# Glossary

**ac**—Acre.

**accessible**—Pertaining to physical access to areas and activities for people of different abilities, especially those with physical impairments.

**A.D.**—Anno Domini, "in the year of the Lord."

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

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

**amphibian**—Class of cold-blooded vertebrates that includes frogs, toads, and salamanders.

**annual**—Plant that flowers and dies within 1 year of germination.

**BAER**—Burned Area Emergency Response.

**BAR**—Burned Area Rehabilitation.

**baseline**—Set of critical observations, data, or information used for comparison or a control.

**biological control**—Organisms or viruses used to control invasive plants or other pests.

**biological diversity, biodiversity**—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 ("Fish and Wildlife Service Manual" 052 FW 1.12B). The National Wildlife Refuge System's focus is on indigenous species, biotic communities, and ecological processes.

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

**breeding habitat**—Environment used by migratory birds or other animals during the breeding season.

**canopy**—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.

**cfs**—Cubic feet per second.

**cm**—Centimeter.

**$CO_2$**—Carbon dioxide.

**Code of Federal Regulations (CFR)**—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.

**Compact**—Montana House Bill Number 717–Bill to Ratify Water Rights Compact.

**Compact Commission**—Montana Reserved Water Rights Compact Commission.

**compatibility determination**—See compatible use.

**compatible use**—Wildlife-dependent recreational use or any other use of a refuge or district 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 or district ("Draft Fish and Wildlife 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)**—Document that describes the desired future conditions of the refuge or district and provides long-range guidance and management direction for the refuge manager to accomplish the purposes of the refuge or district, contribute to the mission of the Refuge System, and meet other relevant mandates ("Draft Fish and Wildlife Service Manual" 602 FW 1.5).

**concern**—See issue.

**cool-season grass**—Grass that begins growth earlier in the season and often becomes dormant in summer; grasses that germinate at lower temperatures. Examples of cool-season grasses in the refuge complex are western wheatgrass, needle and thread, and green needlegrass.

**conservation**—Management of natural resources to prevent loss or waste; actions may include preservation, restoration, and enhancement.

**conservation easement**—Perpetual agreement entered into by a landowner and the Service by which a landowner gives up or sells one or more of the rights on their property for conservation purposes, with terms set by the Service. In return for a single lump-sum payment, the landowner agrees not to drain, burn, level, or fill habitats covered by the easement. Conservation easements generally prohibit the cultivation of grassland and wetland habitats while still permitting the landowner traditional grazing uses. A single-habitat conservation easement is often referred to as either a wetland easement or a grassland easement.

**coordination area**—Wildlife management area made available to a State by a "cooperative agreement between the United States Fish and Wildlife Service and the State fish and game agency pursuant to section 4 of the Fish and Wildlife Coordination Act (16 U.S.C. 664); or (B) by long-term leases or agreements pursuant to the Bankhead–Jones Farm Tenant Act (50 Stat. 525; 7 U.S.C. 1010 et seq.)." States manage coordination areas, but they are part of the Refuge System. CCPs are not required for coordination areas.

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

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

**dense nesting cover (DNC)**—Composition of grasses and forbs that allows for a dense stand of vegetation that protects nesting birds from the view of predators, usually consisting of one to two species of wheatgrass, alfalfa, and sweetclover.

**DEQ**—Montana Department of Environmental Quality.

**district**—See wetland management district

**district purpose**—See purpose of the refuge.

**disturbance**—Significant alteration of habitat structure or composition from natural causes such as wildfire or human-caused activities and development such as timber harvest and road building.

**DNC**—See dense nesting cover.

**DNRC**—Montana Department of Natural Resources and Conservation.

**drawdown**—Manipulating the water level in an impoundment to allow for the natural drying-out cycle of a wetland.

**duck, dabbling**—Duck that mainly feeds on vegetable matter by upending on the water surface or by grazing and only rarely dives.

**duck, diving**—Duck that mainly feeds by diving through the water.

**EA**—See environmental assessment.

**easement, flowage**—Easement signed by the landowner granting the Service the right to maintain and operate an artificial lake or raise the water of a natural lake or stream—by means of dams, dikes, fills, ditches, spillways, and other structures—for water conservation, drought relief, migratory birds, and other wildlife conservation purposes.

**easement, refuge**—Easement signed by the landowner granting the Service the right to control hunting and trapping, to maintain a wildlife conservation demonstration unit, and to maintain a closed refuge and reservation for migratory birds and other wildlife.

**EC**—Electrical conductivity.

**ecosystem**—Dynamic and interrelating complex of plant and animal communities and their associated nonliving environment; a biological community, together with its environment, functioning as a unit. For administrative purposes, the U.S. Fish and Wildlife 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.

**ecotype**—Subspecies or race that is especially adapted to a particular set of environmental conditions.

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

**endangered species, Federal**—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**—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; species with a population at a critically low level or having habitat that has been degraded or depleted to a significant degree.

**environmental assessment (EA)**—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 that 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**—U.S. Environmental Protection Agency.

**evapoconcentration**—Concentration of chemical constituents in a liquid due to evaporative processes.

**extinction**—Complete disappearance of a species from the earth; no longer existing.

**extirpation**—Extinction of a population; eradication of a species within a specified area.

**°F**—Temperature in degrees Fahrenheit.

**fauna**—Vertebrate and invertebrate animals in an area.

**Federal trust resource**—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, and native plant or wildlife species found on a national wildlife refuge.

**Federal trust species**—Species where the Federal Government has primary jurisdiction including federally endangered or threatened species, migratory birds, anadromous fish, and certain marine mammals.

**fee title**—Acquisition of most or all of the rights to a tract of land.

**Federal land**—Public land owned by the Federal Government including lands such as national wildlife refuges, national forests, and national parks.

**flora**—Plant species in an area.

**FmHA**—Farmers Home Administration.

**forb**—Broad-leaved herbaceous plant; 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**—Alteration of a large block of habitat that creates isolated patches of the original habitat interspersed with a variety of other habitat types; process of reducing the size and connectivity of habitat patches, making movement of individuals or genetic information between parcels difficult or impossible.

**ft**—Foot, feet, length measure.

**full-time equivalent**—One or more job positions with tours of duty that, when combined, equate to one person employed for the standard Government work-year.

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

**Geographic Information System (GIS)**—Computer system capable of storing and manipulating spatial data; set of computer hardware and software for analyzing and displaying spatially referenced features (such as points, lines and polygons) with nongeographic attributes such as species and age.

**GIS**—See Geographic Information System.

**GLO**—General Land Office.

**glyphosate**—Glyphosate N–(phosphonomethyl) glycine; broad-spectrum systemic herbicide used to kill invasive plants, especially perennials. Glyphosate inhibits an enzyme involved in the synthesis of the amino acids tyrosine, tryptophan, and phenylalanine; absorbed through foliage and translocated to growing points, it is only effective on actively growing plants and is not effective as a pre-emergence herbicide.

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

**gpm**—Gallons per minute, water flow.

grassland tract—Contiguous area of grassland that is unfragmented.

**GPS**—Global Positioning System.

**GS**—General schedule pay rate schedule for certain Federal positions.

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

**habitat type, vegetation type, cover type**—Land classification system based on the concept of distinct plant associations.

**HAPET**—Habitat and Population Evaluation Team.

**hemimarsh**—Emergent phase of a seasonal or semipermanent wetland where the ratio of open-water area to emergent vegetation cover is about 50:50 and vegetation and open-water areas are highly interspersed.

**hydroperiod**—Period of time during which soils, waterbodies, and sites are wet.

**impoundment**—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.

**Improvement Act**—National Wildlife Refuge System Improvement Act of 1997.

**in**—Inch.

**indigenous**—Originating or occurring naturally in a particular place.

**integrated pest management**—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.

**"interseed"**—Mechanical seeding of one or several plant species into existing stands of established vegetation.

**introduced species**—Species present in an area due to intentional or unintentional escape, release, dissemination, or placement into an ecosystem as a result of human activity.

**invasive species**—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.

**inviolate sanctuary**—Place of refuge or protection where animals and birds may not be hunted.

**issue**—Any unsettled matter that requires a management decision; for example, 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 Fish and Wildlife Service Manual" 602 FW 1.5).

**issue remark**—An industry term in the State of Montana denoting official documentation of a problem with a water rights claim, such as an incorrect identification of the place of water diversion or use, an incorrect priority date, or a claim in excess of the amount of water historically put to beneficial use.

**lek**—An elevated patch of grassland used by male grouse to display and challenge one another to attract females; the elevation not only provides a clear view to interested female grouse, but it also enables the males to spot predators at a distance.

**management alternative**—See alternative.

**management plan**—Plan that guides future land management practices on a tract of land.

**MBOGC**—Montana Board of Oil and Gas Conservation.

**mg/L**—Milligrams per liter; measure of weight per volume, in this case, salts in water.

**migration**—Regular extensive, seasonal movements of animals between their breeding regions and wintering regions; to pass periodically from one region or climate to another for feeding or breeding.

**migratory bird**—Bird species that follows a seasonal movement from its breeding grounds to its wintering grounds; includes waterfowl, shorebirds, raptors, and songbirds.

**mission**—Succinct statement of purpose or reason for being.

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

**mixed-grass prairie**—Transition zone between tallgrass prairie and shortgrass prairie dominated by grasses of medium height that are about 2–4 feet tall; soils are not as rich as in the tallgrass prairie and moisture levels are less.

**mmhos/cm**—Millimhos per centimeter; measure of a solution's ability to conduct electricity, in this case, for salinity.

**MOA**—Memorandum of agreement.

**monitoring**—Collecting information to track changes of selected parameters over time.

**MOU**—Memorandum of understanding.

**mS**—MilliSiemens.

**MSGWG**—Montana Sage Grouse Working Group.

**national wildlife refuge (NWR)**—Designated area of land, water, or an interest in land or water within the National Wildlife Refuge System but does not include coordination areas; 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 (Improvement Act)**—Set administrative policy for all refuges and units in the National Wildlife Refuge System; defined a unifying mission for the Refuge System; established the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation); established a formal process for determining appropriateness and compatibility; established the responsibilities of the Secretary of the Interior for managing and protecting the Refuge System; required a comprehensive conservation plan for each unit by the year 2012; amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

**native species**—Species that, other than as a result of an introduction, historically occurred or currently occurs in a specific ecosystem.

**neotropical migrant, migratory bird**—Bird species that breeds north of the United States and Mexican border and winters primarily south of this border.

**NEPA**—National Environmental Policy Act.

**nest success**—Chance that a nest will hatch at least one egg.

**nongovernmental organization**—Group that is not comprised of Federal, State, tribal, county, city, town, local, or other governmental entities.

**North American Waterfowl Management Plan**—Recognized that the recovery and perpetuation of waterfowl populations depends on restoring wetlands and associated ecosystems throughout the United States and Canada; established cooperative international efforts and joint ventures comprised of individuals, corporations, conservation organizations, and local, State, Provincial, and Federal agencies drawn together by common conservation objectives.

**noxious weed**—Plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, natural resources of the United States, public health, or the environment.

**NRCS**—Natural Resources Conservation Service.

**NWR**—See national wildlife refuge.

**objective**—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 provides the basis

for determining management strategies; should be attainable, time-specific, and stated quantitatively to the extent possible (if cannot be stated quantitatively, may be stated qualitatively) ("Draft Fish and Wildlife Service Manual" 602 FW 1.5).

**palustrine**—Relating to a system of inland, nontidal wetlands characterized by the presence of trees, shrubs, and emergent vegetation (vegetation that is rooted below water but grows above the surface); palustrine wetlands range from permanently saturated or flooded land to land that is wet only seasonally.

**Partners in Flight program**—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.

**partnership**—Contract or agreement entered into by two or more individuals, groups of individuals, organizations, or agencies in which each agrees to furnish a part of the capital or some in-kind service such as labor for a mutually beneficial enterprise.

**patch**—Area distinct from that around it; distinguished from its surroundings by environmental conditions.

**perennial**—Lasting or active through the year or through many years; waterbody that retains water year-round; plant species that has a lifespan of more than 2 years.

**planning team**—Group of individuals that prepares the comprehensive conservation plan; interdisciplinary in membership and function; generally consists of a team leader, refuge manager, biologist, staff specialists or other representatives of Service programs, ecosystems or regional offices, and State or tribal partners' wildlife agencies as appropriate.

**planning team leader**—Professional planner or natural resource specialist knowledgeable of the requirements of National Environmental Policy Act and who has planning experience; manages the refuge planning process and ensures compliance with applicable regulatory and policy requirements.

**planning unit**—National wildlife refuge or wetland management district, or an ecologically or administratively related refuge complex, or a distinct unit of a refuge; may include lands outside refuge or district boundaries.

**plant community**—Assemblage of plant species unique in its composition that occurs in particular locations under particular influences; 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 such as ponderosa pine or bunchgrass.

**ppt**—Parts per thousand.

**preferred alternative**—Alternative selected to become the final plan; it can be the proposed action, the no-action alternative, another alternative, or a combination of actions and alternatives described in the draft CCP and environmental analysis document.

**prescribed fire**—Skillful application of fire to natural fuels under specified conditions such as weather, fuel moisture, and soil moisture that allows 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.

**pristine**—Typical of original conditions.

**private land**—Land owned by a private individual, a group of individuals, or a nongovernmental organization.

**private landowner**—Individual, group of individuals, or nongovernmental organization that owns land.

**private organization**—Nongovernmental organization.

**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 or district's purposes; hunting, fishing, wildlife observation, photography, environmental education, and interpretation; also see wildlife-dependent recreational use.

**proposed action**—Alternative proposed to best achieve the purpose, vision, and goals of a refuge or district (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 (may include anyone outside the core planning team); anyone 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 domain, reserved from**—See reserved from public domain.

**public involvement**—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 is given to public views when shaping decisions for refuge and district management.

**purpose of the refuge, district**—Reason for establishment and management of a national wildlife refuge or wetland management district that is specified in or derived from the law, proclamation, Executive order, agreement, public land order, donation document, or administrative memorandum establish-

ing authorization or expansion of a refuge, refuge unit, refuge subunit, or district ("Draft Fish and Wildlife Service Manual" 602 FW 1.5).

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

**Reclamation**—Bureau of Reclamation.

**refuge**—See national wildlife refuge.

**Refuge Operations Needs System**—National database that contains the unfunded operational needs of each refuge and district; 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**—Activity on a refuge, except administrative or law enforcement activity, carried out by or under the direction of an authorized Service employee.

**reserved from public domain**—Public land placed into permanent reserved status, such as a national wildlife refuge, that is not held in private ownership.

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

**rest**—Free from biological, mechanical, or chemical manipulation in reference to Service lands.

**restoration**—Management emphasis designed to move ecosystems to desired conditions and processes such as healthy upland habitats and aquatic systems.

**riparian area, habitat, corridor**—Area that transitions from a terrestrial to aquatic ecosystem including streams, lakes, wet areas, and adjacent plant communities and their associated soils that have free water at or near the surface; land and its vegetation immediately adjoining and directly influenced by a stream.

**RLGIS**—Refuge Lands Geographic Information System.

**"round-outs"**—Odd shapes and holes of non-Federal land within the boundary of Refuge System units that are straightened, or made whole, by the purchase of land tracts.

**runoff**—Water from rain, melted snow, or agricultural or landscape irrigation that flows over the land surface into a waterbody.

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

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

**senior water rights**—Rights to water that were legally filed earlier than junior (more recent) water rights, having precedence.

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

**Service Asset Maintenance Management System**—National database that contains the unfunded maintenance needs of each refuge and district; projects include those required to maintain existing equipment and buildings and to correct safety deficiencies for the implementation of approved plans and to meet goals, objectives, and legal mandates.

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

**shorebird**—Suborder of birds (Charadrii) such as a plover or snipe that frequents the seashore or mudflat areas.

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

**special use permit**—Special authorization from the refuge manager for any service, facility, privilege, or product of the soil provided at the Service's 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**—Species, while not falling under the definition of special status species, that is of management interest by virtue of being Federal trust species such as migratory birds, important game species, or significant keystone species; species that has a documented or apparent population decline, a small or restricted population, or dependence on restricted or vulnerable habitats.

**stand**—Homogenous area of vegetation with more or less uniform soils, landform, and vegetation.

**stepdown management plan**—Specific plan that provides the details necessary to carry out management strategies identified in the comprehensive conservation plan ("Draft Fish and Wildlife Service Manual" 602 FW 1.5).

**strategy**—Specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives ("Draft Fish and Wildlife Service Manual" 602 FW 1.5).

**submergent**—Vascular or nonvascular plant adapted to grow in water, either rooted or nonrooted, that lies entirely beneath the water surface except for flowering parts in some species.

**TDS**—Total dissolved solids (salts).

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

**threatened species, State**—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 resource**—See Federal trust resource.

**trust species**—See Federal trust species.

**µmhos/cm**—Micromhos per centimeter; measure of a solution's ability to conduct electricity, in this case, for salinity.

**U.S.**—United States.

**µS/cm**—MicroSiemens per centimeter; measure of a solution's ability to conduct electricity, in this case, for salinity.

**U.S.C.**—United States Code.

**USDA**—United States Department of Agriculture.

**U.S. Fish and Wildlife Service (Service, FWS)**—Part of U.S. Department of the Interior; 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 National Wildlife Refuge System comprised of national wildlife refuges and waterfowl production areas. The Service operates national fish hatcheries and ecological service field stations, 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, oversees the Federal aid program that distributes millions of dollars in excise taxes on fishing and hunting equipment to State wildlife agencies, and helps foreign Governments with their conservation efforts.

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

**U.S. Geological Survey**—Federal agency in the U.S. Department of the Interior 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.

**ungulate**—Hoofed mammal.

**vision statement**—Concise statement of the desired future condition of a planning unit, based primarily on the Refuge System mission, specific refuge or district purposes, and other relevant mandates ("Draft Fish and Wildlife Service Manual" 602 FW 1.5).

**wading birds**—Birds having long legs that enable them to wade in shallow water such as egret, great blue heron, black-crowned night-heron, and bittern.

**waterbird**—Birds dependent on aquatic habitats to complete portions of their life cycles.

**waterfowl**—Category of birds that groups ducks, geese, and swans.

**watershed**—Geographic area within which water drains into a particular river, stream, or waterbody.

**wetland**—Land transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

**wetland management district**—Land that the Refuge System acquires with Federal Duck Stamp money for restoration and management, primarily as prairie wetland habitat critical to waterfowl and other wetland birds.

**WG**—Wage Grade schedule, pay rate schedule for certain Federal positions.

**wildfire**—Free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands.

**wildland fire**—Wildfire or prescribed fire that occurs in undeveloped land.

**wildlife-dependent recreational use**—Use of a refuge or district involving hunting, fishing, wildlife observation, photography, environmental education, or interpretation; also see priority public use.

**wildlife management**—Practice of manipulating wildlife populations either directly through regulating the numbers, ages, and sex ratios harvested or indirectly by providing favorable habitat conditions and alleviating limiting factors.

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

**WPA**—Waterfowl production area.

# Appendix A

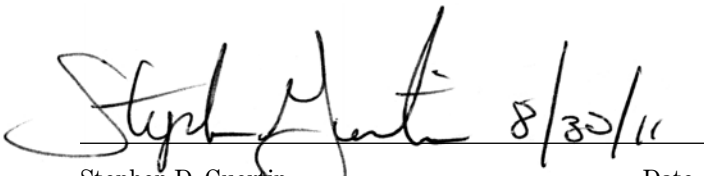
*Environmental Compliance*

### Environmental Action Statement

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

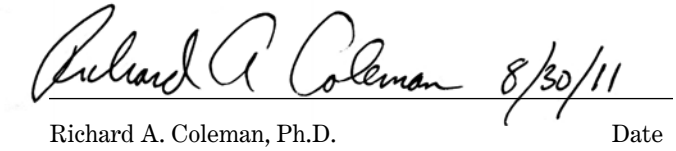
Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record.

I have determined that the action of implementing the "Comprehensive Conservation Plan—Bowdoin National Wildlife Refuge Complex" 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.



Stephen D. Guertin — Date
Regional Director, Region 6
U.S. Fish and Wildlife Service
Lakewood, Colorado

W. Dean Rundle — Date
Refuge Supervisor, Region 6
U.S. Fish and Wildlife Service
Lakewood, Colorado



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

Carmen Luna — Date
Refuge Manager
Bowdoin National Wildlife Refuge Complex
U.S. Fish and Wildlife Service
Malta, Montana

## Finding of No Significant Impact

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

Three separate alternative analyses were completed for the Bowdoin National Wildlife Refuge Complex to determine their effectiveness in achieving the refuge complex purposes and their impacts on the human environment. The three analyses include:

1. Overall management of the Bowdoin National Wildlife Refuge Complex
2. Divestiture of Lake Thibadeau National Wildlife Refuge
3. Addressing the increasing salinity and resulting blowing salts on Bowdoin National Wildlife Refuge

### 1. Overall Refuge Complex Management

- Alternative A, the "no-action" alternative, would continue current management.

- Alternative B focuses on restoring, protecting, and enhancing native mixed-grass prairie and maintaining quality wetland habitat for target migratory and resident birds within the Bowdoin National Wildlife Refuge Complex. Invasive and nonnative plants that are causing habitat losses and fragmentation would be controlled or eradicated. Enhanced wetlands would be managed to mimic natural conditions for wetland-dependent migratory birds during migration and during the breeding and nesting season. The Service would pursue additional water deliveries to better manage wetland habitats.

  Visitor services programs would be enhanced, providing additional opportunities for staff- and volunteer-led programs to provide a greater understanding of the purposes of the refuge complex, the importance of conserving migratory birds and the unique mixed-grass prairie and wetlands, and an awareness of the mission of the U.S. Fish and Wildlife Service and the National Wildlife Refuge System. The Service would work with the State to investigate the potential for offering a safe, compatible, and quality big-game hunt at Bowdoin Refuge. The refuge complex would work with partners to begin developing a comprehensive cultural resources inventory.

  Implementing many of these additional efforts and programs require extra staff, funding, research, monitoring, and new and expanded partnerships. Nevertheless, even with the current staff and funding, some of the objectives of this alternative can be achieved.

- Alternative C includes most of the elements in alternative B. In addition, the Service would improve the water management infrastructure (for example, water delivery systems, dikes, and levees to manipulate individual wetlands) to create a more diverse and productive wetland complex. Biological staff would monitor the level of sedimentation occurring in natural wetlands and plan for its removal to restore the biological integrity of these wetlands.

  Through partnerships, the Service would increase the acres of invasive species treated annually with an emphasis on preventing further encroachment of crested wheatgrass and Russian olive trees into native grassland. The refuge complex would serve as a conservation-learning center for the area. Public access would be improved to Creedman Coulee Refuge.

### 2. Divestiture of Lake Thibadeau National Wildlife Refuge

The Service developed and analyzed two alternatives to evaluate the proposal to divest Lake Thibadeau from the National Wildlife Refuge System.

- Alternative A, the "no-action" alternative, would continue current management and retain the refuge in the National Wildlife Refuge System.

- Alternative B proposes to divest Lake Thibadeau from the Refuge System. Using the divestiture model for the Mountain–Prairie Region, the Service evaluated the habitat quality and the ability of Lake Thibadeau National Wildlife Refuge to meet its purposes and support the goals of the National Wildlife Refuge System. The Service owns less than 1 percent of the lands within the 3,868-acre approved acquisition boundary; the remaining area is private land encumbered by refuge and flowage easements.

  The easements give the Service the right to manage the impoundments and the uses that occur on the water and to control hunting and trapping, but these easements do not prohibit development,

grazing, or agricultural uses. Due to upstream development in the watershed, the impoundments do not receive adequate water supplies and are often dry enough to be farmed. The surrounding uplands are also farmed or heavily grazed. This loss or lack of habitat is the basis for the Service's decision to divest this refuge.

### 3. Salinity and Blowing Salts

The Service developed and analyzed five alternatives to address the salinity and blowing salts issue for Lake Bowdoin in the Bowdoin National Wildlife Refuge. Alternatives B through E describe different processes for achieving the desired salinity concentration of 7,000 mg/L.

- Alternative A, the "no-action" alternative, would continue current management.

- Alternative B proposes to remove salts from Lake Bowdoin during the winter by pumping highly concentrated saline water via underground pipelines to evaporation ponds located in Dry Lake. These evaporation ponds would cover approximately 300 acres. The water in these ponds would evaporate during the summer to the consistency of a concentrated sludge material. The material would then be moved to a drying building located near the railroad line, where it would be loaded onto railcars and properly disposed of in an approved landfill site. Modeling showed that a water withdrawal rate of 800 acre-feet per year would be required to reach the desired salinity objective, removing about 7,000 tons of salt per year. It is estimated that the cost of this alternative would be $44 million with an annual cost of $2 million and would take up to 20 years to achieve the salinity objective.

- Alternative C evaluated the effectiveness of flooding by Beaver Creek as the primary means to remove salts from Bowdoin Refuge. Historically, flooding by Beaver Creek played a major role in removing salts from the lake system and maintaining the salt balance. Many factors have changed, altering the flood frequency of Beaver Creek. Six management options were evaluated for the effectiveness of flooding on removal of salts for modeled flood-return frequencies of 10, 25, 50, and 100 years. For all options, there would be a temporary reduction in salinity due to water entering Lake Bowdoin during a flood. However, if no water were flushed out of the lake, the long-term salinity concentrations would increase once the water level returned to normal. The time to reach the salinity objective for this alternative would likely be more than 100 years. Only the largest floods (100-year) would likely remove enough salt to freshen the system for several years following the event. Some improvement in plant diversity could occur if the reduced salinity concentrations were maintained for several years; however, absent another flood, salinity concentrations would return to unacceptable levels. The cost of implementing this alternative would depend on how many water level management structures and roads would need to be removed or modified to maximize the effects of natural flooding.

- Alternative D would use an underground injection well to force saline water deep into the ground, possibly more than 6,000 feet. Once the salinity objective was met and water in Lake Bowdoin met all applicable water quality standards, modifications to the lake's infrastructure would be evaluated to determine the best way to recreate a flow-through system that maximized the effects of natural flooding. The injection well might need periodic operation once the salinity objective was met, if flooding did not naturally flush salts from the system or if more water was not available. The time to reach the salinity objective would be 10–20 years with a water withdrawal rate of 800 acre-feet per year and accepting all sources of water and salt to match historical management. The injection well would cost at least $6.7 million, with an estimated annual operating cost of at least $100,000. Additionally, there would be a Service employee assigned to maintaining and operating the injection well and to working with the necessary contractors.

- In alternative E, a pipeline would carry saline water pumped from Lake Bowdoin to the Milk River. There are two locations for possible water discharge points: one west of Bowdoin Refuge and one east of the refuge. The distance to the Milk River at the western location would be considerably less than at the eastern location (4 miles compared with 14 miles); however, the western location would require easements across private property (from willing landowners). The quantity of water pumped to the Milk River would depend on the quantity of water flowing in the river. During high flows, more water could be pumped to the Milk River because there is more water to mix with the lake water. Similarly, during low flows, less water could be pumped to the Milk River to meet water quality guidelines. The time to reach the salinity objective would vary depending on flow rates and water quality in the Milk River. A 10- to 20-year period could be expected. The costs

to construct the pipeline would vary between $3 and $9 million, depending on the route chosen. The annual operating cost is estimated at $100,000 per year. To discharge into the Milk River, an "authorization to degrade" permit would be required due to water quality issues. While possible to request such a permit, the State has never granted one; moreover, the Service would not want to degrade any water system. Without this permit, the Service would not be able to carry out this alternative and could not achieve the salinity objective.

Based on this assessment and comments received, I have selected the following preferred alternatives:

1. Alternative B for overall refuge complex management

2. Alternative B for divestiture of Lake Thibadeau National Wildlife Refuge divestiture

3. Alternative D for salinity and blowing salts

These preferred alternatives were selected because they best meet the purposes for which the Bowdoin National Wildlife Refuge Complex was established and are preferable to the "no-action" alternatives in light of physical, biological, economic, and social factors. These preferred alternatives will continue to provide public access for wildlife-dependent recreation at Bowdoin National Wildlife Refuge Complex (i.e., hunting, fishing, wildlife observation, photography, environmental education, and interpretation).

I find that the preferred alternative are not major Federal actions 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 actions is not required.

The following is a summary of anticipated environmental effects from implementation of these preferred alternatives:

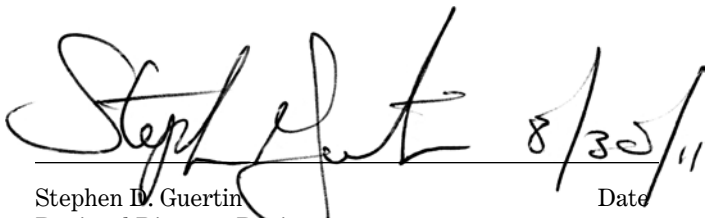
- The preferred alternatives will not adversely impact endangered or threatened species or their habitat.

- The preferred alternatives will not adversely impact archaeological or historical resources.

- The preferred alternatives 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 alternatives will not have a disproportionately high or adverse human health or environmental effect on minority or low-income populations.

The State of Montana has been notified and given the opportunity to review the comprehensive conservation plan and associated environmental assessment.



Stephen D. Guertin — Date
Regional Director, Region 6
U.S. Fish and Wildlife Service
Lakewood, Colorado

# Appendix B

*Compatibility Determinations*

## B.1 Refuge Complex Name

Bowdoin National Wildlife Refuge Complex:

- Bowdoin National Wildlife Refuge
- Black Coulee National Wildlife Refuge
- Creedman Coulee National Wildlife Refuge
- Hewitt Lake National Wildlife Refuge
- Lake Thibadeau National Wildlife Refuge
- Bowdoin Wetland Management District

## B.2 Dates Established

February 14, 1936
August 1, 1958
January 28, 1938
October 25, 1941
March 7, 1938
September 23, 1937

## B.3 Establishing and Acquisition Authorities

7 U.S.C. § 1000, 1006, 1010–13, July 22, 1937 (Bankhead–Jones Farm Act)
16 U.S.C. § 715(d), Migratory Bird Conservation Act
16 U.S.C. § 718(c), Migratory Bird Hunting and Conservation Stamp
Executive Order 7295, February 14, 1936
Executive Order 7713, September 23, 1937
Executive Order 7801, January 28, 1938
Executive Order 7833, March 7, 1938
Executive Order 8592, November 12, 1940
Executive Order 8924, October 25, 1941
Public Law 85–585, August 1, 1958
Secretarial Order 2843, November 17, 1959

## B.4 Refuge Complex Purposes

The establishing and acquisition authorities set out the purposes for each unit of the refuge complex, as described below.

### Bowdoin National Wildlife Refuge

- "As a refuge and breeding ground for migratory birds and other wildlife; "[…] and that such part of said lands as the Secretary of Agriculture may deem proper be reserved for use as a shooting area to be operated under a cooperative agreement or lease with the Montana State Game Commission or such other operating agency as may be approved. The reservation of these lands as a migratory waterfowl refuge is subject to the use thereof by [the Department of the Interior] for irrigation and other incidental purposes."*Executive Order 7295, February 14, 1936*

- As "a refuge and breeding ground for migratory birds and other wildlife […] subject to their use pursuant to the reclamation laws, and for the purpose of oil and gas development […] and for purposes incidental thereto." *Executive Order 8592, November 12, 1940*

- For "any other management purpose, for migratory birds." *Migratory Bird Conservation Act*

### Black Coulee National Wildlife Refuge

- For "water conservation, drought relief, and for migratory bird and wildlife conservation purposes […] wildlife conservation demonstration unit and closed refuge and reservation for migratory birds and other wildlife." *Three refuge and flowage easements, 1937–38*

- As "a refuge and breeding ground for migratory birds and other wildlife." *Executive Order 7801, January 28, 1938*

## Creedman Coulee National Wildlife Refuge

- For "water conservation, drought relief, and for migratory bird and wildlife conservation purposes […] wildlife conservation demonstration unit and closed refuge and reservation for migratory birds and other wildlife." *Eight refuge and flowage easements, 1937–39*

- As "a refuge and breeding ground for migratory birds and other wildlife." *Executive Order 8924, October 25, 1941*

## Hewitt Lake National Wildlife Refuge

- For "water conservation, drought relief, flood control, stock water, migratory waterfowl and wildlife conservation purposes […] and operate and maintain a closed refuge for migratory birds and other wildlife." *Section 16 land; revocable easement signed August 30, 1938*

- For "water conservation, drought relief, and for migratory bird and wildlife conservation purposes *[…]* wildlife conservation demonstration unit and closed refuge and reservation for migratory birds and other wildlife." *Two refuge and flowage easements, 1937–38*

- As "a refuge and breeding ground for migratory birds and other wildlife […] nothing herein shall affect the disposition of the oil and gas deposits therein." *Executive Order 7833. March 7, 1938*

- For "purposes of a land conservation and land utilization program." *Bankhead–Jones Farm Tenant Act*

- For "use and administration under applicable laws as refuges for migratory birds and other wildlife." *Secretarial Order 2843, November 17, 1959*

## Lake Thibadeau National Wildlife Refuge

- For "water conservation, drought relief, and for migratory bird and wildlife conservation purposes […] wildlife conservation demonstration unit and closed refuge and reservation for migratory birds and other wildlife." *Thirteen refuge and flowage easements, 1937–38*

- As "a refuge and breeding ground for migratory birds and other wildlife." *Executive Order 7713, September 23, 1937*

## Bowdoin Wetland Management District

- As "Waterfowl Production Areas subject to […] all of the provisions of such Act [*Migratory Bird Conservation Act*] […] except the inviolate sanctuary provisions." *Migratory Bird Hunting and Conservation Stamp*

- For "any other management purpose, for migratory birds." *Migratory Bird Conservation Act*

# B.6 National Wildlife Refuge System Mission

*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.*

# B.7 Description of Uses

The following uses are evaluated for compatibility within the Bowdoin National Wildlife Refuge Complex:

- Recreational hunting and trapping
- Recreational fishing
- Wildlife observation and noncommercial photography
- Environmental education and interpretation
- Cooperative farming, haying, and grazing
- Commercial filming, commercial audio recording, and commercial still photography
- Research and monitoring

# Recreational Hunting and Trapping

In addition to the site-specific regulations mentioned below, the State hunting and trapping regulations apply to all Service-owned lands in the refuge complex. Hunters and trappers may only possess and use Service-approved, nontoxic shot loads on Service-owned lands, and vehicle travel and parking is restricted to public roads, pullouts, and parking areas. The refuge complex's Web site and public use brochures provide guidance on site-specific regulations. The general hunting and trapping regulations are available from Montana Fish, Wildlife & Parks.

