

Glossary

adaptive management—The rigorous application of management, research, and monitoring to gain information and experience necessary to assess and modify management activities; a process that uses feedback from research, monitoring, and evaluation of management actions to support or modify objectives and strategies at all planning levels; a process in which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in management plan. Analysis of results helps managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

alternative—A reasonable way to solve an identified problem or satisfy the stated need (40 CFR 1500.2); one of several different means of accomplishing refuge purposes and goals and contributing to the Refuge System mission (Draft Service Manual 602 FW 1.5).

amphibian—A class of cold-blooded vertebrates including frogs, toads or salamanders.

baseline—A set of critical observations, data, or information used for comparison or a control.

biological control—The use of organisms or viruses to control invasive plants or other pests.

biological diversity, also **biodiversity**—The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (Service Manual 052 FW 1.12B). The National Wildlife Refuge System's focus is on indigenous species, biotic communities, and ecological processes.

biomass—The total amount of living material, plants and animals, above and below the ground in a particular habitat or area.

biotic—Pertaining to life or living organisms; caused, produced by, or comprising living organisms.

Birds of Conservation Concern—The Birds of Conservation Concern is the most recent effort to satisfy the 1988 amendment to the Fish and Wildlife Conservation Act, which mandates the Service to “identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely

to become candidates for listing under the Endangered Species Act of 1973” (Service 2002).

boat closure—Closed to all flotation devices.

canopy—A layer of foliage, generally the uppermost layer, in a vegetative stand; midlevel or understory vegetation in multilayered stands. Canopy closure (also canopy cover) is an estimate of the amount of overhead vegetative cover.

CCP—See comprehensive conservation plan.

CFR—See Code of Federal Regulations.

Code of Federal Regulations (CFR)—The codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government. Each volume of the CFR is updated once each calendar year.

compatible use—A wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the director of the U.S. Fish and Wildlife Service, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge (Draft Service Manual 603 FW 3.6). A compatibility determination supports the selection of compatible uses and identified stipulations or limits necessary to ensure compatibility.

comprehensive conservation plan (CCP)—A document that describes the desired future conditions of the refuge and provides long-range guidance and management direction for the refuge manager to accomplish the purposes of the refuge, contribute to the mission of the Refuge System, and to meet other relevant mandates (Draft Service Manual 602 FW 1.5).

concern—See issue.

cool-season grasses—Grasses that begin growth earlier in the season and often become dormant in the summer. These grasses will germinate at lower temperatures. Examples of cool-season grasses at the refuge are western wheatgrass, needle and thread, and green needlegrass.

cover, also **cover type**, **canopy cover**—Present vegetation of an area.

cultural resources—The remains of sites, structures, or objects used by people in the past.

cultural resource inventory—A professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined geographic area. Inventories may involve various levels including background literature search, comprehensive field examination to identify all exposed physical manifestations of cultural resources, or sample inventory to project site distribution and density over a larger area. Evaluation of identified cultural resources to determine eligibility for the National Register follows the criteria found in 36 CFR 60.4 (Service Manual 614 FW 1.7).

cultural resource overview—A comprehensive document prepared for a field office that discusses, among other things, its prehistory and cultural history, the nature and extent of known cultural resources, previous research, management objectives, resource management conflicts or issues, and a general statement on how program objectives should be met and conflicts resolved. An overview should reference or incorporate information from a field office background or literature search described in Section VIII of the Cultural Resource Management Handbook (Service Manual 614 FW 1.7).

dense nesting cover (DNC)—is a mixture of cool-season grasses and legumes, like alfalfa and yellow sweetclover. Some wildlife species, like pheasant, use it for nesting, rearing their broods, roosting and loafing. DNC is high quality nesting cover designed to maximize nesting activity and reproductive success. Many Conservation Reserve Program lands are established with a DNC mixture.

depredation—Destruction or consumption of eggs, broods, or individual wildlife due to a predatory animal; damage inflicted on agricultural crops or ornamental plants by wildlife.

DNC—See dense nesting cover.

drawdown—The act of manipulating water levels in an impoundment to allow for the natural drying-out cycle of a wetland.

EA—See environmental assessment.

ecological diversity—The variety of life and its processes including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (Service Manual 052 FW 1.12B).

ecosystem—A dynamic and interrelating complex of plant and animal communities and their associated nonliving environment (climate, water, rocks, nonliving components); a biological community, together with its environment, functioning as a unit. For administrative

purposes, the Service has designated 53 ecosystems covering the United States and its possessions. These ecosystems generally correspond with watershed boundaries and their sizes and ecological complexity vary.

emergent—A plant rooted in shallow water and having most of the vegetative growth above water such as cattail and hardstem bulrush.

endangered species, federal—A plant or animal species listed under the Endangered Species Act of 1973, as amended, that is in danger of extinction throughout all or a significant portion of its range.

endangered species, state—A plant or animal species in danger of becoming extinct or extirpated in a particular state within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.

environmental assessment (EA)—A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action and alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

EPA—Environmental Protection Agency.

fauna—All the vertebrate and invertebrate animals of an area.

federal trust resources—a resource managed by one entity for another who holds the ownership. The Service holds in trust many natural resources for the people of the United States of America as a result of federal acts and treaties. Examples are species listed under the Endangered Species Act, migratory birds protected by international treaties, anadromous fish once they enter inland U.S. waterways, and native plant and wildlife species found on a national wildlife refuge.

federal trust species—all species where the federal government has primary jurisdiction, including federally endangered or threatened species, migratory birds, anadromous fish, and certain marine mammals.

flora—All the plant species of an area.

FONSI—finding of no significant impact.

forb—A broad-leaved, herbaceous plant; a seed-producing annual, biennial, or perennial plant that does not develop persistent woody tissue but dies down at the end of the growing season.

fragmentation—The alteration of a large block of habitat that creates isolated patches of the original habitat that are interspersed with a variety of other habitat types (Koford et al. 1994); the process of reducing the size and connectivity of habitat patches, making movement of individuals or genetic information between parcels difficult or impossible.

FWS—See U.S. Fish and Wildlife Service.

geographic information system (GIS)—A computer system capable of storing and manipulating spatial data; a set of computer hardware and software for analyzing and displaying spatially referenced features (e.g., points, lines and polygons) with nongeographic attributes such as species and age (Koford et al. 1994).

GIBA—Globally Important Bird Area, as designated by the American Bird Conservancy.

GIS—See geographic information system.

goal—Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (Draft Service Manual 620 FW 1.5).

GPS—See global positioning system.

habitat—Suite of existing environmental conditions required by an organism for survival and reproduction; the place where an organism typically lives and grows.

habitat disturbance—Significant alteration of habitat structure or composition; may be natural (e.g., wildland fire) or human-caused events (e.g., timber harvest and disking).

habitat type, also vegetation type, cover type—A land classification system based on the concept of distinct plant associations.

impoundment—A body of water created by collection and confinement within a series of levees or dikes, creating separate management units although not always independent of one another.

integrated pest management (IPM)—Methods of managing undesirable species such as invasive plants; education, prevention, physical or mechanical methods of control, biological control, responsible chemical use, and cultural methods.

invasive plant, also noxious weed—A species that is nonnative to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.

IPM—See integrated pest management.

issue—Any unsettled matter that requires a management decision (e.g., a Service initiative, opportunity, resource management problem, a threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition) (Draft Service Manual 602 FW 1.5).

KDWP—Kansas Department of Wildlife and Parks.

maintenance management system (MMS)—A national database which contains the unfunded maintenance needs of each refuge; projects include those required to maintain existing equipment and buildings, correct safety deficiencies for the implementation of approved plans, and meet goals, objectives, and legal mandates.

management alternative—See alternative.

migration—Regular extensive, seasonal movements of birds between their breeding regions and their wintering regions (Koford et al. 1994); to pass usually periodically from one region or climate to another for feeding or breeding.

migratory birds—Birds which follow a seasonal movement from their breeding grounds to their wintering grounds. Waterfowl, shorebirds, raptors, and songbirds are all migratory birds.

mission—Succinct statement of purpose and/or reason for being.

mitigation—Measure designed to counteract an environmental impact or to make an impact less severe.

mixed-grass prairie—A transition zone between the tall-grass prairie and the short-grass prairie dominated by grasses of medium height that are approximately 2–4 feet tall. Soils are not as rich as the tall-grass prairie and moisture levels are less.

MMS—See maintenance management system.

monitoring—The process of collecting information to track changes of selected parameters over time.

National Wildlife Refuge—A designated area of land, water, or an interest in land or water within the National Wildlife Refuge System, but does not include coordination areas; a complete listing of all units of the Refuge System is in the current “Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service.”

National Wildlife Refuge System (Refuge System)—Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife including species threatened with extinction, all lands,

waters, and interests therein administered by the Secretary as wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas.

National Wildlife Refuge System Improvement Act of 1997—Sets the mission and the administrative policy for all refuges in the National Wildlife Refuge System; defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation); establishes a formal process for determining appropriateness and compatibility; establish the responsibilities of the Secretary of the Interior for managing and protecting the Refuge System; 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 species—A species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

NAWMP—North American Waterfowl Management Plan.

Neotropical migrant—A bird species that breeds north of the United States and Mexican border and winters primarily south of this border.

NEPA—National Environmental Policy Act.

non-wildlife-dependent recreation uses—Use of a refuge that does not depend on the presence of wildlife (e.g., water and jet skiing, personal water craft, camping, swimming, horseback riding, volleyball, basketball, tournament fishing, power and speed boating).

noxious weed, also invasive plant—Any living stage (including seeds and reproductive parts) of a parasitic or other plant of a kind that is of foreign origin (new to or not widely prevalent in the U.S.) and can directly or indirectly injure crops, other useful plants, livestock, poultry, other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or public health. According to the Federal Noxious Weed Act (PL 93-639), a noxious weed (i.e., invasive plant) is one that causes disease or has adverse effects on humans or the human environment and, therefore, is detrimental to the agriculture and commerce of the U.S. and to public health.

NWR—National Wildlife Refuge.

objective—An objective is a concise target statement of what will be achieved, how much will be achieved, when and where it will be achieved, and who is responsible for the work; derived from goals and provide the basis for determining management strategies. Objectives should be attainable and time-specific and should be stated quantitatively to the extent possible. If objectives cannot be stated quantitatively, they may be stated qualitatively (Draft Service Manual 602 FW 1.5).

palustrine—“Palustrine” comes from the Latin word “palus” or marsh. Wetlands within this category include inland marshes and swamps as well as bogs, fens, tundra, and flood plains. Palustrine systems include any inland wetland which lacks flowing water and contains ocean derived salts in concentrations of less than .05 percent.

Partners in Flight (PIF)—A Western Hemisphere program designed to conserve Neotropical migratory birds and officially endorsed by numerous federal and state agencies and nongovernmental organizations; also known as the Neotropical Migratory Bird Conservation Program (Koford et al. 1994).

patch—An area distinct from that around it; an area distinguished from its surroundings by environmental conditions.

perennial—Lasting or active through the year or through many years; a plant species that has a life span of more than 2 years.

pergola—an arbor formed of horizontal trelliswork supported on columns or posts, over which vines or other plants are trained. A colonnade having the form of such an arbor.

PIF—See Partners in Flight.

plant community—An assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site such as soil, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community (e.g., ponderosa pine or bunchgrass).

prescribed fire—The skillful application of fire to natural fuels under conditions such as weather, fuel moisture, and soil moisture that allow confinement of the fire to a predetermined area and produces the intensity of heat and rate of spread to accomplish planned benefits to one or more objectives of habitat management, wildlife management, or hazard reduction.

priority public use—One of six uses authorized by the National Wildlife Refuge System

Improvement Act of 1997 to have priority if found to be compatible with a refuge's purposes. This includes hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

proposed action—The alternative proposed to best achieve the purpose, vision, and goals of a refuge (contributes to the Refuge System mission, addresses the significant issues, and is consistent with principles of sound fish and wildlife management).

public—Individuals, organizations, and groups; officials of federal, state, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in Service issues and those who do or do not realize that Service decisions may affect them.

public involvement—A process that offers affected and interested individuals and organizations an opportunity to become informed about, and to express their opinions on, Service actions and policies. In the process, these views are studied thoroughly and thoughtful consideration of public views is given in shaping decisions for refuge management.

purpose of the refuge—The purpose of a refuge is specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing authorization or expanding a refuge, refuge unit, or refuge subunit (Draft Service Manual 602 FW 1.5).

raptor—A carnivorous bird such as a hawk, a falcon, or a vulture that feeds wholly or chiefly on meat taken by hunting or on carrion (dead carcasses).

refuge operations needs system (RONS)—A national database that contains the unfunded operational needs of each refuge. Projects included are those required to implement approved plans and meet goals, objectives, and legal mandates.

refuge purpose—See purpose of the refuge.

Refuge System—See National Wildlife Refuge System.

refuge use—Any activity on a refuge, except administrative or law enforcement activity, carried out by or under the direction of an authorized Service employee.

resident species—A species inhabiting a given locality throughout the year; nonmigratory species.

restoration—Management emphasis designed to move ecosystems to desired conditions and processes (e.g., healthy upland habitats and aquatic systems).

riparian area or riparian zone—An area or habitat that is transitional from terrestrial to aquatic ecosystems including streams, lakes, wet areas, and adjacent plant communities and their associated soils that have free water at or near the surface; an area whose components are directly or indirectly attributed to the influence of water; or of relating to a river; specifically applied to ecology, “riparian” describes the land immediately adjoining and directly influenced by streams. For example, riparian vegetation includes all plant life growing on the land adjoining a stream and directly influenced by the stream.

RONS—See refuge operations needs system.

SAV—See submerged aquatic vegetation.

scoping—The process of obtaining information from the public for input into the planning process.

seasonal boat closure—Closed to all flotation devices.

sediment—Material deposited by water, wind, and glaciers.

Service—See U.S. Fish and Wildlife Service.

shelterbelts—Single to multiple rows of trees and shrubs planted around cropland or buildings to block or slow down the wind.

shorebird—Any of a suborder (Charadrii) of birds such as a plover or a snipe that frequent the seashore or mud flat areas.

six-shell area—A maximum of six shotgun shells per person per day.

spatial—Relating to, occupying, or having the character of space.

special-use permit—A permit for special authorization from the refuge manager required for any refuge service, facility, privilege, or product of the soil provided at refuge expense and not usually available to the general public through authorizations in Title 50 CFR or other public regulations (Refuge Manual 5 RM 17.6).

species of concern—Those plant and animal species, while not falling under the definition of special-status species, that are of management interest by virtue of being federal trust species such as migratory birds, important game species, or significant keystone species; species that have documented or apparent populations declines,

small or restricted populations, or dependence on restricted or vulnerable habitats.

step-down management plan—A plan that provides the details necessary to implement management strategies identified in the comprehensive conservation plan (Draft Service Manual 602 FW 1.5).

strategy—A specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives (Draft Service Manual 602 FW 1.5).

submerged aquatic vegetation (SAV)—A vascular or nonvascular hydrophyte, either rooted or nonrooted, that lies entirely beneath the water surface, except for flowering parts in some species.

threatened species, federal—Species listed under the Endangered Species Act of 1973, as amended, that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

threatened species, state—A plant or animal species likely to become endangered in a particular state within the near future if factors contributing to population decline or habitat degradation or loss continue.

trust species—See federal trust species.

U.S. Fish and Wildlife Service (Service, USFWS, FWS)—The principal federal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. The Service manages the 93-million-acre National Wildlife Refuge System comprised of more than 530 National Wildlife Refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological service field stations, the agency enforces federal wildlife laws, manages migratory bird populations, restores national significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the federal aid program that distributes millions of dollars in excise taxes on fishing and hunting equipment to state wildlife agencies.

USFWS—See U.S. Fish and Wildlife Service.

U.S. Geological Survey (USGS)—A federal agency whose mission is to provide reliable scientific information to describe and understand the earth; minimize loss of life and property from

natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

USGS—See U.S. Geological Survey.

vision statement—A concise statement of the desired future condition of the planning unit, based primarily on the Refuge System mission, specific refuge purposes, and other relevant mandates (Draft Service Manual 602 FW 1.5).

visual obstruction—Pertaining to the density of a plant community; the height of vegetation that blocks the view of predators and conspecifics to a nest.

visual obstruction reading (VOR)—A method of visually quantifying vegetative structure and composition.

VOR—See visual obstruction reading.

wading birds—Birds having long legs that enable them to wade in shallow water including egrets, great blue herons, black-crowned night-herons, and bitterns.

warm-season grasses—Grasses that begin growth later in the season (early June). These grasses require warmer soil temperatures to germinate and actively grow when temperatures are warmer. Examples of warm-season grasses are Indiangrass, switchgrass, and big bluestem.

waterfowl—A category of birds that includes ducks, geese, and swans.

watershed—The region draining into a river, a river system, or a body of water.

wetland management district (WMD)—a feral administrative unit that is charged with acquiring, overseeing, and managing the waterfowl production areas and easements within a specified group of counties. Most districts are large, covering several counties.

wildlife-dependent recreational use—Use of a refuge that is dependent on the presence of wildlife (e.g., involving hunting, fishing, wildlife observation, wildlife photography, environmental education, or interpretation). The National Wildlife Refuge System Improvement Act of 1997 specifies that these are the six priority general public uses of the Refuge System.

woodland—Open stands of trees with crowns not usually touching, generally forming 25–60 percent cover.

Appendix A—Key Legislation and Policies

This appendix briefly describes the guidance for the National Wildlife Refuge System and other policies and key legislation that guide the management of Kirwin National Wildlife Refuge.

NATIONAL WILDLIFE REFUGE SYSTEM

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

Goals

- To fulfill our statutory duty to achieve refuge purpose(s) and further the System mission.
- Conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered.
- Perpetuate migratory bird, inter-jurisdictional fish, and marine mammal populations.
- Conserve a diversity of fish, wildlife, and plants.
- Conserve and restore, where appropriate, representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems.
- To foster understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high quality, and compatible wildlife-dependent public use. Such use includes hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Guiding Principles

There are four guiding principles for management and general public use of the Refuge System established by Executive Order 12996 (1996):

- **Public Use**—The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

- **Habitat**—Fish and wildlife will not prosper without high quality habitat, and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitat within refuges.
- **Partnerships**—America’s sportsmen and women were the first partners who insisted on protecting valuable wildlife habitat within wildlife refuges. Conservation partnerships with other federal agencies, state agencies, tribes, organizations, industry, and the general public can make significant contributions to the growth and management of the Refuge System.
- **Public Involvement**—The public should be given a full and open opportunity to participate in decisions regarding acquisition and management of our national wildlife refuges.

LEGAL AND POLICY GUIDANCE

Management actions on national wildlife refuges are circumscribed by many mandates including laws and executive orders, the latest of which is the Volunteer and Community Partnership Enhancement Act of 1998. Regulations that affect refuge management the most are listed below.

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)—Prohibits discrimination in public accommodations and services.

Antiquities Act (1906)—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)—Directs the preservation of historic and archaeological data in federal construction projects.

Archaeological Resources Protection Act (1979), as amended—Protects materials of archaeological interest from unauthorized removal or destruction and requires federal managers to develop plans and schedules to locate archaeological resources.

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

Clean Water Act (1977)—Requires consultation with the U.S. Army Corps of Engineers (404 permits) for major wetland modifications.

Endangered Species Act (1973)—Requires all federal agencies to carry out programs for the conservation of endangered and threatened species.

Executive Order 7169 (1935)—Establishes Sand Lake National Wildlife Refuge “... as a refuge and breeding ground for migratory birds and other wild life... to effectuate further the purposes of the Migratory Bird Conservation Act....”

Executive Order 11988 (1977)—Requires federal agencies to provide leadership and take action to reduce the risk of flood loss, minimize the impact of floods on human safety, and preserve the natural and beneficial values served by the floodplains.

Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System (1996)—Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the Refuge System.

Executive Order 13007, Indian Sacred Sites (1996)—Directs federal land management agencies to accommodate access to and ceremonial uses 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.

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 Records Act (1950)—Requires the preservation of evidence of the government’s organization, functions, policies, decisions, operations, and activities, as well as basic historical and other information.

Fish and Wildlife Coordination Act (1958)—Allows the U.S. Fish and Wildlife Service to enter into agreements with private landowners for wildlife management purposes.

Migratory Bird Conservation Act (1929)—Establishes procedures for acquisition by purchase, rental, or gifts of areas approved by the Migratory Bird Conservation Commission.

Migratory Bird Hunting and Conservation Stamp Act (1934)—Authorizes the opening of part of a refuge to waterfowl hunting.

Migratory Bird Treaty Act (1918)—Designates the protection of migratory birds as a federal responsibility; and enables the setting of seasons and other regulations, including the closing of areas, federal or nonfederal, to the hunting of migratory birds.

National Environmental Policy Act (1969)—Requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate this Act with other planning requirements, and prepare appropriate documents to facilitate better environmental decision making. [From the Code of Federal Regulations (CFR), 40 CFR 1500]

National Historic Preservation Act (1966), as amended—Establishes as policy that the federal government is to provide leadership in the preservation of the Nation’s prehistoric and historical resources.

