Canyon from Las Cruces , NM and I can say I miss the riding along the bar ditches and at the river. Besides the canyons here (which are wonderful places to ride) there are no other public trail riding parks that are close to Canyon/Amarillo. I would love to see Bufflao Lake reopened to Horse riders.

21. I am writing to urge that horseback riding be included in the permitted activities at Buffalo Lake Wildlife Refuge in Randall County, TX. (I mean where people bring their own horses, not a rental concession.). My experiences with trail riding in Palo Duro Canyon State Park and privately owned Pole Canyon Ranch enable me to say with confidence that horse owners are almost always respectful of others and take care of the land. We take care not to disturb wildlife because we appreciate the beauty of birds, animals and the land around us. That's why a lot of us trail ride. Much land where we used to ride (Canadian River, Lighthouse Trail) has been taken over by off-road trucks, motorcycles, bicycles etc. which are noisy, fast, destructive of the land and frightening to wildlife. Having riding access to designated areas of Buffalo Lake would be compatible with its purpose as a wildlife preserve.
Thank you for your consideration.

22. I am voicing my desire to ride my horse at Buffalo Lake. I know presently there are no Equine allowed but home this policy changes in the near future!

23. Mr. Lujan, Thank you for giving me the opportunity to make a comment about the use of Buffalo Lake National Wildlife Refuge. Please consider allowing people to ride the refuge trails on horseback again. I notice on the information page there are auto tours on the refuge! http://www.fws.gov/refuges/profiles/recEdMore.cfm?ID=21570 (click on Wildlife Observation and Photography). The exhaust and oil from the autos cannot be good for the plants, animals, or birds on the refuge.

    Don't you think it would be more natural or nature friendly to have horses on the tour trails?

    More people would be able to enjoy the beauty and nature of Buffalo Lake, if only we could ride our horses.

    Many of us do not have the stamina to hike anymore, but we can still RIDE!

Please feel free to contact me, if I can help in some way to get horseback riding back at the Buffalo Lake National Wildlife Refuge.

24. I would love to see this area opened up the equestrian group. We need more places to ride and view the wildlife and scenery in our area. I have heard it is a nice place but has been blocked from equestrians for many years. The horse club I belong to works directly with the Lake Meredith park service to preserve trails in their park area. The park has provided equipment for horse corrals and my club along with the boy scouts have made the holding pens. We love to help preserve our park and recreation areas. It would be wonderful to have another area open for recreation.
Thank you for your time.

25. Hello Mr. Luján would like to see the Buffalo Lake opened up to the Equine. I know that I'm just one of many equine riders in the area that would love to have the great opportunity to ride at this lake. Please consider opening the lake to the equine riders. Thank you.

26. Dear Joseph, Just dropping you a line to let you know that I would Love to have Buffalo Lake open to Equestrians again. I remember riding there as a young girl with my uncles. My mother was born in Umbarger and I have lived in Canyon all of my life. Yes, I remember being in my Dads boat on the Lake! The people I ride with are very conscientious with trails, trash and wildlife. We ride at Plum Creek, Palo Duro, Caprock Canyons and Pole Canyon Ranch and never leave behind problems. It would be wonderful to have another close site to traverse and enjoy that would also bring monies to the Lake (with fees). Please consider letting equestrians back to the site, it would be much appreciated! Thank you in advance and warmest regards,

27. I wanted to take a moment to express my opinion on allowing horseback riding at Buffalo Lake in the future. Being a horseman I know the awe inspiring impact of seeing nature from the back of a horse, up close and personal as they say.

    I also know the level of responsibility required to protect the land and the wildlife of a place so special as Buffalo Lake. I'd like to offer that one of the most reliable participants in land management these days can be the local horsemen.

    Many members of the Crown of Texas Arabian Horse Club are trail riders and besides wanting to have access to ride the Buffalo Lake area many of us are committed to doing our part to help maintain the trails and help protect the beauty as well as enjoy it.

    I'd very much like to recommend your considering a partnership between local horsemen and Buffalo Lake administrators. We both want the same thing, for Buffalo Lake to be pristine and preserved for generations to come.

    At your convenience I'm sure a pleasant meeting between you and some of the people keen on seeing a removal of the present ban on horses to discuss the possibilities could be

arranged. Please feel free to contact me if you'd be willing to discuss the ways we might work together.

Thank you for your service, and in advance for your time.

28. Dear Mr. Lujan,

I am an avid horseback rider, and for many years was able to ride at Buffalo Lake. Then that privilege was taken away from us.

I wish to emphatically request that horseback riding be reinstated at the Refuge. We have ridden at refuges in Texas and Okalahoma, and there is no conflict between the refuges and horses. In fact, riders are welcomed at these places.

I don't believe that horses leave as heavy an imprint on the land or the wildlife as automobiles that are currently allowed to tour the area. Horses are quiet, naturally accepted by the wildlife, and offer riders the opportunity to view wildlife in a way that does not condition them to the presence of humans.

Please consider that horseback riders are concerned about the environment, and the shrinking areas that we can ride. Any riders will gladly abide by regulations set forth, so long as they are clear. I'm talking about "pack it in, pack it out", and so forth. When I look at places like LBJ grasslands, (from which we just returned), hunters, MANY riders, and hikers all were using the land in a compatible way. I believe that our organization, the Panhandle Trail Riders Association, can work with the FWS to accomplish the same thing at Buffalo Lake.