The CCP continues the hunting and trapping uses described for each unit below. In addition, the Service will add the following to improve recreational hunting opportunities within the refuge complex:

- The eastern portion of Bowdoin Refuge will be closed to all foot traffic from the beginning of the waterfowl hunting season through November 30 to provide continued sanctuary for waterfowl and shorebirds. Although the auto tour route remains open through this portion of the refuge, visitors need to remain inside their vehicles outside of the hunting areas.

- On Black Coulee Refuge, the Service will improve public access to compatible wildlife-dependent activities, including hunting, by developing the entrance road and parking for the reservoir.

**Bowdoin National Wildlife Refuge.** Public hunting of migratory birds (ducks, geese, coot, swan, sandhill crane, and mourning dove) and upland gamebirds (ring-necked pheasant, sharp-tailed grouse, greater sage-grouse, and gray partridge) is permitted on the western portion (approximately 40 percent) of Bowdoin Refuge excluding the railroad right-of-way and around the residences, shop, and maintenance areas, or where otherwise posted. Upland gamebird hunters must wear at least one item of blaze orange clothing above the waist.

Limited hunting of fox and coyote will be permitted through issuance of a special use permit from the refuge manager on Bowdoin Refuge. Trapping is by permit only. No leg-hold traps are permitted. Only centerfire rifles, rimfire rifles, or shotguns with Service-approved nontoxic shot are permitted.

Big game hunting is not permitted on Bowdoin Refuge. The refuge may not be used to access adjoining land, except the Pearce and Beaver Creek WPAs, for big game hunting. Using the refuge to access adjoining land to retrieve a big game animal is not allowed unless approved and the hunter is accompanied by a refuge employee or State game warden. Shooting from roads is prohibited. If hunters must retrieve dead or injured gamebirds from closed areas, they may not carry their firearms.

An accessible boat dock, a pier, and a parking area are available at the west boat launch on Lake Bowdoin. Hunters on Bowdoin Refuge are required to sign in and out at the hunter registration kiosk. Brochures with current public use regulations will be available at the registration kiosk and from the refuge's Web site.

Since 2002, the portion of the refuge normally closed to hunting (along the eastern boundary) has been opened to upland gamebird hunting throughout the month of December, with the first 2 days of the special opening being limited to youth hunters only. Since waterfowl generally remain at Bowdoin Refuge until the wetlands freezeup, the opening of the late-season, upland gamebird hunt is contingent on waterfowl being gone by November 30 to avoid further disturbance to these migratory birds.

**Black Coulee National Wildlife Refuge.** A portion of the land within the refuge boundary is private land and hunters and trappers wishing to gain access to this inholding must get permission from the landowner. The refuge is otherwise open to trapping of furbearers and hunting of migratory birds (duck, goose, coot, swan, sandhill crane, and mourning dove), upland game (ring-necked pheasant, sharp-tailed grouse, greater sage-grouse, gray partridge, red fox, and coyote), and big game according to State regulations.

**Creedman Coulee National Wildlife Refuge.** Most of the land within the refuge boundary is private land encumbered by a refuge or flowage easement. Hunters and trappers wishing to gain access must get permission from the landowner. The refuge is otherwise open to trapping of furbearers and hunting of migratory birds (duck, goose, coot, swan, sandhill crane, and mourning dove), upland game (pheasant, sharp-tailed grouse, greater sage-grouse, gray partridge, red fox, and coyote), and big game according to State regulations.

**Hewitt Lake National Wildlife Refuge.** A portion of the land within the refuge boundary is private land encumbered by refuge and flowage easement. Hunters and trappers wishing to gain access to these areas must get permission from the landowner. The refuge is otherwise open to trapping of furbearers and hunting of migratory birds (duck, goose, coot, swan, sandhill crane, and mourning dove), upland game (pheasant, sharp-tailed grouse, greater sage-grouse, gray partridge, red fox, and coyote), and big game according to State regulations.

**Lake Thibadeau National Wildlife Refuge.** Most of the land within the refuge boundary is private land encumbered by refuge and flowage easements. Hunt-

ers wishing to gain access must get permission from the landowner. The refuge is otherwise open to trapping of furbearers and hunting of migratory birds (duck, goose, coot, swan, sandhill crane, and mourning dove), upland game (ring-necked pheasant, sharp-tailed grouse, greater sage-grouse, gray partridge, red fox, and coyote), and big game according to State regulations.

**Bowdoin Wetland Management District.** Except for the Holm WPA, all waterfowl production areas within Bowdoin District are open to trapping of furbearers and hunting of migratory birds, upland game, furbearers, and big game. Big game hunting at the McNeil Slough WPA is restricted to archery, muzzleloader, and shotgun only. An accessible hunting and photography blind and parking area are provided at the Pearce WPA. Unless otherwise noted, all Service lands open to hunting and trapping are subject to State hunting regulations and seasons.

## Availability of Resources

Existing programs such as current refuge directional signs and brochures will be updated with available resources. Maintenance of access roads, parking, hunting and information kiosks, and public use signs is closely tied to funding through the Service Asset Maintenance Management System. The refuge complex's base funding will pay for the update and printing of existing and new brochures.

Additional law enforcement staff and resources may be required to (1) manage significant changes to the hunting program to minimize disturbance to wildlife and habitat, and (2) monitor compliance with public use and hunting regulations.

## Anticipated Impacts of Use

The hunting and trapping program on Service lands in the refuge complex provides hunters ample quality hunting opportunities without materially detracting from the mission of the Refuge System and goals or establishing purposes of the refuge complex lands. Public use brochures and the refuge complex's Web site will be kept up-to-date and made readily available to hunters. Hunter success and satisfaction will be monitored using the hunter registration kiosk sign-in sheet along with random contacts with hunters in the field and in the refuge complex office.

Hunting and trapping activities are considered by many to be legitimate, traditional, recreational uses of renewable natural resources. National wildlife refuges exist primarily to safeguard wildlife populations through habitat preservation. The word "refuge" includes the idea of providing a haven of safety for wildlife and, as such, hunting and trapping might seem an inconsistent use of the National Wildlife Refuge System. However, habitat that normally supports healthy wildlife populations, which produce harvestable surpluses, are renewable resources. As practiced on the Bowdoin Refuge Complex, hunting and trapping do not pose a threat to the wildlife populations and, in some instances, is necessary for sound wildlife management. By their very nature, hunting and trapping create a disturbance to wildlife and directly impact the individual animals being hunted. However, it is well recognized that these activities have given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving their habitat, which has ultimately contributed to the Refuge System mission. Furthermore, despite the potential impacts of hunting and trapping, a goal of the refuge complex is to provide opportunities for quality wildlife-dependent recreation. Hunting and trapping will be designed and monitored to offer a safe and quality program and to keep adverse effects within acceptable limits.

Although hunting and trapping directly impact the hunted species and may indirectly disturb other species, limits on harvest and access will ensure that populations do not fall to unsustainable levels. Closed areas on the refuge complex provide sanctuary to migratory birds. In some cases, hunting and trapping can be used as a management tool to control elevated populations that are having a negative effect on wildlife habitat. In particular, trapping can be used to remove animals that are damaging water management structures such as levees. Removing animals such as skunks and raccoons that will hunt for and kill nesting grassland birds (including waterfowl and their young) can increase production of these species, some of which are imperiled.

Additional impacts from hunting activity include conflicts with individuals participating in wildlife-dependent, priority public uses such as wildlife observation and photography. Closing the eastern portion of Bowdoin Refuge to foot traffic during the migratory bird hunting season could lead to more crowding and conflicts between hunters and nonhunters. This could decrease the visitors' satisfaction during the hunting season if different users are restricted to the same portions of the refuge. Additional staff time and resources are required to manage this program.

## Determination

Recreational hunting and trapping are compatible uses on Bowdoin National Wildlife Refuge Complex.

## Stipulations Necessary to Ensure Compatibility

- Visitors participating in recreational hunting will be provided the Service's public use regulations,

including site-specific regulations and the State's hunting regulations.

- Hunters will be required to use approved nontoxic shot for hunting migratory birds and upland gamebirds on Service-owned lands.
- Trappers need to acquire special use permits to trap on Bowdoin Refuge. No leg-hold traps are permitted and, if practical, trappers will use live traps to ensure nontarget animals are not killed.
- Trapping in open areas in Bowdoin District will follow State seasons and limits.
- Vehicles will be restricted to county and public roads and parking areas in the refuge complex.
- Signage and brochures will be used to provide hunters information on where and how to hunt on the refuge complex to ensure compliance with public use regulations.

### Justification

One of the secondary goals of the Refuge System is to provide opportunities, when found compatible, for the public to develop an understanding and appreciation for wildlife. Recreational hunting and trapping can instill, in citizens of all ages, a greater appreciation for wildlife and its habitat. This appreciation may extend to the Refuge System and other conservation agencies.

The use of trapping as a management tool can reduce the damage on infrastructure caused by burrowing furbearers and reduce the predation on migratory birds.

Based on anticipated biological impacts described above and in the EA, the Service has determined that recreational hunting and trapping within the refuge complex will not interfere with the Service's habitat goals and objectives or purposes for which the refuges and district were established. Limiting access and monitoring the use will help limit any adverse effects. Except for the Holm WPA, all lands and waters within the wetland management district are open to hunting in accordance with the Migratory Bird Hunting and Conservation Stamp Act, under which they were acquired. In some cases, trapping will be by special use permit only.

### Mandatory 15-year Reevaluation Date: 2026.

## Recreational Fishing

Recreational fishing is identified as a wildlife-dependent recreational use under the Improvement Act. The Service does not actively manage sport fisheries within the Bowdoin Refuge Complex, but recreational fishing opportunities are available at the McNeil Slough WPA (primarily in the Milk River) and the Beaver Creek WPA (primarily in Beaver Creek). The remaining wetlands within Bowdoin District have only minimal habitat or have high salinity levels, or both, and do not support a game fishery. The Bowdoin, Black Coulee, Creedman Coulee, Hewitt Lake, and Lake Thibadeau Refuges are closed to all fishing to provide refuge for migratory birds. Regardless, wetlands on these refuges do not support game fish due to high salinity levels or minimal or no permanent deepwater habitat.

Anglers have plenty of fishing opportunities within 10–100 miles of the refuge complex including the nearby Nelson Reservoir, Cole Ponds, Milk River, Missouri River, Fort Peck Lake, and stocked ponds on public and private lands.

The CCP does not call for the implementation of any new fishing programs.

### Availability of Resources

The fishing program can be administered using current resources.

### Anticipated Impacts of Use

Fishing and other human activities cause disturbance to wildlife and trampling of vegetation along the bank of rivers and streams. Littering can also become a problem.

### Determination

Recreational fishing is not a compatible use at the Bowdoin, Black Coulee, Creedman Coulee, Hewitt Lake, and Lake Thibadeau National Wildlife Refuges.

Recreational fishing is a compatible use at waterfowl production areas throughout the Bowdoin Wetland Management District in accordance with State regulations.

### Stipulations Necessary to Ensure Compatibility

- Visitors participating in recreational fishing will be provided the Service's public use regulations and State fishing regulations and limits.
- Vehicles will be restricted to county and public roads and parking areas on the waterfowl production areas.
- Use of motorized boats is prohibited.

- Boats, fishing equipment, and all other personal property must be removed at the end of each day.

### Justification

Fishing is listed as a priority public use in the Improvement Act. Based on the biological effects addressed above and in the EA, the Service has determined that recreational fishing will not interfere with the habitat goals and objectives or purposes for establishment of the waterfowl production areas within the refuge complex.

### Mandatory 15-year Reevaluation Date: 2026.

## Wildlife Observation and Noncommercial Photography

Wildlife observation and photography are identified as wildlife-dependent recreational uses under the Improvement Act. All lands within the Bowdoin Refuge Complex are open to these activities although portions of the Black Coulee, Creedman Coulee, Hewitt Lake, and Lake Thibadeau Refuges are private land, and visitors must get permission from the landowners to access those areas.

Bowdoin Refuge provides a 15-mile auto tour route with accompanying interpretive brochure and observation pullouts as well as an accessible photo blind and observation deck on the Display Pond Trail. Pearce WPA provides an accessible blind with parking and a boardwalk. The refuge complex provides interpretive brochures and panels, which allow self-guided access to the Bowdoin Refuge, and a bird list that can be used throughout the refuge complex. Public roads, trails, and photography blinds will be maintained as needed. Walk-in access is allowed anywhere on Bowdoin Refuge and Bowdoin District except on the railroad right-of-way and around the residences, shop, and maintenance areas, or where otherwise posted.

Access to the privately owned portions of the Lake Thibadeau, Creedman Coulee, Black Coulee and Hewitt Lake Refuges is by landowner permission only.

The CCP will continue the above wildlife observation and noncommercial photography uses and add the following to improve opportunities for these uses:

- An accessible wildlife observation site and expanded parking area will be added at stop number 5 along the auto tour route. Two permanent spotting scopes and interpretive panels will be added. At least one spotting scope will be set at a level accessible to visitors in wheelchairs and small children. The panels will describe the natural history of the birds and the area.

- The Service will close the east end of Bowdoin Refuge to all foot traffic at the start of the waterfowl-hunting season at least through November 30, or until waterfowl depart the refuge, to provide sanctuary areas for primarily migratory waterfowl and shorebirds. The auto tour route will be open but visitors will remain on the auto tour route in designated sanctuary areas.

### Availability of Resources

Implementing new facilities outlined in the CCP is closely tied to funding requests submitted as visitor facility enhancement projects through the Service Asset Maintenance Management System. Existing programs such as directional signs and brochures can be updated with available resources.

Additional staff and resources are required to manage the increased use to minimize disturbance to wildlife and habitat and to educate photographers and wildlife observers about the local resources and proper wildlife-viewing and photography etiquette.

### Anticipated Impacts of the Use

Guided tours of the refuge complex could potentially increase wildlife disturbance, but the presence of Service employees will keep this impact to a minimum, and this opportunity can be used to educate all attendees on proper wildlife-viewing and photography etiquette. Increased visitation can also lead to other short-term impacts such as increased litter and trampled vegetation.

The added wildlife observation area along the auto tour will provide more opportunities to see birds and other wildlife but from longer distances, for minimal disturbance. A small concrete pad and spotting scope will be added to an expanded pulloff to accommodate additional vehicles. The expansion and additions will be minimal and should not cause any impacts.

Sanctuary will be provided for migrating waterfowl and other waterbirds during the waterfowl-hunting season at Bowdoin Refuge. Conflicts between hunters and nonhunters may increase during the hunting season due to closure of the eastern portion of the refuge to foot traffic. Nonhunter satisfaction may decrease due to a reduction in access opportunities. Hunter satisfaction may decrease due to an increase in wildlife disturbance within the hunting zone.

## Determination

Wildlife observation and noncommercial photography are compatible uses on the Bowdoin National Wildlife Refuge Complex.

## Stipulations Necessary to Ensure Compatibility

- Visitors participating in wildlife observation and photography must follow all public use regulations. Guided tours will be held where minimal impact to habitat and wildlife would occur.
- Non-Service vehicles will be restricted to county and public access roads in the refuge complex.
- Viewing areas will be designed to minimize disturbance impacts to wildlife and all refuge resources while providing a good opportunity to view wildlife in their natural environments. Visitors using permanent or portable observation and photography blinds will be provided with information on proper use and etiquette of these structures to minimize disturbance to wildlife and their natural environments and other refuge complex visitors.

## Justification

One of the secondary goals of the Refuge System is to provide opportunities, when found compatible, for the public to develop an understanding and appreciation for wildlife. Wildlife observation and photography are identified as priority public uses in the Improvement Act and will help meet the above secondary goal with only minimal conflicts. Wildlife observation and photography can instill, in citizens of all ages, a greater appreciation for wildlife and its habitat. This appreciation may extend to the Refuge System and other conservation agencies.

Based on anticipated biological impacts described above and in the EA, the Service has determined that wildlife observation and noncommercial photography within the refuge complex will not interfere with the Service's habitat goals and objectives or purposes for which the refuges and district were established. Limiting access and monitoring the uses could help limit any adverse effects.

## Mandatory 15-year Reevaluation Date: 2026.

# Environmental Education and Interpretation

Environmental education and interpretation are identified as wildlife-dependent recreational uses under the Improvement Act. All lands within the Bowdoin Refuge Complex remain open to these activities. These programs have been opportunistic as time and staff allow. Interpretive panels and brochures will be maintained and updated to reflect changes in information or policy and to meet the Service's graphic standards. Portions of the Black Coulee, Creedman Coulee, Hewitt Lake, and Lake Thibadeau Refuges are private land, and visitors must get permission from the landowners to access these areas.

The CCP will continue environmental education and interpretation and add the following to improve these programs:

- The Service will expand the opportunities for environmental education and interpretation to foster appreciation and understanding of the Refuge System and the resources of the Bowdoin Refuge Complex. Additional interpretive panels will be developed for the refuge complex and an accessible observation site with spotting scopes will be developed along the auto tour route at Bowdoin Refuge. The mammal, reptile, and amphibian lists will be updated for the refuge complex and a brochure will be developed.
- The Service will develop a Friends group and work with the Malta Chamber of Commerce and Phillips County Historical Society to develop informational kiosks and interpretive displays for the refuge complex that will be placed in the town of Malta.

Many of these actions are contingent on recruiting a visitor services specialist to develop and carry out these additional programs.

## Availability of Resources

Environmental education and interpretation activities, directional signs, and brochures will be mainly funded by annual operation and maintenance money. Funding from other sources such as grants, regional project proposals, challenge cost-share agreements, and other temporary sources will also be sought and used as they become available.

Funding requests for new facilities will be submitted as visitor facility enhancement projects through the Service Asset Maintenance Management System.

## Anticipated Impacts of the Use

The use of the refuge complex for onsite activities by groups of teachers and students for environmental education or interpretation may impose a short-term, low-level impact on the immediate and surrounding area. Impacts may include trampling of vegetation

and temporary disturbance to nearby wildlife species during the activities.

Refuge complex brochures, interpretive panels, and other educational materials will be updated as needed to meet Service requirements. Features such as the auto tour route and accessible observation sites provide access to the many sights and sounds of the refuge complex.

The Service will continue to promote a greater public understanding and appreciation of the refuge complex resources, programs, and issues through interpretive, outreach, and environmental education programs. Working with the Friends group and other local groups, the Service will provide environmental education and interpretation onsite and off Service lands. Presentations will be provided to refuge visitors, school groups, and organizations, allowing the Service to reach a broader audience. Onsite presentations will be managed to minimize disturbance to wildlife, habitat, and cultural resources.

### Determination

Environmental education and interpretation are compatible uses on Bowdoin National Wildlife Refuge Complex.

### Stipulations Necessary to Ensure Compatibility

- Visitors participating in environmental education and interpretation programs must follow all Service regulations. Onsite activities will be held where minimal impact to wildlife and habitats would occur.

- The Service will review new environmental education and interpretation activities to ensure activities meet program objectives and are compatible.

### Justification

One of the secondary goals of the Refuge System is to provide opportunities, when found compatible, for the public to develop an understanding and appreciation for wildlife. Environmental education and interpretation are identified as priority public uses in the Improvement Act and will help meet the above secondary goal with only minimal conflicts. Environmental education and interpretation will be used to encourage an understanding in citizens of all ages to act responsibly in protecting wildlife and its habitat. These are tools used in building a land ethic, developing support of the refuge complex, and decreasing wildlife violations.

Environmental education is an important tool for the refuge complex to provide visitors with an awareness of its purposes, values, and specific issues such as wetland ecology, water quality, impacts of nonnative species, and migratory bird management. This tool will also provide visitors and students a greater understanding of the mission and importance of the Refuge System to the American people.

Based on anticipated biological impacts described above and in the EA, the Service has determined that environmental education and interpretation on the refuge complex will not interfere with the Service's habitat goals and objectives or purposes for which the refuges and district were established. Limiting access and monitoring the uses will help reduce any adverse effects.

### Mandatory 15-year Reevaluation Date: 2026.

## Cooperative Farming, Haying, and Grazing

The Service will use cooperative farming, haying, and prescriptive livestock grazing as management tools throughout the refuge complex. These tools will be used to meet habitat objectives, control vegetative litter, promote native plant production and diversity, control the spread of invasive plant species, and help convert disturbed grasslands back to native plant species.

**Farming and Haying.** The Bowdoin Refuge and Bowdoin District currently use cooperative farming and haying as tools to manage upland habitats, including control of invasive plant species and cattails. The Service will enter into an agreement with a local landowner to (1) help restore cropland and poor quality habitat to quality grassland habitat for wildlife or (2) cut and remove DNC to rejuvenate vegetation growth. A farming cooperator will be issued a cooperative farming agreement or special use permit by the refuge manager and will be allowed to till seed, harvest small grain, control invasive plants, or harvest hay on Service-owned lands. The agreement generally will be issued for a 2- to 4-year management prescription.

Cooperative farming of Service lands is usually done on a share basis where the Service and the cooperator each receive a share of the crop. The Service will retain its share as standing cover for wildlife forage or in exchange for additional work from the cooperator such as invasive plant control, grass seeding, or provision of supplies such as herbicides and fence materials for habitat protection and improvement on the management unit. Any fees or cash income received by the Service will be deposited in the Refuge Revenue Sharing Account.

The CCP provides for cooperative farming and haying to manage habitats by establishing goals and objectives for specific habitat types where these activities may be used. The Service has identified target wildlife species (for example, northern pintail and Sprague's pipit), their habitat requirements, and objectives that guide management to achieve the habitat needs of these species.

The refuge complex will improve the monitoring and research programs for vegetation and wildlife to assess habitat and wildlife population responses to cooperative farming and haying.

**Grazing.** The refuge complex currently uses prescriptive livestock grazing as a tool to manage a variety of uplands and seasonal wetlands. Grazing by livestock has been a preferred management tool because the effect on habitat is controllable and measurable. Livestock grazing has been used in a variety of ways including high intensity–short duration, rest rotation, and complete rest. Grazing may occur throughout the year as management needs dictate. Where applicable, a rotation schedule using multiple grazing units will be used to manage grazing intensity.

Fencing and controlling livestock is the responsibility of the cooperating rancher. The Service provides instruction and guidance within the special use permit for placement of fences, water tanks, and livestock supplements to ensure that sensitive habitats or refuge complex assets are protected. A temporary electrical fence can be used where there is no existing fence. Forage conditions, habitat objectives, and available water will determine stocking rates in each grazing unit. Two stockwater wells exist on the eastern part of Bowdoin Refuge but need rehabilitation before they can be used again by livestock.

The CCP provides for prescriptive livestock grazing to meet habitat objectives. Furthermore, the CCP establishes goals and objectives for specific habitat types where prescriptive livestock grazing may be used. The Service has identified target wildlife species (for example, northern pintail and Sprague's pipit), their habitat requirements, and objectives that guide the prescriptive grazing program to achieve the habitat needs of these species. The refuge complex will improve the monitoring and research programs for vegetation and wildlife to assess habitat and wildlife population responses to prescriptive livestock grazing. Different grazing rates and management strategies will be investigated to determine the best methods for meeting the habitat goals and objectives.

## Availability of Resources

Existing resources are sufficient to administer the farming, haying, and grazing programs at current levels. These programs will be conducted through special use permits or cooperative farming agreements, which minimizes the need for staff time and Service assets to complete work. A refuge complex biologist will be needed to plan and oversee monitoring and research of to assess the impacts and effectiveness of these management programs. One temporary biological technician will be necessary to carry out the on-the-ground monitoring.

Rehabilitation of existing stockwater wells and drilling of additional wells in strategic locations will increase the effectiveness of the grazing program and reduce the impacts caused by livestock watering in wetlands and canals and by cooperators hauling water to grazing cells on a daily basis.

## Anticipated Impacts of the Use

The cooperative farming and haying program and prescriptive livestock-grazing program will be used to meet habitat- and species-specific goals and objectives identified in the CCP. These programs are intended to maintain and enhance habitat conditions for the benefit of a wide variety of migratory birds and other wildlife that use the refuge complex. Minimal negative effects are expected through the use of these tools. Control of invasive plant species through these programs will be a long-term benefit.

Some wildlife disturbance will occur during the operation of noisy farming equipment, and some animals may be temporarily displaced. Wildlife will receive the short-term benefit of standing crops or stubble for food and shelter and the long-term benefit of having cropland or other poor-quality habitat converted to native grasses or DNC. In addition, restoration of cropland to grassland cover will prevent soil erosion, improve water quality, and lessen the need for chemical use.

It is anticipated that grazing will be in a mosaic pattern with some areas more intensively grazed than others in certain years. Grazing, as well as fire, is known to increase the nutrient cycling of nitrogen and phosphorous (Hauer and Spencer 1998, McEachern et al. 2000, Burke et al. 2005). Hoof action may break up mats of clubmoss and allow native plant seeds to become established. However, cattle grazing will also increase the risk of invasive plants getting established. If fences are not maintained, it may be difficult to meet habitat objectives.

The presence of livestock may be disturbing to some wildlife species and some public users. Some trampling by livestock may occur around watering areas or mineral licks. Grazing in the spring could have adverse effects on grassland bird nests due to trampling and loss of vegetation. However, the long-term benefits of this habitat management tool should outweigh the short-term negative effects.

### Determination

Cooperative farming, haying, and grazing as a habitat management tools are compatible uses on Bowdoin National Wildlife Refuge Complex.

### Stipulations Necessary to Ensure Compatibility

- To ensure consistency with management objectives, the Service will require general and specific conditions for each farming, haying, or grazing permit.

- Only areas that have a prior crop history, an invasive plant problem, or decadent DNC will be included in the farming and haying program. To minimize impacts to nesting birds and other wildlife, the refuge manager will determine and incorporate any needed timing constraints on the permitted activity into the cooperative farming agreement or special use permit. For example, haying will not be permitted on Service lands until after August 1 to avoid destroying bird nests on the management unit unless the refuge manager deems it necessary to hay earlier to control invasive plants or restore grasslands.

- The cooperative farming agreement or special use permit will specify the type of crop to be planted. Farming permittees will be required to use Service-approved chemicals that are less detrimental to wildlife and the environment.

- Control and confinement of livestock are the responsibility of the permittee, but the Service determines where fences, water tanks, and livestock supplements are placed within the management unit. Temporary electrical fencing will be used to retain livestock within grazing cells as well as to protect sensitive habitat areas and refuge complex assets such as water control structures or water quality–monitoring wells. Cooperators will be required to remove fences at the end of the grazing season.

- Grazing fees will be based on the current-year USDA Statistics Board publication for "Grazing Fee Rates for Cattle by Selected States and Regions," as provided annually by the regional office. Standard deductions for labor associated with the grazing permit will be included on the special use permit.

- The refuge complex will carry out a vegetation-monitoring program to assess if habitat requirements of target species are being met. A minimum of one temporary biological technician will be necessary to monitor and document these activities. A biologist will be necessary to plan and oversee the monitoring program and assess the impacts and effectiveness of these management programs.

### Justification

Some habitat management needs to occur to maintain and enhance habitat for migratory birds and other wildlife. When properly managed and monitored, prescriptive farming and haying are options that can be used to improve wildlife cover and restore disturbed habitats to desirable grassland cover. Prescriptive livestock grazing can rejuvenate native grasses and help control the spread of some invasive plant species. Each of these tools will be controlled and the results monitored (for example, vegetation monitoring) so that adjustments in the programs are made to meet habitat goals and objectives.

Using local cooperators to accomplish the work will be a cost-effective method to accomplish the habitat objectives. The long-term benefits of habitat restoration and management far outweigh the short-term impacts caused by cooperative farming, haying, and grazing.

### Mandatory 10-year Reevaluation Date: 2021.

## Commercial Filming, Commercial Audio Recording, and Commercial Still Photography

Commercial filming is the digital or film recording of a visual image with or without sound. Commercial audio recording is the recording of sound. Commercial still photography is the capture of a still image on film or in a digital format—by a person, business, or other entity for a market audience such as for a documentary, television, feature film, advertisement, or similar project. It does not include news coverage or visitor use.

Bowdoin Refuge Complex provides tremendous opportunities for commercial filming, commercial audio recording, and commercial still photography of migratory birds and other wildlife. Each year, the refuge complex staff receives one to three requests to conduct these commercial activities on Service lands.

The staff will evaluate each request on an individual basis, and, if the use is allowed, the requesting individual or group will be issued a special use permit. The permit will designate what areas may be accessed and what activities are and are not allowed

to minimize the possibility of damage to cultural or natural resources or interference with other visitors (refer to "Stipulations Necessary to Ensure Compatibility"). Permittees will be able to access all areas of the refuge complex that are open to the public and must abide by all public use regulations. In rare cases and through the special use permit process, the Service may permit access to areas closed to the public.

## Availability of Resources

These commercial uses could be administered with current resources. Administrative costs for review of applications, issuance of special use permits, and staff time to conduct compliance checks may be offset by a fee system described in a proposed rule that would modify the commercial filming and still photography policy for agencies within the Department of the Interior.

## Anticipated Impacts of Use

Wildlife filmmakers and photographers tend to create the greatest disturbance of all wildlife observers (Dobb 1998, Klein 1993, Morton 1995). While observers frequently stop to view wildlife, photographers are more likely to approach the animals (Klein 1993). Even a slow approach by photographers tends to have behavioral consequences to wildlife (Klein 1993). Photographers often remain close to wildlife for extended periods in an attempt to habituate the subject to their presence (Dobb 1998). Furthermore, photographers with low-power lenses tend to get much closer to their subjects (Morton 1995). This usually results in increased disturbance to wildlife as well as to habitat (trampling of plants). Handling of animals and disturbing vegetation (such as cutting plants and removing flowers) or cultural artifacts is prohibited on Service lands.

Issuance of special use permits with strict guidelines and followup by refuge complex staff for compliance could help minimize or avoid these impacts. Permittees who do not follow the stipulations of their special use permits could have their permits revoked, and further applications for filming or photographing on refuge complex lands will be denied.

## Determination

Commercial filming, commercial audio recording, and commercial still photography are compatible uses on Bowdoin National Wildlife Refuge Complex.

## Stipulations Necessary to Ensure Compatibility

- These commercial uses must (1) demonstrate a means to extend public appreciation and understanding of wildlife or natural habitats; (2) enhance education, appreciation, and understanding of the Refuge System; or (3) facilitate outreach and education goals of the refuge complex. Failure to demonstrate any of these criteria will result in denial of a special use permit request.

- All commercial filming and commercial audio recording requires a special use permit that (1) identifies conditions that protect the refuge complex's values, purposes, resources, and public health and safety and (2) prevents unreasonable disruption of the public's use and enjoyment of the refuge complex. Such conditions may be, but are not limited to, specifying road conditions when access is not allowed, establishing time limitations, and identifying routes of access. These conditions will be identified to prevent excessive disturbance to wildlife, damage to habitat or refuge complex infrastructure, or conflicts with other visitor services or management activities. The special use permit will stipulate that imagery produced on refuge complex lands be made available for use in environmental education and interpretation, outreach, internal documents, or other suitable uses. In addition, any commercial products must include appropriate credits to the Bowdoin Refuge Complex, the Refuge System, and the Service.

- Commercial still photography requires a special use permit (with specific conditions as previously outlined for filming and audio recording) if one or more of the following would occur:

  - It takes place at locations where or when members of the public are not allowed.

  - It uses models, sets, or props that are not part of the location's natural or cultural resources or administrative facilities.

  - The Service incurs additional administrative costs to monitor the activity.

  - The Service provides management and oversight to (1) avoid impairment of the resources and values of the site, (2) limit resource damage, or (3) minimize health and safety risks to the visiting public.

- To minimize the impact on Service lands and resources, the refuge complex staff will ensure that commercial filmmakers, commercial audio recorders, and commercial still photographers (regardless of whether a special use permit is issued) comply with policies, rules, and regulations. The staff will monitor and assess the activities of filmmakers, audio recorders, and still photographers.

### Justification

Commercial filming, commercial audio recording, and commercial still photography are economic uses that, to be considered compatible uses, must contribute to the achievement of the refuge complex purposes, mission of the Refuge System, or the mission of the Service. Providing opportunities for these uses should result in an increased public awareness of the refuge complex's ecological importance as well as advancing the public's knowledge and support for the Refuge System and the Service. The stipulations outlined previously and conditions imposed in the special use permits issued to commercial filmmakers, commercial audio recorders, and commercial still photographers will ensure that these wildlife-dependent activities occur with minimal adverse effects to resources or visitors.