National Wildlife Refuge System Administration Act (1966)—Defines the National Wildlife Refuge System and authorizes the Secretary of the Interior to permit any use of a refuge, provided such use is compatible with the major purposes for which the refuge was established.

National Wildlife Refuge System Improvement Act of 1997—Sets the mission and administrative policy for all refuges in the National Wildlife Refuge System; mandates comprehensive conservation planning for all units of the Refuge System.

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.

Refuge Recreation Act (1962)—Allows the use of refuges for recreation when such uses are compatible with the refuge’s primary purposes and when sufficient funds are available to manage the uses.

Rehabilitation Act (1973)—Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the federal

government to ensure that any person can participate in any program.

Rivers and Harbors Act (1899)—Section 10 of this Act requires the authorization of U.S. Army Corps of Engineers prior to any work in, on, over, or under navigable waters of the United States.

Volunteer and Community Partnership Enhancement Act (1998)—Encourages the use of volunteers to assist in the management of refuges within the Refuge System; facilitates partnerships between the Refuge System and nonfederal entities to promote public awareness of the resources of the Refuge System and public participation in the conservation of the resources; and encourages donations and other contributions.

Appendix B—Compatibility Determinations

REFUGE NAME

Kirwin National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY

Fish and Wildlife Coordination Act

REFUGE PURPOSES

“.. shall be administered by him [Secretary of the 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, ...in behalf of the National Migratory Bird Management Program” 16 U.S.C. § 664 (Fish and Wildlife Coordination Act).

NATIONAL WILDLIFE REFUGE SYSTEM MISSION

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

1. DESCRIPTION OF PROPOSED USE: ARMING, GRAZING, AND HAYING

Continue upland management activities such as farming, grazing, and haying that are conducted under cooperative farming or special-use permit by private individuals. Currently these economic uses are used as tools to manage habitat for wildlife.

Cropland is planted to establish seedbeds free of invasive plants for the establishment of grassland, to provide food for migratory birds, and to control invasive plant species. The farming rotation is based on a diversified crop rotation to control invasive plants and insects, and to provide for soil fertility. The crops that may be used in the rotation include, but are not limited to, corn, milo (grain sorghum), winter wheat, cane (forage sorghum), and spring grains (e.g., barley).

The Service’s policy is to restrict pesticide use on National Wildlife Refuges. All cooperative farming

permits do not allow insecticides and restrict the use of herbicides to those least toxic and persistent in the environment.

Availability of Resources

The needed staff time for development and administration of cooperative farming, haying, and grazing programs is stretched thin to maintain existing programs. If additional staff support were available, these programs could be expanded to use these tools more effectively and additional monitoring could be accomplished.

Additional staff (assistant refuge manager) is identified in the CCP. This position will be needed to fully accomplish the goals of this CCP and improve existing programs.

Anticipated Impacts of the Use

Current management affects approximately 25 percent of the uplands, transition zone (dry reservoir bottom), and riparian zones. Under this CCP, management will place increased emphasis on managing refuge habitats for migratory birds.

Without management, general habitat conditions would gradually deteriorate due to long periods of rest. While some short-term wildlife and habitat disturbance does occur with these activities, the benefits to wildlife outweigh these disturbances.

No cultural resources will be impacted. No impact to endangered species should occur.

Determination

The use of haying, grazing, and farming as habitat management tools is compatible.

Stipulations Necessary to Ensure Compatibility

- Require general and special conditions for each permit to ensure consistency with management objectives.
- Restrict farming permittees to a list of approved chemicals that are less detrimental to wildlife and the environment.
- Restrict farming permittees to a list of crops that are beneficial to migratory birds.

Justification

To maintain and enhance the habitat for migratory birds and other wildlife, some habitat manipulation needs to occur. Prairie grassland habitat conditions would deteriorate without the use of a full range of management tools. Migratory bird nesting and feeding habitat and ecological diversity would decrease as habitat suitability for these species declines. Invasive plant species would increase and habitat diversity would decrease.

Farming provides a useful tool to control invasive plants, restore prairie grasslands, provide open areas, and improve habitat conditions for the nesting and feeding of migratory birds. Farming facilitates wildlife observation, photography, and environmental education by attracting and concentrating wildlife in areas where they are highly visible.

Mandatory 10-year Reevaluation Date: 2016

2. DESCRIPTION OF PROPOSED USE: ENVIRONMENTAL EDUCATION AND INTERPRETATION

Provide opportunities for environmental education and interpretation.

Environmental education consists of activities conducted by refuge staff. Interpretation occurs in less formal activities with refuge staff through exhibits, educational trunks, signs, and brochures.

Currently, environmental education and interpretation activities are conducted at the refuge office. Programs and activities are also conducted at Bluegill Point, and Knob Hill day use areas. Additional programs are conducted at schools and other locations as personnel are available.

The CCP proposes an expansion of the multi-purpose room at the refuge office. This expansion will provide enough room, displays, and educational materials to maximize the public's learning experience while visiting the refuge. The remainder of the refuge will provide excellent opportunities for environmental learning. These uses occur year-round.

This CCP proposes to continue with the above uses and add the following to improve environmental education and interpretation opportunities for all visitors:

- Expand the multi-purpose room of the refuge office.
- Update and improve refuge signs.

- Update existing brochures to the Service graphic standards.
- Expand and enhance environmental education through various initiatives such as educational displays, presentations, and websites that feature purposes, programs, and wildlife of the refuge.

Availability of Resources

Currently all environmental education and interpretation are conducted using available resources. Implementing new programs, activities, and facilities outlined in the CCP is tied to funding requests in the form of RONS and MMS projects (appendices L and M).

Anticipated Impacts of Use

Minimal disturbances to wildlife and wildlife habitat will result from these uses at the current and proposed levels. Adverse impacts are minimized through careful timing and placement of activities. Some disturbance to wildlife will occur in areas frequented by visitors. There will be some minor damage to vegetation, littering, and increased maintenance. Location and time limitations placed on environmental education and interpretation activities will ensure that this activity will have only minor impacts on wildlife and will not detract from the primary purposes of the refuge.

No cultural resources will be impacted. No impact to endangered species should occur. Some short-term disturbance to wildlife will occur during construction.

Determination

Environmental education and interpretation are compatible.

Stipulations Necessary to Ensure Compatibility

- Allow environmental education and interpretation only in designated areas or under the guidance of refuge staff, a volunteer, or a trained teacher to ensure minimal disturbance to wildlife, minimal damage to vegetation, and minimal conflicts between groups.
- Annually review environmental education and interpretation activities to ensure these activities are compatible.

Justification

Based on biological impacts described in the EA and the draft CCP, it is determined that environmental education and interpretation within the Kirwin National Wildlife Refuge will not materially interfere with or detract from the purposes for which this refuge was established.

Environmental education and interpretation are priority public uses listed in the National Wildlife Refuge System Improvement Act of 1997. By facilitation of environmental education, refuge visitors will gain knowledge and an appreciation of fish, wildlife, and their habitats, which will lead to increased public awareness and stewardship of natural resources. Increased appreciation for natural resources will support and complement the Service's actions in achieving the purposes of the refuge and the mission of the National Wildlife Refuge System.

Mandatory 15-year Reevaluation Date: 2021

3. DESCRIPTION OF PROPOSED USE: WILDLIFE OBSERVATION AND WILDLIFE PHOTOGRAPHY

Provide opportunities that support wildlife-dependent recreation.

Wildlife observation and wildlife photography are facilitated by two hiking trails, two pullouts with pergolas (observation platform), and several parking areas (that are also used in support of hunting and fishing).

This CCP proposes to continue the above uses and add the following to improve wildlife observation and wildlife photography:

- Hire an outdoor recreation planner.
- Hire a full-time law enforcement officer to enforce wildlife laws.
- Update and improve refuge signs.
- Update existing brochures to the Service's graphic standards.

Availability of Resources

Currently, the programs for wildlife observation and wildlife photography are administered using available resources. Implementing new programs, activities, and facilities outlined in this CCP is tied to funding requests in the form of RONS and MMS projects (appendices L and M).

Anticipated Impacts of Use

Anticipated impacts from visitors engaged in wildlife observation and wildlife photography include minor damage to vegetation, littering, increased maintenance activity, potential conflicts with other visitors, and minor disturbances to wildlife. These activities will have only minor impacts on wildlife and do not detract from the primary purposes of the refuge. All other potential impacts are considered minor.

Determination

Wildlife observation and wildlife photography are compatible.

Stipulations Necessary to Ensure Compatibility

- Restrict vehicles to designated roads and trails.
- Monitor vehicle use for wildlife disturbance, law enforcement violations, etc.
- Monitor use, regulate access, and maintain necessary facilities to prevent habitat degradation and minimize wildlife disturbance.

Justification

Based on the anticipated biological impacts above and in the EA, it is determined that wildlife observation and wildlife photography on the Kirwin National Wildlife Refuge will not interfere with the habitat goals and objectives or purposes for which it was established.

Wildlife observation and wildlife photography are priority public uses listed in the National Wildlife Refuge System Improvement Act of 1997. By facilitating these uses, visitors will gain knowledge and an appreciation of fish and wildlife, which will lead to increased public stewardship of wildlife and their habitats. Increased public stewardship will support and complement the Service's actions in achieving the purposes of the refuge and the mission of the National Wildlife Refuge System.

Mandatory 15-year Reevaluation Date: 2021

4. DESCRIPTION OF USE: RECREATIONAL FISHING

Continue to provide for recreational fishing in accordance with state regulations.

The primary game fish are walleye, black bass, white bass, wipers, crappie, and channel catfish. Foot travel is allowed in all parts of the refuge. There are three boat ramps that are available at varying water elevations. Anglers park within the road right-of-way or designated parking areas where available.

Fishing visitations and success fluctuate according to water conditions in the Kirwin Reservoir, Bow Creek, and the North Fork Solomon River. The river and creek have marginal fisheries due to their seasonal flows. During the prairie's wet cycles, high water in the reservoir promotes fish spawning and vegetation provides cover. Fish populations can flourish until the reservoir returns to normal (low) water levels.

Availability of Resources

The current fishing program is administered using available resources. Implementing new programs, activities, and facilities outlined in this CCP is tied to funding requests in the form of RONS and MMS projects (appendices L and M).

Anticipated Impacts of Use

Fishing and other human activities cause disturbance to wildlife.

Determination

Recreational fishing is compatible.

Stipulations Necessary to Ensure Compatibility

- See “Boating in support of the six priority public uses” CD for additional requirements.
- Require that fishing follow state regulations.
- Monitor vehicle use for wildlife disturbance, law enforcement violations, etc.
- Do not permit unattended boats to remain on the refuge overnight.

Justification

Based on the biological impacts addressed above and in the EA, it is determined recreational fishing will not materially interfere with the habitat goals and objectives or purposes for refuge establishment.

Fishing is a priority public use as listed in the National Wildlife Refuge System Improvement Act of 1997.

Mandatory 15-year Reevaluation Date: 2021

5. DESCRIPTION OF USE: RECREATIONAL HUNTING

Continue recreational hunting of deer, waterfowl, upland game birds, cottontail rabbits, and fox squirrels.

Kirwin National Wildlife Refuge allows hunting in four distinct areas.

- The western portion is only open to archery deer hunting.
- The Bow Creek area is open to waterfowl, doves, pheasants, quail, turkey, prairie chickens, snipe, coots, cottontail rabbits, fox squirrels, and archery deer hunting.
- The area between Quillback Cove and Prairie Dog Town is open to the same species as Bow Creek, except no more than six shells are allowed per hunter per day.
- The areas from Crappie Point to the dam, and the area around Knob Hill is open to the same species

as Bow Creek, except that waterfowl hunting is not allowed.

- Hunting pressure for upland game centers around opening weekends of pheasant and quail. Hunting pressure for waterfowl increases as waterfowl numbers increase. This varies annually depending on the weather.

Availability of Resources

The current administration of hunting programs is conducted using available resources. Implementing new programs, activities, and facilities outlined in the CCP is tied to funding requests in the form of RONS and MMS projects (appendices L and M).

Anticipated Impacts of Use

Hunting and other human activities cause disturbance to wildlife. Hunting has shown no detrimental environmental impacts to habitats or wildlife. Hunting harvests a small percentage of the populations of waterfowl and upland game species, which is in accordance with wildlife objectives and principles.

Restricting vehicle use to designated purposes, times, and established roads, trails, and parking lots protects habitats from damage and minimizes disturbance to wildlife.

Determination

Recreational hunting is compatible.

Stipulations Necessary to Ensure Compatibility

- Only nontoxic shot is permitted on the refuge when hunting with a shotgun (waterfowl, upland game, turkey).
- Hunting must be in accordance with federal, state, and refuge specific regulations.
- Vehicle travel is limited to designated roads, trails and parking areas.
- Promote sound hunting practices for hunter safety and quality experiences.

Justification

Hunting on national wildlife refuges has been identified as a priority public use in the National Wildlife Refuge System Improvement Act of 1997. Hunting is a legitimate wildlife management tool that can be used to manage populations.

Based on the biological impacts anticipated above and in the EA, it is determined that recreational hunting at Kirwin National Wildlife Refuge will not materially interfere with or detract from the purposes for which this refuge was established or its habitat goals and objectives.

Mandatory 15-year Reevaluation Date: 2021**6. DESCRIPTION OF USE: BOATING IN SUPPORT OF THE SIX PRIORITY PUBLIC USES**

Allow motorized and nonmotorized boating in support of hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

Availability of Resources

The current administration of the boating program is conducted using available resources.

Implementing new programs, activities, and facilities outlined in the CCP is tied to funding requests in the form of RONS and MMS projects (appendices L and M).

Anticipated Impacts of the Use

Hunting and other human activities cause disturbance to wildlife. Disturbance to migrating and wintering waterfowl will be reduced by implementing a seasonal boat closure on most of the reservoir during low water conditions.

Determination

Boating in support of the six public uses (hunting, fishing, wildlife observation, wildlife photography, environmental education, interpretation) is compatible.

Stipulations Necessary to Ensure Compatibility

- At water levels <1,722 ft., implement a seasonal (October 1 to April 1) boat closure on the majority of the reservoir.
- Move the boat closure buoys from Railroad Flats to Grays Park and leave them there at all water levels. (This is made possible by implementing the seasonal boat closure.)
- Continue to allow motorless boats and float tubes in the area that is closed to boating (in the Solomon Arm) from August 1 to September 30.
- Continue to allow float tubes in areas open to boating.
- Continue the No Wake Zone in Bow Creek.
- Continue the No Wake Zone within 300 feet of all shorelines and islands.
- Boats must be equipped and operated in accordance with Kansas Boat and Water Safety Laws and appropriate federal regulations.

Justification

Based on biological impacts described in the EA and the draft CCP, it is determined that boating in

support of the six priority public uses within the Kirwin National Wildlife Refuge will not materially interfere with or detract from the purpose for which the refuge was established.

Boating is not a priority public use. However, it does facilitate the six priority public uses. By specifying areas, time of year, no wake zones, and implementing a seasonal boat closure, boating is determined to be compatible.

Mandatory 10-year Reevaluation Date: 2016**7. DESCRIPTION OF USE: FIREWOOD CUTTING**

Allow firewood cutting in designated areas to facilitate refuge management. The main reason for allowing the cutting of firewood is to remove woody vegetation from areas where replanting and/or restoring native prairie is occurring. Other reasons include reducing fuel loading, and preventing destruction/killing of desirable live native trees in portions of riparian area.

Availability of Resources

Resources are currently available to oversee the cutting of firewood. The workload of the staff involves issuing permits and checking permits in the field.

Anticipated Impacts of the Use

Anticipated adverse impacts to the refuge are minimal. Temporary displacement of wildlife from the area where cutting occurs is expected. However, the benefits to migratory grassland birds exceeds the temporary disturbance (i.e., removing trees from grasslands reduces avian predators, nest parasites, and mammalian predators on grassland birds).

Determination

Firewood cutting is compatible.

Stipulations Necessary to Ensure Compatibility

- Firewood cutting may be allowed by special use permits issued by the refuge manager.
- Firewood cutting will only be allowed in areas specified by the refuge manager.

Justification

The refuge is currently in the process of removing trees for several reasons, including prairie enhancement and restoration, eliminating invasive terrestrial plants, and gaining physical access to allow for noxious weed control. Using contractors to remove trees costs approximately \$200 per acre, depending on how dense the trees are. Typically

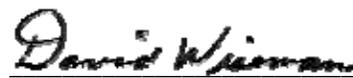
trees are piled and burned. Burning of the piles can sterilize the soil for a period of time.

Most of the trees are located in areas that were historically migratory grassland bird habitat. The CCP identifies a block of 5,000 acres of prairie will be restored/enhanced. In order to accomplish this goal, the removal of trees is necessary.

Mandatory 10-year Reevaluation Date: 2016

SIGNATURE

 11-20-06
Date
Craig Mowry
Refuge Manager
Kirwin National Wildlife Refuge, KS

 11/24/06
Date
Dave Wiseman
Refuge Supervisor (CO, KS, NE)
U.S. Fish and Wildlife Service, Region 6, CO

CONCURRENCE

 11/27/06
Date
Richard A. Coleman, Ph.D.
Assistant Regional Director
National Wildlife Refuge System
U.S. Fish and Wildlife Service, Region 6, CO

Appendix C—Memorandum of Agreement

MEMORANDUM OF AGREEMENT BETWEEN THE
BUREAU OF RECLAMATION AND FISH AND WILDLIFE SERVICE
CONCERNING THE OPERATION AND MAINTENANCE OF THE
KIRWIN DAM AND RESERVOIR

This Memorandum of Agreement made and entered into this 21st day of October, 1985, by and between the Bureau of Reclamation, hereinafter referred to as the Bureau, represented by the Regional Director, Lower Missouri Region, and the Fish and Wildlife Service, hereinafter referred to as the Service, represented by the Regional Director, Region 6, pursuant to the authorities included in the Reclamation Act of 1902, 43 U.S.C., sec. 371 et. seq., chapter 12, (1982) and the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668 et (a)) as amended in 1976 by Public Law 94-233.

WHEREAS, the Bureau has acquired certain lands in Phillips County, Kansas, and constructed a dam for the operation of Kirwin Dam and Reservoir, Kirwin Unit, Solomon Division, Missouri River Basin Project, and

WHEREAS, pursuant to the Act of August 14, 1946 (60 Stat. 1080), there has been formulated a GENERAL PLAN dated June 17, 1954, for the use of the lands of the Kirwin Dam and Reservoir, Kirwin Unit, Solomon Division, Missouri River Basin Project, as a wildlife refuge to be managed by the Service, and the same has been approved by the Secretary of the Interior and the Director of the Kansas Fish and Game Commission:

WHEREAS, pursuant to Public Law 94-233 all areas administered by the Service as wildlife refuges are designated as part of the National Wildlife System:

NOW THEREFORE, it is mutually agreed in consideration of the covenants and releases hereinafter contained that:

1. The Bureau will have administrative jurisdiction of those lands designated as operation areas on exhibit "A" attached and made a part of this document for the operation and maintenance of Kirwin Dam and Reservoir, Kirwin Unit, Solomon Division, Missouri River Basin Program.

2. The Service will have administrative jurisdiction over those lands designated as wildlife refuge lands and waters on exhibit "A" and the use of said land and water areas by the service shall not interfere with the primary purpose of the project and operation and maintenance of said project by the Bureau.

3. All activities in the refuge area designated in number 2 above must comply with 50 CFR subchapter C.

4. Both parties agree to cooperate in the presuppression and suppression of all wildfires.

5. All rights-of-way applications for roads, telephone lines, power lines, and other similar uses, over, across, in, or upon the lands within the designated operations area will be granted by the Bureau, and all instruments granting an interest in the designated refuge lands within the maximum water elevation will be submitted to the Bureau for concurrence and must comply with 50 CFR 29.21.

6. The Bureau reserves the right to vary the water surface of Kirwin Reservoir above as well as below elevation 1729.25 feet as it deems necessary for operations and for maintenance of reservoir works. This reserved right will be recognized on all permits, leases, agreements, and contracts issued by the Service for use of lands and waters designated as part of the refuge.

7. All permits or leases for the exploration or removal and use of oil, gas, coal, and other minerals or geothermal resources on land under the Service's jurisdiction must comply with 50 CFR part 29, subpart c and shall have the Bureau's concurrence prior to the execution of a lease or permit. To ensure the safety of project structures and facilities the Bureau will prohibit oil, gas, and other mineral exploration within 1,000 feet of the dam axis and abutments.

8. The Service and the Bureau shall include provisions in all leases, licenses, permits, or contracts or any other authorizations for use of the reservoir area, requiring the lessee, licensee, permittee, or contractor to hold harmless and to indemnify the United States, its officers and agents, as to any liability for injury or damage to persons or property arising out of the acts or omissions, negligent or otherwise, of the lessee, licensee, permittee, or contractor.

