

Glossary

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

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

adfluvial—Lake dwelling.

Administration Act—National Wildlife Refuge System Administration Act of 1966.

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

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

annual—A plant that flowers and dies within 1 year of germination.

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

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

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

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

blowout—An area denuded of vegetation due to rapid wind erosion.

calcareous—Consisting of or containing calcium carbonate.

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

CCP—*See* comprehensive conservation plan.

CFR—*See* Code of Federal Regulations.

cfs—Cubic feet per second.

clonal—A group of genetically identical individuals (e. g., plants, fungi, or bacteria) that have grown in a given location, all originating vegetatively (not sexually) from a single ancestor.

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

compatibility determination—*See* compatible use.

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

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

concern—*See* issue.

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

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

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

deme—A local, usually stable population of interbreeding organisms of the same kind or species.

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

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

EA—*See* environmental assessment.

ecosystem—A 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 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.

ecotone—The transition zone between two different plant communities, as that between forest and prairie.

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

EIS—Environmental impact statement.

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

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

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

endemic species—Plants or animals that occur naturally in a certain region and whose distribution is relatively limited to a particular locality.

environmental assessment (EA)—A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action and alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare

an environmental impact statement or a finding of no significant impact (40 CFR 1508.9).

eutrophication—Characterized by an abundant accumulation of nutrients that support a dense growth of algae and other organisms, the decay of which depletes the shallow waters of oxygen in summer.

extinction—The complete disappearance of a species from the earth; no longer existing.

extirpation—The extinction of a population; complete eradication of a species within a specified area.

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

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

fen—An area of low, flat, marshy land.

flora—All the plant species of an area.

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

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

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

gleyed soil—Greenish-gray in color and oxygen-deprived due to high water content.

GIS—*See* geographic information system.

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

graminoid—Grasses or grasslike plants such as sedges and rushes.

grassland tract—A contiguous area of grassland without fragmentation.

GS—General schedule (pay rate schedule for certain federal positions).

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

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

hypereutrophic—Very nutrient-rich lakes characterized by frequent and severe nuisance algal blooms and low transparency. Hypereutrophic lakes are the most biologically productive lakes, and support large amounts of plants, fish and other animals. Hypereutrophic lakes have a visibility depth of <3 feet, they have >40 micrograms/liter total chlorophyll and >100 micrograms/liter phosphorus.

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

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.

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

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 Service Manual 602 FW 1.5).

lacustrine—Of or pertaining to a lake.

lek—A dancing ground for male sage grouse used to attract breeding females.

management alternative—*See alternative.*

mesic—Of, pertaining to, or adapted to an environment having a balanced supply of moisture.

mesotrophic—Commonly clear water lakes and ponds with beds of submerged aquatic plants and medium levels of nutrients.

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

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

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

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

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

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

National Wildlife Refuge System (Refuge System)—Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife, including species threatened with extinction; all lands, waters, and interests therein administered by the Secretary as wildlife refuges; areas for the protection and conservation of fish and wildlife that are threatened with extinction; wildlife ranges; game ranges; wildlife management areas; and waterfowl production areas.

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

native species—A species that historically occurred or currently occurs in that ecosystem; does not include species that are present in an ecosystem as a result of an introduction.

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

nest success—The percentage of nests that successfully hatch one or more eggs of the total number of nests initiated in an area.

nongovernmental organization (NGO)—Any group that is not composed of federal, state, tribal, county, city, town, local, or other governmental entities.

noxious weed—Any 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.

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 provide the basis for determining management strategies. Objectives should be attainable and time-specific and should be stated quantitatively to the extent possible. If objectives cannot be stated quantitatively, they may be stated qualitatively (Draft Service Manual 602 FW 1.5).

obligates—Species which must occupy a certain niche or behave in a certain way in order to survive.

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 (as in marshes, swamps, and lake shores) to land that is wet only seasonally.

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

pelagic—Open water.

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

permanent seasonal employee—*See* temporary seasonal employee. A permanent position with benefits, 40 hours per week during the season of employment, usually summer.

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

pluvial lake—A lake that experiences significant increase in depth and extent as a result of increased precipitation and reduced evaporation.

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

priority public use—One of six uses authorized by the National Wildlife Refuge System Improvement Act of 1997 to have priority if found to be compatible with a refuge's purposes. This includes hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

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

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

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

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

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

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

refuge purpose—*See* purpose of the refuge.

Refuge System—*See* National Wildlife Refuge System.

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

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

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

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

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

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

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

senior water users—water users with a water right that was filed “earlier” than the Services

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

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

sodic—Soil containing sodium.

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

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

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

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

temporal—Of or relating to time.

temporary seasonal employee—See permanent seasonal employee. A temporary position without benefits, 40 hours per week during the season of employment, usually summer. The position will be re-opened for candidates each year.

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

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

trust resource—See federal trust resource.

trust species—See federal trust species.

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

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

U.S. Geological Survey (USGS)—A federal agency whose mission is to provide reliable scientific information to describe and understand the earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

USGS—See U.S. Geological Survey.

ungulate—A hooved animal such as a white-tailed deer or bison.

vegetation alliance—A physiognomically (pertaining to physical features, character, or appearance) uniform group of vegetation associations sharing one or more diagnostic (dominant, differential, indicator, or character) species that, as a rule, are found in the uppermost stratum of the vegetation. This is

the second finest level in the National Vegetation Classification Standard hierarchy.

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

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

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

VOR—*See* visual obstruction reading.

wading birds—These birds have long legs that enable them to wade in shallow water; wading birds include egrets, great blue herons, black-crowned night-herons, and bitterns.

waterbird—Birds dependent upon aquatic habitats to complete portions of their life cycles (for example, breeding).

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

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

wetland management district (WMD)—Land that the Refuge System acquires with Federal Duck Stamp funds 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).

wildland fire—A free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands (Service Manual 621 FW 1.7).

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

WMD—*See* wetland management district.

woodland—Open stands of trees with crowns which do not usually touch, generally forming 25–60% cover.

WPA—Works Progress Administration or Waterfowl Production Area

WUI—wildland–urban interface.

Appendix A

Key Legislation and Policies

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

NATIONAL WILDLIFE REFUGE SYSTEM

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

GOALS

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

GUIDING PRINCIPLES

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

- Public Use—The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving

hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

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

LEGAL AND POLICY GUIDANCE

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

American Indian Religious Freedom Act

(1978)—Directs agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Americans with Disabilities Act (1992)

—Prohibits discrimination in public accommodations and services.

Antiquities Act (1906)

—Authorizes the scientific investigation of antiquities on federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Archaeological and Historic Preservation Act

(1974)—Directs the preservation of historic and archaeological data in federal construction projects.

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

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

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

Emergency Wetlands Resources Act (1986)—Promotes wetland conservation for the public benefit to help fulfill international obligations in various migratory bird treaties and conventions. The act authorizes the purchase of wetlands from Land and Water Conservation Fund monies.

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

Executive Order No. 7023 (1935)—Establishes Red Rock Lakes National Wildlife Refuge “as a refuge and breeding ground for birds.”

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

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

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

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

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

Fish and Wildlife Act (1956)—Directs the Secretary of the Interior to develop the policies and procedures necessary for carrying out fish and wildlife laws and to research and report on fish and wildlife matters.

The act establishes the 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)—Allows the U.S. Fish and Wildlife Service to enter into agreements with private landowners for wildlife management purposes.

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

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

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

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

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

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

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

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

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

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

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

Appendix B

List of Preparers, Consultation, and Coordination

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

<i>Team Member</i>	<i>Position</i>	<i>Work Unit</i>
Suzanne Beachaine	Wildlife refuge specialist (assistant manager)	Red Rock Lakes National Wildlife Refuge, Lima, MT
Bob Brannon	Area biologist	Montana Fish, Wildlife, and Parks; region 3; Sheridan, Montana
Mark Ely	Geographic information system (GIS) specialist	Division of Planning, Region 6, Lakewood, CO
Susan Hale	Editor	TBC Solutions, Clinton, TN
Laura King	Planning team leader	Division of Planning, Region 6, Cayuga, ND
Karen Newlon	Former biological science technician (wildlife)	Red Rock Lakes National Wildlife Refuge, Lima, MT
Mike Parker	Former Refuge manager	Red Rock Lakes National Wildlife Refuge, Lima, MT
Jeff Warren	Wildlife biologist	Red Rock Lakes National Wildlife Refuge, Lima, MT

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 towards the completion of this plan. The diversity, talent, and knowledge contributed dramatically improved the vision and completeness of this document.

<i>Contributor</i>	<i>Position</i>	<i>Work Unit</i>
Steve Berenzen	Former refuge supervisor	USFWS
Glenn Boltz	Fisheries biologist	USFWS
Rick Coleman	Assistant regional director, Refuge System	USFWS
Tim Covino	Graduate student, hydrology	Montana State University
Steve Custer	Professor, earth sciences	Montana State University
John Esperance	Chief, Comprehensive and Land Protection Planning	USFWS
Sheri Fetherman	Chief, Division of Education and Visitor Services	USFWS
Sean Fields	Wildlife biologist/GIS	USFWS

<i>Contributor</i>	<i>Position</i>	<i>Work Unit</i>
Brian Hackett	Range specialist	BLM
Dave Hamilton	Ecologist	USGS
Shannon Heath	Outdoor recreation planner	USFWS
Lynn Kaeding	Fisheries biologist	USFWS
Richard Keigley	Research ecologist	USGS
Wayne King	Wildlife biologist	USFWS
Nathan Korb	Biologist	The Nature Conservancy
Murray Laubhan	<i>Former</i> ecologist	USGS, <i>formerly</i>
Rachel Laubhan	Wildlife biologist	USFWS
Peter Lesica	Range management consultant	Independent consultant
Brian McGlynn	Professor, watershed hydrology	Montana State University
Jim Mogen	Fisheries biologist	USFWS
Jana Mohrman	Hydrologist	USFWS
Deb Parker	Writer and Editor	USFWS
Ken Pierce	Geologist emeritus	USGS
David Redhorse	<i>Former</i> Native American liaison	USFWS
Jay Rotella	Professor of ecology	Montana State University
Dean Rundle	Refuge supervisor	USFWS
Rick Schroeder	Wildlife biologist	USGS
Richard Sodja	Wildlife biologist	USGS
Michael Spratt	Chief, Division of Refuge Planning	USFWS
Meg Van Ness	Regional archeologist	USFWS

Appendix C

Public Involvement

A notice of intent (NOI) to prepare the draft comprehensive conservation plan (CCP) and environmental assessment (EA) was published in the Federal Register on June 12, 2006. A mailing list of more than 250 names was compiled during preplanning; the list includes private citizens; local, regional, and state government representatives and legislators; other federal agencies; and interested organizations. Public scoping began immediately after publication of the NOI and was announced through news releases and issuance of the first planning update in July 2006. Information was provided on the history of the refuge and the CCP process, along with an invitation to public scoping meetings. Each planning update included a comment form and postage-paid envelope to give the public an opportunity to provide written comments. Emails were also accepted at the refuge's email address Redrocks@fws.gov.

Three public scoping meetings were held within a 2-hour drive of the refuge office. There were over 35 attendees, primarily local citizens and surrounding ranchers. Following a presentation about the refuge and an overview of the CCP and National Environmental Policy Act (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 September 15, 2006. A total of 55 additional written comments were received throughout the scoping process. All comments were shared with the planning team and considered throughout the planning process.

FEDERAL OFFICIALS

U.S. Representative Dennis Rehberg, Washington DC
Representative Rehberg State Office, Missoula, MT
U.S. Senator Max Baucus, Washington DC
Sen. Baucus's Area Director, Bozeman, MT
U.S. Senator John Tester, Washington DC
Sen. Tester's Area Director, Bozeman, MT

FEDERAL AGENCIES

National Forest Service, Dillon, MT
National Forest Service, Ennis, MT
Bureau of Land Management, Dillon, MT

National Park Service, Yellowstone National Park, MT
Bureau of Reclamation, Dillon, MT
Agricultural Research Service, Dubois, ID
U.S. Geological Service, Fort Collins Science Center, Fort Collins, CO
U.S. Geological Service, Bozeman, MT

TRIBAL OFFICIALS

Eastern Shoshone Business Council, Ft. Washakie, WY
Crow Tribe of Indians, Crow Agency, MT
Northern Cheyenne Tribal Council, Lama Deer, MT
Arapaho Business Council, Fort Washakie, WY

STATE OFFICIALS

Governor Brian Schweitzer, Helena, MT
Mary Sexton, Office of the Governor, Helena, MT
Representative Diane Rice, Harrison, MT
Representative Bill Tash, Dillon, MT
Representative Debbie Barrett, Dillon, MT
Representative Roger Koopman, Bozeman, MT
Representative John Sinrud, Bozeman, MT
Representative Jack Wells, Bozeman, MT
Senator Gary Perry, Manhattan, MT
Senator Steve Gallus, Butte, MT
Senator Joe Balyeat, Bozeman, MT

STATE AGENCIES

Montana Department of State Lands, Dillon, MT
Montana Fish, Wildlife and Parks, Bozeman, MT
Montana Fish, Wildlife and Parks, West Yellowstone, MT
Montana Fish, Wildlife and Parks, Dillon, MT
Montana Fish, Wildlife and Parks, Sheridan, MT
Montana Fish, Wildlife and Parks, Helena, MT
Montana Department of Environmental Quality, Helena, MT
Harriman State Park, Island Park, ID
Idaho Fish and Game, Boise, ID
Montana Department of Natural Resources and Conservation, Dillon, MT
Montana Historical Society and Preservation Office, Helena, MT

LOCAL GOVERNMENT

Madison County Commissioners, Madison, MT
Gallatin County Commissioners, Belgrad, MT
Beaverhead County Commissioners, Dillon, MT
Beaverhead County Road Department, Dillon, MT
Beaverhead County Weed Coordinator, Dillon, MT
Beaverhead County Planner, Dillon, MT

ORGANIZATIONS

Conservation Endowment Fund, Lima, MT
Greater Yellowstone Coalition, Bozeman, MT
Gallatin Wildlife Association, Bozeman, MT
Centennial Valley Association, Idaho Falls, ID
Henry's Lake Foundation, Island Park, ID
Montana Wildlife Federation, Helena, MT
Montana Audubon, Helena, MT
Greater Yellowstone Coordinating Committee, Bozeman, MT
Wilderness Watch, Missoula, MT
American Wildlands, Missoula, MT and Bozeman, MT
Ducks Unlimited, Memphis, TN and Lincoln, MT
Pintler Audubon Society, Dillon, MT
Wildlife Conservation Society, Bozeman, MT
Defenders of Wildlife, Bozeman, MT and Washington DC
Trumpeter Swan Society, Wayan, ID
Sierra Club, San Francisco, CA and Bozeman, MT
The Nature Conservancy, Bozeman, MT
Rocky Mountain Elk Foundation, Missoula, MT
Trout Unlimited, Missoula, MT
Montana Wilderness Association, Dillon, MT
National Wildlife Refuge Association, Washington DC
The Wilderness Society, Washington D.C. and Bozeman, MT
Audubon Society, Washington DC and New York, NY
North American Nature Photography Association, Wheat Ridge, CO
Animal Protection Institute
Beyond Pesticides
Wildlife Management Institute
National Wildlife Federation, Reston, VA
National Trappers Association, New Martinsville, WV
Fund for Animals
Isaac Walton League, Gaithersburg, MD
American Bird Conservancy, The Plains, VA
U.S. Humane Society, Washington DC

UNIVERSITIES, COLLEGES, AND SCHOOLS

Montana Tech, Butte, MT
University of Montana–Western, Dillon, MT
Montana State University, Bozeman, MT

MEDIA

Dillon Tribune, Dillon, MT
Montana Standard, Butte, MT
Bozeman Daily Chronicle, Bozeman, MT
West Yellowstone News, West Yellowstone, MT
KDBM Radio, Dillon, MT
KBOW and KOPR Radio, Butte, MT
KWYS and KEZQ Radio, Idaho Falls, ID
The Missoulian, Missoula, MT
KID Radio, Idaho Falls, ID
KUPI Radio and Sandhills Media, Idaho Falls, ID
The Post Register, Idaho Falls, ID
Rexburg Standard Journal, Rexburg, ID
Idaho State Journal, Pocatello, ID
Dillonite Daily, Dillon, MT

INDIVIDUALS

78 private individuals

Appendix D

Species List

Below is a list of resident and migrant wildlife and plant species found at or adjacent to Red Rock Lakes National Wildlife Refuge.

This list includes all mammals, fish, and herpetofauna expected to occur on Red Rock Lakes National Wildlife Refuge based on refuge files, unpublished systematic survey data, and other relevant literature and data that pertains to southwest Montana. Bird species listed in this appendix are based on the Red Rock Lakes National Wildlife Refuge Bird List,

as well as additional information from refuge files. Plant species listed in this appendix are based upon plant collections made on or near the refuge (Dorn 1969, Culver 1994, Paullin 1971), refuge files, and the recent vegetation mapping of the refuge (Newlon 2007).

Taxonomic order follows the Integrated Taxonomic Information System (<http://www.itis.gov>) and the "Check-list of North American Birds" ([anon.] 2007).

CLASS AMPHIBIA

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Caudata	Blotched tiger salamander	<i>Ambystoma mavortium melanostictum</i>
Anura	Western toad	<i>Bufo boreas</i>
Anura	Columbia spotted frog	<i>Rana luteiventris</i>
Anura	Boreal chorus frog	<i>Pseudacris maculate</i>

CLASS REPTILIA

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Squamata	Western terrestrial garter snake	<i>Thamnophis elegans</i>