### Mandatory 10-year Reevaluation Date: 2021.

## Research and Monitoring

The Bowdoin Refuge Complex receives one to three requests each year to conduct scientific research or monitoring on Service lands. The Service will give priority to studies that contribute to the enhancement, protection, preservation, and management of the refuge complex's native plant, fish, and wildlife populations and their habitats. Non-Service applicants must submit a proposal that outlines the following:

- Objectives of the study
- Justification for the study
- Detailed methodology and schedule
- Potential impacts on wildlife and habitat including short- and long-term disturbance, injury, or mortality
- Description of measures the researcher will take to reduce disturbance or impacts
- Staff required and their qualifications and experience
- Status of necessary permits such as scientific collection permits and endangered species permits
- Costs to the Service including staff time requested, if any
- Anticipated progress reports and end products such as reports or publications

Refuge complex staff or others, as appropriate, will review research proposals case-by-case and issue special use permits if approved. Criteria for evaluation includes, but is not be limited to, the following:

- Research that would contribute to specific refuge complex management issues will be given priority over other requests.
- Research that would conflict with other ongoing research, monitoring, or management programs will not be approved.
- Research that would cause undue disturbance or be intrusive will likely not be approved. The degree and type of disturbance will be carefully weighed when evaluating a research request.

Proposals will be evaluated to determine if any effort was made to minimize disturbance through study design including adjusting location, timing, number of permittees, study methods, and number of study sites. The length of the project will be considered and agreed on before approval.

### Availability of Resources

Current resources are adequate to administer the research and monitoring on a very limited basis. A refuge complex biologist will be necessary to administer large and long-term projects, which generally require more indepth evaluation of applications, management of permits, and to provide oversight of research projects. The biologist will identify research and monitoring needs and work with other Service staff, universities, and scientists to develop studies that benefit the refuge complex and address the goals and objectives in the CCP.

### Anticipated Impacts of Use

Some degree of disturbance is expected with all research activities, since researchers may use Service roads or enter areas that are closed to the public. In addition, some research may require collection of samples or handling of wildlife. However, minimal impact on wildlife and habitats is expected with research studies, because special use permits will include conditions to ensure that impacts to wildlife and habitats are kept to a minimum.

### Determination

Research and monitoring are compatible uses on Bowdoin National Wildlife Refuge Complex.

### Stipulations Necessary to Ensure Compatibility

- Extremely sensitive wildlife habitats and species will be sufficiently protected from disturbance by limiting research activities in these areas. All refuge complex rules and regulations will be followed unless otherwise exempted by refuge complex managers. Projects will be reviewed annually.

- Refuge complex staff will use the previous criteria for evaluating and determining whether to approve a proposed study. If research methods are determined to have potential impacts on habitat or wildlife, it must be demonstrated that the research is necessary for conservation of resources on the refuge complex. Measures to minimize potential impacts will be developed and included as part of the study design; these measures will be conditions on the special use permit.

- Refuge complex staff will monitor research activities for compliance with conditions of the special use permit. At any time, refuge complex staff may accompany the researchers to determine potential impacts. Staff may determine that previously approved research and special use permits be terminated due to observed impacts. The refuge manager can cancel a special use permit if the researcher is out of compliance or to ensure wildlife and habitat protection.

### Justification

Potential impacts of research activities on refuge complex resources will be minimized through restrictions included as part of the study design, and research activities will be monitored by the refuge complex staff. Results of research projects will contribute to the understanding, enhancement, protection, preservation, and management of the refuge complex's wildlife populations and their habitats.

### Mandatory 10-year Reevaluation Date: 2021.

## B.8 Signatures

### Submitted by:

Carmen Luna August 30, 2011

Carmen Luna, Project Leader Date
Bowdoin National Wildlife Refuge Complex
Malta, Montana

### Reviewed by:

W. Dean Rundle August 30, 2011

W. Dean Rundle, Refuge Supervisor Date
U.S. Fish and Wildlife Service
Mountain–Prairie Region
National Wildlife Refuge System
Lakewood, Colorado

### Approved by:

Richard A. Coleman August 30, 2011

Richard A. Coleman, Ph.D. Date
Assistant Regional Director
U.S. Fish and Wildlife Service
Mountain–Prairie Region
National Wildlife Refuge System
Lakewood, Colorado

# Appendix C

## *Intra-Service Section 7 Biological Evaluation*

Originating Person: Carmen Luna  Date Submitted: July 29, 2011

Telephone Number: 406-654-2863

I. **Service Program and Geographic Area or Station Name:** Bowdoin National Wildlife Refuge Complex
Bowdoin National Wildlife Refuge (Phillips County)
Black Coulee National Wildlife Refuge (Blaine County)
Creedman Coulee National Wildlife Refuge (Hill County)
Hewitt Lake National Wildlife Refuge (Phillips County)
Lake Thibadeau National Wildlife Refuge (Hill County)
Bowdoin Wetland Management District (Blaine, Hill, Phillips, and Valley counties)

II. **Flexible Funding Program** (e.g., Joint Venture, etc.) if applicable: N/A

III. **Location:** Location of the project including county, State and TSR (township, section and range):
See attached map (page 3) in accompanying comprehensive conservation plan (CCP).

IV. **Species/Critical Habitat:** List federally endangered, threatened, proposed, and candidate species or designated or proposed critical habitat that may occur within the action area.

| *Species* | *Status* | *Relevance* | *Critical Habitat* |
|---|---|---|---|
| Sprague's pipit | Candidate | Documented on Bowdoin Refuge | None |
| Piping plover | Threatened | Has been known to migrate through Bowdoin Refuge (last nested in 1999) | Bowdoin Refuge |
| Whooping crane | Endangered | Never documented | None |
| Black-footed ferret | Endangered and experimental non-essential population | Never documented | None |
| Pallid sturgeon | Endangered | Never documented | None |
| Greater sage-grouse | Candidate | Hewitt and Bowdoin Refuges, Bowdoin District | None |
| Interior least tern | Endangered | Never documented | None |

V. **Project Description:** Describe proposed project or action or, if referencing other documents, prepare an executive summary (attach additional pages as needed)

This proposed action is to implement the goals, objectives, and strategies of the Bowdoin National Wildlife Refuge Complex Comprehensive Conservation Plan for the next 15 years, while fulfilling the goals of the National Wildlife Refuge System.

The CCP proposes to conserve natural resources by restoring, protecting, and enhancing native mixed-grass prairie and maintaining quality wetland habitat for target migratory and resident birds

within the Bowdoin National Wildlife Refuge Complex (refuge complex). The Sprague's pipit, piping plover, and greater sage-grouse have each been selected as target species for management and monitoring.

Although not abundant, greater sage-grouse has been documented on Bowdoin Refuge and Beaver Creek, McNeil Slough, Hewitt Lake, and Korsbeck Waterfowl Production Areas (WPAs). The Service would monitor greater sage-grouse population levels and trends. Sage-grouse habitat would be identified throughout the refuge complex and maintained or enhanced. Silver sagebrush would be planted on the Korsbeck and Beaver Creek WPAs to provide additional breeding, nesting, and feeding habitat for sage-grouse. Public hunting of upland game birds (ring-necked pheasant, sharp-tailed grouse, greater sage-grouse, gray partridge), would continue throughout the refuge complex in designated areas and according to state seasons and limits.

Sprague's pipits arrive at Bowdoin Refuge in late April and begin nesting in mid-May. The CCP is proposing to enhance breeding and nesting habitat for the pipit and other target grassland nesting birds including restoring large blocks of contiguous grassland habitat by removing Russian olive trees and non-native and invasive shrubs. These trees have not only fragmented habitat but increased predation of ground nesting birds. Research would be conducted to control crested wheatgrass and clubmoss that unnaturally dominate grassland areas, primarily due to overgrazing, historically. In all cases, treated areas would be restored and monitored, including the response of target species. The Service would use prescriptive grazing, fire, and haying to control invasive and noxious species and restore and enhance grassland habitat. Bird use and climate history would be monitored prior to implementing any of these actions; particularly when using prescribed fire in this arid climate.

Bowdoin National Wildlife Refuge (Bowdoin Refuge) is located on the extreme western edge of the breeding range for the northern Great Plains population of the piping plover. Bowdoin Refuge has 3,325 acres of designated critical habitat. The piping plover has not nested on the refuge since 1999, when 9 nests were documented. There has been migrating piping plover documented on Bowdoin Refuge in some years, most recently in 2011. It is suspected that a lack of water to manage the preferred nesting area and the presence of trees, particularly Russian olive trees, have discouraged plovers from nesting on the refuge. The CCP is proposing to address these and other habitat management concerns including removing trees from around Piping Plover Pond. In addition, the Service would work with other agencies to acquire additional water resources and improve the current water delivery system, primarily to Piping Plover Pond. This should allow the Service to better manage or increase piping plover habitat on Bowdoin National Wildlife Refuge.

Invasive and nonnative plants that are causing habitat losses and fragmentation would be controlled or eradicated throughout the refuge complex. In particular, the Service would expand efforts to remove Russian olive trees to restore contiguous, treeless, grassland areas. In addition, the control of invasive grass and forb species would improve habitat quality by restoring native plant diversity and structure.

#### Divest Lake Thibadeau National Wildlife Refuge

The Service owns less than 1 percent of the lands within the 3,868-acre approved acquisition boundary; the remaining area is private land encumbered by refuge and flowage easements. The easements give the Service the right to manage the impoundments and the uses that occur on that water and to control hunting and trapping. These easements do not prohibit development, grazing, or agricultural uses. These rights were retained by the landowner. These listed species have never been documented using this refuge.

Due to upstream development in the watershed, the impoundments do not receive adequate water supplies and are often dry enough to be farmed. The surrounding uplands are also farmed or heavily

grazed. Using the divestiture model for the Mountain–Prairie Region, the Service evaluated the habitat quality and ability of Lake Thibadeau National Wildlife Refuge to meet its purposes and support the goals of the National Wildlife Refuge System. Due to this lack of habitat and current land uses, the model recommended this refuge be considered for divestiture.

**Salinity and Blowing Salts**

The principle sources of water for the Bowdoin National Wildlife Refuge are precipitation, floodwater from Beaver Creek, ground water seepage, water deliveries from the Milk River Project, and irrigation return flows. The last three sources of water add dissolved solids (salinity) to the refuge. In addition, the refuge is underlain by glacial till and shale containing high concentrations of soluble salts. The Milk River Project water supply on Bowdoin Refuge is limited and insufficient to improve wetland water quality. As water evaporates from Lake Bowdoin's closed system, salts have become concentrated and water salinity has increased. If no action is taken to improve water quality on the refuge, the progressively increasing salinity levels in Lake Bowdoin and the blowing salts out of Dry Lake will continue to threaten migratory birds, other wildlife, wetland habitats, and, potentially, neighboring landowners and downstream irrigators.

The Service evaluated five alternatives to address this issue. The proposed action is to construct an injection well and recreate a flow through system. An underground injection well would be used to force saline water deep into the ground, between 3,500–6,000 feet. Once the salinity objective was met and water in Lake Bowdoin met all applicable water quality standards, as determined by Montana Department of Environmental Quality, modifications to the lake's infrastructure would be evaluated to determine the best way to recreate a flow-through system that maximized the effects of natural flooding. If natural flooding did not occur or more water to be supplied from the Milk River was not granted, the injection well could be used periodically to maintain salinity at an acceptable level.

VI. **Determination of Effects:**

A. **Description of Effects:** Describe the action(s) that may affect the species and critical habitats listed in item IV. Your rationale for the Section 7 determinations made below (B) should be fully described here.

The proposals to restore and enhance grassland and wetland habitat, including acquiring additional deliveries of water, should increase desirable habitat for the Sprague's pipit, piping plover, and greater sage-grouse, all of which have or did occur on the refuge complex. Recreating large, contiguous blocks of grassland habitat on Bowdoin Refuge should increase the nesting success and brood survival of these species.

Restoring silver sagebrush habitat to waterfowl production areas, where greater sage-grouse occur, should provide expanded areas of nesting and feeding habitat, increasing the survival of this candidate species.

Divesting Lake Thibadeau Refuge should not have any impact on any of these listed species. Not only is there no suitable habitat for these species, but they have never been documented on this refuge.

The proposed injection well site on Bowdoin Refuge will be placed in an area that will have the least impact. In addition, except for the initial construction, there should be minimal disturbance to any wildlife as a result of operating the injection well. Any noise from the pump would be reduced using a silencing device. The reduced salinity levels will improve habitat and survival of wetland dependent wildlife species.

B. **Determination:** Determine the anticipated effects of the proposed project on species and critical habitats listed in item IV. Check all applicable boxes and list the species (or attach a list) associated with each determination.

| | *Determination* |
|---|---|
| *No Effect:* This determination is appropriate when the proposed project will not directly or indirectly affect (neither negatively nor beneficially) individuals of listed/proposed/candidate species or designated/proposed critical habitat of such species. **No concurrence from ESFO required.** (pallid sturgeon, interior least tern, whooping crane, black-footed ferret) | X |
| *May Affect but Not Likely to Adversely Affect:* This determination is appropriate when the proposed project is likely to cause insignificant, discountable, or wholly beneficial effects to individuals of listed species and/or designated critical habitat. **Concurrence from ESFO required.** (Piping plover, Sprague's pipit, greater sage-grouse) | X |
| *May Affect and Likely to Adversely Affect:* This determination is appropriate when the proposed project is likely to adversely impact individuals of listed species and/or designated critical habitat. **Formal consultation with ESFO required.** | |
| *May affect but Not Likely to Jeopardize candidate or proposed species/critical habitat:* This determination is appropriate when the proposed project may affect, but is not expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Concurrence from ESFO optional.** | |
| *Likely to Jeopardize candidate or proposed species/critical habitat:* This determination is appropriate when the proposed project is reasonably expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Conferencing with ESFO required.** | |

Signature Carmen R. Luna Date 07/29/2011

Carmen Luna, Refuge Manager
Bowdoin National Wildlife Refuge Complex
Malta, MT

**Reviewing Ecological Services Office Evaluation** (check all that apply):

A. Concurrence __X__ Nonconcurrence _____
Explanation for nonconcurrence:

B. Formal consultation required _____
List species or critical habitat unit

C. Conference required _____
List species or critical habitat unit

Ecological Services
U.S. Fish and Wildlife Service
Helena, MT

Signature ____ R. Mark Wilson 8-1-11 _____
R. Mark Wilson, Ecological Services Supervisor,
Ecological Services
Helena, MT

# Appendix D

## *Divestiture Model Results for Lake Thibadeau Refuge*

During the CCP process, the Service identified Lake Thibadeau National Wildlife Refuge as a candidate for removal from the National Wildlife Refuge System through divestiture (the selling or release of Service interests). The refuge was evaluated by the planning team, regional office, and the refuge manager to determine whether it warranted continued status as a national wildlife refuge. Based on the analysis, the Service is recommending that Lake Thibadeau National Wildlife Refuge be considered for divestiture.

This 3,840-acre limited-interest refuge is primarily private land encumbered by flowage and refuge easements acquired by the Government in the 1930s. The Service has the right to impound water, control uses that occur on that water, and control hunting and trapping. The Service does not have rights to control uses of the uplands or natural wetland basins; these rights would require additional easements or purchase of the land from a willing seller. The 19.4-acre fee-title area is land reserved from public domain by the Bureau of Land Management.

The analysis of Lake Thibadeau Refuge used the Service's Mountain–Prairie Region evaluation model to determine whether to recommend the refuge for divestiture. The divestiture model is a set of criteria for measuring the value of a refuge based primarily on its purposes and the goals of the Refuge System. Designed as a pre-planning tool, the model allows planners and refuge managers to determine whether a refuge or easement refuge should be considered for divestiture. Since use of the model indicated that Lake Thibadeau Refuge should be considered for divestiture, the process and consequences of divestiture were analyzed further during the CCP process and documented in chapter 3 of the draft CCP and EA.

## D.1 The Divestiture Model

Mountain–Prairie Region staff developed the divestiture model during a 2-day workshop held December 14–15, 2004, at the regional office in Lakewood, Colorado. The model standardizes policy in the Mountain–Prairie Region for identifying which refuges to consider for divestiture.

The divestiture model comprises primary criteria (five questions), secondary criteria (three questions), additional considerations, and five rules (to organize answers to criteria questions for determination of whether to consider divestiture). For each criteria question, the answer related to Lake Thibadeau National Wildlife Refuge is stated and followed by a justification.

## Primary Criteria

The following five questions compose the primary criteria for evaluating a national wildlife refuge for divestiture.

### 1. Does the refuge achieve one or more of the goals of the National Wildlife Refuge System?

*Answer:* No. According to the rules of this model, if the refuge does not achieve one or more goals of the National Wildlife Refuge System, it should automatically be recommended for divestiture.

*Justification:* Lake Thibadeau National Wildlife Refuge does not meet the goals of the Refuge System as set by Service policy—National Wildlife Refuge System Mission and Goals and Refuge Purposes (June 20, 2006):

A. Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.

B. Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.

C. Conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique,

rare, declining, or underrepresented in existing protection efforts.

D. Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation, photography, environmental education, and interpretation).

E. Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

The refuge is a reservoir created by a dam in the middle of an arid landscape. It provides little migratory bird habitat, because the watersheds up stream of the reservoir have been heavily developed since its establishment, capturing most of the water. With the absence of permanent vegetative cover around the wetlands, erosion occurs and sediment continues to be added to the wetland basins.

The refuge's ability to function as a water source and habitat for migrating waterbirds is almost gone. In the last 10 years, there has only been one occasion when there was sufficient water collected in the spring to provide habitat; this event provided about 30 acres of water for about 3 months. The historical lakebeds of the refuge provide this seasonal habitat any time moisture is made available and will continue to function in this capacity whether or not the area is a refuge. In addition, the lakebeds are natural sumps, being the lowest points for the surrounding area. Runoff from surrounding farm land finds its way to these locations. Draining or removing this water from these locations is highly unlikely.

The impoundment Lake Thibadeau Refuge is functioning as any other livestock pond in the area (figure 45). Within 10 miles of the refuge are more than 6,500 acres of wetlands including more than 3,000 acres of seasonal or temporarily flooded wetlands in more than 1,300 basins. The impoundment on the refuge does provide some loafing areas for waterfowl, but not of any quality. The mere presence of seasonal water does not make it a refuge.

Conservation implies action, and the Service has no authority to do anything other than impound water when it is available. Hunting is allowed by landowner permission. There are no other opportunities to provide wildlife-dependent recreation or to foster an understanding or appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

## 2. Does the refuge meet its purpose (fulfill the refuge's intent and statutory purpose)?

*Answer:* No.

*Justification:* The refuge was established in 1937 "as a refuge and breeding ground for migratory birds and other wildlife" (Executive Order 7713). The lands and waters of this area cannot provide the habitat necessary to provide a refuge and breeding ground as found on other Refuge System lands. As described previously, there is a lack of water due to upstream development. The uplands, over which the Service has no authority to manage, are used for agriculture. Only about 8 percent of the upland habitat (about 340 acres) is unbroken ground with the potential to retain some native prairie species. However, 95 percent of this area is in one block and is heavily grazed. The Service has no authority or ability within the easement to control the uses and management of this upland habitat. The remaining uplands of the refuge are intensively farmed.

## 3. Does the refuge provide substantial support for migratory bird species, important sheltering habitat for threatened and endangered species, or support for species identified in authorizing legislation?

*Answer:* No.

*Justification:* The past 30 years of wildlife observations show there has never been substantial use of this refuge by migratory birds.

## 4a. Does the refuge have biological integrity; if it does not, is it feasible to restore the biological integrity of the converted or degraded habitat?

*Answer:* No.

*Justification:* Due to alteration of the natural hydrologic processes in the watershed and the conversion of native grasslands to cropland, the refuge has lost most of the historical biotic composition, structure, and function that define its biological integrity, diversity, and environmental health. Certainly, migratory birds will make use of open-water habitat, and the refuge will at times provide a remnant amount of what historically was present, but this amount of use alone will not bring the biological diversity of the refuge to a level that meets the purpose of a migratory bird refuge.

Since the refuge has no authority over the uplands, it is unrealistic to expect that this area would be restored to grassland cover by the current landowners. Further, acquisition of this land in either fee title or conservation easement is unlikely given the limited money for these activities and the fact that this location is not a high priority for either type of acquisition.

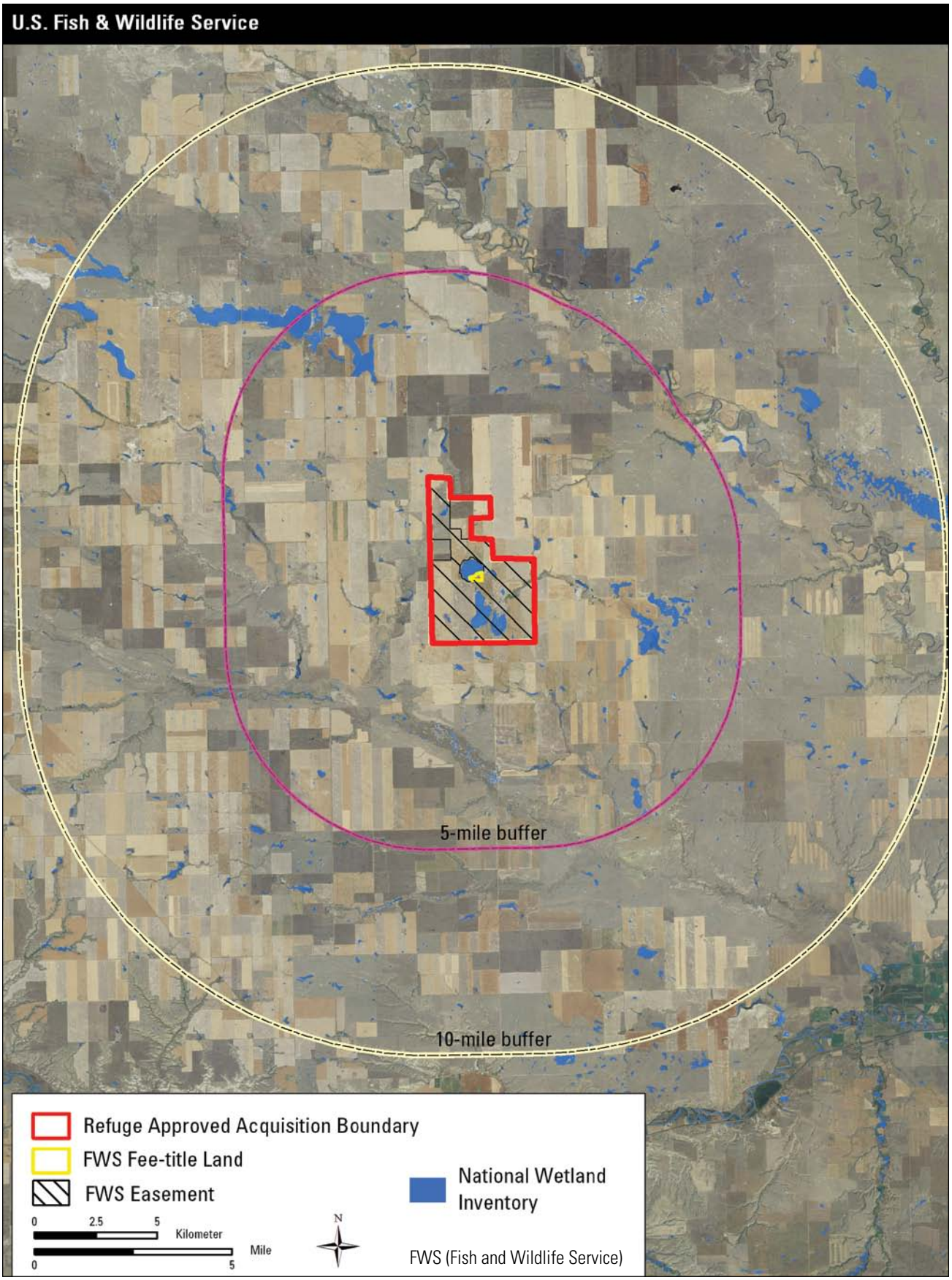



**Figure 45. Map of wetlands within 10 miles of Lake Thibadeau National Wildlife Refuge, Montana.**

### 4b. Does the Service have or can it reasonably acquire the right to restore the habitat?

*Answer:* No.
*Justification:* The upland habitat is more than 90-percent cropland. Acquiring this land for restoration would not only be expensive, but biological restoration of native prairie in a mixed-grass prairie ecosystem is very difficult. The moisture regime that defines the prairie is arid, so establishing a full complement of prairie species is not likely. Native vegetation exists, but the value has been reduced due to the introduction of invasive plants and the loss of ecological functions.

The Service's water right for the refuge may be enough to provide open-water habitat for migratory birds, given several consecutive good water years. The process to exercise these rights would require an evaluation to determine the extent of retained Service water by dams or diversions in the upstream watersheds. Water rights in north-central Montana are not only very valuable but a necessity for the ranching lifestyle. If the Service were to spend the time and resources trying to pursue this water right, the results would not be worth the effort and would most likely create a legal water rights debate with the upstream landowners. Moreover, restoration of the wetland habitat alone will not raise the level of the biological diversity to achieve the purpose of this refuge.

Expenditure of money to restore biological diversity of critical migratory bird habitat is not be a priority in this location of the refuge complex. There are other areas of higher priority that still have some elements of biological diversity.

### 5. Does the refuge contribute to landscape conservation, provide a stepping stone for migratory birds, or serve as a unique habitat patch important to the conservation of a trust species?

*Answer:* No.
*Justification:* Lake Thibadeau National Wildlife Refuge is not the only water source in the area (refer to figure 14 in chapter 2). It does not contribute to landscape conservation and is not important for trust species, because it is identical to the surrounding landscape. If the refuge did not exist, migratory birds would not be affected. Creedman Coulee National Wildlife Refuge and other wetlands and stock ponds in the vicinity provide for migrating birds.

## Secondary Criteria

These last three questions, although secondary criteria, are also part of the divestiture evaluation.

### 6. Politics/Community—Is there such significant community interest in and support for the refuge that divestiture would result in unacceptable long-term public relations?

*Answer:* No.
*Justification:* All of the landowners holding title to land within the refuge boundary are active ranchers or farmers. It is unlikely that they would be willing to sell the land to the Service as they rely on it to make their living.

### 7. Jurisdiction—Does the Service have or can it acquire the jurisdiction to meet the refuge's purpose and Refuge System mission and goals and also prevent incompatible uses?

*Answer:* No.
*Justification:* Refer to the above justifications for answers to 4a and 4b.

### 8. Other Land Manager—Could some other party achieve most or all of the purposes of the refuge without the Service having to incur costs?

*Answer:* No.
*Justification:* Refer to the above justifications for answers to 4a and 4b.

## Additional Considerations

*Justification:* The dam and water control devises were last inspected in 2007. The diversion dam, which has been designated as a low-hazard dam, received a good evaluation with minor deficiencies. The remaining dams and water control structures would require extensive repair and replacement to bring the system to a functioning level. This repair would be costly to the Service for minimal benefit.

## Rules

Five rules organize the answers to the criteria questions and are for determining whether to consider a national wildlife refuge for divestiture.

### Rule 1: IF the refuge cannot meet one or more Refuge System goals, the refuge should be considered for divestiture.

This is the rule that applies to Lake Thibadeau National Wildlife Refuge.

Since rule 1 is definitive for Lake Thibadeau Refuge, there is no need to apply the other four rules. If rule 1 did not apply, a refuge would be further evaluated using rules 2–5, which address how well a refuge meets the Refuge System goals and refuge purposes, how well a refuge supports trust species, if a refuge possesses biological integrity and connectivity, and if the Service has jurisdiction.

## D.2 Justification

Based on the Service's evaluation using the Mountain–Prairie Region's divestiture model, Lake Thibadeau National Wildlife Refuge should be considered for divestiture. Specifically, under rule 1, the refuge did not meet one or more of the Refuge System goals and, therefore, should be considered for divestiture. The refuge does not meet or minimally meets the refuge purpose. Furthermore, the refuge does not substantially support trust species and does not possess biological integrity.

# Appendix E

*Public Involvement*

This appendix describes how the Service conducted public involvement and considered the resulting information for developing the CCP for the Bowdoin Refuge Complex. The appendix is organized by the following topics:

- E.1 Public Involvement Activities
- E.2 Public Mailing List
- E.3 Public Comments on the Draft Plan

## E.1 Public Involvement Activities

A notice of intent to prepare a CCP for the Bowdoin National Wildlife Refuge Complex was published in the Federal Register on May 14, 2007.

The Service prepared to involve the public by compiling a mailing list of more than 170 names during pre-planning. The list includes private citizens; local, regional, and State government representatives and legislators; other Federal agencies; and interested organizations.

### Public Scoping

Public scoping began immediately after publication of the notice of intent and was announced in May 2007 through news releases and issuance of the first planning update to the mailing list. Information was provided on the history of the refuge complex and the CCP process, along with an invitation to a public scoping meeting. Each planning update included a comment form to give the public an opportunity to provide written comments. Emails were also accepted at the refuge complex's email address: bowdoin@fws.gov.

One public scoping meeting was held in Malta, Montana, on May 22, 2007. There were more than 25 attendees, primarily local citizens and surrounding ranchers. Following a presentation about the refuge complex and an overview of the CCP and NEPA processes, attendees were encouraged to ask questions and offer comments. Verbal comments were recorded and each attendee was given a comment form to submit additional thoughts or questions in writing.

All written comments were due June 14, 2007; 15 emails and letters were received in addition to the verbal comments recorded at the scoping meeting. All comments were shared with the planning team and considered throughout the planning process.

### Briefing on Salinity and Blowing Salts

As part of the CCP process, the planning team set up a salinity team to address the most critical issue to both the refuge complex and the public—increased salinity and blowing salts on Bowdoin National Wildlife Refuge. The salinity team worked for almost 2 years on the issue, which included a yearlong study by a contractor to develop alternatives for addressing this problem.

On October 22, 2009, the planning team held a public meeting to provide information about the results of this effort and resulting alternatives. The public had an opportunity to ask questions and offer suggestions about the various aspects of the alternatives. To notify the public about this meeting, more than 170 meeting announcements were mailed out to the planning mailing list on September 24, 2009. Media outlets were sent a news release, and staff provided interviews to statewide newspapers. Several people helped prepare for the meeting and were there to answer questions: (1) Service staff from the Bowdoin Refuge, the regional Division of Refuge Planning, and the regional Division of Water Resources; and (2) the Montana Department of Natural Resources and Conservation and Department of Environmental Quality, including members of the Montana Reserved Water Rights Compact Commission. Thirty individuals attended this meeting and provided comments, which were recorded. These comments were considered by the planning team in the preparation of the draft CCP and EA, particularly chapter 6 of that document, which addressed the salinity and blowing salts problem.

### Review of the Draft Plan

The draft CCP and final EA was released to the public on June 22, 2011, though a notice of availability published in the Federal Register. Copies of either

the draft CCP and EA or a planning update were mailed to individuals on the planning mailing list. The document was also available online through the refuge complex's Web site. The public was offered 34 days to review this document and provide comments.

On June 29, 2011, the Service held a public meeting attended by more than 20 participants in Malta, Montana. Two weeks before the meeting, a news release was issued and planning updates were mailed providing details on where and when this meeting would be held. A short presentation was given on the draft plan, followed by an opportunity for participants to ask questions and offer comments. In addition to the oral comments recorded at the meeting, 24 emails and letters were received. All comments needed to be received or postmarked by July 25, 2011.

## E.2 Public Mailing List

The Service sent planning updates to all individuals and organizations on the mailing list. In addition, many hard copies of the draft CCP and EA were distributed using the mailing list and additional requests.