9. This agreement shall become effective upon its approval by the Secretary and shall remain in force until terminated by mutual consent.

10. No member of or delegate to the Congress or resident commissioner shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom, but this restriction shall not be construed to extend to this agreement if made with a corporation or company for its general benefit.

IN WITNESS WHEREOF, the parties hereto have executed this Memorandum of Understanding as of the day and year first above written.

FISH AND WILDLIFE SERVICE

By *Robert B. ...*
Regional Director
Region 6

BUREAU OF RECLAMATION

By *S. M. ...*
Assistant Regional Director
Lower Missouri Region

Appendix D—Landscape-level Goals and Objectives

This appendix summarizes landscape-level plans that are relevant to management of Kirwin National Wildlife Refuge.

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

Signed in 1986, the North American Waterfowl Management Plan (NAWMP) is broad policy framework that describes the overall scope of requirements for management of waterfowl in the United States, Canada, and Mexico.

The NAWMP also serves as a guide for the participation of various private organizations and the public in the conservation and management of waterfowl. The goal of the NAWMP is to restore waterfowl populations to the levels recorded during the 1970s, a benchmark decade for waterfowl. The NAWMP is designed to reach its objectives through key joint venture areas, species joint ventures, and state implementation plans within these joint ventures.

The “North American Waterfowl Management Plan, 1998 Update, Expanding the Vision” reflects on the legacy established by the NAWMP and presents three visions to advance waterfowl conservation in the future:

- Plan partners enhance the capability of landscapes to support waterfowl and other wetland-associated species by ensuring that plan implementation is guided by biologically based planning, which in turn is refined through ongoing evaluation.
- Plan partners define the landscape conditions needed to sustain waterfowl, benefit other wetland-associated species, and participate in the development of conservation, economic, management, and social policies and programs that most affect the ecological health of these landscapes.
- Plan partners collaborate with other conservation efforts, particularly migratory bird initiatives, and reach out to other sectors and communities to forge broader alliances in a collective search for sustainable uses of landscapes.

PARTNERS IN FLIGHT

Nationally and internationally, several nongame bird initiatives are in the planning stage and implementation is expected to begin in the near future. Partners in Flight (PIF) is developing bird conservation plans, primarily for land birds, in numerous physiographic areas. The plans include priority species lists, associated habitats, and management strategies.

The primary goal of PIF is to provide for the long-term health of the avifauna of this continent.

- The first priority is to prevent the rarest species from going extinct.
- The second priority is to prevent uncommon species from descending into threatened status.
- The third goal is to keep common birds common.

PIF’s general recommendations for the mixed-grass prairie are:

“Although agriculture has taken over much of the mixed-grass, significant areas of native prairie remain, most notably in the glacial coteau of the Dakotas and the sandhills of Nebraska.

These great reservoirs for grassland birds must be retained through easements, protection, and strengthening of ranching economies.

The interests of land birds extensively overlap with those of waterfowl and shorebirds in the wetter portions of this ecosystem.”

U.S. SHOREBIRD CONSERVATION PLAN

The shorebird plan is designed to complement the existing landscape-scale conservation efforts of the North American Waterfowl Management Plan, Partners in Flight, and the North American Colonial Waterbird Conservation Plan. The plan has three major goals at different scales.

At a regional scale, the goal of the plan is to ensure that adequate quantity and quality of habitat is identified and maintained to support the different shorebirds that breed in, winter in, and migrate through each region (Brown et al. 2001).

There are eleven regional working groups formed in this planning process. The Sand Lake National Wildlife Refuge is in the northern plains/prairie-potholes region. Three major shorebird issues have been identified for this region:

- endangered and threatened species, declining species, and species of special concern
- habitat loss, including fragmentation and degradation
- the need for additional information to evaluate potential threats, such as contaminants, depredation, and invasion of exotic plants, to migrating and breeding shorebirds

The regional goals are:

- maintain biotic integrity and persistence of breeding shorebird populations in the northern plains/prairie-potholes region
- ensure that adequate stopover resources exist to support populations of migrating shorebirds
- identify and fill information gaps, including the development of tools to use within the context of dynamic ecosystem processes
- coordinate with other conservation efforts in a cross-border landscape

NORTH AMERICAN WATERBIRD CONSERVATION PLAN

VOLUME 1: SEABIRDS AND COLONIAL WATERBIRDS, REVIEW DRAFT II

The goal of this plan is ensure that the distribution, diversity, and abundance of waterbird populations and habitats (breeding, nonbreeding, and migratory) is sustained or restored throughout North America (Kushlan et al. 2002).

Species and population goal—Have sustainable distributions, diversity and abundance of priority species for conservation and those in decline.

Habitat goal—Secure, maintain, and enhance sufficient high quality habitat throughout the year to achieve and maintain sustainable populations of waterbirds throughout North America.

Area goal—Identify, protect, maintain, and enhance important areas needed to maintain sustainable populations and habitats of waterbirds throughout their ranges in North America.

Education goal—Ensure that information for the conservation of waterbirds is widely available to decision makers, the public, and all those whose actions affect seabird and colonial waterbird populations.

NONGAME MIGRATORY BIRDS CONSERVATION PLAN, REGION 6

This plan outlines the conservation of nongame bird species in Region 6 (Mountain–Prairie Region) of the U.S. Fish and Wildlife Service. Information concerning nongame species in the region is scarce and research is ongoing.

The goal of the nongame migratory bird program is to protect and maintain all native, nongame species at viable population levels and protect their habitats. An important part of this goal is to prevent any avian species from becoming listed as threatened or endangered, or from becoming extirpated from Region 6.

Appendix E—List of Preparers, Consultation, and Coordination

This document is the result of the extensive, collaborative, and enthusiastic efforts by the members of the planning team shown below. Many others contributed insight and support. The Comprehensive Conservation Plan was written by refuge staff and the refuge planner, with input from other team members.

<i>Team Member</i>	<i>Position</i>	<i>Work Unit</i>
William Busby	Associate scientist	Kansas Biological Survey, Lawrence, KS
Mary Ely	GIS specialist	U.S. Fish and Wildlife Service (USFWS), Region 6, Lakewood, CO
Erich Gilbert	<i>Former</i> refuge manager	Kirwin National Wildlife Refuge, Kirwin, KS
Toni Griffin	Refuge planner	USFWS, Region 6, Lakewood, CO
Tony Ifland	Partners for Fish and Wildlife biologist	Kirwin National Wildlife Refuge, Kirwin, KS
Steve Knowles	Maintenance worker	Kirwin National Wildlife Refuge, Kirwin, KS
Jill Manring	Natural resource specialist	U.S. Bureau of Reclamation, Grand Island, NE
Craig Mowry	Refuge manager	Kirwin National Wildlife Refuge, Kirwin, KS
Steve Price	Fisheries and wildlife supervisor	Kansas Department of Wildlife and Parks, Hays, KS
Ron Shupe	<i>Former</i> refuge supervisor	USFWS, Region 6, Lakewood, CO
Dianne Stockman	Administrative assistant	Kirwin National Wildlife Refuge, Kirwin, KS
Bruce Taggart	Public lands supervisor	Kansas Department of Wildlife and Parks, Hays, KS
Dave Wiseman	Refuge supervisor	USFWS, Region 6, Lakewood, CO

Valuable support to the planning team was provided by the individuals listed on the next page. The diversity, talents, and knowledge contributed by these individuals dramatically improved the vision and completeness of this document.

<i>Name</i>	<i>Position</i>	<i>Work Unit</i>
Rick Coleman	Assistant regional director	USFWS, Lakewood, CO
Galen Green	Fire ecologist	USFWS, Lakewood, CO
Linda Kelly	Branch chief of comprehensive conservation planning	USFWS, Lakewood, CO
Wayne King	Regional biologist	USFWS, Lakewood, CO
Murray Laubhan	Biologist	USGS Northern Prairie Wildlife Research Center, Jamestown, ND
Rachel Laubhan	Wildlife biologist	USFWS, Region 6
Rhoda Lewis	<i>Former</i> regional archaeologist	USFWS, Lakewood, CO
Mimi Mather	Planner	Shapins Associates, Boulder, CO
Jana Mohrman	Hydrologist	USFWS, Lakewood, CO
Ann Moss	Planner	Shapins Associates, Boulder, CO
Dan Mulhern	Biologist	USFWS, Manhattan, KS
Deb Parker	Writer-editor	USFWS, Lakewood, CO
Derek Reed	Contracting officer	USFWS, Lakewood, CO
Michael Spratt	Chief of refuge planning	USFWS, Lakewood, CO
Melvie Uhland	Outdoor recreation planner	USFWS, Lakewood, CO

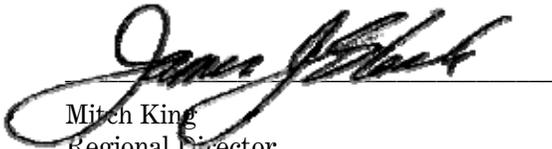
Appendix F—Environmental Compliance

Environmental Action Statement

U.S. Fish and Wildlife Service, Region 6
Lakewood, Colorado

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record.

I have determined that the action of implementing the *Comprehensive Conservation Plan for Kirwin National Wildlife Refuge* is found not to have significant environmental effects, as determined by the attached Finding of No Significant Impact and the environmental assessment as found with the draft comprehensive conservation plan.



Mitch King
Regional Director
U.S. Fish and Wildlife Service, Region 6
Lakewood, CO

12-1-06

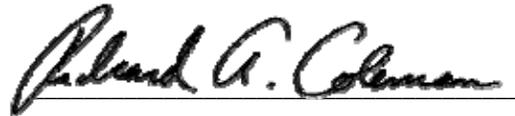
Date



David Wiseman
Refuge Supervisor (CO, KS, NE)
U.S. Fish and Wildlife Service, Region 6
Lakewood, CO

11-24-06

Date



Richard A. Coleman, Ph.D.
Assistant Regional Director
National Wildlife Refuge System
U.S. Fish and Wildlife Service, Region 6
Lakewood, CO

11/27/06

Date



Craig E. Mowry
Refuge Manager
Kirwin National Wildlife Refuge
Kirwin, KS

11-20-06

Date

Finding of No Significant Impact

U.S. Fish and Wildlife Service, Region 6
Lakewood, Colorado

Fulfill the Comprehensive Conservation Plan for Kirwin National Wildlife Refuge

Two management alternatives for the Kirwin National Wildlife Refuge were assessed as to their effectiveness in achieving the refuge purposes and their impact on the human environment. Alternative A, the “no-action” alternative, would continue current management of the refuge. Alternative B, to enhance habitat, wildlife and public use, would place management emphasis on grassland-nesting birds and species of conservation concern.

Based on this assessment and comments received, I have selected Alternative B for implementation.

The preferred alternative was selected because it best meets the purposes for which the Kirwin National Wildlife Refuge was established and is preferable to the “no-action” alternative in light of physical, biological, economic, and social factors. The preferred alternative will continue to provide public access for wildlife-dependent recreation, environmental education, and interpretation.

I find that the preferred alternative is not a major federal action that would significantly affect the quality of the human environment within the meaning of Section 102(2)(C) of the National Environmental Policy Act of 1969. Accordingly, the preparation of an environmental impact statement on the proposed action is not required.

The following is a summary of anticipated environmental effects from implementation of the preferred alternative:

- The preferred alternative will not adversely impact endangered or threatened species or their habitat.
- The preferred alternative will not adversely impact archaeological or historical resources.
- The preferred alternative will not adversely impact wetlands nor does the plan call for structures that could be damaged by or that would significantly influence the movement of floodwater.
- The preferred alternative will not have a disproportionately high or adverse human health or environmental effect on minority or low-income populations.
- The state of Kansas has been notified and given the opportunity to review the comprehensive conservation plan and associated environmental assessment.



Mitch King
Regional Director
U.S. Fish and Wildlife Service
Region 6
Lakewood, CO



Date

Appendix G—Public Involvement

Public scoping was initiated for Kirwin National Wildlife Refuge in a “Notice of Intent” dated March 3, 2003, announcing the Service’s intent to prepare a comprehensive conservation plan for the refuge, and opportunities for public input on refuge management.

PUBLIC INVOLVEMENT

A planning update was distributed in May 2003 through mailings to interested parties and at public locations (e.g., libraries, grocery and hardware stores, etc.) announcing dates for public open houses to be held for public input.

A media contact list was compiled and news releases and flyers were distributed the week prior to the public meetings. The refuge announced the intent to prepare a comprehensive conservation plan on their website and provided contact information. Three scoping meetings were held in May 2003 to gather input from the public.

- May 20, 2003 in Kirwin, KS
- May 21, 2003 in Hays, KS
- May 22, 2003 in Phillipsburg, KS

Thirty-four people attended these meetings and approximately 81 written comments were received during the initial comment period. Comments received identified biological, social, and economic concerns regarding refuge management.

A second planning update was distributed to interested parties in November 2003. Eighteen additional comments were received during the open comment period as a result of the second planning update.

The issues raised and comments received from the public, other federal agencies, the State of Kansas, and other organizations helped the planning team to develop the alternatives contemplated in the draft CCP/EA and the goals, objectives, and strategies described for the proposed action.

The draft CCP/EA was presented to the public March 24, 2006 for a 30-day comment period. An open house was held April 20, 2006 in Phillipsburg, KS. Forty-three people attended the open house and approximately 99 written comments were received during the comment period on the draft plan.

PUBLIC COMMENTS

The following issues, concerns, and comments are a compilation and summary of those expressed during the March–April 2006 comment period for the draft CCP and EA. Comments were provided by the public, federal and state agencies, local and county governments, private organizations, and individuals concerned about the natural resources and public use of Kirwin National Wildlife Refuge. Comments were received orally at meetings, via email, and in writing.

The refuge staff recognizes and appreciates all input received from the public. To address this input, several clarifications and some changes are reflected in this final CCP.

The issues, comments and concerns are summarized, followed by responses from the Service. Where there were similar statements from more than one commenter, the statements were grouped into one summarized comment.

Comments about editorial and presentation corrections were addressed in the production of this final CCP, and are not detailed here.

Comment 1: Kirwin Reservoir belongs to the local people of Phillipsburg, Kansas, and the needs of local residents should be taken into consideration.

Response: The Refuge, including Kirwin Reservoir, is owned by the United States of America. The Bureau of Reclamation has primary jurisdiction, the Service has secondary jurisdiction. The Service does not have secondary jurisdiction on the Bureau of Reclamation “operations area.” This includes the dam and approximately 450 acres down stream of the dam. All decisions concerning the Refuge are done in compliance with current Federal laws, regulations, and policies. Comments from local residents are taken into consideration to the extent possible.

Comment 2: Support Alternative A (No Action). Access to the refuge and Kirwin Reservoir should be left the way it is with no change to current management (continue to allow non-wildlife dependent uses such as camping, swimming, waterskiing, horseback riding, volleyball, and tournament fishing). Several generations of local residents have participated in recreation at the

refuge and would like to continue using the area as it currently exists.

Response: Congress sets guiding principles for the management of public lands by federal agencies. While some federal agencies have multiple-use mandates from Congress, the Service has a specific mandate to put wildlife first. The Service is mandated to accommodate wildlife-oriented public use only when compatible with conservation of wildlife resources and their habitats. Non-wildlife dependent uses such as camping, swimming, picnicking, horseback riding, and volleyball are not appropriate uses on a national wildlife refuge. By law, tournament fishing is an economic use of a national wildlife refuge and is held to a higher standard than a non-economic use.

Comment 3: Support Alternative B (Proposed Action). The proposed action is needed. The draft CCP/EA is thorough, interesting, and forward-looking.

Response: The proposed action (alternative B) was selected to allow wildlife-oriented public uses while ensuring the wildlife and their habitats are protected, enhanced, and restored, so that future generations of Americans can continue to enjoy wildlife. The Service expects that, when all the habitat goals are met, the results will be positive impacts to vegetation and wildlife.

Comment 4: Kirwin National Wildlife Refuge should be transferred to, and managed by, the Kansas Department of Wildlife and Parks.

Response: Divestiture of the refuge was considered, but eliminated as an option in the CCP planning process. A detailed and objective account is in Appendix D of the Draft CCP.

Comment 5: Support refuge efforts to increase migratory bird habitat and nesting habitat for grassland birds.

Response: The refuge is a migratory bird refuge. Grassland dependent bird numbers are declining faster and steeper than any other group of birds in North America.

Comment 6: The Service should not cut down trees on the refuge. Turkey and whitetail deer populations are negatively affected by tree removal. Trees are beautiful and needed in a region (western Kansas) that doesn't have many trees.

Response: Turkey and whitetail deer populations are stable to increasing. An important part of grassland bird habitat improvement is tree removal from certain areas. The refuge will remove trees to

improve habitat for the group of birds in most need of conservation. The refuge must also comply with state and federal mandates for invasive species. Invasive trees in the riparian corridors will be removed. Large areas of dead timber are targeted to gain physical access to the ground to control Canada thistle. Many trees remain along the shoreline of the reservoir and in the wooded stream corridors.

Comment 7: Restoring cropland to grassland on the refuge will decrease the number of migrating birds that use the refuge. The lack of cropland (i.e., food source) on the refuge for geese and ducks will cause them to not return the refuge, and move farther south to migrate.

Response: Restoring prairie to selected cropland areas will increase the number of many species of grassland dependent migratory birds on the refuge. Weather plays a major role in determining the number of waterfowl that reach the refuge. The no waterfowl hunting area also plays a major role in keeping waterfowl in the area. Due to water fluctuations, the acres of cropland are projected to remain approximately the same as in the 1990s when the reservoir was full. One new crop field will be installed in the Bow Creek area and some other fields will be expanded. Approximately 1,000 acres of cropland will remain within the transition zone (dry reservoir bottom). These acres generally produce more bushels per acre, resulting in more grain.

Comment 8: Plenty of wildlife exists under the present conditions. Additional numbers of birds is not better if they become over populated. Disease (e.g., avian bird flu) can result from overpopulation.

Response: Grassland birds do not generally gather in large flocks. However, unchecked large populations of white-tailed deer have been known to become over populated resulting in disease outbreaks.

Comment 9: The refuge should continue to maintain food plots for waterfowl on the northwest portion of the refuge.

Response: The refuge is mandated to manage for wildlife, specifically migratory birds. Hunting is a secondary use. Improving and increasing the acres of habitat for the group of birds, grassland dependent birds, in the most need of conservation will take priority.

Comment 10: More emphasis should be placed on controlling invasive species (e.g., musk thistle, Canada thistle) on the refuge.

Response: The refuge agrees. The CCP contains a goal to address invasive plant species, with specific objectives and strategies.

Comment 11: Support higher water and more stable water levels in the reservoir. Western Kansas needs open waters and rivers that function. Water in the reservoir generates more money to the local economy than irrigated cropland. Encourage retirement/regulation of the water for the benefit of the refuge. The Service should try to obtain water rights.

Response: Greater stability of the water levels would allow the development of food resources and make those resources available to waterfowl, shorebirds, wading birds and other wetland-dependent wildlife.

Comment 12: The proposed action will stop irrigation and flood control if the water level is not allowed to fluctuate. No irrigation would lower the tax base and the population.

Response: The Service has no jurisdiction over water management or irrigation. This jurisdiction is the responsibility of the Kirwin–Webster Irrigation District, the Bureau of Reclamation, and the Army Corps of Engineers. The refuge would expand efforts to work with the Irrigation District and Reclamation to attempt to maintain higher water levels and reduce dramatic water level fluctuations. By working with these agencies, the refuge will have an opportunity to discuss wildlife benefits that occur with greater water level stability. The CCP does not propose stopping irrigation or flood control.

Comment 13: The environmental education programs at the refuge provide important information and social opportunities for the people in the local community. Support proposal to expand environmental education programs at the refuge.

Response: Environmental education programs are important to disseminate information and educate the public. These programs will continue when the outdoor recreation planner position is funded.

Comment 14: Consider providing guided tours on the refuge.

Response: Guided tours will be considered when the outdoor recreation planner position is funded.

Comment 15: The refuge should discontinue the use of jet/water skiing on the refuge because it disturbs wildlife and other users.

Response: The Improvement Act states that uses of national wildlife refuge must be appropriate. The

1997 Act also stipulated 6 wildlife-dependent uses that may occur on a refuge if they are deemed compatible and do not interfere with the refuges purpose. Jet/water skiing is not wildlife-dependent and is an inappropriate use on a national wildlife refuge.

Comment 16: The discontinuation of camping on the refuge would create an opportunity for a private entrepreneur to start a campground on land adjacent to the refuge. This would be a boon for private enterprise in the region. Perhaps the local community could be of assistance in locating an operator or parcel of land for such a purpose.

Response: The local community is welcome to explore the development of a campground near the refuge. However, there are already numerous places to camp, and modestly priced motels, nearby. The Bureau of Reclamation land, approximately 450 acres, is open to camping. Camping is allowed along the face of the dam next to the water.

Comment 17: Hunting should be banned on the refuge because it is a violent act that promotes additional violence.

Response: The Improvement Act states that hunting is considered a priority general public use of the Refuge System. Hunting is an appropriate use of the refuge when compatible.