CLASS AVES

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Anseriformes	Snow goose	<i>Chen caerulescens</i>
Anseriformes	Ross's goose	<i>Chen rossii</i>
Anseriformes	Greater white-fronted goose	<i>Anser albifrons</i>
Anseriformes	Canada goose	<i>Branta canadensis</i>
Anseriformes	Trumpeter swan	<i>Cygnus buccinator</i>
Anseriformes	Tundra swan	<i>Cygnus columbianus</i>
Anseriformes	Mute swan	<i>Cygnus olor</i>
Anseriformes	Black swan	<i>Cygnus atratus</i>
Anseriformes	Wood duck	<i>Aix sponsa</i>
Anseriformes	Gadwall	<i>Anas strepera</i>
Anseriformes	American Pigeon	<i>Anas americana</i>
Anseriformes	Mallard	<i>Anas platyrhynchos</i>
Anseriformes	Blue-winged teal	<i>Anas discors</i>
Anseriformes	Cinnamon teal	<i>Anas cyanoptera</i>
Anseriformes	Northern shoveler	<i>Anas clypeata</i>
Anseriformes	Northern pintail	<i>Anas acuta</i>
Anseriformes	Green-winged teal	<i>Anas crecca</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Anseriformes	Canvasback	<i>Aythya valisineria</i>
Anseriformes	Redhead	<i>Aythya Americana</i>
Anseriformes	Ring-necked duck	<i>Aythya collaris</i>
Anseriformes	Lesser scaup	<i>Aythya affinis</i>
Anseriformes	Greater scaup	<i>Aythya marila</i>
Anseriformes	Bufflehead	<i>Bucephala albeola</i>
Anseriformes	Common goldeneye	<i>Bucephala clangula</i>
Anseriformes	Barrow's goldeneye	<i>Bucephala islandica</i>
Anseriformes	Hooded merganser	<i>Lophodytes cucullatus</i>
Anseriformes	Common merganser	<i>Mergus merganser</i>
Anseriformes	Red-breasted merganser	<i>Mergus serrator</i>
Anseriformes	Ruddy duck	<i>Oxyura jamaicensis</i>
Anseriformes	Surf scoter	<i>Melanitta perspicillata</i>
Anseriformes	White-winged scoter	<i>Melanitta fusca</i>
Anseriformes	Long-tailed duck	<i>Clangula hyemalis</i>
Anseriformes	Harlequin duck	<i>Histrionicus histrionicus</i>
Galliformes	Ruffed grouse	<i>Bonasa umbellus</i>
Galliformes	Blue grouse	<i>Dendragapus obscurus</i>
Galliformes	Greater sage grouse	<i>Centrocercus urophasianus</i>
Galliformes	Columbia sharp-tailed grouse	<i>Tympanuchus phasianellus columbianus</i>
Galliformes	Gray partridge	<i>Perdix perdix</i>
Galliformes	Ring-necked pheasant	<i>Phasianus colchicus</i>
Gaviiformes	Common loon	<i>Gavia immer</i>
Gaviiformes	Arctic loon	<i>Gavia arctica</i>
Podicipediformes	Pied-billed grebe	<i>Podilymbus podiceps</i>
Podicipediformes	Horned grebe	<i>Podiceps auritus</i>
Podicipediformes	Red-necked grebe	<i>Podiceps grisegena</i>
Podicipediformes	Eared grebe	<i>Podiceps nigricollis</i>
Podicipediformes	Western grebe	<i>Aechmophorus occidentalis</i>
Podicipediformes	Clark's grebe	<i>Aechmophorus clarkii</i>
Pelicaniformes	American white pelican	<i>Pelecanus erythrocephalus</i>
Pelicaniformes	Double-crested cormorant	<i>Phalacrocorax auritus</i>
Ciconiiformes	American bittern	<i>Botaurus lentiginosus</i>
Ciconiiformes	Great blue heron	<i>Ardea Herodias</i>
Ciconiiformes	Great egret	<i>Ardea alba</i>
Ciconiiformes	Snowy egret	<i>Egretta caerulea</i>
Ciconiiformes	Black-crowned night-heron	<i>Nycticorax nycticorax</i>
Ciconiiformes	White-faced ibis	<i>Plegadis chihi</i>
Ciconiiformes	Turkey vulture	<i>Cathartes aura</i>
Falconiformes	Osprey	<i>Pandion haliaetus</i>
Falconiformes	Bald eagle	<i>Haliaeetus leucocephalus</i>
Falconiformes	Northern harrier	<i>Circus cyaneus</i>
Falconiformes	Sharp-shinned hawk	<i>Accipiter striatus</i>
Falconiformes	Cooper's hawk	<i>Accipiter cooperii</i>
Falconiformes	Northern goshawk	<i>Accipiter gentilis</i>
Falconiformes	Swainson's hawk	<i>Buteo swainsoni</i>
Falconiformes	Red-tailed hawk	<i>Buteo jamaicensis</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Falconiformes	Ferruginous hawk	<i>Buteo regalis</i>
Falconiformes	Rough-legged hawk	<i>Buteo lagopus</i>
Falconiformes	Golden eagle	<i>Aquila chrysaetos</i>
Falconiformes	American kestrel	<i>Falco sparverius</i>
Falconiformes	Merlin	<i>Falco columbarius</i>
Falconiformes	Peregrine falcon	<i>Falco peregrinus</i>
Falconiformes	Prairie falcon	<i>Falco mexicanus</i>
Falconiformes	Gyr falcon	<i>Falco rusticolus</i>
Gruiformes	Virginia rail	<i>Rallus limicola</i>
Gruiformes	Yellow rail	<i>Coturnicops noveboracensis</i>
Gruiformes	Sora	<i>Porzana carolina</i>
Gruiformes	American coot	<i>Fulica Americana</i>
Gruiformes	Sandhill crane	<i>Grus canadensis</i>
Gruiformes	Whooping crane	<i>Grus americana</i>
Charadriiformes	Killdeer	<i>Charadrius vociferous</i>
Charadriiformes	Semipalmated plover	<i>Charadrius semipalmatus</i>
Charadriiformes	Mountain plover	<i>Charadrius montanus</i>
Charadriiformes	Snowy plover	<i>Charadrius alexandrius</i>
Charadriiformes	Black-bellied plover	<i>Pluvialis squatarola</i>
Charadriiformes	Black-necked stilt	<i>Himantopus mexicanus</i>
Charadriiformes	American avocet	<i>Recurvirostra americana</i>
Charadriiformes	Greater yellowlegs	<i>Tringa melanoleuca</i>
Charadriiformes	Lesser yellowlegs	<i>Tringa flavipes</i>
Charadriiformes	Solitary sandpiper	<i>Tringa solitaria</i>
Charadriiformes	Willet	<i>Catoptrophorus semipalmatus</i>
Charadriiformes	Spotted sandpiper	<i>Actitis macularia</i>
Charadriiformes	Upland sandpiper	<i>Bartamia longicauda</i>
Charadriiformes	Long-billed curlew	<i>Numenius americanus</i>
Charadriiformes	Marbled godwit	<i>Limosa fedoa</i>
Charadriiformes	Long-billed dowitcher	<i>Limnodromus scolopaceus</i>
Charadriiformes	Wilson's snipe	<i>Gallinago delicata</i>
Charadriiformes	American woodcock	<i>Scolopax minor</i>
Charadriiformes	Wilson's phalarope	<i>Phalaropus tricolor</i>
Charadriiformes	Red-necked phalarope	<i>Phalaropus lobatus</i>
Charadriiformes	Parasitic jaeger	<i>Stercorarius parasiticus</i>
Charadriiformes	Sanderling	<i>Calidris alba</i>
Charadriiformes	Semipalmated sandpiper	<i>Calidris pusilla</i>
Charadriiformes	Western sandpiper	<i>Calidris mauri</i>
Charadriiformes	Least sandpiper	<i>Calidris minutilla</i>
Charadriiformes	White-rumped sandpiper	<i>Calidris fuscicollis</i>
Charadriiformes	Pectoral sandpiper	<i>Calidris melanotos</i>
Charadriiformes	Dunlin	<i>Calidris alpina</i>
Charadriiformes	Baird's sandpiper	<i>Calidris bairdii</i>
Charadriiformes	Franklin's gull	<i>Larus pipixcan</i>
Charadriiformes	Ring-billed gull	<i>Larus delawarensis</i>
Charadriiformes	California gull	<i>Larus californicus</i>
Charadriiformes	Herring gull	<i>Larus argentatus</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Charadriiformes	Bonaparte's gull	<i>Larus philadelphia</i>
Charadriiformes	Forster's tern	<i>Sterna forsteri</i>
Charadriiformes	Black tern	<i>Sterna niger</i>
Charadriiformes	Caspian tern	<i>Sterna caspia</i>
Charadriiformes	Common tern	<i>Sterna hirundo</i>
Columbiformes	Mourning dove	<i>Zenaida macroura</i>
Columbiformes	Band-tailed pigeon	<i>Patagioenas fasciata</i>
Columbiformes	Rock pigeon	<i>Columba livia</i>
Cuculiformes	Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>
Cuculiformes	Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Strigiformes	Great horned owl	<i>Bubo virginianus</i>
Strigiformes	Burrowing owl	<i>Athene cunicularia</i>
Strigiformes	Long-eared owl	<i>Asio otus</i>
Strigiformes	Short-eared owl	<i>Asio flammeus</i>
Strigiformes	Northern saw-whet owl	<i>Aegolius acadicus</i>
Strigiformes	Northern pygmy-owl	<i>Glaucidium gnoma</i>
Strigiformes	Western screech-owl	<i>Megascops kennicottii</i>
Strigiformes	Great gray owl	<i>Strix nebulosa</i>
Caprimulgiformes	Common nighthawk	<i>Chordeiles minor</i>
Apodiformes	White-throated swift	<i>Aeronautes saxatalis</i>
Apodiformes	Broad-tailed hummingbird	<i>Selasphorus platycercus</i>
Apodiformes	Rufous hummingbird	<i>Selasphorus rufus</i>
Apodiformes	Calliope hummingbird	<i>Stellula calliope</i>
Apodiformes	Black-chinned hummingbird	<i>Archilochus alexandri</i>
Coraciiformes	Belted kingfisher	<i>Ceryle alcyon</i>
Piciformes	Lewis' woodpecker	<i>Melanerpes lewis</i>
Piciformes	Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Piciformes	Downy woodpecker	<i>Picoides pubescens</i>
Piciformes	Hairy woodpecker	<i>Picoides villosus</i>
Piciformes	Black-backed woodpecker	<i>Picoides arcticus</i>
Piciformes	American three-toed woodpecker	<i>Picoides dorsalis</i>
Piciformes	Pileated woodpecker	<i>Dryocopus pileatus</i>
Piciformes	Northern flicker	<i>Colaptes auratus</i>
Piciformes	Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>
Piciformes	Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>
Passeriformes	Western kingbird	<i>Tyrannus verticalis</i>
Passeriformes	Eastern kingbird	<i>Tyrannus forficatus</i>
Passeriformes	Say's phoebe	<i>Saynoris saya</i>
Passeriformes	Willow flycatcher	<i>Empidonax traillii</i>
Passeriformes	Dusky flycatcher	<i>Empidonax oberholseri</i>
Passeriformes	Hammond's flycatcher	<i>Empidonax hammondi</i>
Passeriformes	Cordilleran flycatcher	<i>Empidonax occidentalis</i>
Passeriformes	Least flycatcher	<i>Empidonax minimus</i>
Passeriformes	Western wood-peewee	<i>Contopus sordidulus</i>
Passeriformes	Olive-sided flycatcher	<i>Contopus cooperi</i>
Passeriformes	Horned lark	<i>Eremophila alpestris</i>
Passeriformes	Tree swallow	<i>Tachycineta bicolor</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Passeriformes	Violet-green swallow	<i>Tachycineta thalassina</i>
Passeriformes	Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Passeriformes	Bank swallow	<i>Riparia riparia</i>
Passeriformes	Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Passeriformes	Barn swallow	<i>Hirundo rustica</i>
Passeriformes	Steller's jay	<i>Cyanocitta stelleri</i>
Passeriformes	Pinyon jay	<i>Gymnorhinus cyanocephalus</i>
Passeriformes	Gray jay	<i>Perisoreus Canadensis</i>
Passeriformes	Blue jay	<i>Cyanocitta cristata</i>
Passeriformes	Black-billed magpie	<i>Pica hudsonia</i>
Passeriformes	American crow	<i>Corvus brachyrhynchos</i>
Passeriformes	Common raven	<i>Corvus corax</i>
Passeriformes	Clark's nutcracker	<i>Nucifraga columbiana</i>
Passeriformes	Black-capped chickadee	<i>Poecile atricappila</i>
Passeriformes	Mountain chickadee	<i>Poecile gambeli</i>
Passeriformes	American dipper	<i>Cinclus mexicanus</i>
Passeriformes	Red-breasted nuthatch	<i>Sitta canadensis</i>
Passeriformes	White-breasted nuthatch	<i>Sitta carolinensis</i>
Passeriformes	Pygmy nuthatch	<i>Sitta pygmaea</i>
Passeriformes	Brown creeper	<i>Certhia americana</i>
Passeriformes	House wren	<i>Troglodytes aedon</i>
Passeriformes	Winter wren	<i>Troglodytes troglodytes</i>
Passeriformes	Rock wren	<i>Salpinctes obsoletus</i>
Passeriformes	Canyon wren	<i>Catherpes mexicanus</i>
Passeriformes	Marsh wren	<i>Cistothorus palustris</i>
Passeriformes	Gray catbird	<i>Dumetella carolinensis</i>
Passeriformes	Northern mockingbird	<i>Mimus polyglottos</i>
Passeriformes	Sage thrasher	<i>Oreoscoptes montanus</i>
Passeriformes	American robin	<i>Turdus migratorius</i>
Passeriformes	Townsend's solitaire	<i>Myadestes townsendi</i>
Passeriformes	Swainson's thrush	<i>Catharus ustulatus</i>
Passeriformes	Hermit thrush	<i>Catharus guttatus</i>
Passeriformes	Veery	<i>Catharus fuscescens</i>
Passeriformes	Mountain bluebird	<i>Sialia currucoides</i>
Passeriformes	Western bluebird	<i>Sialia mexicana</i>
Passeriformes	Golden-crowned kinglet	<i>Regulus satrapa</i>
Passeriformes	Ruby-crowned kinglet	<i>Regulus calendula</i>
Passeriformes	American pipit	<i>Anthus rubescens</i>
Passeriformes	Sprague's pipit	<i>Anthus spragueii</i>
Passeriformes	Bohemian waxwing	<i>Bombycilla garrulous</i>
Passeriformes	Cedar waxwing	<i>Bombycilla cedrorum</i>
Passeriformes	Loggerhead shrike	<i>Lanius ludovicianus</i>
Passeriformes	Northern shrike	<i>Lanius excubitor</i>
Passeriformes	European starling	<i>Sturnus vulgaris</i>
Passeriformes	Warbling vireo	<i>Vireo gilvus</i>
Passeriformes	Cassin's vireo	<i>Vireo cassinii</i>
Passeriformes	Red-eyed vireo	<i>Vireo olivaceus</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Passeriformes	Tennessee warbler	<i>Vermivora peregrina</i>
Passeriformes	Orange-crowned warbler	<i>Vermivora celata</i>
Passeriformes	Yellow warbler	<i>Dendroica petechia</i>
Passeriformes	Yellow-rumped warbler	<i>Dendroica coronata</i>
Passeriformes	Townsend's warbler	<i>Dendroica townsendi</i>
Passeriformes	Northern waterthrush	<i>Seiurus noveboracensis</i>
Passeriformes	Common yellowthroat	<i>Geothlypis trichas</i>
Passeriformes	MacGillivray's warbler	<i>Oporornis tolmiei</i>
Passeriformes	Wilson's warbler	<i>Wilsonia pusilla</i>
Passeriformes	Yellow-brested chat	<i>Icteria virens</i>
Passeriformes	American redstart	<i>Setophaga ruticilla</i>
Passeriformes	House sparrow	<i>Passer domesticus</i>
Passeriformes	Bobolink	<i>Dolichonyx oryzivorus</i>
Passeriformes	Western meadowlark	<i>Sturnella neglecta</i>
Passeriformes	Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Passeriformes	Red-winged blackbird	<i>Agelaius phoeniceus</i>
Passeriformes	Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Passeriformes	Common grackle	<i>Quiscalus quiscula</i>
Passeriformes	Brown-headed cowbird	<i>Molothrus ater</i>
Passeriformes	Bullock's oriole	<i>Icterus bullockii</i>
Passeriformes	Western tanager	<i>Piranga ludoviciana</i>
Passeriformes	Black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Passeriformes	Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
Passeriformes	Evening grosbeak	<i>Coccothraustes vespertinus</i>
Passeriformes	Lazuli bunting	<i>Passerina amoena</i>
Passeriformes	Cassin's finch	<i>Carpodacus cassinii</i>
Passeriformes	House finch	<i>Carpodacus mexicanus</i>
Passeriformes	Pine grosbeak	<i>Pinicola enucleator</i>
Passeriformes	Gray-crowned rosy finch	<i>Leucosticte tephrocotis</i>
Passeriformes	Black rosy finch	<i>Leucosticte atrata</i>
Passeriformes	White-winged crossbill	<i>Loxia leucoptera</i>
Passeriformes	Common redpoll	<i>Carduelis flammea</i>
Passeriformes	Pine siskin	<i>Carduelis pinus</i>
Passeriformes	American goldfinch	<i>Carduelis tristis</i>
Passeriformes	Red crossbill	<i>Loxia curvirostra</i>
Passeriformes	Green-tailed towhee	<i>Pipilo chlorurus</i>
Passeriformes	Spotted towhee	<i>Pipilo maculatus</i>
Passeriformes	Savannah sparrow	<i>Passerculus sandwichensis</i>
Passeriformes	Lark bunting	<i>Calamospiza melanocorys</i>
Passeriformes	Vesper sparrow	<i>Poocetes gramineus</i>
Passeriformes	Lark sparrow	<i>Chondestes grammacus</i>
Passeriformes	Dark-eyed junco	<i>Junco hyemalis</i>
Passeriformes	American tree sparrow	<i>Spizella arborea</i>
Passeriformes	Chipping sparrow	<i>Spizella passerina</i>
Passeriformes	Brewer's sparrow	<i>Spizella breweri</i>
Passeriformes	Clay-colored sparrow	<i>Spizella pallida</i>
Passeriformes	White-crowned sparrow	<i>Zonotrichia leucophrys</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Passeriformes	White-throated sparrow	<i>Zonotrichia albicollis</i>
Passeriformes	Harris' sparrow	<i>Zonotrichia querula</i>
Passeriformes	Fox sparrow	<i>Passerelia iliaca</i>
Passeriformes	Song sparrow	<i>Melospiza melodia</i>
Passeriformes	Lincoln sparrow	<i>Melospiza lincolni</i>
Passeriformes	Grasshopper sparrow	<i>Ammodramus savannarum</i>
Passeriformes	Sage sparrow	<i>Amphispiza belli</i>
Passeriformes	McCown's longspur	<i>Calcarius mccownii</i>
Passeriformes	Lapland longspur	<i>Calcarius lapponicus</i>
Passeriformes	Chestnut-collared longspur	<i>Calcarius ornatus</i>
Passeriformes	Snow bunting	<i>Plectrophenax nivalis</i>

CLASS MAMMALIA

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Insectivora	Masked shrew	<i>Sorex cinereus</i>
Insectivora	Water shrew	<i>Sorex palustris</i>
Chiroptera	Little brown bat	<i>Myotis lucifugus</i>
Chiroptera	Small-footed bat	<i>Myotis leibii</i>
Chiroptera	Hoary bat	<i>Lasiurus cinereus</i>
Chiroptera	Silver-haired bat	<i>Lasionycteris noctivagans</i>
Carnivora	Black bear	<i>Ursus americanus</i>
Carnivora	Grizzly bear	<i>Ursus arctos</i>
Carnivora	Ermine	<i>Mustela erminea</i>
Carnivora	Long-tailed weasel	<i>Mustela frenata</i>
Carnivora	Mink	<i>Mustela vison</i>
Carnivora	Marten	<i>Martes americana</i>
Carnivora	Fisher	<i>Martes pennanti</i> *
Carnivora	Wolverine	<i>Gulo gulo</i>
Carnivora	River otter	<i>Lontra canadensis</i>
Carnivora	Badger	<i>Taxidea taxus</i>
Carnivora	Striped skunk	<i>Mephitis mephitis</i>
Carnivora	Raccoon	<i>Procyon lotor</i>
Carnivora	Red fox	<i>Vulpes vulpes</i>
Carnivora	Coyote	<i>Canis latrans</i>
Carnivora	Gray wolf	<i>Canis lupus</i>
Carnivora	Bobcat	<i>Lynx rufus</i>
Carnivora	Canada lynx	<i>Lynx canadensis</i>
Carnivora	Mountain lion	<i>Puma concolor</i>
Artiodactyla	Moose	<i>Alces alces</i>
Artiodactyla	Pronghorn	<i>Antilocapra americana</i>
Artiodactyla	Bison	<i>Bison bison</i> *
Artiodactyla	Elk	<i>Cervus elaphus</i>
Artiodactyla	Mule deer	<i>Odocoileus hemionus</i>
Artiodactyla	White-tailed deer	<i>Odocoileus virginianus</i>
Artiodactyla	Bighorn sheep	<i>Ovis Canadensis</i> *
Lagomorpha	White-tailed jackrabbit	<i>Lepus townsendii</i>
Lagomorpha	Black-tailed jackrabbit	<i>Lepus californicus</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Lagomorpha	Snowshoe hare	<i>Lepus americanus</i>
Lagomorpha	Pygmy rabbit	<i>Brachylagus idahoensis</i>
Lagomorpha	Pika	<i>Ochotona princeps</i>
Rodentia	Wyoming ground squirrel	<i>Spermophilus elegans</i>
Rodentia	Golden-mantled ground squirrel	<i>Spermophilus lateralis</i>
Rodentia	Northern flying squirrel	<i>Spermophilus lateralis</i>
Rodentia	Red squirrel	<i>Tamiasciurus hudsonicus</i>
Rodentia	Least chipmunk	<i>Tamias minimus</i>
Rodentia	Yellow-pine chipmunk	<i>Tamias amoenus</i>
Rodentia	Yellow-bellied marmot	<i>Marmota flaviventris</i>
Rodentia	Bushy-tailed woodrat	<i>Neotoma cinerea</i>
Rodentia	Porcupine	<i>Erethizon dorsatum</i>
Rodentia	Northern pocket gopher	<i>Thomomys talpoides</i>
Rodentia	Muskrat	<i>Ondatra zibethicus</i>
Rodentia	Beaver	<i>Castor canadensis</i>
Rodentia	Deer mouse	<i>Peromyscus maniculatus</i>
Rodentia	Western jumping mouse	<i>Zapus princeps</i>
Rodentia	Southern red-backed vole	<i>Clethrionomys gapperi</i>
Rodentia	Meadow vole	<i>Microtus pennsylvanicus</i>
Rodentia	Montane vole	<i>Microtus montanus</i>
Rodentia	Long-tailed vole	<i>Microtus longicaudus</i>

CLASS OSTEICHTHYES

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Cypriniformes	White sucker	<i>Catostomus commersonii</i>
Cypriniformes	Longnose sucker	<i>Catostomus catostomus</i>
Cypriniformes	Mountain sucker	<i>Catostomus platyrhynchus</i>
Cypriniformes	Longnose dace	<i>Rhinichthys cataractae</i>
Gadiformes	Burbot	<i>Lota lota</i>
Salmoniformes	Arctic grayling	<i>Thymallus arcticus</i>
Salmoniformes	Mountain whitefish	<i>Prosopium williamsoni</i>
Salmoniformes	Yellowstone cutthroat trout	<i>Oncorhynchus clarkii bowvieri</i>
Salmoniformes	Rainbow trout	<i>Oncorhynchus mykiss</i>
Salmoniformes	Brook trout	<i>Salvelinus fontinalis</i>
Scorpaeniformes	Mottled sculpin	<i>Cottus bairdii</i>

PLANTS

CLASS PINOPSIDA

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Pinales	Subalpine fir	<i>Abies lasiocarpa</i>
Pinales	Engelmann spruce	<i>Picea engelmannii</i>
Pinales	Whitebark pine	<i>Pinus albicaulis</i>
Pinales	Lodgepole pine	<i>Pinus contorta</i>
Pinales	Limber pine	<i>Pinus flexilis</i>
Pinales	Douglas-fir	<i>Pseudotsuga menziesii</i>
Pinales	Rocky Mountain juniper	<i>Juniperus scopulorum</i>
Pinales	Common juniper	<i>Juniperus communis</i>
Pinales	Creeping juniper	<i>Juniperus horizontalis</i>