### Federal Officials

U.S. Representative Dennis Rehberg, Washington, DC
U.S. Senator John Tester, Washington, DC
U.S. Senator Max Baucus, Washington, DC

### Federal Agencies

Bureau of Land Management, Malta, Montana
Bureau of Reclamation, Billings, Montana
National Park Service, Omaha, Nebraska
Natural Resource Conservation Service, Malta, Montana
U.S. Geological Service, Fort Collins Science Center, Fort Collins, Colorado
U.S. Geological Service, Jamestown, North Dakota

### Tribal Officials

Blackfeet Nation, Browning, Montana
Chippewa Cree Tribe, Box Elder, Montana
Crow Tribe of Indians, Crow Agency, Montana
Fort Belknap Tribal Council, Harlem, Montana
Fort Peck Tribal Council, Poplar, Montana

### Montana State Officials

Attorney General's Office, Helena
Governor Brian Schweitzer, Helena
Representative Tony Belcourt, Box Elder
Representative Kristin Hansen, Havre
Representative John Musgrove, Havre
Representative Wayne Stahl, Saco
Representative Wendy Warburton, Havre
Senator John Brenden, Scobey
Senator Rowlie Hutton, Havre
Senator Jonathan Windy Boy, Box Elder

### Montana State Agencies

Farm Services Agency, Malta
Montana Department of Environmental Quality, Helena
Montana Department of Natural Resources and Conservation, Glasgow
Montana Department of Natural Resources and Conservation, Great Falls
Montana Department of Natural Resources and Conservation, Havre
Montana Department of Natural Resources and Conservation, Helena
Montana Department of Tourism, Helena
Montana Fish, Wildlife & Parks Commissioner, District 4, Scobey
Montana Fish, Wildlife & Parks Director, Helena
Montana Fish, Wildlife & Parks, Glasgow
Montana Fish, Wildlife & Parks, Malta
Montana Historical Society and Preservation Office, Helena

### Local Government

Blaine County Commissioners, Chinook
Glasgow Irrigation District, Glasgow
Hill County Commissioners, Havre
Malta Irrigation District, Malta
Mayor of Malta, Malta
Phillips County Commissioners, Malta
Valley County Commissioners, Glasgow
Montana Salinity Control Association, Conrad

### Organizations

American Bird Conservancy, The Plains, Virginia
American Prairie Foundation, Malta, Montana
American Rivers, Washington, DC
American Wildlands, Bozeman, Montana
Audubon Society, Helena, Montana

Audubon Society, New York, New York
Audubon Society, Washington, DC
Beyond Pesticides, Washington, DC
Blue Goose Alliance, Tallahassee, Florida
Burlington Northern Railway, Havre, Montana
CARE Group, Washington, DC
Defenders of Wildlife, Washington, DC
Ducks Unlimited, Clancy, Lewistown, Montana
Ducks Unlimited, Memphis, Tennessee
Fund for Animals, New York, New York
Gallatin Valley Pheasants Forever, Bozeman, Montana
The Humane Society, Washington, DC
Isaac Walton League, Gaithersburg, Maryland
Malta Area Chamber of Commerce, Malta, Montana
Montana Department of Tourism, Helena
Montana Natural Heritage Program, Helena
Montana National Wildlife Federation, Helena
National Trappers Association, New Martinsville, West Virginia
National Wildlife Federation, Reston, Virginia
National Wildlife Refuge Association, Washington, DC
The Nature Conservancy, Boulder, Colorado
The Nature Conservancy, Helena, Montana
North American Nature Photography Association, Wheat Ridge, Colorado
Phillips County Historical Society, Malta, Montana
St. Mary Rehabilitation Working Group, Glasgow, Montana
Sierra Club, San Francisco, California
The Wilderness Society, Washington, DC
Wildlife Management Institute, Bend, Oregon
Wildlife Management Institute, Fort Collins, Colorado
Wildlife Management Institute, Washington, DC
The Wildlife Society, Townsend, Montana
World Wildlife Fund, Bozeman, Montana

## Universities and Schools

Colorado State University Libraries, Fort Collins
Malta Elementary School, Malta, Montana
Malta High School, Malta, Montana
Northwestern University, Evanston, Illinois

## Montana Media

Billings Gazette Online, Billings
The Billings Outpost, Billings
Fort Belknap News, Harlem
The Glasgow Courier, Glasgow
Great Falls Tribune, Great Falls
Havre Daily News, Havre
KLAN Radio, Glasgow
KLTZ Radio, Glasgow
KMMR Radio, Malta
Montana Public Radio, Missoula
News Media Broadcasters, Havre
Phillips County News, Malta
Yellowstone Public Radio, Billings

## Individuals

81 private individuals

# E.3 Public Comments on the Draft Plan

The public provided many comments during the public review period for the draft CCP and EA. The Service read all comments and found the following comments to be substantive. The Service developed responses to each of these comments after grouping them in the following topics:

- Salinity and blowing salts (comments 1–12)
- Russian olive (13–34)
- Divesting Lake Thibadeau Refuge (35–36)
- Upland habitat (37–38)
- Wetland habitat (39–43)
- Predator management (44–45)
- Prescriptive grazing (46–51)
- Climate change (52–53)
- Public use (54–58)
- General (59–63)

## Salinity and Blowing Salts

***Comment 1.*** *"The scope, complexity and longevity of this plan, most especially the Salinity and Blowing Salts Plan, seem to argue for completion of not just an Environmental Assessment, but instead of a comprehensive Environmental Impact Statement."*

***Response 1.*** The preferred alternative is not a major federal action that will 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 is not warranted. The issues identified in the CCP, including the salinity and blowing salts issue, are not significant and neither are the changes to the management of the Bowdoin Refuge Complex.

***Comment 2.*** *Reduce or stop adding saline water to the Bowdoin system.*

***Response 2.*** The Service wants to control salinity inputs; however, this can be challenging since irrigation return flows, which the Service does not control, are significant contributors of salts. The Service will work with the Montana Salinity Control Association, surrounding landowners, and other partners to implement strategies that reduce salt inputs, where possible. Some new strategies have been added to the final plan based on this and other saline input comments.

***Comment 3.*** *"Allow the lake's footprint to flux and notably shrink back toward historic acreage, rather than managing for artificially inflated lake levels during dry seasons and dry years."*

***Response 3.*** During the salt removal process, Lake Bowdoin will be kept at a lower level to better concentrate salts for removal using an injection well. Once the salinity objective is achieved and can be maintained, the Service will recreate a flow-through system to allow for more natural water fluctuations.

***Comment 4.*** *Allow technology time to advance in hopes of future development of a low-risk, affordable solution. Hold additional consultations on this matter before deciding on a preferred alternative.*

***Response 4.*** The Service, State, and other partners have spent significant time, effort, and money to develop a range of viable alternatives including the preferred alternative. The analysis, documented in the draft CCP and EA, supports the chosen direction as the most viable method to address the salinity and blowing salts issue. Nevertheless, as the plan is implemented, the Service will continue to seek and evaluate proven technologies that may increase the effectiveness of removing salts, while reducing costs and time to achieve the salinity objective.

***Comment 5.*** *"I believe we need to quit managing the Bowdoin refuge to have certain elevated salt levels for those species that prefer it."*

***Response 5.*** The Service is not managing for elevated salt concentrations. All the alternatives evaluated were developed to reduce the current, unnaturally high salinity concentrations.

***Comment 6.*** *"It is essential to keep the Malta Irrigation District informed of any plans that may affect the irrigation system Bowdoin uses for water conveyance."*

***Response 6.*** The Service will work closely with the Malta Irrigation District on any needs related to the irrigation system.

***Comment 7.*** *"Salinity control and abatement of blowing salts are major concerns, and we recommend that Bowdoin staff consult soon and frequently with Jane Holzer and the Montana Salinity Control Association on these issues."*

***Response 7.*** The Service will continue to work with the Montana Salinity Control Association and other partners to address this issue. Many of the suggestions provided by Jane Holzer, primarily to address salinity inputs, have been added to the final CCP.

***Comment 8.*** *"The Bowdoin Refuge is a saline sink. If the Russian Olives are no longer drawing salty water away from the surface, the Refuge shorelines will become more saline."*

***Response 8.*** The Service does not agree with this statement. Russian olive trees are a salt-tolerant tree that grows well in wet, saline soils. However, they have little effect on drawing salty water away from the surface especially when considering the tons of salt added to the system annually.

***Comment 9.*** *"Lake Bowdoin is within the Beaver Total Maximum Daily Load Planning Area. A Total Maximum Daily Load will need to be prepared by the MDEQ to improve water quality and restore full support for designated beneficial uses in Lake Bowdoin. We encourage the Service to coordinate its efforts to address Lake Bowdoin water quality impairments with MDEQ staff involved in this planning area and water quality planning."*

***Response 9.*** The Montana Department of Environmental Quality has served as a key member on the planning team since the beginning of this process and has been instrumental in developing the alternatives. The Service will continue this close coordination during implementation of the CCP.

***Comment 10.*** *"Let the Bowdoin wetland function the same as all other wetlands in this area. When there is an abundance of water the wetland may have standing water during the spring and summer depending on weather. But if there is limited moisture then the wetland may only have standing water during the early spring. The only reason this may not work is if there is a saline seep situation occurring. But this can be dealt with also and is frequently by the Montana Salinity Association. They identify and treat the recharge areas and I've seen some great success with their work."*

***Response 10.*** Lake Bowdoin functions as a sump for irrigation return flows and does receive subirrigation. There will likely always be some water in this area, regardless of weather or canal deliveries. One of the long-term goals of reducing salinity to acceptable concentrations is to be able to recre-

ate a more natural flow-through system for Lake Bowdoin. Recreating this system should restore the appropriate concentration of salts in the lake. The Service will continue to work with the Montana Salinity Control Association, particularly on strategies to reduce salt inputs.

***Comment 11.*** *"I believe we need to quit managing the Bowdoin refuge to have certain elevated salt levels for those species that prefer it. We obviously cannot control this when salts and other contaminants reach toxic levels and begin killing the inhabitants."*

***Response 11.*** The Service does not purposely manage for elevated saline concentrations. The species the Service is managing habitat for are negatively affected by unnaturally elevated saline concentrations. The goal for this issue is to reduce saline concentrations and blowing salts.

***Comment 12.*** *"Be certain to work with MT Bureau of Mines and Geology in determining how deep the injection well should be drilled to avoid potable water and where the best placement should be located. USFWS should work with the local community including landowners, conservation district, Natural Resources Conservation Service, and MT Dept Natural Resources and Conservation for long term management to reduce saline inputs. Work with local irrigation district to line portions of canal known to leak and cause salt accumulations on the Refuge."*

***Response 12.*** The final CCP incorporates these suggestions.

## Russian Olive

***Comment 13.*** *"Pheasant hunter economic input to the local community will drop significantly due to the decline in the pheasant population (as a result of controlling Russian olive trees)."*

***Response 13.*** The primary purpose and resulting management actions performed on the Bowdoin Refuge Complex are for migratory birds. The Service does not manage for pheasants; however, pheasants do benefit from management actions designed to benefit migratory birds. The Service does not believe that the removal of Russian olive trees, particularly those that are scattered, will significantly affect the pheasant population on or surrounding the refuge complex. The refuge complex and surrounding landscape will continue to provide winter cover, food, and nesting habitat for pheasants.

***Comment 14.*** *"Will the Service replace shelter belts with shrubs that provide cover and a winter food source for sharp-tail grouse and ring neck pheasants? If not, will Service plant food plots of either native perennials and/or annuals such as wheat and/or barley to compensate for the loss of the Russian olive, which is the primary winter food source for upland birds, both native and nonnative."*

***Response 14.*** Upland gamebirds including sharp-tailed grouse and pheasants should benefit from the grassland and native shrubland restoration projects. The Service will not plant food plots.

***Comment 15.*** *"On those areas outside the Refuge (WPAs and adjacent Bureau of Reclamation lands along the canal), would BNWR consider not removing Russian olive shelterbelts that are not within the riparian area? We would recommend that specific shelterbelts be removed only when they directly expand blocks of grassland habitat. Our preference would be to maintain some shelterbelts for wintering habitat, mainly for upland game birds."*

***Response 15.*** The Bowdoin Refuge Complex was established for migratory birds, species that rely on large blocks of unfragmented grassland habitat for survival. In addition, the Service requires the refuge complex to treat any nonnative or invasive species that impede the biological integrity or health of the lands and waters on which these birds depend. Grassland birds, such as Sprague's pipit, are the most imperiled birds in North America primarily due to habitat loss and fragmentation. The Service will not commit to protecting any Russian olive trees, because they are a nonnative species that affects the Service's ability to achieve the purpose for which the refuge complex was established. Nevertheless, the removal of Russian olive trees will be challenging and systematic. The objective is to remove at least 25 acres of Russian olive trees over the next 15 years; most of these trees will be removed from Bowdoin Refuge and Pearce WPA. Initially, scattered trees will be removed where their removal will result in an enhancement and restoration of large, contiguous blocks of grassland. In addition, trees that are impeding water conveyance systems will be targeted. Other larger, contiguous blocks of trees will be a lower priority unless proven treatment methods improve. The Service has no jurisdiction or management rights on adjacent Reclamation lands along the canal.

***Comment 16.*** *"Would Bowdoin Refuge consider not removing other shrub shelterbelts, such as Caragana even though it is in the riparian areas?"*

***Response 16.*** No, the Service will not guarantee the protection of any shelterbelts, particularly those that contains nonnative species. Caragana and

other nonnative trees and shrubs may be removed but could be replaced by native species such as silver buffaloberry, if they occurred historically in the same area including riparian areas.

***Comment 17.*** *"We recommend that if Bowdoin Refuge chooses to remove Russian olive, that they be replaced with native shrubs such as buffalo berry, hawthorn, or chokecherry in areas where Russian olive are being eradicated."*

***Response 17.*** The CCP calls for restoring native shrubs to portions of the refuge complex where they historically occurred; however, not all areas where Russian olive trees occur today had native shrubs. Most areas were native mixed-grass prairie and will be restored to this habitat.

***Comment 18.*** *"The misguided attempt to eradicate Russian olive trees from the Bowdoin refuge will have irreparable damage to the sharp-tail grouse and pheasant populations."*

***Response 18.*** The Service disagrees with this statement. Pheasants will adapt and continue to exist on Bowdoin Refuge. The refuge has lost all of its sharp-tailed grouse leks. Research shows that grouse will not establish or use leks or nesting sites near trees. The removal of these nonnative trees may allow sharp-tailed grouse to reestablish leks and nesting areas on the refuge. The contiguous grasslands will also provide more-protected areas for nesting pheasants, which are vulnerable to the same predators of upland-nesting migratory birds. Nevertheless, the Service will not manage for pheasants on the refuge, but pheasants will continue to benefit from the Service's management actions designed to protect migratory birds.

***Comment 19.*** *"The plan will result in fewer hunters due to the eradication of the Russian olive trees which will result in fewer game birds."*

***Response 19.*** The Service does not agree. Pheasants will adapt and continue to exist on the refuge complex.

***Comment 20.*** *"The direction, in the CCP, is to remove all nonnative shelterbelts and grasses and replace them with native species. What are the native species that will tolerate high salinity soils?"*

***Response 20.*** Species such as western wheatgrass, saltwort, and saltgrass are native to this area. The Bowdoin Refuge naturally has somewhat saline soils. The native vegetation that remains throughout the refuge persists in naturally saline soils.

***Comment 21.*** *"Continue the systematic removal of shelterbelts. The goal of this work should be to enhance and restore large blocks of native prairie grasslands. No additional shelterbelts should be permitted."*

***Response 21.*** The Service agrees with this comment. Native shrubs will be reestablished only where they historically occurred.

***Comment 22.*** *"Eradicate the Russian olives completely. Let the non-native pheasant adapt and thrive in areas without the Russian olive, as most surely will do."*

***Response 22.*** The Service does not disagree with this concept; however, the eradication of Russian olive trees from an area that is heavily infested, such as Bowdoin Refuge, will be time-consuming and costly. The CCP directs the systematic removal of Russian olive trees from the refuge complex, focusing on those areas where contiguous grassland habitat can be restored by removing trees, both scattered and in large blocks. These areas will then be retreated as needed and restored to native species. The tremendous seed source from trees both on and off the refuge complex will make the success of this program very challenging. The Service agrees that restored grassland will benefit pheasants and other upland gamebirds.

***Comment 23.*** *"I believe the plan to increase efforts to control and eradicate Russian olive trees is not consistent with the established purpose of the refuge, federal law, and its basis is scientifically questionable and perhaps motivated by a 'nativist' prejudice against non-native species and even by a prejudice by some at FWS against hunting on National Wildlife Refuges."*

***Response 23.*** The establishment purposes, laws, and policies that guide management of the Bowdoin Refuge Complex and the Refuge System prohibit the protection of nonnative species, particularly those that prevent the refuge complex from meeting its purposes. There is no prejudice against hunting on national wildlife refuges or the refuge complex—the refuge complex commits significant resources and efforts to provide hunting opportunities and provide for the safety of hunters and other visitors while enforcing game laws.

***Comment 24.*** *"There is no reference in the National Wildlife Refuge System Improvement Act of 1997 to 'native' birds and wildlife or 'native' plants and there is no mandate that refuges be managed for the benefit of 'native' species only."*

***Response 24.*** The Improvement Act states that in administering the Refuge System, "the Secretary shall … ensure that the biological integrity, diversity, and environmental health of the System are maintained." Secondarily, the Service will restore lost or severely degraded elements of integrity,

diversity, environmental health at the refuge scale and other appropriate landscape scales where it is feasible and supports achievement of refuge purposes and Refuge System mission. Biological integrity is the biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historical conditions, including the natural biological processes that shape genomes, organisms, and communities. Russian olive is a nonnative species that threatens the biological integrity, diversity, and environmental health of the Bowdoin Refuge Complex. By law and policy, the Service must manage this nonnative species to achieve the purposes of the refuge complex and to maintain and restore native habitats.

***Comment 25.*** *"The CCP authors should review and consider 'Relationships between Olive and Duck Nest Success in Southeastern Idaho' (Gazda et al. 2002). While this reference supports many of the same findings that are cited in the CCP, it is not conclusive on the impact to duck nest success from birds using Russian olive trees as nesting and brooding sites."*

***Response 25.*** The Service reviewed this study and used it as a reference in the CCP. While the study was inconclusive due to the limited number of data sets, it did show a trend that the success of duck nests decreased as the presence of Russian olive trees increased and recommended against introducing trees into historically treeless areas. This document references many credible studies on the negative effects of introducing trees into grassland habitat on waterfowl and other grassland-nesting birds.

***Comment 26.*** *"A study by Pietz et al 2009 found that 'parasitism of grassland passerine nests was lower in landscapes with trees than in those without trees'."*

***Response 26.*** The Pietz study looked at parasitism by only brown-headed cowbirds. Cowbirds prefer woodland habitat, particularly edge habitat. Parasitism of grassland birds increases along the woodland edges, a preferred habitat of the cowbird. The key to discouraging cowbird parasitism or controlling populations of brown-headed cowbirds in the Great Plains is maintaining large expanses of grassland, eliminating foraging areas (such as feedlots) and perch sites, and reducing the extent of overgrazed pastures. Cowbird parasitism is present on the refuge complex and increases in areas where trees have been introduced. A much greater threat of nonnative Russian olive trees is the opportunity for increased predation and the avoidance of these fragmented grasslands by grassland-nesting birds. The Pietz report supports this, stating, "Finally, our results should not be viewed as a rationale for enhancing tree cover in grassland landscapes. Many grassland bird species exhibit area sensitivity and may avoid nesting in areas with too much tree cover."

***Comment 27.*** *"I agree with the removal of the Russian Olives and a return to natural species. I am concerned the many birds that use these trees as winter cover and as a winter food source will be negatively impacted."*

***Response 27.*** We do not disagree that pheasants and other birds use Russian olive trees, particularly in the winter. However, many of these bird species have come to this area or expanded their territories since these nonnative trees were introduced. Many of these birds are avian predators including magpies and hawks. The plan to remove Russian olive trees may cause pheasants and other bird species to shift to other Russian olive trees on and off the refuge or into other types of thermal cover found throughout the refuge complex, particularly cattails. The Service feels that these birds will adapt and survive. Grassland-nesting birds are the fastest declining group of birds, and they do not and will not adapt to the invasion of trees in their nesting areas. Habitat loss, particularly from the fragmentation of grassland habitats or conversion of lands for agriculture or other developments, is the major cause of this decline.

***Comment 28.*** *"The plan states attempts would be made to replace lost Russian olive trees with some native shrubs. In reality, funds will be provided to remove trees, but funds will not be found to provide for the replanting of other native wildlife food or cover producing shrubs."*

***Response 28.*** If the Service does not conduct some sort of restoration when a Russian olive tree is removed, the tree will return or some other opportunistic invasive species will become established. This would be counterproductive. This is one of the greatest challenges of the treatment process but is crucial to its long-term success. Removal of trees, particularly larger blocks of trees, requires that money for restoration back to native grasses and shrubs is available.

***Comment 29.*** *"Although Russian olive is not designated as an 'invasive species' in Montana, as of September 2010, Russian olive can no longer be sold in the state of Montana. It is now classified as a Priority 3 regulated plant, which prohibits its sale but does not require removal. Because of this development, we do not believe that the Refuge Complex needs to spend precious resources educating the public about this issue."*

***Response 29.*** Based on the response to the Service's proposal to remove and treat Russian olive trees, there is a clear misconception about the benefits and impacts of these trees on native wildlife, particularly grassland birds. Even though this tree species may someday be designated as a noxious weed in Montana, the treatment and restoration of the large areas infested by these trees may take decades, if not lifetimes, to convert back to grassland. These are very prolific and successful invaders in this part of Montana. An effective education and outreach program may benefit the efforts called for in the final CCP.

***Comment 30.*** *"To the extent that the biological opinion has changed at FWS, I believe it is due to a 'nativist' prejudice against 'invasive' species. A number of biologists are challenging the orthodoxy that alien species are inherently bad and believe many introduced species have increased the diversity and resiliency of native ecosystems."*

***Response 30.*** Restoring an area back to historical communities is difficult and may not be possible. However, no invasive or nonnative species or artificial process can ever function or benefit wildlife as well as the native habitats and their supporting processes, such as fire and flooding. Sustaining biological diversity and integrity, where possible, is the focus for the refuge complex and the Refuge System.

***Comment 31.*** *"The CCP is flawed in that a discussion on the effects of converting vegetation within the Bowdoin Refuge to native species does not include impacts on the production and harvest of upland game birds."*

***Response 31.*** This was not included, because the Service feels the removal of Russian olive trees will not have significant impacts on the production of and subsequent harvest of upland gamebirds. Restoring fragmented grasslands will benefit upland gamebirds, particularly sharp-tailed grouse, which depend on these areas for breeding and nesting.

***Comment 32.*** *"Management direction for upland game birds on the Montana Fish, Wildlife and Parks strategic plan for managing both native and non-native upland game birds on Montana encourages the planting of shelterbelts."*

***Response 32.*** The State completed a document in 2004 titled, "Literature Review of Montana Upland Game Bird Biology and Habitat Relationships as Related to Montana Fish, Wildlife, and Parks' Upland Game bird Habitat Enhancement Program." This review states that the planting of trees and shrubs for upland gamebirds in agricultural landscapes is a habitat management strategy intended to provide shelter from extreme weather and predators. Tree and shrub cover, however, appears to be unrelated to survival of pheasants in some regions. Pheasants in Illinois experienced high mortality during two severe winters regardless of the amount, configuration, or structure of woody cover present. In South Dakota, however, researchers noticed increased use of shelterbelts by pheasants during a severe winter and concluded that this type of cover was important during unusually cold periods accompanied by deep snow. Nonetheless, the majority of the radio-marked pheasants in the study died from predation rather than exposure. Some researchers have speculated that plantings of mature trees may provide habitat for avian predators such as owls and, when gamebirds move into these areas during periods of severe weather, their mortality rates may increase considerably due to predation. The Service agrees that planting trees in treeless areas increases predation of grassland-dependent birds, even upland gamebirds.

***Comment 33.*** *"The plan should be revised to restrict attempts to eradicate Russian olive trees and restore the native prairie to Big Island and the non-hunting eastern part of Bowdoin Refuge where the refuge has 'relatively pristine, native prairie.' I understand the need to control Russian olive trees when they interfere with irrigation canals, the maintenance of boundary fences and when they are encroaching upon open water."*

***Response 33.*** The Service will focus its initial efforts to remove Russian olive trees in the areas described in addition to scattered trees in grassland habitat throughout the Bowdoin Refuge. However, the remaining Russian olive areas will be treated once these higher priority areas have been effectively treated and restored.

***Comment 34.*** *"A large section of Russian olive trees has already been removed along the refuge's northern border, north of old highway #2 in order to gain access to the border fence. The hillside north of old highway #2 has been an excellent hunting area and further attempted eradication of Russian olive trees there will destroy the area for pheasant hunting. The area is far enough away from Lake Bowdoin to not cause harm to migratory birds."*

***Response 34.*** The Service will not protect any Russian olive tree stands.

## Divesting Lake Thibadeau Refuge

***Comment 35.*** *"We support divesting of Lake Thibadeau National Wildlife Refuge. From the description in the Draft Plan, it appears that the wildlife values for this refuge are minimal. It would be helpful to know what would happen to any funds from the divesture."*

***Response 35.*** This Service will no longer maintain structures associated with these private lands. Also, the refuge staff will no longer need to monitor the Lake Thibadeau Refuge, which will free the staff to work on other units of the refuge complex that have greater potential to benefit migratory birds and other wildlife. There is no specific annual budget associated with the refuge; however, not having to use special project money to maintain structures on the refuge will free this money for use on other units within the Bowdoin Refuge Complex or other refuges in the Mountain–Prairie Region.

***Comment 36.*** *Could the water right for Lake Thibadeau be traded for a water right that would benefit one of the other wetlands within the Bowdoin Refuge Complex rather than voluntarily relinquishing the water right to the State?*

***Response 36.*** Service policy is to relinquish voluntarily the water rights associated with a divested refuge back to the State.

## Upland Habitat

***Comment 37.*** *"Will there be modification made to the Native grass/forbs mixes that will allow for native grass to be planted with a combination of tall and intermediate wheat grass, great basin rye along with native and nonnative forbs?"*

***Response 37.*** The Service will strive to use a native mixed-grass and forb mix in all grassland habitat restoration.

***Comment 38.*** *"Roads deemed inappropriate or unnecessary should be not only closed but also reclaimed."*

***Response 38.*** The Service agrees. Roads deemed unnecessary for management, maintenance, and adequate visitor access will be targeted for removal and reclamation. Before completion of this CCP, the Service had already decommissioned some roads that did not meet these criteria.

## Wetland Habitat

***Comment 39.*** *"Why are cattails and bulrush considered an undesirable emergent? Both plants provide winter cover for pheasants and nesting habitat for several native migratory birds."*

***Response 39.*** Native cattail and bulrush species are not undesirable unless they become unnaturally dominant to the point of reducing or eliminating open-water areas and the diversity and productivity of wetland habitat.

***Comment 40.*** *"The target species of birds for wetlands is missing two important species: American White Pelicans and Black-crowned Night-Herons. Both are species of concern in the state of Montana, and for both species, the Bowdoin Refuge Complex plays an essential role."*

***Response 40.*** Although the target species list does not include these two species, the Service feels they will benefit from the actions in the CCP. These species will be monitored as Lake Bowdoin is lowered to concentrate salts for removal. In addition, the Service will continue to conduct an annual over-water and colonial bird nest survey. Ultimately, the Service's management actions will protect and support any species of concern, regardless of their status as a target species in the plan.

***Comment 41.*** *"According to current records from the Montana Dept. of Fish, Wildlife & Parks, there are only four colonies of Franklin's gull in the state of Montana. These gulls have not been found breeding at Freezout Lake for several years. Numbers used in the Draft Plan should be updated from the 1994-95 numbers—the breeding pair numbers are dramatically lower in recent years. These facts should be corrected."*

***Response 41.*** The Service researched these numbers and made this correction in the final CCP.

***Comment 42.*** *"We do not think it would be a wise use of resources to identify wetland creation projects. The Refuge Complex has a long history of not being able to deliver water to the wetlands that are currently on-site. It is more important to secure long-term consistent water for current wetlands—rather than creating new ones."*

***Response 42.*** The Service will restore natural wetland basins that were drained, primarily for agricultural use. Many of these wetlands are completely dependent on runoff and rainfall and function as temporary or seasonal wetlands. These types of wetlands are very beneficial during migration periods and for amphibians. The strategies have

been corrected in the final CCP to clarify that the Service will not create wetlands in areas where they did not historically exist.

***Comment 43.*** *"The Conservation District would like to see inclusion of grassland management techniques to bolster competitive advantages of native vegetation."*

***Response 43.*** The actions for managing grassland and wetland habitats, including controlling invasive species, will assist native species in competing against invasive species; however, the Service welcomes additional suggestions. The stepdown plan for habitat management, which is revised every 5 years, will provide more details on actions and techniques.

## Predator Management

***Comment 44.*** *"Gulls have major impacts on the nests of ground nesting birds, which have been reported in many studies. Will the Bowdoin Refuge remove gull nesting sites to reduce impacts to ground nesting bird populations?"*

***Response 44.*** Gulls and other avian predators can have an impact on ground-nesting birds. The removal of trees and the restoration of contiguous grassland habitat will significantly reduce the vulnerability of ground-nesting birds to being located and depredated by gulls and other nest predators. The Service may investigate the potential to control specific gull species if monitoring shows significant impacts to imperiled grassland-nesting species.

***Comment 45.*** *"The CCP needs to address the impact to ground nesting birds from other predators."*

***Response 45.*** The Service will continue to allow limited harvesting of other predators such as skunks and coyotes. An even greater effect on reducing the success of these predators will occur through restoring contiguous blocks of native grassland habitat by reducing the fragmentation caused by nonnative trees. Contiguous grassland makes it more difficult for these and other predators to locate ground-nesting birds.

## Prescriptive Grazing

***Comment 46.*** *"Whether in the CCP or in subsequent step-down plans, the details of grazing lease administration need to be geared to assuring the best possible outcomes for both the lessor and the lessee, which in turn guarantees the best possible outcome for the long-term health of the land."*

***Response 46.*** Any grazing will be prescriptive, based on specific objectives designed to enhance habitat for migratory birds and at the same time benefit the lessee. Grazing operations will be monitored to ensure objectives are met. The stepdown plan for habitat management will describe these objectives and techniques in detail.

***Comment 47.*** *"We strongly encourage Bowdoin NWR to network extensively with leading range, fire and soil scientists in the exploration of grassland management alternatives, including the strategic use of cattle, sheep or goats to control undesirable vegetation and boost vigor of desirable plants."*

***Response 47.*** The wildlife biologist and other refuge complex staff will work with many partners to ensure that the most effective and proven techniques are used to boost the vigor of desirable plant species and restore and manage habitats for target wildlife species.

***Comment 48.*** *"We ask that Bowdoin staff consider development of stewardship contracts with local ranchers to use their livestock as tools to meet Bowdoin's vegetation management objectives."*

***Response 48.*** Habitat management objectives and subsequent monitoring will be the determining factors for where and when to use prescriptive grazing and the duration of grazing activities. The Service will work with cattle ranchers to meet specific habitat objectives when using prescriptive grazing as a habitat management tool.

***Comment 49.*** *"The grasslands evolved under disturbance. Disturbance being events that altered the vegetation and this included drought/floods, extreme temperatures, snow pack, disease, grazing by mammals and insects, trampling, and fire. Of all those natural disturbances grazing is probably the most manageable and should be used as a management tool also. Haying could also be a vegetative manipulation tool and is very manageable."*

***Response 49.*** The CCP describes the use of prescriptive grazing, haying, fire, invasive species management, and native vegetation restoration to meet habitat objectives by attempting to mimic natural processes.

***Comment 50.*** *"Get all cattle ranchers grazing cows and cattle out of this site."*

***Response 50.*** Prescriptive cattle grazing is a management tool for enhancing, maintaining, and restoring native grassland habitat and for meeting other habitat objectives. Bison historically grazed these grasslands; since the bison have been extirpated, proper cattle grazing can be used to mimic the natural (bison grazing) process.

***Comment 51.*** *Boundary fences need to be evaluated and replaced with wildlife-friendly fences as needed. "Interior fencing such as riparian fencing should be similarly evaluated to allow for wildlife passage. This is especially pertinent to facilitated antelope migration."*

***Response 51.*** There is no fencing of riparian areas or other internal areas in the refuge complex. If areas adjacent to riparian habitat are grazed, a temporary electrical fence will be used to keep cattle out of this important habitat.

## Climate Change

***Comment 52.*** *"We recommend that the final Comprehensive Conservation Plan include a process to work on climate change in a systematic and scientific way that benefits wildlife—and enhances wildlife adaptation—by first identifying (1) species of plants that are likely to be first to decline; (2) animals that are associated with these plant species including insects, birds, and mammals; and (3) species of plants and animals that could increase."*

***Response 52.*** The Service agrees that this information is important for understanding the long-term health of the refuge complex. This type of monitoring will be incorporated into more broad-scale management plans currently being developed by the landscape conservation cooperative. Landscape conservation cooperatives are management–science partnerships that guide integrated resource management actions addressing climate change and other stressors within and across landscapes. The cooperative's recommendations, including monitoring programs, will be incorporated as appropriate into the stepdown for habitat management at the Bowdoin Refuge Complex.

***Comment 53.*** *"In order to better address climate change, we recommend that the USFWS consider the following actions: (1) replacing all vehicles with more fuel-efficient vehicles; (2) upgrading all refuge buildings to "green" standards; (3) installing solar panels for refuge buildings; (4) making buildings more energy efficient; (5) providing more recycling bins; (6) using more teleconferencing instead of traveling for meetings; (7) encouraging staff to be more energy efficient (and providing incentives for those behavior changes); (8) and studying and promoting the carbon sequestration benefits of the refuge."*

***Response 53.*** The Service agrees and does much of this on the refuge complex today, some due to Service policy (such as vehicle purchases) and some voluntarily as conservationists. In fact, the Service conducted most of the planning process for the CCP using online meetings and conference calls. Bowdoin Refuge uses a wind turbine to provide electricity to building facilities. Any new construction on the refuge complex will use the "green" technologies described in this comment.

## Public Use

***Comment 54.*** *"Ban all hunting and trapping. The wildlife and birds deserve a site to live their lives."*

***Response 54.*** Hunting is a compatible, traditional, public use of the Bowdoin Refuge Complex, excluding Holm WPA. The National Wildlife Refuge System Administration Act of 1966, other laws, and Service policy permit hunting on a national wildlife refuge when it is compatible with (does not materially detract from) the purposes for which the refuge was established and acquired. National wildlife refuges exist primarily to safeguard wildlife populations through habitat management and conservation. The word "refuge" includes the idea of providing a haven of safety for wildlife and, as such, hunting might seem an inconsistent use of the Refuge System. However, habitat that supports healthy wildlife populations produces harvestable animal surpluses, with wildlife being a renewable resource in these situations. Hunting, trapping, and fishing as practiced on refuges do not pose a threat to wildlife populations and, in some instances, are actually necessary for sound wildlife management.

***Comment 55.*** *Montana Fish, Wildlife & Parks recommends that big game diseases be recognized and suggests that white-tailed deer populations be managed at lower densities to prevent disease transmission.*

***Response 55.*** The CCP describes known big game diseases in the wildlife disease section (chapter 4 in the draft plan and chapter 3 in this final plan). The refuge complex completed a chronic wasting disease plan in 2006. The Service agrees that higher density big game populations are more susceptible to disease. Service and State biologists will collaborate to determine the feasibility and compatibility of offering a big game hunt on Bowdoin Refuge.

***Comment 56.*** *Montana Fish, Wildlife & Parks suggests that, if a big game hunt is allowed on Bowdoin Refuge, the permitted weapons be expanded beyond archery to increase harvest. Nearby State wildlife management areas allow archery equipment, shotgun, traditional handgun, muzzleloader, or crossbow. These weapons still provide*

*for safety, but expand the hunting opportunity and harvest potential. Furthermore, maintaining consistency between Bowdoin Refuge and State-managed wildlife management areas would be less confusing to hunters.*

***Response 56.*** The final CCP incorporates the consideration of other types of weapons when evaluating the potential for offering big game hunting on Bowdoin Refuge. As this new hunting program is evaluated with assistance from the State, it will be determined which weapons are be appropriate and safe.