Comment 18: Bow hunter education certification should be mandatory to obtain an archery deer hunting permit.

Response: In general, the Service adheres to state mandated hunter education requirements.

Comment 19: Privately sponsored deer hunts pay well, and many people in the area depend on revenue associated with deer hunting for their livelihood. There is an imbalance between Nebraska and Kansas regarding deer tags. More deer tags are available in Nebraska than Kansas which has prohibited wider patronization of the State of Kansas. The State of Kansas and the refuge should open up deer hunting to nonresidents.

Response: All archery deer hunters on the refuge must obtain a Kansas deer permit to hunt on the refuge. The Kansas Department of Wildlife and Parks determines hunting criteria. A refuge specific permit is required and is available to all who have obtained a Kansas archery permit for this unit (residents and non-residents).

Comment 20: The draft CCP/EA predicts that hunting quality will be improved, but bow hunting

quality has already been degraded by the removal of trees on the refuge.

Response: The CCP states that in general the quality of the hunting experience would be enhanced due to increased block size, and quality of grassland habitat which will increase wildlife populations (pheasants, quail, prairie chickens, and mule deer). Decreased traffic disturbance would benefit bow hunters where roads are closed. Ground blinds are one alternative to tree stands.

Comment 21: Clarify the archery only hunting area boundaries (specifically, the river bottom of the North Fork Solomon River).

Response: The archery deer hunting zone will be expanded to include the North Fork Solomon river bottom. If high water levels return to the reservoir, this hunting area may be re-evaluated for compatibility. If deemed incompatible as a result of the evaluation, the area will be closed to hunting. Hunting brochures and maps will be updated to indicate the new hunting boundaries.

Comment 22: The Willow Flats area has been a good hunting area. If the area is restored to grassland, the geese will feed on private ground and hunting opportunities would deteriorate. The six shell area will be of little benefit to hunters with decreased use of area by geese.

Response: Some cropland will remain in the Willow Flats area. The bottomland northeast of Prairie Dog Town will retain approximately 1,000 acres of cropland. The 'no hunting' zone and weather are the main factors that dictate how long and how many geese use the refuge, not the acres of cropland on the refuge. The benefits of continuing the six shell zone will continue to be evaluated.

Comment 23: The six shell area provides a good opportunity for decoy goose hunters, however it is confusing. Please simplify the regulations.

Response: The six shell zone regulations will be simplified to stipulate that no more than six shotgun shells per person per day are allowed during all hunting seasons.

Comment 24: The refuge does not provide any muzzleloader deer hunting opportunities. Consider opening the refuge to muzzleloader deer hunting.

Response: The refuge will consider this in the near future. Muzzleloader hunting has some appealing attributes from a migratory bird management point of view, especially when compared to archery hunting. Muzzleloader deer hunting has a short 14 day season in September that provides less

disturbance to wildlife than the 80 day archery season in October, November, and December. It does not coincide with waterfowl migration, and therefore provides separation of deer and waterfowl hunters, and therefore provides less disturbance amongst the two types of hunters. Rationale for opening the western end of the Refuge to archery deer hunting was to harvest deer to deter depredation by them on private land. Muzzleloader hunting would harvest more deer to better meet this objective. Muzzleloader hunting is better suited for prairie habitat. Deer may be cleanly harvested at longer ranges. Muzzleloader hunters generally hunt from the ground. Fewer tree stands would be used, leading to fewer law enforcement violations due to illegal tree stands and illegal screw-in steps.

Comment 25: The refuge gets crowded with archery deer hunters sometimes. Consider implementing a draw permit system to alleviate the congestion.

Response: The refuge will consider this in the near future.

Comment 26: The refuge should continue to allow fishing (including boat fishing) on Kirwin Reservoir because it is one of the few areas near Phillipsburg, KS that provides fishing opportunities.

Response: 100% of the refuge will remain open to fishing, most of this by foot travel. At times of high water, boat fishing will remain open to the main body of the reservoir year round. At times of low water, boat fishing will remain open on the majority of the reservoir from April 1 to October 1. At all water levels, boat fishing will remain open year round in Bow Creek from Crappie Point south. Non-motorized boats will be allowed in the area closed to motorized boats in August and September. Within a sixty mile radius of the refuge there are at least five large reservoirs, six smaller lakes, and state owned access on two streams.

Comment 27: The public needs better access to the water on the south side of the reservoir. Currently there are 15–20' banks which make it difficult to access the reservoir. Suggest mowing access paths to facilitate foot traffic to the reservoir for fishing.

Response: The refuge is amenable to improving foot access to the reservoir in selected locations.

Comment 28: The refuge should place more timber and brush in the reservoir to create fish habitat.

Response: Historically, every 3 years, the refuge has placed 25 cedar trees on each of the 4 fish attractors. Recently the refuge has increased the frequency and quantity of trees placed on the attractors.

Comment 29: Dredge the boat ramp on the north side of the reservoir and extend all boat ramps to the water level.

Response: The reservoir receives the most boat fishing use at times of high water, and less boat fishing use at normal low water levels. The north shore boat ramp is useable at high water levels and has 2 ramps available. The south shore boat ramp is useable at high and medium water levels and also has 2 ramps available. At low water levels the low water boat ramp and the face of the dam provide sufficient access for the reduced number of boats.

Comment 30: Install a boat ramp to provide access to Bow Creek for boating and hunting.

Response: The refuge is open to a boat ramp at Crappie Point. At this time refuge funding and staffing are not available. However, the refuge would be amenable to members of the public seeking grants and facilitating the work under refuge supervision.

Comment 31: Install boat ramp on the south side of the reservoir to alleviate safety concerns associated with launching a boat on the north side of the reservoir when the wind is from the south.

Response: Boats may be launched from the south end of the dam at low water levels. Some windy days are not safe for boating. See comment 30.

Comment 32: Move the buoy line back to Grays Park.

Response: With implementation of the CCP the buoy line will be moved to Grays Park. This is made possible by implementing the seasonal boat closure.

Comment 33: The refuge should not implement a seasonal boat closure. A no wake zone or five mile per hour speed limit on the entire reservoir could be implemented in place of the seasonal boat closure.

Response: The presence of boats is a bigger factor in disturbance of waterfowl than the speed of the boats.

Comment 34: Eliminate the no wake zone on the reservoir. Slow boating causes more damage to the resource than fast boating.

Response: The no wake zone was implemented to help alleviate the disturbance boats were causing to shore fishermen.

Comment 35: Reduced recreation opportunities will reduce visitation and create a negative impact on local businesses.

Response: The majority of visitors to the refuge come to hunt, fish, and view wildlife. Camping is

allowed on Reclamation lands along the face of the dam. Visitation to the area is not expected to decline appreciably. A socio-economic evaluation was completed for the CCP and presented in Chapter 4 of the Draft CCP. CCP implementation should have no significant detrimental affects to the local economy.

Comment 36: The citizens of Kansas pay the refuge manager's salary. The fees paid by local residents to purchase hunting and fishing licenses pay the refuge's operating expenses.

Response: Funding for the refuge is appropriated by Congress and the President of the United States. The state of Kansas sells state hunting and fishing licenses and keeps the money. No money from the sale of hunting and fishing licenses, including Federal Duck Stamp money, goes to the refuge.

Comment 37: Maintain existing roads and marina areas. People do not want to walk a mile or more to reach the reservoir. Closing roads limits wildlife viewing opportunities.

Response: Access to the reservoir will be maintained. Seasonal and permanent road closures drastically reduce disturbance to wildlife. The Service anticipates wildlife observation opportunities will increase with improved habitat.

Comment 38: The refuge should not remove outhouses. It doesn't make sense to remove what already exists.

Response: Currently, six restrooms are located on the refuge. Three restrooms associated with campgrounds were proposed for removal. Although camping at Crappie Point will be discontinued, the area will remain a popular location for fishing. Due to public comments, the refuge will maintain a restroom at Crappie Point. Restrooms removed from camping areas that are in good condition will be reused on the refuge or transferred to another national wildlife refuge for reuse.

Comment 39: The refuge should not change the management of the face of the dam.

Response: Decisions regarding management of the dam are made by the Bureau of Reclamation.

Comment 40: Form partnerships to involve the community to assist with litter control, facilities maintenance and construction, and general care-taking of the refuge. Create a Keep Kirwin National Wildlife Refuge Clean Day.

Response: Local Boy Scouts spend one day per year picking up litter, as do a few fishermen. The refuge

would greatly appreciate assistance from the community for the above mentioned items. Due to reduced staff and funding, the refuge will need a member of the public to spearhead the effort.

Comment 41: Consider obtaining grants and/or donations to improve the refuge.

Response: The refuge annually applies for grants to improve wildlife habitat. Grant applications will increase with implementation of the CCP.

Comment 42: The draft CCP/EA states it is a draft plan, but the refuge has been operating under alternative B for several years by removing trees on the refuge.

Response: The refuge has been operating under the guidance of the Kirwin NWR Comprehensive Management Plan (CMP) completed in 1996. The goals of the CMP include:

- enhance and maintain migratory bird populations
- provide nesting and breeding habitat for grassland nesting species
- enhance and maintain native mixed-grass prairie, emphasizing structural diversity in the plant community
- enhance and maintain riparian areas in Bow Creek and North Fork of the Solomon River corridors, emphasizing structural diversity in the native shrub-tree community for wildlife
- manage grasslands that favor native species of flora and fauna, represented by big bluestem, little bluestem
- plant native grasses in retired croplands and areas previously seeded to smooth brome grass

Comment 43: At times the Refuge gets crowded with archery deer hunters. Please consider implementing a limited quota draw for refuge deer permits. This would provide a more quality hunt with less competition amongst hunters.

Response: The Refuge has heard complaints from archers for years about this issue. The Refuge will consider implementing a limited quota draw for refuge deer permits in the near future.

MAILING LIST

The following mailing list was developed for this CCP.

Federal Officials

U.S. Senator Pat Roberts,—Dodge City, Wichita, Topeka, and Prairie Village, KS

U.S. Senator Sam Brownback—Topeka, Overland Park, Garden City, Pittsburg, and Wichita, KS

U.S. Congressman Jerry Moran—Hutchinson, and Hays, KS

Federal Agencies

U.S. Army Corps of Engineers—Kansas City District, Kansas City, MO, and Harlan County Lake, Republican City, NE

U.S. Bureau of Reclamation—Grand Island, NE, and Billings, MT

U.S. Fish and Wildlife Service—Ecological Services, Manhattan, KS and Grand Island, NE

U.S. Fish and Wildlife Service—Flint Hills National Wildlife Refuge, Harford, KS

U.S. Fish and Wildlife Service—Marais des Cygnes National Wildlife Refuge, Pleasanton, KS

U.S. Fish and Wildlife Service—Quivira National Wildlife Refuge, Stafford, KS

U.S. Fish and Wildlife Service—Great Plains Nature Center, Wichita, KS

U.S. Geological Survey—Biological Resources Division, Fort Collins, CO

U.S. Geological Survey—Northern Prairie Wildlife Research Center, Jamestown, ND

Tribal Officials

Prairie Band Potawatomi Nation, Mayetta, KS

Pawnee Tribe, Pawnee, OK

Kansas State Officials

Governor Kathleen Sebelius, Topeka, KS

Senator Janice Lee, Kensington, KS

Representative John Faber, Brewster, KS

Representative Dan Johnson, Hays, KS

Representative Laura McClure, Osborne, KS

Kansas State Agencies

Kansas Department of Wildlife and Parks—Office of the Secretary, Topeka, KS- Mike Hayden

Kansas Department of Wildlife and Parks—Region 1 Office, Hays, KS

Kansas Department of Wildlife and Parks—Area Conservation Officer, Kirwin, KS

Kansas Biological Survey—Lawrence, KS

Local Agencies and Officials

Mayor, Kirwin

Mayor, Phillipsburg

Mayor, Agra

Mayor, Prairie View

Mayor, Logan

Mayor, Long Island

Mayor, Glade

Mayor, Speed

Phillips County Commissioners

Phillips County Extension Office

State Colleges, Universities, Schools and Libraries

Fort Hays State University, Division of Biology, Hays

Kansas State University, Division of Biology, Manhattan

Eastern Heights High School, Agra

Northern Valley High School, Alma

Osborne High School, Osborne

Hill City High School, Hill City

Hays High School, Hays

West Smith County High School, Kensington

Logan High School, Logan

Natoma High School, Natoma

Palco High School, Palco

Phillipsburg High School, Phillipsburg

Plainville High School, Plainville

Smith Center High School, Smith Center

Stockton High School, Stockton

Norton Community High School, Norton

Media

Smith County Pioneer, Smith Center, KS

Phillips County Review, Phillipsburg, KS

Norton Daily Telegram, Norton, KS

Hill City Times, Hill City, KS

Plainville Times, Plainville, KS

Phillips County Advocate, Phillipsburg, KS

Stockton Sentinel, Stockton, KS

Osborne County Farmer, Osborne, KS

Hays Daily News, Hays, KS

The Logan Republican, Logan, KS

KKAN_KQMA

Organizations, Business, and Civic Groups

Friends of Kirwin Lake, Phillipsburg, KS

Solomon Valley Birdwatcher's, Agra, KS

Phillips County Chamber of Commerce, Phillipsburg, KS

National Audubon Society, Manhattan, KS

Kansas Audubon Society, Lawrence, KS

Burroughs Audubon of Greater Kansas City, Overland Park, KS

Wildlife Society, Manhattan, KS

Rotary Club, Phillipsburg, KS

Lions Club—Phillipsburg, Kirwin, Kensington, Smith Center, Agra, and Stockton, KS

Boothill Bass Club, Spearville, KS

American Bass Anglers—Fort Collins, CO, Abilene, KS, and Ceresco, NE

Blue Valley Bass Club, Seward, NE

Sarpy County Bassmasters, Bellevue, NE

Liberal Bassmaster Bass Club, Liberal, KS

Southern Colorado Bass Club, Pueblo, CO

Southwest Anglers, Hugoton, KS

Midwest Bass Anglers, Weeping Water, NE

Trophy Teams Association, Colorado Springs, CO

Kansas Bass Anglers Association, Junction City, KS

Omaha Bass Club, Omaha, NE

Southwest Anglers, Liberal, KS

Northern Colorado Bass Club, Johnstown, CO

Front Range Bassmasters, Colorado Springs, CO

Lincoln County Bassmasters, North Platte, NE

Mile High Bass Pioneers, Longmont, CO

Heartland His and Hers Bass Circuit, Omaha, NE

McPherson Bassmasters, Lindsborg, KS

Douglas County Bassmasters, Boone, IA

Pikes Peak Bassmasters, Security, CO

Coronado Area Council/BSA, Salina, KS

National Wild Turkey Federation, Phillipsburg, KS

Individuals

83 persons

Appendix H—Fire Management Program

The U.S. Fish and Wildlife Service has administrative responsibility, including fire management, on approximately 10,778 acres of National Wildlife Refuge lands, in Phillips, Kansas.

Fire—A Critical Natural Process

In ecosystems in the prairies of the Great Plains, vegetation has evolved under periodic disturbance and defoliation from bison, fire and drought. This periodic disturbance is what kept the ecosystem diverse and healthy while maintaining significant biodiversity for thousands of years. Historically, natural fire has played an important role in many ecosystems by removing fuel accumulations, decreasing the impacts insects and diseases, simulating regeneration, cycling critical nutrients, and providing a diversity of habitats for plant species and wildlife.

When fire is excluded on a broad scale, the unnatural accumulation of living and dead fuels that occurs can contribute to degraded plant communities and wildlife habitats. These fuel accumulations often change fire regime characteristics, and have created a potential in many areas across the country for uncharacteristically severe wildland fires. These catastrophic wildland fires often pose risks to public and firefighter safety. In addition, they threaten property and resource values such as wildlife habitat, grazing opportunities, timber, soils, and water quality.

In the grassland species of the northern Great Plains, vegetation has evolved under periodic disturbance and defoliation from bison and fire. This periodic disturbance is what made the prairie healthy and a place of enormous diversity for thousands of years. Return of fire in most ecosystems is essential for healthy vegetation in grasslands, wetlands, and some woodlands, for wildlife habitat.

When integrated back into an ecosystem, fire can help restore and maintain healthy systems and reduce the risk of wildland fires. To facilitate fire's natural role in the environment, fire must be integrated into land and resource management plans and activities on a broad scale. Reintroduced fire:

- Can improve wetlands and riparian areas by reducing the density of vegetation, thereby increasing the amount of available water;

- Can improve deer and elk habitat, especially in areas with shortages such as winter habitat and on the spring and fall transitional ranges;
- Can sustain biological diversity;
- Can improve access in woodlands and shrublands;
- Can improve soil fertility;
- Can improve the quality and amount of livestock forage;
- Can improve growth in immature woodlands by reducing density;
- Can reduce susceptibility of plants to insects and disease caused by moisture and nutrient stress;
- Can improve water yield for off-site activities and communities dependent on wildlands for their water supply.

Wildland Fire Management Policy and Guidance

In 2001, an update of the 1995 Federal Fire Policy was completed and approved by the Secretaries of Interior and Agriculture. The 2001 Federal Wildland Fire Management Policy directs federal agencies to achieve a balance between fire suppression to protect life, property, and resources and fire use to regulate fuels and maintain healthy ecosystems. In addition, it directs agencies to use the appropriate management response for all wildland fires regardless of the ignition source. This policy provides nine guiding principles that are fundamental to the success of the fire management program:

- Firefighter and public safety is the first priority in every fire management activity.
- The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.
- Fire management plans (FMPs), programs, and activities support land and resource management plans and their implementation.
- Sound risk management is a foundation for all fire management activities.
- Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.
- FMPs and activities are based upon the best available science.

- FMPs 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.

It is essential to have written fire management in the land use resources plans (e.g., the comprehensive conservation plans). FMPs are step-down processes from the land use plans and habitat plans, with more detail on fire suppression, fire use, and fire management activities.

Management Direction

Fire management will be used to protect life, property and other resources from wildland fires by safely suppressing all wildfires on the Kirwin National Wildlife Refuge. Prescribed fire will be used in an ecosystem management context for habitat management and to protect both federal and private property. Fuel reduction activities will be applied where needed, especially in areas with a higher proportion of residences that may be considered “wildland–urban interface” (WUI) areas.

All fire management programs will be conducted in a manner consistent with applicable laws, policies, and regulations. The refuge will maintain a Fire Management Plan to accomplish resource management objectives. Prescribed fire and manual and/or mechanical fuels treatments will be applied in a scientific way under selected weather and environmental conditions on approximately 500 to 2,000 acres, over a 5-year average, for native and restored prairie habitat, to accomplish habitat management objectives.

Fire Management Goal

Restore and enhance fire as an ecosystem process within prairie habitats. The return and maintenance of fire is essential for wildlife habitat in these ecosystems.

Fire Management Objective

Fire is an important grassland management tool that can be used to accomplish habitat management objectives. Fire is also a tool that can quickly destroy equipment, buildings and property, and hurt or kill those that work with it. Prescribed fire and WUI treatments will be used to reduce hazardous fuels on refuge lands to reduce the intensity and favorable conditions for wildland fires.

Strategies

Strategies and tactics that consider public and firefighter safety and values at risk will be used. A more detailed fire plan for information on wildland

fire suppression and prescribed fire methods, timing, and monitoring will be found in a step-down FMP.

All management actions will use prescribed fire to control nonnative vegetation and the spread of woody vegetation in grassland habitats.

The prescribed fire program will be outlined in the FMP for the refuge. This plan describes the following:

- the year’s burn units and their predominant vegetation
- the primary objectives of the units and the fires
- the acceptable range of results
- site preparation requirements
- weather requirements
- safety considerations and measures to protect sensitive features
- burn-day activities
- communications and coordination for burns
- ignition techniques
- smoke management procedures
- post-burn monitoring

Air Quality

Prescribed fire temporarily reduces air quality by reducing visibility and releasing several components through combustion. The four major components are carbon monoxide, carbon dioxide, hydrocarbons, and particulates. Varying amounts of particulate content are generated in different types of burns (e.g., wildlife habitat improvement burns vs. fuel-reduction burns). Clean Air Act standards will be met during all prescribed fire under all fire management actions.

Visibility and clean air are primary natural resource values. The protection of these resources must be given full consideration in fire management planning and operations. Additionally, smoke can have serious health and safety effects that must be considered. The management of smoke will be incorporated into the planning of prescribed fires and, to the extent possible, in the suppression of wildland fire. The state of South Dakota does not have a permit system for air quality, but does have regulations concerning agricultural burning.

Fire Management Organization, Contacts, and Cooperation

Qualified fire management technical oversight and support for the refuge will be established by the Region using the Fire Management District approach. Under this approach, an appropriate fire management staffing organization will be

determined by established modeling systems based on the fire management workload of a group of refuges and possibly even that of interagency partners. (Fire management workload consists of historical wildfire suppression activities and historical and planned fuels treatment workload.) Depending on budgets, fire management staffing and support equipment may be located on the station or at other refuges in the district and shared between all units. Wherever possible, fire management activities will be conducted in a

coordinated and collaborative manner with federal and nonfederal partners.

