

# Glossary

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

**active management**—The direct manipulation of habitats or wildlife populations to achieve specific objectives. Actions could include planting food plots, managing water levels, prescribed grazing or fire, or wildlife relocations.

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

**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 (The “Fish and Wildlife 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.

**appropriate use**—A proposed or existing uses on national wildlife refuges that meet at least one of the following—(1) is a wildlife-dependent recreational use; (2) contributes to fulfilling refuge purposes, the Refuge System mission, or goals and objectives outline in a CCP; or (3) the refuge manager has evaluated the use and found it to be appropriate.

**ATV**—All-terrain vehicle.

**AUM**—Animal-unit month.

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

**BCR**—Bird conservation region.

**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 (The “Fish and Wildlife Service Manual,” 052 FW 1.12B). The National Wildlife Refuge System’s focus is on indigenous species, biotic communities, and ecological processes.

**biological integrity**—Biotic composition, structure, and function at genetic, organism, and community levels.

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

**BLM**—See Bureau of Land Management.

**Bureau of Land Management (BLM)**—A Federal agency under the Department of Interior that was established in 1946 through consolidation of the General Land Office and U.S. Grazing Service. The agency has a multiple-use mandate is responsible for a variety of programs for managing and conserving surface and subsurface mineral estates, mostly in the western United States.

**Bureau of Reclamation (BOR)**—A Federal agency under the Department of Interior that oversees dams, power plants, and canals. The agency oversees the Closed Basin Project in the San Luis Valley which was built to fulfil water obligation delivery downstream of Colorado.

**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.

**cervid**—All members of the family Cervidae and hybrids including deer, elk, moose, caribous, reindeer, and related species.

**CFR**—See Code of Federal Regulations.

**cfs**—Cubic feet per second.

**CO<sub>2</sub>**—Carbon dioxide.

**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.

**Colorado Division of Water Resources (DWR)**—State of Colorado agency charged with management of the State’s water resources including administering water rights and issuing water well permits. Also known as the Office of the State Engineer.

**Colorado Division of Wildlife (CDOW)**—See Colorado Parks and Wildlife.

**Colorado Parks and Wildlife (CPW)**—State of Colorado wildlife agency; formerly Colorado Division of Wildlife (CDOW)

**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 (The “Fish and Wildlife Service Manual” 603 FW 3.6). A compatibility determination supports the selection of compatible uses and identified stipulations or limits necessary to ensure compatibility.

**comprehensive conservation plan (CCP)**—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 (The “Fish and Wildlife Service Manual,” 602 FW 1.5).

**concern**—See issue.

**conservation district**—Organized in the 1930s as a response to the severe erosion problems, a district is often a political subdivision of a State. Money comes from assessments levied on real property within the boundaries of the district. It helps citizens in conserving renewable natural resources.

**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.

**county road**—In general, means any public highway opened, established, constructed, maintained, abandoned in accordance with State law.

**cover, cover type, canopy cover**—Present vegetation.

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

**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.

**dispersal hunting**—A limited public hunt used primarily to control elk numbers and their distribution

**DOI**—Department of the Interior.

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

**EA**—See environmental assessment.

**ecological resilience**—The ability to absorb disturbances, to be changed, and then to reorganize and still have the same identity, that is, keep the same basic structure and ways of functioning. A resilient system is forgiving of external shocks; a disturbance is unlikely to affect the whole. A resilient habitat (1) sustains many species of plants and animals and a highly variable structural composition; (2) is asymmetric; (3) exemplifies biological integrity, biological diversity, and environmental health; and (4) adapts to climate change.

**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.

**ecosystem resilience**—See ecological resilience.

**EIS**—Environmental impact statement.

**endangered species, Federal**—A plant or animal species listed under the Endangered Species Act of 1973, as amended, that is in danger of extinction throughout all or a significant part 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**—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 effects to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

- environmental health**—Composition, structure, and functioning of soil, water, air, and other abiotic features.
- EPA**—Environmental Protection Agency.
- ephemeral**—Lasting for a very short time; short-lived; transitory;
- 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 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.
- fire management plan (FMP)**—A plan that identifies and integrates all wildland fire management and related activities within the context of approved land and resource management plans. The plan defines a program to manage wildland fires (wildfire and prescribed fire).
- focal species**—A multispecies approach where the ecological needs of a suite of species are used to define an ideal landscape to maintain the range of habitat conditions and ecological processes required by landbirds or other species. Focal species are considered most sensitive to or limited by certain ecological processes (such as fire or nest predation) or habitat attributes (such as patch size). The needs of a suite of focal species are then used to help guide management activities.
- 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.
- Friends group**—Any formal organization whose mission is to support the goals and purposes of its associated refuge and the National Wildlife Refuge Association overall; Friends organizations and cooperative and interpretive associations.
- FTE**—A full-time equivalent; one or more job positions with tours of duty that, when combined, equate to one person employed for the standard Government work-year.
- FWS**—See U.S. Fish and Wildlife Service.
- geocaching**—A high-technology scavenger hunt in which objects are hidden at secret outdoor locations for participants to find using Global Positioning System positions posted on the Internet.
- 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.
- GIS**—See geographic information system.
- Global Positioning System (GPS)**—A navigational system involving satellites that allows a user with a receiver to determine precise coordinates for their location on the earth's surface.
- goal**—Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (The "Fish and Wildlife Service Manual," 620 FW 1.5).
- GPS**—See Global Positioning System.
- GS**—General Schedule (pay rate schedule for certain Federal positions).
- graminoids**—of or relating to grasses.
- habitat**—Suite of existing environmental conditions required by an organism for survival and reproduction; the place where an organism typically lives and grows.
- habitat disturbance**—Significant alteration of habitat structure or composition; may be natural (for example, wildfire) or human-caused events (for example, timber harvest and disking).
- habitat management plan (HMP)**—A stepdown plan to a comprehensive conservation plan that identifies in detail how the objectives and strategies for uplands, riparian areas, river bottoms, and shorelines will be carried out.
- habitat type, also vegetation type, cover type**—A land classification system based on the concept of distinct plant associations.
- HDP**—See height density plot.
- herbivory**—Grazing of grass and other plants by any animal.
- heterogeneity**—diversity or dissimilar species within a landscape
- HMP**—See habitat management plan.
- HUA**—Hydrologic unit area.

**hunnable**—A species that can be hunted on the refuge in accordance with Federal and State regulations.

**Hydrogeomorphic methodology evaluation (HGM)**—An evaluation of ecosystem restoration and management options. The study evaluates historical and current information about geology, geomorphology, soils, topography, hydrology, plant and animal communities, and other factors for designing future restoration or management approaches.

**IMPLAN**—Impact Analysis for Planning.

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

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

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

**inholding**—Non-Service land owned by private, other agency, or other group landowners that is within the boundary of a national wildlife refuge.

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

**invertebrates**—An animal that lacks an internal skeleton or backbone such as insects, butterflies, and aquatic species like snails.

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

**issue**—Any unsettled matter that requires a management decision; for example, a Service initiative, opportunity, resource management problem, a threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition (The “Fish and Wildlife Service Manual,” 602 FW 1.5).

**lentic**—Still-water wetlands. These wetlands occur in basins and lack a defined channel and floodplain. Examples include perennial, intermittent bodies of water like lakes, reservoirs, stock ponds.

**lotic**—Flowing water wetlands are associated with rivers, streams and drainage ways. These riparian wetlands contain a defined channel and floodplain.

**management alternative**—See alternative.

**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.

**mimic**—To copy or imitate closely; to take on the appearance of.

**mission**—Succinct statement of purpose 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 Park Service (NPS)**—A Federal agency under the Department Interior which oversees the care of the Nation’s National Parks.

**Natural Resources Conservation Service (NRCS)**—A Federal agency under the Department of Agriculture. Formerly the Soil Conservation Service (SCS), the agency works with landowners through conservation planning and assistance designed to benefit the soil, water, air, plants, and animals that result in productive lands and healthy ecosystems.

**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; establishes the responsibilities of

the Secretary of the Interior for managing and protecting the Refuge System; requires a comprehensive conservation plan for each refuge by the year 2012. This act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

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

**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**—Any group that is not a Federal, State, tribal, county, city, town, local, or other governmental entity.

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

**NWR**—National wildlife refuge.

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

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

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

**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.

**playa habitat**—Wetlands that are usually described as shallow, typically round, ephemeral bodies of water with clay floors that lie in the lowest point of a closed watershed. When wet, these saline wetlands provide important habitat for many bird species.

**preferred alternative**—The Service’s final selection (after analysis of alternatives in a draft NEPA document) of a management alternative to carry out, which is documented in a “record of decision” for an EIS or a “finding of no significant impact” for an EA and published in the Federal Register. The decision is based on the legal responsibility of the Service including the missions of the Service and the Refuge System, other legal and policy mandates, the purpose of the refuge, and the vision and goals in the final CCP. In addition, the Service considers public, tribal, and agency input along with land uses in the ecosystem, environmental effects, and budget projections.

**prescribed fire**—A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements (where applicable) have been met before ignition. These objectives could be hazardous fuel reduction, habitat- or wildlife-oriented, or other objectives in the prescribed fire burn plan.

**prescriptive grazing**—The planned application of livestock grazing at a specified season, duration and intensity to accomplish specific vegetation management objectives. The objectives are designed to achieve the broader habitat and wildlife goals.

**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.

**properly functioning condition**—Qualitative method for assessing the condition of riparian-wetland areas. It describes both the assessment and the conditions of the wetland area. It evaluates how well the physical processes are functioning through use of a checklist.

**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; Native American tribes; and foreign

nations. It may include anyone outside the core planning team. It includes those who may or may not have shown an interest in Service issues and those who do or do not realize that Service decisions may affect them.

**public domain**—Lands that were not under private or State ownership during the 18th and 19th centuries in the United States, as the country was expanding. These lands were obtained from the 13 colonies, Native American tribes, or purchases from other counties. The domain was controlled by the Federal Government and sold to States or private interests through the General Land Office, which would eventually become the Bureau of Land Management.

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

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

**quality wildlife-dependent recreation**—Programs are based on 11 criteria that defined under 605 FW1, “General Guidelines for Wildlife-Dependent Recreation.” Quality programs include the following—safety of participants and compliance with laws and regulations; minimized conflicts with other goals or users; accessibility, stewardship, and availability to a broad spectrum of the American people; public understanding and appreciation of the natural resources; reliable and reasonable opportunities to experience wildlife; accessible facilities that blend in with the natural setting; and visitor satisfaction to help define and evaluate programs.

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

**refuge 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.

**resilience**—The ability to absorb disturbances, to be changed and then to reorganize and still have the same identity (keep the same basic structure and ways of functioning).

**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 area or riparian zone**—An area or habitat that is transitional from terrestrial to aquatic ecosystems including streams, lakes, wet areas, and adjacent plant communities and their associated soils that have free water at or near the surface; an area whose components are directly or indirectly attributed to the influence of water; 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.

**RLGIS**—Refuge land geographic information system.

**SAMMS**—See Service Asset Maintenance Management System.

**San Luis Valley (SLV)**—An extensive high-altitude basin in Colorado with a small portion overlapping into New Mexico covering about 8,000 square miles and sitting at an average elevation of 7,664 feet. It is drained to the south by the Rio Grande. The valley is about 122 miles long and 74 miles wide.

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

**seasonally flooded**—Surface water is present for extended periods in the growing season, but is absent by the end of the season in most years.

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

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

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

**shorebird**—Any of a suborder (Charadrii) of birds such as plovers or sandpipers that frequent wetlands.

**shrub-grass**—This habitat type occurs in areas of Baca National Wildlife Refuge that receive high amounts of subsurface irrigation from adjacent wet meadows. These areas provide valuable wetland habitat for multiple native species. It has patches of dense graminoids in the understory.

The overstory is dominated by rubber rabbit-brush, but other shrubs like greasewood may also be present.

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

**special status species**—Plants or animals that have been identified through Federal law, State law, or agency policy as requiring special protection of monitoring. Examples include federally listed endangered, threatened, proposed, or candidate species; State-listed endangered, threatened, candidate, or monitor species; Service's species of management concern; or species identified by the Partners in Flight Program as being of extreme or moderately high conservation concern.

**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 public through authorizations in Title 50 CFR or other public regulations (Refuge Manual, 5 RM 17.6).

**species of concern**—Those plant and animal species, while not falling under the definition of special status species, that are of management interest by virtue of being Federal trust species such as migratory birds, important game species, or significant keystone species; species that have documented or apparent populations declines, small or restricted populations, or dependence on restricted or vulnerable habitats.

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

**suppression**—All the work of extinguishing a fire or confining fire spread.

**surrogate species**—species that represent other species or aspects of the environment. These include umbrella, focal, keystone, indicator, and flagship species. It is a commonly-used scientific term for system-based conservation planning that uses a species as an indicator of landscape habitat and system conditions.

**target species**—A species selected, because of specific biological or social reasons, for management and monitoring. A target species could be a focal, endangered, big game, or other species.

**TES**—Threatened and endangered species.

**threatened species, Federal**—Species listed under the Endangered Species Act of 1973, as amended, that are likely to become endangered within the fore-

seeable future throughout all or a significant part 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.

**travel corridor**—A landscape feature that facilitates the biologically effective transport of animals between larger patches of habitat dedicated to conservation functions. Such corridors may facilitate several kinds of traffic including frequent foraging movement, seasonal migration, or the once in a lifetime dispersal of juvenile animals. These are transition habitats and need not contain all the habitat elements required for long-term survival or reproduction of its migrants.

**trust resource**—See Federal trust resource.

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

**ungulate**—A hoofed mammal such as horses, cattle, deer, elk, pronghorn, and bighorn sheep.

**U.S.C.**—United States Code.

**USDA**—U.S. Department of Agriculture.

**USDA Forest Service (USFS)**—A Federal agency under the Department of Agriculture which oversees management of national forests.

**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 runs 65 national fish hatcheries and 78 ecological service field stations, the agency enforces Federal wildlife laws, manages migratory bird populations, restores national significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign Governments with their conservation efforts. It also oversees the Federal aid program that distributes millions of dollars in excise taxes on fishing and hunting equipment to State wildlife agencies.

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

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

**USGS**—See U.S. Geological Survey.

**vision statement**—A concise statement of the desired future condition of the planning unit, based primarily on the Refuge System mission, specific

refuge purposes, and other relevant mandates (The “Fish and Wildlife Service Manual,” 602 FW 1.5).

**wildfire**—A wildland fire originating from an unplanned ignition caused by lightning, volcanoes, unauthorized and accidental human-caused fires, and escaped prescribed fires.

**wildland fire**—A general term describing any non-structure fire that occurs in the wildland.

# Appendix A

## *Key Legislation and Policies*

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

### **A.1 National Wildlife Refuge System**

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

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### **Goals**

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Develop and maintain a network of habitats for migratory birds, anadromous and inter-jurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.
- Conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or under-represented in existing protection efforts.
- Provide and enhance opportunities to participate in compatible wildlife-dependent

recreation (hunting, fish, wildlife observation and photography, and environmental education and interpretation).

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

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### **Guiding Principles**

There are four guiding principles for management and 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 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 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 about acquisition and management of national wildlife refuges.