***Comment 57.*** *"The proposal to close the east end of Bowdoin Refuge to all foot traffic during the waterfowl hunting season will have unknown effects to hunting opportunity and will limit other recreational opportunities, such as hiking, photography and wildlife viewing. MFWP recommends that this be considered experimental by nature and we do not recommend this action. At a minimum MFWP recommends that it be reversible should it not provide the intended sanctuary that increases waterfowl numbers in the area during hunting season."*

***Response 57.*** The east half of Bowdoin Refuge is designated as a waterfowl sanctuary area during waterfowl hunting season. The purpose of this closure is to provide an undisturbed resting area for waterbirds, particularly during waterfowl hunting (October through November or until freezeup). Currently, the Service allows visitors to walk throughout this area, which does cause waterfowl to flush and expend energy. As a sanctuary area, waterfowl should be permitted to rest and feed with minimal disturbance. Other areas currently open to foot traffic and the auto tour route (that travels through the sanctuary area) will remain open, providing many opportunities for wildlife viewing and hiking. The Service predicts that the sanctuary may encourage waterfowl to remain in the overall area during hunting season, thereby creating greater opportunities for harvest in non-sanctuary areas. Nevertheless, these plans are adaptable. If the closure does not result in less disturbance, the Service will decide at that time whether to reopen the area to foot traffic.

***Comment 58.*** *"The contention that there are 25,000 visitors per year is not backed up by a statistically valid survey. I find it hard to believe that there is an average of 68 visitors per day."*

***Response 58.*** This is the Service's best estimate of visitors throughout the refuge complex, which spreads across a four-county area. This number does not represent just visitors to the Bowdoin Refuge.

# General

***Comment 59.*** *"Wherever possible, the USFWS should work to ban mining and mineral leasing within the refuge complex. Plans should be made to institute a permanent withdraw of all Refuge Complex lands from mining and mineral leasing, particularly where the U.S. government owns the mineral rights."*

***Response 59.*** The Service has not permitted mining or fluid mineral (natural gas or oil) extractions on areas where the Government owns the mineral rights. Natural gas extractions occur throughout the Bowdoin Refuge Complex where the Government has not bought the mineral rights or the private-land easements do not restrict this activity. By law, the Service is required to provide access to the owners of mineral rights, even on Federal lands. In the future, the Service will evaluate the effects of not being able to acquire mineral rights on lands proposed for easement or acquisition.

***Comment 60.*** *"None of the management alternatives evaluated in this plan are inexpensive. Given substantial differences in cost of proposed actions among the three alternatives, and the perilous state of our national economy, the CCP should include a rigorous economic cost-benefit analysis."*

***Response 60.*** The CCP is a 15-year management plan. It is difficult to predict what a project will cost over that time, particularly since costs will change. Some of the objectives and strategies in the CCP can be accomplished with current resources, but it will require a change in priorities. That is a benefit of long-term planning. Even if the refuge complex does not receive additional resources, particularly given the current economic realities, the plan helps the refuge complex staff ensure they are using resources (such as staff and money) on the highest priority habitats, species, and issues. More money and staff to carry out the CCP will depend on available funds and regional priorities for the Service, as stated in beginning of this plan and repeated here:

"Comprehensive conservation plans provide long-term guidance for management decisions and set forth goals, objectives, and strategies needed to accomplish refuge purposes and identify the U.S. Fish and Wildlife Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition."

***Comment 61.*** *"In regard to overall CCP/EA refuge management, the EPA supports Alternative C that would improve refuge water management infrastructure (water delivery systems, dikes, and levees to manipulate individual wetlands) to create a more diverse and productive wetland complex. With Alternative C biological staff would also monitor the level of sedimentation occurring in natural wetlands and plan for its removal to restore the biological integrity of these wetlands; and Alternative C would also restore grasslands to provide the diverse habitats needed for target species of resident and migratory birds, and increase the acreage of invasive and nonnative species treated annually. The Bowdoin Refuge would serve as a conservation learning center for the local area, and public access would be improved to Creedman Coulee National Wildlife Refuge. We believe Alternative C provides greater potential for fish and wildlife habitat and environmental improvements than no action (Alternative A) and the proposed action (Alternative B)."*

***Response 61.*** The Service does not disagree. However, given the 15-year timeframe of the plan, the Service feels the objectives and strategies in alternative B are more achievable. It is possible that the focus and actions of alternative C could be incorporated into a followup CCP once the Service achieves the goals and objectives in this plan.

***Comment 62.*** *"I think eradication of invasive species is not a reasonable expectation, and I would prefer management to maintain less harmful levels of these species."*

***Response 62.*** The Service agrees with this statement especially for well-established invasive plant species. It is very time-consuming and costly to treat established infestations, which makes early detection and rapid response critical. The invasive species focus of the CCP is to eradicate these species where possible but, at a minimum, to manage invasive plants at less harmful concentrations.

***Comment 63.*** *"The Conservation District endorses voluntary, incentive-based conservation of private lands. Toward that end, we concur that it is important to retain a staff person to administer the private lands Partners for Fish and Wildlife Program."*

***Response 63.*** The CCP specifies retention of this position at the refuge complex headquarters.

# Appendix F

*Key Legislation and Policy*

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

## F.1 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

A. Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.

B. Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.

C. Conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts.

D. Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fish, wildlife observation and photography, and environmental education and interpretation).

E. Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

## 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, photography, environmental education, and interpretation.

- *Habitat*—Fish and wildlife will not prosper without 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.

## F.2 Legal and Policy Guidance

Management actions on national wildlife refuges and wetland management districts are circumscribed by many mandates including laws and Executive orders.

**American Indian Religious Freedom Act** (1978)—Directed 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)—Prohibited discrimination in public accommodations and services.

**Antiquities Act** (1906)—Authorized 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)—Directed the preservation of historic and archaeological data in Federal construction projects.

**Archaeological Resources Protection Act** (1979), as amended—Protected 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)—Required federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

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

**Dingell–Johnson Act** (1950)—Authorized the Secretary of the Interior to provide financial assistance for State fish restoration and management plans and projects. Financed by excise taxes paid by manufacturers of rods, reels, and other fishing tackle. Known as the Federal Aid in Sport Fish Restoration Act.

**Emergency Wetlands Resources Act** (1986)—Promoted wetland conservation for the public benefit to help fulfill international obligations in various migratory bird treaties and conventions. Authorized the purchase of wetlands with Land and Water Conservation Fund monies.

**Endangered Species Act** (1973), as amended—Required all Federal agencies to carry out programs for the conservation of threatened and endangered species.

**Environmental Education Act of 1990**—Established the Office of Environmental Education within the Environmental Protection Agency to develop and administer a Federal environmental education program. Responsibilities of the office include developing and supporting programs to improve understanding of the natural and developed environment and the relationships between humans and their environment, supporting the dissemination of educational materials, developing and supporting training programs and environmental education seminars, managing a Federal grant program, and administering an environmental internship and fellowship program. Required the office to develop and support environmental programs in consultation with other Federal natural resource management agencies including the Service.

**Executive Order 7295** (1936)—Established Bowdoin National Wildlife Refuge "as a refuge and breeding ground for migratory birds and other wildlife."

**Executive Order 7713** (1937)—Established Lake Thibadeau National Wildlife Refuge "as a refuge and breeding ground for migratory birds and other wildlife."

**Executive Order 7801** (1938)—Established Black Coulee National Wildlife Refuge "as a refuge and breeding ground for migratory birds and other wildlife."

**Executive Order 7833** (1938)—Established Hewitt Lake National Wildlife Refuge "as a refuge and breeding ground for migratory birds and other wildlife."

**Executive Order 8924** (1941)—Established Creedman Coulee National Wildlife Refuge "as a refuge and breeding ground for migratory birds and other wildlife."

**Executive Order 11644, Use of Off-road Vehicles on Public Lands** (1972)—Provided policy and procedures for regulating off-road vehicles.

**Executive Order 11988, Floodplain Management** (1977)—Required 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. Prevented Federal agencies from contributing to the "adverse impacts associated with occupancy and modification of floodplains" and the "direct or indirect support of floodplain development." In the course of fulfilling their respective authorities, Federal agencies "shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains."

**Executive Order 11990, Protection of Wetlands** (1977)—Directed Federal agencies to (1) minimize destruction, loss, or degradation of wetlands, and (2)

preserve and enhance the natural and beneficial values of wetlands when a practical alternative exists.

**Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System** (1996)—Defined the mission, purpose, and priority public uses of the Refuge System; presented four principles to guide management of the Refuge System.

**Executive Order 13007, Indian Sacred Sites** (1996)—Directed 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.

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

**Federal Noxious Weed Act** (1990)—Required 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)—Required the preservation of evidence of the Government's organization, functions, policies, decisions, operations, and activities, as well as basic historical and other information.

**Federal Water Pollution Control Act of 1972**—Required any applicant for a Federal license or permit to conduct any activity that may result in a discharge into navigable waters to obtain a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over navigable waters at the point where the discharge originates or will originate, that the discharge will comply with applicable effluent limitations and water quality standards. Required that a certification obtained for construction of any facility must also pertain to subsequent operation of the facility.

*Section 404*: Authorized the Secretary of the Army, acting through the Chief of Engineers, to issue permits, after notice and opportunity for public hearing, for discharge of dredged or fill material into navigable waters of the United States, including wetlands, at specified disposal sites. Required selection of disposal sites be in accordance with guidelines developed by the Administrator of the Environmental Protection Agency in conjunction with the Secretary of the Army. Stated that the Administrator can prohibit or restrict use of any defined area as a disposal site whenever she or he determines, after notice and opportunity for public hearings, that discharge of such materials into such areas will have an unacceptable adverse effect on municipal water supplies, shellfish beds, fishery areas, wildlife, or recreational areas.

**Fish and Wildlife Act** (1956)—Directed the Secretary of the Interior to develop the policies and procedures necessary for carrying out fish and wildlife laws and to research and report on fish and wildlife matters. Established the U.S. Fish and Wildlife Service within the Department of the Interior, as well as the positions of Assistant Secretary for Fish and Wildlife and Director of the Service.

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

**Fish and Wildlife Improvement Act of 1978**—Improved the administration of fish and wildlife programs and amends several earlier laws including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. Authorized the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. Authorized the use of volunteers for Service projects and appropriations to carry out volunteer programs.

**Historic Sites, Buildings and Antiquities Act** (1935), known as the Historic Sites Act, as amended (1965)—Declared a national policy to preserve historic sites and objects of national significance, including those located at refuges and districts. Provided procedures for designation, acquisition, administration, and protection of such sites and for designation of national historic and natural landmarks.

**Land and Water Conservation Fund Act of 1965**—Provided money from leasing bonuses, production royalties, and rental revenues for offshore oil, gas, and sulphur extraction to the Bureau of Land Management, the USDA Forest Service, the U.S. Fish and Wildlife Service, and State and local agencies for purchase of lands for parks, open space, and outdoor recreation.

**Migratory Bird Conservation Act** (1929)—Established 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)—Authorized the opening of part of a refuge to waterfowl hunting.

**Migratory Bird Treaty Act** (1918)—Designated the protection of migratory birds as a Federal responsibility and enabled the setting of seasons and other regulations including the closing of areas, Federal or non-Federal, to the hunting of migratory birds.

**Mineral Leasing Act** (1920), as amended—Authorized and governed leasing of public lands for development of deposits of coal, oil, gas and other hydrocarbons, sulphur, phosphate, potassium and sodium. Section 185 provided for granting of rights-of-way over Federal lands for pipelines.

**National Environmental Policy Act** (1969)—Required 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. Required Federal agencies to integrate this act with other planning requirements and prepare appropriate documents to facilitate better environmental decisionmaking (40 CFR 1500).

**National Historic Preservation Act** (1966), as amended—Established 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)—Defined the National Wildlife Refuge System and authorized 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**—Set the mission and administrative policy for all refuges in the National Wildlife Refuge System. Mandated comprehensive conservation planning for all units of the Refuge System.

**National Wildlife Refuge System Volunteer and Community Partnership Enhancement Act of 1998**—Encouraged the use of volunteers to help the Service in the management of refuges within the Refuge System. Facilitated partnerships between the Refuge System and non-Federal entities to promote public awareness of the resources of the Refuge System and public participation in the conservation of those resources. Encouraged donations and other contributions by persons and organizations to the Refuge System.

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

**North American Wetlands Conservation Act** (1989)—Provided for the conservation of North American wetland ecosystems, waterfowl and other migratory birds, fish, and wildlife that depend on such habitats.

**Pittman–Robertson Act** (1937)—Taxed the purchase of ammunition and firearms and earmarks the proceeds to be distributed to the States for wildlife restoration. Known as the Federal Aid in Wildlife Restoration Act or P–R Act.

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

**Refuge Revenue Sharing Act**, *section 401* (1935)—Provided for payments to counties in lieu of taxes using revenues derived from the sale of products from refuges.

**Refuge Trespass Act of June 28, 1906**—Provided the first Federal protection for wildlife at national wildlife refuges. Made it unlawful to hunt, trap, capture, willfully disturb, or kill any bird or wild animal, or take or destroy the eggs of any such birds, on any lands of the United States set apart or reserved as refuges or breeding grounds for such birds or animals by any law, proclamation, or Executive order, except under rules and regulations of the Secretary. Protected Government property on such lands.

**Rehabilitation Act** (1973)—Required 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.

**Salt Cedar and Russian Olive Control Demonstration Act** (2006)—Furthered the purposes of the Reclamation Projects Authorization and Adjustment Act of 1992 by directing the Secretary of the Interior, acting through the Commissioner of Reclamation, to carry out an assessment and demonstration program to control saltcedar and Russian olive, and for other purposes.

**Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948**—Provided that, on determination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency can be transferred without reimbursement to the Secretary of the Interior if the land has particular value for migratory birds or to a State agency for other wildlife conservation purposes.

**U.S. Department of the Interior Order Number 3226** (2001)—Directed bureaus and offices of the Department to analyze the potential effects on climate change when undertaking long-range planning, setting priorities for scientific research, and making major decisions about use of resources.

**Volunteer and Community Partnership Enhancement Act** (1998)—Encouraged the use of volunteers to help in the management of refuges within the Refuge System. Facilitated partnerships between the Refuge System and non-Federal entities to promote public awareness of the resources of the Refuge System and public participation in the conservation of the resources and encouraged donations and other contributions.

**Wilderness Act of 1964**—Directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within the Refuge System and National Park Service for inclusion in the National Wilderness Preservation System.

# Appendix G

## *Preparers, Consultation, and Coordination*

This document is the result of extensive, collaborative, and enthusiastic efforts by the members of the planning team shown below.

| *Team member* | *Position* | *Work unit* |
|---|---|---|
| Mike Artmann | Wildlife biologist and GIS specialist | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Division of Refuge Planning, Lakewood, Colorado |
| Mike Dailey | Hydrologist, planner | Montana Department of Natural Resources and Conservation, Glasgow, Montana |
| Paula Gouse | Wildlife refuge specialist | Charles M. Russell National Wildlife Refuge Complex, Fort Peck, Montana |
| James Graham | *Former* wetland district manager<br>(*Current* supervisory wildlife refuge specialist) | Bowdoin National Wildlife Refuge Complex, Malta, Montana<br>(Agassiz National Wildlife Refuge, Middle River, Minnesota) |
| Stan Jones | Hydrologist | Montana Department of Natural Resources and Conservation, Helena, Montana |
| Laura King | Planning team leader | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Division of Refuge Planning, Moiese, Montana |
| Carmen Luna | Refuge manager | Bowdoin National Wildlife Refuge Complex, Malta, Montana |
| Jana Mohrman | Hydrologist | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Division of Water Resources, Lakewood, Colorado |
| Deb Parker | Writer-editor | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Division of Refuge Planning, Lakewood, Colorado |
| John Simpson | Hydrologist | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Division of Water Resources, Lakewood, Colorado |
| Kathy Tribby | *Former* refuge operations specialist<br>(*Current* outdoor recreation planner) | Bowdoin National Wildlife Refuge Complex, Malta, Montana<br>(Bureau of Land Management, Malta, Montana) |
| Dean Yashan | Watershed management section supervisor | Montana Department of Environmental Quality, Helena, Montana |

Many organizations, agencies, and individuals provided invaluable assistance with the preparation of this CCP. The Service acknowledges the efforts of the following individuals and groups toward the completion of the plan. The diversity, talent, and knowledge contributed dramatically improved the vision and completeness of this document.

| *Contributor* | *Position* | *Work unit* |
|---|---|---|
| Bruce Barbour | *Former* private lands biologist | U.S. Fish and Wildlife Service, Malta, Montana |
| Rick Coleman | Assistant regional director, National Wildlife Refuge System | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Jack Cunningham | Hydraulic engineer | Bureau of Reclamation, Denver, Colorado |
| John Esperance | *Former* branch chief of Comprehensive and Land Protection Planning | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Ned Euliss | Research biologist | U.S. Geological Survey, Jamestown, North Dakota |
| Sheri Fetherman | Chief, Division of Education and Visitor Services | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Vanessa Fields | Wildlife biologist | Benton Lake National Wildlife Refuge, Great Falls, Montana |
| Robert Gleason | Director | U.S. Geological Survey, Jamestown, North Dakota |
| Bill Greiman | Agricultural engineer | Montana Department of Natural Resources and Conservation, Helena, Montana |
| Steve Guertin | Regional Director | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Ann Harrie | Fish standards specialist | Montana Department of Environmental Quality, Helena, Montana |
| Shannon Heath | Outdoor recreation planner | U.S. Fish and Wildlife Service, Helena, Montana |
| Jeff King | Project leader | National Bison Range, Moiese, Montana |
| Wayne King | Wildlife biologist | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Lisa Kusnierz | Water quality planner | Montana Department of Environmental Quality, Helena, Montana |
| Rachel Laubhan | Wildlife biologist | U.S. Fish and Wildlife Service, Stafford, Kansas |
| Brant Loflin | Zone archaeologist | U.S. Fish and Wildlife Service, Spearfish, South Dakota |
| David Lucas | Chief, Division of Refuge Planning | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Rod McNeil | Environmental science specialist, aquatic ecologist | Montana Department of Environmental Quality, Helena, Montana |
| Karen Nelson | Toxicologist | U.S. Fish and Wildlife Service, Ecological Services, Helena, Montana |
| David Redhorse | *Former* Native American liaison | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Mark Rodney | Hydrologist | U.S. Fish and Wildlife Service, Lakewood, Colorado |
| Richard Roy | Wildlife biologist | Malheur National Wildlife Refuge, Princeton, Oregon |
| Dean Rundle | Refuge supervisor | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Rick Schroeder | *Former* wildlife biologist | U.S. Geological Survey, Fort Collins, Colorado |

| *Contributor* | *Position* | *Work unit* |
|---|---|---|
| Bob Skinner | Wildlife biologist | Charles M. Russell National Wildlife Refuge, Lewistown, Montana |
| Michael Spratt | *Former* chief, Division of Refuge Planning | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Mark Sullivan | Wildlife management biologist | Montana Fish, Wildlife & Parks, Glasgow, Montana |
| Brian Tangen | Research biologist | U.S. Geological Survey, Jamestown, North Dakota |
| Kate Thompson | *Former* biological science technician (wildlife) | Bowdoin National Wildlife Refuge Complex, Malta, Montana |
| Meg Van Ness | Regional archaeologist | U.S. Fish and Wildlife Service, Mountain–Prairie Region, Lakewood, Colorado |
| Matthew Walker | Area biologist | Natural Resources Conservation Service, Great Falls, Montana |
| Jay Weiner | Legal counsel | Montana Reserved Water Rights Compact Commission, Helena, Montana |
| Harold Wentland | Wildlife biologist | Montana Fish, Wildlife & Parks; Glasgow, Montana |

# Appendix H

*Species Lists*

This appendix contains the common and scientific names of animals and plants of the Bowdoin National Wildlife Refuge Complex. The amphibians, reptiles, and mammals have ranges that encompass the refuge complex. The bird and plant lists are from actual sightings and surveys at the Bowdoin National Wildlife Refuge. Species of concern were determined from global, Federal, and State of Montana listings (Montana Natural Heritage Program 2009a, 2009b).

## H.1 List of Amphibian and Reptile Species

The following amphibian and reptile list is based on refuge complex files and listings on the Montana Natural Heritage Program Web site for Phillips, Blaine, and Hill Counties. The taxonomic order follows Werner et al. (2004).

| *Common Name* | *Scientific Name* | *Designation* |
|---|---|---|
| SALAMANDERS | | |
| Tiger salamander | *Ambystoma tigrinum* | — |
| FROGS AND TOADS | | |
| Plains spadefoot toad | *Spea bombifrons* | Species of concern |
| Great Plains toad | *Bufo cognatus* | Species of concern |
| Woodhouse's toad | *Bufo woodhousii* | — |
| Boreal chorus frog | *Pseudacris maculata* | — |
| Northern leopard frog | *Rana pipiens* | Species of concern |
| TURTLES | | |
| Painted turtle | *Chrysemys picta* | — |
| Spiny softshell | *Apalone spinifera* | Species of concern |
| LIZARDS | | |
| Greater short-horned lizard | *Phrynosoma hernandesi* | Species of concern |
| Common sagebrush lizard | *Sceloporus graciosus* | Species of concern |
| SNAKES | | |
| Eastern racer | *Coluber constrictor* | — |
| Western hognose snake | *Heterodon nasicus* | Species of concern |
| Milk snake | *Lampropeltis triangulum* | Species of concern |
| Gopher snake *or* bullsnake | *Pituophis catenifer* | — |
| Terrestrial garter snake | *Thamnophis elegans* | — |
| Plains garter snake | *Thamnophis radix* | — |
| Common garter snake | *Thamnophis sirtalis* | — |
| Western rattlesnake | *Crotalus viridis* | — |

# H.2 List of Fish Species

The following fish list is based on surveys of Beaver Creek and the Bowdoin National Wildlife Refuge intake canal (2000–2003) and staff observations.

| *Common* | *Scientific* | *Designation* |
|---|---|---|
| Goldeye | *Hiodon alosoides* | — |
| Brassy minnow | *Hybognathus hankinsoni* | Potential species of concern |
| Common carp | *Cyprinus carpio* | Exotic species (not native to Montana) |
| Spottail shiner | *Notropis hudsonius* | Exotic species (not native to Montana) |
| Fathead minnow | *Pimephales promelas* | — |
| River carpsucker | *Carpiodes carpio* | — |
| White sucker | *Catostomus commersoni* | — |
| Black bullhead | *Ameiurus melas* | Exotic species (not native to Montana) |
| Brook stickleback | *Culaea inconstans* | Potential species of concern |
| Black crappie | *Pomoxis nigromaculatus* | Exotic species (not native to Montana) |
| Iowa darter | *Etheostoma exile* | Potential species of concern |
| Yellow perch | *Perca flavescens* | Exotic species (not native to Montana) |
| Bigmouth buffalo | *Ictiobus cyprinellus* | — |
| Pumpkinseed | *Lepomis gibbosus* | Exotic species (not native to Montana) |
| Smallmouth bass | *Micropterus dolomieu* | Exotic species (not native to Montana) |
| Northern pike | *Esox lucius* | — |

# H.3 List of Bird Species

The following bird list is based on the Bowdoin National Wildlife Refuge bird list (July 2008); all species have been observed on the refuge. Species names are in accordance with the Montana Natural Heritage Program Web site (Montana Natural Heritage Program 2009a, 2009b). A "B" indicates local breeders, and focal bird species were determined from the focal species strategy of the 2005 U.S. Fish and Wildlife Service Migratory Bird Program.

| *Common Name* | *Scientific Name* | *Designation* |
|---|---|---|
| LOONS | | |
| Common loon | *Gavia immer* | Species of concern |
| GREBES | | |
| Pied-billed grebe | *Podylimbus podiceps* | B |
| Horned grebe | *Podiceps auritus* | Species of concern, B |
| Red-necked grebe | *Podiceps grisegena* | — |
| Eared grebe | *Podiceps nigricollis* | B |
| Western grebe | *Aechmophorus occidentalis* | B |
| Clark's grebe | *Aechmophorus clarkii* | Species of concern, B |
| PELICANS | | |
| American white pelican | *Pelecanus erythrorhynchos* | Species of concern, B |
| CORMORANTS | | |
| Double-crested cormorant | *Phalacrocorax auritus* | Focal species, B |

| Common Name | Scientific Name | Designation |
|---|---|---|
| HERONS | | |
| American bittern | *Botaurus lentiginosus* | Species of concern, B |
| Great blue heron | *Ardea herodias* | Species of concern, B |
| Great egret | *Ardea alba* | — |
| Snowy egret | *Egretta thula* | — |
| Cattle egret | *Bubulcus ibis* | — |
| Black-crowned night-heron | *Nycticorax nycticorax* | Species of concern, B |
| IBIS | | |
| White-faced ibis | *Plegadis chihi* | Species of concern, B |
| GEESE | | |
| Greater white-fronted goose | *Anser albifrons* | — |
| Snow goose | *Chen caerulescens* | — |
| Ross' goose | *Chen rossii* | — |
| Canada goose | *Branta canadensis* | B |
| SWANS | | |
| Tundra swan | *Cygnus columbianus* | — |
| DUCKS | | |
| Wood duck | *Aix sponsa* | Focal species, B |
| Gadwall | *Anas strepera* | B |
| Eurasian wigeon | *Anas penelope* | — |
| American wigeon | *Anas americana* | Focal species, B |
| Mallard | *Anas platyrhynchos* | Focal species, B |
| Blue-winged teal | *Anas discors* | B |
| Cinnamon teal | *Anas cyanoptera* | B |
| Northern shoveler | *Anas clypeata* | B |
| Northern pintail | *Anas acuta* | Focal species, B |
| Green-winged teal | *Anas crecca* | B |
| Canvasback | *Aythya valisineria* | B |
| Redhead | *Aythya americana* | B |
| Ring-necked duck | *Aythya collaris* | — |
| Greater scaup | *Aythya marila* | Focal species |
| Lesser scaup | *Aythya affinis* | Focal species, B |
| White-winged scoter | *Melanitta fusca* | Focal species |
| Long-tailed duck | *Clangula hyemalis* | — |
| Bufflehead | *Bucephala albeola* | B |
| Common goldeneye | *Bucephala clangula* | B |
| Barrow's goldeneye | *Bucephala islandica* | Potential species of concern |
| Hooded merganser | *Lophodytes cucullatus* | Potential species of concern |
| Common merganser | *Mergus merganser* | — |
| Red-breasted merganser | *Mergus serrator* | — |
| Ruddy duck | *Oxyura jamaicensis* | B |
| NEW WORLD VULTURES | | |
| Turkey vulture | *Cathartes aura* | — |

| Common Name | Scientific Name | Designation |
|---|---|---|
| HAWKS AND EAGLES | | |
| Osprey | *Pandion haliaetus* | — |
| Bald eagle | *Haliaeetus leucocephalus* | Species of concern |
| Northern harrier | *Circus cyaneus* | B |
| Sharp-shinned hawk | *Accipiter striatus* | — |
| Cooper's hawk | *Accipiter cooperii* | — |
| Northern goshawk | *Accipiter gentilis* | Species of concern |
| Broad-winged hawk | *Buteo platypterus* | — |
| Swainson's hawk | *Buteo swainsoni* | Species of concern, B |
| Red-tailed hawk | *Buteo jamaicensis* | B |
| Ferruginous hawk | *Buteo regalis* | Species of concern, focal species, B |
| Rough-legged hawk | *Buteo lagopus* | — |
| Golden eagle | *Aquila chrysaetos* | Species of concern |
| FALCONS | | |
| American kestrel | *Falco sparverius* | B |
| Merlin | *Falco columbarius* | — |
| Peregrine falcon | *Falco peregrinus* | Species of concern, focal species |
| Prairie falcon | *Falco mexicanus* | — |
| GALLINACEOUS BIRDS | | |
| Gray partridge | *Perdix perdix* | Exotic (not native to Montana, introduced) species, B |
| Ring-necked pheasant | *Phasianus colchicus* | Exotic (not native to Montana, introduced) species, B |
| Greater sage-grouse | *Centrocercus urophasianus* | Species of concern, B |
| Sharp-tailed grouse | *Tympanuchus phasianellus* | Species of concern, B |
| Wild turkey | *Meleagris gallopavo* | Exotic (not native to Montana) species |
| RAILS | | |
| Yellow rail | *Coturnicops noveboracensis* | Species of concern, focal species |
| Virginia rail | *Rallus limicola* | B |
| Sora | *Porzana carolina* | B |
| American coot | *Fulica americana* | B |
| CRANES | | |
| Sandhill crane | *Grus canadensis* | B |
| PLOVERS | | |
| Black-bellied plover | *Pluvialis squatarola* | — |
| American golden-plover | *Pluvialis dominica* | — |
| Snowy plover | *Charadrius alexandrinus* | Focal species |
| Semipalmated plover | *Charadrius semipalmatus* | — |
| Piping plover | *Charadrius melodus* | Threatened species, species of concern, focal species, B |
| Killdeer | *Charadrius vociferous* | B |
| Mountain plover | *Charadrius montanus* | Species of concern. focal species |
| STILTS AND AVOCETS | | |
| Black-necked stilt | *Himantopus mexicanus* | Species of concern, B |

| Common Name | Scientific Name | Designation |
|---|---|---|
| American avocet | *Recurvirostra americana* | B |
| SANDPIPERS | | |
| Greater yellowlegs | *Tringa melanoleuca* | — |
| Lesser yellowlegs | *Tringa flavipes* | — |
| Solitary sandpiper | *Tringa solitaria* | — |
| Willet | *Tringa semipalmatus* | B |
| Spotted sandpiper | *Actitis macularia* | B |
| Upland sandpiper | *Bartamia longicauda* | Focal species, B |
| Whimbrel | *Numenius phaeopus* | — |
| Long-billed curlew | *Numenius americanus* | Species of concern. focal species, B |
| Hudsonian godwit | *Limosa haemastica* | Focal species |
| Marbled godwit | *Limosa fedoa* | Focal species, B |
| Ruddy turnstone | *Arenaria interpres* | — |
| Red knot | *Calidris canutus* | — |
| Sanderling | *Calidris alba* | — |
| Semipalmated sandpiper | *Calidris pusilla* | — |
| Western sandpiper | *Calidris mauri* | — |
| Least sandpiper | *Calidris minutilla* | — |
| White-rumped sandpiper | *Calidris fuscicollis* | — |
| Baird's sandpiper | *Calidris bairdii* | — |
| Pectoral sandpiper | *Calidris melanotos* | — |
| Stilt sandpiper | *Calidris himantopus* | — |
| Short-billed dowitcher | *Limnodromus griseus* | — |
| Long-billed dowitcher | *Limnodromus scolopaceus* | — |
| Wilson's snipe | *Gallinago delicata* | B |
| PHALAROPES | | |
| Wilson's phalarope | *Phalaropus tricolor* | Focal species, B |
| Red-necked phalarope | *Phalaropus lobatus* | — |
| GULLS | | |
| Franklin's gull | *Leucophaeus pipixcan* | Species of concern, B |
| Bonaparte's gull | *Chroicocephalus philadelphia* | — |
| Ring-billed gull | *Larus delawarensis* | B |
| California gull | *Larus californicus* | B |
| Herring gull | *Larus argentatus* | — |
| TERNS | | |
| Caspian tern | *Hydroprogne caspia* | Species of concern. focal species, B |
| Common tern | *Sterna hirundo* | Species of concern, focal species, B |
| Arctic tern | *Sterna paradisaea* | Focal species, B |
| Forster's tern | *Sterna forsteri* | Species of concern |
| Black tern | *Chlidonias niger* | Species of concern. focal species, B |
| DOVES | | |
| Rock pigeon | *Columba livia* | Exotic (not native to Montana, introduced) species |

| Common Name | Scientific Name | Designation |
|---|---|---|
| Eurasian collared-dove | *Streptopelia decaocto* | Exotic (not native to Montana, introduced) species, B |
| Mourning dove | *Zenaida macroura* | Focal species, B |
| CUCKOOS | | |
| Black-billed cuckoo | *Coccyzus erythropthalmus* | Species of concern, focal species, B |
| Yellow-billed cuckoo | *Coccyzus americanus* | Species of concern, focal species |
| OWLS | | |
| Eastern screech-owl | *Megascops asio* | Species of concern, B |
| Great horned owl | *Bubo virginianus* | B |
| Snowy owl | *Bubo scandiaca* | — |
| Burrowing owl | *Athene cunicularia* | Species of concern. focal species, B |
| Long-eared owl | *Asio otus* | B |
| Short-eared owl | *Asio flammeus* | Potential species of concern, focal species, B |
| Northern saw-whet owl | *Aegolius acadicus* | Focal species |
| NIGHTJARS | | |
| Common nighthawk | *Chordeiles minor* | B |
| HUMMINGBIRDS | | |
| Ruby-throated hummingbird | *Archilochus colubris* | B |
| KINGFISHERS | | |
| Belted kingfisher | *Megaceryle alcyon* | — |
| WOODPECKERS | | |
| Red-headed woodpecker | *Melanerpes erythrocephalus* | Species of concern, focal species, B |
| Yellow-bellied sapsucker | *Sphyrapicus varius* | Focal species |
| Downy woodpecker | *Picoides pubescens* | B |
| Hairy woodpecker | *Picoides villosus* | B |
| Northern flicker (yellow-shafted) | *Colaptes auratus auratus* | B |
| Northern flicker (red-shafted) | *Colaptes auratus cafer* | B |
| FLYCATCHERS | | |
| Western wood-pewee | *Contopus sordidulus* | B |
| Willow flycatcher | *Empidonax traillii* | B |
| Least flycatcher | *Empidonax minimus* | B |
| Say's phoebe | *Saynoris saya* | B |
| Western kingbird | *Tyrannus verticalis* | B |
| Eastern kingbird | *Tyrannus tyrannus* | B |
| SHRIKES | | |
| Loggerhead shrike | *Lanius ludovicianus* | Species of concern. focal species, B |
| Northern shrike | *Lanius excubitor* | — |
| VIREOS | | |
| Warbling vireo | *Vireo gilvus* | — |
| Red-eyed vireo | *Vireo olivaceus* | — |