CLASS MAGNOLIOPSIDA

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Salicales	Balsam poplar	<i>Populus balsamifera ssp. trichocarpa</i>
Salicales	Quaking aspen	<i>Populus tremuloides</i>
Salicales	Bebb willow	<i>Salix bebbiana</i>
Salicales	Booth's willow	<i>Salix boothii</i>
Salicales	Sageleaf willow	<i>Salix candida</i>
Salicales	Drummond's willow	<i>Salix drummondiana</i>
Salicales	Geyer willow	<i>Salix geyeriana</i>
Salicales	Grayleaf willow	<i>Salix glauca</i>
Salicales	Pacific willow	<i>Salix lucida ssp. lasiandra</i>
Salicales	Yellow willow	<i>Salix lutea</i>
Salicales	Blueberry willow	<i>Salix myrtilifolia</i>
Salicales	Diamondleaf willow	<i>Salix planifolia</i>
Salicales	False mountain willow	<i>Salix pseudomonticola</i>
Salicales	Scouler's willow	<i>Salix scouleriana</i>
Salicales	Wolf's willow	<i>Salix wolfii</i>
Sapindales	Rocky Mountain maple	<i>Acer glabrum</i>
Asterales	Little sagebrush	<i>Artemisia arbuscula ssp. arbuscula</i>
Asterales	Alkali sagebrush	<i>Artemisia arbuscula ssp. longiloba</i>
Asterales	Silver sagebrush	<i>Artemisia cana ssp. viscidula</i>
Asterales	Prairie sagewort	<i>Artemisia frigida</i>
Asterales	Basin big sagebrush	<i>Artemisia tridentata ssp. tridentata</i>
Asterales	Mountain big sagebrush	<i>Artemisia tridentata ssp. vaseyana</i>
Asterales	Threetip sagebrush	<i>Artemisia tripartita ssp. tripartita</i>
Asterales	Green rabbitbrush	<i>Chrysothamnus viscidiflorus</i>
Asterales	Whitestem goldenbush	<i>Ericameria discoidea</i>
Asterales	Rubber rabbitbrush	<i>Ericameria nauseosa</i>
Asterales	Dwarf goldenbush	<i>Ericameria nana</i>
Asterales	Singlehead goldenbush	<i>Ericameria suffruticosa</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Asterales	Spineless horsebrush	<i>Tetradymia canescens</i>
Asterales	Common yarrow	<i>Achillea millefolium</i>
Asterales	Orange agoseris	<i>Agoseris aurantiaca</i>
Asterales	Pale agoseris	<i>Agoseris glauca</i>
Asterales	Western pearly everlasting	<i>Anaphalis margaritacea</i>
Asterales	Alpine pussytoes	<i>Antennaria alpina</i>
Asterales	Pearly pussytoes	<i>Antennaria anaphaloides</i>
Asterales	Flat-top pussytoes	<i>Antennaria corymbosa</i>
Asterales	Rush pussytoes	<i>Antennaria luzuloides</i>
Asterales	Littleleaf pussytoes	<i>Antennaria microphylla</i>
Asterales	Raceme pussytoes	<i>Antennaria racemosa</i>
Asterales	Rosy pussytoes	<i>Antennaria rosea</i>
Asterales	Chamisso arnica	<i>Arnica chamissonis</i>
Asterales	Heartleaf arnica	<i>Arnica cordifolia</i>
Asterales	Broadleaf arnica	<i>Arnica latifolia</i>
Asterales	Hairy arnica	<i>Arnica mollis</i>
Asterales	Twin arnica	<i>Arnica sororia</i>
Asterales	Biennial wormwood	<i>Artemisia biennis</i>
Asterales	Tarragon	<i>Artemisia dracuncululus</i>
Asterales	White sagebrush	<i>Artemisia ludoviciana</i>
Asterales	Arrowleaf balsamroot	<i>Balsamorhiza sagittata</i>
Asterales	Nodding beggartick	<i>Bidens cernua</i>
Asterales	Musk thistle	<i>Carduus nutans*</i>
Asterales	Spotted knapweed	<i>Centaurea stoebe*</i>
Asterales	Douglas' dustymaiden	<i>Chaenactis douglasii</i>
Asterales	Canada thistle	<i>Cirsium arvense*</i>
Asterales	Graygreen thistle	<i>Cirsium canovirens</i>
Asterales	Meadow thistle	<i>Cirsium scariosum</i>
Asterales	Wavyleaf thistle	<i>Cirsium undulatum</i>
Asterales	Bull thistle	<i>Cirsium vulgare*</i>
Asterales	Tapertip hawksbeard	<i>Crepis acuminata</i>
Asterales	Fiddleleaf hawksbeard	<i>Crepis runcinata</i>
Asterales	Giant sumpweed	<i>Cyclachaena xanthifolia</i>
Asterales	Tufted fleabane	<i>Erigeron caespitosus</i>
Asterales	Cutleaf daisy	<i>Erigeron compositus</i>
Asterales	Longleaf fleabane	<i>Erigeron corymbosus</i>
Asterales	Streamside fleabane	<i>Erigeron glabellus</i>
Asterales	Quill fleabane	<i>Erigeron gracilis</i>
Asterales	Shortray fleabane	<i>Erigeron lonchophyllus</i>
Asterales	Buff fleabane	<i>Erigeron ochroleucus</i>
Asterales	Philadelphia fleabane	<i>Erigeron philadelphicus</i>
Asterales	Subalpine fleabane	<i>Erigeron peregrinus</i>
Asterales	Rydberg's fleabane	<i>Erigeron rydbergii</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Asterales	Aspen fleabane	<i>Erigeron speciosus</i>
Asterales	Tweedy's fleabane	<i>Erigeron tweedyi</i>
Asterales	Common woolly sunflower	<i>Eriophyllum lanatum</i>
Asterales	Elegant aster	<i>Eucephalus elegans</i>
Asterales	Engelmann's aster	<i>Eucephalus engelmannii</i>
Asterales	Western showy aster	<i>Eurybia conspicua</i>
Asterales	Thickstem aster	<i>Eurybia integrifolia</i>
Asterales	Common gaillardia	<i>Gaillardia aristata</i>
Asterales	Western marsh cudweed	<i>Gnaphalium palustre</i>
Asterales	Curlycup gumweed	<i>Grindelia squarrosa</i>
Asterales	Oneflower helianthella	<i>Helianthella uniflora</i>
Asterales	Common sunflower	<i>Helianthus annuus</i>
Asterales	Nuttall's sunflower	<i>Helianthus nuttallii</i>
Asterales	Showy goldeneye	<i>Heliomeris multiflora</i>
Asterales	White hawkweed	<i>Hieracium albiflorum</i>
Asterales	Houndstongue hawkweed	<i>Hieracium cynoglossoides</i>
Asterales	Slender hawkweed	<i>Hieracium gracile</i>
Asterales	Fineleaf hymenopappus	<i>Hymenopappus filifolius</i>
Asterales	Owl's-claws	<i>Hymenoxys hoopesii</i>
Asterales	Lava aster	<i>Ionactis alpina</i>
Asterales	Tall blue lettuce	<i>Lactuca biennis</i>
Asterales	Blue lettuce	<i>Lactuca tatarica</i>
Asterales	Hoary tansyaster	<i>Machaeranthera canescens</i>
Asterales	Mountain tarweed	<i>Madia glomerata</i>
Asterales	Disc mayweed	<i>Matricaria discoidea</i>
Asterales	Nodding microseris	<i>Microseris nutans</i>
Asterales	Meadow prairie-dandelion	<i>Nothocalais nigrescens</i>
Asterales	Woolly groundsel	<i>Packera cana</i>
Asterales	Weak groundsel	<i>Packera debilis</i>
Asterales	Elegant groundsel	<i>Packera indecora</i>
Asterales	Balsam groundsel	<i>Packera paupercula</i>
Asterales	Falsegold groundsel	<i>Packera pseud aurea</i>
Asterales	Rocky Mountain groundsel	<i>Packera streptanthifolia</i>
Asterales	Hoary groundsel	<i>Packera wernerifolia</i>
Asterales	Arctic sweet coltsfoot	<i>Petasites frigidus</i>
Asterales	Many-stemmed goldenweed	<i>Pyrocoma integrifolia</i>
Asterales	Lanceleaf goldenweed	<i>Pyrocoma lanceolata</i>
Asterales	Plantain goldenweed	<i>Pyrocoma uniflora</i>
Asterales	Western coneflower	<i>Rudbeckia occidentalis</i>
Asterales	Thickleaf ragwort	<i>Senecio crassulus</i>
Asterales	Dwarf mountain ragwort	<i>Senecio fremontii</i>
Asterales	Tall ragwort	<i>Senecio hydrophiloides</i>
Asterales	Water ragwort	<i>Senecio hydrophilus</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Asterales	Lambstongue ragwort	<i>Senecio integerrimus</i>
Asterales	Small blacktip ragwort	<i>Senecio lugens</i>
Asterales	Tall ragwort	<i>Senecio serra</i>
Asterales	Ballhead ragwort	<i>Senecio sphaerocephalus</i>
Asterales	Arrowleaf ragwort	<i>Senecio triangularis</i>
Asterales	Canada goldenrod	<i>Solidago canadensis</i>
Asterales	Missouri goldenrod	<i>Solidago missouriensis</i>
Asterales	Manyray goldenrod	<i>Solidago multiradiata</i>
Asterales	Gray goldenrod	<i>Solidago nemoralis</i>
Asterales	Dwarf goldenrod	<i>Solidago simplex</i>
Asterales	Moist sowthistle	<i>Sonchus arvensis</i> *
Asterales	Stemless mock goldenweed	<i>Stenotus acaulis</i>
Asterales	Woolly mock goldenweed	<i>Stenotus lanuginosus</i>
Asterales	Narrowleaf wirelettuce	<i>Stephanomeria minor</i>
Asterales	Western meadow aster	<i>Symphyotrichum campestre</i>
Asterales	Eaton's aster	<i>Symphyotrichum eatonii</i>
Asterales	White prairie aster	<i>Symphyotrichum falcatum</i>
Asterales	Alpine leafybract aster	<i>Symphyotrichum foliaceum</i>
Asterales	White panicle aster	<i>Symphyotrichum lanceolatum</i>
Asterales	Western mountain aster	<i>Symphyotrichum spathulatum</i>
Asterales	Common tansy	<i>Tanacetum vulgare</i> *
Asterales	Rock dandelion	<i>Taraxacum laevigatum</i> *
Asterales	Common dandelion	<i>Taraxacum officinale</i> *
Asterales	Graylocks four-nerve daisy	<i>Tetraneuris grandiflora</i>
Asterales	Wyoming Townsend daisy	<i>Townsendia alpigena</i>
Asterales	Cushion Townsend daisy	<i>Townsendia condensata</i>
Asterales	Parry's Townsend daisy	<i>Townsendia parryi</i>
Asterales	Yellow salsify	<i>Tragopogon dubius</i> *
Asterales	Jack-to-bed-at-noon	<i>Tragopogon lamottei</i> *
Asterales	Mule-ears	<i>Wyethia amplexicaulis</i>
Asterales	Sunflower mule-ears	<i>Wyethia helianthoides</i>
Fagales	Bog birch	<i>Betula pumila</i>
Caryophyllales	Brittle pricklypear	<i>Opuntia fragilis</i>
Caryophyllales	Greasewood	<i>Sarcobatus vermiculatus</i>
Dipsacales	Twinberry honeysuckle	<i>Lonicera involucrata</i>
Dipsacales	Utah honeysuckle	<i>Lonicera utahensis</i>
Dipsacales	Red elderberry	<i>Sambucus racemosa</i>
Dipsacales	Mountain snowberry	<i>Symphoricarpos oreophilus</i>
Dipsacales	Squashberry	<i>Viburnum edule</i>
Dipsacales	Twinline	<i>Linnaea borealis</i>
Dipsacales	Tobacco root	<i>Valeriana edulis</i>
Dipsacales	Western valerian	<i>Valeriana occidentalis</i>
Cornales	Redosier dogwood	<i>Cornus sericea</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Cornales	Bunchberry dogwood	<i>Cornus canadensis</i>
Rhamnales	Russet buffaloberry	<i>Shepherdia canadensis</i>
Rhamnales	Alderleaf buckthorn	<i>Rhamnus alnifolia</i>
Ericales	Kinnikinnick	<i>Arctostaphylos uva-ursi</i>
Ericales	Thinleaf huckleberry	<i>Vaccinium membranaceum</i>
Ericales	Grouse whortleberry	<i>Vaccinium scoparium</i>
Ericales	Pipsissewa	<i>Chimaphila umbellata</i>
Ericales	Sidebells wintergreen	<i>Orthilia secunda</i>
Ericales	Liverleaf wintergreen	<i>Pyrola asarifolia</i>
Ericales	Single delight	<i>Moneses uniflora</i>
Ericales	Greenflowered wintergreen	<i>Pyrola chlorantha</i>
Fabales	Siberian peashrub	<i>Caragana arborescens*</i>
Fabales	Purple milkvetch	<i>Astragalus agrestis</i>
Fabales	Alpine milkvetch	<i>Astragalus alpinus</i>
Fabales	American milkvetch	<i>Astragalus americanus</i>
Fabales	Silverleaf milkvetch	<i>Astragalus argophyllus</i>
Fabales	Canadian milkvetch	<i>Astragalus canadensis</i>
Fabales	Browse milkvetch	<i>Astragalus cibarius</i>
Fabales	Drummond's milkvetch	<i>Astragalus drummondii</i>
Fabales	Elegant milkvetch	<i>Astragalus eucosmus</i>
Fabales	Flexile milkvetch	<i>Astragalus flexuosus</i>
Fabales	Bent milkvetch	<i>Astragalus inflexus</i>
Fabales	Spiny milkvetch	<i>Astragalus kentrophyta</i>
Fabales	Prairie milkvetch	<i>Astragalus laxmannii</i>
Fabales	Freckled milkvetch	<i>Astragalus lentiginosus</i>
Fabales	Park milkvetch	<i>Astragalus leptaleus</i>
Fabales	Timber milkvetch	<i>Astragalus miser</i>
Fabales	Woollypod milkvetch	<i>Astragalus purshii</i>
Fabales	Railhead milkvetch	<i>Astragalus terminalis</i>
Fabales	Bentflower milkvetch	<i>Astragalus vexilliflexus</i>
Fabales	Utah sweetvetch	<i>Hedysarum boreale</i>
Fabales	White sweetvetch	<i>Hedysarum sulphurescens</i>
Fabales	Silvery lupine	<i>Lupinus argenteus</i>
Fabales	Velvet lupine	<i>Lupinus leucophyllus</i>
Fabales	Bigleaf lupine	<i>Lupinus polyphyllus</i>
Fabales	Silky lupine	<i>Lupinus sericeus</i>
Fabales	Yellow sweetclover	<i>Melilotus officinalis*</i>
Fabales	Nodding locoweed	<i>Oxytropis deflexa</i>
Fabales	Haresfoot locoweed	<i>Oxytropis lagopus</i>
Fabales	White locoweed	<i>Oxytropis sericea</i>
Fabales	Slimflower scurfpea	<i>Psoraleidium tenuiflorum</i>
Fabales	Alsike clover	<i>Trifolium hybridum*</i>
Fabales	Longstalk clover	<i>Trifolium longipes</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Fabales	Red clover	<i>Trifolium pratense*</i>
Fabales	White clover	<i>Trifolium repens*</i>
Fabales	American vetch	<i>Vicia americana</i>
Rosales	Wax currant	<i>Ribes cereum</i>
Rosales	Northern black currant	<i>Ribes hudsonianum</i>
Rosales	Whitestem gooseberry	<i>Ribes inerme</i>
Rosales	Gooseberry currant	<i>Ribes montigenum</i>
Rosales	Inland gooseberry	<i>Ribes oxycanthoides</i>
Rosales	Sticky currant	<i>Ribes viscosissimum</i>
Rosales	Shrubby cinquefoil	<i>Dasiphora fruticosa</i>
Rosales	Mat rockspirea	<i>Petrophyton caespitosum</i>
Rosales	Chokecherry	<i>Prunus virginiana</i>
Rosales	Woods' rose	<i>Rosa woodsii</i>
Rosales	American red raspberry	<i>Rubus idaeus</i>
Rosales	Thimbleberry	<i>Rubus parviflorus</i>
Rosales	Greene's mountain ash	<i>Sorbus scopulina</i>
Rosales	White spirea	<i>Spiraea betulifolia</i>
Rosales	Ledge stonecrop	<i>Rhodiola integrifolia</i>
Rosales	Redpod stonecrop	<i>Rhodiola rhodantha</i>
Rosales	Leiberg stonecrop	<i>Sedum leibergii</i>
Rosales	Spearleaf stonecrop	<i>Sedum lanceolatum</i>
Rosales	Silverweed cinquefoil	<i>Argentina anserina</i>
Rosales	Virginia strawberry	<i>Fragaria virginiana</i>
Rosales	Largeleaf avens	<i>Geum macrophyllum</i>
Rosales	Old man's whiskers	<i>Geum triflorum</i>
Rosales	Gordon's ivesia	<i>Ivesia gordonii</i>
Rosales	Varileaf cinquefoil	<i>Potentilla diversifolia</i>
Rosales	Sticky cinquefoil	<i>Potentilla glandulosa</i>
Rosales	Slender cinquefoil	<i>Potentilla gracilis</i>
Rosales	Sheep cinquefoil	<i>Potentilla ovina</i>
Rosales	Platte River cinquefoil	<i>Potentilla plattensis</i>
Rosales	Roundleaf alumroot	<i>Heuchera cylindrica</i>
Rosales	Smallflower woodland-star	<i>Lithophragma parviflorum</i>
Rosales	Smallflower miterwort	<i>Mitella stauropetala</i>
Rosales	Fringed grass of Parnassus	<i>Parnassia fimbriata</i>
Rosales	Smallflower grass of Parnassus	<i>Parnassia palustris</i>
Rosales	Yellowdot saxifrage	<i>Saxifraga bronchialis</i>
Rosales	Brook saxifrage	<i>Saxifraga odontoloma</i>
Rosales	Diamondleaf saxifrage	<i>Saxifraga rhomboidea</i>
Solanales	Granite prickly phlox	<i>Linanthus pungens</i>
Solanales	Dwarf hesperochiron	<i>Hesperochiron pumilus</i>
Solanales	Ballhead waterleaf	<i>Hydrophyllum capitatum</i>
Solanales	Basin nemophila	<i>Nemophila breviflora</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Solanales	Franklin's phacelia	<i>Phacelia franklinii</i>
Solanales	Silverleaf phacelia	<i>Phacelia hastata</i>
Solanales	Silky phacelia	<i>Phacelia sericea</i>
Solanales	Tiny trumpet	<i>Collomia linearis</i>
Solanales	Spiny phlox	<i>Phlox hoodii</i>
Solanales	Kelsey's phlox	<i>Phlox kelseyi</i>
Solanales	Longleaf phlox	<i>Phlox longifolia</i>
Solanales	Western polemonium	<i>Polemonium occidentale</i>
Solanales	Jacob's-ladder	<i>Polemonium pulcherrimum</i>
Solanales	Sticky polemonium	<i>Polemonium viscosum</i>
Solanales	Black henbane	<i>Hyoscyamus niger*</i>
Scrophulariales	Bush penstemon	<i>Penstemon fruticosus</i>
Scrophulariales	Flat-top broomrape	<i>Orobanche corymbosa</i>
Scrophulariales	Clustered broomrape	<i>Orobanche fasciculata</i>
Scrophulariales	Louisiana broomrape	<i>Orobanche ludoviciana</i>
Scrophulariales	Wyoming besseya	<i>Besseya wyomingensis</i>
Scrophulariales	Yellow Indian paintbrush	<i>Castilleja flava</i>
Scrophulariales	Giant red Indian paintbrush	<i>Castilleja miniata</i>
Scrophulariales	Sulphur Indian paintbrush	<i>Castilleja sulphurea</i>
Scrophulariales	Maiden blue eyed Mary	<i>Collinsia parviflora</i>
Scrophulariales	Water mudwort	<i>Limosella aquatica</i>
Scrophulariales	Seep monkeyflower	<i>Mimulus guttatus</i>
Scrophulariales	Yellow owl's-clover	<i>Orthocarpus luteus</i>
Scrophulariales	Field locoweed	<i>Oxytropis campestris</i>
Scrophulariales	Elephanthead lousewort	<i>Pedicularis groenlandica</i>
Scrophulariales	Parry's lousewort	<i>Pedicularis parryi</i>
Scrophulariales	Sickle-top lousewort	<i>Pedicularis racemosa</i>
Scrophulariales	Sulphur penstemon	<i>Penstemon attenuatus</i>
Scrophulariales	Cordroot beardtongue	<i>Penstemon montanus</i>
Scrophulariales	Matroot penstemon	<i>Penstemon radicosus</i>
Scrophulariales	Rydberg's penstemon	<i>Penstemon rydbergii</i>
Scrophulariales	American speedwell	<i>Veronica americana</i>
Scrophulariales	American alpine speedwell	<i>Veronica wormskjoldii</i>
Scrophulariales	Common bladderwort	<i>Utricularia macrorhiza</i>
Alismatales	Arumleaf arrowhead	<i>Sagittaria cuneata</i>
Apiales	Lyall's angelica	<i>Angelica arguta</i>
Apiales	Small-leaf angelica	<i>Angelica pinnata</i>
Apiales	American thorum wax	<i>Bupleurum americanum</i>
Apiales	Western water hemlock	<i>Cicuta douglasii</i>
Apiales	Plains springparsley	<i>Cymopterus acaulis</i>
Apiales	Snowline springparsley	<i>Cymopterus nivalis</i>
Apiales	Common cowparsnip	<i>Heracleum maximum</i>
Apiales	Fernleaf licorice-root	<i>Ligusticum filicinum</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Apiales	Wyeth biscuitroot	<i>Lomatium ambiguum</i>
Apiales	Cous biscuitroot	<i>Lomatium cous</i>
Apiales	Desert biscuitroot	<i>Lomatium foeniculaceum</i>
Apiales	Bigseed biscuitroot	<i>Lomatium macrocarpum</i>
Apiales	Nineleaf biscuitroot	<i>Lomatium triternatum</i>
Apiales	Leafy wildparsley	<i>Musineon divaricatum</i>
Apiales	Sweetcicely	<i>Osmorhiza berteroi</i>
Apiales	Bluntseed sweetroot	<i>Osmorhiza depauperata</i>
Apiales	Western sweetroot	<i>Osmorhiza occidentalis</i>
Apiales	Gardner's yampah	<i>Perideridia gairdneri</i>
Apiales	Henderson's wavewing	<i>Pteryxia hendersonii</i>
Apiales	Hemlock waterparsnip	<i>Sium suave</i>
Apiales	Meadow zizia	<i>Zizia aptera</i>
Lamiales	Sanddune cryptantha	<i>Cryptantha fendleri</i>
Lamiales	Roundspike cryptantha	<i>Cryptantha humilis</i>
Lamiales	Torrey's cryptantha	<i>Cryptantha torreyana</i>
Lamiales	Watson's cryptantha	<i>Cryptantha watsonii</i>
Lamiales	Gypsyflower	<i>Cynoglossum officinale</i>
Lamiales	Manyflower stickseed	<i>Hackelia floribunda</i>
Lamiales	Jessica sticktight	<i>Hackelia micrantha</i>
Lamiales	Spotted stickseed	<i>Hackelia patens</i>
Lamiales	Flatspine stickseed	<i>Lappula occidentalis</i>
Lamiales	Narrowleaf stoneseed	<i>Lithospermum incisum</i>
Lamiales	Western stoneseed	<i>Lithospermum ruderale</i>
Lamiales	Tall fringed bluebells	<i>Mertensia ciliata</i>
Lamiales	Oblongleaf bluebells	<i>Mertensia oblongifolia</i>
Lamiales	Tall bluebells	<i>Mertensia paniculata</i>
Lamiales	Asian forget-me-not	<i>Myosotis asiatica</i>
Lamiales	True forget-me-not	<i>Myosotis scorpioides</i>
Lamiales	Sleeping popcornflower	<i>Plagiobothrys scouleri</i>
Lamiales	Nettleleaf giant hyssop	<i>Agastache urticifolia</i>
Lamiales	Wild mint	<i>Mentha arvensis</i>
Lamiales	Common selfheal	<i>Prunella vulgaris</i>
Lamiales	Marsh skullcap	<i>Scutellaria galericulata</i>
Lamiales	Marsh hedgenettle	<i>Stachys palustris</i>
Capparales	Pale madwort	<i>Alyssum alyssoides*</i>
Capparales	Desert madwort	<i>Alyssum desertorum</i>
Capparales	Spreadingpod rockcress	<i>Arabis xdivaricarpa</i>
Capparales	Hairy rockcress	<i>Arabis hirsuta</i>
Capparales	Collins' rockcress	<i>Arabis holboellii</i>
Capparales	Lemmon's rockcress	<i>Arabis lemmonii</i>
Capparales	Littleleaf rockcress	<i>Arabis microphylla</i>
Capparales	Nuttall's rockcress	<i>Arabis nuttallii</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Capparales	Sicklepod rockcress	<i>Arabis sparsiflora</i>
Capparales	American yellowrocket	<i>Barbarea orthoceras</i>
Capparales	Littlepod false flax	<i>Camelina microcarpa</i>
Capparales	Shepherd's purse	<i>Capsella bursa-pastoris</i> *
Capparales	Brewer's bittercress	<i>Cardamine breweri</i>
Capparales	Crossflower	<i>Chorispora tenella</i>
Capparales	Mountain tansymustard	<i>Descurainia incana</i>
Capparales	Western tansymustard	<i>Descurainia pinnata</i>
Capparales	Herb sophia	<i>Descurainia sophia</i> *
Capparales	Golden draba	<i>Draba aurea</i>
Capparales	Cushion draba	<i>Draba breweri</i>
Capparales	Snowbed draba	<i>Draba crassifolia</i>
Capparales	Lancepod draba	<i>Draba lonchocarpa</i>
Capparales	Woodland draba	<i>Draba nemorosa</i>
Capparales	Fewseed draba	<i>Draba oligosperma</i>
Capparales	Payson's draba	<i>Draba paysonii</i>
Capparales	Western wallflower	<i>Erysimum asperum</i>
Capparales	Wormseed wallflower	<i>Erysimum cheiranthoides</i> *
Capparales	Shy wallflower	<i>Erysimum inconspicuum</i>
Capparales	Common pepperweed	<i>Lepidium densiflorum</i>
Capparales	Mountain pepperweed	<i>Lepidium montanum</i>
Capparales	Clasping pepperweed	<i>Lepidium perfoliatum</i> *
Capparales	Virginia pepperweed	<i>Lepidium virginicum</i>
Capparales	Idaho bladderpod	<i>Lesquerella carinata</i>
Capparales	Onerow yellowcress	<i>Nasturtium microphyllum</i> *
Capparales	Watercress	<i>Nasturtium officinale</i> *
Capparales	Meadow pennycress	<i>Noccaea parviflora</i>
Capparales	Common twinpod	<i>Physaria didymocarpa</i>
Capparales	Curvepod yellowcress	<i>Rorippa curvisiliqua</i>
Capparales	Bog yellowcress	<i>Rorippa palustris</i>
Capparales	Small tumbleweed mustard	<i>Sisymbrium loeselii</i> *
Capparales	Alpine smelowskia	<i>Smelowskia calycina</i>
Capparales	Northwestern thelypody	<i>Thelypodium paniculatum</i>
Capparales	Arrow thelypody	<i>Thelypodium sagittatum</i>
Capparales	Field pennycress	<i>Thlaspi arvense</i>
Campanulales	Bluebell bellflower	<i>Campanula rotundifolia</i>
Campanulales	Great Basin calicoflower	<i>Downingia laeta</i>
Caryophyllales	Slender mountain sandwort	<i>Arenaria capillaris</i>
Caryophyllales	Ballhead sandwort	<i>Arenaria congesta</i>
Caryophyllales	Field chickweed	<i>Cerastium arvense</i>
Caryophyllales	Bering chickweed	<i>Cerastium beeringianum</i>
Caryophyllales	Big chickweed	<i>Cerastium fontanum</i>
Caryophyllales	Nuttall's sandwort	<i>Minuartia nuttallii</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Caryophyllales	Twinflower sandwort	<i>Minuartia obtusiloba</i>
Caryophyllales	Beautiful sandwort	<i>Minuartia rubella</i>
Caryophyllales	Bluntleaf sandwort	<i>Moehringia lateriflora</i>
Caryophyllales	Tuber starwort	<i>Pseudostellaria jamesiana</i>
Caryophyllales	Western pearlwort	<i>Sagina decumbens</i>
Caryophyllales	Moss campion	<i>Silene acaulis</i>
Caryophyllales	Bladder campion	<i>Silene latifolia*</i>
Caryophyllales	Menzies' campion	<i>Silene menziesii</i>
Caryophyllales	Nightflowering silene	<i>Silene noctiflora*</i>
Caryophyllales	Parry's silene	<i>Silene parryi</i>
Caryophyllales	Northern starwort	<i>Stellaria calycantha</i>
Caryophyllales	Fleshy starwort	<i>Stellaria crassifolia</i>
Caryophyllales	Curled starwort	<i>Stellaria crispa</i>
Caryophyllales	Longleaf starwort	<i>Stellaria longifolia</i>
Caryophyllales	Longstalk starwort	<i>Stellaria longipes</i>
Caryophyllales	Rocky Mountain chickweed	<i>Stellaria obtusa</i>
Caryophyllales	Spear saltbrush	<i>Atriplex patula</i>
Caryophyllales	Wedgescale saltbush	<i>Atriplex truncata</i>
Caryophyllales	Lambsquarters	<i>Chenopodium album*</i>
Caryophyllales	Blite goosefoot	<i>Chenopodium capitatum</i>
Caryophyllales	Oakleaf goosefoot	<i>Chenopodium glaucum*</i>
Caryophyllales	Red goosefoot	<i>Chenopodium rubrum</i>
Caryophyllales	Nuttall's povertyweed	<i>Monolepis nuttalliana</i>
Caryophyllales	Red swampfire	<i>Salicornia rubra</i>
Caryophyllales	Lanceleaf springbeauty	<i>Claytonia lanceolata</i>
Caryophyllales	Bitter root	<i>Lewisia rediviva</i>
Caryophyllales	Water minerslettuce	<i>Montia chamissoi</i>
Papaverales	Scrambled eggs	<i>Corydalis aurea</i>
Gentianales	Elkweed	<i>Frasera speciosa</i>
Gentianales	Pleated gentian	<i>Gentiana affinis</i>
Gentianales	Moss gentian	<i>Gentiana fremontii</i>
Gentianales	Autumn dwarf gentian	<i>Gentianella amarella</i>
Gentianales	Oneflower fringed gentian	<i>Gentianopsis simplex</i>
Gentianales	Felwort	<i>Swertia perennis</i>
Geraniales	Richardson's geranium	<i>Geranium richardsonii</i>
Geraniales	Sticky geranium	<i>Geranium viscosissimum</i>
Malvales	Streambank wild hollyhock	<i>Iliamna rivularis</i>
Myrtales	Fireweed	<i>Chamerion angustifolium</i>
Myrtales	Tall annual willowherb	<i>Epilobium brachycarpum</i>
Myrtales	Fringed willowherb	<i>Epilobium ciliatum</i>
Myrtales	Glaucus willowherb	<i>Epilobium glaberrimum</i>
Myrtales	Hornemann's willowherb	<i>Epilobium hornemannii</i>
Myrtales	Marsh willowherb	<i>Epilobium palustre</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Myrtales	Spreading groundsmoke	<i>Gayophytum diffusum</i>
Myrtales	Dwarf groundsmoke	<i>Gayophytum humile</i>
Myrtales	Tufted evening-primrose	<i>Oenothera caespitosa</i>
Myrtales	Yellow evening-primrose	<i>Oenothera flava</i>
Myrtales	Pale evening-primrose	<i>Oenothera pallida</i>
Myrtales	Idaho pale evening-primrose	<i>Oenothera pallida ssp. pallida</i>
Plantaginales	Common plantain	<i>Plantago major</i>
Plantaginales	Tweedy's plantain	<i>Plantago tweedyi</i>
Polygonales	Matted buckwheat	<i>Eriogonum caespitosum</i>
Polygonales	Cushion buckwheat	<i>Eriogonum ovalifolium</i>
Polygonales	Sulphur-flower buckwheat	<i>Eriogonum umbellatum</i>
Polygonales	Alpine mountainsorrel	<i>Oxyria digyna</i>
Polygonales	American bistort	<i>Polygonum bistortoides</i>
Polygonales	Douglas' knotweed	<i>Polygonum douglasii</i>
Polygonales	Curlytop knotweed	<i>Polygonum lapathifolium</i>
Polygonales	Western dock	<i>Rumex aquaticus</i>
Polygonales	Alpine sheep sorrel	<i>Rumex paucifolius</i>
Polygonales	Water knotweed	<i>Polygonum amphibium</i>
Primulales	Pygmyflower rockjasmine	<i>Androsace septentrionalis</i>
Primulales	Darkthroat shootingstar	<i>Dodecatheon pulchellum</i>
Primulales	Silvery primrose	<i>Primula incana</i>
Ranunculales	Red baneberry	<i>Actaea rubra</i>
Ranunculales	Little Belt Mountain thimbleweed	<i>Anemone lithophila</i>
Ranunculales	Pacific anemone	<i>Anemone multifida</i>
Ranunculales	Yellow columbine	<i>Aquilegia flavescens</i>
Ranunculales	Western columbine	<i>Aquilegia formosa</i>
Ranunculales	Hairy clematis	<i>Clematis hirsutissima</i>
Ranunculales	Duncecap larkspur	<i>Delphinium occidentale</i>
Ranunculales	Little larkspur	<i>Delphinium bicolor</i>
Ranunculales	Twolobe larkspur	<i>Delphinium nuttallianum</i>
Ranunculales	Eastern pasqueflower	<i>Pulsatilla patens</i>
Ranunculales	Sharpleaf buttercup	<i>Ranunculus acriformis</i>
Ranunculales	Alkali buttercup	<i>Ranunculus cymbalaria</i>
Ranunculales	Sagebrush buttercup	<i>Ranunculus glaberrimus</i>
Ranunculales	Gmelin's buttercup	<i>Ranunculus gmelinii</i>
Ranunculales	High northern buttercup	<i>Ranunculus hyperboreus</i>
Ranunculales	Graceful buttercup	<i>Ranunculus inamoenus</i>
Ranunculales	Cursed buttercup	<i>Ranunculus sceleratus</i>
Ranunculales	Longbeak buttercup	<i>Ranunculus longirostris</i>
Ranunculales	Fendler's meadow-rue	<i>Thalictrum fendleri</i>
Ranunculales	Western meadow-rue	<i>Thalictrum occidentale</i>
Ranunculales	Veiny meadow-rue	<i>Thalictrum venulosum</i>
Ranunculales	Creeping barberry	<i>Mahonia repens</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Rubiales	Northern bedstraw	<i>Galium boreale</i>
Rubiales	Fragrant bedstraw	<i>Galium triflorum</i>
Santalales	Bastard toadflax	<i>Comandra umbellata</i>
Urticales	Stinging nettle	<i>Urtica dioica</i>
Violales	Hookedspur violet	<i>Viola adunca</i>
Violales	Northern bog violet	<i>Viola nephrophylla</i>
Violales	Goosefoot violet	<i>Viola purpurea</i>
Callitrichales	Northern water-starwort	<i>Callitriche hermaphroditica</i>
Callitrichales	Vernal water-starwort	<i>Callitriche palustris</i>
Callitrichales	Common mare's-tail	<i>Hippuris vulgaris</i>
Nymphaeales	Coon's tail	<i>Ceratophyllum demersum</i>
Haloragales	Shortspike watermilfoil	<i>Myriophyllum sibiricum</i>
Linales	Lewis flax	<i>Linum lewisii</i>
Linales		<i>Class Liliopsida</i>