## A.2 Other Legal and Policy Guidance

Management actions on national wildlife refuges are constrained by many mandates including laws and Executive orders. The more common regulations that affect refuge complex management 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.
- Bald and Golden Eagle Protection Act (1940): Provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds.
- Bureau of Reclamation Project Authorization Act (1972): Public Law 92-514 (Closed Basin Project) allowed for furnishing water for operation of Alamosa National Wildlife Refuge.
- Clean Air Act (1970, amended 1990): Restricts the amount of pollutants that can be emitted into the air. Designated wilderness areas including the Great Sand Dunes National Park and Preserve (adjacent to portions of Baca National Wildlife Refuge) have the highest standards (class I) for pollution and visibility.
- Clean Water Act (1977): Requires consultation with the U.S. Army Corps of Engineers (404 permits) for major wetland modifications.
- Closed Based Project (1972): BOR is authorized by Public Law 92-514 (October 20, 1972) to operate and maintain the Closed Basin Project through portion of the San Luis Valley including Alamosa and Baca Refuges for the transport of water into the Rio Grande for the fulfillment of the United States' obligation to Mexico and for furnishing water downstream of Alamosa Refuge for deficient areas of Colorado, New Mexico, and Texas. This is accomplished through direct diversion of water out of the closed basin system.
- Data Quality Act (2001): Requires Government agencies to ensure and maximize the quality, objectivity, utility, and dissemination of information by Federal agencies.
- Dingell-Johnson Act (1950): Authorizes the Secretary of the Interior to provide financial assistance for State Fish restoration and management plans and projects. Financed by excise taxes paid by manufacturers of rods, reels, and other fishing equipment.
- 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 buying wetlands with Land and Water Conservation Fund monies.
- Endangered Species Act (1973): Requires Federal agencies to carry out programs for the conservation of endangered and threatened species.
- Enhancement Act (2000): Public Law 106-54 authorized the Secretary of Army, working with the Secretary of Interior, to

- identify cabin sites suitable for conveyance to current lessees. The funds received will be used for acquiring other lands with greater wildlife and other public value for the refuge.
- 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 and other agencies
    - to accommodate access to and ceremonial uses of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites and, where appropriate, maintain the confidentiality of sacred sites.
  - Executive Order 13352, Cooperative Conservation (2004): Directs Federal agencies to implement laws relating to the environment and natural resources in a manner that promotes cooperative conservation with an emphasis on appropriate inclusion of local participation in Federal decisionmaking in accordance with respective agency missions and policies.
  - Executive Order 13443, Facilitation of Hunting Heritage and Wildlife Conservation (2007): Directs Federal land management and other agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.
  - Executive Order 13653, Preparing the United States for the Impacts of Climate Change (2013): Directs Federal Government agencies to build on recent progress and pursue new strategies to improve the Nation's preparedness and resilience in preparing and adapting to climate change.
  - Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species and an interdisciplinary approach with the cooperation of other Federal and State agencies.
  - Federal Records Act (1950): Requires the preservation of evidence of the Government's organization, functions, policies, decisions, operations, and activities, as well as basic historical and other information.
  - Fish and Wildlife Coordination Act (1958): Allows the U.S. Fish and Wildlife Service to enter into agreements with private landowners for wildlife management purposes.
  - Great Sand Dunes National Park and Preserve Act (2000): Public Law 106-530 was passed by Congress on November 22, 2000. Section 6 of the Act authorized the establishment of Baca National Wildlife Refuge. It also recognized the significant diversity of resources within the Great Sand Dunes ecosystem and changed the park from its national monument status to a national park. The Act was amended in 2009 by Public Law 111-8 to provide purposes for Baca Refuge.
  - 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 non-Federal, to the hunting of migratory birds.
  - Native American Policy (1994): Articulates the general principles that guide the Service's government-to-government relationship to Native American governments in the conservation of fish and wildlife resources.
  - 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 decisionmaking. [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.
- Paleontological Resources Preservation Act of 2009: Requires the Secretary of Interior and Agriculture to manage and protect paleontological resources on Federal land using scientific principles and expertise.
- Refuge Recreation Act (1962): Allows the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient funds are available to manage the uses.
- Rehabilitation Act (1973): Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the Federal Government to ensure that any person can participate in any program.
- Rivers and Harbors Act (1899): Section 10 of this act requires the authorization of U.S. Army Corps of Engineers before any work in, on, over, or under navigable waters of the United States.
- Sangre de Cristo National Heritage Area (2009): National heritage areas are set aside by Congress. The Sangre de Cristo National Heritage Area was established in Public Law 111-11 on March 30, 2009 for the purposes of providing integrated and cooperative approach for the "protection, enhancement, and interpretation of the natural, cultural, scenic, and recreational resources of the Heritage Area."
- 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 non-Federal 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.
- Wilderness Act (1964): The act (Public Law 88-577) [16 U.S.C. 1131-36] defines wilderness as "A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain."

# Appendix B

## *Preparers and Contributors*

This document is the result of the extensive, collaborative, and enthusiastic efforts by the members of the planning team, cooperating agencies, and other Service or agency contributors listed below.

### U.S. Fish and Wildlife Service Staff Planning Team

<i>Name</i>	<i>Agency and/or Position</i>	<i>Education and Experience</i>	<i>Contributions</i>
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Mike Blenden	Project Leader, San Luis Valley National Wildlife Refuge Complex	B.S. and M.S. Wildlife Management 32 yrs.	Project coordination, organization, writing, and review
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Scott Miller	Wildlife Biologist, San Luis Valley National Wildlife Refuge Complex	B.S. Wildlife Ecology; M.S. Wildlife Biology 17 yrs.	Writing and reviewing
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Ron Garcia	Baca Refuge Manager	B.S. Field Biology 26 yrs.	Writing and reviewing
Corinna Hanson	Deputy Refuge Manager, Baca Refuge	B.S. Criminal Justice M.S. Wildlife Ecology 5 yrs.	Writing and reviewing
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**U.S. Fish and Wildlife Service Staff Planning Team**

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**Cooperating Agency Members**

The Cooperating Agency Members Role: Primary representative(s) of respective agencies at meetings; participated in planning team meetings; helped identify issues; provided input on alternative approaches and objectives and strategies; reviewed draft planning documents and provided information as requested.

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**Consultants**

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Ian Scott	Roothouse Studio		Assistance in facilitation of public use objectives workshop
Bill Mangle	ERO Resources, Natural Resources Planner, Denver, CO	B.S. History/Political Science M.S. Natural Resources Policy Planning	Assistance with analysis and research for reasonably foreseeable activities and cumulative impacts, and other NEPA documentation
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## Individuals and Groups

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

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# Appendix C

## *Public Involvement*

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Following the guidance found in NEPA, the Improvement Act, and our planning policies, we have made sure that all interested groups and the public have had an opportunity to be involved in the planning process. This appendix outlines our outreach efforts during the development of the CCP and EIS.

### **C.1 Public Scoping Activities**

A notice of intent to develop a CCP and a request for comments was published in the Federal Register on March 11, 2011(76 FR Doc. 2011-5924) (FWS 2011h). The notice of intent notified the public of our intent to begin the CCP and EIS process.

#### **Public Outreach**

Early in the preplanning phase, the Service identified a process that would be inclusive of many interests and would involve a range of activities for keeping the public informed and ensure meaningful public input. To date, the Service used various methods to solicit guidance and feedback from interested citizens, organizations, and government agencies. These methods have included outreach materials, public scoping meetings, agency meetings (planning team), briefings and presentations, as well as letters, email and telephone calls.

#### **Planning Updates**

A Planning Update was mailed to about 300 persons and businesses during the period leading up to the public meetings, and most updates were mailed in mid-March 2011 (FWS 2011h). The planning update and an earlier piece titled Planning Process Summary (FWS 2011g), outlined the planning process, the draft vision and goals for the refuge, and the dates, times and locations of the public scoping meetings. Information contained in the Planning Update was announced at local agency meetings

(FWS2011h). The Planning Update distribution list consisted of individuals, agencies, and organizations who previously expressed an interest in refuge activities (FWS2011h).

#### **Press Release**

A press release announcing the planning process and notifying the public of the schedule and location of the public meetings was sent to nearly 857 media organizations throughout Colorado including congressional offices, other Federal and State agency offices, and tribal agencies. A number of news articles about the planning process appeared in a number of newspapers, radio, TV and online publications prior to the meetings. Additionally, the project leader gave a 20-minute taped radio interview with KSLV in Monte Vista, CO that aired on April 16, 2011 and another 20-minute live interview with KRZA which aired twice on April 19, 2011.

#### **Project Website**

The project's planning web site <<http://www.fws.gov/alamosa/planning>> was established in early March 2011 (FWS 2014X). The site provides information about the public scoping meetings, as well as downloadable versions of all of the available public scoping documents. An example of the web site is included in the scoping report (FWS2011h). All interested citizens can sign up to be on the project mailing list or can provide public comment through the planning website.

#### **Public Scoping Meetings**

The three public scoping meetings (March 29-31, 2011) were a major component of the public scoping process. The purpose of these meetings was to solicit public concerns and planning ideas that will be considered in the CCP/LPP and EIS. Meetings were

held at three locations—Alamosa, Monte Vista, and Crestone.

Following a brief welcome and introduction, Service staff made a 15-minute presentation that outlined the following points:

- Description of the Service and the purpose of the Refuge System
- CCP and EIS process
- Project schedule
- Draft Vision and goals
- Proposed San Luis Valley Conservation Area and LPP

Following the presentation, the remainder of the meeting was broken up into two components, questions and answers and public comments. During the question and answer session, the facilitator took all the audience's questions. In turn, we answered all the questions. Most of the meeting time was spent in the question and answer session. After all the questions were answered, we took comments from those who wanted to offer them. This format enabled participants to have their questions and concerns answered about the planning process and also identified many of the important issues.

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## Other Briefings

We have briefed or given a presentation to a number of entities that have included county commissioners from the affected governments, the Rio Grande Water Conservation District, and others.

For the President's America's Great Outdoor initiative, we have met with a wide array of local ranchers and stakeholders, county commissioners, State representatives, and other Federal agencies to talk about landscape conservation in the San Luis valley.

## C.2 Agency and Tribal Coordination

In accordance with the Service's planning policy, the preplanning and scoping process began with formal notification to Native American tribes and other Federal and State agencies with a land management interest and inviting them to participate as cooperating agencies and members of the planning team.

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## Native American Tribes

We sent letters of notification about the planning process including an invitation to participate on the planning team to the following tribes: Cochiti Pueblo, Pueblo of Santa Clara, Pueblo of Laguna, Pueblo of Zuni, Pueblo of Picuris, Pueblo of San Ildefonso, Pueblo of Acoma, Pueblo of Santa Ana, Pueblo of Taos, Pueblo of Jemez, Uintah and Ouray Ute Indian Tribe, Southern Ute Tribe, Ute Mountain Tribe, Jicarilla Apache Nation, Ohkay Owingeh, and Navajo Nation. We are continuing to work with interested tribes who are interested in the planning process.

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## Federal, State, and Local Agencies

We sent letters of notification about the planning process including an invitation to participate on the planning team to the following agencies: NPS, BLM and USFS (San Juan Public Lands Office), NRCS, and CPW. Subsequently, we met and briefed the six counties within the refuge boundaries about the planning process including the proposed San Luis Valley Conservation Area. The counties include: Alamosa, Rio Grande, Saguache, Conejos, Costilla, and Mineral counties.

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## Cooperating Agencies

Following notification to Native American tribes and Federal, State, and local agencies, the following agencies have participated as cooperating agencies in the development of the draft CCP and EIS: Bureau of Land Management (BLM) and the Forest Service (USFS) (both agencies are part of the San Juan Public Lands Center), National Park Service (NPS), Natural Resources Conservation Service (NRCS), Colorado Parks and Wildlife (CPW), and the Colorado Division of Water Resources. They have provided input on vision and goal, alternatives development, objectives development, and internal review of the draft CCP and EIS. We have greatly valued the input that we have received from the cooperating agencies in guiding the development of the draft CCP and EIS.

## C.3 Scoping Results

The following summarizes the methods for comment collection and analysis, the number and source of comments received and a summary of the comments. The planning team collected comments, questions and concerns about the future of the refuge through public meetings, letters, email, and other methods as described in the public scoping activities above.

### Methods for Comment Collection and Analysis

The objective of the scoping process is to gather the full range of comments, questions and concerns that the public has about management of the refuge or the planning process. All comments, questions, or issues, whether from written submissions or recorded at the public meetings were organized by topic into a spreadsheet and coded for organizational purposes. Every effort was made to document all issues, questions, and concerns. Regardless of whether comments and questions were general in nature or about specific points of concern, they were added to the spreadsheet one time.

We provided optional questions to the public that included the following:

- What suggestions do you have for managing migratory birds on the refuges in the face of climate change and declining precipitation?
- What ideas do you have regarding visitor services and wildlife-dependent public uses on the refuges, particularly Baca National Wildlife Refuge which is currently closed to any public use?
- What changes, if any, would you like to see in the management of the Alamosa and Monte Vista National Wildlife Refuges?
- What concerns do you have regarding the additional protection of wildlife and wetland habitat in the San Luis Valley? Can the use of conservation easements protect important wildlife resources in the valley?
- What concerns do you have regarding ungulate management on the refuges or the rein-

roduction of species such as the American bison?

All comments received from individuals on Service NEPA documents become part of the official public record. Requests for information contained in comments are handled in accordance with the Freedom of Information Act, NEPA (40 CFR 1506.6 (f)) and other Department of Interior and Service policies and procedures.

### Summary of the Scoping Comments

During the initial scoping process, we received input on a wide array of topics and subtopics. Comments were submitted in writing and/or offered at the public meetings held in March 2011 in Alamosa, Monte Vista, and Moffat, Colorado.

Fifty-two people attended the three public meetings with the largest audience at the meeting in Moffat where about 33 people attended (10 at Alamosa and 9 at Monte Vista). Additionally, about 14 organizations and citizens provided written comments. Agency or organizations included the Environmental Protection Agency, Defenders of Wildlife, TNC, Lexam, and their legal firm.

Subsequently, we identified seven significant issues or topics to address (refer to chapter 1, section 1.7):

- Habitat and Wildlife Management
- Water Resources
- Landscape Conservation and Protection
- Visitor Services
- Partnerships and Operations
- Cultural Resources and Tribal Coordination
- Research, Science and Protection of the Physical Environment

## C.4 Development of Draft Alternatives

We consider alternatives development as part of an iterative process in the development of a draft CCP and EIS, meaning it continues to evolve. This phase of the project began in the fall of 2011. The core planning team developed four approaches to managing the refuge complex. This included three action alternatives including a proposed action and the no-action alternative. Each of the draft alternatives

presented a different approach for future management with a varied focus on wildlife and habitat management and visitor services. Following further input from other Service staff and our cooperating agencies, we sought further input from the public during three workshops that we held from January 23-25, 2012. Similar to the initial scoping meetings, we mailed out a planning update and put out a press release. Forty-one people attended these workshops held in Alamosa, Monte Vista, and Moffat, Colorado. We also received several hundred written comments from individuals and stakeholder groups. This input shaped further development and refinement of the alternatives.

## C.5 List of Entities Receiving the Draft CCP and EIS

The following Federal and State agencies, Tribes, and nonprofit organizations received copies of the Draft CCP and EIS. Other interested groups and members of the public who were on our mailing list received a copy of Planning Update, Issue 3, which summarized the contents of the Draft CCP and EIS, announced the locations and times of the public meetings, and provided information on how to obtain a copy of the CCP and EIS.

### Federal Elected Officials

- U.S. House of Representatives, Colorado Representative Scott Tipton
- U.S. Senate, Colorado Senator Mark Udall
- U.S. Senate, Colorado Senator Michael Bennet

### Federal Agencies

- Bureau of Land Management, San Luis Valley Field Office, Saguache, Colorado
- Bureau of Reclamation, Alamosa, Colorado
- Environmental Protection Agency, Region 8, Denver, Colorado
- National Park Service, Mosca, Colorado
- Natural Resources Conservation Service, Alamosa and Center, Colorado

- U.S. Forest Service, Rio Grande National Forest, Monte Vista Colorado
- USGS, Fort Collins, Colorado

### Tribes

- Jicarilla Apache Nation, Dulce, NM
- Navajo Nation, Window Rock, AZ
- Pueblo of Acoma, Acoma, NM
- Pueblo of Cochiti, Cochiti, NM
- Pueblo of Jemez, Jemez, Pueblo, NM
- Pueblo of Laguna, Laguna, NM
- Pueblo of Picuris, Penasco, NM
- Pueblo of San Ildefonso, Santa Fe, NM
- Pueblo of Santa Clara, Espanola, NM
- Pueblo of Taos, Taos, NM
- Pueblo of Zuni, Zuni, NM
- Pueblo of Santa Ana, Santa Ana Pueblo, NM
- Southern Ute Tribe, Ignacio, CO
- Uintah and Ouray Ute Indian Tribe, Fort Duchesne, UT
- Ute Mountain Ute Tribe, Towaoc, CO

### Colorado Elected Officials

- John Hickenlooper, Governor, Denver, CO
- Representative Edward Vigil, Denver, CO
- Senator Larry Crowder, State Senator, Denver, CO

### Colorado State Agencies

- Colorado Division of Water Resources, Division 3, Alamosa, CO
- Colorado Parks and Wildlife, Monte Vista, CO
- Colorado State Historic Preservation Office

### Local Government

- County Commissioner Alamosa County, Alamosa, CO
- County Commissioner, Conejos County, Conejos, CO
- County Commissioner, Costilla County, San Luis, CO

- County Commissioner, Mineral County, Creede, CO
- County Commissioner, Rio Grande County, Del Norte, CO
- County Commissioner, Saguache, CO
- Mayor, Alamosa, CO
- Mayor, Monte Vista, CO
- Mayor, Saguache, CO
- Rio Grande Water Conservation District, Alamosa, CO
- Town of Crestone, Crestone, CO
- Del Norte Town Government, Del Norte, CO

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## Public Libraries

- Alamosa Public Library, Alamosa, CO
- Carnegie Public Library, Monte Vista, CO
- Baca Grande Library, Crestone, CO
- Saguache Public Library, Saguache, CO
- Colorado State University Morgan Library, Fort Collins, CO
- U.S. Fish and Wildlife Service, National Conservation Training Center Library, Shepherdstown, West Virginia

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## Organizations

- The Nature Conservancy, Boulder, CO
- American Bird Conservancy, Washington, DC
- Wilderness Society, Colorado headquarters, Denver, CO
- Friends of the San Luis Valley National Wildlife Refuges, CO
- Rio Grande Headwaters Land Trust, Del Norte, CO
- Colorado Open Lands, Lakewood, CO
- Orient Land Trust, Villa Grove, CO
- San Luis Valley Ecosystem Council, Crestone, CO
- Baca Grande Property Owners Association, Crestone, CO
- Crestone Baca Land Trust, Crestone, CO



# Appendix D

## *Compatibility Determinations*

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### D.1 USES

We have developed draft compatibility determinations for the following existing and proposed uses. As per our planning policy, we provide these compatibility determinations in our draft CCP and EIS as part of the public review. These draft compatibility determinations only apply to the draft proposed action. Refer to chapter 1, section 1.2 for more information on compatible refuge uses.