With the signature of this CCP, a new Fire Management Plan will be developed for the Kirwin NWR, as a stand-alone Fire Management Plan, a Fire Management Plan with two or three refuges (i.e., three refuges in the fire management district), or as an interagency Fire Management Plan.

Appendix I—Species List

This appendix presents the scientific and common names of vertebrates and plants known to occur on Kirwin NWR. Bold indicates species that have been recorded as nesting. Information on fish, amphibians, and reptiles was obtained from Kansas Department of Wildlife and Parks (refuge files dated 01/30/2003).

Birds follow the American Ornithologists' Union Committee on Classification and Nomenclature (American Ornithologists' Union 1998, 2000, 2002, 2003).

Amphibians			
Bullfrog	<i>Rana catesbeiana</i>	Ornate box turtle	<i>Terrapene ornata</i>
Great plains narrow-mouthed frog	<i>Gastrophryne olivacea</i>	Smooth soft-shelled turtle	<i>Apalone mutica</i>
Great plains toad	<i>Bufo cognatus</i>	Spiny soft-shelled turtle	<i>Apalone spinifera</i>
Northern cricket frog	<i>Acris crepitans</i>	Western painted turtle	<i>Chrysemys picta</i>
Plains leopard frog	<i>Rana blairi</i>	Yellow mud turtle	<i>Kinosternon flavescens</i>
Plains spadefoot	<i>Scaphiopus bombifrons</i>	Birds	
Rocky mountain toad	<i>Bufo woodhousii</i>	American avocet	<i>Recurvirostra Americana</i>
Tiger salamander	<i>Ambystoma tigrinum</i>	American black duck	<i>Anas rubripes</i>
Reptiles		American bittern	<i>Botaurus lentiginosus</i>
Brown snake	<i>Storeria dekayi</i>	American coot	<i>Fulica Americana</i>
Bull snake	<i>Pituophis melanoleucus</i>	American crow	<i>Corvus brachyrhynchos</i>
Coachwhip	<i>Masticophis flagellum</i>	American golden plover	<i>Pluvialis dominica</i>
Common garter snake	<i>Thamnophis sirtalis</i>	American goldfinch	<i>Carduelis tristis</i>
Common kingsnake	<i>Lampropeltis getula</i>	American kestrel	<i>Falco sparverius</i>
Eastern fence lizard	<i>Sceloporus undulates</i>	American pipit	<i>Anthus rubescens</i>
Eastern hog-nosed snake	<i>Heterodon platirhinos</i>	American redstart	<i>Setophaga ruticilla</i>
Five-lined skink	<i>Eumeces fasciatus</i>	American robin	<i>Turdus migratorius</i>
Great plains skink	<i>Eumeces faciatus</i>	American tree sparrow	<i>Spizella arborea</i>
Lesser earless lizard	<i>Holbrookia maculate</i>	American white pelican	<i>Pelecanus erythrorhynchos</i>
Lined snake	<i>Tropidoclonion lineatum</i>	American widgeon	<i>Anas Americana</i>
Milk snake	<i>Lampropeltis triangulum</i>	Baird's sandpiper	<i>Calidris bairdii</i>
Northern water snake	<i>Nerodia sipedon</i>	Bald eagle	<i>Haliaeetus leucocephalus</i>
Plains blackhead snake	<i>Tantilla nigriceps</i>	Baltimore oriole	<i>Icterus galbula</i>
Plains garter snake	<i>Thamnophis radix</i>	Bank swallow	<i>Riparia riparia</i>
Prairie rattle snake	<i>Crotalus viridis</i>	Barn owl	<i>Tyto alba</i>
Rat snake	<i>Elaphe obsoleta</i>	Barn swallow	<i>Hirundo rustica</i>
Ringneck snake	<i>Diadophis punctatus</i>	Barred owl	<i>Strix varia</i>
Slender glass lizard	<i>Ophisaurus attenuatus</i>	Bell's vireo	<i>Vireo bellii</i>
Texas horned lizard	<i>Phrynosoma cornutum</i>	Belted kingfisher	<i>Ceryle alcyon</i>
Western hog-nosed snake	<i>Heterodon nasicus</i>	Bullock's oriole	<i>Icterus bullockii</i>
Western ribbon snake	<i>Thamnophis proximus</i>	Black-and-white warbler	<i>Mniotilta varia</i>
Yellow-bellied racer	<i>Coluber constrictor</i>	Black-bellied plover	<i>Pluvialis squatarola</i>
Alligator snapping turtle	<i>Macrolemys temmincki</i>	Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>
Common snapping turtle	<i>Chelydra serpentina</i>	Black-billed magpie	<i>Pica hudsonia</i>
		Black-capped chickadee	<i>Poecile atricapillus</i>
		Black-crowned night-heron	<i>Nycticorax nycticorax</i>

Black-headed grosbeak	<i>Pheucticus melanocephalus</i>	Eastern phoebe	<i>Sayornis phoebe</i>
Black-necked stilt	<i>Himantopus mexicanus</i>	Eastern screech owl	<i>Megascops asio</i>
Black-throated gray warbler	<i>Dendroica nigrescens</i>	Eastern towhee	<i>Pipilo erythrophthalmus</i>
Blackpoll warbler	<i>Dendroica striata</i>	Eastern wood-pewee	<i>Contopus virens</i>
Black tern	<i>Chlidonias niger</i>	European starling	<i>Sturnus vulgaris</i>
Blue grosbeak	<i>Passerina caerulea</i>	Ferruginous hawk	<i>Buteo regalis</i>
Blue jay	<i>Cyanocitta cristata</i>	Field sparrow	<i>Spizella pusilla</i>
Blue-winged teal	<i>Anas discors</i>	Forster's tern	<i>Sterna forsteri</i>
Bobolink	<i>Dolichonyx oryzivorus</i>	Franklin's gull	<i>Larus pipixcan</i>
Bonaparte's gull	<i>Larus Philadelphia</i>	Gadwall	<i>Anas strepera</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	Glaucous gull	<i>Larus hyperboreus</i>
Brewer's sparrow	<i>Spizella breweri</i>	Golden-crowned kinglet	<i>Regulus satrapa</i>
Brown-headed cowbird	<i>Molothrus ater</i>	Golden eagle	<i>Aquila chrysaetos</i>
Brown creeper	<i>Certhia Americana</i>	Grasshopper sparrow	<i>Ammodramus savannarum</i>
Brown thrasher	<i>Toxostoma rufum</i>	Gray catbird	<i>Dumetella carolinensis</i>
Bufflehead	<i>Bucephala albeola</i>	Greater prairie chicken	<i>Tympanuchus cupido</i>
Burrowing owl	<i>Athene cunicularia</i>	Great blue heron	<i>Ardea herodias</i>
Canada goose	<i>Branta Canadensis</i>	Great crested flycatcher	<i>Myiarchus crinitus</i>
Canvasback	<i>Aythya valisineria</i>	Great egret	<i>Ardea alba</i>
Caspian tern	<i>Sterna caspia</i>	Great horned owl	<i>Bubo virginianus</i>
Cattle egret	<i>Bubulcus ibis</i>	Greater scaup	<i>Aythya marila</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>	Greater yellowlegs	<i>Tringa melanoleuca</i>
Chestnut-collared longspur	<i>Calcarius ornatus</i>	Greater white-fronted goose	<i>Anser albifrons</i>
Chimney swift	<i>Chaetura pelagica</i>	Green-winged teal	<i>Anas crecca</i>
Chipping sparrow	<i>Spizella passerina</i>	Green heron	<i>Butorides virescens</i>
Cinnamon teal	<i>Anas cyanoptera</i>	Hairy woodpecker	<i>Picoides villosus</i>
Clay-colored sparrow	<i>Spizella pallida</i>	Harris' sparrow	<i>Zonotrichia querula</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	Hermit thrush	<i>Catharus guttatus</i>
Common goldeneye	<i>Bucephala clangula</i>	Herring gull	<i>Larus argentatus</i>
Common grackle	<i>Quiscalus quiscula</i>	Hooded merganser	<i>Lophodytes cucullatus</i>
Common loon	<i>Gavia immer</i>	Horned grebe	<i>Podiceps auritus</i>
Common merganser	<i>Mergus merganser</i>	Horned lark	<i>Eremophila alpestris</i>
Common nighthawk	<i>Chordeiles minor</i>	House finch	<i>Carpodacus mexicanus</i>
Common redpoll	<i>Carduelis flammea</i>	House sparrow	<i>Passer domesticus</i>
Common snipe	<i>Gallinago gallinago</i>	House wren	<i>Troglodytes aedon</i>
Common tern	<i>Sterna hirundo</i>	Hudsonian godwit	<i>Limosa haemastica</i>
Common yellowthroat	<i>Geothlypis trichas</i>	Indigo bunting	<i>Passerina cyanea</i>
Cooper's hawk	<i>Accipiter cooperii</i>	Killdeer	<i>Charadrius vociferus</i>
Dark-eyed junco	<i>Junco hyemalis</i>	Lapland longspur	<i>Calcarius lapponicus</i>
Dickcissel	<i>Spiza Americana</i>	Lark bunting	<i>Calamospiza melanocorys</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>	Lark sparrow	<i>Chondestes grammacus</i>
Downy woodpecker	<i>Picoides pubescens</i>	Lazuli bunting	<i>Passerina amoena</i>
Dunlin	<i>Calidris alpina</i>	Least bittern	<i>Ixobrychus exilis</i>
Eared grebe	<i>Podiceps nigricollis</i>	Least flycatcher	<i>Empidonax minimus</i>
Eastern bluebird	<i>Sialia sialis</i>	Least sandpiper	<i>Calidris minutilla</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>	Least tern	<i>Sterna antillarum</i>
Eastern meadowlark	<i>Sturnella magna</i>	Lesser scaup	<i>Aythya affinis</i>

Lesser yellowlegs	<i>Tringa flavipes</i>	Ring-necked pheasant	<i>Phasianus colchicus</i>
Lincoln's sparrow	<i>Melospiza lincolni</i>	Rock pigeon	<i>Columba livia</i>
Little blue heron	<i>Egretta caerulea</i>	Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>	Ross's goose	<i>Chen rossii</i>
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>	Rough-legged hawk	<i>Buteo lagopus</i>
Long-billed curlew	<i>Numenius americanus</i>	Ruby-crowned kinglet	<i>Regulus calendula</i>
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	Ruddy duck	<i>Oxyura jamaicensis</i>
Magnolia warbler	<i>Dendroica magnolia</i>	Ruddy turnstone	<i>Arenaria interpres</i>
Mallard	<i>Anas platyrhynchos</i>	Sanderling	<i>Calidris alba</i>
Marbled godwit	<i>Limosa fedoa</i>	Sandhill crane	<i>Grus Canadensis</i>
Merlin	<i>Falco columbarius</i>	Scissor-tailed flycatcher	<i>Tyrannus forficatus</i>
Mississippi kite	<i>Ictinia mississippiensis</i>	Scott's oriole	<i>Icterus parisorum</i>
Mountain bluebird	<i>Sialia currucoides</i>	Semipalmated plover	<i>Charadrius semipalmatus</i>
Mourning dove	<i>Zenaida macroura</i>	Semipalmated sandpiper	<i>Calidris pusilla</i>
Northern bobwhite	<i>Colinus virginianus</i>	Sharp-shinned hawk	<i>Accipiter striatus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>	Short-eared owl	<i>Asio flammeus</i>
Northern flicker	<i>Colaptes auratus</i>	Snow goose	<i>Chen caerulescens</i>
Northern goshawk	<i>Accipiter gentiles</i>	Snowy egret	<i>Egretta thula</i>
Northern harrier	<i>Circus cyaneus</i>	Snowy owl	<i>Bubo scandiacus</i>
Northern mockingbird	<i>Minus polyglottos</i>	Snowy plover	<i>Charadrius alexandrinus</i>
Northern pintail	<i>Anas acuta</i>	Song sparrow	<i>Melospiza melodia</i>
Northern rough-winged swallow	<i>Stelgidopterys serripennis</i>	Sora	<i>Porzana carolina</i>
Northern shoveler	<i>Anas clypeata</i>	Spotted sandpiper	<i>Actitis macularia</i>
Northern waterthrush	<i>Seiurus noveboracensis</i>	Spotted towhee	<i>Pipilo maculatus</i>
Orange-crowned warbler	<i>Vermivora celata</i>	Stilt sandpiper	<i>Calidris himantopus</i>
Orchard oriole	<i>Icterus spurius</i>	Swainson's Hawk	<i>Buteo swainsoni</i>
Osprey	<i>Pandion haliaetus</i>	Swainson's thrush	<i>Catharus ustulatus</i>
Ovenbird	<i>Seiurus aurocapilla</i>	Tennessee warbler	<i>Vermivora peregrine</i>
Peregrine falcon	<i>Falco peregrinus</i>	Townsend's warbler	<i>Dendroica townsendi</i>
Pie-billed grebe	<i>Podilymbus podiceps</i>	Trumpeter swan	<i>Cygnus buccinator</i>
Pine siskin	<i>Carduelis pinus</i>	Tundra swan	<i>Cygnus columbianus</i>
Piping plover	<i>Charadrius melodus</i>	Turkey vulture	<i>Cathartes aura</i>
Plumbeous vireo	<i>Vireo plumbeus</i>	Upland sandpiper	<i>Bartramia longicauda</i>
Prairie falcon	<i>Falco mexicanus</i>	Veery	<i>Catharus fuscescens</i>
Purple martin	<i>Progne subis</i>	Vesper sparrow	<i>Poocetes gramineus</i>
Prairie warbler	<i>Dendroica discolor</i>	Virginia rail	<i>Rallus limicola</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	Warbling vireo	<i>Vireo gilvus</i>
Red-eyed vireo	<i>Vireo olivaceus</i>	Western grebe	<i>Aechmophorus occidentalis</i>
Redhead	<i>Aythya Americana</i>	Western kingbird	<i>Tyrannus verticalis</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>	Western meadowlark	<i>Sturnella neglecta</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Western sandpiper	<i>Calidris mauri</i>
Red-shouldered hawk	<i>Buteo lineatus</i>	White-breasted nuthatch	<i>Sitta carolinensis</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>	White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>	White-faced ibis	<i>Plegadis chihi</i>
Ring-billed gull	<i>Larus delawarensis</i>	White-rumped sandpiper	<i>Calidris fuscicollis</i>
Ring-necked duck	<i>Aythya collaris</i>	White-throated sparrow	<i>Zonotrichia albicollis</i>
		Whooping crane	<i>Grus Americana</i>

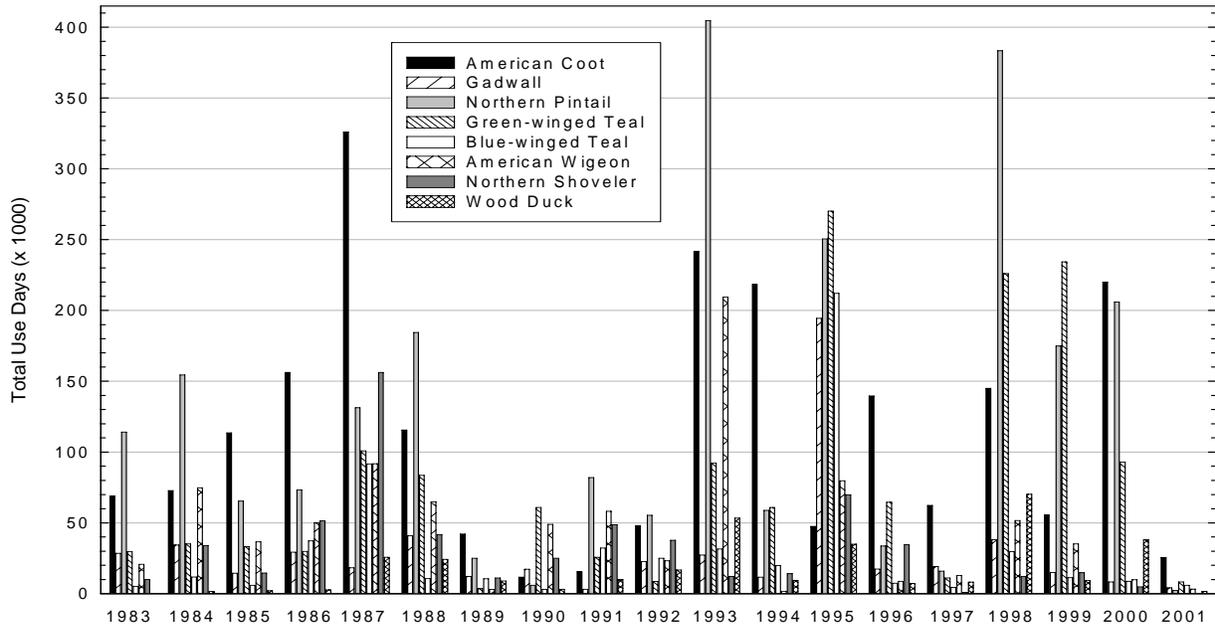
Wild turkey	<i>Meleagris gallopavo</i>	Deer mouse	<i>Peromyscus maniculatus</i>
Willet	<i>Catoptrophorus semipalmatus</i>	Desert cottontail	<i>Sylvilagus audubonii</i>
Willow flycatcher	<i>Empidonax traillii</i>	Eastern cottontail	<i>Sylvilagus floridanus</i>
Wilson's phalarope	<i>Phalaropus tricolor</i>	Eastern mole	<i>Scalopus aquaticus</i>
Winter wren	<i>Troglodytes troglodytes</i>	Eastern spotted skunk	<i>Spilogale putorius</i>
Wood duck	<i>Aix sponsa</i>	Eastern wood rat	<i>Peromyscus gossypinus</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Evening bat	<i>Nycticeius humeralis</i>
Yellow-breasted chat	<i>Icteria virens</i>	Fox squirrel	<i>Sciurus niger</i>
Yellow-crowned night heron	<i>Nyctanassa violacea</i>	Franklin's ground squirrel	<i>Spermophilus franklinii</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	Gray fox	<i>Urocyon cinereoargenteus</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>	Hispid cotton rat	<i>Sigmodon hispidus</i>
Yellow-throated vireo	<i>Vireo flavifrons</i>	Hispid pocket mouse	<i>Chaetodipus hispidus</i>
Yellow warbler	<i>Dendroica petechia</i>	Hoary bat	<i>Lasiurus cinereus</i>
Fishes		Keen's bat	<i>Myotis keenii</i>
Black bullhead	<i>Ictalurus melas</i>	Least shrew	<i>Cryptotis parva</i>
Black crappie	<i>Pomoxis nigromaculatus</i>	Long-tailed weasel	<i>Mustela frenata</i>
Bluegill	<i>Lepomis macrochirus</i>	Mule deer	<i>Odocoileus hemionus</i>
Channel catfish	<i>Ictalurus punctatus</i>	Northern grasshopper mouse	<i>Onychomys leucogaster</i>
Common carp	<i>Cyprinus carpio</i>	Plains harvest mouse	<i>Reithrodontomys montanus</i>
Creek chub	<i>Semotilus atromaculatus</i>	Plains pocket gopher	<i>Geomys bursarius</i>
Flathead catfish	<i>Pylodictis olivaris</i>	Plains pocket mouse	<i>Perognathus flavescens</i>
Freshwater drum	<i>Aplodinotus grunniens</i>	Prairie vole	<i>Microtus ochrogaster</i>
Gizzard shad	<i>Dorosoma cepedianum</i>	Ord's kangaroo rat	<i>Dipodomys ordii</i>
Green sunfish	<i>Lepomis cyanellus</i>	Red bat	<i>Lasiurus borealis</i>
Largemouth bass	<i>Micropterus salmoides</i>	Red fox	<i>Vulpes vulpes</i>
Orangespotted sunfish	<i>Lepomis humilis</i>	Short-tailed shrew	<i>Blarina brevicauda</i>
Red shiner	<i>Cyprinella lutrensis</i>	Silky pocket mouse	<i>Perognathus flavus</i>
River carpsucker	<i>Carpionodes carpio</i>	Silver-haired bat	<i>Lasionycteris noctivagans</i>
Sand shiner	<i>Notropis stramineus</i>	Small-footed bat	<i>Myotis leibii</i>
Walleye	<i>Stizostedion vitreum</i>	Striped Skunk	<i>Mephitis mephitis</i>
White crappie	<i>Pomoxis annularis</i>	Thirteen-lined ground squirrel	<i>Spermophilus tridecemlineatus</i>
White base	<i>Morone chrysops</i>	Virginia opossum	<i>Didelphis virginiana</i>
Wiper	<i>Morone chrysops XM. Saxatilis</i>	Western harvest mouse	<i>Reithrodontomys megalotis</i>
Mammals		White-footed mouse	<i>Peromyscus leucopus</i>
American beaver	<i>Castor canadensis</i>	White-tailed deer	<i>Odocoileus virginianus</i>
American porcupine	<i>Erethizon dorsatum</i>	Plants	
American badger	<i>Taxidea taxus</i>	Grasses	
Big brown bat	<i>Eptesicus fuscus</i>	Big bluestem	<i>Andropogon gerardii</i>
Black-tailed jackrabbit	<i>Lepus californicus</i>	Blue grama	<i>Bouteloua gracilis</i>
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	Buffalograss	<i>Buchloe dactyloides</i>
Bobcat	<i>Felis rufus</i>	Canada wildrye	<i>Elymus canadensis</i>
Brasilian free-tailed bat	<i>Tadarida brasiliensis</i>	Fall Panicum	<i>Digitaria cognatum.</i>
Common muskrat	<i>Ondatra zibethicus</i>	Foxtail barley	<i>Hordeum jubatum</i>
Common raccoon	<i>Procyon lotor</i>	Green needlegrass	<i>Stipa viridula</i>
Coyote	<i>Canis latrans</i>	Hairy grama	<i>Bouteloua hirsuta</i>
		Indiangrass	<i>Sorghastrum nutans</i>