| *Common Name* | *Scientific Name* | *Designation* |
|---|---|---|
| JAYS, MAGPIES, AND CROWS | | |
| Blue jay | *Cyanocitta cristata* | — |
| Black-billed magpie | *Pica hudsonia* | B |
| American crow | *Corvus brachyrhynchos* | — |
| Common raven | *Corvus corax* | — |
| LARKS | | |
| Horned lark | *Eremophila alpestris* | B |
| SWALLOWS | | |
| Tree swallow | *Tachycineta bicolor* | B |
| Northern rough-winged swallow | *Stelgidopteryx serripennis* | B |
| Bank swallow | *Riparia riparia* | B |
| Cliff swallow | *Petrochelidon pyrrhonota* | B |
| Barn swallow | *Hirundo rustica* | B |
| CHICKADEES | | |
| Black-capped chickadee | *Poecile atricapillus* | B |
| Mountain chickadee | *Poecile gambeli* | — |
| NUTHATCHES | | |
| Red-breasted nuthatch | *Sitta canadensis* | — |
| CREEPERS | | |
| Brown creeper | *Certhia americana* | Species of concern |
| WRENS | | |
| Rock wren | *Salpinctes obsoletus* | — |
| House wren | *Troglodytes aedon* | B |
| Winter wren | *Troglodytes troglodytes* | Species of concern |
| Marsh wren | *Cistothorus palustris* | B |
| KINGLETS | | |
| Golden-crowned kinglet | *Regulus satrapa* | — |
| Ruby-crowned kinglet | *Regulus calendula* | — |
| THRUSHES | | |
| Mountain bluebird | *Sialia currucoides* | — |
| Townsend's solitaire | *Myadestes townsendi* | — |
| Veery | *Catharus fuscescens* | Species of concern |
| Swainson's thrush | *Catharus ustulatus* | — |
| Hermit thrush | *Catharus guttatus* | — |
| American robin | *Turdus migratorius* | B |
| Varied thrush | *Ixoreus naevius* | — |
| THRASHERS | | |
| Gray catbird | *Dumetella carolinensis* | — |
| Brown thrasher | *Toxostoma rufum* | B |
| Northern mockingbird | *Mimus carolinensis* | — |

| Common Name | Scientific Name | Designation |
|---|---|---|
| STARLINGS | | |
| European starling | *Sturnus vulgaris* | Exotic (not native to Montana) species, B |
| PIPITS | | |
| American (water) pipit | *Anthus rubescens* | — |
| Sprague's pipit | *Anthus spragueii* | Species of concern. focal species, B |
| WAXWINGS | | |
| Bohemian waxwing | *Bombycilla garrulous* | — |
| Cedar waxwing | *Bombycilla cedrorum* | B |
| WARBLERS | | |
| Tennessee warbler | *Vermivora peregrina* | Potential species of concern |
| Orange-crowned warbler | *Vermivora celata* | — |
| Yellow warbler | *Dendroica petechia* | B |
| Yellow-rumped warbler | *Dendroica coronata* | — |
| Townsend's warbler | *Dendroica townsendi* | — |
| Blackpoll warbler | *Dendroica striata* | — |
| American redstart | *Setophaga ruticilla* | — |
| Ovenbird | *Seiurus aurocapilla* | Species of concern |
| Northern waterthrush | *Seiurus noveboracensis* | — |
| Mourning warbler | *Oporornis philadelphia* | — |
| MacGillivray's warbler | *Oporornis tolmiei* | — |
| Common yellowthroat | *Geothlypis trichas* | B |
| Wilson's warbler | *Wilsonia pusilla* | — |
| Yellow-breasted chat | *Icteria virens* | — |
| TANAGERS | | |
| Scarlet tanager | *Piranga olivacea* | — |
| Western tanager | *Piranga ludoviciana* | — |
| SPARROWS | | |
| Spotted towhee | *Pipilo maculates* | B |
| American tree sparrow | *Spizella arborea* | — |
| Chipping sparrow | *Spizella passerina* | B |
| Clay-colored sparrow | *Spizella pallida* | B |
| Brewer's sparrow | *Spizella breweri* | Species of concern, B |
| Vesper sparrow | *Pooecetes gramineus* | B |
| Lark sparrow | *Chondestes grammacus* | B |
| Lark bunting | *Calamospiza melanocorys* | B |
| Savannah sparrow | *Passerculus sandwichensis* | B |
| Grasshopper sparrow | *Ammodramus savannarum* | Species of concern. focal species, B |
| Baird's sparrow | *Ammodramus bairdii* | Species of concern. focal species, B |
| Le Conte's sparrow | *Ammodramus leconteii* | Species of concern. focal species |
| Fox sparrow | *Passerelia iliaca* | — |
| Song sparrow | *Melospiza melodia* | B |
| Lincoln's sparrow | *Melospiza lincolnii* | — |
| White-throated sparrow | *Zonotrichia albicollis* | — |

| Common Name | Scientific Name | Designation |
|---|---|---|
| Harris' sparrow | *Zonotrichia querula* | — |
| White-crowned sparrow | *Zonotrichia leucophrys* | — |
| Golden-crowned sparrow | *Zonotrichia atricapilla* | — |
| Dark-eyed junco | *Junco hyemalis* subspp. | — |
| McCown's longspur | *Calcarius mccownii* | Species of concern, B |
| Lapland longspur | *Calcarius lapponicus* | — |
| Chestnut-collared longspur | *Calcarius ornatus* | Species of concern. focal species, B |
| Snow bunting | *Plectrophenax nivalis* | — |
| GROSBEAKS AND BUNTINGS | | |
| Rose-breasted grosbeak | *Pheucticus ludovicianus* | — |
| Black-headed grosbeak | *Pheucticus melanocephalus* | — |
| Lazuli bunting | *Passerina amoena* | — |
| BLACKBIRDS AND ORIOLES | | |
| Bobolink | *Dolichonyx oryzivorus* | Species of concern. focal species |
| Red-winged blackbird | *Agelaius phoeniceus* | B |
| Western meadowlark | *Sturnella neglecta* | B |
| Yellow-headed blackbird | *Xanthocephalus xanthocephalus* | B |
| Rusty blackbird | *Euphagus carolinus* | Focal species |
| Brewer's blackbird | *Euphagus cyanocephalus* | B |
| Common grackle | *Quiscalus quiscula* | B |
| Brown-headed cowbird | *Molothrus ater* | B |
| Baltimore oriole | *Icterus galbula* | B |
| Bullock's oriole | *Icterus bullockii* | B |
| FINCHES | | |
| Pine grosbeak | *Pinicola enucleator* | — |
| Cassin's finch | *Carpodacus cassinii* | Species of concern |
| House finch | *Carpodacus mexicanus* | B |
| Common redpoll | *Acanthis flammea* | — |
| Hoary redpoll | *Acanthis hornemanni* | — |
| Pine siskin | *Spinus pinus* | — |
| American goldfinch | *Spinus tristis* | B |
| Evening grosbeak | *Coccothraustes vespertinus* | — |
| OLD WORLD SPARROWS | | |
| House sparrow | *Passer domesticus* | Exotic (not native to Montana) species, B |

# H.4 List of Mammal Species

| Common Name | Scientific Name | Designation |
|---|---|---|
| SHREWS | | |
| Masked shrew | *Sorex cinereus* | — |
| Merriam's shrew | *Sorex merriami* | Species of concern |

| Common Name | Scientific Name | Designation |
|---|---|---|
| Preble's shrew | *Sorex preblei* | Species of concern |
| BATS | | |
| Little brown myotis | *Myotis lucifugus* | — |
| Silver-haired bat | *Lasionycteris noctivagans* | Potential species of concern |
| Big brown bat | *Eptesicus fuscus* | — |
| Townsend's big-eared bat | *Corynorhinus townsendii* | Species of concern |
| Hoary bat | *Lasiurus cinereus* | Species of concern |
| Western small-footed myotis | *Myotis ciliolabrum* | — |
| Western long-eared myotis | *Myotis evotis* | — |
| Spotted bat | *Euderma maculatum* | Species of concern |
| Eastern red bat | *Lasiurus borealis* | Species of concern |
| Fringed myotis | *Myotis thysanodes* | Species of concern |
| Long-legged myotis | *Myotis volans* | — |
| Yuma myotis | *Myotis yumanensis* | Potential species of concern |
| HARES AND RABBITS | | |
| Mountain cottontail | *Sylvilagus nuttallii* | — |
| White-tailed jackrabbit | *Lepus townsendii* | — |
| Snowshoe hare | *Lepus americanus* | — |
| SQUIRRELS | | |
| Richardson's ground squirrel | *Spermophilus richardsonii* | — |
| POCKET GOPHERS | | |
| Northern pocket gopher | *Thomomys talpoides* | — |
| BEAVERS | | |
| Beaver | *Castor canadensis* | — |
| MICE, RATS, AND VOLES | | |
| Western harvest mouse | *Reithrodontomys megalotis* | — |
| White-footed mouse | *Peromyscus leucopus* | — |
| Deer mouse | *Peromyscus maniculatus* | — |
| House mouse | *Mus musculus* | Exotic species (not native to Montana) |
| Meadow vole | *Microtus pennsylvanicus* | — |
| Prairie vole | *Microtus ochrogaster* | — |
| Western jumping mouse | *Zapus princeps* | — |
| Meadow jumping mouse | *Zapus hudsonius* | Species of concern |
| Bushytail woodrat | *Neotoma cinerea* | — |
| Muskrat | *Ondatra zibethicus* | — |
| NEW WORLD PORCUPINES | | |
| Porcupine | *Erethizon dorsatum* | — |
| CANIDS | | |
| Coyote | *Canis latrans* | — |
| Red fox | *Vulpes vulpes* | — |
| Swift fox | *Vulpes velox* | Species of concern |

| Common Name | Scientific Name | Designation |
|---|---|---|
| FELIDS | | |
| Bobcat | *Lynx rufus* | — |
| Mountain lion | *Felis concolor* | — |
| PROCYONIDS | | |
| Raccoon | *Procyon lotor* | — |
| MUSTELIDS | | |
| Long-tailed weasel | *Mustela frenata* | — |
| Least weasel | *Mustela nivalis* | — |
| Mink | *Mustela vison* | — |
| Badger | *Taxidea taxus* | — |
| MEPHITIDS | | |
| Striped skunk | *Mephitis mephitis* | — |
| CERVIDS | | |
| Mule deer | *Odocoileus hemionus* | — |
| White-tailed deer | *Odocoileus virginianus* | — |
| Elk | *Cervus canadensis* | — |
| Moose | *Alces alces* | — |
| PRONGHORN | | |
| Pronghorn | *Antilocapra americana* | — |

# H.5 List of Plant Species

| Common Name | Scientific Name |
|---|---|
| Alfalfa | *Medicago sativa* |
| Alkali bulrush | *Scirpus maritimus* |
| Alkali sacaton | *Sporobolus airoides* |
| American sloughgrass | *Beckmania syzigachne* |
| American vetch | *Vicia americana* |
| Arum-leaved arrowhead | *Sagittaria cuneata* |
| Baby's breath | *Gypsophila paniculata* |
| Balkan catchfly | *Silene csereii* |
| Barnyard grass | *Echinochloa crusgalli* |
| Beaked sedge | *Carex rostrata* |
| Bigbract verbena | *Verbena bracteata* |
| Birch | *Betula papyrifera* |
| Black bindweed | *Polygonum convovulus* |
| Black medick | *Medicago lupulina* |
| Bluebunch wheatgrass | *Pseudoroegneria spicata* |
| Blue grama | *Bouteloua gracilis* |
| Blue lettuce | *Lactuca pulchella* |
| Bottlebrush grass | *Elymus hystrix* |

| Common Name | Scientific Name |
|---|---|
| Boxelder | *Acer negundo* |
| Box knotweed | *Polygonum buxiforme* |
| Broad-leaf arrowhead | *Sagittaria latifolia* |
| broom snakeweed | *Gutierrezia serothrae* |
| Buffaloberry | *Shepherdia argentea* |
| Buffalograss | *Buchloe dactyloides* |
| Bull thistle | *Cirsium vulgare* |
| Bushy knotweed | *Polygonum ramosissimum* |
| Butter and eggs | *Linaria vulgaris* |
| Canadian waterweed | *Elodea canadensis* |
| Canada thistle | *Cirsium arvense* |
| Canada wild rye | *Elymus canadensis* |
| Cheatgrass | *Bromus tectorum* |
| Chokecherry | *Prunus virginiana* |
| Clasping pepperweed | *Lepidium perfoliatum* |
| Common bladderwort | *Utricularia vulgaris* |
| Common cattail | *Typha latifolia* |
| Common mallow | *Malva neglecta* |

| Common Name | Scientific Name |
|---|---|
| Common plantain | *Plantago major* |
| Common ragweed | *Ambrosia artemisiifolia* |
| Coontail | *Ceratophyllum demersum* |
| Crested wheatgrass | *Agropyron cristatum* |
| Curlycup gumweed | *Grindelia squarrosa* |
| Cutleaf goldenweed | *Haplopappus spinulosus* |
| Dandelion | *Taraxacum officianale* |
| Dewey sedge | *Carex deweyana* |
| Dotted blazingstar | *Liatris punctata* |
| Eaton's aster | *Symphyotrichum eatonii* |
| English plantain | *Plantago lanceolata* |
| European bur-reed | *Sparganium emersum* |
| Field bindweed | *Convolvulus arvensis* |
| Field chickweed | *Cerastium arvense* |
| Field horsetail | *Equisetum arvense* |
| Field pennycress | *Thlaspi arvense* |
| Fireweed | *Chamerion angustifolium* |
| Flatspine stickseed | *Lappula occidentalis* |
| Foothill arnica | *Arnica fulgens* |
| Foxtail barley | *Hordeum jubatum* |
| Fries' pondweed | *Potamogeton friesii* |
| Fringed loosestrife | *Lysimachia ciliata* |
| Fringed sagewort | *Artemisia frigida* |
| Giant goldenrod | *Solidago gigantea* |
| Giant red Indian paint-brush | *Castilleja miniata* |
| Golden currant | *Ribes odoratum* |
| Golden dock | *Rumex maritimus* |
| Goosefoot | *Chenopodium* spp. |
| Greasewood | *Sarcobatus vermiculatus* |
| Green ash | *Fraxinus pennsylvanica* |
| Green foxtail | *Setaria viridis* |
| Green needlegrass | *Stipa viridula* |
| Green sagewort | *Artemesia dracunculus* |
| Hairy evening-primrose | *Oenothera strigosa* |
| Hairy golden-aster | *Chrysopsis villosa* |
| Hardstem bulrush | *Scirpus acutus* |
| Heliotrope | *Heliotropium curassavicum* |
| Hoary alyssum | *Berteroa incana* |
| Horsemint | *Monarda stricta* |
| Horsetail | *Equisetum fluviatile* |
| Inland saltgrass | *Distichlis spicata* |
| Jacob's ladder | *Polemonium pulcherrimum* |
| Japanese brome | *Bromus japonicus* |

| Common Name | Scientific Name |
|---|---|
| Juniper | *Juniperus communis* |
| Kentucky bluegrass | *Poa pratensis* |
| Kochia | *Kochia scoparia* |
| Lambstongue ragwort | *Senecio integerrimus* |
| Leafy spurge | *Euphorbia esula* |
| Lupine | *Lupinus flexuosus* |
| Macoun's buttercup | *Ranunculus macounii* |
| Many-flowered aster | *Symphyotrichum ericoides* |
| Maximilian sunflower | *Helianthus maximilianii* |
| Missouri goldenrod | *Solidago missouriensis* |
| Musk mallow | *Malva moschata* |
| Narrow-leaf water plantain | *Alisma gramineum* |
| Narrow-leaved collomia | *Collomia linearis* |
| Narrow-leaved milkvetch | *Astragalus pectinatus* |
| Needle and thread | *Stipa comata* |
| Needle spikerush | *Eleocharis acicularis* |
| Nodding brome | *Bromus anomalus* |
| Nodding chickweed | *Cerastium nutans* |
| Nodding smartweed | *Polygonum lapathifolium* |
| Northern bedstraw | *Galium boreale* |
| Orchardgrass | *Dactylis glomerata* |
| Pale spikerush | *Eleocharis macrostachya* |
| Pasqueflower | *Pulsatilla patens* |
| Perennial pepperweed | *Lepidium latifolium* |
| Perennial sowthistle | *Sonchus arvensis* |
| Pigweed | *Amaranthus retroflexus* |
| Plains cottonwood | *Populus deltoides* |
| Ponderosa pine | *Pinus ponderosa* |
| Povertyweed | *Iva axillaris* |
| Prairie coneflower | *Ratibida columnifera* |
| Prairie Junegrass | *Koeleria macrantha* |
| Prairie rose | *Rosa arkansana* |
| Prickly pear | *Opuntia polycantha* |
| Prickly lettuce | *Lactuca serriola* |
| Proso millet | *Panicum miliaceum* |
| Prostrate knotweed | *Polygonum aviculare* |
| Purple prairie clover | *Dalea purpurea* |
| Purplestem aster | *Symphyotrichum puniceum* |
| Quackgrass | *Agropyron repens* |
| Redtop | *Agrostis stolonifera* |
| Reed canarygrass | *Phalaris arundinacea* |
| Richardson's pondweed | *Potamogeton richardsonii* |
| Ridgeseed spurge | *Chamaesyce glyptosperma* |
| Rocky Mountain beeplant | *Cleome serrulata* |

| Common Name | Scientific Name |
|---|---|
| Rubber rabbitbrush | *Chrysothamnus nauseosus* |
| Rush skeletonweed | *Lygodesmia juncea* |
| Russian knapweed | *Acroptilon repens* |
| Russian olive | *Elaeagnus angustifolia* |
| Russian thistle | *Salsola iberica* |
| Sago pondweed | *Potamogeton pectinatus* |
| Saltcedar | *Tamarix ramosissima* |
| Saltgrass | *Distichlis spicata* |
| Sandbar willow | *Salix interior* |
| Sandberg bluegrass | *Poa secunda* |
| Scarlet gaura | *Gaura coccinea* |
| Scarlet globemallow | *Sphaeralcea coccinea* |
| Scratchgrass | *Muhlenbergia asperifolia* |
| Seaside arrowgrass | *Triglochin maritima* |
| Shortbeak sedge | *Carex brevior* |
| Showy milkweed | *Asclepias speciosa* |
| Silver sage | *Artemisia cana* |
| Silverweed cinquefoil | *Argentina anserina* |
| Silver cinquefoil | *Potentilla argentea* |
| Slender lip fern | *Cheilanthes feei* |
| Slender pondweed | *Potamogeton filiformis* |
| Silverleaf scurfpea | *Psoralea argophylla* |
| Small pondweed | *Potamogeton pusilus* |
| Smartweed | *Polygonum persicaria* |
| Smooth brome | *Bromus inermis* |
| Spotted knapweed | *Centaurea stoebe* |
| Spreading dogbane | *Apocynum androsaemifolium* |
| Stiff goldenrod | *Oligoneuron rigidum* |
| Stiff sunflower | *Helianthus pauciflorus* |
| Stinkgrass | *Eragrostis cilianensis* |
| Threadleaf crowfoot | *Ranunculus trichophyllus* |
| Three-square bulrush | *Schoenoplectus pungens* |
| Timothy | *Phleum pretense* |
| Tufted phlox | *Phlox caespitosa* |
| Tumblemustard | *Sisymbrium altissimum* |
| Watermilfoil | *Myriophyllum exalbescena* |
| Water plantain | *Alisma plantago-aquatica* |
| Water starwort | *Collitriche hermadroditica* |
| Wavyleaf thistle | *Cirsium undulatum* |
| Western clamy weed | *Polanisia trachysperma* |
| Western snowberry | *Symphoricarpos occidentalis* |
| Western waterweed | *Anacharis occidentalis* |
| Western wheatgrass | *Agropyron smithii* |
| Western white clematis | *Clematis ligusticifolia* |
| Western wild rose | *Rosa woodsii* |
| Western wild-rye | *Elymus glavcus* |
| Western yarrow | *Achillea millefolium* |
| White cinquefoil | *Potentilla arguta* |
| White prairie aster | *Aster ericoides* |
| White sage | *Artemesia ludoviciana* |
| Whitetop | *Cardaria draba* |
| Widgeongrass | *Ruppia maitima* |
| Wild asparagus | *Asparagus officianalis* |
| Wild buckwheat | *Polygonum convolvulus* |
| Wild daisy, fleabane | *Erigeron glabellus* |
| Wild licorice | *Glyzerhiza lepidata* |
| Wild mint | *Nemtha arvensis* |
| Wild mustard | *Brassica kaber* |
| Wild oats | *Averia fatua* |
| Wild onion | *Allium textile* |
| Willow | *Salix* spp. |
| Wire rush | *Juncus balticus* |
| Wolf berry | *Symphoricarpos orbiculatus* |
| Woolly plantain | *Plantago patagonica* |
| Yellow sweetclover | *Melilotus officinalis* |
| Yellow umbrella plant | *Eriogonum flavum* |

# Appendix I

*Fire Management Program*

The Service has administrative responsibility for fire management at Bowdoin National Wildlife Refuge and Bowdoin Wetland Management District, which covers 24,915 acres. Additional fire responsibilities cover the satellite refuges—Black Coulee, Creedman Coulee, Hewitt Lake, and Lake Thibadeau National Wildlife Refuges—which total 1,458 fee-title acres.

## I.1 The Role of Fire

In ecosystems of the Great Plains, vegetation has evolved under periodic disturbance and defoliation from grazing, fire, drought, and floods. This periodic disturbance is what kept the ecosystem diverse and healthy while maintaining significant biodiversity for thousands of years.

Historically, natural fire and fires started by Native Americans have played an important disturbance role in many ecosystems by removing fuel accumulations, decreasing the impact of insects and diseases, stimulating regeneration, recycling nutrients, and providing a diversity of habitats for plants and wildlife.

When fire or grazing is excluded from prairie landscapes, the fuel load increases due to the buildup of thatch and expansion of woody vegetation. This increase in fuel loading leads to an increase in a fire's resistance to control, which threatens firefighter and public safety as well as Federal and private lands and facilities. However, fire when properly used can do the following:

- Reduce hazardous fuel buildup in both wildland-urban interface and non–wildland-urban interface areas
- Improve wildlife habitats by reducing the density of vegetation or changing the plant species composition, or both
- Sustain or increase biological diversity
- Improve woodland and shrubland by reducing plant density
- Reduce susceptibility of plants to insect and disease outbreaks
- Improve the quality and quantity of livestock forage
- Increase the quantity of water available for municipalities and activities dependent on water supplies from wildlands

## I.2 Wildland Fire Management Policy and Guidance

Based on Federal interagency policy (Fire Executive Council 2009), wildland fire is defined as any nonstructure fire that occurs in the wildland including wildfire and prescribed fire. Response to wildland fire is based on consideration of a full range of fire management actions—allowing the fire to benefit the resource where possible or taking suppression action when those benefits are not attainable or there is a likely risk to important resources or adjacent lands.

Considerations, guidance, and direction for wildland fire management should be addressed in the land use resource plans (for example, this CCP). Fire management plans are stepdown processes from the land use plans and habitat plans and provide details about fire suppression, fire use, and fire management activities.

The 1995 Federal Fire Policy Wildland Fire Management Policy was updated in 2001. This revised 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. The following guiding principles and policy statements are excerpted from this document titled Review and Update of the 1995 Federal Wildland Fire Management Policy; these are the foundational principles for Federal wildland fire management policy.

## Guiding Principles

1. Firefighter and public safety is the first priority in every fire management activity.

2. The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.
   *Federal agency land and resource management plans set the objectives for the use and desired future condition of the various public lands.*

3. Fire management plans, programs, and activities support land and resource management plans and their implementation.

4. Sound risk management is a foundation for all fire management activities.
   *Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity. Net gain in public benefit will be an important component of decisions.*

5. Fire management programs and activities are economically viable, based on values to be protected, costs, and land and resource management objectives.
   *Federal agency administrators are adjusting and reorganizing programs to reduce costs and increase efficiencies. As part of this process, investments in fire management activities must be evaluated against other agency programs to effectively accomplish the overall mission, set short- and long-term priorities, and clarify management accountability.*

6. Fire management plans and activities are based on the best available science.
   *Knowledge and experience are developed among all Federal wildland fire management agencies. An active fire research program combined with interagency collaboration provides the means to make these tools available to all fire managers.*

7. Fire management plans and activities incorporate public health and environmental quality considerations.

8. Federal, State, tribal, local, interagency, and international coordination and cooperation are essential.
   *Increasing costs and smaller workforces require that public agencies pool their human resources to successfully deal with the ever-increasing and more complex tasks of fire management. Full collaboration among Federal wildland-fire management agencies and between these agencies and international, State, tribal, and local governments and private entities results in a mobile fire management workforce available for the full range of public needs.*

9. Standardization of policies and procedures among Federal wildland-fire management agencies is an ongoing objective.
   *Consistency of plans and operations provides the fundamental platform on which these agencies can cooperate, integrate fire activities across agency boundaries, and provide leadership for cooperation with State, tribal, and local fire management organizations.*

# I.3 Management Direction

The Bowdoin National Wildlife Refuge Complex and the Eastern Montana Fire District will protect life, property, and other resources by safely suppressing all wildfires.

Prescribed fire, as well as manual and mechanical fuel treatments, will be used in an ecosystem context to protect both Federal and private property and for habitat management purposes. Fuel reduction activities will be applied in collaboration with Federal, State, private, and nongovernmental partners. In addition, the Service will set priorities for fuel treatment based on guidance for prioritization established in the goals and strategies outlined in the following documents: (1) "U.S. Fish and Wildlife Service National Wildlife Refuge System Wildland Fire Management Program Strategic Plan 2003–2010"; and (2) "Region 6 Refuges Regional Priorities FY07–11." For wildland-urban interface treatments, areas with community wildfire protection plans and designated "communities at risk" will be the primary focus. The only community at risk near the refuge complex, as identified in the Federal Register, is the town of Malta. The development of the community wildfire-protection plan for Malta is a current, ongoing process.

All aspects of the fire management program will be conducted consistent with applicable laws, policies, and regulations. Bowdoin National Wildlife Refuge Complex will maintain a fire management plan to accomplish the fire management goals described below. Prescribed fire and manual and mechanical fuel treatments will be applied in a scientific way under selected weather and environmental conditions.

## Fire Management Goals

Fire management goals are set at national, regional, and local levels.

### National Fire Management Goals

The goals and strategies of the "U.S. Fish and Wildlife Service National Wildlife Refuge System Wildland Fire Management Program Strategic Plan" are consistent with the following guidance:

- Policies of the Department of the Interior and the Service
- National Fire Plan direction
- The President's Healthy Forest Initiative
- The 10-Year Comprehensive Strategy and Implementation Plan
- National Wildfire Coordinating Group Guidelines
- Initiatives of the Wildland Fire Leadership Council
- Interagency Standards for Fire and Aviation Operations

### Regional Fire Management Goals

The "Region 6 Refuges Regional Priorities FY07–11" are consistent with the refuges' vision statement for the Mountain–Prairie Region, "to maintain and improve the biological integrity of the region, ensure the ecological condition of the region's public and private lands are better understood, and endorse sustainable use of habitats that support native wildlife and people's livelihoods."

### Refuge Complex Fire Management Goals

The fire management goal for the Bowdoin National Wildlife Refuge Complex is to use prescribed fire and manual and mechanical treatments to (1) reduce the threat to life and property through hazardous-fuel reduction treatments, and (2) meet the habitat goals and objectives identified in this CCP.

## Fire Management Objective

Fire is an important natural component in the maintenance and restoration of native prairie and wetland ecosystems, as well as tamegrasses planted for wildlife, such as dense nesting cover. The primary objective of the prescribed fire management program is to reduce fuel loads while restoring and maintaining native prairie and wetland habitats. Prescribed fire will be used to recycle nutrients, reduce or eliminate invasive plants, increase the growth and production of native plants, improve wildlife habitat and nesting cover for migratory birds, and reduce the risk of wildfire.

Achieving this objective will require burning between 500 and 2,000 acres of upland and wetland habitats annually, until every acre has been burned at least once. However, according to the literature, fire must be used cautiously in this arid climate. It is uncertain how often this area historically burned, particularly since the arid climate makes it slow to recover. To determine the need and frequency of using prescribed fire, the Service will review the historical weather patterns; the quality, diversity, and species of vegetation; the presence of invasive species; the habitat needs of target species; and the results of monitoring prior-treatment sites. It is possible that other habitat manipulations would be more appropriate to achieve desired objectives.

## Strategies

Strategies and tactics that consider public and firefighter safety, as well as resource values at risk, will be used. Wildfire suppression, prescribed fire methods, manual and mechanical means, timing, and monitoring will be described in detail within the stepdown fire management plans for the refuge complex.

All fire management actions will use prescribed fire and manual or mechanical means to reduce hazardous fuels, restore and maintain desired habitat conditions, control nonnative vegetation, and control the spread of woody vegetation within the diverse ecosystem habitats. The fuel treatment program will be site-specific and follow the most recent interagency template for burn plans.

A prescribed fire would temporarily decrease air quality by reducing visibility and releasing components through combustion. The refuge complex will meet the Clean Air Act emission standards by adhering to the Montana requirements during all prescribed fire activities.

# I.4 Fire Management Organization, Contacts, and Cooperation

Using the fire management district approach, the Mountain–Prairie Region of the Service will establish qualified technical oversight of fire management for the refuge complex. Under this approach, the level of fire management staffing will be determined by established modeling systems and be based on the fire management workload of a group of refuges and pos-

sibly that of interagency partners. Workload is based on historical wildfire suppression activities as well as historical and planned fuel treatments.

Depending on budgets, fire management staff and support equipment may be located at the headquarters of the refuge complex or at other refuges within the district and shared between all units. Fire management activities will be conducted in a coordinated and collaborative manner with Federal and non-Federal partners.

On approval of this CCP, one or more fire management plans will be developed for the refuge complex. The fire management plans may be prepared as (1) plans that cover each individual refuge and wetland management district, (2) a plan that covers the area identified within this CCP, (3) a plan that covers the fire management district, or (4) an interagency fire management plan.

# Bibliography


Adair, S.E. 2003. America's vanishing wetlands. In: Butcher, Russell; editor. America's national wildlife refuges, a complete guide. Lahnam, Maryland: Roberts Rinehart. 1–11.

Alden, W.C. 1932. Physiography and glacial geology of eastern Montana and adjacent areas. United State Geological Survey Professional Paper. 174 p.

Allen, J.N. 1980. The ecology and behavior of the long-billed curlew in southeastern Washington. Wildlife Monographs 73:1–67.

Alspach C.M. 1989. Surface use by the mineral owner: how much accommodation is required under current oil and gas law? In: 55 Oklahoma Law Review. Rev. 89–*Bergen Ditch & Reservoir Co.* v. *Barnes*. Norman, Oklahoma: University of Oklahoma College of Law. 683 p.

Ambrose, L.G.; Wilson, S.D. 2003. Emergence of the introduced grass *Agropyron cristatum* and the native grass *Boutleoua gracilis* in a mixed-grass prairie restoration. Restoration Ecology 11(1):110–5.

Arnold, T.W. [and others]. 2007. Waterfowl use of dense nesting cover in the Canadian Parklands. Journal of Wildlife Management 71(8):2542–9.

Askins, R.A.; Chavez-Ramirez, F.; Dale, B.C.; [and others]. 2007. Conservation of grassland birds in North America: understanding ecological processes in different regions. Ornithological Monographs 64:1–46.

Atkinson, S.J.; Dood, A.R. 2006. Montana piping plover management plan. Bozeman, Montana: Montana Department of Fish, Wildlife & Parks. 78 p.

Bakker, K.K. 2003. A synthesis of the effect of woody vegetation on grassland-nesting birds. In: Proceedings of the South Dakota Academy of Science; [Date of meeting unknown]; [City and State of meeting unknown]. [City and State of publication unknown]: [Publisher unknown]. 82:119–41.

Bakker, K.K.; Naugle, D.E.; Higgins, K.F. 2002. Incorporating landscape attributes into models for migratory grassland bird conservation. Conservation Biology 16:1,638–46.

Baldassarre G.A.; Bolen, E.G. 2006. Waterfowl ecology and management. 2nd edition. Malabar, Florida: Krieger Publishing Company. 576 p.

Ball, I.J.; Eng, Robert L.; Ball, Susan Kraft. 1995. Population density and productivity of ducks on large grassland tracts in northcentral Montana. Wildlife Society Bulletin 23(4):767–73.

Batt, B.D.J.; Anderson, M.G.; Anderson, C.D.; Caswell, F.D. 1989. The use of prairie potholes by North American ducks. In: van der Valk, A., editor. Northern Prairie Wetlands. Ames, Iowa: Iowa State University Press. 204–27.

Bauder, J.W.; Hershberger, K.; Seesoms, H. 2007. Bowdoin National Wildlife Refuge salt mitigation impact review. Open-file report to Montana Reserve Water Rights Compact Commission, Technical Advisory Team, April 2007. 81 p.

BBC Consulting. 2010. Bowdoin National Wildlife Refuge Complex socioeconomic impact analysis. On file at Bowdoin National Wildlife Refuge, Malta, Montana. 17 p.