- Hunting
- Fishing
- Wildlife observation, photography, environmental education, and interpretation
- Commercial photography
- Prescribed grazing and haying
- Cooperative farming (Monte Vista National Wildlife Refuge)
- Research

### D.2 Refuge Names

The San Luis Valley National Wildlife Refuge Complex (refuge complex) consists of three national wildlife refuges:

- Monte Vista National Wildlife Refuge
- Alamosa National Wildlife Refuge
- Baca National Wildlife Refuge

### D.3 Establishing and Acquisition Authorities

The following laws and Executive orders established the refuges and authorized acquisition of refuge lands.

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#### Monte Vista National Wildlife Refuge

- Establishing authority: Migratory Bird Conservation Act of 1929
- Approved for acquisition on June 10, 1952, by the Migratory Bird Conservation Commission
- Public Land Order 2204 dated September 1960

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#### Alamosa National Wildlife Refuge

- Establishing authority: Migratory Bird Conservation Act of 1929
- Approved for acquisition on June 27, 1962, by the Migratory Bird Conservation Commission
- Public Land Order 3899 dated December 1965

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#### Baca National Wildlife Refuge

- Establishing authority: Great Sand Dunes National Park and Preserve Act of 2000 (Public Law 106-530, November 22, 2000)
- Established on April 8, 2003, with transfer of 3,315 acres from BOR

## D.4 Refuge Purposes

### Monte Vista and Alamosa National Wildlife Refuges

The Monte Vista and Alamosa National Wildlife Refuges (refuges) were established “for use as an inviolate sanctuary, or for any other management purposes, for migratory birds” (16 U.S.C. § 715d (Migratory Bird Conservation Act)).

### Baca National Wildlife Refuge

The Baca Refuge was established “to restore, enhance, and maintain wetland, upland, riparian, and other habitats for native wildlife, plant, and fish species in the San Luis Valley” (Omnibus Appropriations Act, 2009, H.R. 1105).

### National Wildlife Refuge System Mission

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

## D.5 Description of Use

### Hunting

The refuge complex proposes to continue to provide safe and sustainable waterfowl and small game hunting opportunities within designated areas of the Alamosa and Monte Vista Refuges. In addition, we propose to expand big game hunting opportunities on

the Alamosa and Monte Vista Refuges and open the Baca Refuge to both big and small game hunting.

Under the authority of the National Wildlife Refuge Administration Act, the Secretary of the Interior can authorize hunting on any unit of the National Wildlife Refuge System (Refuge System) as long as it is compatible with the purposes for which the refuge was established. This act also allows waterfowl hunting on up to 40 percent of land acquired under the Migratory Bird Conservation Act that would otherwise be considered “inviolate sanctuary.” Both the Alamosa and Monte Vista Refuges were acquired with funds generated from the sale of Migratory Bird Hunting and Conservation Stamps (“Duck Stamps”). Consequently, portions of both refuges are open to waterfowl hunting in compliance with all applicable State and Federal laws. In addition to waterfowl hunting, hunting for pheasant, cottontail, and jack-rabbit is permitted during established waterfowl hunting seasons within the areas of each refuge designated for waterfowl hunting.

For all practical purposes, elk were not present on the Alamosa and Monte Vista Refuges during the first 40 years after the establishment of the refuges. It was not until the mid-1990s that elk starting using Monte Vista Refuge in noticeable numbers. During the late 1990s, elk started using the Alamosa Refuge. Elk hunting has never been opened to the public on either of these refuges.

As a consequence of the change in elk distribution and abundance on the Alamosa and Monte Vista Refuges, we are proposing some elk hunting on both refuges. The CCP provides the first opportunity in the history of the Baca Refuge to consider making refuge hunting opportunities available to the public. We propose opening small game hunting, as defined by Colorado hunting regulations, in the southwest and northwest portions of the refuge (figure 18) and an elk archery season both along and to the north of Crestone Creek. Additional elk hunting opportunities would be made available following additional planning.

On all three refuges, we propose working with CPW to conduct dispersal hunts to redistribute concentrations of elk that are excessively damaging refuge resources or private property or that are presenting unusual hazards on nearby public roads. These hunts would use licensed hunters to eliminate stubborn management conflicts when all conventional efforts have failed. Hunters would be accompanied by agency personnel and instructed about which animals to take to meet management objectives.

## **Availability of Resources**

We currently have a full-time law enforcement officer and two collateral duty officers to help administer the hunting program. Additionally, law enforcement assistance would continue to be provided by CPW.

## **Anticipated Impacts of Use**

As with all hunting programs that use firearms, human safety and the potential for property damage are important considerations. Hunters, other refuge users, and refuge staff are exposed to potential hazards whenever firearms are present. Damage and theft of cultural resources are potential impacts whenever people, including hunters, are in areas with these resources. Harvest of individual animals can have negative impacts on larger populations if sustainable harvest practices are not used. Hunting activity in one area of a refuge often causes animals to move to other portions of the refuge or to neighboring private or public lands. In developing a sustainable waterfowl hunting program, we must consider the response of waterfowl to hunting, and we often maintain areas that are closed to hunting along with areas where hunting is allowed.

## **Determination**

Hunting, including big game, waterfowl, and small game hunting, is a compatible use of the Alamosa, Baca, and Monte Vista Refuges.

## **Stipulations Necessary To Ensure Compatibility**

- Plans for specific hunting programs would ensure reasonable human safety by maintaining hunter densities at or below reasonable levels, providing information to hunters regarding the areas they are hunting in and associated conditions, and maintaining law enforcement and staff presence to enable response to emergencies and provide information in the field.
- Plans for specific hunting programs would exclude areas from hunting activity if there is a substantial risk of property damage from firearm discharge.
- Illegal activities, including hunting violations and removal of cultural artifacts, would be minimized by providing well

thought-out information and sufficient law enforcement presence.

- All hunting programs would consider population objectives. Waterfowl hunting would follow seasons and bag limits provided by CPW.
- Plans for specific programs would include objectives for elk distribution. In some cases, discouraging elk use of some parts of a refuge may be a major objective of the hunt. In other cases, it would be desirable to prevent movement of elk off a refuge onto the adjoining Great Sand Dunes National Park and Preserve or private lands.
- All hunting programs would be coordinated with CPW.
- The refuge manager would have the ability to close or modify entire hunting programs, including access, timing, and methods, in response to unforeseen conditions in order to ensure public safety and best management of natural resources.
- Refuge staff would regularly solicit feedback from hunters regarding safety, the overall quality of their hunting experiences, and any suggestions they may have.

## **Justification**

Within the refuge complex, expansion of the current hunting program would provide diverse and quality hunting opportunities for waterfowl, big game, and small game hunting, as defined in the Service's guidelines for wildlife-dependent recreation (FWS 2006). Under this policy, providing quality experiences is highlighted as an important component of a hunting program (605 FW1, 605FW2). Promoting safety, providing reasonable opportunities for success, and working collaboratively with the State wildlife agencies are just a few of the key elements that should be considered in providing for quality experiences. For example, a quality experience could mean that participants could expect reasonable harvest opportunities, uncrowded conditions, few conflicts between hunters, relatively undisturbed wildlife, and limited interference from, or dependence on, mechanized aspects of the sport.

Hunting has long been an important cultural and social component of the lands that make up the refuge complex. About 800 to 1,000 hunters visit the Alamosa and Monte Vista Refuges each year, and these refuges would continue to provide for quality

and diverse hunting experiences. The opening of the Baca Refuge would provide welcome hunting opportunities for many hunters. On all three refuges, elk hunting is a badly needed tool which would improve the ability of refuge managers to influence the distribution of elk on the refuges and assist CPW in achieving population objectives.

*Mandatory 15-year reevaluation date: 2030*

## Fishing

Throughout most of the history of Monte Vista Refuge, the Service has hosted an annual “Kids Fishing Day.” Over the years, the event has had several participating partners. Since 2000, it has been sponsored by the Friends of the San Luis Valley National Wildlife Refuges (Friends group). This event is scheduled to occur on a Saturday in June close to or during National Fishing Week, with the objective of introducing youth to fishing and wildlife-dependent activities while providing environmental education regarding cold-water fisheries and national wildlife refuges.

Kids Fishing Day is conducted at a shallow, two-acre pond that is a remnant of a fish hatchery that operated before the refuge was acquired. Typically, the pond is filled with water from an adjoining well several weeks in advance. Approximately 1 week prior to the event, approximately 1,000 fish donated from the Hotchkiss National Fish Hatchery are introduced into the pond. Public service announcements and fliers posted in local communities indicate required adult supervision, announce a free lunch, and describe the educational displays or presentations, which vary from year to year depending on the availability of presenters and cooperators. Volunteers and refuge staff are present to assist young anglers when needed and to ensure public safety.

Other service organizations including a private, non-profit mental health agency, and a number of retirement and assisted living facilities are then allowed to bring groups to the pond after the Kids Fishing Day event to take advantage of any remaining angling opportunities in the safe and accessible environment. This event also provides additional opportunities for appreciation of wildlife-dependent recreation to an underserved segment of the public.

## Availability of Resources

This event does not require a large amount of refuge resources. The fish are donated and delivered by the Hotchkiss National Fish Hatchery. Organization and execution of the event is largely conducted by the

Friends group with help from varying partners. The largest refuge expense is the electricity used to pump water when surface water is unavailable.

## Anticipated Impacts of Use

All water used for this event and not lost to evaporation goes into the Spring Creek system of the Monte Vista Refuge, which then provides some benefit to wetlands. About 5 acres of short emergent wetland habitat could be maintained if this same amount of water was directly used for that purpose.

## Determination

Conducting the Kids Fishing Day event is a compatible use of Monte Vista Refuge.

## Stipulations Necessary To Ensure Compatibility

Stipulations required include:

- the event continues to be well supported by the Friends of the San Luis Valley National Wildlife Refuges and other partners
- reliance on groundwater for this event is minimized by maintaining the pond for as short a period as possible while allowing harvest of most of the fish and providing the greatest angling opportunity
- fish continue to be donated from the Hotchkiss National Fish Hatchery or equivalent
- fish remaining in the pond are donated to CPW for placement in other approved fisheries such as nearby Homelake State Wildlife Area

## Justification

Fishing is one of the wildlife-dependent recreational activities that is encouraged on national wildlife refuges and is a fundamental strategy in the Service’s “Connecting People with Nature” effort. Although this fishing event is provided in a somewhat artificial setting, it is a very popular and accessible opportunity in a community that otherwise must drive extensive distances for similar experiences, which may not be possible for youth from lower-income families. The cost of conducting this small, short-term event is well worth the benefit to the community and achieving Refuge System goals.

*Mandatory 15-year reevaluation date: 2030*

## Wildlife Observation, Photography, Interpretation, and Environmental Education

The Improvement Act identified six wildlife-dependent recreational activities as priority public uses and encouraged their implementation on refuges when they are found compatible with refuge purposes and when adequate resources are available to manage these activities on refuge lands. This compatibility determination considers wildlife observation, wildlife interpretation, environmental education, and wildlife photography. The compatibility of the other two activities identified in the Act, hunting and fishing, are assessed above.

Compatible access for priority public uses would be improved on the Monte Vista and Alamosa Refuges and established on the Baca Refuge. On the Monte Vista and Alamosa Refuges, we would allow more access for viewing and interpretation on a seasonal basis from about July 15 to February 28. Modes of access that facilitate wildlife-dependent uses—walking, cross-country skiing and bicycles—would be favored on all three refuges. Portions of the Baca Refuge would be seasonally opened for all public uses except fishing. An auto tour route would be built on the Baca Refuge. Additional trails or viewing platforms could be considered to enhance viewing opportunities. Limited commercial opportunities such as photography could be considered. We would seek funding to build a visitor center and refuge complex staff offices at the Monte Vista Refuge to better serve the public, provide for safer access to our offices, and create a more efficient work environment for our employees.

On the Alamosa Refuge, we would:

- extend the auto tour route to the east to connect with the Bluff Road; improve the accessibility of the Rio Grande nature trail and enhance the experience by providing better seating, shelter, and interpretation for visitors; seasonally open about 7.3 additional miles of existing trails and administrative roads for wildlife viewing and photography access (foot, bicycle, cross country ski) currently available only to hunters during the hunting season; and open about 6.4 additional miles of nature trails, including a trail link to town and an

extension of Bluff Nature Trail to parking lot 4

- work with partners to develop a trail from the town of Alamosa to the Alamosa Refuge
- repurpose the existing contact station and visitor center at the Alamosa Refuge to focus on environmental education and administrative needs

On the Baca Refuge, we would:

- develop auto tour routes and install wayside interpretive panels along these routes. Auto tour routes would provide seasonal access and allow visitors to experience different habitats on the refuge. These routes would be accessible from Colorado Highway 17 and Saguache County Road T.
- develop a looped interpretive trail around the refuge's headquarters area (old Baca Ranch) with several interpretive panels or other interpretive media positioned along the trail route
- develop a nature trail from the refuge office to the sandy bluff and windmill above the office, as well as a trail through the pinion unit uplands with access from the Baca Grande subdivision. This trail would accommodate horse traffic as well as foot traffic
- develop two nature trails originating from the historic Cottonwood Cow Camp, where there would also be a picnic spot with table(s) and a vault toilet
- develop two picnic spots (without toilets) at the refuge headquarters and one at the historic Sheds Cow Camp
- develop three elevated wildlife viewing areas along the auto tour routes and along the Baca Grande subdivision access road
- develop seven seasonal access parking areas along the western boundary of the refuge
- develop a pullout with an informational kiosk along Saguache County Road T
- provide a refuge office and visitor center and work with agency partners, Friends group, and others to staff and provide orien-

tation and interpretation for natural and cultural resources throughout the San Luis Valley. This office and visitor center would also house impressive archeological collections and provide opportunities for the public to view and learn about these artifacts.

- seasonally open portions of the refuge to big game hunting and other wildlife-dependent uses, with all using non-motorized forms of access during normal elk hunting seasons
- open proposed big game hunting areas to all non-motorized forms of access during the elk season

On the Monte Vista Refuge we would:

- improve the accessibility of the Meadowlark Nature Trail and add a viewing blind; replace information kiosks at three parking areas; develop visitor facilities around Parker Pond, including an accessible parking area and trailhead, viewing blind, trail, and observation platform; develop one crane observation pull-off and parking along Rio Grande County Road 6 South; and replace signs at existing crane observation pull-offs.
- build a new visitor center and refuge complex headquarters facility. We would link trails from this facility to the Meadowlark Nature Trail, the auto tour route and other destinations.
- work with partners to develop a trail from the town of Monte Vista to the Monte Vista Refuge
- work with BLM and Rio Grande County to develop a trailhead on Rio Grande County Road 6 South to provide non-motorized access to BLM land

On all three refuges we would:

- construct additional recreational vehicle pads for volunteers

## ***Availability of Resources***

We would mostly use existing funding and staffing to implement some of the projects that only require opening an administrative road to non-motorized access or extending an auto tour route along existing roads. Most of these projects would potentially be

funded through traditional appropriated funds as they become available. Their availability depends on annual appropriations and on the degree to which refuge staff succeed in competing for any of the Service's flexible funding opportunities. Additionally, the generation of outside funding, "in-kind" assistance from partners, especially the Friends group, would also be used.

Once implemented, these projects would result in a significant increase in visitor use at all three refuges, placing a significant demand on refuge maintenance and law enforcement programs. Additional positions and maintenance funds required to sustain these projects are identified in the CCP.