Junegrass	<i>Koeleria macrantha</i>	Ground plum	<i>Astragalus crassicaarpus</i>
Little bluestem	<i>Andropogon scoparius</i>	Hairy goldaster	<i>Chrysopsis villosa</i>
Marsh muhly	<i>Muhlenbergia racemosa</i>	Hairy pucoon	<i>Lithospermum carolinense</i>
Porcupine grass	<i>Stipa spartea</i>	Heath aster	<i>Aster ericoides</i>
Prairie cordgrass	<i>Spartina pectinata</i>	Hemp dogbane	<i>Apocynum cannabinum</i>
Prairie three-awn	<i>Aristida oligantha</i>	Hoary vervain	<i>Verbena stricta</i>
Purple lovegrass	<i>Eragrostis spectabilis</i>	Illinois bundleflower	<i>Desmanthus illinoiensis</i>
Scribners Panicum	<i>Panicum oligoanthes</i>	Illinois tick clover	<i>Desmodium illinoensis</i>
Side-oats grama	<i>Bouteloua curtipendula</i>	Indian hemp dogbane	<i>Apocynum cannabinum</i>
Slender Wheatgrass	<i>Elymus trachycaulus</i>	Indigo bush	<i>Amorpha fruticosa</i>
Switchgrass	<i>Panicum virgatum</i>	Jerusalem artichoke	<i>Helianthus tuberosa</i>
Tall dropseed	<i>Sporobolus asper</i>	Leadplant	<i>Amorpha canescens</i>
Virginia wildrye	<i>Elymus virginicus</i>	Lemon scurfpea	<i>Psoraleidum lanceolatum</i>
Western wheatgrass	<i>Agropyron smithii</i>	Longbeard hawkweed	<i>Hieracium longipilum</i>
Forbs			
American germander	<i>Teucrium canadense</i>	Marble-seeded Borage	<i>Onosmodium molle</i>
American vetch	<i>Vicia americana</i>	Maximillian sunflower	<i>Helianthus maximilliani</i>
Bee balm	<i>Monarda fistulosa</i>	Missouri goldenrod	<i>Solidago missouriensis</i>
Blackeyed Susan	<i>Rudbeckia hirta</i>	Mountain mint	<i>Pycnanthemum virginianum</i>
Blue lettuce	<i>Lactuca oblongifolia</i>	Narrowleaf pucoon	<i>L. incisum</i>
Blue sage	<i>Salvia azurea</i>	New England aster	<i>Aster novae-angliae</i>
Blue vervain	<i>Verbena hastata</i>	Norwegian cinquefoil	<i>Potentilla norvegica</i>
Blue-eyed grass	<i>Sisyrinchium campestre</i>	Panicled aster	<i>Aster simplex</i>
Boneset	<i>Eupatorium perfoliatum</i>	Philadelphia fleabane	<i>Erigeron philadelphicus</i>
Bracted spiderwort	<i>Tradescantia bracteata</i>	Pink poppy mallow	<i>Callirhoe alcaeoides</i>
Buckbrush	<i>Symphoricarpos occidentalis</i>	Plains sunflower	<i>Helianthus petiolaris</i>
Canada goldenrod	<i>Solidago canadensis</i>	Plains yellow primrose	<i>Calylophus serrulatus</i>
Canada milkvetch	<i>Astragalus canadensis</i>	Prairie cinquefoil	<i>Potentilla arguta</i>
Canada tickclover	<i>Desmodium canadense</i>	Prairie coreopsis	<i>Coreopsis tinctoria</i>
Clammy ground cherry	<i>Physalis heterophylla</i>	Prairie goldenrod	<i>Solidago missouriensis</i>
Common milkweed	<i>Asclepias syriaca</i>	Prairie larkspur	<i>Delphinium virescens</i>
Common sunflower	<i>Helianthus annuus</i>	Prairie ragwort	<i>Senecio plattensis</i>
Compass plant	<i>Silphium laciniatum</i>	Prairie violet	<i>Viola pedatifida</i>
Coralberry	<i>Symphoricarpos orbiculatus</i>	Prairie wild rose	<i>Rosa arkansana</i>
Croton	<i>Croton texensis.</i>	Prickly poppy	<i>Argemone plyanthemus</i>
Cudweed sagewort	<i>Artemesia ludoviciana</i>	Purple coneflower	<i>Echinacea angustifolia</i>
Cup plant	<i>Silphium perfoliatum</i>	Purple poppy mallow	<i>Callirhoe involucrata</i>
Curlycup gumweed	<i>Grindelia squarrosa</i>	Purple prairie clover	<i>Dalea purpureum</i>
Daisy fleabane	<i>Erigeron strigosus</i>	Redroot New Jersey tea	<i>Ceanothus herbaceous</i>
Dandelion hawks-beard	<i>Crepis runcinata</i>	Rigid goldenrod	<i>Solidago rigida</i>
Deer vetch	<i>Lotus purshianus</i>	Rosinweed	<i>Silphium integrifolium</i>
False boneset	<i>Brickellia eupatorioides</i>	Rough blazingstar	<i>Liatris punctata</i>
False boneset	<i>Kuhnia eupatoriodes</i>	Rough rattlesnake-root	<i>Prenanthes aspera</i>
False sunflower	<i>Heliopsis helianthoides</i>	Round head lespedeza	<i>Lespedeza capitata</i>
Field pussytoes	<i>Antennaria neglecta</i>	Rush skeleton plant	<i>Lygodesmia juncea</i>
Grass-leaved goldenrod	<i>Solidago graminifolia</i>	Sand lovegrass	<i>Eragrostis trichoides</i>
Green sage	<i>Artemisia</i>	Sawtooth sunflower	<i>Helianthus grosseratus</i>
		Scarlet globemallow	<i>Spharalcea coccinea</i>

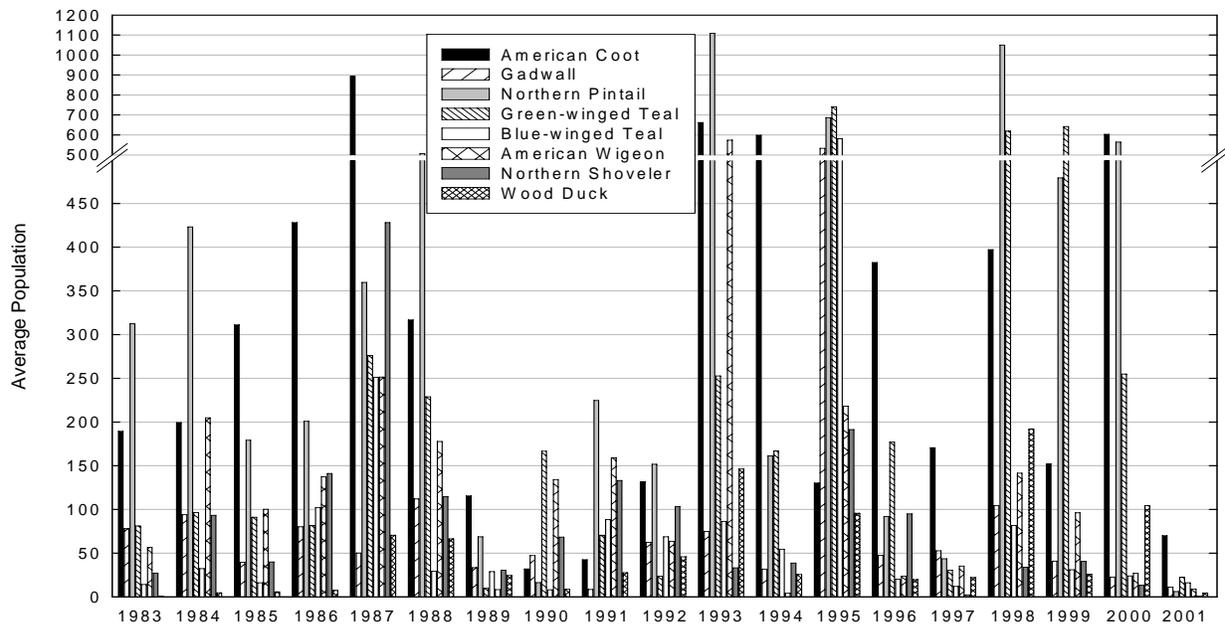
Sensitive brier	<i>Schrankia nuttallii</i>	Western yarrow	<i>Achillea millefolium</i>
Shell-leaf penstemon	<i>Penstemon grandiflorus</i>	White prairie clover	<i>Dalea candida</i>
Short green milkweed	<i>Asclepias viridiflora</i>	Whorled milkweed	<i>Asclepias verticillata</i>
Showy partridge pea	<i>Cassia chamaecrista</i>	Wild four-O'clock	<i>Mirabilis nyctaginea</i>
Silky prairie clover	<i>Dalea villosa</i>	Wild lettuce	<i>Lactuca canadensis</i>
Silver-leaf scurf pea	<i>Psoralea argophylla</i>	Wild licorice	<i>Glycyrrhizia lepidota</i>
Slender-leaf scurf pea	<i>Psoralea tenuiflora</i>	Wild onion	<i>Allium canadense</i>
Spider milkweed	<i>Asclepias viridis</i>	Willowleaf aster	<i>Aster praealtus</i>
Stiff goldenrod	<i>S. rigida</i>	Wooly plantain	<i>Plantago patagonica</i>
Stiff sunflower	<i>Helianthus rigidus</i>	Wetland emergents	
Tall thistle	<i>Cirsium altissimum</i>	Duley rush	<i>Juncus dudleyyi</i>
Talus slope penstemon	<i>Penstemon digitalis</i>	Fescue sedge	<i>Carex brevior</i>
Thick-spike gayfeather	<i>Liatris pycnostachya</i>	Fox sedge	<i>Carex vulpinoidea</i>
Thimbleweed	<i>Anemone cylindrica</i>	Gravid sedge	<i>Carex grvida</i>
Upright prairie coneflower	<i>Ratibiada columnifera</i>	Interior rush	<i>Juncus interior</i>
Venus' looking glass	<i>Tridanis perfoliata</i>	Marsh smartweed	<i>Polygonum coccineum</i>
Violet wood sorrel	<i>Oxalis violacea</i>	Pale smartweed	<i>Polygonum lapathifolium</i>
Virginia ground cherry	<i>Physallis virginiana</i>	Self heal	<i>Prunella vulgaris</i>
Wavyleaf thistle	<i>Cirsium undulatum</i>	Wedgelead fog-fruit	<i>Lippia cuneifolia</i>
Western ironweed	<i>Vernonia fasciculata</i>		
Western wild lettuce	<i>Lactuca ludoviciana</i>		

Appendix J—Graphs

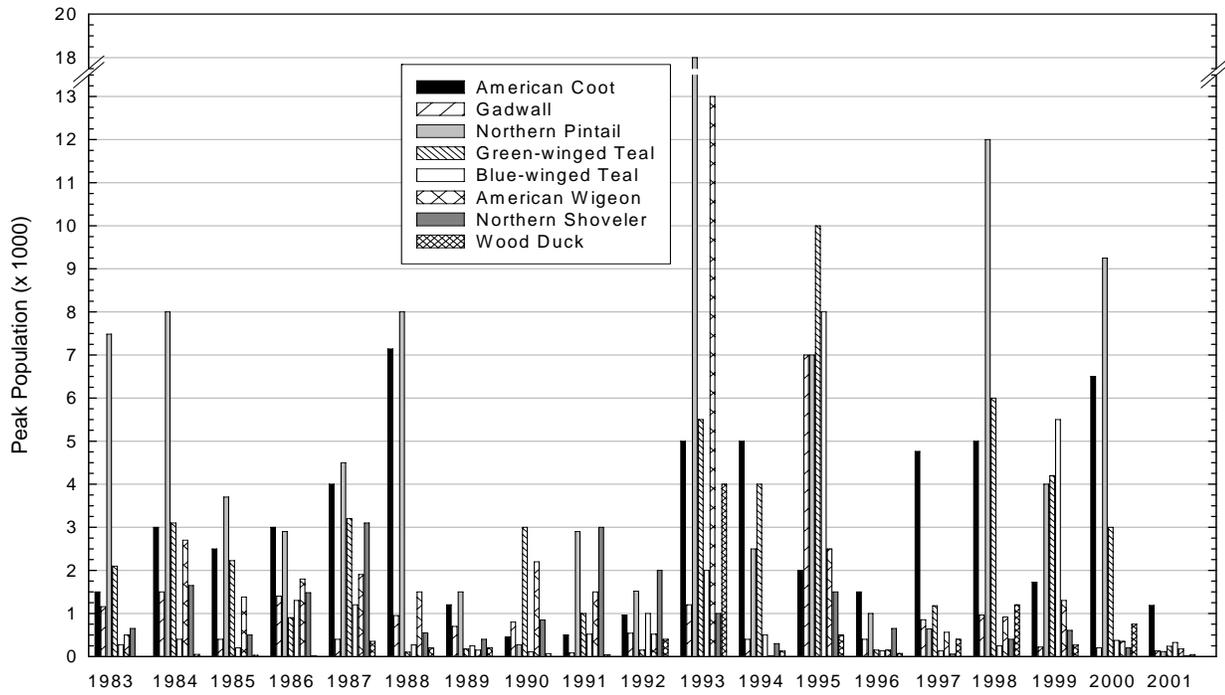
This appendix displays graphs showing total annual use days, average annual populations, and peak populations, respectively for the following waterfowl groups: American Coot and dabbling ducks excluding Mallard (a – c), diving ducks (d – f), Canada Goose and Mallard (g – i), and White-fronted Goose and Snow Goose (j – l) using Kirwin National Wildlife Refuge between 1983 and 2001.



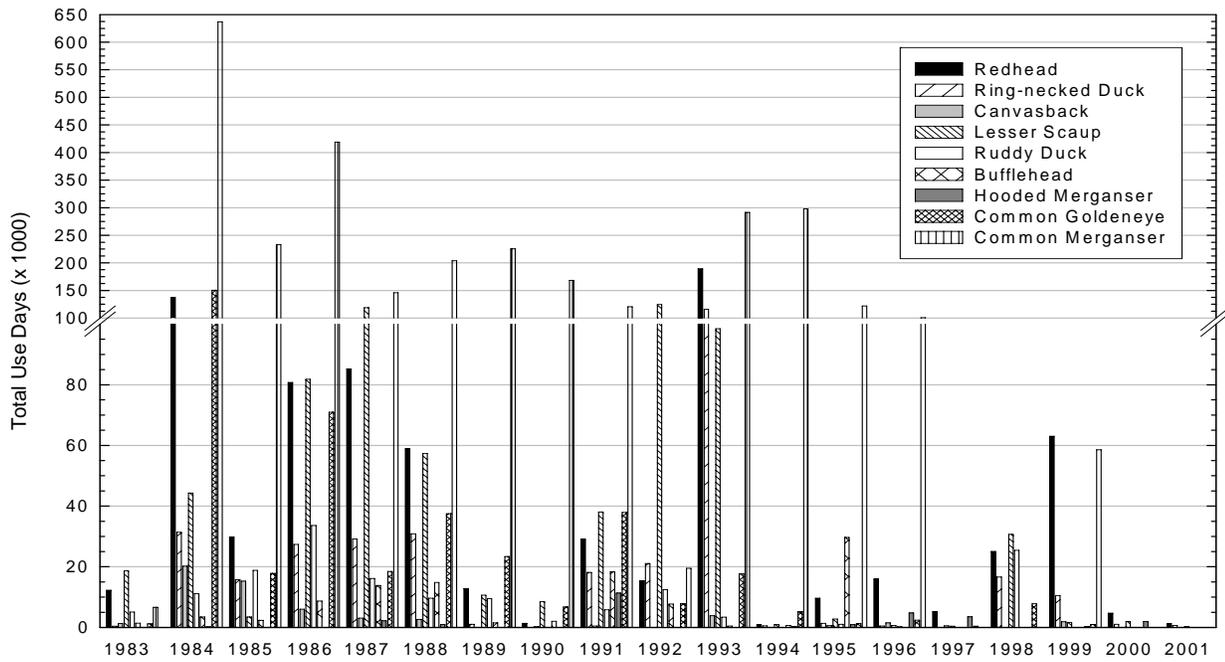
(a)



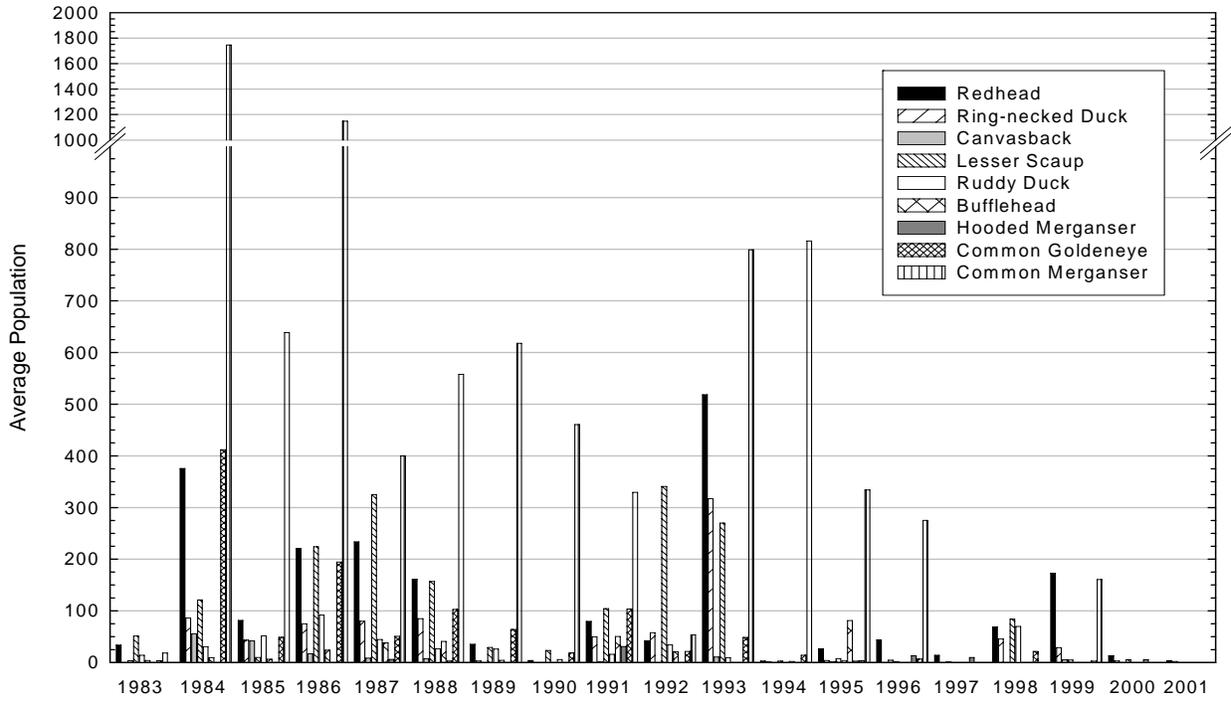
(b)