Bedunah, D.J. 1992. The complex ecology of weeds, grazing, and wildlife. Western Wildlands 18:6–11.

Belrose, F.C. 1976. Ducks, geese and swans of North America. Harrisburg, Pennsylvania: Stackpole Books. 540 p.

Belrose, F.C. 1980. Ducks, geese and swans of North America. 3rd edition. Harrisburg, Pennsylvania: Stackpole Books. 540 p.

Bent, A.C. 1962. Life histories of North American shorebirds. Part 1. New York: Dover Publications, Inc. 602 p.

Berger, R.P.; Baydack, R.K. 1992. Effects of aspen succession on sharp-tailed grouse, *Tympanuchus phasianellus*, in the Interlake Region of Manitoba. The Canadian Field-Naturalist 106:185–91.

Bergman, R.D.; Swain, P.; Weller, M.W. 1970. A comparative study of nesting Forster's and black terns. Wilson Bulletin 82:435–44.

Bicak, T.K.; Redmond, R.L.; Jenni, D.A. 1982. Effects of grazing on long-billed curlew (*Numenius americanus*) breeding behavior and ecology in southwestern Idaho. In: Peek, J.M.; Dalke, P.D.; editors. Proceedings of the wildlife-livestock relationships symposium; [Date of symposium unknown]; [City and State of symposium unknown]. Moscow, Idaho: University of Idaho; Forest, Wildlife and Range Experiment Station. 74–85.

Bock, C.E.; Saab, V.A.; Rich, T.D.; Dobkin, D.S. 1993. Effects of livestock grazing on neotropical migratory landbirds in western North America. In: Finch, D.M.; Stangel, P.W.; editors. Status and management of neotropical migratory birds. USDA Forest Service, General Technical Report RM–229:296–309.

Bomberger, M.L. 1984. Quantitative assessment of the nesting habitat of Wilson's phalarope. Wilson Bulletin 96:126–28.

Brewer, T.K. 2003. [Dense clubmoss]. University of Idaho. <www.cnr.uidaho.edu/range454/2003_pet_weeds/club_moss.html> Accessed April 5, 2007.

Briggs, F.P. 1964. Waterfowl in a changing continent. In: Linduska, J.P.; editor. Waterfowl tomorrow. Washington, DC: U.S. Government Printing Office. 3–11.

Brown, M.; Dinsmore, J.J. 1986. Implications of marsh size and isolation for marsh bird management. Journal of Wildlife Management 50:392–97.

Brumley, J. 2006. Nemont Telephone Cooperative's 2006 Dagmar, Glentanna and Larslan exchanges: cultural resources inventory. [City and State of publication unknown]: Ethos Consultants, Inc. 8–47.

Bureau of Land Management. 2008. Bowdoin natural gas development project environmental assessment, MT–92234–07–59, December 2008. Great Falls, Montana: U.S. Department of the Interior. Bureau of Land Management. <www.blm.gov/mt/st/en/fo/malta_field_office/bowdoin_ea.html> Accessed February 2009.

Bureau of Sport Fisheries and Wildlife. 1973. Wilderness study summary, Bowdoin National Wildlife Refuge, Malta, Montana. [City and State of publication unknown]: U.S. Government Printing Office 849–921. 14 p.

Burger, J.; Gochfeld, M. 1994. Franklin's gull (*Larus pipixcan*). In: Poole, A; Gill, F.; editors. The birds of North America, No. 116. Philadelphia, Pennsylvania: The Academy of Natural Sciences. Washington, DC: The American Ornithologists Union. 28 p.

Campbell, R.W.; Dawe, N.K.; McTaggart-Cowan, J.; [and others]. 1990. The Birds of British Columbia: Nonpasserines. Volume 2. Victoria, British Columbia: Royal British Columbia Museum and Canadian Wildlife Service. [Pages unknown].

Carson, S.; Messer, A.; Jakes, A.; Rauscher, R. 2004. Milk River Wildlife Management Area 2004 small mammal trapping and species inventory report. [City and State of publication unknown]: Montana Fish, Wildlife & Parks. 8 p.

Casey, Daniel. 2000. Partners in Flight Draft Bird Conservation Plan Montana. Version 1.0. Kalispell, Montana: Montana Partners in Flight. 288 p.

Caudill, James; Henderson, E. 2005. Banking on nature 2004: the economic benefits to local communities of national wildlife refuge visitation. Washington, DC: U.S. Fish and Wildlife Service. [Pages unknown].

Centers for Disease Control and Prevention. [No date]. Avian influenza (bird flu). Atlanta, Georgia: Department of Health and Human Services. <www.cdc.gov/flu/avian/> Accessed April 2008.

Christian, J.M.; Wilson, S.D. 1999. Long-term ecosystem impacts of an introduced grass in the northern Great Plains. Ecology 80(7):2,397–407.

Cochrane, J.F.; Anderson, S.H. 1987. Comparison of habitat attributes at sites of stable and declining long-billed curlew populations. Great Basin Naturalist 47:459–66.

Cogswell, H.L. 1977. Water birds of California. Berkeley, California: University of California Press. 399 p.

Colberg, T.J.; Romo, J.T. 2003. Clubmoss effects on plant water status and standing crop. Journal of Range Management 56(5):489–95.

Colwell, M.A. 1987. Breeding biology, intrasexual competition, and philopatry in Wilson's phalarope [Ph.D. dissertation]. Grand Forks, North Dakota: University of North Dakota. 123 p.

Colwell, M.A.; Jehl, J.R., Jr. 1994. Wilson's phalarope (*Phalaropus tricolor*). From: Poole, A.; editor. The Birds of North America Online. Ithaca, New York: Cornell Lab of Ornithology. <http://bna.birds.cornell.edu/bna/species/083> Accessed January 2011.

Colwell, M.A.; Oring, L.W. 1988a. Breeding biology of Wilson's phalarope in southcentral Saskatchewan. Wilson Bulletin 100:567–82.

Colwell, M.A.; Oring, L.W. 1988b. Habitat use by breeding and migrating shorebirds in southcentral Saskatchewan. Wilson Bulletin 100:554–66.

Colwell, M.A.; Oring, L.W. 1988c. Return rates of prairie shorebirds: sex and species differences. Wader Study Group Bulletin 55:21–24.

Colwell, M.A.; Oring, L.W. 1990. Nest site characteristics of prairie shorebirds. Canadian Journal of Zoology 68:297–302.

Cook, H.H.; Powers, C.F. 1958. Early biochemical changes in the soils and waters of artificially created marshes in New York. New York Game and Fish Journal 5:9–65.

Cooper, S.V.; Jean, C.; Hendricks, P. 2001. Biological survey of a prairie landscape in Montana's glaciated plains [report to the Bureau of Land Management]. Helena, Montana: Montana Natural Heritage Program. 24 p.

Corn, J.G.; Armbruster, M.J. 1993. Prey availability for foraging piping plovers along the Platte River in Nebraska. In: Higgins, K.F.; Brashier, M.R.; editors. Proceedings of the Missouri River and its tributaries: piping plover and least tern symposium–workshop; [Date of symposium unknown]; [City and State of symposium unknown]. Brookings, South Dakota: South Dakota State University, Department of Wildlife and Fisheries Sciences. 143–49.

Cosens, B. 2006. The role of hydrology in the resolution of water disputes. Journal of Contemporary Water Research & Education. 33:17–25.

Cowardin, Lewis M.; Carter, Virginia; Golet, Francis C.; LaRoe, Edward T. 1979. Classification of

wetlands and deepwater habitats of the United States. FWS/OBS–79/31. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 131 p.

Cowardin, L.M.; Blohm, R. 1992. Breeding population inventories and measures of recruitment. In: B.D.J.B.; [and others]; editors. Ecology and management of breeding waterfowl. Minneapolis, Minnesota: University of Minnesota. 423–45.

Crissey, W.F. 1969. Prairie potholes from a continental viewpoint. In: Canadian Wildlife Service Report Series 6. Saskatoon Wetlands Seminar; [Date of seminar unknown]; [City and State of seminar unknown]. [City and State of publication unknown]: Canadian Wildlife Service. 161–71.

Custer, C.M. 1993. Waterfowl management handbook—life history traits and habitat needs of the redhead. Fish and Wildlife leaflet 13.1.11. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 7 p.

Dai, X.; Boutton, T.W.; Hailemichael, M.; [and others]. 2006. Soil carbon and nitrogen storage in response to fire in a temperate mixed-grass savanna. Journal of Environmental Quality 35:1,620–28.

Davis, J.W.; Anderson, R.C.; Karstad, L.; Trainer, D.O. 1971. Infectious and parasitic diseases of wild birds. [City and State of publication unknown]: [Publisher unknown]. 344 p.

Davis, S.K. 2004. Area sensitivity in grassland passerines: effects of patch size, patch shape, and vegetation structure on bird abundance and occurrence in southern Saskatchewan. Auk 121:1,130–45.

Davis, S.K.; Duncan, D.C. 1999. Grassland songbird occurrence in native and crested wheatgrass pastures of southern Saskatchewan. Studies in Avian Biology 19:211–18.

Dechant, J.A.; Johnson, D.H.; Igl, L.D.; [and others]. 2003a. Effects of management practices on grassland birds: Wilson's phalarope. From: Northern Prairie Wildlife Research Center Online. Jamestown, North Dakota: Northern Prairie Wildlife Research Center. <www.npwrc.usgs.gov/resource/literatr/grasbird/wiph/wiph.htm> (Version 12DEC2003) Accessed February 2011.

Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; [and others]. 1999 (revised 2002). Effects of management practices on grassland birds: long-billed curlew. Jamestown, North Dakota: Northern Prairie Wildlife Research Center. 19 p.

Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; [and others]. 2003b. Effects of management practices on grassland birds: chestnut-collared longspur. Jamestown, North Dakota: Northern Prairie Wildlife Research Center. Northern Prairie Wildlife Research Center Online. <www.npwrc.usgs.gov/resource/literatr/grasbird/cclo/cclo.htm> (Version 28MAY2004). Accessed April 2011.

DeGraaf, Richard M.; Scott, Virgil E.; Hamre, R.H. [and others]. 1991. Forest and rangeland birds of the United States: natural history and habitat use. Agriculture Handbook 688. Washington, DC: U.S. Department of Agriculture, Forest Service. 625 p.

Delisle J.M.; Savidge, J.A. 1996. Reproductive success of grasshopper sparrows in relation to edge. Prairie Naturalist 28:107–13.

DeVoto, B.; editor. 1953. The journals of Lewis and Clark. Cambridge, Massachusetts: The Riverside Press. 504 p.

Dieni, J.S.; Jones, S.L. 2003. Grassland songbird nest site selection patterns in northcentral Montana. Wilson Bulletin 115(4):388–96.

Dinsmore, J.J.; Schuster, W. 1997. Wilson's phalarope nest in Boone County. Iowa Bird Life 67:67.

Dobb, E. 1998. Reality check: the debate behind the lens. Audubon: January–February. [Pages unknown].

Dolan, J.J.; Taylor, J.E. 1972. Residual effects of range renovation on dense clubmoss and associated vegetation. Journal of Range Management 25:32–37.

Drilling, N.; Titman, R.; McKinney, F. 2002. Mallard (*Anas platyrhynchos*). In: Poole, A.; Gill, F.; editors. The birds of North America, No. 658. Philadelphia, Pennsylvania: The Academy of Natural Sciences. [Pages unknown].

DuBois, K. 1989. Arising, alighting ibis. Montana Outdoors 20(6):30–33.

DuBois, K. 1996. Black tern nest monitoring at Freezout Lake WMA. Unpublished report. Montana Department of Fish, Wildlife & Parks. 7 p.

Ducks Unlimited. 2003. Prairie Pothole Joint Venture 2003. [City and State of publication unknown]: Ducks Unlimited. 30 p.

Duebbert, H.F. 1969. High nest density and hatching success of ducks on South Dakota CAP land. Transactions of the North American Wildlife Natural Resource Conference; [Date of conference unknown]; [City and State of conference unknown]. [City and State of publication unknown]: [Publisher unknown]. 34:18–228.

Duebbert, H.F.; Frank, A.M. 1984. Value of prairie wetlands to duck broods. Wildlife Society Bulletin 12:27–34.

Duebbert, H.F.; Jacobson, E.T.; Higgins, K.F.; Podoll, E.B. 1981. Establishment of seeded grasslands for wildlife habitat in the Prairie Pothole Region. Special Scientific Report–Wildlife No. 234, Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. [Pages unknown].

Duebbert, H.F.; Lokemoen, J.T. 1976. Duck nesting in fields of undisturbed grass-legume cover. Journal of Wildlife Management 40:39–49.

Dugger, Bruce D.; Dugger, Katie M. 2002. Long-billed curlew (*Numenius americanus*). In: Poole,

A.; editor. The Birds of North America Online. Ithaca, New York: Cornell Lab of Ornithology. <http://bna.birds.cornell.edu/bna/species/628> [Access date unknown].

Dunn, E.H. 1979. Nesting biology and development of young in Ontario black terns. Canadian Field-Naturalist 93:276–81.

Dunn, E.H.; Agro, D.J. 1995. Black tern (*Chlidonias niger*). In: Poole, A.; Gill, F.; editors. The Birds of North America. No. 147. Philadelphia: The Academy of Natural Sciences. Washington, DC: The American Ornithologists Union. 24 p.

Dunne, T.; Leopold, L.B. 1978. Water in environmental planning. San Francisco: W.H. Freeman and Company. 95–121.

Dwyer, T.J.; Krapu, G.L.; Janke, D.M. 1979. Use of prairie pothole habitat by breeding mallards. Journal of Wildlife Management 43:526–31.

Dzubin, A. 1969. Comments in carrying capacity of small ponds for ducks and possible effects of density on mallard production. In: Canadian Wildlife Service Report Series 6. Saskatoon Wetlands Seminar; [Date of seminar unknown]; [City and State of seminar unknown]. [City and State of publication unknown]: Canadian Wildlife Service. 138–60.

Earnst, S.L. 1994. Tundra swan habitat preferences during migration in North Dakota. Journal of Wildlife Management 58:546–51.

Einemann, L. 1991. A nesting report of a Wilson's phalarope in Lancaster County. Nebraska Bird Review 59:59–61.

Eldridge, Jan. 1992. Waterfowl management handbook—management of habitat for breeding and migrating shorebirds in the Midwest. Fish and Wildlife Leaflet 13.2.14. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 6 p.

Espie, R.H.M.; Brigham, R.M.; James, P.C. 1996. Habitat selection and clutch fate of piping plover (*Charadrius melodus*) breeding at Lake Diefenbaker, Saskatchewan. Canadian Journal of Zoology 74:1,069–75.

Euliss, N.H., Jr.; Wrubleski, D.A.; Mushet, D.M. 1999. Wetlands of the Prairie Pothole Region—invertebrate species composition, ecology, and management. In: Batzer, D.; Rader, R.B.; Wissinger, S.A.; editors. Invertebrates in freshwater wetlands of North America—ecology and management. New York: John Wiley and Sons. 471–514.

Faanes A.; Lingle, G.R. 1995. Breeding birds of the Platte River Valley of Nebraska. From: Northern Prairie Wildlife Research Center Online. Jamestown, North Dakota: Northern Prairie Wildlife Research Center. <www.npwrc.usgs.gov/resource/distr/birds/platte/platte.htm> (Version 16JUL97) [Access date unknown].

Fire Executive Council. 2009. Guidance for Implementation of Federal Wildland Fire Management Policy. Washington, DC: U.S. Department of Agriculture and U.S. Department of the Interior. 20 p. <www.nifc.gov/policies/guidance/GIFWFMP.pdf> Accessed February 3, 2010.

Food and Agriculture Organization of the United Nations. [No date]. Chapter 7–salty soils. In: Irrigation water management. <www.fao.org/docrep/R4082E/r4082e08.htm> Accessed June 8, 2010.

Fredrickson, L.H. 1991. Waterfowl management handbook—strategies for water level manipulations in moist-soil systems. Fish and Wildlife Leaflet 13.4.6. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 8 p.

Fredrickson, L.H.; Reid, F.A. 1988a. Waterfowl management handbook—invertebrate response to wetland management. Fish and Wildlife Leaflet 13.3.1. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 6 p.

Fredrickson, L.H.; Reid, F.A. 1988b. Waterfowl management handbook—waterfowl use of wetland complexes. Fish and Wildlife Leaflet 13.2.1. 6 p.

Fredrickson, L.H.; Taylor, T.S. 1982. Management of seasonally flooded impoundments for wildlife. Fish and Wildlife Service Resource Publication 148. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 29 p.

Friend, Milton; Franson, J. Christian; editors. 1999. Field manual of wildlife diseases—general field procedures and diseases of birds. Biological Resources Division, Information and Technology Report 1999–001. Madison, Wisconsin: U.S. Department of the Interior, U.S. Geological Survey, Biological Resources Division, National Wildlife Health Center. 438 p.

Frost, C.C. 1998. Presettlement fire frequency regimes of the United States—a first approximation. In: Pruden, T.L.; Brennan, L.A.; editors. Fire in ecosystem management—shifting the paradigm from suppression to prescription. Tall Timbers Fire Ecology Conference Proceedings, No. 20; May 7–10, 1996; Boise, Idaho. Tallahassee, Florida: Tall Timbers Research Station. 70–81.

Fuhlendorf, S.D.; Harrell, W.C.; Engle, D.M.; [and others]. 2006. Should heterogeneity be the basis for conservation? Grassland bird response to fire and grazing. Ecological Applications 16(5):1,706–16.

Gazda, R.J.; Meidinger, R.R.; Ball, I.J.; Connelly, J.W. 2002. Relationships between Russian olive and duck nest success in southeastern Idaho. Wildlife Society Bulletin 30(2):337–44.

Geist, V.; Mahoney, S.P.; Organ, J.F. 2001. Why hunting has defined the North American model of wildlife conservation. In: Transactions of the North American Wildlife and Natural Resources Conference; March 20, 2001; Washington, DC.

Washington, DC: Wildlife Management Institute. 66:175–85.

Geist, V.; Organ, J.F. 2004. The public trust foundation of the North American model of wildlife conservation. Northeast Wildlife 58:49–56.

Gillihan, S.W.; Hutchings, S.W. 2000. Best management practices for shortgrass prairie birds: a landowner's guide. [City and State of publication unknown]: Colorado Bird Observatory. 32 p.

General Accounting Office. 2001. U.S. Fish and Wildlife Service—information on oil and gas activities in the National Wildlife Refuge System. Letter to Representative Edward J. Markey, October 31, 2001. <www.gao.gov/new.items/d0264r.pdf> Accessed January 2010.

Gleason, R.A.; Tangen, B.A.; Laubhan, M.K.; Finocchiaro, R.G.; Stamm, J.F. 2009. Literature review and database of relations between salinity and aquatic biota—applications to Bowdoin National Wildlife Refuge, Montana. Scientific Investigations Report 2009–5098. Reston, Virginia: U.S. Department of the Interior, U.S. Geological Survey. 76 p.

Goodwin, R.E. 1960. A study of the ethology of the black tern, *Chlidonias niger surinamensis* (Gmelin) [Ph.D. dissertation]. Ithaca, New York: Cornell University. [Pages unknown].

Grant, T.A.; Madden, E.; Berkey, G.B. 2004. Tree and shrub invasion in northern mixed-grass prairie—implications for breeding grassland birds. Wildlife Society Bulletin 32:807–18.

Gratto-Trevor, C.L. 2000. Marbled godwit (*Limosa fedoa*). In: Poole, A; Gill, F.; editors. The birds of North America, No. 492. Philadelphia, Pennsylvania: The Academy of Natural Sciences. <www.allaboutbirds.org/guide/Marbled_Godwit/lifehistory> Accessed December 14, 2009.

Green, M.T.; Lowther, P.E.; Jones, S.L.; [and others]. 2002. Baird's sparrow (*Ammodramus bairdii*). In: Poole, A.; editor. The Birds of North America Online. Ithaca, New York: Cornell Lab of Ornithology. <http://bna.birds.cornell.edu/bna/species/638> [Access date unknown].

Greenwalt, L.A. A brief history of the National Wildlife Refuge System. In: Butcher, Russell; editor. Lanham, Maryland: Roberts Rinehart. 12–23.

Gregg, L. 1987: Recommendations for a program of sharp-tail habitat preservation in Wisconsin. Research Report 141. Madison, Wisconsin: Department of Natural Resources. 24 p.

Grinnell, G.B. 1913. Brief history of the Boone and Crockett Club. In: Grinnell, G.B.; editor. Hunting at high altitudes. New York: Harper & Brothers. 422–91.

Haig, S.M.; Plissner, J.H. 1993. Distribution and abundance of piping plovers—results and implications of the 1991 international census. The Condor 95:145–56.

Hamilton, D.B.; Roelle, J.E.; Schafer, W.M. 1989. A simulation model of water and salt balance at Bowdoin National Wildlife Refuge. U.S. Fish and Wildlife Service, National Ecology Research Center Report NERC–89/08. Fort Collins, Colorado: U.S. Department of the Interior, U.S. Geological Survey. 69 p.

Hanowski, J.M.; Christina, D.P.; Niemi, G.J. 2000. Landscape requirements of prairie sharp-tailed grouse *Tympanuchus phasianellus campestri* in Minnesota, USA. Wildlife Biology 6:257–63.

Harmon, K.W. 1970. Prairie potholes. National Parks & Conservation Magazine 45:25–28.

Hatch, D.R.M. 1971. Brown-headed cowbird parasitism on spotted sandpiper and Wilson's phalarope. Blue Jay 29:17–18.

Hauer, F.R.; Spencer, C.N. 1998. Phosphorous and nitrogen dynamics in streams associated with wildfire—a study of immediate and long-term effects. International Journal of Wildland Fire 8:183–98.

Hawkins, A.S. 1984. The U.S. response. In: Flyways—pioneering waterfowl management in North America. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 2–9.

Heady, H.F. 1952. Reseeding, fertilizing, and renovating in an ungrazed mixed-prairie. Journal of Range Management 5:144–49.

Heath, Shane R.; Dunn, Erica H.; Agro, David J. 2009. Black tern (*Chlidonias niger*). In: Poole, A.; editor. The Birds of North America Online. Ithaca, New York: Cornell Lab of Ornithology. <http://bna.birds.cornell.edu/bna/species/147> [Access date unknown].

Helmers, D.L. 1992. Shorebird management manual. Manomet, Massachusetts: Western Hemispheric Shorebird Reserve Network. 58 p.

Helzer, C.J. 1996. The effects of wet meadow fragmentation on grassland birds [master's thesis]. Lincoln, Nebraska: University of Nebraska. 65 p.

Henderson, R. 1982. Vegetation—fire ecology of tallgrass prairie. Natural Areas Journal 2:17–26.

Herkert, J.R. 1994. The effects of habitat fragmentation on midwestern grassland bird communities. Ecological Applications 4:461–71.

Higgins, K.F. 1986. Interpretation and compendium of historical fire accounts in the northern Great Plains. Resource Publication 161. Washington, DC: Department of the Interior, Fish and Wildlife Service. 41 p.

Higgins, K.F.; Barker, W.T. 1982. Changes in vegetation structure in seeded nesting cover in the Prairie Pothole Region. Fish and Wildlife Special Science Report–Wildlife 242. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 26 p.

Hill, Dorothy P.; Gould, Lorne K. 1997. Chestnut-collared longspur (*Calcarius ornatus*). In: Poole, A.;

editor. The Birds of North America Online. Ithaca, New York: Cornell Lab of Ornithology. <http://bna.birds.cornell.edu/bna/species/288doi:10.2173/bna.288> Accessed April 2011.

Hohn, E.O. 1967. Observations on the breeding biology of Wilson's phalaropes in central Alberta. Auk 84:220–44.

Holling, C.S. 1978. Adaptive environmental assessment and management. London: John Wiley and Sons. 377 p.

Howe, M.A. 1972. Pair bond formation and maintenance in Wilson's phalarope, *Phalaropus tricolor* [Ph.D. dissertation]. Minneapolis, Minnesota: University of Minnesota. 169 p.

Hulbert, L.C. 1986. Fire effects on tallgrass prairie. In: Clambey, G.K.; Pemble, R.H.; editors. Proceedings, Ninth North American Prairie Conference; [Date of conference unknown]; [City and State of conference unknown]. [City and State of publisher unknown]: [Publisher unknown]. 138–142.

Hutchinson, M. 1992. Vegetation management guideline—Canada thistle (*Cirsium arvense* [L.] Scop.) Natural Areas Journal 12:160–61.

Ingelfinger, F. 2001. The effects of natural gas development on sagebrush steppe passerines in Sublette County, Wyoming [master's thesis]. Laramie, Wyoming: University of Wyoming, Department of Zoology and Physiology. [Pages unknown].

Jenni, D.A.; Redmond, R.L.; Bicak, T.K. 1981. Behavioral ecology and habitat relationships of long-billed curlew in western Idaho. Boise, Idaho: Bureau of Land Management. Boise District. [Pages unknown].

Johns, J.E. 1969. Field studies of Wilson's phalarope. The Auk 86(4):660–70.

Johnsgard, P.A. 1980. A preliminary list of the birds of Nebraska and adjacent plains states. Lincoln, Nebraska: University of Nebraska. 156 p.

Johnsgard, P.A. 2002. Dawn dancers on dun grass—the sharp-tailed grouse and the northern prairies and shrublands. In: Johnsgard, P.A. Grassland Grouse. Washington D.C.:Smithsonian Institution Press. 81–103.

Johnsgard, Paul A. 1979. A guide to North American waterfowl. Bloomington, IN: Indiana University Press. 274 p.

Johnson, D.H.; Grier, J.W. 1988. Determinants of breeding distributions of ducks. Wildlife Monographs:1–37.

Johnson, J. 2004. Restoring native species to crested wheatgrass dominated rangelands [master's thesis]. Bozeman, Montana: Montana State University. 11 p.

Johnson, K.M. 1990. Aquatic vegetation, salinity, aquatic invertebrates and duck brood use at Bowdoin National Wildlife Refuge, Montana [master's thesis]. Bozeman, Montana: Montana State University. [Pages unknown].

Johnson, R.G.; Temple, S.A. 1990. Assessing habitat quality for birds nesting in fragmented tallgrass prairies. In: Verner, J.; Morrison, M.L.; Ralph, C.J.; editors. Wildlife 2000—modeling habitat relationships of terrestrial vertebrates. Madison, Wisconsin: University of Wisconsin Press. 245–49.

Jones, S.L. 2010. Sprague's pipit (*Anthus spragueii*) conservation plan. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. [Pages unknown].

Jones, S.L.; Dieni, J.S.; Gouse, P.J. 2010. Reproductive biology of a grassland songbird community in northcentral Montana. The Wilson Journal of Ornithology 122(3):455–64.

Jones, Stan. 2005. Review of salt balance model and alternative water management practices, Bowdoin National Wildlife Refuge [Unpublished report]. Montana Department of Natural Resources and Conservation, Reserved Water Rights Compact Commission. 43 p.

Jordan, N.R.; Larson, D.L.; Huerd, S.C. 2008. Soil modification by invasive plants—effects on native and invasive species of mixed-grass prairies. In: Biological invasions; Northern Prairie Wildlife Research Center Publication. [City and State of publication unknown]: U.S. Fish and Wildlife Service. 10(2):177–90.

Kadlec, J.A.; Smith, L.M. 1992. Habitat management for breeding areas. In: Batt, B.D.J.; Afton, A.D.; Anderson, M.G. [and others]; editors. Ecology and management of breeding waterfowl. Minneapolis, Minnesota: University of Minnesota. 590–610.

Kaiser, P.H.; Berlinger, S.S.; Fredrickson, L.H. 1979, Response of blue-winged teal to range management on waterfowl production areas in southeastern South Dakota. Journal of Range Management (32)4:[Pages unknown].

Kaminski, R.M.; Murkin, H.R.; Smith, C.E. 1985. Control of cattail and bulrush by cutting and flooding. In: Prince, H.H.; D'Itri, F.M.; editors. Coastal wetlands. Chelsea, Michigan: Lewis Publishers. 253–62.

Kantrud, H.A. 1983. An environmental overview of North Dakota—past and present. Ver. July 16, 1997. Jamestown, North Dakota: U.S. Fish and Wildlife Service, Northern Prairie Wildlife Research Center. <www.npwrc.usgs.gov/resource/habitat/envovrvw/envovrvw.htm> Accessed December 2009.

Kantrud, H.A.; Higgins, K.F. 1992. Nest and nest site characteristics of some ground-nesting, nonpasserine birds of northern grasslands. Prairie Naturalist 24:67–84.

Kantrud, H.A.; Kologiski, R.L. 1982. Effects of soils and grazing on breeding birds of uncultivated upland grasslands of the northern Great Plains. U.S. Fish and Wildlife Service Research Report No. 15.

[City and State of publication unknown]: Department of the Interior, Fish and Wildlife Service. [Pages unknown].

Kantrud, H.A.; Krapu, G.L.; Swanson, G.A. 1989. Prairie basin wetlands of the Dakotas—a community profile. U.S. Fish and Wildlife Service, Biological Report 85 (7.28). Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 111 p.

Kantrud, H.A; Stewart, R.E. 1977. Use of natural basin-wetlands by breeding waterfowl in North Dakota. Journal of Wildlife Management 41:243–53.

Kantrud, H.A.; Stewart, R.E. 1984. Ecological distribution and crude density of breeding birds on prairie wetlands. Journal of Wildlife Management 48:426–37.

Kelsey, K.W.; Naugle, D.E.; Higgins, K.F.; Bakker, K.K. 2006. Planting trees in prairie landscapes: do the ecological costs outweigh the benefits? Natural Areas Journal 26(3):254–60.

Kendall, W.L. 2001. Using models to facilitate complex decisions. In: Shenk, T.M.; Franklin, A.B., editors. Modeling in natural resource management—development, interpretation, and application. Washington, DC: Island Press. 223 p.

Kendy, E. 1999. Simulation of water and salt budgets and effects of proposed management strategies for Bowdoin National Wildlife Refuge, northeastern Montana. Water-Resources Investigations Report 98–4260. [City and State of publication unknown]: U.S. Department of the Interior, U.S. Geological Survey. 86 p.

King, R. 1978. Habitat use and related behaviors of breeding long-billed curlews [master's thesis]. Fort Collins, Colorado: Colorado State University. [Pages unknown].

Klein, M.L. 1993. Waterbird behavioral responses to human disturbances. Wildlife Society Bulletin 21:31–39.

Krapu, G.L.; Greenwood, R.J.; Dwyer, C.P.; Kraft, K.M.; Cowardin, L.M. 1997. Wetland use, settling patterns, and recruitment in mallards. Journal of Wildlife Management 61:736–46.

Krapu, G.L.; Swanson, G.A. 1975. Some nutritional aspects of reproduction in prairie nesting pintails. Journal of Wildlife Management 39:156–62.

Kushlan, James A.; Steinkamp, Melanie J.; Parsons, Katharine C.; [and others]. 2002. Waterbird conservation for the Americas—the North American waterbird conservation plan, version 1. Washington, DC: Waterbird Conservation for the Americas. 78 p.

LaBough, J.W.; Swanson, G.A. 1993. Spatial and temporal variability in chemical characteristics and water-column biota in the Cottonwood Lake area wetlands, North Dakota. In: Wetland symposium on prairie ecosystems—wetland ecology, management and restoration; [Date of symposium unknown]; [City and State of symposium unknown]. Jamestown, North Dakota: U.S. Department of the Interior, Fish and Wildlife Service, Northern Prairie Wildlife Research Center. 25–26.

LaBough, J.W.; Swanson, G.A. 2004. Spatial and temporal variability in specific conductance and chemical characteristics of wetland water and in water column biota in the wetlands in the Cottonwood Lake area. In: Winter, T.C.; editor. Hydrological, chemical, and biological characteristics of a prairie pothole wetland complex under highly variable climate conditions—the Cottonwood Lake area, east-central North Dakota. U.S. Geological Survey Professional Paper 1675. 35–53.

Lacey, J.; Rasmussen, M.; SiddowayLimpert, J.; Bandy, R.; Snell, J.; Snell, G. 2005. Ecological site description for silty 10 to 14 inch precipitation zone. [City and State of publication unknown]: U.S. Department of Agriculture, Natural Resources Conservation Service. [Pages unknown].

Lake Access. 1991. Electrical conductivity—measuring salts in water. <http://lakeaccess.org/russ/conductivity.htm> Accessed June 8, 2010.

Lambing, J.H.; Jones, W.E.; Sutphin, J.W. 1988. Reconnaissance investigation of water quality, bottom sediment, and biota associated with irrigation drainage in Bowdoin National Wildlife Refuge and adjacent areas of the Milk River basin, in northeastern Montana, 1986–87. Water-Resources Investigations Report 87–4243. [City and State of publication unknown]: U.S. Department of the Interior, U.S. Geological Survey. 71 p.

Lancia, R.A.; Braun, C.E.; Collopy, M.W.; [and others]. 1996. ARM! For the future—adaptive resource management in the wildlife profession. Wildlife Society Bulletin 24:436–42.

Langbein, W.B. 1961. Salinity and hydrology of closed lakes. U.S. Geological Survey Professional Paper 412. [City and State of publication unknown]: U.S. Department of the Interior, U.S. Geological Survey. 20 p.

Larson, M.A.; Ryan, M.R.; Murphy, R.K. 2002. Population viability of piping plovers—effects of predator exclusion. Journal of Wildlife Management 66:361–71.

Lenard, S.; Carlson, J.; Ellis, J.; Jones, C.; Tilly, C. 2003. P.D. Skaar's Montana bird distribution list. 6th edition. Helena, Montana: Montana Audubon. 156 p.

Lesica, P.; DeLuca, T.H. 1996. Long-term harmful effects of crested wheatgrass on Great Plains grassland ecosystems. Journal of Soil and Water Conservation 51(5):408–409.