CLASS LILIOPSIDA

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Najadales	Seaside arrowgrass	<i>Triglochin maritima</i>
Najadales	Nodding waternymph	<i>Najas flexilis</i>
Najadales	Leafy pondweed	<i>Potamogeton foliosus</i>
Najadales	Fries' pondweed	<i>Potamogeton friesii</i>
Najadales	Whitestem pondweed	<i>Potamogeton praelongus</i>
Najadales	Small pondweed	<i>Potamogeton pusillus</i>
Najadales	Richardson's pondweed	<i>Potamogeton richardsonii</i>
Najadales	Flatstem pondweed	<i>Potamogeton zosteriformis</i>
Najadales	Sago pondweed	<i>Stuckenia pectinata</i>
Najadales	Sheathed pondweed	<i>Stuckenia vaginata</i>
Najadales	Fineleaf pondweed	<i>Stuckenia filiformis</i>
Najadales	Horned pondweed	<i>Zannichellia palustris</i>
Liliales	Rocky Mountain iris	<i>Iris missouriensis</i>
Liliales	Narrowleaf blue-eyed grass	<i>Sisyrinchium angustifolium</i>
Liliales	Tapertip onion	<i>Allium acuminatum</i>
Liliales	Shortstyle onion	<i>Allium brevistylum</i>
Liliales	Nodding onion	<i>Allium cernuum</i>
Liliales	Geyer's onion	<i>Allium geyeri</i>
Liliales	Wild chives	<i>Allium schoenoprasum</i>
Liliales	Textile onion	<i>Allium textile</i>
Liliales	White mariposa lily	<i>Calochortus eurycarpus</i>
Liliales	Sego lily	<i>Calochortus nuttallii</i>
Liliales	Small camas	<i>Camassia quamash</i>
Liliales	Bride's bonnet	<i>Clintonia uniflora</i>
Liliales	Yellow avalanche-lily	<i>Erythronium grandiflorum</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Liliales	Spotted fritillary	<i>Fritillaria atropurpurea</i>
Liliales	Yellow fritillary	<i>Fritillaria pudica</i>
Liliales	Common alplily	<i>Lloydia serotina</i>
Liliales	Feathery false lily of the valley	<i>Maianthemum racemosum</i>
Liliales	Starry false lily of the valley	<i>Maianthemum stellatum</i>
Liliales	Roughfruit fairybells	<i>Prosartes trachycarpa</i>
Liliales	Claspleaf twistedstalk	<i>Streptopus amplexifolius</i>
Liliales	Meadow deathcamas	<i>Zigadenus venenosus</i>
Orchidales	Fairy slipper	<i>Calypso bulbosa</i>
Orchidales	Summer coralroot	<i>Corallorhiza maculata</i>
Orchidales	Pacific coralroot	<i>Corallorhiza mertensiana</i>
Orchidales	Western rattlesnake plantain	<i>Goodyera oblongifolia</i>
Orchidales	Northern twayblade	<i>Listera borealis</i>
Orchidales	Slender-spire orchid	<i>Piperia unalascensis</i>
Orchidales	Northern green orchid	<i>Platanthera aquilonis</i>
Orchidales	Slender bog orchid	<i>Platanthera stricta</i>
Orchidales	Hooded lady's tresses	<i>Spiranthes romanzoffiana</i>
Typhales	Broadleaf cattail	<i>Typha latifolia</i>
Typhales	Narrowleaf bur-reed	<i>Sparganium angustifolium</i>
Typhales	Broadfruit bur-reed	<i>Sparganium eurycarpum</i>
Typhales	Floating bur-reed	<i>Sparganium fluctuans</i>
Cyperales	Water sedge	<i>Carex aquatilis</i>
Cyperales	Slenderbeak sedge	<i>Carex athrostachya</i>
Cyperales	Golden sedge	<i>Carex aurea</i>
Cyperales	Lesser paniced sedge	<i>Carex diandra</i>
Cyperales	Softleaf sedge	<i>Carex disperma</i>
Cyperales	Douglas' sedge	<i>Carex douglasii</i>
Cyperales	Needleleaf sedge	<i>Carex duriuscula</i>
Cyperales	Threadleaf sedge	<i>Carex filifolia</i>
Cyperales	Geyer's sedge	<i>Carex geyeri</i>
Cyperales	Cloud sedge	<i>Carex haydeniana</i>
Cyperales	Hood's sedge	<i>Carex hoodii</i>
Cyperales	Idaho sedge	<i>Carex idahoa</i>
Cyperales	Inland sedge	<i>Carex interior</i>
Cyperales	Woollyfruit sedge	<i>Carex lasiocarpa</i>
Cyperales	Kellogg's sedge	<i>Carex lenticularis</i>
Cyperales	Smallwing sedge	<i>Carex microptera</i>
Cyperales	Manyrib sedge	<i>Carex multicostata</i>
Cyperales	Nebraska sedge	<i>Carex nebrascensis</i>
Cyperales	Chamisso sedge	<i>Carex pachystachya</i>
Cyperales	Dunhead sedge	<i>Carex phaeocephala</i>
Cyperales	Clustered field sedge	<i>Carex praegracilis</i>
Cyperales	Raynolds' sedge	<i>Carex raynoldsii</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Cyperales	Ross' sedge	<i>Carex rossii</i>
Cyperales	Northern singlespike sedge	<i>Carex scirpoidea</i>
Cyperales	Mountain sedge	<i>Carex scopulorum</i>
Cyperales	Analogue sedge	<i>Carex simulata</i>
Cyperales	Northwest Territory sedge	<i>Carex utriculata</i>
Cyperales	Valley sedge	<i>Carex vallicola</i>
Cyperales	Whitescale sedge	<i>Carex xerantica</i>
Cyperales	Needle spikerush	<i>Eleocharis acicularis</i>
Cyperales	Pale spikerush	<i>Eleocharis macrostachya</i>
Cyperales	Common spikerush	<i>Eleocharis palustris</i>
Cyperales	Fewflower spikerush	<i>Eleocharis quinqueflora</i>
Cyperales	Tall cottongrass	<i>Eriophorum angustifolium</i>
Cyperales	Simple bog sedge	<i>Kobresia simpliciuscula</i>
Cyperales	Hardstem bulrush	<i>Schoenoplectus acutus</i>
Cyperales	Indian ricegrass	<i>Achnatherum hymenoides</i>
Cyperales	Columbia needlegrass	<i>Achnatherum nelsonii</i>
Cyperales	Western needlegrass	<i>Achnatherum occidentale</i>
Cyperales	Crested wheatgrass	<i>Agropyron cristatum*</i>
Cyperales	Spike bentgrass	<i>Agrostis exarata</i>
Cyperales	Redtop	<i>Agrostis gigantea</i>
Cyperales	Seashore bentgrass	<i>Agrostis pallens</i>
Cyperales	Rough bentgrass	<i>Agrostis scabra</i>
Cyperales	Shortawn foxtail	<i>Alopecurus aequalis</i>
Cyperales	Boreal alopecurus	<i>Alopecurus alpinus</i>
Cyperales	Water foxtail	<i>Alopecurus geniculatus</i>
Cyperales	American sloughgrass	<i>Beckmannia syzigachne</i>
Cyperales	Fringed brome	<i>Bromus ciliatus</i>
Cyperales	Smooth brome	<i>Bromus inermis*</i>
Cyperales	Mountain brome	<i>Bromus marginatus</i>
Cyperales	Cheatgrass	<i>Bromus tectorum*</i>
Cyperales	Bluejoint	<i>Calamagrostis canadensis</i>
Cyperales	Plains reedgrass	<i>Calamagrostis montanensis</i>
Cyperales	Pinegrass	<i>Calamagrostis rubescens</i>
Cyperales	Northern reedgrass	<i>Calamagrostis stricta</i>
Cyperales	Water whorlgrass	<i>Catabrosa aquatica</i>
Cyperales	Drooping woodreed	<i>Cinna latifolia</i>
Cyperales	Orchardgrass	<i>Dactylis glomerata</i>
Cyperales	Timber oatgrass	<i>Danthonia intermedia</i>
Cyperales	Tufted hairgrass	<i>Deschampsia caespitosa</i>
Cyperales	Slender hairgrass	<i>Deschampsia elongata</i>
Cyperales	Saltgrass	<i>Distichlis spicata</i>
Cyperales	Baker's wheatgrass	<i>Elymus bakeri</i>
Cyperales	Blue wildrye	<i>Elymus glaucus</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Cyperales	Thickspike wheatgrass	<i>Elymus lanceolatus</i>
Cyperales	Quackgrass	<i>Elymus repens</i>
Cyperales	Slender wheatgrass	<i>Elymus trachycaulus</i>
Cyperales	Alpine fescue	<i>Festuca brachyphylla</i>
Cyperales	Idaho fescue	<i>Festuca idahoensis</i>
Cyperales	Western fescue	<i>Festuca occidentalis</i>
Cyperales	Small floating mannagrass	<i>Glyceria borealis</i>
Cyperales	American mannagrass	<i>Glyceria grandis</i>
Cyperales	Fowl mannagrass	<i>Glyceria striata</i>
Cyperales	Needle-and-thread	<i>Hesperostipa comata</i>
Cyperales	Meadow barley	<i>Hordeum brachyantherum</i>
Cyperales	Foxtail barley	<i>Hordeum jubatum</i>
Cyperales	Prairie junegrass	<i>Koeleria macrantha</i>
Cyperales	Basin wildrye	<i>Leymus cinereus</i>
Cyperales	Yellow wildrye	<i>Leymus flavescens</i>
Cyperales	Purple oniongrass	<i>Melica spectabilis</i>
Cyperales	Marsh muhly	<i>Muhlenbergia racemosa</i>
Cyperales	Mat muhly	<i>Muhlenbergia richardsonis</i>
Cyperales	Western wheatgrass	<i>Pascopyrum smithii</i>
Cyperales	Alpine timothy	<i>Phleum alpinum</i>
Cyperales	Common timothy	<i>Phleum pratense</i>
Cyperales	Canada bluegrass	<i>Poa compressa</i>
Cyperales	Cusick's bluegrass	<i>Poa cusickii</i>
Cyperales	Fowl bluegrass	<i>Poa palustris</i>
Cyperales	Kentucky bluegrass	<i>Poa pratensis</i>
Cyperales	Sandberg's bluegrass	<i>Poa secunda</i>
Cyperales	Rough bluegrass	<i>Poa trivialis</i>
Cyperales	Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>
Cyperales	Nuttall's alkaligrass	<i>Puccinellia nuttalliana</i>
Cyperales	Alkali cordgrass	<i>Spartina gracilis</i>
Cyperales	Spike trisetum	<i>Trisetum spicatum</i>
Juncales	Baltic rush	<i>Juncus arcticus</i> ssp. <i>littoralis</i>
Juncales	Toad rush	<i>Juncus bufonius</i>
Juncales	Colorado rush	<i>Juncus confusus</i>
Juncales	Drummond's rush	<i>Juncus drummondii</i>
Juncales	Common rush	<i>Juncus effusus</i>
Juncales	Swordleaf rush	<i>Juncus ensifolius</i>
Juncales	Hall's rush	<i>Juncus hallii</i>
Juncales	Longstyle rush	<i>Juncus longistylis</i>
Juncales	Parry's rush	<i>Juncus parryi</i>
Juncales	Rocky Mountain rush	<i>Juncus saximontanus</i>
Juncales	Smallflowered woodrush	<i>Luzula parviflora</i>
Hydrocharitales	Canadian waterweed	<i>Elodea canadensis</i>

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Arales	Star duckweed	<i>Lemna trisulca</i>
Arales	Common duckweed	<i>Lemna minor</i>
Polypodiales	Brittle bladderfern	<i>Cystopteris fragilis</i>
Polypodiales	Oregon cliff fern	<i>Woodsia oregana</i>
Polypodiales	Brewer's cliffbrake	<i>Pellaea breweri</i>

CLASS EQUISETOPSIDA

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Equisetales	Field horsetail	<i>Equisetum arvense</i>
Equisetales	Smooth horsetail	<i>Equisetum laevigatum</i>
Equisetales	Water horsetail	<i>Equisetum fluviatile</i>
Equisetales	Marsh horsetail	<i>Equisetum palustre</i>

CLASS LYCOPODIOPSIDA

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Isoetales	Quillwort	<i>Isoetes</i> spp.

CLASS CHAROPHYCEAE

<i>Order</i>	<i>Common Name</i>	<i>Scientific Name</i>
Charales	Common stonewort	<i>Chara vulgaris</i>

Appendix E

Draft Compatibility Determinations

Refuge Name: Red Rock Lakes National Wildlife Refuge

Date Established: April 22, 1935

ESTABLISHING AND ACQUISITION AUTHORITIES

- Executive Order 7023, April 22, 1935
- Executive Order 7172, September 4, 1935
- 16 U.S.C. § 715d (Migratory Bird Conservation Act)
- 16 U.S.C. § 460k-2 (Refuge Recreation Act) (16 U.S.C. § 460k-460k-4), as amended
- 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)
- 16 U.S.C. § 742f(a)(4) and 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956)
- 16 U.S.C. § 668dd(a)(2) (National Wildlife Refuge System Administration Act)

REFUGE PURPOSES

- “As a refuge and breeding ground for wild birds and animals.” [Executive Order 7023]
- “For use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” [16 U.S.C. § 715d (Migratory Bird Conservation Act)]
- “Suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species . . . The Secretary . . . may accept and use . . . real . . . property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors.” [16 U.S.C. § 460k-1, k-2 (Refuge Recreation Act) (16 U.S.C. § 460k-460k-4), as amended)]
- “The conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions.” [16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)]
- “For the development, advancement,

management, conservation, and protection of fish and wildlife resources . . . for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude.” [16 U.S.C. § 742f(a)(4), (b)(1) (Fish and Wildlife Act of 1956)]

- “Conservation, management, and . . . restoration of the fish, wildlife, and plant resources and their habitats . . . for the benefit of present and future generations of Americans.” [16 U.S.C. § 668dd(a)(2) (National Wildlife Refuge System Administration Act)]
- “Wilderness areas . . . shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness.” [16 U.S.C. § 1131 (Wilderness Act)]

NATIONAL WILDLIFE REFUGE SYSTEM MISSION

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

DESCRIPTION OF USE: BIG GAME HUNTING

Hunting in the Centennial Valley is a traditional form of wildlife-dependent recreation. Red Rock Lakes National Wildlife Refuge has a long history of allowing hunting. Waterfowl hunting has been allowed on the refuge since its establishment. However, big game hunting on the refuge was not

allowed until 1952 when a limited moose hunt was initiated. This limited hunt occurred until 1958. From 1959 to 1962, the only hunting allowed on the refuge was for waterfowl. A very limited pronghorn hunt was allowed in 1963 in the northeast corner of the refuge. This hunt area was expanded in 1964 to include all refuge lands on the north side of the refuge (north of Lower lake, the River Marsh area and Upper lake). In 1965 hunting of waterfowl, elk, deer, pronghorn and moose was allowed on the refuge. The hunt was separated in space with waterfowl hunting occurring on Lower lake, deer and elk hunting occurring south of the Southside Centennial Road, pronghorn hunting occurring on “the north side” of the refuge (north of the River Marsh area, Upper and Lower Red Rock lakes), and moose hunting occurring in the southwest corner of the refuge (also known as willow fen area). Big game and waterfowl hunting have continued on the refuge, using various scenarios of time and space separation to manage potential and observed conflicts.

The Red Rock Lakes National Wildlife Refuge proposes to continue to provide limited opportunities for big game hunting that are compatible with the refuge purpose. Hunting is identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997. Hunting of deer (white-tailed and mule deer), pronghorn, elk, and moose will be permitted in designated hunting areas on the refuge. Hunting will be conducted in accordance with state of Montana regulations and refuge-specific regulations. When appropriate, zoning (utilizing time and space separation) will be used to resolve conflicts with other user groups.

The refuge big game hunting program objectives are to (1) control and maintain ungulate populations at a level that is compatible with plant and wildlife animal communities on the refuge (for example, to prevent over-browsing of willow communities), and (2) provide the public with high-quality wildlife-oriented recreation.

The refuge proposes to allow deer, elk, and pronghorn hunting on approximately 20,592 acres, or of the entire refuge. In addition, the refuge is proposing to have the option of opening an additional 2,982 acres (the area between Upper and Lower Red Rock lakes) to limited primitive weapons only hunt. This hunt would only be opened if degraded habitat conditions (such as over-browsing of vegetation by native ungulates) were documented. The hunting area will be delineated by signs and physical features (such as roads and creeks). To create a contiguous hunting area and eliminate hunting boundary confusion, moose hunting would be open in the area west and north of South Valley Road (Red Rock Pass Road). The area south of South Valley Road would be closed to eliminate a road hunting issue. Closed areas in the northern section of the refuge would be opened to deer, elk, and pronghorn hunting. Moose hunting

will be permitted on approximately 2,675 acres, or less than 6% of the entire refuge. This hunting area will be delineated by signs, roads, creeks, and lake shores.

Seasons and regulations vary for each big game species. The typical seasons for each species are shown in table 1. There will be no limit on the number of hunters and hunt days and no designated blind sites. Refuge staff estimate 800 hunter visits during the big game season. Hunting pressure varies but is usually heaviest during the openers of each season.

Table 1. Typical hunting seasons for pronghorn, deer, elk and moose in the state of Montana.

<i>Species</i>	<i>Typical Start Date</i>	<i>Typical End Date</i>
Pronghorn—archery	1st Saturday in September	2nd Saturday in October
Pronghorn—archery	1st Sunday in October	2nd Sunday in November
Deer and elk—archery	1st Saturday in September	2nd Sunday in October
Deer and elk—archery	3rd Sunday in October	5 weeks after opening
Moose—general*	September 15	December 15

Access will be on foot for a majority of the area because most of the hunting area exists in a designated wilderness area. However, stock animals would be allowed south of the Southside Centennial Road, mainly to allow access into the Centennial Mountains. Stock may be used in order to retrieve big game on the refuge within designated hunt areas. Stock may not be used in areas north of the Southside Centennial Road for hunting purposes—only retrieval purposes.

AVAILABILITY OF RESOURCES

The following annual costs would be required to administer and manage waterfowl hunting activities:

<i>Item</i>	<i>Cost</i>
Buy and post signs	\$10,000
Maintenance of campgrounds and parking areas	\$7,000
Law enforcement	\$5,000
Administration (brochures, monitoring, etc.)	\$15,000
Total	\$37,000

Adequate funding exists to administer the big game hunt program. There is currently no law enforcement staff on-site although it is typically available during periods of heavy use. Partnerships have been developed with the Bureau of Land Management and

Montana Fish, Wildlife and Parks to assist with law enforcement needs and provide for a safe, quality visitor services program as described above.

ANTICIPATED IMPACTS OF USE

The direct effects of hunting on big game include mortality, wounding, and changes in distribution. However, regulated big game hunting has been used as a management tool to control ungulate populations, which helps ensure high-quality habitats and thus producing healthy individuals and populations of big game species. In addition, it is well recognized that hunting has 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. Despite the potential negative impacts of hunting, a goal of the refuge is to provide opportunities for quality wildlife-dependent recreation. By law (see above), hunting is one of the six priority visitor services of the National Wildlife Refuge System. The key focus is to offer a safe quality program and maintain adverse impacts within acceptable limits.

Hunting on the refuge does affect big game movements, distribution, and behavior. Big game species will likely spend more time in wooded habitats during the day as well as in closed areas (regardless of habitat type) on the refuge. Hunting also increases agitation, nervousness, and energetic expenditures associated with running from hunters and the sounds of weapons being fired. Changing the areas where hunting is allowed from 1 year to the next may increase these impacts because big game would have to learn where the “safe zones” are every year. This would also negatively impact wildlife viewing opportunities because there may not be a particular area each year where big game animals would congregate. Areas on the refuge that have traditionally been closed to hunting provide some of the best big game viewing opportunities to see white-tailed deer, elk, and moose. Big game animals typically congregate in these closed areas.

Direct negative impacts of big game hunting on other wildlife will be minimal because hunting occurs in the fall when breeding and nesting seasons are over. Most land birds and many of the waterfowl have migrated out of the valley when the peak big game hunting occurs. Other birds (such as owls, ravens, and magpies) do remain in the area during hunting season; however, impacts on these species are expected to be minimal. Any disturbance impacts on most predators and scavengers will probably be outweighed by an increase in food in the form of gut piles and carcass remains.

Recreational hunting activities may, in some cases, result in competition for limited resources (such as preferred campsites or use areas) between hunters and other refuge users. However, campsites are

typically available even during the peak hunting seasons. In addition, a portion of the areas closed to hunting are still open to other wildlife-dependent recreation activities such as wildlife viewing, wildlife photography. Some big game animals tend to congregate in the closed areas. This behavior may ultimately provide refuge visitors with increased opportunities to view animals such as moose, elk, and deer. However, the aesthetic value of the viewing may be diminished by the occasional sound of gunshots.

DETERMINATION

Recreational big game hunting is a compatible use at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

The refuge big game hunt program will be designed to provide quality experiences. A quality hunt experience means that (1) hunters are safe; (2) hunters exhibit high standards of ethical behavior; (3) hunters are provided with uncrowded conditions; (4) hunters have reasonable harvest opportunities; (5) hunters are clear on which areas are open and closed to hunting; and (6) minimal conflicts occur between hunters and other visitors, especially those engaging in wildlife-dependent priority visitor services.

The 7-day per week hunt program proposed on the refuge would include the following restrictions to reduce impacts:

1. a limited hunt area (areas will be posted and enforced)
2. use of stock animals to retrieve game
3. use of stock animals south of the Southside Centennial Road to access other areas of the Centennial Mountains
4. periodic biological and social monitoring and evaluation of the hunting program, including feedback from users to determine if objectives of a quality experience are being met

Hunter compliance with current State of Montana big game and refuge specific regulations would be achieved through a combination of printed information, signing, outreach efforts, and enforcement of regulations by law enforcement officers.

JUSTIFICATION

Hunting is one of the six priority visitor services of the National Wildlife Refuge System. Providing for a quality hunting program contributes to achieving one of the refuge goals. This program as described was determined to be compatible in view of the potential impacts that hunting, camping, and use

of stock animals can have on the Service’s ability to achieve refuge purposes and goals. The refuge would be opened to big game hunting, with sufficient restrictions in place on hunting, use of stock animals, and other visitor services to ensure a quality hunting program.

Refuge hunt programs are designed to provide quality experiences. In general, hunting on refuges should be superior to that available on other public lands, which may require special restrictions (Refuge Manual 8RM5). Measures are often used to ensure quality. The limited hunt program is proposed on the refuge to (1) provide a quality hunting experience that meets refuge guidelines and policies; (2) prevent conflicts with other priority wildlife-dependent visitor services; and (3) control and maintain ungulate populations at a level that is compatible with plant and wildlife animal communities on the refuge and meets habitat objectives (for example, preventing over-browsing of willow communities) outlined in the refuge’s Comprehensive Conservation Plan.

The hunting areas provide distinct, manageable units that can be easily delineated, posted, and enforced. It is anticipated that big game will find sufficient food resources and resting places, both inside and outside of the hunt area, hunting pressure will not cause premature departure from the area, the physiological condition of big game and other wildlife species will not be impaired, their behavior and normal activity patterns will not be altered dramatically, and their overall state and national population status will not be impaired (that is, the species will not be in jeopardy of becoming federally threatened or endangered).

Mandatory 15-year reevaluation date: 2023

**DESCRIPTION OF USE:
WATERFOWL HUNTING**

The Red Rock Lakes National Wildlife Refuge proposes to continue to provide limited opportunities for waterfowl hunting (a wildlife-dependent recreation) that are compatible with the refuge’s purpose. Hunting is identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997. Hunting of waterfowl (limited to coots, ducks, and geese) will be permitted in a designated hunting area on and surrounding the Lower Red Rock lake (also known as Lower lake) and Red Rock Creek/River Marsh area.

The refuge proposes to allow waterfowl hunting on approximately 7,750 acres—less than 17% of the entire refuge. However, 3,550 acres of this is upland habitat where little or no hunting occurs because few geese or ducks are present in this habitat. As such, due to habitat constraints, hunting typically only occurs on

4,200 acres of the refuge, less than 10% of the entire refuge. The hunting area will be delineated by signs along the eastern and northern boundaries, the refuge boundary fence and signs along the western boundary, and the Southside Centennial Road along the southern boundary.

Hunting will be allowed consistent with annual Montana State hunting regulations and seasons, as well as applicable specific refuge and federal regulations. The waterfowl hunting season generally falls within the period from October through early January. However, waterfowl hunting on the refuge typically does not occur after October because all water is frozen, and very few waterfowl remain in the area. There will be no limit on the number of hunters and hunt days and no designated blind sites. Refuge staff estimate 300 hunter visits during the waterfowl season. A majority of hunter visits occur on the first two weekends of the year. Hunting pressure is almost nonexistent during weekdays and after the second weekend of the hunting season.

Access will be on foot and nonmotorized boats for a majority of the area because most of the hunting area exists in a designated wilderness area. However, motorized boats would be allowed from the Lower Red Rock lake water control structure downstream on Red Rock Creek. During the hunting season, hunting dogs will be allowed off leash and under voice control for the purpose of retrieving waterfowl.

AVAILABILITY OF RESOURCES

The following annual costs would be required to administer and manage waterfowl hunting activities:

<i>Item</i>	<i>Cost</i>
Buy and post signs	\$7,000
Maintenance of access roads, parking lots, boat ramps	\$12,000
Law enforcement	\$3,000
Administration (brochures, monitoring, etc.)	\$10,000
Total	\$32,000

Adequate funding exists to administer the waterfowl hunt program. Law enforcement staffing does not currently occur on-site but typically is available during periods of heavy use. Partnerships have been developed with the Bureau of Land Management and Montana Fish, Wildlife and Parks to assist with law enforcement needs and provide for a safe, quality visitor services program.

ANTICIPATED IMPACTS OF USE

Adequate funding exists to administer the waterfowl hunt program. There is currently no law enforcement staff on-site. There is some law enforcement presence during periods of heavy use. Partnerships have been

developed with the Bureau of Land Management and Montana Fish, Wildlife and Parks to assist with law enforcement needs.