## ***Anticipated Impacts of Use***

Projects on all three refuges could have the following impacts:

- On the Alamosa Refuge, additional wildlife disturbance could occur from extension of the auto tour route, opening areas for non-motorized access, expansion of wildlife viewing nature trails, and providing a trail link from the town of Alamosa to the refuge.
- On all three refuges, the proposed projects would increase human presence in both time and space. There is inter- and intra-specific variation within and among wildlife species since some species, especially habitat specialists, are more susceptible than others to human disturbance, especially habitat generalists. Research has shown that human presence associated with roads and trails can result in a simplification of avian communities (fewer specialists and more generalists), reduced nest success, and reduced habitat quality. Many species are more likely to flush with increased human presence, resulting in less time spent foraging, which can affect building suitable energy reserves for egg laying and migration, reduced food delivery rates to young, territory establishment and defense, and mate attraction. For many species, especially medium-sized and large mammals, the presence of dogs can greatly magnify the effects of disturbance. Research has shown that various activities result in differing levels of disturbance. Pedestrian and bicycle use results in greater disturbance than vehicle use. Trails and roads create habitat edges, which lead to increased predation, cowbird parasitism, and displacement of interior-sensitive birds. Trails and

roads can restrict animal movement and dispersal. A corresponding increase in law enforcement resources would be required to ensure public safety.

- On the Alamosa Refuge, repurposing the visitor center and contact station would result in more use of the facility.
- On the Baca Refuge, the development of the auto tour routes and trails would result in increased disturbance to migratory birds, elk, pronghorn, and mule deer. Additionally, large movements of amphibians, primarily Great Plains toad, have occurred under some environmental conditions on the Baca Refuge. During these mass movements, it is impossible to avoid direct mortality from vehicles.
- On the Baca Refuge, increased public access comes with a greater concern about accidental destruction and intentional illegal collection of cultural artifacts commonly found on the refuge. This could also occur on the Monte Vista and Alamosa Refuges.
- On the Baca Refuge, the proposed auto tour route could increase the likelihood of visitors becoming stranded in relatively remote areas.
- On the Monte Vista Refuge, development of year-round access to Parker Pond could increase disturbance to an important water-bird nesting colony.
- On the Monte Vista Refuge, some additional disturbance would be associated with development of observation areas along County Road 6.
- Some additional disturbance would result from any non-motorized trail extending from the city of Monte Vista onto the refuge.
- Construction of a new office and visitor center would create a larger footprint than the existing small office and contact station.

## **Determination**

Wildlife interpretation, environmental education, wildlife photography, and wildlife observation are compatible uses of the Alamosa, Baca, and Monte Vista Refuges.

## **Stipulations Necessary To Ensure Compatibility**

Stipulations required on the Alamosa Refuge include:

- Riparian habitat acquired in 2003 with the Lillpop addition was purchased with funds provided by BOR as mitigation for southwestern willow flycatcher habitat lost from the construction and operation of the Salt River Project in Arizona. Consequently, southwestern willow flycatchers are a priority management goal on this tract and destruction of habitat and disturbance of nesting birds must be minimized by careful siting and timing of projects and associated disturbance.
- Additional limited non-motorized access to the refuges would be allowed outside of the critical breeding period from July 15th to the end of waterfowl season (end of February).
- Leashes are required for all dogs not actively being used for hunting.
- Existing administrative roads and trails would be used as much as possible in the expansion of non-motorized access to the refuge, which would minimize ground disturbance, associated habitat loss, and the spread of weeds.
- Additional volunteer recreational vehicle pads would be located in areas that are already disturbed and that are near existing administrative facilities to minimize soil and wildlife disturbance.
- The refuge manager could terminate or modify any activity if conditions change or assumptions in this analysis are found incorrect, resulting in the activity materially interfering with refuge purposes.
- Interpretive information would be posted and included in refuge brochures describing the impact of disturbance on wildlife and simple practices for the visitor to minimize disturbance.

Stipulations required on the Baca Refuge include:

- Visitors on the auto tour route would be restricted to their vehicles or the immediate area outside their vehicle.
- Refuge staff would temporarily close the auto tour route during times of significant amphibian movement to prevent toad mortality.
- Visitors on the wildlife observation trail(s) would be required to stay on the trail and keep their dogs on a leash.
- Existing administrative roads and trails would be used as much as possible in the expansion of non-motorized access to the refuge, which would minimize ground disturbance, associated habitat loss, and the spread of weeds.
- Law enforcement presence on the refuge must correspond to the amount of public use to minimize poaching, habitat destruction from off-road driving, and illegal collection of artifacts. Law enforcement presence would also have to increase to ensure that the public has a reasonable expectation of safety when visiting the refuge. Much of the Baca Refuge is relatively isolated from busy roads and people, resulting in a potentially life-threatening situation if visitors and users become stranded due to injury, mud, snow, or break down. Tour routes would be closed during times when conditions pose a significant threat to public safety.
- The use of horses would be restricted to all areas open to non-motorized access and where horses are permitted.
- Additional volunteer recreational vehicle pads would be located in areas that are already disturbed and are near existing administrative facilities to minimize soil and wildlife disturbance.
- The refuge manager could terminate or modify any activity if conditions change or assumptions in this analysis are found to be incorrect, resulting in the activity materially interfering with refuge purposes.
- Interpretive information would be posted and included in refuge brochures describing the impact of disturbance on wildlife and

simple practices for the visitor to minimize disturbance.

Stipulations required on the Monte Vista Refuge include:

- Additional non-motorized access to the refuges would be allowed during the non-critical breeding period from July 15th to the end of February.
- The new visitor center and office would be built on land previously disturbed by farming activity and on the current administrative area occupied by the old office and parking lot.
- Existing administrative roads and trails would be used as much as possible in expansion of non-motorized access to the refuge, which would minimize ground disturbance, associated habitat loss, and the spread of weeds.
- Additional volunteer recreational vehicle pads would be located in areas that are already disturbed and are near existing administrative facilities to minimize soil and wildlife disturbance.
- Interpretive information would be posted and included in refuge brochures describing the impact of disturbance on wildlife and simple practices for the visitor to minimize disturbance.

### ***Justification***

The abundant wildlife resources found on the refuge complex attract many visitors to the San Luis Valley. The largest draw is the Monte Vista Crane Festival, which attracts thousands of people annually during the spring migration of sandhill cranes. This event, which is put on in partnership with the Friends group and the local community, provides a significant boost to the local economy. Other visitors frequent the auto tour routes at the Monte Vista and Alamosa Refuges, walk the nature trails, or enjoy the spectacular vistas from the Bluff Overlook at the Alamosa Refuge. The Service is unable to open the Baca Refuge to significant public access without the benefit of a planning process with public participation. Overall, access for visitors wanting to participate in nonconsumptive recreation on these three refuges has been limited. It is clear from talking with visitors and community members and from a USGS visitor survey of the Monte Vista Refuge that there is a substantial

demand for more opportunities for public access on these refuges. It is the intent of this determination and the CCP to provide well-thought-out and desirable access opportunities without materially interfering with achievement of refuge wildlife management goals.

*Mandatory 15-year reevaluation date: 2030*

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## **Commercial Photography**

The San Luis Valley offers several photogenic wildlife spectacles such as the sandhill crane migration, elk herds, and waterfowl concentrations, with a stunning backdrop provided by the San Juan Mountains and the Culebra and Sangre de Cristo Ranges. Wildlife observation areas, hiking trails, and auto tour routes are available on the Alamosa and Monte Vista Refuges, while similar opportunities are being proposed in the CCP for the Baca Refuge. Commercial photographers and videographers regularly visit the San Luis Valley.

Commercial filming is defined as the digital recording or filming 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, advertising, 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. These descriptions and further information about these activities are found in 43 CFR Part 5 (Department of the Interior) and 50 CFR Part 27 (Fish and Wildlife Service).

Under the Code of Federal Regulations (50 CFR § 27.71), special use permits for commercial filming and still photography are required when “it takes place at location(s) where or when members of the public are generally not allowed; or (2) it uses model(s), sets(s), or prop(s) that are not a part of the location’s natural or cultural resources or administrative facilities; or (3) the agency would incur additional administrative costs to monitor the activity; or (4) the agency would need to provide management and oversight to:

- i. avoid impairment or incompatible use of the resources and values of the site; or
- ii. limit resource damage; or
- iii. minimize health or safety risks to the visiting public.”

These permit requests are evaluated on an individual basis, using a number of Department of the Interior, Service, and National Wildlife Refuge System policies (for example, 43 CFR Part 5, F0 CFR Part 7, 8 RM 16). Commercial filming would be managed on the refuges through the special use permit-

ting process to minimize the possibility of damage to cultural or natural resources or interference with other visitors to the area.

## **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. Special use permits for commercial filming and still photography would require payment of a location fee and a reimbursement for actual costs incurred in processing the permit request and administering the permit.

## **Anticipated Impacts of 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 and cinematographers are more likely to approach wildlife (Klein 1993). Even a slow approach by wildlife photographers tends to have behavioral consequences on 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 subjects to their presence (Dobb 1998) and the tendency for photographers to use low-power lenses to get much closer to their subjects (Morton 1995). This usually results in increased disturbance to wildlife and habitat. Handling of animals and disturbing vegetation (such as cutting plants and removing flowers) is prohibited on national wildlife refuges.

A special use permit request would be denied if the commercial filming, audio recording, or still photography activities are found not to be compatible with refuge purposes.

## **Determination**

Commercial filming, audio recording, and still photography are compatible uses of the Alamosa, Baca, and Monte Vista Refuges.

## **Stipulations Necessary To Ensure Compatibility**

- All commercial filming requires a special use permit.
- Special use permits would identify conditions that protect the refuges’ values, purposes, and resources; ensure public health

and safety; and prevent unreasonable disruption of the public's use and enjoyment of the refuge. Such conditions may be specifying road conditions when access would not be allowed, establishing time limitations, and identifying routes of access into refuges. These conditions would be identified to prevent excessive disturbances to wildlife, damage to habitat or refuge infrastructure, or conflicts with other visitor services or management activities.

- The special use permit would stipulate that imagery produced on refuge lands would be made available to the refuge to use in environmental education and interpretation, outreach, internal documents, or other suitable uses. In addition, any commercial products must include appropriate credits to the refuges, the Refuge System, and the Service.
- Any commercial filming, still photography, or audio recording permits that are requested must demonstrate a means to extend public appreciation and understanding of wildlife or natural habitats, or enhance education, appreciation, and understanding of the Refuge System, or facilitate outreach and education goals of the refuges.
- Still photography and audio recording also require a special use permit (with specific conditions as outlined above) if one or more of the following would occur:
  - it would occur in places where or when members of the public are not allowed.
  - it uses model(s), set(s), or 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 would ensure that all commercial filmmakers, commercial still photographers, and commercial audio recorders comply with policies, rules, and regulations, and refuge staff would monitor and assess the activities of all filmmakers, photographers, and audio recorders.

## ***Justification***

Commercial filming, still photography, or audio recording are economic uses that must contribute to the achievement of the refuge purposes, mission of the Refuge System, or the mission of the Service. Providing opportunities for commercial filming, still photography, and audio recording that meets the above requirements should result in increased public awareness of the refuges' ecological importance as well as advancing the public's knowledge and support for the Refuge System and the 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: 2030*

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## **Prescribed Grazing and Haying**

Since the three refuges were established, prescribed grazing and haying have been used to achieve a number of habitat objectives. These tools are used to improve the vigor and maintain the health of plant communities by removing decadent vegetation that has accumulated over several growing seasons, as well as reduce or eliminate infestations of noxious and invasive plants, often in combination with herbicide applications. Additionally, they are used to modify the condition of plant communities to make them more attractive to some wildlife species.

Domestic cattle (including calves and yearlings), domestic sheep, and, to a lesser degree, bison (which are classified as "livestock" by the State of Colorado) have been used on the refuges.

Haying and grazing is conducted with private cooperators through annual special use permit or cooperative farming agreements. Cooperators are charged at fair market value for the grazing or haying privilege, and the permit or agreement fee may be reduced based on project objectives.

Hay cutting is used almost entirely in wetland habitat while livestock grazing is used mostly on wet-

land. Livestock grazing is used in uplands to combat noxious weeds.

In all cases grazing and haying are and would be used to meet specific management objectives outlined in the permit that would be communicated to the permittee or cooperator.

### ***Availability of Resources***

Current staffing levels allow for fundamental planning and administration of grazing and haying programs, but allow only very basic monitoring of treatment efficacy. Additional staff positions are identified for the proposed alternative (table 7) to satisfy this need.

### ***Anticipated Impacts of Use***

As with the use of many vegetation management tools, there could be a negative impact for some species in the short term. For example, a temporary drop in duck nesting densities has been documented on the Monte Vista Refuge after vegetation removal in wetland habitat. This immediate decline in nesting is confined to the treatment area and is relatively short term. Although refuge staff and permittees are increasingly relying on single strand electric fencing, multi-strand barbed wire fence is still required in many instances. Improperly designed barbed wire fence presents hazards to elk, deer, pronghorn, and some bird species.

Both grazing and haying can be detrimental to riparian habitat and riparian habitat restoration projects. Steps must be taken to exclude grazing and haying from riparian areas unless they are used as part of a deliberate prescription.

The benefits of thoughtful use of haying and grazing exceed the negative impacts.

### ***Determination***

Grazing and haying are compatible uses within the refuge complex.

### ***Stipulations Necessary To Ensure Compatibility***

- Ensure control of location, duration, and intensity of grazing through carefully planned and implemented projects that are designed to achieve site-specific biological objectives. Use herders to move animals when fencing requirements are too large or impractical.

- Monitor results of grazing and haying treatments.
- Design and implement haying projects to achieve biological objectives.
- Use the appropriate class of livestock to meet project goals.
- Grazing or haying prescriptions on any individual refuge would not exceed 25 percent of the refuge in any given year.
- The refuge manager would retain control over all haying and grazing practices and has the right to discontinue any practice if conditions change that may compromise the compatibility of the project.

### ***Justification***

Prescribed livestock grazing and haying are two grassland and wetland management tools that are used in combination with rest, prescribed fire, and herbicides, and are effective in maintaining and restoring quality migratory bird habitat. They are also valuable tools in establishing vegetative structural conditions needed for the life requirements of many species, such as loafing and foraging habitat for sandhill cranes, foraging habitat for dabbling ducks and some shorebirds, and foraging and breeding habitat for Gunnison's prairie dogs. Grazing and haying practices are easily planned, controlled, implemented, and monitored. Due to the value of cattle and hay as commodities, grazing and haying are extremely cost-effective methods to treat large tracts of habitat to meet habitat objectives.

Many wetland-dependent migratory bird species (waterfowl, northern harriers, and short-eared owls in particular) require tall dense stands of grass and sedges for optimal nesting habitat. These plant communities have evolved under a regime of regular disturbance, primarily ungulate grazing and fire. Historic management practices on all three of the refuges consisted of frequent grazing or haying events that removed decadent vegetation from previous years. The Alamosa and Monte Vista Refuges saw little disturbance of vegetation during the late 1990s and early 2000s, resulting in little removal of residual vegetation. Refuge staff has observed that the overall health and vigor of these plant communities declined during this time period. The years of accumulation of vegetation seem to have reduced the stem density and height of grasses and sedges, likely from (1) shading the current year's growth and compromising photosynthesis, (2) insulating the soil and effectively retarding the initiation of spring plant growth, and (3)

preventing nutrients contained in above-ground portions of the plant from reentering the soil and nutrient cycle.

Refuge staff must be able to use these tools to restore and maintain healthy plant communities in conditions that directly benefit migratory birds and other wildlife.

*Mandatory 15-year reevaluation date: 2030*

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## **Cooperative Farming Program (Monte Vista Refuge)**

This plan proposes to continue farming on the Monte Vista Refuge to produce an average of 190 acres of small grain (primarily barley) annually in order to provide food for spring-migrating sandhill cranes. This food production would occur on four fields, each of which would be irrigated by center pivot sprinklers. This irrigation technique is preferred due to the dramatically reduced cost (primarily for labor) and greater water efficiency compared with the flood irrigation practices that were used before 1990.

Farming operations would be conducted by a cooperating farmer under an agreement with the refuge manager. The typical agreement allows the cooperator to plant half of a field with barley and the other half with alfalfa. The four farm fields on the refuge average about 100 acres of cultivated land on each. The cooperator is responsible for costs associated with planting and irrigating (pumping), while the refuge is responsible for maintaining the associated water rights and for major maintenance to the sprinkler system and well. At the end of the growing season, the small grain crops are not harvested and are left standing. Just prior to and during spring sandhill crane migration, these standing crops are scattered to the ground by mowing them, which makes them available for the migrating cranes. The alfalfa grown on the other half of the irrigated field becomes the property of the cooperative farmer. Refuge and cooperator responsibilities may vary between fields and years in response to changing maintenance circumstances.

### **Availability of Resources**

Because of the low costs associated with the cooperative farming approach, adequate funding exists to administer this farming program. Refuge responsibilities include maintenance of the associated water rights and maintenance of irrigation equipment. Water rights maintenance includes the ability to demonstrate beneficial use of the water and compliance

with upcoming ground water rules and regulations pertaining to groundwater. Some of the systems irrigating these fields are supplemented by surface water when available. In these instances, refuge responsibilities include membership in the mutual ditch company and maintenance of the water distribution system. Maintenance of these water rights is required whether the water is used for farming, wetland irrigation, or other wildlife habitat objectives. Maintenance of the actual irrigation equipment is typically met within annual budgets. Exceptions include rare catastrophic pump, sprinkler, or even well failures. In these instances, Refuge System policy allows for adjustment of the annual agreement with the cooperator to cover these repairs.