Licht, D.S. 2001. Relationship of hydrological conditions and populations of breeding piping plovers. Prairie Naturalist 33:209–19.

Limpert, R.J.; Earnst, S.L. 1994. Tundra swan (*Cygnus columbianus*). From: Poole, A.; editor. The Birds of North America Online. Ithaca, New York: Cornell Lab of Ornithology. <http://bna.birds.cornell.edu/bna/species/089> Accessed June 3, 2010.

Lloyd, J.D.; Martin, T.E. 2005. Reproductive success of chestnut-collared longspurs in native and exotic grassland. The Condor 107:363–74.

Lokemoen, J.T. 1984. Examining economic efficiency of management practices that enhance waterfowl production. In: Transactions of the North American Wildlife and Natural Resources Conference; [Date of conference unknown]; [City and State of conference unknown]. [City and State of publication unknown]: [Publisher unknown]. 49:584–607.

Mabee, T.J.; Estelle, V.B. 2000. Assessing the effectiveness of predator exclosures for plovers. Wilson Bulletin 112:14–20.

Madden, E.M.; Hansen, A.J.; Murphy, R.K. 1999. Influence of prescribed fire history on habitat and abundance of passerine birds in northern mixed-grass prairie. Canadian Field-Naturalist 113:627–40.

Madden, E.M.; Murphy, R.K.; Hansen, A.J.; Murray, S.L. 2000. Models for guiding management of prairie bird habitat in northwestern North Dakota. American Midland Naturalist 144(2):377–92.

Madge, Steve; Burn, Hilary. 1988. Waterfowl—an identification guide to the ducks, geese and swans of the world. Boston, Massachusetts: Houghton Mifflin Company. 298 p.

Majorowicz, A.K. 1963. Club moss infestation on northeastern Montana rangeland. In: Proceedings of the annual meeting of the American Society for Range Management; [Date of meeting unknown]; [City and State of meeting unknown]. [City and State of publication unknown]: [Publisher unknown]. 16:72 doi:bna.89. [Pages unknown].

Manske, L.L.; Barker, W.T. 1987. Habitat usage by prairie grouse on the Sheyenne National Grasslands. In: Bjugstad, A.J.; technical coordinator. Prairie chickens on the Sheyenne National Grasslands. General Technical Report RM-159. Fort Collins, Colorado: U. S. Department of Agriculture, Rocky Mountain Forest and Range Experiment Station. 73 p. 8–20.

Maxson, S. J. 1993. Habitat selection and nesting success of black terns at Agassiz NWR. Unpublished report. Bemidji, Minnesota: Minnesota Department of Natural Resources. [Pages unknown].

McEachern P.; Prepas, E.E.; Gibson, J.J.; Dinsmore, P. 2000. The forest fire induced impacts on phosphorus, nitrogen and chlorophyll a concentrations in boreal sub-arctic lakes of northern Alberta. Canadian Journal of Fisheries and Aquatic Sciences 57(Supplement 2):73–81.

McWilliams, J.L.; Van Cleave, P.E. 1960. A comparison of crested wheatgrass and native grass mixtures seeded on rangeland in eastern Montana. Journal of Range Management 13(2):91–94.

Melcher, C.P.; Farmer, A.; Fernández, G. 2006. Conservation plan for the marbled godwit. Version 1.1. Manomet, Massachusetts: Manomet Center for Conservation Science. 117 p.

Michaud, J.P. 1991. A citizen's guide to understanding and monitoring lakes and streams. Publication Number 94–149. Olympia, Washington: Washington State Department of Ecology, Publications Office. [Pages unknown].

Mills, Richard Paul; Phillips, Roberto; Saliva, Jorge E.; Sydeman, Bill; Trapp, John; Wheeler, Jennifer; Wohl, Kent. 2002. Waterbird conservation for the Americas—the North American waterbird conservation plan. Version 1. Washington, DC: Waterbird Conservation for the Americas. 78 p.

Missouri River Country. 2007. Montana's Missouri River country hunting and fishing brochure. [City and State of publication unknown]: Missouri River Country. [Pages unknown].

Mitcham, S.A.; Wobeser, G. 1988. Toxic effects of natural saline waters on mallard ducklings. Journal of Wildlife Diseases 24(1):45–50.

Montana Bird Distribution Committee. 1996. P.D. Skaar's Montana bird distribution. 5th edition. Montana Natural Heritage Program Special Publication No. 3. [City and State of publication unknown]: Montana Natural Heritage Program. [Pages unknown].

Montana Bird Distribution Online Database. 2001. Helena, Montana. April–September 2003. <http://nhp.nris.state.mt.us/mbd/> [Access date unknown].

(MBOGC) Montana Board of Oil and Gas Conservation. 2010. Well surface data. Montana Department of Natural Resources and Conservation [Internet]. <http://bogc.dnrc.mt.gov> Accessed August 2010.

Montana Department of Environmental Quality. 2006. Subchapter 6, surface water quality standards and procedures. Subchapter 6, 17.30.601–70. In: Environmental quality–chapter 30, water quality. Administrative rules of Montana. <http://deq.mt.gov/dir/Legal/Chapters/CH30-06.pdf> Accessed June 3, 2010.

(DNRC) Montana Department of Natural Resources and Conservation. 1977. Supplemental water for the Milk River. Helena, Montana. [Pages unknown].

Montana Field Guide. [No date]a. Franklin's gull—*Leucophaeus pipixcan*. Helena, Montana: Montana Information Technology Services Division. <http://fieldguide.mt.gov/detail_ABNNM03020.aspx> Accessed June 3, 2010.

Montana Field Guide. [No date]b. Mallard—*Anas platyrhynchos*. Helena, Montana: Montana Information Technology Services Division. <http://fieldguide.mt.gov/detail_ABNJB10060.aspx> Accessed June 3, 2010.

Montana Field Guide. [No date]c. Marbled godwit—*Limosa fedoa*. Helena, Montana: Montana Information Technology Services Division. <http://fieldguide.mt.gov/detail_ABNNF08040.aspx> Accessed June 3, 2010.

Montana Field Guide. [No date]d. Wilson's phalarope—*Phalaropus tricolor*. Helena, Montana: Montana Information Technology Services Division. <http://fieldguide.mt.gov/detail_ABNNF20010.aspx> Accessed June 3, 2010.

Montana Fish, Wildlife & Parks. 2005. Montana's comprehensive fish and wildlife conservation strategy. Helena, Montana. <http://fwp.mt.gov/wildthings/conservationInAction/fullplan.html> Accessed June 3, 2010. 658 p.

Montana Natural Heritage Program. 2003. Data derived from element occurrences with no other known source material; biotics—black tern, *Chlidonias niger*. Montana Field Guide. Helena, Montana: Montana Natural Heritage Program and Montana Fish, Wildlife & Parks. <http://FieldGuide.mt.gov/detail_ABNNM10020.aspx> Accessed March 7, 2011.

———. 2009a. Animal species of concern. [Internet]. <http://mtnhp.org/SpeciesOfConcern/?AorP=a> Accessed November 2009.

———. 2009b. Plant species of concern. [Internet]. <http://mtnhp.org/SpeciesOfConcern/?AorP=p> Accessed November 2009.

Montana Piping Plover Recovery Committee. 1997. 1995 Surveys for piping plovers (*Charadrius melodius*) and least terns (*Sterna antillarum*) in Montana. Unpublished report. 114 p.

(MSGWG) Montana Sage Grouse Working Group. 2005. Management plan and conservation strategies for sage grouse in Montana. [Internet]. <http://fwpiis.mt.gov/content/getItem.aspx?id=31187> Accessed April 6, 2010. 200 p.

Moore, M.L. 1989. NALMS management guide for lakes and reservoirs. Madison, Wisconsin: North American Lake Management Society. [Pages unknown].

Moorman, A.M.; Moorman, T.E.; Baldassarre, G.A.; Richard, D.M. 1991. Effects of saline water on growth and survival of mottled duck ducklings in Louisiana. Journal of Wildlife Management 55(3):471–76.

Morton, J.M. 1995. Management of human disturbance and its effects on waterfowl. In: Whitman, W. R.; Strange, T.; Widjeskog, L.; Whittemore, R.; Kehoe, P.; Roberts, L.; editors. Waterfowl habitat restoration, enhancement and management in the Atlantic flyway. 3rd edition. Dover, Delaware: Environmental Management Committee, Atlantic Flyway Council Technical Section; Delaware Division of Fish and Wildlife. F59–F86.

Moyles, D.L.J. 1981. Seasonal and daily use of plant communities by sharp-tailed grouse (*Pedioecetes phasianellus*) in the parklands of Alberta. Canadian Field-Naturalist 95:287–91.

Murphy, R.K.; Grant T.A.; Madden, E.M. 2005. Prescribed fire for fuel reduction in northern mixed grass prairie: influence on habitat and population dynamics of indigenous wildlife. Final Report, December 2005: Joint Fire Science Program RFP 2001–2003. [City and State of publication unknown]: [Publisher unknown]. [Pages unknown].

Murphy, R.K.; Greenwood, R.J.; Ivan, J.S.; Smith, K.A. 2003. Predator exclusion methods for managing endangered shorebirds—are two barriers better than one. Waterbirds 26:156–59.

Murray, B.G., Jr. 1983. Notes on the breeding biology of Wilson's phalarope. Wilson Bulletin 95:472–75.

Musgrove, Jack W.; Musgrove, Mary R. 1943. Waterfowl in Iowa. Des Moines, Iowa: State Conservation Committee. 113 p.

National Association of Counties. 2009. About counties. [Internet]. <www.naco.org/Template.cfm?Section=Find_a_County&Template=/cffiles/counties/state.cfm&statecode=mt> Accessed February 2010.

National Association of Interpretation. [No date]. Mission, vision, and core values. Fort Collins, Colorado. <www.interpnet.com/about_nai/mission.shtml> Accessed July 2, 2010.

National Audubon Society. 2010. Bowdoin National Wildlife Refuge. In: Important bird areas for neotropical migrants of conservation concern—landbirds. [Internet]. <http://iba.audubon.org/iba/profileReport.do?siteId=2930&navSite=search&pagerOffset=0&page=1> Accessed June 2010.

National Invasive Species Council. 2008. 2008–2012 National invasive species management plan. Washington, DC: U.S. Department of the Interior. 35 p.

National Park Service. 2009. Natural resources interpretation. [Internet]. U.S. Department of the Interior, National Park Service, Archeology Program. <www.nps.gov/archeology/ifora/tools_6.htm> Accessed July 2, 2010.

Natural Resources Conservation Service. 2002. History, biology, ecology, suppression, and revegetation of Russian-olive sites (*Elaeagnus angustifolia*, L.). NRCS Technical Note No. MT–43. [City and State of publication unknown]: U.S. Department of Agriculture, Natural Resources Conservation Service. [Pages unknown].

———. 2003. Ecological site information system. [Internet]. Fort Worth, Texas: U.S. Department of Agriculture, Natural Resources Conservation Service, Central National Technology Support Center. <http://esis.sc.egov.usda.gov/About.aspx> Accessed March 2008.

———. 2008. Official soil series descriptions. [Internet]. Lincoln, Nebraska: U.S. Department of Agriculture, Natural Resources Conservation Service. <http://soils.usda.gov/technical/classification/osd/index.html> Accessed October 2009.

Naugle, D.E. 1997. Habitat area requirements of prairie wetland birds in eastern South Dakota [Ph.D. dissertation]. Brookings, South Dakota: South Dakota State University. 85 p.

Naugle, D. 2004. Black tern (*Childonias niger surinamensis*): a technical conservation assessment. [Internet]. USDA Forest Service, Rocky Mountain Region. <www.fs.fed.us/r2/projects/scp/assessments/blacktern.pdf> [Access date unknown].

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. Wildlife Technical Report 1. Stevens Point, Wisconsin: University of Wisconsin–Stevens Point, College of Natural Resources. [Pages unknown].

Naugle, D.E.; Higgins, K.F.; Nusser, S.M. 1999. Effects of woody vegetation on prairie wetland birds. Canadian Field-Naturalist 113:487–92.

Niemuth, N.D. 2000. Land use and vegetation associated with greater prairie chicken leks in an agricultural landscape. Journal of Wildlife Management 64:278–86.

Niemuth, N.D.; Solberg, J.W. 2003. Response of waterbirds to number of wetlands in the Prairie Pothole Region of North Dakota, USA. Waterbirds 26(2):233–38.

Old, S.M. 1969. Microclimate, fire, and plant production in an Illinois prairie. Ecological Monographs 39:355–84.

Pampush, G.J. 1980. Status report on the long-billed curlew in the Columbia and Northern Great Basins. Portland, Oregon: Department of the Interior, Fish and Wildlife Service. [Pages unknown].

Pampush, G.J.; Anthony, R.G. 1993. Nest success, habitat utilization and nest-site selection of long-billed curlews in the Columbia Basin, Oregon. Condor 95:957–67.

Peterjohn, B.G.; Sauer, J.R. 1999. Population status of North American grassland birds from the North American breeding bird survey. Studies in Avian Biology 19:27–44.

PhillCo Economic Growth Council, Inc. 2001. PhillCo Economic Growth Council overview. Malta, Montana. <www.maltachamber.com/phillco/overvu.htm> Accessed December 2009.

Plissner, J.H.; Haig, S.M. 2000. Status of a broadly distributed endangered species—results and implications of the second international piping plover census. Canadian Journal of Zoology 78:128–39.

Poole, A.; editor. 2005. The Birds of North America Online. Ithaca, New York: Cornell Lab of Ornithology. <http://bna.birds.cornell.edu/BNA/> Accessed March 3, 2011.

Prellwitz, D.; Erickson, K.M.; Osborne, L.M. 1995. Translocation of piping plover nests to prevent nest flooding. Wildlife Society Bulletin 23(1):103–106.

Prellwitz, D.M.; Prellwitz, T.A.; Stutzman, K.K.; Stutzman, J.W. 1989. Piping plovers nesting at Nelson Reservoir, Montana. Prairie Naturalist 21:84–86.

Prescott, D.R.C.; Arbuckle, R.; Goddard, B.; Murphy, A. 1993. Methods for the monitoring and assessment of avian communities on NAWMP landscapes in Alberta and 1993 results. NAWMP–007. Edmonton, Alberta: Alberta NAWMP Centre. 48 p.

Prescott, D.R.C.; Murphy, A.J.; Ewaschuk, E. 1995. An avian community approach to determining biodiversity values of NAWMP habitats in the aspen parkland of Alberta. NAWMP–012. Edmonton, Alberta: Alberta NAWMP Centre. 58 p.

Prindiville-Gaines, E.M.; Ryan, M.R. 1988. Piping plover habitat use and reproductive success in North Dakota. Journal of Wildlife Management 52: 266–73.

Prose, B.L. 1987. Habitat suitability index models: plains sharp-tailed grouse. Biological Report 82. Washington D.C.: U.S. Department of the Interior, Fish and Wildlife Service. 31 p.

Pylypec, B.; Romo, J.T. 2003. Long term effects of burning *Festuca* and *Stipa–Agropyron* grasslands. Journal of Range Management 56(6):640–45.

Reichel, J.D. 1996. Preliminary colonial nesting bird survey of the Bureau of Land Management Lewistown District—1995. Helena, Montana: Montana Natural Heritage Program. 97 p.

Reiss. S.A. 1995. Sport in industrial America, 1850–1920. The American History Series. Wheeling, Illinois: Harlan Davidson, Inc. 178 p.

Renken, R.B. 1983. Breeding bird communities and bird-habitat associations on North Dakota waterfowl production areas of three habitat types [master's thesis]. Ames, Iowa: Iowa State University. 90 p.

Renken, R.B.; Dinsmore, J.J. 1987. Nongame bird communities on managed grasslands in North Dakota. Canadian Field-Naturalist 101:551–57.

Reynolds, J.D.; Colwell, M.A.; Cooke, F. 1986. Sexual selection and spring arrival times of red-necked and Wilson's phalaropes. Behavioral Ecology and Sociobiology 18:303–10.

Reynolds, R.E.; Loesch, C.R.; Wangler, B.; Shaffer, T.L. 2007. Waterfowl response to the Conservation Reserve Program and swampbuster provision in the Prairie Pothole Region, 1992–2004. U.S. Fish and Wildlife Service Biological Report. [City and

State of publication unknown]: Department of the Interior, Fish and Wildlife Service. 90 p.

Reynolds, R.E.; Shaffer, T.L.; Renner, R.W.; [and others]. 2001. Impact of the conservation reserve program on duck recruitment in the US Prairie Pothole Region. Journal of Wildlife Management 65:765–80.

Reynolds, T.; Trost, C. 1981. Grazing, crested wheatgrass, and bird populations in southeastern Idaho. Northwest Science 55(3):225–34.

Robbins, Mark B.; Dale, Brenda C. 1999. Sprague's pipit (*Anthus spragueii*). In: Poole, A.; editor. The Birds of North America Online. Ithaca, New York: Cornell Lab of Ornithology. <http://bna.birds.cornell.edu/bna/species/439> Accessed April 2011.

Roberts, T.S. 1932. The birds of Minnesota. Volume 1. Minneapolis, Minnesota: University of Minnesota Press. 691 p.

Rocke, T.E.; Friend, M. 1999. Chapter 38, avian botulism. In: Friend, Milton; Franson, J. Christian; technical editors. Field manual of wildlife diseases—general field procedures and diseases of birds. Biological Resources Division, Information and Technology Report 1999–001. Madison, Wisconsin: U.S. Department of the Interior, U.S. Geological Survey, Biological Resources Division, National Wildlife Health Center. 271–82.

Rocke, T.E.; Samuel, M.D. 1999. Water and sediment characteristics associated with avian botulism outbreaks in wetlands. Journal of Wildlife Management, 63(4):1,249–60.

Rodney, [No first name]; Mohrman, [No first name]. 2007. Conceptual model for analysis of Beaver Creek flood waters entering Bowdoin National Wildlife Refuge, Montana. Draft Report. U.S. Fish and Wildlife Service. 26 p.

Romo, J.T.; Bai, Y. 2004. Seed bank and plant community composition, mixed prairie of Saskatchewan. Journal of Range Management 57:300–304.

Root, B.G.; Ryan, M.R. 2004. Changes in piping plover nesting habitat availability at Great Plains alkaline wetlands, 1938–1937. Wetlands 24:766.

Rumble, M.A.; Flake, L.D. 1983. Management considerations to enhance use of stock ponds by waterfowl broods. Journal of Range Management. 36:691–94.

Ryan, M.R.; Renken, R.B. 1987. Habitat use by breeding willets in the northern Great Plains. Wilson Bulletin 99:175–89.

Ryan, M.R.; Renken, R.B.; Dinsmore, J.J. 1984. Marbled godwit habitat selection in the northern prairie region. Journal of Wildlife Management 48:1,206–18.

Ryan, M.R.; Root, B.G.; Mayer, P.M. 1993. Status of piping plovers in the Great Plains of North America—a demographic simulation model. Conservation Biology 7:581–85.

Ryder, R.A.; Manry, D.E. 1994. White-faced ibis (*Plegadis chihi*). In: Poole, A; Gill, F.; editors. The birds of North America, No. 130. Philadelphia, Pennsylvania: The Academy of Natural Sciences. Washington, DC: The American Ornithologists Union. 24 p.

Safran, R.J.; Colwell, M.A.; Isola, C.R.; Taft, O.E. 2000. Foraging site selection by nonbreeding white-faced ibis. The Condor 102:211–15.

Samson, F.B.; Knopf, F. 1994. Prairie conservation in North America. Bioscience 44:418–21.

Saunders, A.A. 1914. The birds of Teton and northern Lewis and Clark counties, Montana. The Condor 16:124–44.

Schmitz, R.A.; Clark, W.R. 1999. Survival of ring-necked pheasant hens during spring in relation to landscape features. Journal of Wildlife Management 63:147–54.

Schrader, T.A. 1955. Waterfowl and the potholes of the north central states. In: U.S. Department of Agriculture—Yearbook of Agriculture. Washington, DC: U.S. Department of Agriculture. 596–604.

Schwalbach, M.J. 1988. Conservation of least terns and piping plovers along the Missouri River and its major western tributaries in South Dakota [master's thesis]. Brookings, South Dakota: South Dakota State University. 104 p.

Sherwood, G.A. 1960. The whistling swan in the west with particular reference to Great Salt Lake Valley, Utah. The Condor 62:370–77.

Sisson, L. 1969. Land use changes and sharp-tailed grouse breeding behavior. In: Nebraska Game and Parks Commission white papers, conference presentations, and manuscripts.

Skaar, P.D. 1969. Birds of the Bozeman latilong. Bozeman, Montana: P.D. Skaar. 132 p.

Skagen, S.K.; Oman, H.D. 1996. Dietary flexibility of shorebirds in the Western Hemisphere. Canadian Field-Naturalist 10:419–44.

Snyder, W.D. 1984. Ring-necked pheasant nesting ecology and wheat farming on the high plains. Journal of Wildlife Management 48:878–88.

Society for Ecological Restoration International Science & Policy Working Group. 2004. The SER international primer on ecological restoration. Tucson, Arizona: Society for Ecological Restoration International. <www.ser.org/content/ecological_restoration_primer.asp> Accessed June 7, 2010.

Speulda, L.A.; Lewis, R.O. 2003. Region 6—historical and architectural assessment of the Depression Era work projects. [City and State of publication unknown]: U.S. Fish and Wildlife Service. 36–37; appendix B 1–5.

State of Montana. 2009. 82–10–504: Surface damage and disruption payments; dispute resolution; penalty for late payment. In: Montana

Code Annotated 2009; Title 82–minerals, oil, and gas; chapter 10–oil and gas, general provisions. <http://data.opi.mt.gov/bills/mca/82/10/82-10-504.htm> Accessed February 24, 2010.

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

Stewart, R.E.; Kantrud, H.A. 1965. Ecological studies of waterfowl populations in the prairie potholes of North Dakota. 1965 Progress Report. Washington, DC: Bureau of Sport Fisheries and Wildlife. 14 p.

Stewart, R.E.; Kantrud, H.A. 1971. Classification of natural ponds and lakes in the glaciated prairie region. Resource Publication 92. Washington, DC: Bureau of Sport Fisheries and Wildlife. 57 p.

Stewart, R.E.; Kantrud, H.A. 1973. Ecological distribution of breeding waterfowl populations in North Dakota. Journal of Wildlife Management 37(1):39–50.

Stewart, R.E.; Kantrud, H.A. 1974. Breeding waterfowl populations in Prairie Pothole Region of North Dakota. The Condor 76:70–79.

Stewart, R.E.; Kantrud, H.A. 1984. Ecological distribution and crude density of breeding birds on prairie wetlands. Journal of Wildlife Management 48:426–37.

Strong, M.A. 1971. Avian productivity on the shortgrass prairie of northcentral Colorado [master's thesis]. Fort Collins, Colorado: Colorado State University. 70 p.

Sullivan, M. 2008. Environmental assessment for Cree Crossing fee title proposal. [City and State of publication unknown]: Montana Fish, Wildlife & Parks, Wildlife Division. 22 p.

Sutter, G.C. 1997. Nest site selection and nest entrance orientation in Sprague's pipit. Wilson Bulletin 109:462–69.

Svedarsky, W.D.; Van Amburg, G.L. 1996. Integrated management of the greater prairie-chicken and livestock on the Sheyenne National Grasslands. Crookston, Minnesota: Northwest Experiment Station, University of Minnesota. 243 p.

Swanson, G.A.; Adomaitis, V.A.; Lee, F.B.; Serie, J.R.; Shoesmith, J.A. 1984. Limnological conditions influencing duckling use of saline lakes in south-central North Dakota. Journal of Wildlife Management 48(2):340–49.

Swanson, G.A.; Euliss, N.H.; Hanson, B.A.; Muset, D.M. 2003. Dynamics of a prairie wetland complex—implications for wetland management. In: Winter, T.C. Hydrological, chemical, and biological characteristics of a prairie pothole wetland complex under highly variable climate conditions–the Cottonwood Lake area, east-central North Dakota. U.S. Geological Survey Professional Paper 1675. [City and State of publication unknown]: U.S. Department of the Interior, U.S. Geological Survey. 55–94.

Swanson, G.A.; Meyer, M.I.; Serie, J.R. 1974. Feeding ecology of breeding blue-winged teals. Journal of Wildlife Management 38(3):396–407.

Swanson, G.A.; Winter, T.C.; Adomaitis, V.A.; LaBaugh, J.W. 1988. Chemical characteristics of prairie lakes in south-central North Dakota—their potential for influencing use by fish and wildlife. U.S. Fish and Wildlife Service Report 18. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 44 p.

Swenson, J.E. 1985. Seasonal habitat use by sharptailed grouse, *Tympanuchus phasianellus*, on mixed-grass prairie in Montana. Canadian Field-Naturalist 99:40–46.

Talent, L.G.; Krapu, G.L.; Jarvis, R.L. 1982. Habitat use by mallard broods in south-central North Dakota. The Condor 85:74–78.

Tchobanoglous, George; Burton, Franklin. 1991. Wastewater engineering: treatment, disposal and reuse. New York: McGraw-Hill Publishing Company. [Pages unknown].

Terres, J.K. 1980. The Audubon Society encyclopedia of North American birds. New York: A. Knopf. 1,100 p.

Trammell, M.A.; Butler, J.L. 1995. Effects of exotic plants on native ungulate use of habitat. Journal of Wildlife Management 59:808–16.

Umbanhowar, C.E., Jr. 1996. Recent fire history of the northern Great Plains. American Midland Naturalist 135:115–21.

URS Group, Inc. 2009. Lake Bowdoin feasibility study. Final report. Denver, Colorado: URS Group, Inc. 49 p.

U.S. Army Corps of Engineers. 1965. Review report on flood control and allied purposes for Beaver Creek, Milk River Basin, Montana. Omaha, Nebraska: U.S. Army Corps of Engineers. [Pages unknown].

U.S. Bureau of Labor Statistics. 2009. Local area unemployment statistics [database]. <www.bls.gov/data/#unemployment> [Access date unknown].

U.S. Department of Energy, Office of Fossil Energy and the Office of Science. 1999. Carbon sequestration research and development. Springfield, Virginia: National Technical Information Service. <www.fossil.energy.gov/programs/sequestration/publications/1999_rdreport/> Accessed November 2008.

(EPA) U.S. Environmental Protection Agency. 2010. Industrial and municipal waste disposal wells (class 1). [Internet]. <http://water.epa.gov/type/groundwater/uic/wells_class1.cfm> Accessed May 16, 2011.

U.S. Fish and Wildlife Service. 1985. Endangered and threatened wildlife and plants; determination of endangered and threatened status for the piping plover—final rule. Federal Register 50: 50720–34.

———. 1988. Fish and Wildlife Coordination Act report—Milk River water supply study, Montana. [City and State of publication unknown]: [Publisher unknown]. [Pages unknown].

———. 1999a. Field manual of wildlife diseases—general field procedures and diseases of birds. DOI/USFWS Resource Publication 167. [City and State of publication unknown]: U.S. Department of the Interior, Fish and Wildlife Service. 225 p.

———. 1999b. Fulfilling the promise. Arlington, Virginia: U.S. Department of the Interior, Fish and Wildlife Service. 94 p.

———. 2003. Biological opinion on the operation of the Missouri River main stem reservoir system, operation and maintenance of the Missouri River bank stabilization and navigation project and operation of the Kansas River reservoir system. [City and State of publication unknown]: U.S. Fish and Wildlife Service. 296 p.

———. 2007. Montana Partners for Fish and Wildlife strategic habitat conservation plan. Unpublished report. [Pages unknown].

———. 2008a. Birds of conservation concern 2008. Arlington, Virginia: U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management. 85 p. <www.fws.gov/migratorybirds/> [Access date unknown].

———. 2008b. Prairie Pothole Joint Venture. U.S. Fish and Wildlife Service, Mountain-Prairie Region. <www.fws.gov/mountain-prairie/nawm/ppjv.htm> Accessed September 2008.

———. 2008c. Staffing model for field stations—final report. Unpublished report on file at Bowdoin National Wildlife Refuge Complex, Malta, Montana. 22 p.

———. 2009. Management of oil and gas activities on Fish and Wildlife Service lands. Draft. Unpublished report. [Pages unknown].

———. 2010. Rising to the urgent challenge—strategic plan for responding to accelerating climate change. Unpublished report. Washington, DC: U.S. Fish and Wildlife Service. 36 p. <www.fws.gov/home/climatechange/pdf/CCStrategicPlan.pdf> Accessed May 6, 2011.

U.S. Fish and Wildlife Service; Canadian Wildlife Service. 1986. North American waterfowl management plan—a strategy for cooperation. Washington, DC: U.S. Department of the Interior. Gatineau, Quebec: Environment Canada. 26 p.

U.S. General Accounting Office. 2001. U.S. Fish and Wildlife Service—information on oil and gas activities in the National Wildlife Refuge System. <www.gao.gov/new.items/d0264r.pdf> Accessed January 8, 2010.

U.S. Geological Survey. 2006. Strategic habitat conservation—final report of the National Ecological Assessment Team. [City and State of publication unknown]: U.S. Department of the Interior, U.S. Geological Survey. 45 p.

(USRS) U.S. Reclamation Service. 1920. Nineteenth annual report of the U.S. Reclamation Service 1919–1920. Washington, DC. [Pages unknown].

van der Valk, A.G.; editor. 1989. Northern prairie wetlands. Ames, Iowa: Iowa State University Press. 400 p.

Van Dyne, G.M.; Vogel, W.G. 1967. Relationship of *Selaginella densa* to site, grazing and climate. Ecology 48:438–44.

Vrtiska, M.P.; Hansen, J.L.; Sharp, D.E. 1999. Central flyway perspectives on trumpeter swans. Plymouth, Minnesota: Trumpeter Swan Society. 5 p.

Walters, C.J.; Holling, C.S. 1990. Large-scale management experiments and learning by doing. Ecology 71:2,060–68.

Watson, A.K. 1985. Introduction—the leafy spurge problem. In: Watson, A.K.; editor. Leafy spurge. Weed Science Society of America Monograph 3:1–6.

Weller, M.W.; Spatcher, C.S. 1965. Role of habitat in the distribution and abundance of marsh birds. Department of Zoology and Entomology Special Report Number 43. Ames, IA: Iowa State University, Agricultural and Home Economics Experiment Station. [Pages unknown].

Werner, J.K.; Hendricks, D.P.; Maxell B.A.; Flath, D.L. 2004. Amphibians and reptiles of Montana. Missoula, Montana: Mountain Press Publishing Company. 262 p.

Western Hemisphere Shorebird Reserve Network. 2009. Bowdoin National Wildlife Refuge. <www.whsrn.org/site-profile/bowdoin-national-wildlife-refuge> Accessed February 2010.

Weydemeyer, W.; Marsh, V.L. 1936. The bird life of Lake Bowdoin, Montana. The Condor 38(5):185–98.

Whyte, A.J. 1985. Breeding ecology of the piping plover (*Charadrius melodus*) in central Saskatchewan [master's thesis]. Saskatoon, Saskatchewan: University of Saskatchewan. 126 p.

Wightman, C.; Jones, S.L.; Tilly, F. 2011. Western colonial waterbird survey database for Montana during 2009–2011. Unpublished database submitted to U.S. Fish and Wildlife Service.

Wightman, Catherine; Tilly, Fred. 2011. Montana's colonial-nesting waterbird inventory 2011: annual report. Unpublished report submitted to U.S. Fish and Wildlife Service and American Bird Conservancy. [Pages unknown].

Wikipedia. 2009. Milk River (Alberta–Montana). <http://en.wikipedia.org/wiki/Milk_River_(Alberta%E2%80%93Montana)#History> Accessed December 1, 2009.

Wilson, S. 2000. Crested wheatgrass control in Grasslands National Park. Unpublished report. Regina, Saskatchewan: University of Regina. 3 p.

Wilson, S.D.; Gerry, A.K. 1995. Strategies for mixed-grass prairie restoration—herbicide, tilling, and nitrogen manipulation. Restoration Ecology 3(4):290–98.

Wilson, S.D.; Pärtel, M. 2003. Extirpation or coexistence? Management of a persistent introduced grass in a prairie restoration. Restoration Ecology 11(4):410–16.

Windingstad, R.M.; Kartch, F.X.; Stroud, R.K.; Smith, M.R. 1987. Salt toxicosis in waterfowl in North Dakota. Journal of Wildlife Diseases 23(3):443–46.

Winter, M.; Johnson, D.H.; Faaborg, J. 1999. Patterns of area sensitivity in grassland nesting birds. Conservation Biology 13:1,424–36.

Winter, M.; Johnson, D.H.; Faaborg, J. 2000. Evidence for edge effects on multiple levels in tallgrass prairie. The Condor 102(2):256–66.

Wolfgram, T.J.; Nemeth, C. 1998. A cultural resources inventory of a buried telephone cable from Malta to Sleeping Buffalo, Montana. Ethos Consultants, Inc., for Triangle Telephone Cooperative, Inc., and Central Montana Communications, Inc. 59 p.

Woodin, Marc C.; Michot, Thomas C. 2002. Redhead (*Aythya americana*). From: Poole, A.; editor. The birds of North America Online. Ithaca, New York: Cornell Lab of Ornithology. <http://bna.birds.cornell.edu/bna/species/695doi:bna.695> [Access date unknown].

Wright, H.A.; Bailey, A.W. 1980. Fire ecology and prescribed burning in the Great Plains–a research review. General Technical Report INT–77. Ogden, Utah: U.S. Department of Agriculture, Forest Service. 62 p.

Ziewitz, J.W.; Sidle, J.G.; Dinan, J.J. 1992. Habitat conservation for nesting least terns and piping plovers on the Platte River, Nebraska. Prairie Naturalist 24(1):1–20.