By its very nature, waterfowl hunting has very few, if any, positive effects on waterfowl and other birds while the activity is occurring. However, it is well recognized that this activity has 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, a goal of the refuge is to provide opportunities for quality wildlife-dependent recreation. By law (see above), hunting is one of the six priority visitor services of the National Wildlife Refuge System. A key concern is to offer a safe and quality program and to keep adverse impacts to within acceptable limits.

Although hunting directly impacts individual birds, the amount of waterfowl harvest is not expected to have a measurable effect on refuge, national or international populations, especially since waterfowl hunting activity is extremely limited (in time and space) on the refuge. For example, the refuge staff estimates that approximately 300 hunter visits are made annually to the refuge. Over the entire season, the average hunter visit per day would be approximately 3.0 during an average season. However, since the refuge hunting season is typically nonexistent after October, the average on the refuge is probably closer to 9.1 hunter visits per day. Hunting may be either compensatory or additive to natural mortality (Anderson 1995). Compensatory mortality occurs when hunting substitutes for other forms of mortality (such as disease, competition, predation, and severe weather). Additive mortality occurs when hunting compounds the total mortality. In some cases, hunting can be used as a management tool to control populations. In concert with Canada, Mexico, and multistate flyway councils, the Service and Montana Fish, Wildlife and Parks regulate hunting so that harvest does not reduce populations to unsustainable levels.

Direct effects of hunting on waterfowl are mortality, wounding, and disturbance (DeLong 2002). Hunting can alter behavior (such as foraging time), population structure, and distribution patterns of wildlife (Bartelt 1987, Cole and Knight 1990, Madsen 1985, Owens 1977, Raveling 1979, Thomas 1983, White-Robinson 1982). In Denmark, hunting was documented to affect the diversity and number of birds using a site (Madsen 1995). Bird diversity changed from predominantly mute swan and mallard to a more even distribution of a greater number of species when a sanctuary was established. Hence, species diversity increased with the elimination of hunting. There also appears to be an inverse relationship between the number of birds using an area and hunting intensity (DeLong 2002). In Connecticut, lesser scaup were observed to forage

less in areas that were heavily hunted (Cronan 1957). In California, the numbers of northern pintails on Sacramento National Wildlife Refuge nonhunt areas increased after the first week of hunting and remained high until the season was over in early January (Heitmeyer and Raveling 1988). Following the close of hunting season, ducks generally increased their use of the hunt area; however, use was lower than before the hunting season began.

Human disturbance to wintering birds and other wildlife using the open waters and marshes on the refuge would occur as a result of hunting activity. Migratory and wintering waterfowl generally attempt to minimize time spent in flight and maximize foraging time because flight requires considerably more energy than any other activity, other than egg laying. Human disturbance associated with hunting includes loud noises and rapid movements, such as those produced by shotguns and boats powered by motors. This disturbance, especially when repeated over a period of time, compels waterfowl to change food habits, feed only at night, lose weight, or desert feeding areas (Belanger and Bedard 1990; Madsen 1995; Wolder 1993). Disturbance levels from hunting activity outside Chincoteague National Wildlife Refuge were found to be high enough to force wintering black ducks into a pattern of nocturnal feeding within surrounding salt marsh and diurnal resting with refuge impoundments (Morton et al. 1989a, 1989b). Unhunted populations have been documented to behave differently from hunted ones (Wood 1993).

These impacts can be reduced by the presence of sanctuary areas where hunting does not occur, and birds can feed relatively undisturbed. Sanctuaries or nonhunt areas have been identified as the most common solution to disturbance problems caused from hunting (Havera et al. 1992). Prolonged and extensive disturbances may cause large numbers of waterfowl to leave disturbed areas and migrate elsewhere (Madsen 1995; Paulins 1984). In Denmark, hunting disturbance effects were experimentally tested by establishing two sanctuaries (Madsen 1995). Over a 5-year period, these sanctuaries became two of the most important staging areas for coastal waterfowl. Numbers of dabbling ducks and geese increase 4- to 20-fold within the sanctuary (Madsen 1995). Thus, sanctuary areas are very important to minimize disturbance to waterfowl populations to ensure their continued use of the refuge.

Intermittent hunting can be a means of minimizing disturbance, especially if rest periods in between hunting events are weeks rather than days (Fox and Madsen 1997). It is common for refuges with heavily used hunt programs to manage their programs with nonhunt days. At Sacramento National Wildlife Refuge, 3%–16% of northern pintails were located in hunt units during nonhunt days, but they were almost entirely absent in those same units on hunt days (Wolder 1993). In addition, northern pintails,

American wigeon, and northern shovelers decreased time spent feeding on days when hunting occurred on public shooting areas, as compared to nonhunt days (Heitmeyer and Raveling 1988). However, intermittent hunting may not always greatly reduce hunting impacts. At Sacramento National Wildlife Refuge, the intermittent hunting of three hunt days per week results in lower northern pintail densities on hunt areas during nonhunt days than establishing nonhunt areas (Wolder 1993). In Germany, several studies reported a range from a few days to approximately 3 weeks for waterbird numbers to recover to pre-disturbance levels (Fox and Madsen 1997). The proposed hunt program at Red Rock Lakes National Wildlife Refuge will not be intermittent due to the limited nature of the hunting season, limited use that occurs during the week days, and the limited amount of area that is open to hunting.

Boating activity associated with hunting during the fall can alter distribution, reduce use of particular habitats or entire areas by waterfowl and other birds, alter feeding behavior and nutritional status, and cause premature departure from areas (Knight and Cole 1995). In the upper Midwest, motor boating and hunting have been found to be the two main activities that disturb waterfowl (Korschgen et al. 1985). In Connecticut, selection of feeding sites by lesser scaup was influenced by disturbances from hunters, anglers, and pleasure boats (Cronan 1957). In Germany, boat pressure on wintering waterfowl had reached such a high level that it was necessary to establish larger sanctuaries, implement a seasonal closure on water sports and angling, and impose a permanent ban on hunting (Bauer et al. 1992). Impacts of boating can occur even at low densities, given their noise, speed, and ability to cover extensive areas in a short amount of time. However, impacts from boating at Red Rock Lakes National Wildlife Refuge will be greatly reduced because a majority of the proposed hunting area will be open to only nonmotorized boating. Thus, much of the disturbance impacts (identified above due to motor boats quick movements, noise, and ability to cover large areas in a short amount of time) will not apply to this refuge. As such, the use of nonmotorized boats is one way of minimizing disturbance to waterbirds at this refuge. In addition, allowing only nonmotorized boating on a majority of the hunting area provides for a very unique experience not easily found in southwest Montana. Each year, the refuge staff receives comments from hunters who specifically come to this refuge because of the nonmotorized regulations.

Additional impacts from hunting activity include conflicts with individuals participating in wildlife-dependent priority visitor services, such as canoing, kayaking, and other wildlife observations. However, the refuge currently provides a minimum of 3,200 acres that are closed to hunting but open to nonmotorized boating and wildlife observation.

In addition, approximately 4,500 acres of upland habitat is closed to hunting but open for visitors to participate in wildlife observation activities on foot.

DETERMINATION

Waterfowl hunting is a compatible use at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

The refuge's waterfowl hunt program will be designed to provide quality experiences. A quality hunt experience means that (1) hunters are safe; (2) hunters exhibit high standards of ethical behavior; (3) hunters are provided with uncrowded conditions; (4) hunters have reasonable harvest opportunities; (5) hunters are clear on which areas are open and closed to hunting; and (6) minimal conflicts occur between hunters and other visitors, especially those engaging in wildlife-dependent priority visitor services.

The 7-days-per-week hunt program proposed on the refuge would include the following restrictions to reduce impacts: (1) a limited hunt area (areas will be posted and enforced); (2) use of nonmotorized boats, except downstream (west) of the Lower Red Rock lake water control structure; (3) use of closed areas, as needed, to provide sufficient feeding and resting habitat for waterfowl; and (4) periodic biological and social monitoring and evaluation of the hunting program, including feedback from users to determine if the objectives for a high-quality experience (as defined above) are being met.

Hunter compliance with current migratory bird and refuge regulations would be achieved through a combination of printed information, signing, outreach efforts, and enforcement of regulations by law enforcement officers.

JUSTIFICATION

Hunting is one of the six priority visitor services of the National Wildlife Refuge System. Providing for a quality hunting program contributes to achieving one of the refuge goals. This program as described was determined to be compatible, in view of potential impacts that hunting and supporting activities (boating) can have on the Service's ability to achieve refuge purposes and goals. The refuge would be opened to waterfowl hunting, with sufficient restrictions in place on hunting, boating, and other visitor services to ensure that an adequate amount of quality feeding and resting habitat would be available in relatively undisturbed areas (sanctuaries) for a majority of waterfowl and other wetland birds using the refuge.

Refuge hunt programs are designed to provide high-quality experiences. In general, hunting on

refuges should be superior to that available on other public lands, which may require special restrictions (Refuge Manual 8RM5). Measures are often used to ensure quality. The limited hunt program is proposed on the refuge to accomplish the following (1) provide a quality hunting experience that meets refuge guidelines and policies, (2) provide sufficient waterfowl sanctuary, and (3) prevent conflicts with other priority wildlife-dependent visitor services.

Consolidation of the hunting area into a single block of land provides a distinct, manageable unit that can be easily delineated, posted, and enforced. It is anticipated that birds will find sufficient food resources and resting places, both inside and outside the hunt area, such that their abundance and use of the refuge will not be measurably lessened, hunting pressure will not cause premature departure from the area, the physiological condition of waterfowl and other waterbirds will not be impaired, their behavior and normal activity patterns will not be altered dramatically, and their overall population status will not be impaired.

Mandatory 15-year reevaluation date: 2023

DESCRIPTION OF USE: RECREATIONAL FISHING

Recreational fishing (a wildlife-dependent activity) has been identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use, provided it is compatible with the purpose for which the refuge was established. An establishment authority for Red Rock Lakes National Wildlife Refuge, the Refuge Recreation Act, provides for “incidental fish and wildlife-oriented recreational development.”

Currently, fishing is allowed on Odell, Red Rock, and Elk Springs (west of Elk Lake Road) under state seasons. Culver, Widgeon, and MacDonald ponds and Elk Springs Creek (east of Elk Lake Road) are open seasonally (July 15–October 1). All other refuge waters are closed to fishing to protect breeding waterfowl and trumpeter swans. Game fish include native Westslope cutthroat trout (although mostly hybridized with nonnatives), Arctic grayling, and limited mountain whitefish. Nonnative game species include brook, Yellowstone cutthroat, and rainbow trout. There are unimproved parking areas at the ponds. Vehicle access points with minimal parking exist at two locations on Red Rock Creek and one each at Elk Springs and Odell creeks. Commercial guiding is not allowed.

Anglers must use nontoxic artificial lures or flies. Lead sinkers are prohibited. Fishing with bait is not permitted in order to reduce introduction of nonnative invasive species and increase the survival of released native fish. The refuge has not collected data on fishing use. From observations, Red Rock

Creek receives the greatest fishing pressure. There is the potential for some Arctic grayling mortality due to such things as trampling of eggs and catch and release fishing. To minimize future impacts on Arctic grayling from fishing, no additional parking areas will be created.

The refuge does not stock nonnative fish species to protect Arctic grayling populations. A primary objective of the proposed alternative (B) is to restore Arctic grayling and Westslope cutthroat trout populations. While refuge streams will be open in compliance with state regulations, fishing closures in target creeks and ponds may be implemented while restoration work is being completed.

The CCP proposes the following fishing opportunities:

- Until they are restored, MacDonald, Widgeon, and Culver ponds would be open under state regulations to fishing from the bank, unless necessary to protect nesting swans or lacustrine/adfluvial Arctic grayling restoration efforts.
- All refuge streams would be open to fishing in compliance with state and refuge regulations.
- To protect native Arctic grayling and Westslope cutthroat populations, visitors would be encouraged to keep all nonnative fish they catch in accordance with state regulations.
- Red Rock Creek west of Lower lake structure would be opened to fishing.

AVAILABILITY OF RESOURCES

Sufficient resources are available at the current levels of fishing pressure. The refuge will continue to work with Montana Fish, Wildlife and Parks to conduct fish and creel surveys.

ANTICIPATED IMPACTS OF USE

Fishing and other human activities cause disturbance to wildlife. This disturbance may have cumulative impacts on wildlife, habitat, and the fisheries resource. This includes more disturbances to wildlife, vegetation trampling, potential introduction and spread of exotic aquatic and terrestrial plants, potential transmission of diseases including whirling disease, problems associated with disposal of human waste, and deposition of lead sinkers and fishing line. Birds or mammals feeding or resting may be disturbed by anglers fishing from the bank. The current visitor use is often low enough that disturbance by anglers cause minimal impacts on most wildlife species. Opening the remaining creeks on the refuge to fishing should not impact Arctic grayling because they have not been found during surveys outside of Odell and Red Rock creeks.

DETERMINATION

Recreational fishing is a compatible use at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

- Fishing is not allowed on Swan Lake and Lower and Upper Red Rock lakes.
- Fishing on the creeks is open according to Montana state seasons.
- Until restored, bank fishing on MacDonald, Widgeon, and Culver ponds would be open under state regulations unless necessary to protect nesting swans or Arctic grayling restoration efforts.
- Anglers must use nontoxic artificial lures or flies.
- Lead sinkers are prohibited.
- Fishing with bait is not permitted.
- The harvest of nonnative game fish species is promoted.
- Commercial guiding is not permitted.
- Existing use is monitored to ensure that disturbance to wildlife continues to be minimal.
- Existing signage is improved or replaced.

JUSTIFICATION

Based upon biological impacts described above and in the EA, it is determined that recreational fishing within Red Rock Lakes National Wildlife Refuge will not materially interfere with or detract from the purposes for which the refuge was established. One of the secondary goals of the National Wildlife Refuge System is to provide opportunities for public fishing when compatible, and it is identified as a priority public use in the National Wildlife Refuge System Improvement Act of 1997. Current recreational fishing at the refuge will support this goal with only minimal conflicts with the wildlife conservation mission of the Refuge System.

Mandatory 15-year reevaluation date: 2023

DESCRIPTION OF USE: WILDLIFE OBSERVATION AND PHOTOGRAPHY

Wildlife observation and photography are major visitor services at the refuge. The beauty and uniqueness of the area combined with the abundance of various bird and mammal species draw over 12,000 visitors each year. The refuge will continue to support and enhance opportunities related to wildlife observation and photography. Supporting uses to assist visitors in wildlife observation and photography are vehicle access, foot access (including

hiking trails), campgrounds, nonmotorized boat and bicycle access. These supporting uses (access) will be controlled and regulated through the publication of refuge brochures and through information posted at the kiosks.

Wildlife observation and photography are two of the six wildlife-dependent recreational uses specified in the Improvement Act.

Wildlife observation and photography will be allowed across most of the refuge, with the exception of closed areas at Shambow Pond and the area surrounding the residences, shop, and equipment yard.

Foot travel, including hiking, snowshoeing, and cross-country skiing, is permitted throughout the refuge except for the above mentioned closed areas.

Passenger vehicles, motorcycles and bicycles will be restricted to county and public refuge roads. Seasonal road closures, due to weather, limit access during the winter and spring months. Snowmobiles are not permitted on refuge roads and are restricted to county roads. ATV's are not allowed on refuge roads or campgrounds and must be licensed for highway use to be able to operate on county roads.

Nonmotorized boat access is seasonally allowed on Red Rock Creek, Upper and Lower Red Rock lakes and the river marsh connecting the two lakes. Boating access is difficult if a drought persists due to the shallowness of the lakes. Sailing is not permitted.

Horses, mules, llamas, and other animals used for riding or packing are permitted only for access into mountainous areas south of South Valley Road (Red Rock Pass Road).

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

- Update and improve refuge signs and brochures.
- Develop an auto-tour route.
- Replace existing kiosks, update interpretive panels, and add an interpretive kiosk.
- Investigate the development of accessible habitat specific wildlife-viewing/photography areas, infrastructure or trails.

AVAILABILITY OF RESOURCES

Developing new facilities outlined in the CCP is closely tied to funding requests in the form of refuge operation needs system (RONS) and maintenance management system (MMS) projects. Existing programs such as current refuge directional signs and brochures can be updated with available resources.

ANTICIPATED IMPACTS OF USE

Wildlife observation and photography can affect the wildlife resource positively or negatively. A positive effect of public involvement in these priority visitor services will be a better appreciation and more complete understanding of the refuge's wildlife and habitats. That can translate into more widespread, stronger support for the refuge, Refuge System, and the Service.

Walking and hiking is expected to minimally disturb wildlife and wildlife habitat at the current and proposed levels. Increased disturbance to wildlife would occur in areas regularly frequented by visitors, such as the campgrounds and trails. During snow-free months, the majority of visitors restrict their pedestrian use to the trails and parking areas, which concentrates these uses along the road system, minimizing disturbance to wildlife and habitats. The majority of the bird species migrate out of the area in the winter months. Elk, pronghorn, and mule deer also tend to leave the valley. Winter pedestrian travel will have little to no impact on other species because of the inaccessibility of the refuge. White-tailed deer and moose around the headquarters are disturbed more frequently in the winter from pedestrian travel but can easily move away from those visitors snowshoeing or skiing.

Vehicular access, while restricted to the roads, allows visitors to cover more ground, potentially increasing the number of times an animal is disturbed, but it may be of shorter duration compared to pedestrian disturbance. Some areas are closed during the winter to all public activity, thereby protecting wintering waterfowl and trumpeter swans. Wildlife disturbance, especially impacts to moose, from snowmobiles traveling through the refuge has not been studied. Snowmobiles are restricted to the county roads. Snowmobile use on the South Valley Road to Elk Creek Road is low at this time. The use may dramatically increase if a resort business opens up in Lakeview in the near future. Snowmobile use through the refuge on Elk Lake Road is relatively high (average 30 snowmobiles/day). These visitors come from West Yellowstone and go up to Elk Lake Resort for lunch. This use needs to be monitored for impacts on wildlife.

Nonmotorized boating is restricted to Red Rock Creek and Upper Red Rock lake from July 15 to freeze up. Lower Red Rock lake and the River Marsh connecting the two lakes is open September 1 to freeze up. Kayaks and canoes are the typical nonmotorized boats used. Wildlife disturbance from human-powered boating displaces birds from the immediate area of the visitors. The slow speeds of the boats and large size of the lakes allow the birds to easily move to another area without further disturbance. This use needs to be monitored for impacts on wildlife.

No cultural resources would be impacted. No impact on endangered species should occur.

Short-term impacts: There may be temporary disturbance to wildlife near the activity. Direct short-term impacts may include minor damage from traffic to refuge roads and trails when wet and muddy. Temporary disturbance may occur due to facility improvements. However, suitable habitats exist nearby and effects on wildlife would be minor and nonpermanent.

Long-term Impacts: None.

Cumulative Impacts: The Service does not expect substantial cumulative impacts from these two priority uses in the near term, but it will be important for refuge staff to monitor those uses and, if necessary, respond to conserve high-quality wildlife resources.

Refuge staff, in collaboration with volunteers, will monitor and evaluate the effects of these priority visitor services to discern and respond to any unacceptable impacts on wildlife or habitats. To mitigate those impacts, the refuge will close areas where birds such as bald eagles, colonial waterbirds, or swans are nesting. The Service expects no additional effects from providing these two priority uses.

DETERMINATION

Wildlife observation and photography are compatible uses at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

- Wildlife observation and photography will be allowed across most of the refuge, with the exception of closed areas at Shambow Pond and the area surrounding the residences, shop, and equipment yard.
- Foot travel, including hiking, snowshoeing, and cross-country skiing, is permitted throughout the refuge, except for the above-mentioned closed areas.
- Passenger vehicles, motorcycles, and bicycles will be restricted to county and public refuge roads. Seasonal road closures due to weather limit access during the winter and spring months. Snowmobiles are not permitted on refuge roads and are restricted to county roads. All terrain vehicles are not allowed on refuge roads or campgrounds and must be licensed for highway use to be able to operate on county roads.
- Nonmotorized boat access is seasonally allowed on Red Rock Creek, Upper and Lower Red Rock lakes, and the River Marsh connecting the two lakes. Boating access is difficult if a drought

persists due to the shallowness of the lakes. Sailing is not permitted.

- Horses, mules, llamas, and other animals used for riding or packing are permitted only for access into mountainous areas south of South Valley Road (Red Rock Pass Road).
- An increase in education and law enforcement patrols would minimize illegal or undesirable activity.
- Newly constructed viewing areas would be designed to minimize disturbance impacts on wildlife and all refuge resources while providing a good opportunity to view wildlife in their natural environments.

JUSTIFICATION

According to the National Wildlife Refuge System Improvement Act of 1997, wildlife observation and photography are priority public use activities that should be encouraged and expanded where possible. It is through compatible visitor services such as this that the public becomes aware of and provides support for refuges.

Mandatory 15-year reevaluation date: 2023

DESCRIPTION OF USE: ENVIRONMENTAL EDUCATION AND INTERPRETATION

Environmental education and interpretation are both defined as wildlife-dependent recreational uses under the Improvement Act. Currently these programs have been opportunistic as time and staff allows. School group participation in environmental education is severely limited due to road conditions and distance from communities. A few organized groups request tours and talks during the summer months. Interpretation is limited to brochures, information panels at the headquarters visitor contact station, two standalone panels, and three kiosks. In addition, the refuge does not have an auto-tour route or interpretation along designated trails.

The CCP proposes to continue with the above uses, and add the following to improve environmental education and interpretation:

- Hire a seasonal visitor services technician to develop and carry out interpretive programs.
- Update and improve refuge signs and brochures, identifying refuge trails.
- Develop and interpret an auto tour route.
- Replace existing kiosks, update interpretive panels, and add an interpretive kiosk.

AVAILABILITY OF RESOURCES

Funding for these activities is supported solely by annual operation and maintenance money. Resources are stretched in order to continue providing

environmental education and interpretation at the refuge. Implementing new facilities outlined in the CCP is closely tied to funding requests in the form of refuge operation needs system (RONS) and maintenance management system (MMS) projects. Existing programs such as current refuge directional signs and brochures can be updated with available resources.

ANTICIPATED IMPACTS OF USE

The use of the refuge to provide interpretation and environmental education on the refuge may impose a low-level impact on those sites used for these activities. Impacts may include trampling vegetation and temporary disturbance to wildlife species in the immediate vicinity.

DETERMINATION

Environmental education and interpretation use are compatible uses at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

Visitors participating in environmental education and Interpretation programs will follow all refuge regulations. On-site activities should be held where minimal impact would occur.

JUSTIFICATION

One of the secondary goals of the National Wildlife Refuge System is to provide opportunities for the public to develop an understanding and appreciation for wildlife when it is found compatible with other goals. The above uses are identified as priority visitor services in the National Wildlife Refuge System Improvement Act of 1997 and will help meet the above secondary goal with only minimal conflicts.

Environmental education and interpretation are 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 land ethics, developing support for the refuge, and decreasing wildlife violations.

Environmental education at the refuge is incidental to other programs since there is no full-time staff to conduct these activities. However, the program is important and provides visitors with an awareness of refuge-specific issues such as wetland ecology, migratory bird management, and issues relating to the entire Refuge System.

Based on anticipated biological impacts and in the environmental assessment, it is determined that environmental education and interpretation on the refuge will not interfere with refuge habitat goals and objectives or the purposes for which it was

established. Limits to access and monitoring can help mitigate any adverse impacts.

Mandatory 15-year reevaluation date: 2023

DESCRIPTION OF USE: CAMPING

Red Rock Lakes National Wildlife Refuge manages two primitive campgrounds for visitors participating in wildlife-dependant recreation. Camping is not permitted elsewhere on the refuge. The campgrounds provide opportunities to participate in wildlife-dependant recreation without traveling great distances. Because of the distance to town and limited public land access, the campgrounds are used regularly by visitors who are bird watching, photographing wildlife, fishing, hunting, and hiking or bicycling the Continental Divide trails. Groups touring the valley and refuge also use the campgrounds for day use.

Camping is permitted year-round, but it primarily occurs from May through October with some use in November. Access to the campgrounds in the winter is limited to travel across snow-covered roads, and the vault toilets are not maintained. Visitors observing and photographing wildlife are the primary users during the summer, with hunters dominating in the fall. Camping is allowed for up to 14 consecutive days. Fires are only allowed in fire rings, and visitors can collect dead and downed material. Garbage must be packed out. Visitors to the campgrounds rarely litter. Food and carcass storage is required to protect grizzly and black bears and visitors. The refuge will provide bear-proof storage containers for hikers, bicyclists, and motorcyclists and for hunters to store carcasses.

Upper Lake campground receives the most use by visitors due to its beautiful scenery and location adjacent to the county road. It provides two vault toilets (not accessible), piped spring water, picnic tables (one accessible), and fire rings. The entrance road and all campsites need repairs. There are no hookups, parking, or turnarounds specifically for recreational vehicles (RVs). This limits RVs from using this campground, which provides more campsites for hikers, bicyclists, and vehicle campers. This minimizes conflicts between vehicles using generators and low-impact campers. There are 11 designated sites. There is a boat ramp (not accessible) for nonmotorized boats. An informational kiosk is provided to inform the visitor about the refuge and its wildlife. Upper Red Rock lake is open to nonmotorized boats from July 15 to freeze up to protect breeding birds.

River Marsh campground provides two vault toilets (not accessible) and fire rings. There are no designated campsites here and it can accommodate RVs. This campground is primarily used during hunting seasons, especially waterfowl hunting

because it provides immediate access to open hunt areas. Summer use does occur by wildlife observers who want to get away from the county road. There is a boat ramp (accessible) for nonmotorized boats. Lower Red Rock lake is open to nonmotorized boats from September 1 to freeze up to protect breeding birds.

Universally accessible toilets would replace old toilets at both campgrounds, along with an accessible campsite at the River Marsh campground. Other improvements, such as food storage containers, picnic tables, fire rings, and road repair, will increase the safety for visitors and the opportunities to use the refuge over multiple days. A recreational fee may be charged to help offset the maintenance of the campgrounds.