### **Anticipated Impacts of Use**

It is recognized that the benefits of this farming program come with tradeoffs. The benefits of this farming program include (1) assurance that the Rocky Mountain population of greater sandhill cranes arrive on breeding grounds in good physical condition, increasing the likelihood of a successful nesting effort and (2) providing a remarkable and popular wildlife viewing opportunity on the refuge. The Monte Vista Crane Festival has been conducted on the Monte Vista Refuge for 31 years and is the largest wildlife viewing event in Colorado. Large numbers of cranes feeding on one or more of these fields provides unparalleled viewing opportunities for thousands of visitors each spring.

Continuation of the farming program comes largely at the cost of using land and water for grain production instead of maintaining native wildlife habitat.

### **Determination**

This cooperative farming program is compatible when used as a tool for the net benefit of migratory birds.

### **Stipulations Necessary To Ensure Compatibility**

Cooperative farming would be conducted under the terms of a cooperative farming agreement. The agreement would contain general and special conditions to ensure consistency with management objectives. Some of the general stipulations include:

- The use of herbicides would be coordinated with the refuge manager and comply with the station's pesticide use plan.

- Genetically modified crops are not currently used in this farming program. Any future use of such crops would comply with Region 6 policy guidance.
- The cooperative farmer cannot begin harvesting alfalfa in the spring until after most ground-nesting bird activity is complete, as determined by the refuge manager.

Other stipulations would be considered depending upon site- and time-specific circumstances.

## Justification

For centuries, the San Luis Valley has been an important migratory staging area for the Rocky Mountain population of greater sandhill cranes. During spring migration, an estimated 18,000–20,000 greater sandhill cranes and approximately 5,000–6,000 lesser and Canadian sandhill cranes inhabit the valley between late February and early April. During this period, they build up necessary energy reserves to finish migration to their nesting grounds (Tacha et al. 1987). These energy reserves also greatly influence breeding success. However, the loss of natural shallow-water wetlands, due to land use modifications and alterations to hydrology, has reduced the overall amount of potential foraging areas throughout the valley. Furthermore, it is believed that sandhill cranes did not migrate through the valley until later in the spring when natural wetlands would have been largely free of ice and more invertebrates and other natural food sources would have been available. With the advent of agricultural production of small grains in the valley over the last century, sandhill cranes began arriving as early as mid-February to take advantage of the waste grain left in agricultural fields after harvest. Sandhill cranes have likely altered the timing of their migration to take advantage of this readily available food source. They now arrive in the valley in late winter when most wetland areas are still frozen and natural food sources are largely unavailable in sufficient amounts to provide the energy required to build fat reserves. As a result, they have become dependent on small grain production in the valley.

Sandhill cranes forage for small grains in the farm fields on the Monte Vista Refuge and on private agricultural fields. In recent years, fall tillage and flood irrigation of privately owned small grain fields has become increasingly widespread in the valley. Farmers implement these practices to encourage the growth and then subsequent freezing of waste seeds to get a clean field for spring planting. In addition, since the late 1990s, the amount of acres in small grain production in the valley has been dramatically

reduced because many farmers have switched to alfalfa, which is a more profitable crop. These changes in farming practices have resulted in a dramatic reduction in waste grain availability for sandhill cranes during spring and have prompted concern over whether current or future food resources are adequate to meet spring demands for migrating cranes. We would therefore continue agricultural production of a minimum of 190 acres of small grains (primarily barley) on the Monte Vista Refuge to ensure that this critical food resource is provided and available for spring staging cranes.

*Mandatory 15-year reevaluation date: 2030*

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## Research

The refuge complex occasionally receives requests to conduct research. Recent examples include projects assessing the degree of water evapotranspiration in the San Luis Valley. Priority would be given to studies that contribute to the enhancement, protection, preservation, and management of native plants, fish, wildlife populations, and habitat on the refuges. Research applicants must submit a proposal that outlines the (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 (1) a description of mitigation measures the researcher would take to reduce disturbances or impacts; (2) personnel required and their qualifications and experience; (3) status of necessary permits (such as scientific collecting permits and endangered species permits); (4) costs to refuge and refuge staff time requested, if any; and (5) product delivery schedules such as anticipated progress reports and end products such as reports or publications. Refuge staff and others, as appropriate, would review research proposals and issue special use permits if approved.

Evaluation criteria would include the following:

- Research that would contribute to specific refuge management issues would be given higher priority than the other requests.
- Research that would conflict with other ongoing research, monitoring, or management programs would 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 would likely not be approved. The degree and type of disturbance would be carefully weighed when evaluating a research request.
- Research evaluation would determine if any effort has been made to minimize disturbance through study design, including adjusting location, timing, number of permittees, study methods, and number of study sites.
- Research evaluation would determine if any mitigation planning is included to minimize disturbances or impacts or to reclaim resultant disturbed areas.
- Research evaluation would determine if staffing or logistics make it impossible for the refuge to monitor researcher activity in a sensitive area.
- Specific timelines, including the length of the project and product delivery dates, would be considered and agreed upon before approval. All projects would be reviewed annually.

### ***Availability of Resources***

At current and anticipated levels, adequate funding exists to manage requests for research on the Alamosa, Baca, and Monte Vista Refuges. Administration of these requests usually includes evaluation of the proposal as well as management and monitoring of the associated special use permits. Our experience has indicated that the nominal cost of managing research projects is typically offset by the value of information acquired from the research.

### ***Anticipated Impacts of Use***

Some degree of disturbance is expected with all research activities since they often include areas of the refuges closed to or with limited public access, and some research requires collection of samples or direct handling of wildlife. However, minimal impacts on refuge wildlife and habitats is expected with research studies because special use permits would specify conditions to ensure that impacts to wildlife and habitats are kept to a minimum.

### ***Determination***

Research is a compatible use of the Alamosa, Baca, and Monte Vista Refuges.

## ***Stipulations Necessary To Ensure Compatibility***

- Extremely sensitive wildlife habitat areas and wildlife species would be provided sufficient protection from disturbance by limiting proposed research activities in these areas. All refuge rules and regulations would be strictly enforced unless otherwise exempted by refuge management.
- Refuge staff would 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 and 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 would be listed as conditions and requirements of the special use permit.
- Refuge staff would 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 would 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 would be minimized because sufficient restrictions would be included in the required special use permits and all activities would be monitored by refuge staff. At a minimum, research activities would have no significant impact on refuge resources and are expected to contribute to the enhancement, protection, preservation, and management of refuge wildlife populations and their habitats.

***Mandatory 15-year reevaluation date: 2030***





# Appendix E

## *Wilderness Review*

This appendix summarizes our wilderness review on the refuge complex.

The purpose of a wilderness review is to identify and recommend for Congressional designation National Wildlife Refuge System (System) lands and waters that merit inclusion in the National Wilderness Preservation System. Wilderness reviews are a required element of CCPs and are conducted in accordance with the refuge planning process outlined in 602 FW 1 and 3, including public involvement and NEPA compliance.

There are three phases to the wilderness review: (1) inventory, (2) study; and (3) recommendation. Lands and waters that meet the minimum criteria for wilderness are identified in the inventory phase. These areas are called wilderness study areas (WSAs). WSAs are evaluated through the CCP process to determine their suitability for wilderness designation. In the study phase, a range of management alternatives are evaluated to determine if a WSA is suitable for wilderness designation or management under an alternate set of goals and objectives that do not involve wilderness designation. The recommendation phase consists of forwarding or reporting recommendations for wilderness designation from the Director through the Secretary and the President to Congress in a wilderness study report.

If the inventory does not identify any areas that meet the WSA criteria, we document our findings in the administrative record for the CCP which fulfills the planning requirement for a wilderness review.

Because Monte Vista Refuge has been heavily manipulated over time, we determined that no lands within the refuge even minimally met the criteria for wilderness designations, and we did not complete any further review or inventory of the refuge.

We inventoried Alamosa and Baca Refuges and subsequently found that no areas of the Alamosa Refuge met the eligibility criteria for a WSA as defined by the Wilderness Act (refer to table E1 below). However, we found two portions of the Baca Refuge along the southeastern boundary of the refuge and adjacent to the Great Sand Dunes National Park and Preserve's proposed wilderness area meet the criteria for wilderness designation (refer to tables E1 and E2 below).

### **E.1 Inventory Criteria**

The wilderness inventory is a broad look at the planning area to identify WSAs. These are roadless areas that meet the minimum criteria for wilderness identified in Section 2(c) of the Wilderness Act as stated:

“A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions, and which: (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological or other features of scientific, educational, scenic, or historical value.”

A WSA must be a roadless area or island, meet the size criteria, appear natural, and provide outstanding opportunities for solitude or primitive recreation. The process for identification of roadless areas and application of the wilderness criteria are described in the following sections.

### **Identification of Roadless Areas and Roadless Islands**

Identification of roadless areas and roadless islands required gathering and evaluating land status maps, land use and road inventory data, and aerial and satellite imagery for the refuges. “Roadless” refers to the absence of improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use. Only

lands currently owned by the Service in fee title or BLM lands managed under a cooperative agreement were evaluated.

Roadless areas or roadless islands meet the size criteria if any one of the following standards applies:

- An area with over 5,000 contiguous acres. State and private lands are not included in making this acreage determination.
- A roadless island of any size. A roadless island is defined as an area surrounded by permanent waters or that is markedly distinguished from the surrounding lands by topographical or ecological features.
- An area of less than 5,000 contiguous Federal acres that is of sufficient size as to make practicable its preservation and use in an unimpaired condition, and of a size suitable for wilderness management.
- An area of less than 5,000 contiguous Federal acres that is contiguous with a designated wilderness, recommended wilderness, or area under wilderness review by another Federal wilderness managing agency such as the Forest Service, National Park Service, or Bureau of Land Management.

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## Evaluation of the Naturalness Criteria

In addition to being roadless, a WSA must meet the naturalness criteria. Section 2(c) defines wilderness as an area that “... generally appears to have been affected primarily by the forces of nature with the imprint of man’s work substantially unnoticeable.” The area must appear natural to the average visitor rather than “pristine.” The presence of historic landscape conditions is not required. An area may include some human impacts provided they are substantially unnoticeable in the unit as a whole. Significant human-caused hazards, such as the presence of unexploded ordnance from military activity and the physical impacts of refuge management facilities and activities are also considered in evaluation of the naturalness criteria. An area may not be considered unnatural in appearance solely on the basis of the “sights and sounds” of human impacts and activities outside the boundary of the unit.

Evaluation of Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation

In addition to meeting the size and naturalness criteria, a WSA must provide outstanding opportunities for solitude or primitive recreation. The area does not have to possess outstanding opportunities for both solitude and primitive and unconfined recreation and does not need to have outstanding opportunities on every acre. Further, an area does not have to be open to public use and access to qualify under this criteria; Congress has designated a number of wilderness areas in the Refuge System that are closed to public access to protect resource values.

Opportunities for solitude refer to the ability of a visitor to be alone and secluded from other visitors in the area. Primitive and unconfined recreation means non-motorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport. These primitive recreation activities may provide opportunities to experience challenge and risk, self reliance, and adventure.

These two “opportunity elements” are not well defined by the Wilderness Act but, in most cases, can be expected to occur together. An outstanding opportunity for solitude may be present in an area offering only limited primitive recreation potential. Conversely, an area may be so attractive for recreation use that experiencing solitude is not an option.

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## Evaluation of Supplemental Values

Supplemental values are defined by the Wilderness Act as “...ecological, geological, or other features of scientific, educational, scenic, or historic value.” These values are not required for wilderness but their presence should be documented.

## E.2 Inventory and Findings Alamosa Refuge

As documented below, none of the lands within Alamosa Refuge meet the criteria necessary for a WSA. Table E1 summarizes the inventory findings for each unit.

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## Background

Alamosa Refuge consists of 12,026 acres and was established in 1962 under authority of the Migratory Bird Treaty Act with the authorizing purpose “... for

use as inviolate sanctuary or for any other management purpose, for migratory birds.” Primarily located within the historic Rio Grande floodplain, the refuge encompasses lands that include 7 river miles of the Rio Grande as it transitions from flowing in a southeasterly direction to nearly directly south. This transition in direction over time has resulted in the river’s taking many paths over the landscape as it changed directions. This movement of the river created an extensive system of channel sloughs, oxbow lakes, and wet meadow depressions, which make up the character of the refuge today.

Many land and water use changes have occurred throughout the San Luis Valley since European settlement. These changes revolved primarily around the expansion of agriculture and have resulted in the diminished availability of surface and ground water to the refuge. Less water available in the Rio Grande as it enters the refuge made it necessary for the development of irrigation systems to deliver water through ditches and canals to areas that historically

were naturally wet. In efforts to maintain the productivity of the wetlands on the refuge over time, we have continued to make modifications by the development of even more extensive water management infrastructure (levees, ditches, and water-control structures), all of which exist on the landscape today. In addition, the landscape encompassing the refuge was changed by the construction of a BOR water salvage project that included a large, extraordinary canal that bisects the refuge. The canal, which has extensive associated support infrastructure attached to it as it passes through the refuge (heated and enclosed fish barrier screens, and a large concrete spillway and apron), was designed to deliver water to the Rio Grande below the last diversion on the river that occurs on the refuge.

For the purposes of this review, we have divided the refuge into two parcels: Parcel 1 includes those refuge lands that occur north and west of the Closed Basin Project canal, and Parcel 2 is all refuge lands south and east of the Closed Basin canal.

**Table 38. Evaluation of wilderness values on Alamosa Refuge.**

<i>Refuge Area</i>	<i>Areas north and west of Closed Basin canal</i>	<i>Areas south and east of Closed Basin canal</i>
(1) Has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; or (2) generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable?	NO Area is fragmented by county roads, refuge public use roads, and several large irrigation laterals. Large water control structures and manmade dikes are evident throughout as well.	NO Area is fragmented by county roads, refuge public use roads, and several large irrigation laterals. Area is fragmented by county roads, refuge public use roads, and several large irrigation laterals. Large water control structures and man-made dikes are evident throughout as well.
(3a) Has outstanding opportunities for solitude; or (3b) has outstanding opportunities for a primitive and unconfined type of recreation?	NO (3a and 3b) (3a) Area is within 1–5 miles of the city of Alamosa with several public roads intersecting. An active railroad also bounds the unit to the north and an active regional airport is within 3 miles. (3b) Large irrigation canals limit accessibility within the units, and intersecting roads fragment and confine areas.	YES to 3a; NO to 3b (3a) Area is further from town, highways, and active railroad. (3b) Large irrigation canals limit accessibility within the units, and intersecting roads fragment and confine areas.
(4) Contains ecological, geological, or other features of scientific, educational, scenic, or historical value?	YES Area has rich diverse wetlands and riparian areas that provide scientific, educational, and scenic value	YES Area has rich diverse wetlands and riparian areas that provide scientific, educational, and scenic value.
Unit qualifies as a wilderness study area (meets criteria 1, 2, and 3a or 3b)?	NO The human imprint on the environment is substantially noticeable and unavoidable	NO The human imprint on the environment is substantially noticeable and unavoidable.

## Roadless Areas, Roadless Islands, and Size Criteria

Parcels 1 and 2: Many of the roads are associated with the intensive irrigation infrastructure necessary for maintaining the refuge's productivity to meet its intended purpose. These roads divide the refuge into several smaller parcels, which are classified as management units. None of the fragmented parcels are larger than 5,000 acres.

## Naturalness Criteria

Parcels 1 and 2: The land within Alamosa Refuge has been extensively altered by the construction of a vast irrigation network that allowed it to be intensively managed for hay and cattle production prior to the establishment of the refuge and ensured the productivity of its wetlands as a refuge. As a result, many of the visual qualities associated with those uses are evident on the landscape. Man-made ditches, levees, fences, roads and other infrastructure are evidence of some of the former and current operations, thus detracting from the naturalness of the refuge.

## Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation

Parcel 1: There are limited opportunities for solitude or primitive and unconfined recreation in this area as it is closer to the town of Alamosa, an active regional airport, and a busy railway switchyard. Sights and sounds from the town, airport, and switchyard as well as from county roads, refuge headquarters and shop areas, and neighboring agricultural operations interfere with opportunities for solitude and unconfined recreation.

Parcel 2: This area, which is situated east and south of the Closed Basin Project canal, is located further than Parcel 1 from the influence of a neighboring hub community with facilities such as an airport, railyards, and highways. It offers opportunities for relative solitude and unconfined recreation. Neighboring operations and the low hum of a distant town can nearly always be heard, although at a much lower level than the more northern and western parcel areas.