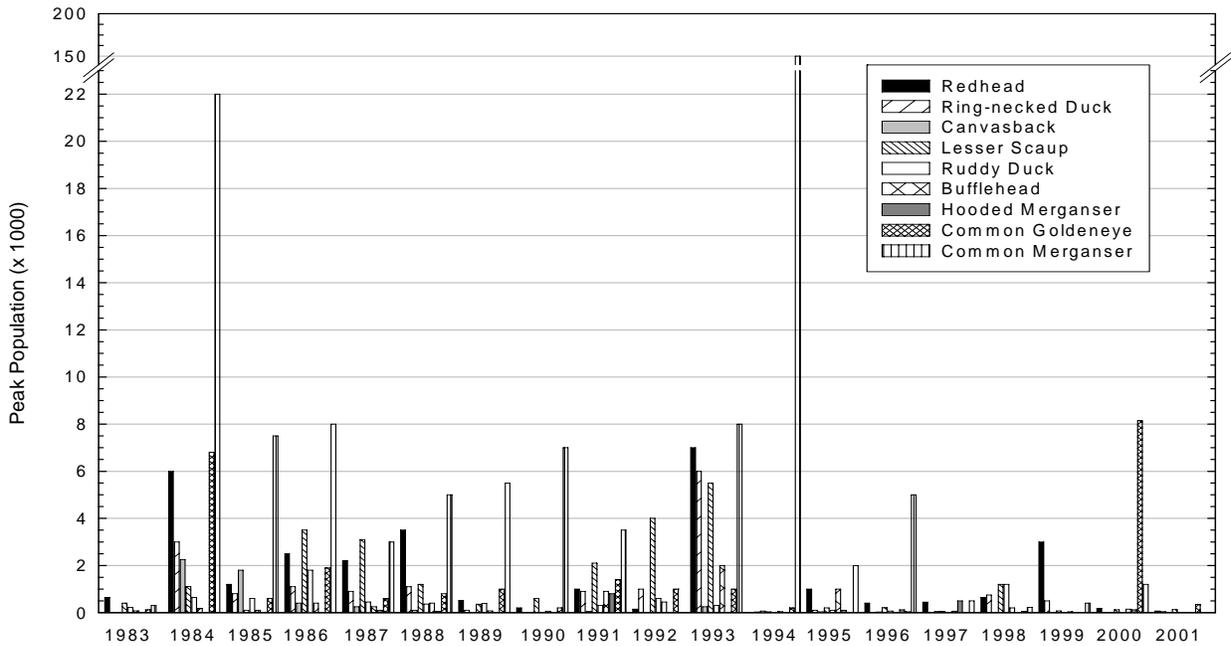
(c)



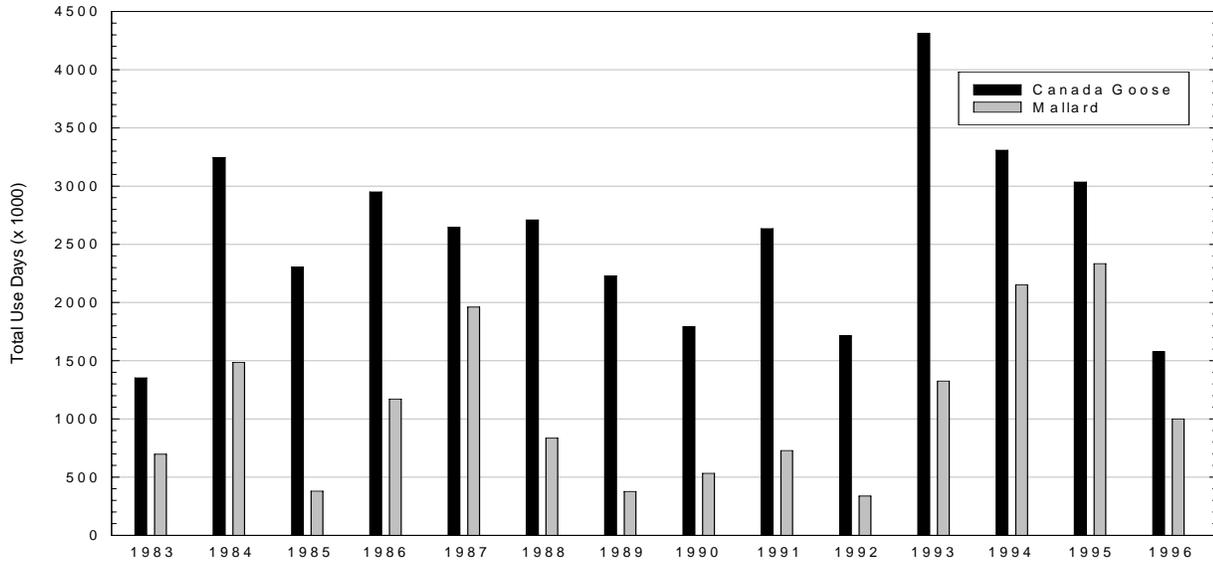
(d)



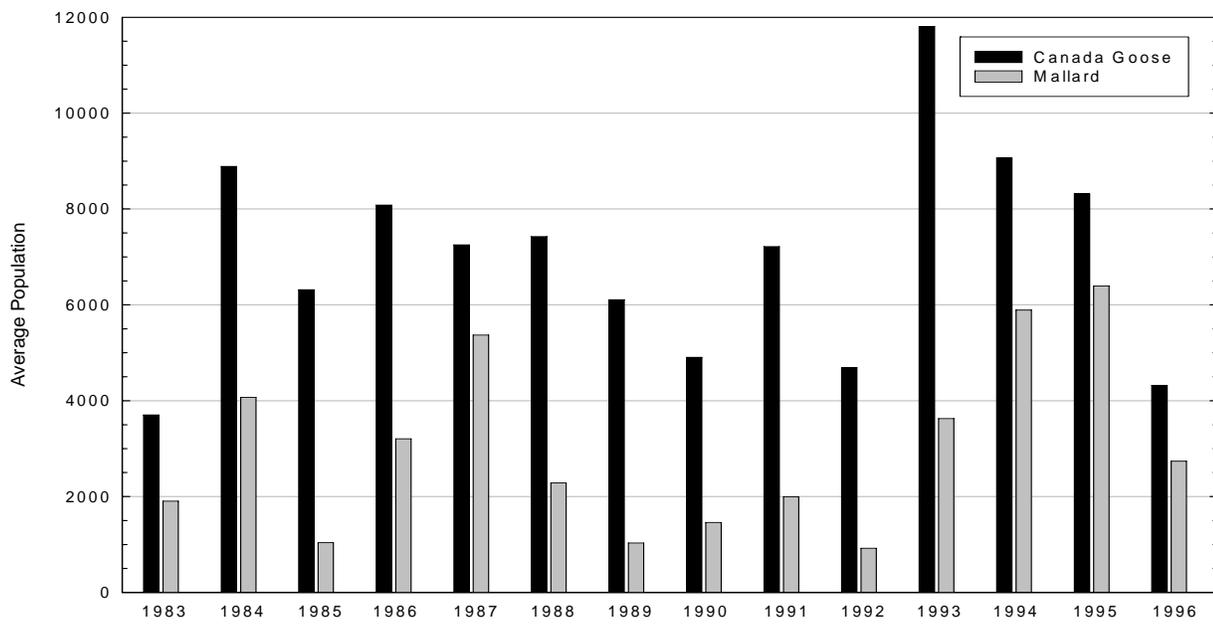
(e)



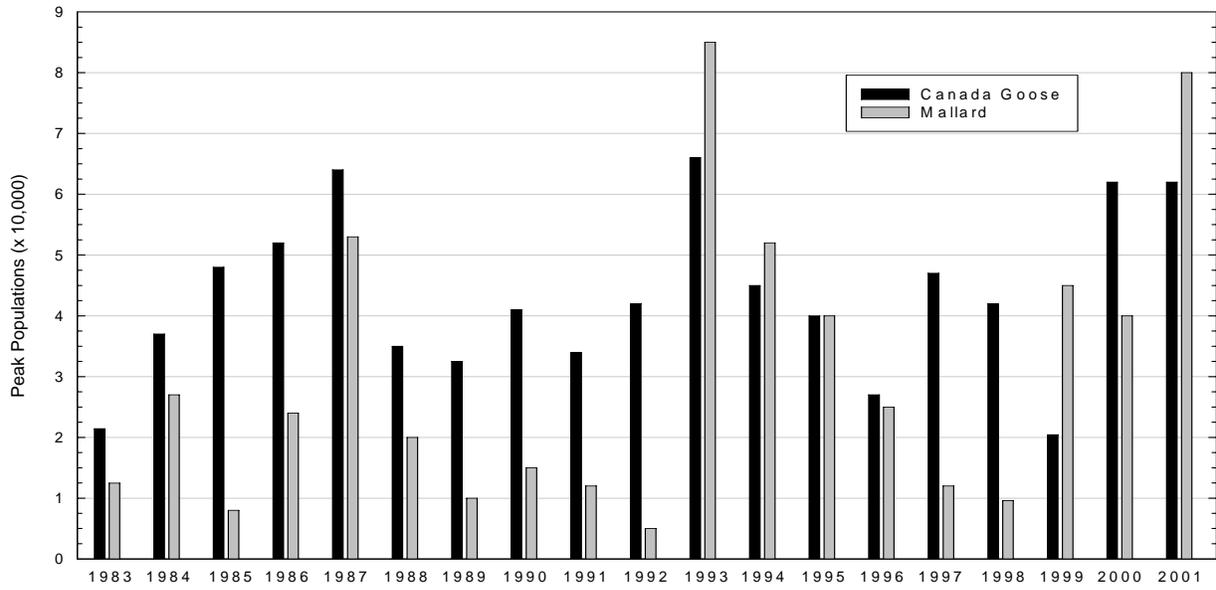
(f)



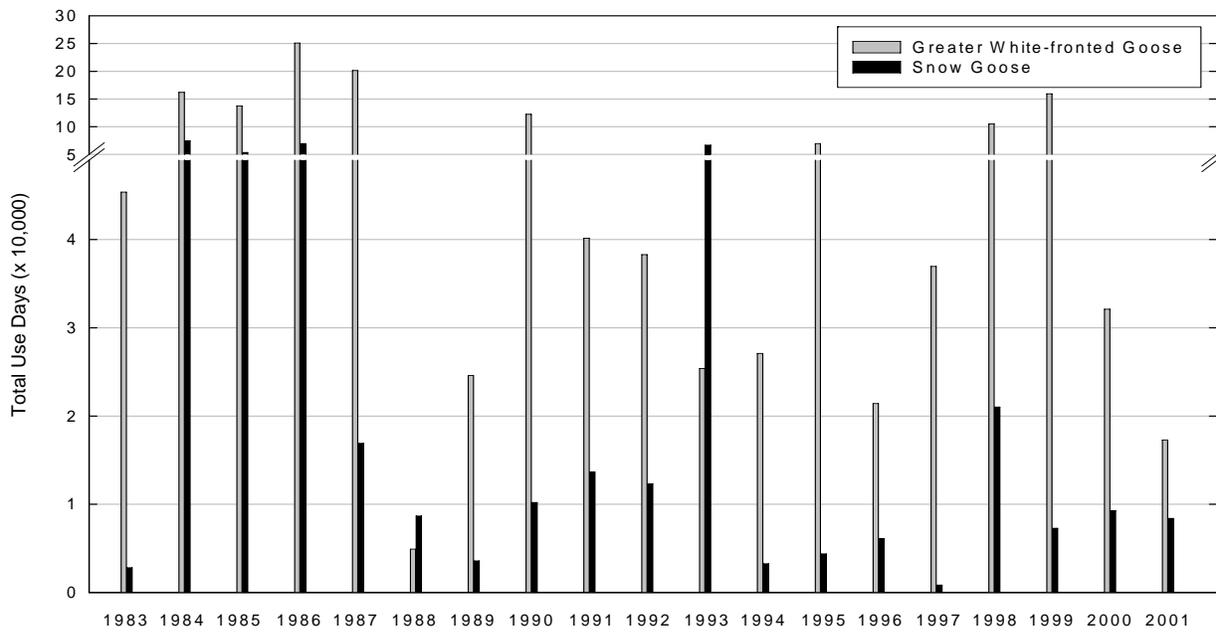
(g)



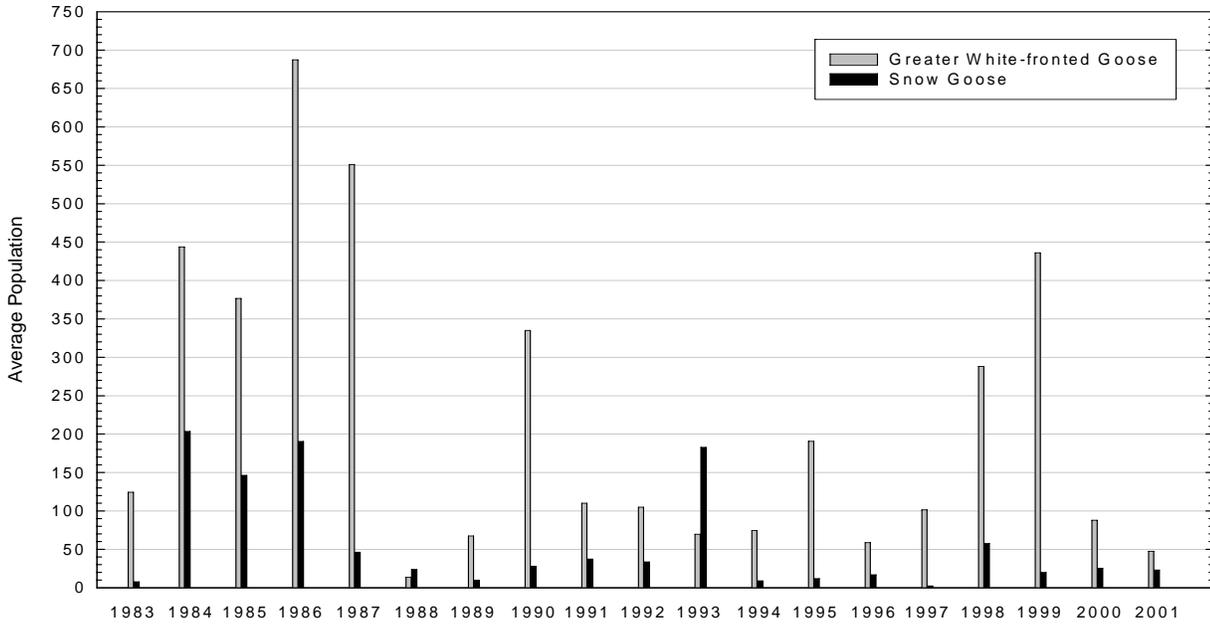
(h)



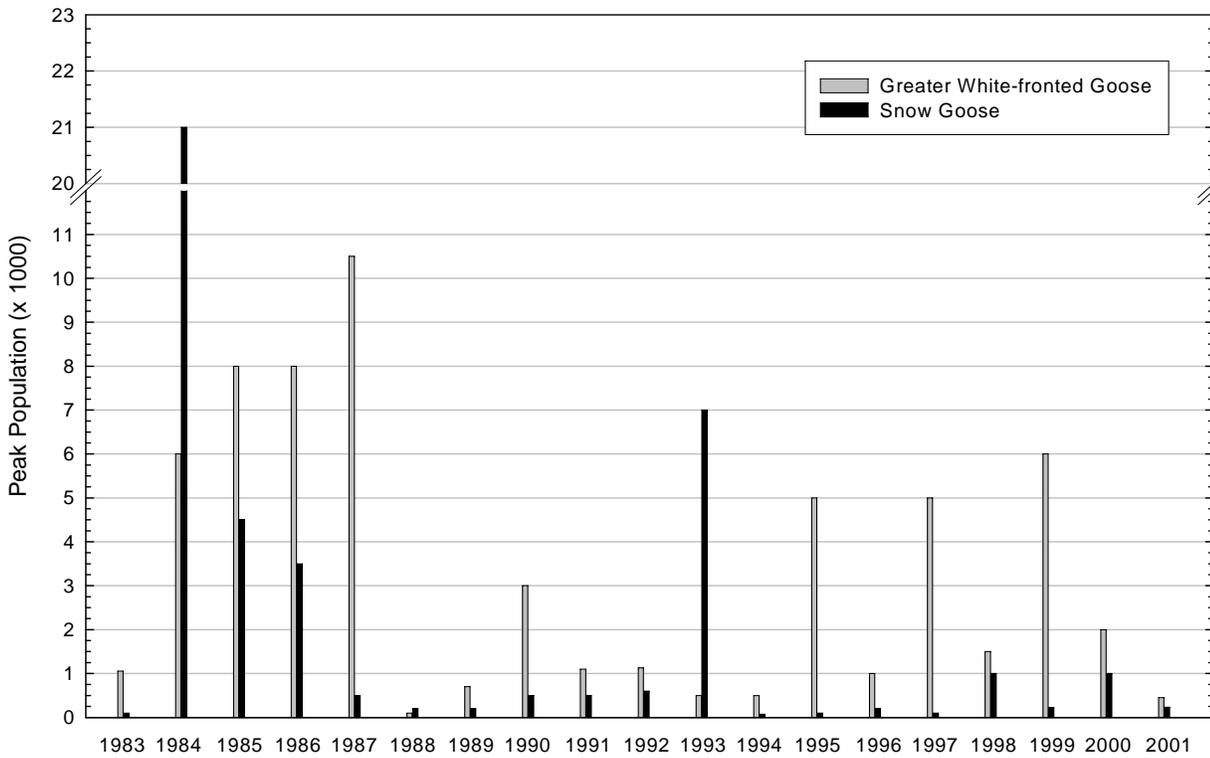
(i)



(j)



(k)



(l)

Appendix K—Section 7 Biological Evaluation

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Persons: Craig Mowry (785) 543-6673
Toni Griffin (303) 236-4378
Date: May 1, 2006

I. Region 6

II. Service Activity (Program): Refuges, Kirwin National Wildlife Refuge

III. Pertinent Species and Habitat

A. Federally Listed Species and/or their critical habitat within the action area:

1. bald eagle-threatened
2. whooping cranes-endangered
3. interior least tern-endangered
4. piping plovers-endangered

*There is no federally designated critical habitat on the Action Area (Kirwin NWR)

B. Proposed species and/or proposed critical habitat within the action area:

1. none

C. Candidate species within the action area:

1. none

D. Include species/habitat occurrence on a map. (see attachment)

IV. Geographic area or station name and action

Station: Kirwin National Wildlife Refuge.

Action: Issuance and implementation of Comprehensive Conservation Plan for Kirwin National Wildlife Refuge.

V. Location (map attached)

A. Ecoregion Number and Name: Kirwin National Wildlife Refuge is located within Service Region 6 Platte/Kansas Rivers Ecosystem (Unit #18)

B. County and State: Phillips County, Kansas

C. Section, township, and range: Kirwin NWR includes parts or all of sections 26, 27, 28, 33, 34, 35, 36 in Township 4 South, Range 17 West; sections 1, 2, 13, 23, 24, 25 in

Township 5 South, Range 17 West; sections 28, 29, 31, 32, 33 in Township 4 South, Range 16 West; sections 4, 5, 6, 7, 8, 9, 18 in Township 5 South, Range 16 West.

D. Distance (miles) and direction to nearest town: The town of Kirwin, Kansas is located adjacent to the northeast portion of the refuge boundary.

E. Species/habitat occurrence:

1. bald eagle: This species occurs only as a migrant and winter species. Commonly found on the Refuge from October-March. Wintering numbers are typically 25 with a range of 0-105. Bald eagle activity centers around the reservoir portion of the Refuge where there are flocks of waterfowl. Roosting occurs in various trees around the Refuge.
2. whooping cranes: Records indicate that the last confirmed sighting was in 1977. Unconfirmed sightings on the Refuge occur almost annually. They pass through the area during spring and fall migrations with most sightings in April and October. Prefer crop fields with large, unobstructed field of view.
3. interior least tern: Occasional visitors to the Refuge. Nesting has been confirmed in the past with young produced in 1974, 1976, and 1980. The majority of nesting habitat is found on the east end of the reservoir.
4. piping plovers: Occasional visitor during migration. Prefers sandy areas bordering vegetation and open shoreline areas.

VI. Description of proposed action: Issuance and implementation of Comprehensive Conservation Plan for Kirwin National Wildlife Refuge.

- Continue to provide for priority public use by maintaining the current hunt plan.
- Increase the area of low disturbance to migrating and wintering waterfowl and bald eagles by implementing a seasonal boat closure on most of the reservoir (October 1-April 1) at low water levels.
- Comply with current laws, regulations, and policies by discontinuing non-wildlife dependent recreational uses, such as camping, jet/water skiing, swimming.
- Increase efforts to control noxious weeds by installing a new crop field below the high water line, in the Bow Creek arm.
- Continue to improve grassland bird habitat by removing invasive trees, and restoring mixed grass prairie to most of the croplands above the high water line.
- Continue to improve the health of the riparian corridors to benefit declining migratory birds, such as Baltimore oriole, yellow billed cuckoo and Swainson's hawk, by removing non-native trees.

VII. Determination of effects:

A. Explanation of effects of the action on species and critical habitats in items III. A, B & C:

1. There is no federally designated critical habitat on the action area (Kirwin NWR) and the CCP does not find a need to propose designating critical habitat within the Refuge at this time.