AVAILABILITY OF RESOURCES

Existing funding and staffing are adequate to maintain the refuge campgrounds to provide access to wildlife-dependent activities on and off of the refuge. During the peak summer months, volunteers maintain the vault toilets, pick up litter, and clean campsites. They also make many contacts with visitors, educating them about the refuge and its wildlife. The campgrounds are both about 4 miles away from headquarters, which allows for easy access to patrol and monitor the visitors. Visitor Facility Enhancement funding will help correct drainage issues on the entrance and campsite access roads. Operating the campgrounds as a fee unit would require, at a minimum, one full day a week of staff time for collecting and counting of money and increased law enforcement presence. The refuge contracts the pumping of the vault toilets. The Upper Lake toilets need to be pumped twice a year due to the high use and inadequate size of the vaults. The refuge could reduce pumping needs to once a year or less by replacing the old vault toilets with adequately sized, clean-smelling vault toilets. The new toilets would meet Americans with Disabilities Act requirements. This improvement is dependent upon funding from the Visitor Facility Enhancement Program.

ANTICIPATED IMPACTS OF THE USE

Some short-term impacts, such as littering, vegetation trampling, and wildlife disturbance, can be expected, but these are not anticipated to be significant at current or increased levels of camping. This is because the vast majority of visitors travel the long distances over rough roads to enjoy the scenery, outdoors, solitude, and wildlife of the refuge. Isolation buffers the refuge from visitors looking for a party location. Very few problems have occurred with visitors using the campgrounds.

The Upper Lake campground is surrounded by thick vegetation, and visitors tend to watch wildlife within

the open areas of the campground and along the county road. Refuge staff regularly receive reports by visitors who see moose, badger, fox, and deer walking through the campground. The River Marsh campground is located in open grassland habitat next to Lower Red Rock lake. Wildlife disturbance primarily impacts waterfowl that move away from the shoreline when there are people present in the campground. The potential for accidental wildfires exists, but with education, the hazard would be reduced or eliminated if burn bans are implemented.

The use of these primitive campsites by through hikers, bicyclists, and motorcyclists on the Continental and Great Divide trails will not adversely impact refuge purposes and objectives. This use is at a low level and is not expected to substantially increase over the next 15 years.

By providing environmental education or interpretive programs, or both, at the campgrounds to a “captive” audience, the refuge staff can encourage an understanding in citizens of all ages to act responsibly in protecting wildlife and habitat. These are tools used in building land ethic, developing support of the refuge, and decreasing wildlife violations.

DETERMINATION

Camping is a compatible use at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

- The refuge will continue to enforce general visitor services regulations which protect habitat and wildlife, and limit disturbance to other refuge visitors.
- The refuge manager may prohibit fires during periods of high fire danger.
- The refuge will continue to provide information to campers.
- Expansion of the campgrounds will not occur.
- A detailed step-down visitor services plan will be completed and will include planned improvements to the existing impacted area within the campgrounds such as placement of new accessible vault toilets out of the view of Upper Red Rock lake, an accessible observation deck, and planned campsite placement.
- Commercial operations will not be allowed to use the campgrounds.

JUSTIFICATION

Camping is not a priority wildlife-dependent recreational use as identified in the National Wildlife Refuge System Improvement Act of 1997. It is, however, an activity in support of other priority

uses, such as fishing, hunting, wildlife observation, and photography. It is a policy of the U.S. Fish and Wildlife Service that, “We may allow other activities on refuges, such as camping, to facilitate compatible wildlife-dependent recreation.” (605 FW 1, 1.2B). Camping on the refuge will have limited negative impacts on natural resources when conducted under the above stipulations. Management of this use will require minimal administrative time and potentially manageable amounts of time in the form of toilet maintenance and public contacts. Camping, therefore, at its current level of use will not negatively interfere with the purposes of the refuge or the mission of the Refuge system.

Mandatory 15-year reevaluation date: 2023

DESCRIPTION OF USE: COMMERCIAL FILMING, AUDIO RECORDING, AND STILL PHOTOGRAPHY

Commercial filming is defined as the digital or film recording of a visual image or sound recording by a person, business, or other entity for a market audience, such as for a documentary, television or feature film, advertisement, or similar project. It does not include news coverage or visitor use. Still photography is defined as the capturing of a still image on film or in a digital format.

The Red Rock Lakes National Wildlife Refuge and designated Wilderness is an incredibly scenic and beautiful landscape with tremendous opportunities for commercial filming and commercial still photography. The refuge provides an ideal setting for filmmakers and photographers. Each year the refuge staff receives approximately one to five requests to conduct commercial filming or commercial still photography on the refuge. Each request is evaluated on an individual basis, using a number of Department of the Interior, U.S. Fish and Wildlife Service, and National Wildlife Refuge System policies (for example, 43 CFR Part 5, 50 CFR Part 7, 8 RM 16). Commercial filming will be managed on the refuge through the special user permit process (except as described below for certain activities conducted by commercial still photographers—see Stipulations Necessary to Ensure Compatibility) to minimize the possibility of damage to cultural or natural resources or interference with other visitors to the area. In addition, much of the refuge is designated wilderness area. A minimum-requirements decision guide will be completed for all commercial filming activities proposed in the wilderness area. This process involves determining if an essential task should be conducted in the Wilderness Area, and then determining the combination of methods, equipment, or administrative practices necessary to successfully and safely administer the refuge and accomplish wilderness management objectives.

The use includes access by groups or individuals in vehicles on roads open to the general public, by nonmotorized boats on refuge waters open to the general public, and on refuge lands open to the general public. In rare cases, access to areas closed to the general public may be permitted through the special use permit process.

AVAILABILITY OF RESOURCES

In general, the refuge would normally incur no expense except administrative costs for review of applications, issuance of a special use permit, and staff time to conduct compliance checks. These costs may be able to be recovered as outlined in a Proposed Rule modifying commercial filming and still photography policy for the several agencies within the Department of the Interior. This Proposed Rule is currently in the public review process (Federal Register, Volume 72, Number 160, dated August 20, 2007).

ANTICIPATED IMPACTS OF THE USE

Wildlife photographers and filmmakers tend to create the largest disturbance impacts of all wildlife observers (Dobb 1998, Klein 1993, Morton 1995). While wildlife observers frequently stop to view species, wildlife photographers are more likely to approach wildlife (Klein 1993). Even a slow approach by wildlife photographers tends to have behavioral consequences to wildlife species (Klein 1993). Other impacts include the potential for photographers to remain close to wildlife for extended periods of time, in an attempt to habituate the wildlife subject to their presence (Dobb 1998) and the tendency for photographers with low-power lenses to get much closer to their subjects (Morton 1995). This usually results in increased disturbance to wildlife and habitat, including the trampling of plants. Handling of animals and disturbing vegetation (such as cutting plants, removing flowers) is prohibited on the refuge.

These impacts are expected to be minimized or avoided through the denial of issuance of special use permits for commercial filming and still photography (see exceptions to still photography permitting outlined below) on a case-by-case basis.

PUBLIC REVIEW AND COMMENT

This compatibility determination was prepared concurrently with the CCP for the refuge. Public review and comment was achieved concurrently with the public review and comment period for the draft CCP and EA.

DETERMINATION

Commercial filming, audio recording, and still photography are compatible uses at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

All commercial filming requires a special use permit.

- Special use permits will identify conditions that protect the refuge's values, purposes, resources; public health and safety, and prevent unreasonable disruption of the public's use and enjoyment of the refuge. Such conditions may be, but are not limited to, specifying road conditions when access will not be allowed, establishing time limitations, and identifying routes of access into the refuge. These conditions will be identified to prevent excessive disturbance to wildlife, damage to habitat or refuge infrastructure, or conflicts with other visitor services or management activities.
- The special use permit will stipulate that imagery produced on refuge lands will be made available to the refuge to use in outreach, interpretation, internal documents, or other suitable uses. In addition, any commercial products must include appropriate credits to the refuge, the National Wildlife Refuge System, and the U.S. Fish and Wildlife Service.
- The commercial filming or still photography use must demonstrate a means to extend public appreciation and understanding of wildlife or natural habitats, or enhance education, appreciation and understanding of the National Wildlife Refuge System, or facilitate outreach and education goals of the refuge. Failure to demonstrate any of these criteria will result in a special use permit being denied.
- Still photography requires a special use permit (with specific conditions as outlined above) if one or more of the following would occur:
 - it takes place at locations where or when member of the public are not allowed.
 - it uses model(s), set(s), prop(s) that are not part of the location's natural or cultural resources or administrative facilities.
 - the refuge would incur additional administrative costs to monitor the activity.
 - the refuge would need to provide management and oversight to: avoid impairment of the resources and values of the site; limit resource damage; or minimize health and safety risks to the visiting public.
 - the photographer(s) intentionally manipulate(s) vegetation to create a "shot" (for example cutting vegetation to create a blind).
- To minimize impact on refuge lands and resources, the refuge staff will ensure that all commercial filmmakers and commercial still photographers (regardless of whether a special use permit is issued) comply with policies, rules,

and regulations, and refuge staff will monitor and assess the activities of all filmmakers, photographers and audio recorders.

JUSTIFICATION

Allowing commercial filming, still photography or audio recording is an economic use that must contribute to the achievement of the refuge purposes, mission of the National Wildlife Refuge System, or the mission of the U.S. Fish and Wildlife Service. Providing opportunities for commercial filming, still photography, or audio recording that meets the above requirements should result in an increased public awareness of the refuge's ecological importance as well as advancing the public's knowledge and support for the National Wildlife Refuge System and the U.S. Fish and Wildlife Service. The stipulations outlined above and conditions imposed in the special use permits issued to commercial filmmakers, still photographers and audio recorders would ensure that these wildlife-dependent activities occur without adverse effects on refuge resources or refuge visitors.

Mandatory 15-year reevaluation date: 2023

DESCRIPTION OF USE: COMMERCIALY GUIDED OR OUTFITTED STOCK ANIMAL SERVICES FOR GAME RETRIEVAL AND ACCESS ACROSS THE REFUGE INTO THE CENTENNIAL MOUNTAINS

Use of stock animals by the public to retrieve game and access the Centennial Mountains is currently authorized on the refuge (see Recreational Hunting – Compatibility Determination which was evaluated separately). There is no authorized use of hunting guides on the refuge.

Commercially guided and/or outfitted stock animal services can be divided into two categories. The first is the use of stock animals (with or without the services of the stock owner) to retrieve big game taken on the refuge or adjacent lands. This service is typically provided to moose hunters on the refuge as it is usually logistically difficult to remove moose carcasses on foot due to the terrain and size of the animal. In addition, this service has been typically provided to hunters that take an elk off-refuge in the upper elevations of the Centennial Mountains. Many times, the only feasible access to this animal is to cross refuge property with the outfitted stock animals. Approximately, 10 to 20 pack trips are made annual to retrieve animals.

The second category of use is to provide access to hunters, campers and environmental education students that are being guided and/or taught by the sole outfitting/guiding service (known as Centennial Outfitters) authorized to operate in the Centennial

Mountains (under State of Montana and Bureau of Land Management permits). Access to the Centennial Mountains across public land is extremely limited – especially on the east end of the mountain range where the refuge exists. Access into the Centennial Mountains by this outfitter is restricted to two access points across the refuge (Odell Creek trail and Shambow Trail). Approximately 65 to 75 trips are made each year over a period of 55 to 65 days. The majority of the trips occur in September, October and November. Trips vary in the number of stock animals that are used from 1 (just a rider on a horse) up to 23 animals (various number of riders and pack animals). The largest number of animals occurs during the summer months (typically July) when Centennial Outfitters are offering day trips for wildlife observation and environmental education/interpretation programs.

Centennial Outfitters is the sole commercial operation licensed to operate in the Centennial Mountains. Access onto and across the refuge has been conducted utilizing a Special Use Permit in past years. As of 2005, Centennial Outfitters reports all trips made across the refuge as well as the number of riders and animals used as a condition of their special use permit.

The use of commercially provided stock animals contributes to fulfillment of refuge purposes and to the National Wildlife Refuge System mission by facilitating priority visitor services (hunting, wildlife observation, interpretation and environmental education) and management of healthy wildlife populations through controlled hunting.

AVAILABILITY OF RESOURCES

Adequate refuge personnel and base operational funds are available to manage this commercial activity at existing levels. Administrative staff time primarily involves issuing one special use permit a year. This burden could be reduced by extending the period of use of this one permit. Fieldwork associated with administering this program primarily involves monitoring the permittee's compliance with permit terms and assessing trail conditions. Total staff time for administering this permit is approximately 5 days per year.

ANTICIPATED IMPACTS OF THE USE

Wildlife disturbance from horseback riding and stock animals is not well-documented. However, some studies suggest that many wildlife species are habituated to livestock and that horseback wildlife observers can approach wildlife at closer distances than by other forms of travel (Bennett and Zuelke 1999, Williams and Conway-Durver 1998).

Horseback riding and the use of stock animals has both a direct and indirect effect on habitat. Trampling causes mortality of plant and animal species. Indirect

effects result when soil is compacted and plants cannot reestablish (Summer 1980). Grazing can reduce vegetation. Nonnative plant species can be spread by stock animals through feces and seeds dropped that were caught in a stock animal's hair. In addition, stock animal manure, although not harmful to human health, can cause conflicts with other trail users since it can be odorous, unaesthetic, and a nuisance.

While there can be user group conflicts and some limited safety issues resulting from hikers and commercial use of stock animals using the same trail, these are expected to be minimal given the current level of use.

In general the impacts to wildlife, plant species, and other visitors to the refuge are expected to be minimal given the current level of use by one outfitter using stock animals to access the Centennial Mountains or retrieve game animals from the refuge.

DETERMINATION

Commercially guided or outfitted stock animal services for game retrieval and access across the refuge into the Centennial Mountains is a compatible use at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

- All commercial use of stock animals requires a special use permit. Special use permits will identify conditions that protect the refuge's values, purposes, resources, and public health and safety, as well as prevent unreasonable disruption of the public's use and enjoyment of the refuge. Such conditions may be, but are not limited to specifying trail conditions when access will not be allowed, establishing limitations on the group size and number of trips allowed annually, recommendations for preventing the spread of nonnative vegetation, and identifying routes of access into the refuge. These conditions will be identified to prevent excessive disturbance to wildlife, damage to habitat or refuge infrastructure, or conflicts with other visitor services or management activities.
- The commercial use of stock animals must demonstrate a means to extend public appreciation and understanding of wildlife or natural habitats, or both; OR enhance education, appreciation and understanding of the National Wildlife Refuge System; OR facilitate outreach, education, and visitor services goals of the refuge. Failure to demonstrate any of these criteria will result in denial of a special use permit.

- Commercial stock animals may not be corralled, tethered, or hitched along trails on the refuge.

JUSTIFICATION

Recreational hunting, environmental interpretation, and environmental education have been found to be compatible with the purposes of the refuge and the National Wildlife Refuge System mission. Commercially guided and outfitted stock animal services is a form of traditional activity that Congress intended to preserve with the enactment of the Wilderness Act, which is an important act guiding the management of the refuge. These services on the refuge support priority visitor services, including hunting, environmental education, environmental interpretation, and wildlife observation and photography. Access into the Centennial Mountains would be much more restricted if these services were not allowed. The requirements placed on recreation guides ensure that these commercial operations are safe and high-quality operations. These requirements are by the Bureau of Land Management through its selection process, by the refuge through the terms of a special use permit, and by the state of Montana through regulations placed on guides and outfitters. These services are a valuable benefit to a segment of the American public that is not physically able to, not comfortable with, or for other reasons chooses not to participate in unguided trips into the Centennial Mountains. Access across the refuge by commercially guided or outfitted stock animals is essential to getting these types of Americans into this wilderness area. In addition, due to the difficulty of pedestrian travel in the area where moose hunting is allowed on the refuge, many moose hunters would not be able to retrieve their animals if this service were not provided.

Mandatory 15-year reevaluation date: 2023

DESCRIPTION OF USE: RESEARCH

The Red Rock Lakes National Wildlife Refuge receives approximately 1–3 requests per year to conduct scientific research on the refuge. Priority would be given to studies that contribute to the enhancement, protection, preservation, and management of the refuge's native plant, fish, and wildlife populations and their habitats. Research applicants must submit a proposal that outlines (1) objectives of the study; (2) justification for the study; (3) detailed study methodology and schedule; and (4) potential impacts on refuge wildlife and habitat, including disturbance (short and long-term), injury, or mortality. This includes a description of measures the researcher will take to reduce disturbances or impacts; (5) personnel required and their qualifications/experience; (6) status of necessary permits (scientific collecting permits, endangered species permits); (7) costs to refuge and refuge staff time requested, if any; and (8) anticipated progress

reports and end products (such as reports or publications). Refuge staff or others, as appropriate, would review research proposals and issues special use permits if approved.

Evaluation criteria will include, but not be limited to, the following:

- Research that will contribute to specific refuge management issues will be given higher priority over other requests.
- Research that will conflict with other ongoing research, monitoring, or management programs will not be approved.
- Research projects that can be conducted off-refuge are less likely to be approved.
- Research that causes undue disturbance or is intrusive will likely not be approved. The degree and type of disturbance would be carefully weighed when evaluating a research request.
- Research evaluation will determine if any effort has been made to minimize disturbance through study design, including adjusting location, timing scope, number of permittees, study methods, and number of study sites.
- If staffing or logistics make it impossible for the refuge to monitor researcher activity in a sensitive area, this may be reason to deny the request, depending on the specific circumstances.
- The length of the project will be considered and agreed upon before approval. Projects will be reviewed annually.

The refuge currently has an active land acquisition program. If newly acquired property includes areas of research interest, the same special use permit process and evaluation criteria described above will be followed.

AVAILABILITY OF RESOURCES

Adequate funding and staffing currently exist to manage for a limited amount of research at the Red Rock Lakes National Wildlife Refuge. As always, discretionary use of staff time would be weighed through a cost-benefit analysis. It is anticipated that approximately \$6,000 per year would be required to administer and manage research activities described above. Administration would include, but not be limited to, evaluation of applications, management of permits, and oversight of research projects.

ANTICIPATED IMPACTS OF USE

Some degree of disturbance is expected with all research activities since most researchers will be entering areas that are seasonally-closed or conducting research in remote areas of the refuge that have limited visitation by the general public,

and some research requires collection of samples or handling of wildlife. However, minimal impact on refuge wildlife and habitats is expected with research studies because special use permits will include conditions to ensure that impact to wildlife and habitats are kept to a minimum.

DETERMINATION

Research use is a compatible use at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Extremely sensitive wildlife habitat areas and wildlife species will be provided sufficient protection from disturbance by limiting proposed research activities in these areas. All refuge rules and regulations must be followed unless otherwise exempted by refuge management.
- Refuge staff will use the criteria for evaluating a research proposal, as outlined above under "Description of Use," when determining whether to approve a proposed study on the refuge. If proposed research methods are evaluated and determined to have potential impacts on refuge resources (habitat or wildlife), it must be demonstrated that the research is necessary for refuge resource conservation management. Measures to minimize potential impacts would need to be developed and included as part of the study design. In addition, these measures will be listed as conditions on the special use permit.
- Refuge staff will monitor research activities for compliance with conditions of the special use permit. At any time, refuge 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 will also have the ability to cancel a special use permit if the researcher is out of compliance or to ensure wildlife and habitat protection.

JUSTIFICATION

The program as described is determined to be compatible. Potential impacts of research activities on refuge resources will be minimized because sufficient restrictions would be included as part of the study design and research activities will be monitored by the refuge staff. Research projects will contribute to the enhancement, protection, preservation, and management of the refuge's wildlife populations and their habitats.

Mandatory 15-year reevaluation date: 2023**DESCRIPTION OF USE: GRAZING**

The refuge currently uses livestock grazing as a tool to manage a variety of upland, riparian, and seasonal wetland habitats. Livestock grazing 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 is not permitted on the refuge until after July 10 to minimize disturbance to nesting birds. Between 1994 and 2006 grazing rates ranged from 0.31–0.85 animal unit months (AUM) per acre, with an average of 3,790 AUM used annually. Actual rates per field varied substantially depending on the site, with some grazing unit rates being as low as 0.02 AUM per acre and others as high as 2.17 AUM per acre. The refuge currently has 23 subunits where grazing is being used as a management tool. Maintenance of the fences is a constant effort due to weather, water, animal, and human impacts.

The CCP proposes to continue using prescribed grazing in order to manage habitats. The CCP will establish goals and objectives for specific habitat types (such as riparian, wet meadow, and shrub-steppe) where prescribed grazing may be used. In addition, target wildlife species (such as northern pintail and Brewer's sparrow) and their habitat requirements have been identified. This has resulted in development of objectives that will guide management to meet target wildlife species habitat needs. The refuge will improve upon the vegetation and wildlife monitoring and research program in order to assess habitat and wildlife population responses to the prescribed grazing management program. Different grazing rates and management strategies will be investigated in order to determine the best methods for the refuge to meet the identified habitat goals and objectives of the CCP.

AVAILABILITY OF RESOURCES

Current refuge staff and funding resources are limited for the purposes of monitoring habitats and implementing research needs to understand the impacts of grazing on the refuge habitats. A minimum of one full-time seasonal biological technician would greatly enhance the refuge's ability to assess the outcomes of grazing. However, over the past 4 years, refuge staff have been able to use students from universities and colleges to lay the ground work for an improved monitoring program. In addition, the refuge recently completed a detailed vegetation inventory using the U.S. National Vegetation Classification Standards. Data were collected during the summers of 2005–2007. Field surveys were digitized, and a database for geographic information systems was generated. This data will greatly benefit the refuge in designing

research and monitoring protocol for assessing the prescribed grazing management program.

ANTICIPATED IMPACTS OF USE

The prescribed grazing management program is intended to be used to meet habitat and species-specific goals and objectives identified in the CCP. This management is intended to maintain and enhance habitat conditions for the benefit of a wide variety of fish and wildlife that used the refuge. Minimal negative impacts are expected through the use of this tool. Some trampling of areas may occur around watering areas or mineral licks. If fences are not maintained, it may be difficult to meet habitat objectives. It is anticipated that grazing will be in a mosaic pattern with some areas more intensely grazed than others in certain years. Grazing, as well as fire, is known to increase the nutrient cycling of nitrogen and phosphorous (Burke et al. 2005, Hauer and Spencer 1998, McEachern et al. 2000). Therefore, management of upland habitats adjacent to natural lakes (such as Upper and Swan lakes) and marshes could result in elevated levels of these nutrients in the lakes. Elevated levels of phosphorous and nitrogen can lead to increases in algae and turbidity in shallow lakes, which may ultimately lead to significant losses of submerged aquatic vegetation communities (see for example, Egertson et al. 2004). In addition, the presence of livestock would be disturbing to some wildlife species and some public users. The benefits of this habitat management tool are felt to outweigh these negative impacts.

DETERMINATION

Grazing use is a compatible use at Red Rock Lakes National Wildlife Refuge.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Maintain existing riparian fences and use temporary fencing, as needed, to protect riparian habitats from cattle.
- Implement a vegetation monitoring program to assess if focal species habitat requirements are being met.
- Carry out a study to determine the influence of cattle grazing on the abundance and distribution of small mammals, as identified in the CCP.
- Begin vegetation monitoring of shrub-steppe and grassland habitats to assure adequate coverage of sagebrush, native bunchgrasses, and forbs—as identified in the CCP.
- Begin nutrient (such as phosphorus, nitrogen) monitoring in Lower Red Rock, Upper Red Rock, and Swan lakes to ensure that nutrient levels are not increased to a point that would

result in algae and turbidity increases and decreases in submerged aquatic vegetation communities.

JUSTIFICATION

To maintain and enhance habitat for migratory birds and other wildlife, some habitat management needs to occur. Prescribed livestock grazing is one option that can be used to achieve desired habitat conditions. Prescribed grazing is a useful tool because it can be controlled, and results of the grazing can be monitored (for example, vegetation monitoring) so that adjustments to the program can be made in order to meet habitat goals and objectives.

Mandatory 15-year reevaluation date: 2023

Appendix F

Fire Management Program

The U.S. Fish and Wildlife Service has administrative responsibility which includes fire management for Red Rock Lakes National Wildlife Refuge, which covers approximately 47,756 acres in southwestern Montana.

THE ROLE OF FIRE

Vegetation in the Rocky Mountains evolved under periodic disturbance and defoliation from fire, drought, floods, large herbivores, insect outbreaks, and disease. These periodic disturbances are what kept the ecosystem diverse and healthy, while maintaining significant biodiversity for thousands of years.

Historically, naturally occurring wildland fire played an important disturbance role in many ecosystems by stimulating regeneration, cycling nutrients, providing a diversity of habitats for plants and wildlife, and decreasing the impacts of insects and diseases.

When fire is excluded on a broad scale, the accumulation of living and dead fuels can contribute to degraded plant communities and wildlife habitats. These fuel accumulations often change fire system characteristics, and have created potential for uncharacteristically severe wildland fires.

Return of fire in most ecosystems is essential for healthy vegetation for wildlife habitat in grasslands, wetlands, and forests. When integrated back into an ecosystem, fire can help restore and maintain healthy systems and reduce the risk of wildland fires. To make fire's natural role in the environment easier, fire first must be integrated into land and resource management plans and activities on a broad scale.

Fire, when properly utilized, can:

- reduce hazardous fuels buildup in both wildland–urban interface (WUI) and non-WUI areas;
- improve wildlife habitats by reducing the density of vegetation or changing plant species composition;
- sustain or increase biological diversity;
- improve woodlands and shrub lands by reducing plant density;

- reduce susceptibility of plants to insect and disease outbreaks;
- improve the effectiveness of an integrated pest management program (such as for controlling smooth brome).

WILDLAND FIRE MANAGEMENT POLICY AND GUIDANCE

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

- Firefighter and public safety is the first priority in every fire management activity.
- The role of wildland fires as an ecological process and natural change agent will be incorporated into the planning process.
- Fire management plans, programs, and activities support land and resource management plans and their implementation.
- Sound risk management is a foundation for all fire management activities.
- Fire management programs and activities are economically viable, based on values to be protected, costs, and land and resource management objectives.
- FMPs and activities are based on the best available science.
- FMP's and activities incorporate public health and environmental quality consideration.
- Federal, state, tribal, local, interagency, and international coordination and cooperation are essential.
- Standardization of policies and procedures among federal agencies is an ongoing objective.