29. It would be very nice to allow Equistrian use once again.
I have heard it might be possible to reinstall horse back riding to Buffalo Lakes. I have a small group at my barn that have started a trail riding club and would be very interested in having the opportunity to ride someplace this close to home. We would be willing to pay for that privilege. Thanks.

30. I would love to see horseback trail riding resume at Buffalo Lake.

31. This is a wonderful place for us to enjoy year around! The refuge should be opened for trail riders on horseback! It is unlikely that the land would ever be abused. Please consider this request! Sincerely yours.

32. Dear Mr. Lujan, I am an avid outdoorsman and enjoy being with nature any way that I can. The Buffalo Lake Wildlife Refuge near Canyon, Texas holds a unique set of natural elements few people get to experience, especially those back country areas far from the main road. This 7600 acre slice of the Texas Panhandle is right here in our own backyard and needs to be explored by anyone who cares enough to see it in it's raw, natural state.

I am writing you this for you to consider opening the Buffalo Lake Wildlife Refuge up to horse and rider use. For those of us who are mobility impaired, seeing the back wooded

areas and splendid wildlife of this great land would be a chance of a lifetime and a memory to keep.

Please consider allowing horses for trailriding into the refuge so that more people can experience what God has put on this Earth.

33. I am writing to you to voice my opinion that horseback riding should be allowed again at Buffalo Lake Wildlife Refuge. I am a member of the Panhandle Trailriders Assoc and also the Randall County Sheriffs Posse Search and Rescue Team. If you would not consider an open availability, a limited availability to groups would be better than none at all.

34. I would like to be able to ride my horse at Buffalo Lake. In my experience of 50 years of riding, horseback riding is a low-impact sport, and in the case of a large gathering, organizers can agree to clean up. There are so few places for public riding in the panhandle region. Thank you for your consideration.

35. I would be very interested in seeing trail riding made available again at Buffalo Lake. I would love to be able to ride trails other than Palo Duro without having to haul so far. We have hauled to Caprock Canyons but the footing on the trailways portion is less than ideal for equine use. It would be wonderful to have another venue close to home.

36. I'm an avid endurance rider and a member of the Crown of Texas Arabian Horse Club. Just wanted to register my plea for you to open Buffalo Lake for horseback riding.

    Endurance riding requires long hours and miles of conditioning to keep the horses fit for the 50, 75, and 100 mile competitions. If you don't have access to private ranches it can be tough around here to find trails that provide those kind of miles. Palo Duro has a limited number of its trails open to equestrians, and Plum Creek is quite a drive north. Multiple times I've driven through Buffalo Lake Refuge and yearned to ride it. Such a beautiful place.

    Please consider opening the area to equestrian use. I believe it would increase visitation and use. I'm sure my club will provide volunteers for trail maintenance. We work with the Park Service to build and maintain trails at Plum Creek in Lake Meredith Recreation Area as well as sponsoring the Llano Estacado Challenge endurance ride there annually.

    Thank you for your consideration and time. I'll be looking forward to a positive outcome.

Response: Horseback riding was never officially delegated as an acceptable public use on Buffalo Lake NWR. However, in the early 1980's a local horseback riding club was allowed to have a charity ride on the refuge. This activity grew in popularity and propagated sporadic horseback riding on the refuge throughout the year.

Lands within the Refuge System are closed to all public uses unless specifically and legally opened. The Improvement Act states, "... the Secretary shall not initiate or permit a new use of a Refuge or expand, renew, or extend an existing use of a Refuge, unless the Secretary has

determined that the use is a compatible use and that the use is not inconsistent with public safety."

In accordance with the Refuge Improvement Act of 1997, the Service has adopted a Compatibility Policy (603 FW 2 of the Service Manual) that includes guidelines for determining if a use proposed on a national wildlife refuge is compatible with the purposes for which the refuge was established. A compatible use is defined in the policy as a proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the Refuge System mission or the purposes of the refuge. Sound professional judgment is defined as a finding, determination, or decision that is consistent with the principles of sound fish and wildlife management and administration, available science and resources (funding, personnel, facilities, and other infrastructure), and applicable laws.

In 1994 the Refuge Manger initiated a Compatibility Determination as well as an Environmental Assessment (EA) to analyze the impacts of horseback riding on refuge resources and to determine if the use was compatible with the purpose of establishment of the refuge.

The CD concluded that horseback riding was not compatible for the following reasons:

- Negative impacts to refuge vegetation occur as a result of trampling and feeding activities
- Impacts from trucks and trailers and well as loading and unloading horses
- Disturbance, harassment and displacement of wildlife by horseback riding
- Disruption to resting, feeding and reproductive activities of migratory birds
- Refuge resources are impacted as funds, and staff time are redistributed from habitat management and restoration activities to implement, monitor and maintain horseback riding activities

Furthermore, due to limited funding, personnel, and the lack of equestrian infrastructure, it was concluded that horseback riding cannot be conducted safely on the refuge.

Today, horseback riding is allowed on large areas in the vicinity of the refuge including Palo Duro State Park, Lake Meredith National Public Use Area near Fritch and the Bureau of Land Management is opening a very large area near Amarillo.

37. I'm in favor of option C (Optimal Management Plan).

Response: Thank you for your support of Alternative C but the Service has selected Alternative B as the preferred alternative. Alternative B was selected over the other Alternatives because it best meets the Refuge's vision for the future, the purpose for which it was established, and the habitat, wildlife, and visitor service goals identified in the CCP (Please see Finding of No Significant Impact at the end of the EA in Appendix C of the CCP).