## Supplemental Values

Alamosa Refuge consists of over 12,000 acres of productive and diverse habitats flanked on the west by the Rio Grande and on the east by a large bluff escarpment providing an overlook of the entire refuge. A mosaic of seasonal to permanent wetlands and alkaline desert uplands provide for a diverse assemblage of wildlife. The juxtaposition of the bluff escarpment with nearby wetlands provided an important lookout for countless generations of hunters and as a result contains the rich archeological history of over 8,000 years of use by humans.

Although the refuge is surrounded by activities ranging from the city of Alamosa to several agricultural operations and a rail switchyard, portions still offer excellent relief from this nearby urban setting. In addition, relatively dark night skies are abundant on the southern portions of the refuge.

## E.3 Inventory and Findings for Baca Refuge

As documented below, there are two areas within Baca Refuge that meet the criteria necessary for a WSA. Figure E1 shows these areas, and table E2 summarizes the inventory findings for each of the refuge's seven major management areas.

## Background

The Baca Refuge located in the northeastern portion of the San Luis Valley in south-central Colorado currently contains roughly 85,942 acres of the nearly 92,500 acres authorized by Congress in 2000 as part of the Great Sand Dunes National Park and Preserve Act. The intended purpose of the refuge is to restore, enhance, and maintain wetland, upland, riparian, and other habitats for wildlife, plants, and fish that are native to the San Luis Valley. Refuge policies emphasize migratory bird conservation and consideration of the refuge in the context of broader San Luis Valley conservation efforts.

The refuge, although located at the base of the impressive Sangre de Cristo Mountains and receiving most of the runoff from the tallest portions of this steep mountain chain, is part of a closed basin having no natural surface outlet connecting it to the Rio Grande, which is the primary artery transferring water out of the San Luis Valley. Lands encompassing the refuge include the major confluence of all

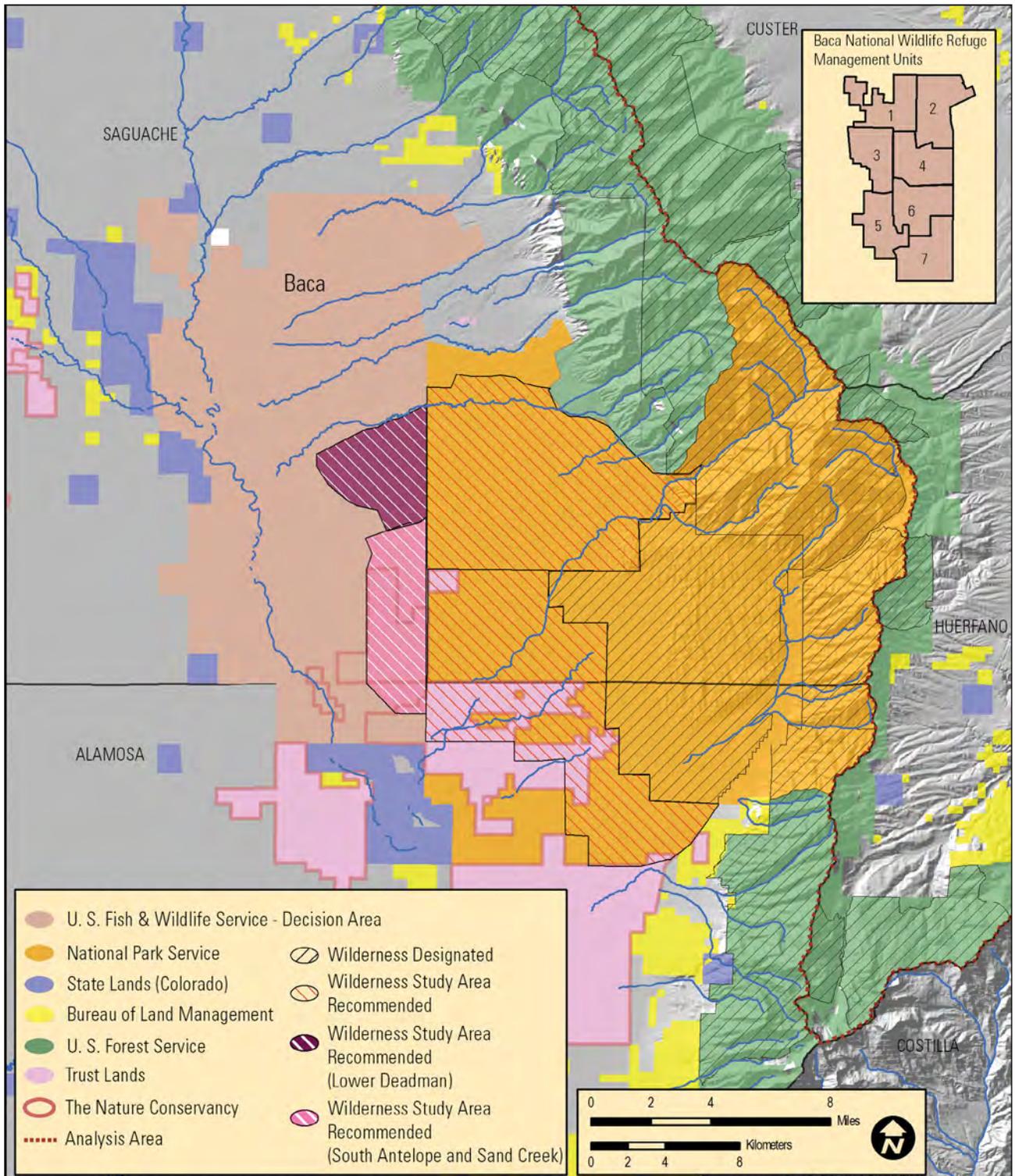


Figure 53. Wilderness Inventory for Baca Refuge.

surface waters draining into the northern portions of the valley from several creeks that originate in the Sangre de Cristo Mountains and discharge into San Luis Creek, and from Saguache and La Garita creeks, which originate in the San Juan Mountains and also discharge into San Luis Creek. Historically, water from these sources maintained one of the largest playa wetland complexes in the San Luis Valley. Restoration of this wetland complex is an emphasis for the Service.

The Baca Refuge contains a large portion of the regionally unique eolian sand sheet associated with the Great Sand Dunes complex, which features the tallest dunes in North America and one of the most fragile and complex dune systems in the world. The portions of this dune system on the refuge contain many unique sand ramps and stabilizing dunes, which lead to and eventually become part of the larger dune mass. These areas provide tremendously scenic settings, which include the massive dunes surrounded by alpine peaks. In addition, portions of the refuge contain remnants of some of the oldest known archaeology in the San Luis Valley (12,000 years of human history in the San Luis Valley).

The majority of the refuge area receiving surface water was developed as part of the historic Baca Grant Ranch. This ranch remained in continuous operation under different ownerships from the late 1800s until the land was acquired by the Service and the refuge was established. An intensive historic network of canals and ditches carry water from streams and wells to meadows that were historically irrigated for the production of forage for large cattle operations that existed there for nearly 120 years. The refuge continues to maintain and operate this infrastructure to provide quality wetland habitats in support of the Service mission and the refuge's intended purposes.

The Baca Refuge borders lands owned by TNC, NPS, CPW and the Colorado State Land Board. The complex of lands within these ownerships including the refuge, total more than 500,000 acres of contiguous protected land and include the Great Sand Dunes National Park and Preserve, TNC's Medano Ranch Preserve, and the San Luis Lakes State Wildlife Area. Management of these lands is primarily focused on protecting the region's hydrology, as well as the ecological, cultural, and wildlife resources of the area.

BOR operates a ground water "salvage" project within the valley's Closed Basin, including major portions of the refuge. This project extracts shallow ground water from the closed basin portion of the valley and delivers it to the Rio Grande through a 42-mile-long canal originating on the western boundary of the refuge. About one-third of this project's wells are within the boundaries of the Baca Refuge.

This array of wells and a vast amount of infrastructure (well sites, pipelines, and an extensive array of powerlines and roads) dissect the majority of the western portions of the refuge.

The northeastern portion of the refuge is bounded by a 15,000-plus-acre subdivision with over 4,000 platted buildable lots and over 600 full-time residents. The landbase for this subdivision was carved from within the boundaries of the historic Baca Grant in the early 1970s. In addition, the subsurface mineral, and oil and gas rights were severed from those portions of the refuge that were part of the historic Baca Grant.

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## Roadless Areas, Roadless Islands, and Size Criteria (figure E-1)

Management Areas 1 and 2: These areas of the refuge contain a series of refuge-maintained roads that are used frequently in the maintenance and operation of the refuge's intensive irrigation infrastructure. In addition, these roads are heavily used by contractors and permittees assisting the Service in maintaining the refuge's productivity to meet its intended purpose. Three of the four CCP public use alternatives consider development of an auto tour route in these areas. These areas of the refuge contain a greater diversity of habitats of relatively smaller patch size and numerous fences delineating individual management units. Management Areas 3 and 5: These areas in the heart of the Closed Basin sump area contain a vast network of roads, powerlines, wells, and pipelines that comprise nearly one-third of BOR's Closed Basin Project. This extensive infrastructure greatly fragments these areas. Management Areas 4, 6, and 7: Western portions of these units are fragmented by the extensive BOR's infrastructure or the refuge's irrigation infrastructure and its associated roads. The eastern portions of these areas, which contribute to the large sand sheet associated with the great sand dunes complex, exhibit very few roads, fences, and other infrastructure that fragment many other areas of the refuge. This largely roadless area encompasses over 13,800 acres and is bounded on the east by Great Sand Dunes National Park lands that are also proposed as wilderness.

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## Naturalness Criteria

Management Areas 1 and 2: These lands within the Baca Refuge have primarily been shaped by the

rich ranching history that has dominated this landscape for the last 120 years. The majority of the refuge irrigation water rights were secured in the late 1870s, and irrigation and associated infrastructure have continued to develop since then. Even though this presence of man's hand is so readily apparent on the landscape, there is still a feel of naturalness as the rich ranch management history that is predominate in the northern San Luis Valley results in wet meadows of native species that are uncharacteristically large and scenic.

Management Areas 3 and 5: Although these areas of the refuge contain remnants of what once was one of Colorado's largest playa wetland complexes, several decades of over demand on the area's limited water resources has resulted in little water currently reaching the area. It is in these areas where BOR's Closed Basin Project extracts shallow ground water for delivery to the Rio Grande. This water salvage project contains a vast network of roads, powerlines, wells, and pipelines that compromise every aspect of the naturalness of these areas. Management Areas 4, 6, and 7: The western portions of land within these management areas contain much of the same infrastructure for BOR's Closed Basin Project or infrastructure used by the Service for irrigation of refuge habitats. These anomalies to the natural landscape greatly detract from the overall naturalness of the area. The eastern portions of these areas, despite having been used for cattle operations for over a century, have retained their natural characteristics. Mostly roadless and intact, these areas have very few infrastructure developments. The developments that do exist consist of two cross fences, a handful of stock and monitoring wells, and three roads transecting the area, which consists of more than 13,800 acres.

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## Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation

Management Areas 1 and 2: These areas are on the north end of the refuge and are bounded on the north by Saguache County Road T, which serves as the only ingress/egress for the town of Crestone and the Baca Grande Subdivision. In addition, these areas house both the refuge headquarters and shop compounds. Many of the habitats in these areas are irrigated and as such have the related infrastructure. Management units within these areas are, for the most part, smaller which results in more fencing and roads on the overall landscape. All of these factors combined reduce the potential for solitude or primitive and unconfined recreation.

Management Areas 3 and 5: These areas in the heart of the Closed Basin sump contain a vast network of roads, powerlines, wells, and pipelines that comprise nearly one-third of BOR's Closed Basin Project. This extensive infrastructure requires frequent maintenance, resulting in frequent vehicle and equipment use. In addition, Colorado Highway 17 lies within 4 miles of any point in these areas. The noises, visual distractions, and the fragmentation due to the vast infrastructure limit any opportunities for solitude and unconfined recreation in these areas.

Management Areas 4, 6, and 7: Western portions of these units are fragmented by BOR's infrastructure and the refuge's irrigation infrastructure and its associated roads and offer little opportunity for solitude and unconfined recreation, while the eastern portions are located nearly as far as one can get from regular human activity on the valley floor. These eastern areas share an administrative boundary with NPS proposed wilderness associated with the Great Sand Dunes National Park and Preserve. NPS has documented a portion of Great Sand Dunes National Park and Preserve as being one the quietest places in the National Park System. One of the greatest attributes of these areas is the opportunity they provide for solitude and unconfined recreation. With or without a wilderness designation, we would strive to maintain those characteristics in these areas.

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## Supplemental Values

Management Areas 1 and 2: These areas of the refuge, although altered by the imprint of man, contain many important values, such as remnants of the rich history of the Baca Grant Ranch and many important archeological sites containing artifacts of more than 9,000 years of human existence in and around important wetlands. Habitats in these management areas consist primarily of rabbit-brush-dominated uplands and large expanses of irrigated wet meadows. The juxtaposition of these two habitats is of interest to scientists as they continue to gather information on their importance and role in overall San Luis Valley wetlands conservation.

Although these areas do not offer opportunities for roadlessness or solitude, they are situated within 10 miles of five 14,000 plus foot peaks and offer a fantastic and rare vantage of the impressive mountain range containing them. Because of the extreme private nature of the ranch for over the past century, the area has been viewed and enjoyed by only a few individuals. Many life-long neighbors who have visited these areas have commented on how this place gives them an incredible and wonderfully different

vantage of the area they call their own and where they have spent their whole lives.

Management Areas 3 and 5: These areas in the heart of the Closed Basin sump once contained one of the largest playa wetland complexes in the San Luis Valley, and although they no longer receive large amounts of water and have been fragmented and invaded by man, there are portions that occasionally can be wetted. These areas offer small glimpses of what once likely dominated the landscape. The resulting natural wetlands that occur are of extreme importance to the scientific community. In addition, the overall area contains a rich archaeological and paleontological history.

Management Areas 4, 6, and 7: Western portions of these areas are similar to the areas described above for management areas 3 and 5. The eastern portions have experienced very little intervention by man and are largely unfragmented and intact. Situated on the sand sheet associated with the rare and globally significant Great Sand Dunes complex, they contain unique native habitats and species. Night skies, extreme quietness, and incredible vistas dominate the area and offer a unique insight as to what the valley floor may have been like prior to human settlement.