The fire management considerations, guidance, and direction should be addressed in the land

use resource plans such as the Comprehensive Conservation Plan (CCP). FMPs are step-down processes from the land use plans and habitat plans, with more detail on fire suppression, fire use, and fire management activities.

MANAGEMENT DIRECTION

Red Rock Lakes National Wildlife Refuge will suppress human-caused fires and wildfires that threaten life and property. The use of appropriate management response will be incorporated into the refuge's FMP to allow agency administrators the ability to choose from a full spectrum of fire suppression actions. Appropriate suppression actions, whether aggressive, high intensity, or low intensity actions, will be based on preplanned analysis and executed to minimize suppression costs, and resource losses consistent with land management objectives.

Wildland fire and 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 organization partners. In addition, fuel treatments will be prioritized based on the guidance for prioritization established in the goals and strategies outlined in the "U.S. Fish and Wildlife Services National Wildlife Refuge System Wildland Fire Management Program Strategic Plan 2003–2010" and "Region 6 Refuges Regional Priorities FY07 to FY11." For WUI treatments, areas with community wildfire protection plans (CWPPs) and "Communities at Risk" will be the primary focus. The settlement of Lakeview, Montana, located adjacent to the refuge, was identified as a "Community at Risk" in the Federal Register: August 17, 2001 (Volume 66, Number 160). Lakeview is being incorporated into a CWPP.

All aspects of the fire management program will be conducted in a manner consistent with applicable laws, policies, and regulations. Red Rock Lakes National Wildlife Refuge will maintain an FMP to accomplish the fire management goals described below. Wildland fire, prescribed fire, and manual and mechanical fuel treatments will be applied in a scientific manner under selected weather and environmental conditions.

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 U.S. Department of the Interior, and Service policies, 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, and Interagency Standards for Fire and Aviation Operations.

The "Region 6 Refuges Regional Priorities FY07 through FY11" are consistent with the refuge's vision statement for region 6: "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 FIRE MANAGEMENT GOALS

The goal of the refuge's fire management program is to work with our interagency partners to:

1. Suppress human-caused fires and wildfires that threaten life and property.
2. Reduce wildland fire risk to the community of Lakeview and other structures on public and private land through hazardous fuels reduction treatments.
3. Use wildland and prescribed fire, manual, and mechanical treatment methods to achieve habitat goals and objectives identified in this CCP using scientific techniques and adaptive resource management to monitor results.
4. Update the current (2002) "Fire Management Plan," incorporating fire management within an interagency fire management plan.

STRATEGIES

Strategies and tactics that consider public and firefighter safety as well as resource values at risk will be used. Wildland fire use and suppression, prescribed fire methods, manual and mechanical methods, timing, and monitoring are described in more detail within step-down FMPs.

All management actions would use wildland fire, prescribed fire, and manual or mechanical treatment methods to reduce hazardous fuels, restore and maintain desired habitat conditions, and control nonnative vegetation within the diverse ecosystem habitats. The fuels treatment program will be outlined in the FMP for the refuges. Site-specific prescribed fire plans will be developed following the "Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide" (2006) template.

Prescribed fire temporarily reduces air quality by reducing visibility and releasing components through combustion. The refuge will meet the Clean Air Act emission standards by adhering to the "Montana State Implementation Plan" requirements during all prescribed fire activities.

FIRE MANAGEMENT ORGANIZATION, CONTACTS, AND COOPERATION

Qualified fire management technical oversight for the refuge will be established by region 6, using the fire management district approach. Under this approach, fire management staff will be determined by established modeling systems based on the fire management workload of a group of refuges, and possibly that of interagency partners. The fire management workload consists of historical wildland fire activity, as well as historical and planned fuels treatments.

Depending on budgets, fire management staffing and support equipment may be located at the administrative station 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 nonfederal partners.

Upon approval of this CCP, a new FMP for Red Rock Lakes National Wildlife Refuge will be developed in collaboration with interagency partners.

Bibliography

- [Anon.] 2007. Check-list of North American birds. [Place of publication unknown]: American Ornithologists' Union. 7th ed., 48th supplement, [Pages unknown].
- [Anon.] [No date]. Miscellaneous publication no. 54. Missoula, MT: Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana. [Pages unknown].
- Aitken, K.E.H.; Wiebe, K.L.; Martin, K. 2002. Nest-site reuse patterns for a cavity-nesting bird community in interior British Columbia. *The Auk* 119:391–402.
- Albanese J.A.; Hill C.L.; Davis L.B. 1995. Upper Pleistocene geology of the Merrell site (24BE1659), Centennial Valley, Southwest Montana. *Current research in the Pleistocene* 12:117–119.
- Allen, D.R.; Marlow, C.B. 1994. Shoot population dynamics of beaked sedge following cattle grazing. *Journal of Range Management* 47:64–69.
- Allen-Diaz, B.H. 1991. Water table and plant species relationships in Sierra Nevada meadows. *American Midland Naturalist* 126:30–43.
- Altman, B.; Sallabanks, R. 2000. Olive-sided flycatcher (*Contopus cooperi*). In: Poole, A.; Gill, F., editors. *The birds of North America* 502. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Ammon, E.M. 1995. Lincoln's sparrow (*Melospiza lincolnii*). In: Poole, A.; Gill, F., editors. *The birds of North America* 191. Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union. [Pages unknown].
- Anderson, S.H. 1995. Recreational disturbance and wildlife populations. In: Knight, R.L.; Gutzwiller, K.J., editors. *Wildlife and Recreationists: coexistence through management and research*. Washington, DC: Island Press, 157–168.
- Anderson, M.; Bourgeron, P.; Bryer, M.T.; Crawford, R.; Engelking, L.; Faber-Langendoen, D.; Gallyoun, M.; Goodin, K.; Grossman, D.H.; Landaal, S.; Metzler, K.; Patterson, K.D.; Pyne, M.; Reid, M.; Sneddon, L.; Weakley, A.S. 1998. International classification of ecological communities: Terrestrial vegetation of the United States. Volume 2. *The National Vegetation Classification System: List of types*. The Nature Conservancy, Arlington, Virginia. [Pages unknown].
- Arcese, P.; Sogge, M.K.; Marr, A.B.; Patten, M.A. 2002. Song sparrow (*Melospiza melodia*). In: Poole, A.; Gill, F., editors. *The birds of North America* 704. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Austin, J.E.; Miller, M.R. 1995. Northern pintail (*Anas acuta*). In: Poole, A.; Gill, F., editors. *The birds of North America* 163. Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union. [Pages unknown].
- Austin, J.E.; Henry, A.R.; Ball, I.J. 2007. Sandhill crane abundance and nesting ecology at Grays Lake, Idaho. *Journal of Wildlife Management* 71:1067–1079.
- Baker, W.L. 2006. Fire and restoration of sagebrush ecosystems. *Wildlife Society Bulletin* 34:177–185.
- Baldassarre, G.A.; Bolen, E.G. 2006. *Waterfowl ecology and management*. 2nd ed. Melbourne, FL: Krieger Publishing Company. [Pages unknown].
- Ball, I.J.; Austin, J.E.; Henry, A.R. 2003. Population and nesting ecology of sandhill cranes at Grays Lake, Idaho, 1997–2000. Missoula, MT: Montana Cooperative Wildlife Research Unit, U.S. Geological Survey; Jamestown, ND: Northern Prairie Wildlife Research Center, final report to U.S. Fish and Wildlife Service. [Pages unknown].
- Banko, W.E. 1960. The trumpeter swan: its history, habits, and population in the United States. *North American Fauna* 63, Bureau of Sport Fisheries and Wildlife, Washington, D.C. [Pages unknown].
- Bartelt, G.A. 1987. Effects of disturbance and hunting on the behavior of Canada goose family groups in east central Wisconsin. *Journal of Wildlife Management* 51:517–522.
- Bartos, D.L.; Campbell, R.B. 1998. Decline of quaking aspen in the Interior West—examples from Utah. *Rangelands* 20:17–24.

- Bauer, H.G.; Stark, H.; Frenzel, P. 1992. Disturbance factors and their effects on water birds wintering in the western parts of Lake Constance. *Der Ornithologische Beobachter* 89:81–91.
- Bayley, S.E.; Prather, C.M. 2003. Do wetland lakes exhibit alternative stable states? Submersed aquatic vegetation and chlorophyll in western boreal shallow lakes. *Limnology and Oceanography* 48:2335–2345.
- BBC Consulting. 2007. Red Rock Lakes National Wildlife Refuge socioeconomic impact analysis. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT. 1-11.
- Beaverhead County History Book Association. 1990. The history of Beaverhead County (1800–1920). Volume 1. Dillon, Montana. 696.
- Beed, W.E. 1957. Red Rock Lakes Aquatic Survey 1955 and 1956. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- Belanger, L.; Be´dard, J. 1990. Energetic cost of man-induced disturbance to staging greater snow geese. *Journal of Wildlife Management* 54:36–41.
- Bennett, K.A.; Zuelke, E. 1999. The effects of recreation on birds: a literature review. Smyrna, DE: Delaware Natural Heritage Program. [Pages unknown].
- Berger, J.; Stacey, P.B.; Bellis, L.; Johnson, M.P. 2001. A mammalian predator-prey imbalance: grizzly bear and wolf extinction affect avian neotropical migrants. *Ecological Applications* 11:947–960.
- Beschta, R.L. 2003. Cottonwoods, elk, and wolves in the Lamar Valley of Yellowstone National Park. *Ecological Applications* 13:1295–1309.
- Bishop, R.A.; Andrews, R.D.; Bridges, R.J. 1979. Marsh management and its relationship to vegetation, waterfowl, and muskrats: Proceedings, [Date of proceedings unknown]; [Place of proceedings unknown]. In: Proceedings of the Iowa Academy of Science 86:50–56.
- Brinson, M.M.; Lugo, A.E.; Brown, S. 1981. Primary productivity, decomposition and consumer activity in freshwater wetlands. *Annual Review of Ecological Systems* 12:123–161.
- Brown, K.; Hansen, A.J.; Keane, R.E.; Graumlich, L.J. 2006. Complex interactions shaping aspen dynamics in the Greater Yellowstone Ecosystem. *Landscape Ecology* 21:933–951.
- Bunting, S.C.; Robberecht, R.; Defosse, G.E. 1998. Length and timing of grazing on postburn productivity of two bunchgrasses in an Idaho experimental range. *International Journal of Wildland Fire* 8:15–20.
- Bunting, S.C.; Kilgore, B.M.; Bushey, C.L. 1987. Guidelines for prescribed burning sagebrush-grass rangelands in the northern Great Basin. Ogden, Utah: U.S. Department of Agriculture. USDA Forest Service General Technical Report INT-231. [Pages unknown].
- Burger, J.; Gochfeld, M.; 1994. Franklin’s gull (*Larus pipixcan*). In: Poole, A.; Gill, F., editors. The birds of North America 116. Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists’ Union. [Pages unknown].
- Burke, J.M.; Prepas, E.E.; Pinder, S. 2005. Runoff and phosphorus export patterns in large forested watersheds on the western Canadian Boreal Plain before and for 4 years after wildfire. *Journal of Environmental Engineering and Science* 4:319–325.
- Cary, K.L. 2005. Willow resilience on Yellowstone’s northern elk winter range: a function of environmental gradients. [master’s thesis]. Bozeman, MT: Montana State University. [Pages unknown].
- Casey, D. 2000. Partners in flight draft bird conservation plan Montana. version 1.0. American Bird Conservancy. Montana Partners in Flight. Kalispell, MT. [Pages unknown].
- Castelli, R.M.; Chambers, J.C.; Tausch, R.J. 2000. Soil-plant relations along a soil-water gradient in Great Basin riparian meadows. *Wetlands* 20:251–266.
- Chadwick, H.W.; Dalke, P.D. 1965. Plant succession on sand dunes in Fremont County, Idaho. *Ecology* 46:765–780.
- Chilton, G.; Baker, M.C.; Barrentine, C.D.; Cunningham, M.A. 1995. White-crowned sparrow (*Zonotrichia leucophrys*). In: Poole, A.; Gill, F., editors. The birds of North America 183. Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists’ Union. [Pages unknown].
- Christiansen, R.L. 2001. The Quaternary and Pliocene Yellowstone Plateau volcanic field of Wyoming, Idaho, and Montana. U.S. Geological Professional Paper 729-G, 145 p.
- Clary, W.P. 1995. Vegetation and soil responses to grazing simulation on riparian meadows. *Journal of Range Management* 48:18–25.
- Cole, D.N.; Knight, R.L. 1990. Impacts of recreation on biodiversity in wilderness. Logan, UT: Utah State University. [Pages unknown].
- Connelly, J.W.; Schroeder, M.A.; Sands, A.R.; Braun, C.E. 2000. Guidelines to manage sage grouse

- populations and their habitats. *Wildlife Society Bulletin* 28:967–985.
- Cooper, D.J.; Dickens, J.; Thompson Hobbs, N.; Christensen, L.; Landrum, L. 2006. Hydrologic, geomorphic, and climatic processes controlling willow establishment in a montane ecosystem. *Hydrological Processes* 20:1845–864.
- Cooper, S.V. 1999. Plant associations of the Red Rock Lakes National Wildlife Refuge: abbreviated community descriptions to accompany vegetation map. [Unpublished report to the U.S. Fish and Wildlife Service]. On file at Montana Natural Heritage Program. Helena, MT. 39 p.
- Cooper, S.V.; Jean, C.; Heidel, B.L. 1999. Plant associations and related botanical inventory of the Beaverhead Mountains Section, Montana. [Unpublished report to the Bureau of Land Management]. On file at Montana Natural Heritage Program. Helena, MT. 235 p.
- Cole, D.N.; Knight, R.L. 1990. Impacts of recreation on biodiversity in wilderness. Logan, UT: Utah State University. [Pages unknown].
- Cronan, J.M. 1957. Food and feeding habits of the scaups in Connecticut waters. *The Auk* 74(4):459–468.
- Cullen, S.A.; Jehl Jr., J.R.; Nuechterlein, G.L. 1999. Eared grebe (*Podiceps nigricollis*). In: Poole, A.; Gill, F., editors. *The birds of North America* 433. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Dai, X.; Boutton, T.W.; Hailemichael, M.; Ansley, R.J.; Jeffup, K.E. 2006. Soil carbon and nitrogen storage in response to fire in a temperate mixed-grass savanna. *Journal of Environmental Quality* 35:1620–1628.
- Dechant, J.A.; Sondreal, M.L.; Johnson, D.H.; Igl, L.D.; Goldade, C.M.; Nenneman, M.P.; Euliss, B.R. 2003. Effects of management practices on grassland birds: short-eared owl. Revised December 12, 2003. Northern Prairie Wildlife Research Center Online. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/seow/seow.htm>> [Access date unknown].
- DeLong, A. 2002. Managing visitor use & disturbance of waterbirds: a literature review of impacts and mitigation measures. [Place of publication unknown]: [Publisher unknown]. [Pages unknown].
- Dobb, E. 1998. Reality check: the debate behind the lens. [Place of publication unknown]. *Audubon* Volume 1: (January–February) 44–51, 98–99.
- Dobkin, D.S.; Rich, A.C.; Pretare, J.A.; Pyle, W.H. 1995. Nest-site relationships among cavity-nesting birds of riparian and snowpocket aspen woodlands in the northwestern Great Basin. *Condor* 97:694–707.
- Dorn, R.D. 1970. Moose and cattle food habits in southwest Montana. *Journal of Wildlife Management* 34:559–564.
- Douglas, D.C.; Ratti, J.T.; Black, R.A.; Alldredge, J.R. 1992. Avian habitat associations in riparian zones of Idaho's Centennial Mountains. *Wilson Bulletin* 104:485–500.
- Dugger, B.D.; Dugger, K.M. 2002. Long-billed curlew (*Numenius americanus*). In: Poole, A.; Gill, F., editors. *The birds of North America* 628. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Dwire, K.A.; Kauffman, J.B. 2003. Fire and riparian ecosystems in landscapes of the western USA. *Forest Ecology and Management* 178:61–74.
- Dwire, K.A.; Kauffman, J.B.; Baham, J.E. 2006. Plant species distribution in relation to water-table depth and soil redox potential in montane riparian meadows. *Wetlands* 26:131–146.
- Egertson, C.J.; Kopaska, J.A.; Downing, J.A. 2004. A century of change in macrophyte abundance and composition in response to agricultural eutrophication. *Hydrobiologia* 624:145–156.
- Esser, L.L. 1992. *Achnatherum richardsonii*. In: Fire Effects Information System, [Internet]. Revised June 29, 2007. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. <<http://www.fs.fed.us/database/feis/>> [Access date unknown].
- Ferguson, S.H.; Bisset, A.R.; Messier, F. 2000. The influences of density on growth and reproduction in moose *Alces alces*. *Wildlife Biology* 6:31–39.
- Ferrel M.H.; Hauck, C.W.; Myer, R.C. 1981. Montana Rail Annual No. 15. [Place of publication unknown]: The Colorado Railroad Museum. US 0-918654-15-7; <http://en.wikipedia.org/wiki/Utah_and_Northern_Railway> [Access date unknown].
- Finch, D.M. 1989. Habitat use and habitat overlap of riparian birds in three elevational zones. *Ecology* 70:866–880.
- Finch, D.M.; Reynolds, R.T. 1987. Bird response to understory variation and conifer succession in aspen forests. In: Emmerick, J. et al., editors. *Proceedings of issues and technology in management of impacted wildlife: Proceedings*, [Title of proceedings unknown]; [Date of proceedings unknown]; [Place of conference unknown]. Colorado Springs, CO: Thorne Ecological Institute. 87–96.

- Fondell, T.F.; Ball, I.J. 2004. Density and success of bird nests relative to grazing on western Montana grasslands. *Biological Conservation* 117:203–213.
- Foresman, K.R. 2001. The wild mammals of Montana. Lawrence, KS: The American Society of Mammalogists. Special Publication No. 12. [Pages unknown].
- Fox, A.D.; Madsen, J. 1997. Behavioral and distributional effects of hunting disturbance on waterbirds in Europe: implications for refuge design. *Journal of Applied Ecology* 34:1–13.
- Fredrickson, L.H.; Heitmeyer, M.E. 1991. Life history strategies and habitat needs of the northern pintail. In: *Waterfowl Management Handbook*. Washington, DC: U.S. Fish and Wildlife Service. [Pages unknown].
- Fuhlendorf, S.D.; Engle, D.M. 2001. Restoring heterogeneity on rangelands: ecosystem management based on evolutionary grazing patterns. *BioScience* 51:625–32.
- Fuhlendorf, S.D.; Harrell, W.C.; Engle, D.M.; Hamilton, R.G.; Davis, C.A.; Leslie Jr., D.M. 2006. Should heterogeneity be the basis for conservation? Grassland bird response to fire and grazing. *Ecological Applications* 16:1706–1716.
- Fuguitt, G.V. 1985. The nonmetropolitan population turnaround. *Annual Review of Sociology* 11:259–280.
- Gallant, A.L.; Hansen, A.J.; Councilman, J.S.; Monte, D.K.; Betz, D.W. 2003. Vegetation dynamics under fire exclusion and logging in a Rocky Mountain Watershed, 1856–1996. *Ecological Applications* 13:385–403.
- Gangloff, M.M. 1996. Winter habitat and distribution of Arctic grayling in Upper Red Rock Lake, Red Rock Lakes National Wildlife Refuge, Montana. [master's thesis]. Bozeman, MT: Montana State University. [Pages unknown].
- Gardali, T.; Ballard, G. 2000. Warbling vireo (*Vireo gilvus*). In: Poole, A.; Gill, F., editors. *The birds of North America* 551. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Giesen, K.M.; Connelly, J.W. 1993. Guidelines for management of Columbian sharp-tailed grouse habitats. *Wildlife Society Bulletin* 21:325–333.
- Guzy, M.J.; Ritchison, G. 1999. Common yellowthroat (*Geothlypis trichas*). In: Poole, A.; Gill, F., editors. *The birds of North America* 448. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Hansen, A.J.; Rotella, J.J.; Kraska, M.P.V.; Brown, D. 2000. Spatial patterns of primary productivity in the Greater Yellowstone ecosystem. *Landscape Ecology* 15:505–522.
- Hansen, P.L.; Pfister, R.D.; Boggs, K.; Cook, B.J.; Joy, J.; Hinckley, D.K. 1995. Classification and management of Montana's riparian and wetland sites. Missoula, MT: University of Montana, School of Forestry, Montana Forest and Conservation Station. Miscellaneous Publication No. 54. [Pages unknown].
- Harris, S.W.; Marshall, W.H. 1963. Ecology of water-level manipulations on a northern marsh. *Ecology* 44:331–343.
- Hart, J.H.; Hart, D.L. 2001. Heartrot fungi's role in creating picid nesting sites in living aspen. In: Shepperd, W.D.; Binkley, D.; Bartos, D.L.; Stohlgren, T.J.; Eskew, L.G., compilers. *Sustaining aspen in western landscapes: symposium proceedings*. USDA Forest Service Proceedings RMRS-P-18. 207–213.
- Harting A.; Glick D. 1994. *Sustaining Greater Yellowstone, a blueprint for the future*. Bozeman, MT: Greater Yellowstone Coalition. [Pages unknown].
- Hauer, F.R.; Spencer, C.N. 1998. Phosphorous and nitrogen dynamics in streams associated with wildfire: a study of immediate and longterm effects. *International Journal of Wildland Fire* 8:183–198.
- Havera, S.P.; Boens, L.R.; Georgi, M.M.; Shealy, R.T. 1992. Human disturbance of waterfowl on Keokuk Pool, Mississippi River. *Wildlife Society Bulletin* 20:290–298.
- Heitmeyer, M.E.; Raveling, D.G. 1988. Winter resource use by three species of dabbling ducks in California. The Department of Wildlife and Fisheries Biology, University of California, Davis, California. On file at Delta Waterfowl and Wetlands Research Center, Portage La Prairie, Manitoba, Canada. 200 p.
- Hendricks, P.; Roedel, M. 2001. A faunal survey of the Centennial Valley Sandhills, Beaverhead County, Montana. Report to the U.S. Bureau of Land Management and U.S. Fish and Wildlife Service. Helena, MT: Montana Natural Heritage Program. 44 p.
- Herkert, J.R.; Simpson, S.A.; Westemeier, R.L.; Esker, T.L.; Walk, J.W. 1999. Response of northern harriers and short-eared owls to grassland management in Illinois. *Journal of Wildlife Management* 63:517–523.
- Heyerdahl, E.K.; Miller, R.F.; Parsons, R.A. 2006. History of fire and Douglas-fir establishment in a savanna and sagebrush–grassland mosaic,

- southwestern Montana, USA. *Forest Ecology and Management* 230:107–118.
- Hinds, T.E. 1985. Diseases. In DeByle, N.V.; Winokur, R.P., editors. *Aspen: Ecology and management in the western United States*. Fort Collins, CO: Rocky Mountain Forest and Range Experiment Station. USDA Forest Service General Technical Report RM-119. 87–106.
- Holling, C.S., editor. 1978. *Adaptive environmental assessment and management*. London: John Wiley and Sons. [Pages unknown].
- Holmes, J.A.; Johnson, M.J. 2005. Brewer's sparrow (*Spizella breweri*): a technical conservation assessment. [Internet]. Durango, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Region; <<http://www.fs.fed.us/r2/projects/scp/assessments/brewerssparrow.pdf>> accessed 15 March 2007.
- Howard, Janet L. 1996. *Bromus inermis*. In: Fire Effects Information System, [Internet]. Revised 6 July 2007. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. <<http://www.fs.fed.us/database/feis/>> [Access date unknown].
- Jahn, L.R.; Hunt, R.A. 1964. Duck and coot ecology and management in Wisconsin. Wisconsin Conservation Department Technical Bulletin No. 33. [Place of publication unknown]: [Publisher unknown]. 212 p.
- Jeppesen, E.; Søndergaard, M.; Christoffersen, K. 1998. *The structuring role of submerged macrophytes in lakes*. New York: Springer-Verlag. [Pages unknown].
- Johnson V.K. 1999. *Rural residential development trends in the Greater Yellowstone ecosystem since listing of the grizzly bear*. Bozeman, MT: Sierra Club. [Pages unknown].
- Johnson, D.; Igl, L.D. 2001. Area requirements of grassland birds: a regional perspective. *The Auk* 118:24–34.
- Jones, J.R.; DeByle, N.V. 1985. Morphology. In: DeByle, N.V.; Winokur, R.P., editors. *Aspen: ecology and management in the western United States*. [Place of publication unknown]: U.S. Department of Agriculture, Forest Service. General Technical Report RM-GTR-119. 11–18.
- Kadlec, J.A. 1962. Effects of a drawdown on a waterfowl impoundment. *Ecology* 43:267–281.
- Kadlec, J.A.; Smith, L.M. 1989. The great basin marshes. In: Smith, L.M.; Pederson, R.L.; Kaminski, R.M., editors. *Habitat management for migrating and wintering waterfowl in North America*. Lubbock, TX: Texas Tech University Press. [Pages unknown].
- Kaeding, L.R.; Boltz, G.D. 1999. A study of Arctic grayling and their stream habitat in support of reserved water right applications, Red Rock Lakes National Wildlife Refuge, Montana. On file at U.S. Fish and Wildlife Service, Bozeman, MT. 24 p.
- .2004. Use of remote-site incubators to produce Arctic grayling fry of wild parentage. *North American Journal of Fisheries Management* 24:1031–1037.
- Kaminski, R.M.; Prince, H.H. 1981. Dabbling duck and aquatic macroinvertebrate responses to manipulated wetland habitat. *Journal of Wildlife Management* 45:1–15.
- Kantrud, H.A. 1990. Sago pondweed (*Potamogeton pectinatus* L.): a literature review. Resource Publication 176. [Place of publication unknown]: U.S. Fish and Wildlife Service. [Pages unknown].
- Kantrud, H.A.; Higgins, K.F. 1992. Nest and nest site characteristics of some ground-nesting, non-passerine birds of northern grasslands. *Prairie Naturalist* 24:67–84.
- Kaya, C.M. 1992. Review of the decline and status of fluvial Arctic grayling, *Thymallus arcticus*, in Montana. In: *Proceedings, 1992 Proceedings of the Montana Academy of Sciences*; [Date of proceedings unknown]; [Place of proceedings unknown]. [Place of publication unknown]: [Publisher unknown]. 43–70.
- Keigley, R.B.; Frisina, M.R. 2001. Browse conditions at Red Rock Lakes National Wildlife Refuge. In: Knapp, S.J.; Frisina, M.R., editors. *Statewide browse evaluation*. Helena, MT: Montana Fish, Wildlife and Parks, Wildlife Division, Habitat Bureau. Project Report No. 1. [Pages unknown].
- Keigley, R.B.; Frisina, M.R.; Fager, C. 2002. Assessing browse trend at the landscape level; part 2: monitoring. *Rangelands* 24:34–38.
- 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. [Pages unknown].
- Klein, M.L. 1993. Waterbird behavioral responses to human disturbances. *Wildlife Society Bulletin* 21:31–39.
- Knick, S.T.; Rotenberry, J.T. 1995. Landscape characteristics of shrubsteppe habitats and breeding passerine birds. *Conservation Biology* 9:1059–1071.