B. Explanation of actions to be implemented to reduce adverse effects:

- Continuing to provide for priority public use by maintaining the current hunt plan would not have any negative affects on bald eagles, whooping cranes, interior least terns, or piping plovers.
- Increasing the area of low disturbance to migrating and wintering waterfowl and bald eagles by implementing a seasonal boat closure on most of the reservoir (October 1-April 1) at low water levels would be a benefit to bald eagles, potential benefit to whooping cranes, and have no affect on interior least terns, or piping plovers.
- Complying with current laws, regulations, and policies by discontinuing non-wildlife dependent recreational uses, such as camping, jet/water skiing, swimming. This would be a benefit by reducing disturbance and increasing available habitat to bald eagles, interior least terns, piping plovers, and it would have no affect on whooping cranes.
- Increasing efforts to control noxious weeds by installing a new crop field below the high water line, in the Bow Creek arm. This would have no affect on interior least terns, piping plovers, or whooping cranes. It may affect bald eagles, but it is not likely to due to the many other trees around the Refuge for them to roost in.
- Continuing to improve grassland bird habitat by removing invasive trees, and restoring mixed grass prairie to most of the croplands above the high water line. This will not have any affect on bald eagles, whooping cranes, interior lease terns, or piping plovers.
- Continuing to improve the health of the riparian corridors to benefit declining migratory birds, such as Baltimore oriole, yellow billed cuckoo and Swainson’s hawk, by removing non-native trees. Removing non-native trees from the riparian areas may affect bald eagles, but it is not likely to due to the many other trees around the Refuge for them to roost in. This action will not affect whooping cranes, interior least terns, or piping plovers.

VIII. Effect determination and response requested
[* = optional]

A. Listed species/designated critical habitat:

Determination	Response requested
No effect/no adverse modification (species: _____)	_____ *Concurrence
May affect, but is not likely to adversely affect species/adversely modify critical habitat	_____ <u>X</u> Concurrence

(species: all 4)

May affect, and is likely to adversely affect species/modify critical habitat (species:_____)

_____ Formal Consultation

B. Proposed species/proposed critical habitat:

Determination

Response requested

No effect on proposed species/no adverse modification of proposed critical habitat (species: _____)

_____ *Concurrence

Is likely to jeopardize proposed species adversely modify proposed critical habitat (species: _____)

_____ Conference

C. Candidate Species:

Determination

Response requested

no effect (species:_____)

_____ *Concurrence

is likely to jeopardize candidate species (species: _____)

_____ Conference

Craig B Mowry

6-6-06

Craig Mowry, Refuge Manager, Kirwin National Wildlife Refuge

Date

IX. Reviewing ESO Evaluation:

- A. Concurrence X Nonconcurrence _____
- B. Formal Consultation required _____
- C. Conference required _____
- D. Informal conference required _____
- E. Remarks

Michael J. Leibel

6/1/06

Signature
[Title/office of reviewing official]

Date

Appendix L—Refuge Operations Needs System Projects

	<i>Initial Year (thousands \$)</i>	<i>Recurring Annual (thousands \$)</i>
Biologist	\$151	\$86
Park Ranger (LEO)	\$140	\$75
Deputy Refuge Manager	\$151	\$86
Outdoor Recreation Planner	\$140	\$75
Equipment Operator	\$140	\$75
Habitat Projects (invasive plants)	\$283	\$30
Research/Monitoring (RLGIS)	\$56	\$8
Total	\$1,061	\$435

Appendix M—Maintenance Management System Projects

<i>Project</i>	<i>Cost</i>
Replace 1982 tractor	\$88,000
Expand visitor center	\$627,000
Replace unsafe shop building	\$410,000

Bibliography

- Albertson, F.W. 1937. Ecology of mixed prairie in west central Kansas. *Ecological Monographs* 7:481–547.
- American Bird Conservancy. Undated. List of globally Important Bird Areas in Kansas. Available from: <<http://www.abcbirds.org/iba/kansas.htm>> Accessed June 2005.
- . 1998. Check-list of North American Birds. 7th edition. American Ornithologists' Union, Washington, D.C.
- . 2000. Forty-second supplement to the American Ornithologists' Union Check-list of North American Birds. *Auk* 117:847–858.
- . 2002. Forty-third supplement to the American Ornithologists' Union Check-list of North American Birds. *Auk* 119:897–906.
- American Ornithologists' Union. 2003. Forty-fourth supplement to the American Ornithologists' Union Check-list of North American Birds. *Auk* 120:923–931.
- Arnold, T.W.; Higgins, K.F. 1986. Effects of Shrub Coverages on Birds of North Dakota Mixed-grass Prairies. *The Canadian Field-Naturalist* 100(1):10–14. Ottawa, Canada.
- Bailey, J.K.; Schweitzer, J.A.; Whitman, T. G. 2001. Saltcedar negatively affects biodiversity of aquatic macroinvertebrates. *Wetlands* 21:442–447.
- Baker, L.A. 1992. Introduction to nonpoint source pollution in the United States and prospects for wetland use. *Ecological Engineering* 1:1–26.
- Bakker, K.K. 2002. The Effect of Woody Vegetation on Grassland Nesting Birds. College of Natural Sciences, Dakota State University, Madison, South Dakota.
- BBC Research & Consulting. ARCview 9.0, ESRI.
- Boyle, S.A.; Samson, F.B. 1985. Effects of Non-consumptive Recreation on Wildlife: A Review. *Wildlife Society Bulletin* 13:110–116.
- Bragg, T.B.; Steuter, A.A. 1996. Prairie Ecology—The Mixed Prairie. Chapter 4 *In* *Prairie Conservation: Preserving North America's most endangered ecosystem*. F.B. Sampson and F.L. Knopf, editors. Island Press, Covelo, California.
- Busby. Sept. 2005. Personal observation.
- Christensen, V.G. 1999. Deposition of selenium and other constituents in reservoir bottom sediment of the Solomon River Basin, north-central Kansas. U.S. Geological Survey, Water Resources Investigations Report 99-4230.
- Christensen, V.G.; Juracek, K.E. 2001. Variability of metals in reservoir sediment from two adjacent basins in the central Great Plains. *Environmental Geology* 40:470–481.
- Currier, P.J. 1988. Plant species composition and groundwater levels in a Platte River wet meadow. Pages 19–24 *in* T. B. Bragg and J. Stubbendieck, editors. *Proceedings of the 11th North American Prairie Conference*. University of Nebraska, Lincoln, Nebraska.
- Dahlgren, R.B.; Korschgen, C.E. 1992. Human Disturbances of Waterfowl: An Annotated Bibliography. U.S. Department of the Interior, Fish and Wildlife Service, Resource Publication 188, Washington, D.C.
- Dechant, J.A.; Dinkins, M.F.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Parkin, B.D.; Euliss, B.R. 2003a. Effects of management practices on grassland birds: Upland Sandpiper. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/upsa/upsa.htm>> (Version 12DEC2003).
- Dechant, J.A.; Dinkins, M.F.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Euliss, B.R. 2003b. Effects of management practices on grassland birds: Vesper Sparrow. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/vesp/vesp.htm>> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Nenneman, M.P.; Euliss, B.R. 2003c. Effects of management practices on grassland birds: Short-eared Owl. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/seow.htm>> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Zimmerman, A.L.; Euliss, B.R. 2003d. Effects of management practices on grassland birds: Dickcissel. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife

- Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/dick/dick.htm>> (Version 12DEC2003).
- Dechant, J.A., M.L. Sondreal, D.H. Johnson, L.D. Igl, C.M. Goldade, B.D. Parkin, and B.R. Euliss. 2003e. Effects of management practices on grassland birds: Lark Sparrow. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/lasp.htm>> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Rabie, P.A.; Euliss, B.R. 2003f. Effects of management practices on grassland birds: Burrowing Owl. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/buow/buow.htm>> (Version 12DEC2003).
- Dechant, J.A., Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Nenneman, M.P.; Euliss, B.R. 2003. Effects of management practices on grassland birds: Short-eared Owl. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/seow.htm>> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Nenneman, M.P.; Euliss, B.R. 2003. Effects of management practices on grassland birds: Grasshopper Sparrow. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/literatr/grasbird/grsp/grsp.htm> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Zimmerman, A.L.; Euliss, B.R. 2003. Effects of management practices on grassland birds: Lark Bunting. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/larb/larb.htm>> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Rabie, P.A.; Euliss, B.R. 2003. Effects of management practices on grassland birds: McCown's Longspur. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/mclo/mclo.htm>> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Nenneman, M.P.; Euliss, B.R. 2003. Effects of management practices on grassland birds: Clay-colored Sparrow. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/ccsp/ccsp.htm>> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Zimmerman, A.L.; Euliss, B.R. 2003. Effects of management practices on grassland birds: Bobolink. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/bobo/bobo.htm>> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Zimmerman, A.L.; Euliss, B.R. 2003. Effects of management practices on grassland birds: Western Meadowlark. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/weme/weme.htm>> (Version 12DEC2003).
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Nenneman, M.P.; Euliss, B.R. 2003. Effects of management practices on grassland birds: Chestnut-collared Longspur. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/literatr/grasbird/cclo/cclo.htm> (Version 12DEC2003).
- Dieter, C.D. 1990. Causes and effects of water turbidity: a selected annotated bibliography. South Dakota Cooperative Wildlife Research Unit, South Dakota State University, Technical Bulletin Number 5.
- Dyksterhuis, E.J. 1958. Range conservation as based on sites and conditions classes. *Journal of Soil and Water Conservation* 13:151–155.
- Eddy, T.A. 1994. Phreatophyte survey and water-use estimates for nine river systems in Kansas. Proceedings of the 14th Annual North American Prairie Conference. Kansas State University, Manhattan, Kansas.
- Fredrickson, L.H. 1991. Strategies for water level manipulations in moist-soil systems. U.S. Fish and Wildlife Service, Waterfowl Management Handbook, Fish and Wildlife Leaflet 13.4.6.
- Fredrickson, L.H.; Reid, F.A. 1986. Wetland and riparian habitats: a non-game overview. Pages 58–96 *in* J. B. Hale, L. B. Best, and R. L. Clawson,

- editors. Management of non-game wildlife in the Midwest: a developing art. North-Central Section, The Wildlife Society, Grand Rapids, Michigan.
- Fredrickson, L.H.; Laubhan, M.K. 1994. Managing wetlands for wildlife. Pages 623–647 in T. A. Bookhout, editor. Research and management techniques for wildlife and habitats. Fifth edition. The Wildlife Society, Bethesda, Maryland.
- Gilbert, E. 2003. Refuge Manager, Kirwin National Wildlife Refuge.
- Gutzwiller, K.J. 1993. Serial Management Experiments: An Adaptive Approach to Reduce Recreational Impacts on Wildlife. Trans. 58th N.A. Wildlife and Natural Resources Conference, 528–536.
- Igl, L.D. 1996. Bird checklists of the United States. Jamestown, ND. Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/othrdata/chekbird/chekbird.htm>> (Version 12MAY03).
- Johnson, D.H.; Igl, L.D.; Dechant, J.A.; Sondreal, M.L.; Goldade, C.M.; Nenneman, M.P.; Euliss, B.R. 1998. Effects of management practices on grassland birds: Northern Harrier. Northern Prairie Wildlife Research Center, Jamestown, ND. 12 pages.
- Johnson, W.C.; Arbogast, A.F. 1993. Geologic map, Phillips County. Kansas Geological Survey, Map M-29.
- Kansas Department of Agriculture. 2002–2004. Available at: < <http://www.ksda.gov>>
- Knight, R.L.; Cole, D.N. 1991. Effects of Recreational Activity on Wildlife in Wildlands. Trans. 56th N.A. Wildlife and Natural Resources Conference 238–247.
- Knopf, F.L.; Samson, F.B. 1997. Conservation of grassland vertebrates. Ecological Studies 125:273–289.
- KNR. 2004. Crime Report.
- Korschgen, C.E.; George, L.S.; Green, W.L. 1985. Disturbance of Diving Ducks by Boaters on a Migrational Staging Area. Wildlife Society Bulletin 13:290–296.
- Krull, J.N. 1970. Aquatic plant-macroinvertebrate associations and waterfowl. Journal of Wildlife Management 34:707–718.
- Kuchler, A.W. 1967. Some geographic features of the Kansas prairie. Transactions of the Kansas Academy of Science 70:388–401.
- . 1972. The oscillations of the mixed prairie in Kansas. Erdkunde 26:120–129.
- . 1974. A new vegetation map of Kansas. Ecology 55:586–604.
- Kullberg, R.G. 1974. Distribution of aquatic macrophytes related to paper mill effluents in a southern Michigan stream. American Midland Naturalist 91:271–281.
- La Duke, J.C.; Wyckoff, A.M. 1986. Vascular Plants of Oakville Prairie, North Dakota. The Prairie Naturalist. 18(4): 203–210.
- Laubhan, M. 2003a. A Biological Assessment of Kirwin National Wildlife Refuge. Northern Prairie Wildlife Research Center, Jamestown, North Dakota.
- . 2003b. Ecologist, NPWRC. Personal observations. March.
- Launchbaugh, J.L.; Owensby, C.E. 1978. Kansas rangelands: their management based on a half century of research. Kansas Agricultural Experiment Station Bulletin 622.
- Leck, M.A. 1989. Wetland seed banks. Pages 283–305 in M.A. Leck, V.T. Parker, and R.L. Simpson, editors. Ecology of soil seed banks. Academic Press, San Diego, California.
- Leonard, A.R. 1952. Geology and ground-water resources of the North Fork Solomon River in Mitchell, Osborne, Smith, and Phillips counties, Kansas. State Geological Survey of Kansas. Bulletin 98.
- Logan, Brad; Johnson, William C.; Campbell, Joshua S. 2004. Geoarchaeological and GIS Modeling of Archaeological Site Locations at Kirwin National Wildlife Refuge, Phillips County, Kansas. Office of Archaeological Research, Museum of Anthropology, University of Kansas, Lawrence, submitted to the Bureau of Reclamation, Nebraska-Kansas Area Office, Grand Island, Nebraska.
- Marion, J.L.; Cole, D.N. 1996. Spatial and Temporal Variation in Soil and Vegetation Impacts on Campsites. Ecological Application, 6(2):520–530.
- Marzluff, J.M.; Ewing, K. 2001. Restoration of Fragmented Landscapes for the Conservation of Birds: A General Framework and Specific Recommendations for Urbanizing Landscapes. Restoration Ecology 9(3): 280–292.
- Meyer, J.L.; Kaplan, L.A.; Newbold, D.; Strayer, D.L.; Woltemade, C.J.; Zedler, J.B.; Beilfuss, R.; Carpenter, Q.; Semlitsch, R.; Watzin, M.C.; Zedler, P.H. 2003. Where Rivers Are Born: The Scientific Imperative for Defending Small Streams and Wetlands. Small Stream Report.
- Mitsch, W.J.; Gosselink, J.G. 1993. Wetlands. Second edition. Van Nostrand Reinhold, New York, New York.
- Moore, R.C.; Landes, K.K. 1937. Geologic map of Kansas. Kansas Geological Survey.

- Mowry, C. 2005. Refuge Manager. Personal communication with Adam Orens, Research Associate, BBC Research & Consulting.
- Naugle, D.E.; Higgins, K.F.; Bakker, K.K. 2000. A synthesis of the Effects of Upland Management Practices on Waterfowl and Other Birds in the Northern Great Plains of the U.S. and Canada. College of Natural Resources, University of Wisconsin-Stevens Point, WI. Wildlife Technical Report 1.
- Niemuth, N.D. 2000. Land use and vegetation associated with greater prairie-chicken leks in an agricultural landscape. *Journal of Wildlife Management* 64.
- Palmer, W.C. 1965. Meteorological drought. Research Paper Number 45. Department of Commerce, Washington, D.C.
- Peak, R.G. 2002. Factors affecting avian species richness, density, and nest success in riparian corridors: M.S. thesis, University of Missouri, Columbia.
- PCensus. 2004. PCensus-USA 7.6, Tetrad Computer Applications, Bellingham, WA.
- Phillips, M.A. 1980. Ground-Water Reconnaissance of the North Fork Solomon River Basin above Kirwin Dam Northwest Kansas. U.S. Bureau of Reclamation, Water and Power Resources Service, Region 7, Denver, Colorado.
- Policy Research Institute. 2005. Kansas County profile report: Phillips County. Kansas Center for Community and Economic Development. Policy Research Institute, University of Kansas.
- Pomerantz, G.A.; Decker, D.J.; Goff, G.R.; Purdy, K.G. 1988. Assessing Impact of Recreation on Wildlife a Classification Scheme. *Wildlife Society Bulletin* 16:58-62.
- Robel, R.J. 1961. Water depth and turbidity in relation to growth of sago pondweed. *Journal of Wildlife Management* 25:436-438.
- Robel, R.J.; Briggs, J.N.; Dayton, A.D.; Hulbert, L.C. 1970. Relationships between visual obstruction measurements and weight of grassland vegetation. *J. Range Manage.* 23:295-297.
- Rodgers, R. 2003. Tree Invasion. Wildlife & Parks, Kansas Department of Wildlife and Parks, Hays, Kansas.
- Ross, J.A., compiler. 1991. Geologic map of Kansas. Kansas Geologic Survey, Map M-23, 1:500,000.
- Saab, V. 1999. Importance of spatial scale to habitat use by breeding birds in riparian forests: a hierarchical analysis. *Ecological Applications* 9:135-151.
- Samson, F.B.; Knopf, F.L. 1994. Prairie conservation in North America. *Bioscience* 44:418-421.
- Sauer, C.O. 1950. Grassland climax, fire, and man. *Journal of Range Management* 3:16-21.
- Sauer, J.R.; Hines, J.E.; Fallon, J. 2004. The North American Breeding Bird Survey, Results and Analysis 1966-2003. USGS Patuxent Wildlife Research Center, Laurel, Maryland Version 2004.1. Available online at <<http://www.mbr-pwrc.usgs.gov/bbs/bbs.html>>
- Scott, M.L.; Wondzell, M.A.; Auble, G.T. 1993. Hydrograph characteristics relevant to the establishment and growth of western riparian vegetation. Pages 237-246 in H. J. Morel-Seytoux, editor. Proceedings of the thirteenth annual American Geophysical Union Hydrology Days. Hydrology Days Publications, Atherton, California.
- Sevigny, M.S. 1998. Foraging behavior and habitat selection by spring migrants in north central Kansas. Ms. Thesis, Fort Hays State University, Fort Hays, Kansas.
- Skagen, S.K.; Knopf, F.L. 1994. Migrating shorebirds and habitat dynamics at a prairie wetland complex. *Wilson Bulletin* 106:91-105.
- Skinner, R.M. 1975. Grassland Use Patterns and Prairie Bird Populations in Missouri. *Grassland Management* 171-180.
- Teskey, R.D.; Hinckley, T.M. 1977. Impact of water level changes on woody riparian and wetland communities, Volume I: Plant and soil resources. U.S. Fish and Wildlife Service, Biological Services Program. FWS/OBS-77/58.
- The Nature Conservancy. 1998. Ecoregional Based Conservation in the Central Shortgrass Prairie 1-92.
- U.S. Bureau of Reclamation. 1984. Solomon River Basin water management study, Kansas. U.S. Department of the Interior, Special Report.
- . 2002. Solomon River Basin final environmental assessment: conversion of long-term water service contracts to repayment contracts. Nebraska-Kansas Area Office, Grand Island, Nebraska. May.
- U.S. Census Bureau. 2000. Summary file 3, American Factfinder. Available at: <<http://factfinder.census.gov/>>
- U.S. Fish and Wildlife Service. 1976. Effect of boating on management of the Ruby Lake National Wildlife Refuge, Nevada. Environmental Assessment. Department of Interior, U.S. Fish and Wildlife Service, Portland, OR.
- . 1994. Whooping Crane Recovery Plan. Albuquerque, New Mexico.

- . 1996. Kirwin National Wildlife Refuge Comprehensive Management Plan. Denver, Colorado.
- . 1999. Fulfilling the Promise: Visions for Wildlife, Habitat, People and Leadership in Preparation for the National Wildlife Refuge System Conference. FWS-WILD or <<http://info.fws.gov/pubs3.html>>
- . 2001. U.S. Fish and Wildlife Service Presence in Kansas. Available: <http://mountain-prairie.fws.gov/reference/briefing_book_ks_2000.pdf> March.
- . 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. Online version available at <<http://migratorybirds.fws.gov/reports/bcc2002.pdf>>
- U.S. Geological Survey. 2003. A biological assessment of Kirwin National Wildlife Refuge. Northern Prairie Wildlife Research Center. March 26–27.
- . 2005. Reservoir sediment Studies in Kansas. Available from: <<http://ks.water.usgs.gov/Kansas/studies/ressed/>>
- Uresk, D.W.; Boldt, C.E. 1986. Effect of Cultural Treatments on Regeneration of Native Woodlands on the Northern Great Plains. *The Prairie Naturalist* 18(4):193–201.
- Van der Valk, A.G.; Davis, C.B. 1978. The role of seed-banks in the vegetation dynamics of prairie glacial marshes. *Ecology* 59:322–335.
- Voigts, D.K. 1976. Aquatic invertebrate abundance in relation to changing marsh vegetation. *American Midland Naturalist* 95:313–322.
- Wildlife Habitat Management Institute. 1999. Grassland Birds. Fish and Wildlife Habitat Management Leaflet 8.
- Winter, M.; Johnson, D.H.; Donovan, T.M.; Svedarsky, W.D. 1999. Evaluation of the Bird Conservation Area Concept in the Northern Tallgrass Prairie, Annual Report: 1998. Jamestown, North Dakota: Northern Prairie Wildlife Research Center