**Table 39. Evaluation of wilderness values on Baca Refuge.**

<i>Refuge Unit or Area</i>	<i>Management Areas 1 and 2</i>	<i>Management Areas 3 and 5</i>	<i>Management Areas 4, 6 and 7 (Western Portions)</i>	<i>Management Areas 4, 6, and 7 (Eastern Portions)</i>
(1) Has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; or (2) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable.	NO Area is fragmented by roads, fences, irrigation laterals, large water control structures, administrative sites, corrals, and sheds.	NO Area extremely fragmented by BOR's roads, pipelines and a large industrial-like canal which are readily visible. Overhead powerline webs landscape and can be seen for miles.	NO Area extremely fragmented by BOR's roads, powerlines, pipelines, and a large industrial-like canal, which are readily visible. Overhead powerlines landscape and can be seen for miles.	YES Areas mostly intact with very few intervening roads and infrastructure and little sign of intervention by man.
(3a) Has outstanding opportunities for solitude; or (3b) Has outstanding opportunities for a primitive and unconfined type of recreation.	NO (3a) Management areas are bounded on the north by busy county road. In addition, these areas house several administrative sites. All major refuge access points are through these areas. (3b) Area is fragmented by roads, several large irrigation laterals, large water control structures, corrals, and sheds. Smaller management units result in more confinement.	NO Area extremely fragmented by BOR's roads, powerlines, pipelines and a large industrial-like canal	NO Area extremely fragmented by BOR's roads, powerlines, pipelines, and a large industrial-like canal.	YES Areas not easily accessible and located nearly as far from regular human activity as possible on the valley floor; share boundary with current WSA.
(5) Contains ecological, geological, or other features of scientific, educational, scenic, or historical value?	YES Area has rich diverse wetland, riparian, and upland habitats. Provides scientific, educational and scenic value. Contains rich historic and prehistoric values.	YES Area has rich playa habitats which provide scientific, educational and scenic value. Also, contains rich prehistoric values.	YES Area has rich playa habitats that provide scientific, educational, and scenic value. Also, contains rich prehistoric values.	YES Areas associated with rare and globally significant Great Sand Dunes complex. Contains unique native habitats and rich historic and prehistoric values.
Unit qualifies as a wilderness study area (meets criteria 1, 2, and 3a or 3b)?	NO The human imprint on the environment is substantially noticeable and unavoidable	NO The human imprint on the environment is substantially noticeable and unavoidable	NO The human imprint on the environment is substantially noticeable and unavoidable	YES



# Appendix F

## Species Lists

Common Name	Scientific Name	Common Name	Scientific Name
Birds			
✧ Known to nest on complex > Suspected to nest on complex < Rare or accidental sightings			
Loons			
< Pacific loon	<i>Gavia pacifica</i>		
< Common loon	<i>Gavia immer</i>		
Grebes			
✧ Pied-billed grebe	<i>Podilymbus podiceps</i>		
✧ Eared grebe	<i>Podiceps nigricollis</i>		
> Western grebe	<i>Aechmophorus occidentalis</i>		
Clark's grebe	<i>Aechmophorus clarkii</i>		
Pelicans			
American white pelican	<i>Pelecanus erythrorhynchos</i>		
Cormorants			
Double-crested cormorant	<i>Phalacrocorax auritus</i>		
Bitterns, Herons, and Egrets			
✧ American bittern	<i>Botaurus lentiginosus</i>		
< Least bittern	<i>Ixobrychus exilis</i>		
Great blue heron	<i>Ardea herodias</i>		
Great egret	<i>Ardea alba</i>		
✧ Snowy egret	<i>Egretta thula</i>		
Little blue heron	<i>Egretta caerulea</i>		
✧ Cattle egret	<i>Bubulcus ibis</i>		
Green heron	<i>Butorides virescens</i>		
✧ Black-crowned night-heron	<i>Nycticorax nycticorax</i>		
< Tricolored heron	<i>Egretta tricolor</i>		
Ibises and Spoonbills			
✧ White-faced ibis	<i>Plegadis chihi</i>		
< White ibis	<i>Eudocimus albus</i>		
New World Vultures			
Turkey vulture	<i>Cathartes aura</i>		
Swans, Geese, and Ducks			
Greater white-fronted goose	<i>Anser albifrons</i>		
		Snow goose	<i>Chen caerulescens</i>
		Ross' goose	<i>Chen rossii</i>
		✧ Canada goose	<i>Branta canadensis</i>
		Tundra swan	<i>Cygnus columbianus</i>
		Wood duck	<i>Aix sponsa</i>
		✧ Gadwall	<i>Anas strepera</i>
		✧ American wigeon	<i>Anas americana</i>
		✧ Mallard	<i>Anas platyrhynchos</i>
		✧ Blue-winged teal	<i>Anas discors</i>
		✧ Cinnamon teal	<i>Anas cyanoptera</i>
		✧ Northern shoveler	<i>Anas clypeata</i>
		✧ Northern pintail	<i>Anas acuta</i>
		✧ Green-winged teal	<i>Anas crecca</i>
		Canvasback	<i>Aythya valisineria</i>
		✧ Redhead	<i>Aythya americana</i>
		Ring-necked duck	<i>Aythya collaris</i>
		Greater scaup	<i>Aythya marila</i>
		Lesser scaup	<i>Aythya affinis</i>
		Bufflehead	<i>Bucephala albeola</i>
		Common goldeneye	<i>Bucephala clangula</i>
		Common merganser	<i>Mergus merganser</i>
		< Hooded merganser	<i>Lophodytes cucullatus</i>
		< Red-breasted merganser	<i>Mergus serrator</i>
		✧ Ruddy duck	<i>Oxyura jamaicensis</i>
Osprey, Kites, Hawks, and Eagles			
		Osprey	<i>Pandion haliaetus</i>
		Bald eagle	<i>Haliaeetus leucocephalus</i>
		✧ Northern harrier	<i>Circus cyaneus</i>
		Sharp-shinned hawk	<i>Accipiter striatus</i>
		Cooper's hawk	<i>Accipiter cooperii</i>
		< Northern goshawk	<i>Accipiter gentilis</i>
		✧ Swainson's hawk	<i>Buteo swainsoni</i>
		✧ Red-tailed hawk	<i>Buteo jamaicensis</i>
		Ferruginous hawk	<i>Buteo regalis</i>
		Rough-legged hawk	<i>Buteo lagopus</i>
		Golden eagle	<i>Aquila chrysaetos</i>

Common Name	Scientific Name
Gallinaceous Birds	
◇ Ring-necked pheasant (Introduced)	<i>Phasianus colchicus</i>
Rails	
◇ Virginia rail	<i>Rallus limicola</i>
◇ Sora	<i>Porzana carolina</i>
◇ American coot	<i>Fulica americana</i>
< Purple gallinule	<i>Porphyrio martinicus</i>
< Common gallinule	<i>Gallinula galeata</i>
Cranes	
Sandhill crane	<i>Grus canadensis</i>
Plovers	
Black-bellied plover	<i>Pluvialis squatarola</i>
Semipalmated plover	<i>Charadrius semipalmatus</i>
◇ Killdeer	<i>Charadrius vociferus</i>
Mountain plover	<i>Charadrius montanus</i>
< Snowy plover	<i>Charadrius nivosus</i>
Stilts and Avocets	
◇ Black-necked stilt	<i>Himantopus mexicanus</i>
◇ American avocet	<i>Recurvirostra americana</i>
Sandpipers and Phalaropes	
Greater yellowlegs	<i>Tringa melanoleuca</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Solitary sandpiper	<i>Tringa solitaria</i>
Willet	<i>Catoptrophorus semipalmatus</i>
◇ Spotted sandpiper	<i>Actitis macularia</i>
< Whimbrel	<i>Numenius phaeopus</i>
Long-billed curlew	<i>Numenius americanus</i>
Marbled godwit	<i>Limosa fedoa</i>
Sanderling	<i>Calidris alba</i>
Western sandpiper	<i>Calidris mauri</i>
Least sandpiper	<i>Calidris minutilla</i>
Baird's sandpiper	<i>Calidris bairdii</i>
Pectoral sandpiper	<i>Calidris melanotos</i>
Stilt sandpiper	<i>Calidris himantopus</i>
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>
◇ Wilson's snipe	<i>Gallinago delicata</i>
◇ Wilson's phalarope	<i>Phalaropus tricolor</i>
Skuas, Jaegers, Gulls, and Terns	
Franklin's gull	<i>Larus pipixcan</i>
Bonaparte's gull	<i>Larus philadelphia</i>
Ring-billed gull	<i>Larus delawarensis</i>

Common Name	Scientific Name
< Caspian tern	<i>Hydroprogne caspia</i>
< Common tern	<i>Sterna hirundo</i>
< Least tern	<i>Sternula antillarum</i>
Forster's tern	<i>Sterna forsteri</i>
> Black tern	<i>Chlidonias niger</i>
Pigeons and Doves	
◇ Rock Dove (Introduced)	<i>Columba livia</i>
Band-tailed pigeon	<i>Columba fasciata</i>
◇ Mourning dove	<i>Zenaidura macroura</i>
Eurasian collared-dove (Introduced)	<i>Streptopelia decaocto</i>
Barn Owls	
Barn owl	<i>Tyto alba</i>
Typical Owls	
◇ Great horned owl	<i>Bubo virginianus</i>
> Burrowing owl	<i>Athene cunicularia</i>
Long-eared owl	<i>Asio otus</i>
◇ Short-eared owl	<i>Asio flammeus</i>
Nightjars	
> Common nighthawk	<i>Chordeiles minor</i>
Common poorwill	<i>Phalaenoptilus nuttallii</i>
Swifts	
White-throated swift	<i>Aeronautes saxatalis</i>
Hummingbirds	
Black-chinned hummingbird	<i>Archilochus alexandri</i>
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>
Rufous hummingbird	<i>Selasphorus rufus</i>
Calliope hummingbird	<i>Stellula calliope</i>
Kingfishers	
> Belted kingfisher	<i>Ceryle alcyon</i>
Woodpeckers	
Lewis' woodpecker	<i>Melanerpes lewis</i>
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>
Downy woodpecker	<i>Picoides pubescens</i>
Hairy woodpecker	<i>Picoides villosus</i>
Northern flicker	<i>Colaptes auratus</i>
< Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Falcons and Caracaras	
◇ American kestrel	<i>Falco sparverius</i>

<i>Common Name</i>	<i>Scientific Name</i>
Merlin	<i>Falco columbarius</i>
Peregrine falcon	<i>Falco peregrinus</i>
Prairie falcon	<i>Falco mexicanus</i>
Tyrant Flycatchers	
Olive-sided flycatcher	<i>Contopus cooperi</i>
◇ Western wood-pewee	<i>Contopus sordidulus</i>
◇ Willow flycatcher	<i>Empidonax traillii</i>
◇ Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>
◇ Say's phoebe	<i>Sayornis saya</i>
< Vermillion flycatcher	<i>Pyrocephalus rubinus</i>
Gray flycatcher	<i>Empidonax wrightii</i>
Cassin's kingbird	<i>Tyrannus vociferans</i>
> Western kingbird	<i>Tyrannus verticalis</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Shrikes	
◇ Loggerhead shrike	<i>Lanius ludovicianus</i>
Northern shrike	<i>Lanius excubitor</i>
Vireos	
Warbling vireo	<i>Vireo gilvus</i>
Crows, Jays, and Magpies	
◇ Black-billed magpie	<i>Pica hudsonia</i>
American crow	<i>Corvus brachyrhynchos</i>
Common raven	<i>Corvus corax</i>
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>
Larks	
◇ Horned lark	<i>Eremophila alpestris</i>
Swallows	
◇ Tree swallow	<i>Tachycineta bicolor</i>
Violet-green swallow	<i>Tachycineta thalassina</i>
> Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
< Purple martin	<i>Progne subis</i>
Bank swallow	<i>Riparia riparia</i>
◇ Cliff swallow	<i>Petrochelidon pyrrhonota</i>
◇ Barn swallow	<i>Hirundo rustica</i>
Titmice and Chickadees	
Black-capped chickadee	<i>Poecile atricapilla</i>
Mountain chickadee	<i>Poecile gambeli</i>
Nuthatches	
White-breasted nuthatch	<i>Sitta carolinensis</i>

<i>Common Name</i>	<i>Scientific Name</i>
Wrens	
Rock wren	<i>Salpinctes obsoletus</i>
◇ House wren	<i>Troglodytes aedon</i>
◇ Marsh wren	<i>Cistothorus palustris</i>
Kinglets	
Ruby-crowned kinglet	<i>Regulus calendula</i>
Thrushes	
Western bluebird	<i>Sialia mexicana</i>
Mountain bluebird	<i>Sialia currucoides</i>
Swainson's thrush	<i>Catharus ustulatus</i>
◇ American robin	<i>Turdus migratorius</i>
Mimic Thrushes	
Northern mockingbird	<i>Mimus polyglottos</i>
◇ Sage thrasher	<i>Oreoscoptes montanus</i>
< Brown thrasher	<i>Toxostoma rufum</i>
Gray catbird	<i>Dumetella carolinensis</i>
Starlings	
◇ European starling (Introduced)	<i>Sturnus vulgaris</i>
Wagtails and Pipits	
American pipit	<i>Anthus rubescens</i>
Wood Warblers	
◇ Yellow warbler	<i>Dendroica petechia</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>
Townsend's warbler	<i>Dendroica townsendi</i>
Northern water-thrush	<i>Seiurus noveboracensis</i>
MacGillivray's warbler	<i>Oporornis tolmiei</i>
◇ Common yellowthroat	<i>Geothlypis trichas</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
< Orange-crowned warbler	<i>Oreothlypis celata</i>
< Black-and-white warbler	<i>Mniotilta varia</i>
< Prothonotary warbler	<i>Protonotaria citrea</i>
< Hooded warbler	<i>Setophaga citrina</i>
Tanagers	
Western tanager	<i>Piranga ludoviciana</i>
Sparrows and Towhees	
Green-tailed towhee	<i>Pipilo chlorurus</i>
Spotted towhee	<i>Pipilo maculatus</i>
Cassin's sparrow	<i>Aimophila cassinii</i>

Common Name	Scientific Name
American tree sparrow	<i>Spizella arborea</i>
Chipping sparrow	<i>Spizella passerina</i>
◇ Brewer's sparrow	<i>Spizella breweri</i>
◇ Vesper sparrow	<i>Poocetes gramineus</i>
Lark sparrow	<i>Chondestes grammacus</i>
Black-throated sparrow	<i>Amphispiza bilineata</i>
Lincoln's sparrow	<i>Melospiza lincolni</i>
Sage sparrow	<i>Amphispiza belli</i>
Lark bunting	<i>Calamospiza melanocorys</i>
◇ Savannah sparrow	<i>Passerculus sandwichensis</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
◇ Song sparrow	<i>Melospiza melodia</i>
◇ White-crowned sparrow	<i>Zonotrichia leucophrys</i>
< Swamp sparrow	<i>Melospiza georgiana</i>
Dark-eyed junco	<i>Junco hyemalis</i>
< Lapland longspur	<i>Calcarius lapponicus</i>
Cardinals, Grosbeaks, and Allies	
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Blue grosbeak	<i>Guiraca caerulea</i>
< Indigo bunting	<i>Passerina cyanea</i>
Blackbirds and Orioles	
Bobolink	<i>Dolichonyx oryzivorus</i>
◇ Red-winged blackbird	<i>Agelaius phoeniceus</i>
◇ Western meadowlark	<i>Sturnella neglecta</i>
◇ Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
◇ Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Great-tailed grackle	<i>Quiscalus mexicanus</i>
◇ Brown-headed cowbird	<i>Molothrus ater</i>
◇ Bullock's oriole	<i>Icterus bullockii</i>
< Orchard oriole	<i>Icterus spurius</i>
Finches	
Gray-crowned rosy finch	<i>Leucosticte tephrocotis</i>
Cassin's finch	<i>Carpodacus cassinii</i>
◇ House finch	<i>Carpodacus mexicanus</i>
Pine siskin	<i>Carduelis pinus</i>
Lesser goldfinch	<i>Carduelis psaltria</i>
> American goldfinch	<i>Carduelis tristis</i>

Common Name	Scientific Name
Old World Sparrows	
House sparrow (Introduced)	<i>Passer domesticus</i>
Mammals ◇ Breeding species on complex	
Insectivores	
◇ Masked shrew	<i>Sorex cinereus</i>
◇ Montane shrew	<i>Sorex monticolus</i>
◇ Water shrew	<i>Sorex palustris</i>
Bats	
Western small-footed myotis	<i>Myotis ciliolabrum</i>
Long-eared myotis	<i>Myotis evotis</i>
Little brown myotis	<i>Myotis lucifugus</i>
Yuma myotis	<i>Myotis yumanensis</i>
Hoary bat	<i>Lasiurus cinereus</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Big brown bat	<i>Eptesicus fuscus</i>
Townsend's big-eared bat	<i>Plecotus townsendii</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
Lagomorphs	
◇ Desert cottontail	<i>Sylvilagus audubonii</i>
◇ Mountain cottontail	<i>Sylvilagus nuttallii</i>
◇ White-tailed jackrabbit	<i>Lepus townsendii</i>
Rodents	
◇ Least chipmunk	<i>Tamias minimus</i>
Yellow-bellied marmot	<i>Marmota flaviventris</i>
◇ Thirteen-lined ground squirrel	<i>Spermophilus tridecemlineatus</i>
Wyoming ground squirrel	<i>Urocitellus elegans</i>
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>
◇ Botta's pocket gopher	<i>Thomomys bottae</i>
◇ Northern pocket gopher	<i>Thomomys talpoides</i>
◇ Plains pocket mouse	<i>Perognathus flavescens</i>
◇ Silky pocket mouse	<i>Perognathus flavus</i>
◇ Ord's kangaroo rat	<i>Dipodimys ordii</i>
◇ Western harvest mouse	<i>Reithrodontomys megalotis</i>
◇ Deer mouse	<i>Peromyscus maniculatis</i>

<i>Common Name</i>	<i>Scientific Name</i>
◇ Northern grasshopper mouse	<i>Onychomys leucogaster</i>
◇ House mouse	<i>Mus musculus</i>
◇ Western jumping mouse	<i>Zapus princeps</i>
◇ Long-tailed vole	<i>Microtus longicaudus</i>
◇ Montane vole	<i>Microtus montanus</i>
◇ Meadow vole	<i>Mecrotus pennsylvanicus</i>
◇ Muskrat	<i>Ondatra zibethicus</i>
◇ American beaver	<i>Castor canadensis</i>
◇ Common porcupine	<i>Erithizon dorsatum</i>
Carnivores	
◇ Coyote	<i>Canis latrans</i>
◇ Red fox	<i>Vulpes vulpes</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Black bear	<i>Ursus americanus</i>
◇ Common raccoon	<i>Procyon lotor</i>
Short-tailed weasel	<i>Mustela erminea</i>
◇ Long-tailed weasel	<i>Mustela frenata</i>
Mink	<i>Mustela vison</i>
◇ American badger	<i>Taxidea taxus</i>
Western spotted skunk	<i>Spilogale gracilus</i>
◇ Striped skunk	<i>Mephitis mephitis</i>
Mountain lion	<i>Felis concolor</i>
Bobcat	<i>Lynx rufus</i>
Ungulates	
◇ American elk	<i>Cervus elaphus</i>
◇ Mule deer	<i>Odocoileus hemionus</i>
White-tailed deer	<i>Odocoileus virginianus</i>
Pronghorn	<i>Antilocapra Americana</i>
Reptiles	
Snapping turtle	<i>Chelydra serpentina</i>
Short-horned lizard	<i>Phrynosoma douglassii</i>
Eastern fence lizard	<i>Sceloporous undulatus</i>
Variable skink	<i>Eumeces gaigeae</i>
Milk snake	<i>Lampropeltis triangulum</i>
Bullsnake	<i>Pituophis melnoleucus</i>
Western terrestrial garter snake	<i>Thamnophis elegans</i>
Common garter snake	<i>Thamnophis sirtalis</i>
Western rattlesnake	<i>Crotalus viridis</i>
Smooth green snake	<i>Opheodrys vernalis</i>
Amphibians	
Tiger salamander	<i>Ambystoma tigrinum</i>