- Knight, R.L.; Cole, D.N. 1995. Wildlife responses to recreationists. In: Knight, R.L.; Gutzwiller, K.J., editors. *Wildlife and recreationists*. Covelo, CA: Island Press. [Pages unknown].
- Knopf, F.L. 1985. Significance of riparian vegetation to breeding birds across an altitudinal cline. In: Johnson, R.R.; Ziebell, C.D.; Patten, D.R.; Ffolliot, P.F.; Hamre, R.H., technical coordinators. *Riparian ecosystems and their management: reconciling conflicting uses*. [Place of publication unknown]: U.S. Department of Agriculture, Forest Service. General Technical Report RM-120. [Pages unknown].
- Korb, N.T. 2005. Historical fire regimes and structures of Douglas-fir forests in the Centennial Valley of southwest Montana. [master's thesis]. Fort Collins, CO: Colorado State University. [Pages unknown].
- Korb N.T.; Bauer, B.D.; Keigley, R.B. 2008. Centennial Valley aspen assessment: Evaluating stand structure and effects of herbivory. On file at Centennial Valley Fire Learning Network, [Place unknown].
- Korschgen, C.E.; George, L.S.; Green, W.L. 1985. Disturbance of diving ducks by boaters on a migrational staging area. *Wildlife Society Bulletin* 13:290–296.
- Krull, J.N. 1970. Aquatic plant-macroinvertebrate associations and waterfowl. *Journal of Wildlife Management* 34:707–718.
- Kruse, T.E. 1959. Grayling of Grebe Lake, Yellowstone National Park, Wyoming. Washington, DC: U.S. Fish and Wildlife Service. *Fishery Bulletin* 149. [Pages unknown].
- Lancia, R.A.; Braun, C.E.; Collopy, M.W.; Dueser, R.D.; Kie, J.G.; Martinka, C.J.; Nichols, J.D.; Nudds, T.D.; Porath, W.R.; Tilghman, N.G. 1996. ARM! For the future: adaptive resource management in the wildlife profession. *Wildlife Society Bulletin* 24:436–442.
- Lanphere, M.A.; Champion, D.E.; Christiansen, R.L.; Izett, G.A.; Obradovich, J.D. 2002. Revised ages of tuffs of Yellowstone Plateau volcanic field: Assignment of the Huckleberry Ridge Tuff to a new geomagnetic polarity event. *Geological Society of American Bulletin* 14:559–568.
- Leondard, J.W. 1939. Feeding habits of the Montana grayling (*Thymallus montanus Milner*) in Ford Lake, Michigan: Proceedings, [Name of proceedings unknown]; [Date of proceedings unknown]; [Place of proceedings unknown]. In: *Transactions of the American Fisheries Society* 68:188–195.
- Lesica, P.; Cooper, S.V. 1999. Succession and disturbance in sandhills vegetation: constructing models for managing biological diversity. *Conservation Biology* 13:293–302.
- Lesica, P.; Cooper, S.V.; Kudray, G. 2005. Big sagebrush shrub-steppe postfire succession in southwest Montana. On file at Montana Natural Heritage Program, Helena, MT.
- Lowther, P.E. 2000. Pacific-slope flycatcher (*Empidonax difficilis*) and Cordilleran flycatcher (*Empidonax occidentalis*). In: Poole, A.; Gill, F., editors. *The birds of North America* 556. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Lowther, P.E.; Celada, C.; Klein, N.K.; Rimmer, C.C.; Spector, D.A. 1999. Yellow warbler (*Dendroica petechia*). In: Poole, A., editor. *The birds of North America online*. Ithaca, NY: Cornell Laboratory of Ornithology. <http://bna.birds.cornell.edu/BNA/account/Yellow_Warbler/> [Access date unknown].
- Madsen J. 1985. Impact of disturbance on field utilization of pink-footed geese in West Jutland, Denmark. *Biological Conservation* 33:53–63.
- Madsen J. 1995. Impacts of disturbance on migratory waterfowl. *Ibis* 137:567–574.
- Martin, K.; Aitken, K.E.H.; Wiebe, K.L. 2004. Nest sites and nest webs for cavity-nesting communities in interior British Columbia, Canada: nest characteristics and niche partitioning. *Condor* 106:5–19.
- McEachern, P.; Prepas, E.E.; Gibson, J.J.; Dinsmore, W.P. 2000. Forest fire induced impacts on phosphorous, nitrogen, and chlorophyll A in boreal subarctic lakes of northern Alberta. *Canadian Journal of Fisheries and Aquatic Sciences* 57:73–81.
- Meagher, M.M. 1973. The bison of Yellowstone National Park. National Park Service Scientific Monograph Series No. 1. [Place of publication unknown]: National Park Service. [Pages unknown].
- Merrill, T.; Mattson, D.J. 2003. The extent and location of habitat biophysically suitable for grizzly bears in the Yellowstone region. *Ursus* 14:171–187.
- Mitchell, C.D. 1994. Trumpeter swan (Cygnus buccinator). In: Poole, A.; Gill, F., editors. *The birds of North America* 105. Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union. [Pages unknown].
- Mitsch, W.J.; Gosselink, J.G. 1986. *Wetlands*. New York: Van Nostrand Reinhold. [Pages unknown].

- Mogan, J. 1996. Status and biology of the spawning population of Red Rock Lakes' Arctic grayling. [master's thesis]. Bozeman, MT: Montana State University. [Pages unknown].
- [MFWP] Montana Fish, Wildlife and Parks. 2004. Montana statewide elk management plan. Helena, MT: Wildlife Division. [Pages unknown].
- . 2005. The Montana comprehensive fish and wildlife conservation strategy. Helena, MT: Montana Fish, Wildlife and Parks. [Pages unknown].
- . [No date]. The population of Arctic grayling in Upper Red Rock Lake. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- [MTNHP] 2002. 2002 list of ecological communities for Montana. On file at Montana State Library, Helena, MT.
- [MTNHP and MFWP] Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. 2006. Montana animal species of concern. Helena, MT: Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. [Pages unknown].
- Morris, M.S.; Kelsey, R.G.; Griggs, D. 1976. The geographic and ecological distribution of big sagebrush and other wood Artemisias in Montana: Proceedings, [Date of proceedings unknown]; [Place of proceedings unknown]. In: Proceedings of the Montana Academy of Sciences 36:56–79.
- 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 ed. Environmental Management Comm., Atlantic Flyway Council Technical Section, and Delaware Division of Fish and Wildlife, Dover, DE. F59–F86.
- Morton, J.M.; Fowler, A.C.; Kirkpattick, R.L. 1989a. Time and energy budgets of American black ducks in winter. *Journal of Wildlife Management* 53(2):401–410.
- Morton, J.M.; Kirkpattick, R.L.; Vaughan, M.R.; Stauffer, D.F. 1989b. Habitat use and movements of American black ducks in winter. *Journal of Wildlife Management* 53:390–400.
- Mueggler, W.F.; Stewart, W.L. 1980. Grassland and shrubland habitat types of western Montana. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. General Technical Report INT-66. 154 p.
- Muenschner, W.C. 1936. The germination of seeds of Potamogeton. *Annals of Botany* 50:805–821.
- Muller, M.J.; Storer, R.W. 1999. Pied-billed grebe (*Podilymbus podiceps*). In: Poole, A.; Gill, F., editors. *The birds of North America* 410. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Mullins, W.H.; Bizeau, E.G. 1978. Summer Foods of Sandhill Cranes in Idaho. *Auk*, Vol. 95, No. 1. 75–178.
- Murkin, H.R.; Murkin, E.J.; Ball, J.P. 1997. Avian habitat selection and prairie wetland dynamics: a 10-year experiment. *Ecological Applications* 7:1144–1159.
- Nelson, P.H. 1954. Life history and management of the American grayling (*Thymallus signifer tricolor*) in Montana. *Journal of Wildlife Management* 18:324–342.
- Newlon, K. R. 2007. Red Rock Lakes National Wildlife Refuge vegetation mapping project. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- O'Reilly, M. 2006. Relationships among moose abundance, willow community structure, and migratory landbirds at Red Rock Lakes National Wildlife Refuge. [bachelor of science thesis]. Bozeman, MT: Montana State University. [Pages unknown].
- Owens, N.W. 1977. Responses of wintering brant geese to human disturbance. *Wildfowl* 28:5–14.
- 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* 95:957–967.
- Paulins S.L. 1984. Activity budgets of nonbreeding gadwalls in Louisiana. *Journal of Wildlife Management* 48:371–380.
- Paullin, D.G. 1973. The ecology of submerged aquatic macrophytes of Red Rock Lakes National Wildlife Refuge, Montana. [master's thesis]. Missoula, MT: University of Montana. [Pages unknown].
- Payne, N.F. 1992. Techniques for wildlife habitat management of wetlands. New York: McGraw-Hill. [Pages unknown].
- Pettit, N.E.; Naiman, R.J. 2007. Fire in the riparian zone: characteristics and ecological consequences. *Ecosystems* 10(5):673.
- Project of the Bureau of Biological Survey. 1935. Detailed plans, Red Rock Lakes Migratory Bird Refuge. Washington D.C.: Bureau of Biological Survey. [Pages unknown].

- Rauscher, R.L. 1997. Status and distribution of the pygmy rabbit in Montana: final report. Bozeman, MT: Montana Department of Fish, Wildlife and Parks. [Pages unknown].
- Raveling, D.G. 1979. The annual cycle of body composition of Canada geese with special reference to control of reproduction. *The Auk* 96:234–252.
- Redenbach, Z.; Taylor, E.B. 1999. Zoogeographical implications of variation in mitochondrial DNA of Arctic grayling (*Thymallus arcticus*). *Molecular Ecology* 8:23–35.
- Restani, M. 1991. Resource partitioning among three buteo species in the Centennial Valley, Montana. *Condor* 93:1007–1010.
- Reynolds, H.W.; Hansen, R.M.; Peden, D.G. 1978. Diets of the Slave River lowland bison herd, Northwest Territories, Canada. *Journal of Wildlife Management* 42:581–590.
- Reynolds, T.D.; Rich, T.D.; Stephens, D.A. 1999. Sage thrasher (*Oreoscoptes montanus*). In: Poole, A.; Gill, F., editors. *The birds of North America* 463. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Romme, W.H.; Turner, M.G.; Wallace, L.L.; Walker, J.S. 1995. Aspen, elk, and fire in northern Yellowstone Park. *Ecology* 76:2097–2106.
- Rotenberry, J.T.; Patten, M.A.; Preston, K.L. 1999. Brewer's sparrow (*Spizella breweri*). In: Poole, A.; Gill, F., editors. *The birds of North America* 390. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Rowland, M.M. 2004. Effects of management practices on grassland birds: greater sage-grouse. Revised August 12, 2004. Northern Prairie Wildlife Research Center Online. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/grsg/grsg.htm>> [Access date unknown].
- Rudzitis G. 1996. *Wilderness and the changing American west*. New York: Wiley. [Pages unknown].
- Rusch, D.H.; DeStefano, S.; Reynolds, M.C.; Lauten, D. 2000. Ruffed grouse (*Bonasa umbellus*). In: Poole, A.; Gill, F., editors. *The birds of North America* 515. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Russell, O.; Haines, A.L. 1965. *Osborne Russell's journal of a trapper*. Lincoln, NE: University of Nebraska Press. 191 p.
- Sankey, T.T.; Montagne, C.; Graumlich, L.; Lawrence, R.; Nielsen, J. 2006. Twentieth century forest—grassland ecotone shift in Montana under differing livestock grazing pressure. *Forest Ecology and Management* 234:282–292.
- Schoennagel, T.; Veblen, T.T.; Romme, W.H. 2004. The Interaction of fire, fuels, and climate across Rocky Mountain Forests. *Bioscience* 54:661–676.
- Schroeder, M.A.; Young, J.R.; Braun, C.E. 1999. Sage grouse (*Centrocercus urophasianus*). In: Poole, A.; Gill, F., editors. *The birds of North America* 425. Philadelphia: The Birds of North America, Inc. [Pages unknown].
- Sears, J.W.; Fritz, W.J. 1998. Cenozoic tilt domains in southwestern Montana: Interference among three generations of extensional fault systems. In: Faulds, J.E.; Stewart, J.H., editors. *Accommodation zones and transfer zones: The regional segmentation of the Basin and Range province*. [Place of publication unknown]: Geological Society of America. Special paper 323. 241–247.
- Sedgwick, J.A. 1993. Dusky flycatcher (*Empidonax oberholseri*). In: Poole, A.; Gill, F., editors. *The birds of North America* 78. Philadelphia: The Birds of North America, Inc.; Washington, DC: The American Ornithologists' Union. [Pages unknown].
- Sempeski, P.; Gaudin, P. 1995. Habitat selection by grayling—I. Spawning habitats. *Journal of Fish Biology*, 47:256–265.
- Servheen, C.; Sandstrom, P. 1993. Ecosystem management and linkage zones for grizzly bears and other large carnivores in the northern Rocky Mountains in Montana and Idaho. *Endangered Species Technical Bulletin* 18:3.
- Sharp, W.M. 1951. Environmental requirements of a freshwater marsh and the ecology of some aquatic plants. In: *Proceedings, 1951 Northeast Game Conference; 23 February 1951*; [Place of proceedings unknown]. [Place of publication unknown]: Proceedings of the Northeast Game Conference. 6 p.
- Sika, J.L. 2006. Breeding ecology, survival rates, and causes of mortality of hunted and nonhunted greater sage-grouse in central Montana. [master's thesis]. Bozeman, MT: Montana State University. [Pages unknown].
- Sive, B.; Shively, D.; Pape, B.. 2003. Spatial variation of volatile organic compounds associated with snowmobile emissions in Yellowstone National Park. On file at University of New Hampshire Climate Change Research Center, Durham, NH. [Submitted to the National Park Service. 2003].
- Sonderegger, J.L.; Schofield, J.D.; Berg, R.B.; Mannick, N.L. 1982. *The Upper Centennial Valley, Beaverhead and Madison Counties, Montana*. Montana Bureau of Mines and Geology Memoir no. 50. 53 p.

- Sperry, C.C. 1922. Report on the Red Rock Lake District east of Monida (Beaverhead County) Montana, with recommendations for its improvement as a wild duck feeding ground. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- Squires, J.R.; Anderson, S.H. 1995. Trumpeter swan (*Cygnus buccinator*) food habits in the greater Yellowstone ecosystem. *American Midland Naturalist* 133:274–282.
- Stacy, M.D.; Perryman, B.L.; Stahl, P.D.; Smith, M.A. 2005. Brome control and microbial inoculation effects in reclaimed cool-season grasslands. *Rangeland Ecology and Management* 58:161–166.
- Stewart, R.E.; Kantrud, H.A. 1973. Ecological distribution of breeding waterfowl populations in North Dakota. *Journal of Wildlife Management* 37:39–50.
- Storer, R.W.; Nuechterlein, G.L. 1992. Western and Clark's Grebe. In: Poole, A.; Stettenheim, P.; Gill, F., editors. *The birds of North America* 26. Philadelphia: The Birds of North America, Inc.; Washington, DC: The American Ornithologists' Union. [Pages unknown].
- Summer R.M. 1980. Impacts of horse traffic on trails in Rocky Mountain National Park. *Journal of Soil and Water Conservation* 35(2):85–87.
- Svejcar, T.; Riegel, G.M. 1998. Spatial pattern of gas exchange for montane moist meadow species. *Journal of Vegetation Science* 9:85–94.
- Tacha, T.C.; Nesbit, S.A.; Vohs, P.A. 1992. Sandhill crane (*Grus canadensis*). In: Poole, A.; Stettenheim, P.; Gill, F., editors. *The birds of North America* 31. Philadelphia: The Birds of North America, Inc.; Washington, DC: The American Ornithologists' Union. [Pages unknown].
- Taylor, J.F. 1991. Report on cultural resources inventory of four proposed project locations within the Red Rock Lakes National Wildlife Refuge. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT. 1-11.
- Thines, N.J.; Shipley, L.A.; Saylor, R.D. 2004. Effects of cattle grazing on ecology and habitat of Columbia Basin pygmy rabbits (*Brachylagus idahoensis*). *Biological Conservation* 119:525–534.
- Thomas, R.C.; Sears, J.W.; Fritz, W.J.; Landon, S.C. 2000. Cenozoic extensional history of southwest Montana. *Geological Society of America*. 32:A–40.
- Thomas, V.G. 1983. Spring migration: the prelude to goose reproduction and a review of its implication. In: Boyd, H., editor. *Fourth Western Hemisphere waterfowl and waterbird symposium: Proceedings of the symposium; 1983* [Date of proceeding unknown]; Ottawa, Canada: Canadian Wildlife Service. 73–81.
- Tirmenstein, D. 1999. *Artemisia tridentata* spp. *tridentata*. In: Fire Effects Information System, [Internet]. Revised July 8, 2007. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. <<http://www.fs.fed.us/database/feis/>> [Access date unknown].
- Tjarnland, U.; Ericson, G.; Lindesjoo, E.; Petterson, I.; Balk, L. 1993. Investigation of the biological effects of 2-cycle outboard engines' exhaust on fish. [Place of publication unknown]: Institute of Applied Research, University of Stockholm. [Pages unknown].
- Turchi, G.M.; Kennedy, P.L.; Urban, D.; Hein, D. 1995. Bird species richness in relation to isolation of aspen patches. *Wilson Bulletin* 107:463–474.
- Unthank, A. 1989. Historical overview of Red Rock Lakes National Wildlife Refuge grayling. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- U.S. Census Bureau. 1999. Census Bureau: State and County QuickFacts for Montana. Data derived from 1999 Population Estimates. <<http://quickfacts.census.gov>> [Access date unknown].
- [USFWS] U.S. Fish and Wildlife Service. 1974–1975. Red Rock Lakes National Wildlife Refuge annual narrative 1974–1975. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- . 1992. Environmental assessment for proposed termination of winter feeding of trumpeter swans at Red Rock Lakes National Wildlife Refuge. Lakewood, CO: Mountain-Prairie Region. [Pages unknown].
- . 1994. Upland habitat management plan. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- . 1994–1995. Red Rock Lakes National Wildlife Refuge annual narrative 1974–1995. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- . 1997. A system for mapping riparian areas in the western United States. Arlington, VA: National Wetlands Inventory. [Pages unknown].
- . 1999a. National Wetlands inventory website: U.S. Department of the Interior, Fish and Wildlife Service. [Revision date unknown]. <<http://www.fws.gov/nwi/>> [Access date unknown].
- . Service 1999b. Fulfilling the promise, the National Wildlife Refuge System. Arlington, VA:

- U.S. Department of the Interior, Fish and Wildlife Service. 101 p.
- . 2001. Centennial Valley Conservation Easement Program Plan. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- . 2002a. Fisheries program, a vision for the future. <<http://www.fws.gov/fisheries/CAF/Vision.htm#intro>> accessed 23 January 2008.
- . 2002b. Birds of conservation concern 2002. Arlington, VA: Division of Migratory Bird Management. [Pages unknown].
- . 2004. Adaptive resource management plan for Lower Red Rock Lake, Red Rock Lakes National Wildlife Refuge. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- . 2008a. Moose winter survey data, 1966–2008. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- . 2008b. Midwinter waterfowl survey. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- . 2008c. Submerged aquatic vegetation surveys 2003–2008. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- Vander Haegen, W.M.; Dobler, F.C.; Pierce, J.D. 2000. Shrubsteppe bird response to habitat and landscape variables in eastern Washington, U.S.A. *Conservation Biology* 14:1145–1160.
- Vander Haegen, W.M.; Schroeder, M.A.; DeGraaf, R.M. 2002. Predation on real and artificial nests in shrubsteppe landscapes fragmented by agriculture. *Condor* 101:496–506.
- Vincent, R.E. 1962. Biogeographical and ecological factors contributing to the decline of Arctic grayling, *Thymallus arcticus* Pallas, in Michigan and Montana. [PhD. Dissertation]. Ann Arbor, MI: University of Michigan. [Pages unknown].
- Voigts, D.K. 1976. Aquatic invertebrate abundance in relation to changing marsh vegetation. *American Midland Naturalist* 95:313–322.
- Walker, B. 2004. Effects of management practices on grassland birds: Brewer's sparrow. Revised 12 August 2004. Northern Prairie Wildlife Research Center Online. <<http://www.npwrc.usgs.gov/resource/literatr/grasbird/brsp/brsp.htm>> [Access date unknown].
- Walker, R.; Craighead, L. 1999. Analyzing wildlife movement corridors in Montana using GIS. In: Proceedings, 1997 ESRI International User Conference; [Date of conference unknown]; San Diego, CA. San Diego, CA: Proceedings of the 1997 ESRI International User Conference. [Pages unknown].
- Wallestad, R.O.; Pyrah, D.B. 1974. Movement and nesting of sage grouse hens in central Montana. *Journal of Wildlife Management* 38:630–633.
- Walters, C.J.; Holling, C.S. 1990. Large-scale management experiments and learning by doing. *Ecology* 71:2060–2068.
- Warren, J.M.; O'Reilly, M. 2005. Hunting district 334 winter moose survey data analysis. On file at Red Rock Lakes National Wildlife Refuge, Lima, MT.
- Welch, B.L.; Criddle, C. 2003. Countering misinformation concerning big sagebrush. [Place of publication unknown]: United States Department of Agriculture, Forest Service. Research Paper RMRS-RP-40. [Pages unknown].
- Weller, M.W. 1981. Freshwater marshes: ecology and wildlife management. Minneapolis, MN: University of Minnesota Press. [Pages unknown].
- . 1999. Wetland birds. Cambridge, UK: Cambridge University Press. [Pages unknown].
- Weller, M.W.; Spatcher, C.E. 1965. Role of habitat in the distribution and abundance of marsh birds. Ames, IA: Agricultural and Home Economics Experiment Station, Iowa State University. Department of Zoology and Entomology Special Report 43. [Pages unknown].
- White-Robinson, R. 1982. Inland and salt marsh feeding of winter brant geese in Essex. *Wildfowl* 33:113–118.
- Wiggins, D.A.; Holt, D.W.; Leasure, S.M. 2006. Short-eared owl (*Asio flammeus*). In: Poole, A., editor. The birds of North America online. Ithaca, NY: Cornell Laboratory of Ornithology. <http://bna.birds.cornell.edu/BNA/account/Yellow_Warbler/> [Access date unknown].
- Williams B.; Conway-Durver, L. 1998. Horse trails in ecological reserves. In: Proceedings, Clemson University Horse Trails Symposium. 1998 [Date of symposium unknown]; [Place of symposium unknown]. [Unpublished paper].
- Willson, G.D.; Stubbendieck, J. 1996. Suppression of smooth brome by atrazine, mowing, and fire. *The Prairie Naturalist* 28:13–20.
- . 1997. Fire effects on four growth stages of smooth brome (*Bromus inermis* Leyss). *Natural Areas Journal* 17:306–312.
- . 2000. A provisional model for smooth management in degraded tallgrass prairie. *Ecological Restoration* 18:34–38.

- Windell, J.T.; Willard, B.E.; Cooper, D.J.; Foster, S.Q.; Knud-Hansen, C.F.; Rink, L.P.; Kiladis, G.N. 1986. An ecological characterization of Rocky Mountain montane and subalpine wetlands. U.S. Fish and Wildlife Service Biology Report 86(11). 298 p.
- Winternitz, B.L. 1980. Birds in aspen. In: Workshop proceedings: management of western forests and grasslands for nongame birds: Proceedings of the workshop; 1980 [Date of workshop unknown]; [Place of workshop unknown]. [Place of publication unknown]: U.S. Department of Agriculture, Forest Service. INT-GTR-86. 247–257.
- Wirth T.; Maus, P.; Powell, J.; Lachowski, H. 1996. Monitoring aspen decline using remote sensing and GIS: Gravelly Mountain Landscape, southwestern Montana. Salt Lake City, UT: Remote Sensing Steering Committee, U.S. Department of Agriculture, Forest Service. [Pages unknown].
- Wolder, M. 1993. Disturbance of wintering northern pintails at Sacramento National Wildlife Refuge, California. [master's thesis]. Arcata, CA: Humboldt State University. 62 p.
- Wood, A.K. 1993. Parallels between old-growth forest and wildlife population management. Wildlife Society Bulletin 21:91–95.
- Wright, H.A.; Klemmedson, J.O. 1965. Effect of fire on bunchgrasses of the sagebrush-grass region of southern Idaho. Ecology 46:680–688.
- Zimmer, K.D.; Hanson, M.A.; Butler, M.G. 2000. Factors influencing invertebrate communities in prairie wetlands: a multivariate approach. Canadian Journal of Fisheries and Aquatic Sciences 57:76–85.
- Zlatnik, E. 1999. *Hesperostipa comata*. In: Fire Effects Information System, [Internet]. Revised 6 July 2007. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. <<http://www.fs.fed.us/database/feis/>> [Access date unknown].
- Zouhar, K.L. 2000. *Festuca idahoensis*. In: Fire Effects Information System, [Internet]. Revised 29 June 2007. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. <<http://www.fs.fed.us/database/feis/>> [Access date unknown].