<i>Common Name</i>	<i>Scientific Name</i>
Plains spadefoot	<i>Scaphiopus bombifrons</i>
Western toad	<i>Bufo boreas</i>
Great Plains toad	<i>Bufo cognatus</i>
Woodhouse's toad	<i>Bufo woodhousii</i>
Western chorus frog	<i>Pseudacris triseriata</i>
Bullfrog	<i>Rana catesbeiana</i>
Northern leopard frog	<i>Rana pipiens</i>
Fish	
Northern pike	<i>Esox lucius</i>
Brown trout	<i>Salmo trutta</i>
Black bullhead	<i>Ameiurus melas</i>
Rio Grande sucker	<i>Catostomus plebeius</i>
Rio Grande chub	<i>Gila pandora</i>
Fathead minnow	<i>Pimephales promelas</i>
Longnose dace	<i>Rhinichthys cataractae</i>
White sucker	<i>Catostomus commersonii</i>
Common carp	<i>Cyprinus carpio</i>
Tench	<i>Tinca tinca</i>
Vegetation	
Agavaceae	
Yucca	<i>Yucca</i> spp.
Aizoaceae	
Verrucose seapurslane	<i>Sesuvium verruosum</i>
Alismataceae	
Arrowhead	<i>Sagittaria cuneata</i>
Northern water plantain	<i>Alisma</i> cf.
Alsinaceae	
Longleaf starwort	<i>Stellaria longifolia</i>
Alliaceae	
Wild onion/garlic	<i>Allium</i> spp.
Amaranthaceae	
Rough pigweed	<i>Amaranthus retroflexus</i>
Mat amaranth	<i>Amaranthus blitoides</i>
Anacardiaceae	
Skunkbush sumac	<i>Rhus aromatica</i>
Apiaceae	
Rocky Mountain hemlock-parsley	<i>Conioselinum scopulorum</i>
Common cowparsnip	<i>Heracleum sphondylium</i>
Hemlock waterparsnip	<i>Sium suave</i>
Asclepiadaceae	
Showy milkweed	<i>Asclepias speciosa</i>
Swamp milkweed	<i>Asclepias incarnata</i>

Common Name	Scientific Name
Asparagaceae	
Garden asparagus-fern	<i>Asparagus officinalis</i>
Starry false lily of the valley	<i>Maianthemum stellatum</i>
Asteraceae	
Aster species	<i>Aster</i> spp.
Canada thistle	<i>Cirsium arvense</i>
Common cocklebur	<i>Xanthium strumarium</i>
Common mare's-tail	<i>Hippuris vulgaris</i>
Common sagewort	<i>Artemisia campestris</i>
Dandelion	<i>Taraxacum officinale</i>
Fringed sage	<i>Artemisia frigida</i>
Horseweed	<i>Conyza canadensis</i>
Marsh sowthistle	<i>Sonchus arvensis</i>
Povertyweed	<i>Iva axillaris</i>
Rabbitbrush	<i>Chrysothamnus nauseosus</i>
Russian knapweed	<i>Acroptilon repens</i>
Silver sage	<i>Artemisia cana</i>
Snakeweed	<i>Gutierrezia lucida</i>
Sunflower	<i>Helianthus</i> spp.
Wild lettuce	<i>Lactuca serriola</i>
Yarrow	<i>Achillea millefolium</i>
Common yarrow	<i>Achillea lanulosa</i>
Pale agoseris	<i>Agoseris glauca</i>
Alkali marsh aster	<i>Almutaster pauciflorus</i>
Flatspine bur ragweed	<i>Ambrosia acanthicarpa</i>
Littleleaf pussytoes	<i>Antennaria microphylla</i>
Lesser burdock	<i>Arctium minus</i>
Biennial wormwood	<i>Artemisia biennis</i>
Prairie sagewort	<i>Artemisia frigida</i>
White sagebrush	<i>Artemisia ludoviciana</i>
Nodding beggarticks	<i>Bidens cernua</i>
Slimlobe beggarticks	<i>Bidens tenuisecta</i>
Rubber rabbitbrush	<i>Chrysothamnus nauseosus</i>
Prairie thistle	<i>Cirsium canescens</i>
Parry's thistle	<i>Cirsium parryi</i>
Purple aster	<i>Dieteria biglovii</i>
Running fleabane	<i>Erigeron divergens</i>
Trailing fleabane	<i>Erigeron flagellaris</i>
Beautiful fleabane	<i>Erigeron formosissimus</i>
Streamside fleabane	<i>Erigeron glabellus</i>
White sagebrush	<i>Artemisia ludoviciana</i>
Nodding beggarticks	<i>Bidens cernua</i>

Common Name	Scientific Name
Slimlobe beggarticks	<i>Bidens tenuisecta</i>
Rubber rabbitbrush	<i>Chrysothamnus nauseosus</i>
Prairie thistle	<i>Cirsium canescens</i>
Parry's thistle	<i>Cirsium parryi</i>
Purple aster	<i>Dieteria biglovii</i>
Running fleabane	<i>Erigeron divergens</i>
Trailing fleabane	<i>Erigeron flagellaris</i>
Beautiful fleabane	<i>Erigeron formosissimus</i>
Streamside fleabane	<i>Erigeron glabellus</i>
Western marsh cudweed	<i>Gnaphalium palustre</i>
Marsh cudweed	<i>Gnaphalium uliginosum</i>
Hairy false goldenaster	<i>Heterotheca villosa</i>
Fineleaf hymenopappus	<i>Hymenopappus filifolius</i>
Blue lettuce	<i>Lactuca tatarica</i>
Hall's ragwort	<i>Ligularia bigelovii</i>
Rush skeletonplant	<i>Lygodesmia juncea</i>
Fall tansyaster	<i>Machaeranthera canescens</i>
Smallflower tansyaster	<i>Machaeranthera parviflora</i>
Tanseyleaf tansyaster	<i>Machaeranthera tanacetifolia</i>
False gold groundsel	<i>Packera pseud aurea</i>
Threetooth ragwort	<i>Packera tridenticulata</i>
Fiddleleaf hawksbeard	<i>Psilochenia runcinata</i>
Lanceleaf goldenweed	<i>Pyrrocoma lanceolata</i>
Blackeyed Susan	<i>Rudbeckia hirta</i>
Manyflower false threadleaf	<i>Schkuhria multiflora</i>
Broomlike ragwort	<i>Senecio multicapitatus</i>
Broom groundsel	<i>Senecio spartioides</i>
Canada goldenrod	<i>Solidago canadensis</i>
Missouri goldenrod	<i>Solidago missouriensis</i>
Spiny sowthistle	<i>Sonchus asper</i>
Moist sowthistle	<i>Sonchus uliginosus</i>
Western aster	<i>Symphotrichum ascensum</i>
White heath aster	<i>Symphotrichum ericoides</i>
White prairie aster	<i>Symphotrichum falcatum</i>
Leafy rayless aster	<i>Symphotrichum frondosum</i>
White panicle aster	<i>Symphotrichum lanceolatum</i>
Yellow salsify	<i>Tragopogon dubius</i>

<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>
Boraginaceae			
Cryptantha	<i>Cryptantha</i> sp.	Four-wing saltbush	<i>Atriplex canescens</i>
Manyflower stickseed	<i>Hackelia floribunda</i>	Goosefoot	<i>Chenopodium murale</i>
Seaside heliotrope	<i>Heliotropium curassavicum</i>	Greasewood	<i>Sarcobatus vermiculatus</i>
Flatspine stickseed	<i>Lappula occidentalis</i>	Saltlover	<i>Halogeton glomeratus</i>
James' cryptantha	<i>Oreocarya pustulosa</i>	Kochia	<i>Kochia scoparia</i>
Sleeping popcornflower	<i>Plagiobothrys scouleri</i>	Lambsquarters	<i>Chenopodium album</i>
Common comfrey	<i>Symphytum officinale</i>	Pickleweed	<i>Salicornia rubra</i>
Brassicaceae		Pursh seepweed	<i>Suaeda calceoliformis</i>
Herb sophia	<i>Descurainia sophia</i>	Winterfat	<i>Krascheninnikovia lanata</i>
Hoary Cress (small white-top)	<i>Cardaria draba</i>	Silverscale saltbush	<i>Atriplex argentea</i>
Peppergrass	<i>Lepidium montanum</i>	Twoscale saltbush	<i>Atriplex heterosperma</i>
Tall Whitetop	<i>Lepidium latifolium</i>	Wolf's saltweed	<i>Atriplex wolfii</i>
Tansymustard	<i>Descurainia</i> spp.	Pinyon goosefoot	<i>Chenopodium atrovirens</i>
Rape	<i>Brassica napus</i>	Zschack's goosefoot	<i>Chenopodium berlandieri</i>
Shepherd's purse	<i>Capsella bursa-pastoris</i>	Fremont's goosefoot	<i>Chenopodium fremontii</i>
Lenspod whitetop	<i>Cardaria chalepensis</i>	Rocky Mountain goosefoot	<i>Chenopodium glaucum</i>
Broadleaved pepperweed	<i>Cardaria latifolia</i>	Narrowleaf goosefoot	<i>Chenopodium leptophyllum</i>
Villa grove tansymustard	<i>Descurainia ramosissima</i>	Desert goosefoot	<i>Chenopodium pratericola</i>
Western wallflower	<i>Erysimum asperum</i>	Hairy bugseed	<i>Corispermum villosum</i>
Field pepperweed	<i>Lepidium campestre</i>	Winged pigweed	<i>Cycloloma atriplicifolium</i>
Mesa pepperwort	<i>Lepidium alyssoides</i>	Slender Russian thistle	<i>Salsola collina</i>
Manybranched pepperweed	<i>Lepidium ramosissimum</i>	Fetid goosefoot	<i>Teloxys graveolens</i>
Spreading yellowcress	<i>Rorippa sinuata</i>	Cleomaceae	
Southern marsh yellowcress	<i>Rorippa teres</i>	Slender spiderflower	<i>Cleome multicaulis</i>
Tall tumbledustard	<i>Sisymbrium altissimum</i>	Rocky Mountain bee plant	<i>Cleome serrulata</i>
Flaxleaf plainsmustard	<i>Sisymbrium linifolium</i>	Convolvulaceae	
Cactaceae		Field bindweed	<i>Convolvulus arvensis</i>
Prickly pear	<i>Opuntia</i> spp.	Cupressaceae	
Campanulaceae		Rocky Mountain juniper	<i>Sabina scopulorum</i>
Parry's bellflower	<i>Campanula parryi</i>	Eastern redcedar	<i>Sabina virginiana</i>
Cannabaceae		Cyperaceae	
Common hop	<i>Humulus lupulus</i>	Hardstem bulrush	<i>Schoenoplectus acutus</i>
Caprifoliaceae		Nebraska sedge	<i>Carex nebrascensis</i>
Honeysuckle	<i>Lonicera</i> sp.	Nevada bulrush	<i>Scirpus nevadensis</i>
Tatarian honeysuckle	<i>Lonicera tatarica</i>	Sedge spp.	<i>Carex</i> spp.
Caryophyllaceae		Softstem bulrush	<i>Schoenoplectus tabernaemontani</i>
Chickweed	<i>Cerastium</i> spp.	Spikerush	<i>Eleocharis</i> spp.
Drummond's campion	<i>Silene drummondii</i>	Common three-Square	<i>Schoenoplectus pungens</i>
Chenopodiaceae		Bearded flatsedge	<i>Cyperus aristatus</i>
Russian thistle	<i>Salsola iberica</i>	Panicled bulrush	<i>Scirpus microcarpus</i>
		Cloaked bulrush	<i>Scirpus pallidus</i>

<i>Common Name</i>	<i>Scientific Name</i>
Elaeagnaceae	
Russian olive	<i>Elaeagnus angustifolia</i>
Equisetaceae	
Field horsetail	<i>Equisetum arvense</i>
Smooth horsetail	<i>Equisetum laevigata</i>
Scouring rush	<i>Equisetum hyemale</i>
Horsetail	<i>Equisetum</i> spp.
Euphorbiaceae	
Spotted spurge	<i>Euphorbia maculate</i>
Ribseed sandmat	<i>Chamaesyce glyptosperma</i>
Thymeleaf sandmat	<i>Chamaesyce serpyllifolia</i>
Rocky Mountain spurge	<i>Tithymalus brachyceras</i>
Fabaceae	
American vetch	<i>Vicia americana</i>
Purple locoweed	<i>Oxytropis lambertii</i>
Mountain goldenbanner	<i>Thermopsis montana</i>
Goldenbanner	<i>Thermopsis rhombifolia</i>
Alkali swainsonpea	<i>Sphaerophysa salsula</i>
Sweet clover	<i>Melilotus officinalis</i>
Wild licorice	<i>Glycyrrhiza lepidota</i>
Alfalfa	<i>Medicago sativa</i>
Clover	<i>Trifolium</i> spp.
Purple Milkvetch	<i>Astragalus agrestis</i>
Bodin's milkvetch	<i>Astragalus bodinii</i>
Painted milkvetch	<i>Astragalus ceramicus</i>
Hall's milkvetch	<i>Astragalus hallii</i>
Siberian peashrub	<i>Caragana arborescens</i>
King's lupine	<i>Lupinus kingii</i>
Black medick	<i>Medicago lupulina</i>
Blue nodding locoweed	<i>Oxytropis deflexa</i>
White locoweed	<i>Oxytropis sericea</i>
Lemon scurfpea	<i>Psoralidium lanceolatum</i>
Garden vetch	<i>Vicia angustifolia</i>
Fumaraceae	
Scrambled eggs	<i>Corydalis aurea</i>
Gentianaceae	
Gentian	<i>Gentiana detonsa</i>
Pleated gentian	<i>Gentiana affinis</i>
Autumn dwarf gentian	<i>Gentianella strictiflora</i>
Rocky Mountain fringed	<i>Gentian Gentianopsis thermalis</i>
Geraniaceae	
Redstem stork's bill	<i>Erodium cicutarium</i>

<i>Common Name</i>	<i>Scientific Name</i>
Pineywoods geranium	<i>Geranium caespitosum</i>
Grossulariaceae	
Golden currant	<i>Ribes aureum</i>
Whitestem gooseberry	<i>Ribes inerme</i>
Trumpet gooseberry	<i>Ribes leptanthum</i>
Haloragaceae	
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Water milfoil	<i>Myriophyllum exalbes-cens</i>
Hippuridaceae	
Mare's tail	<i>Hippuris vulgaris</i>
Hydrophyllaceae	
Wishbone fiddleleaf	<i>Nama dichotomum</i>
White phacelia	<i>Phacelia alba</i>
Iridaceae	
Wild iris	<i>Iris missouriensis</i>
Stiff blue-eyed grass	<i>Sisyrinchium demissum</i>
Juncaceae	
Baltic rush	<i>Juncus balticus</i>
Toad rush	<i>Juncus bufonius</i>
Inland rush	<i>Juncus interior</i>
Longstyle rush	<i>Juncus longistylis</i>
Rocky Mountain rush	<i>Juncus saximontanus</i>
Torrey's rush	<i>Juncus torreyi</i>
Juncaginaceae	
Seaside arrowgrass	<i>Triglochin maritimum</i>
Slender arrowgrass	<i>Triglochin concinna</i>
Marsh arrowgrass	<i>Triglochin palustris</i>
Lamiaceae	
Field mint	<i>Mentha arvensis</i>
Spearmint	<i>Mentha spicata</i>
Wild mint	<i>Mentha arvensis</i>
Hairy hedgenettle	<i>Stachys palustris</i>
Lemnaceae	
Duckweed	<i>Lemna</i> spp.
Loasaceae	
Bractless blazingstar	<i>Mentzelia nuda</i>
Adonis blazingstar	<i>Nuttallia multiflora</i>
Malvaceae	
Salt spring checkerbloom	<i>Sidalcea neomexicana</i>
Scarlet globemallow	<i>Sphaeralcea coccinea</i>
Nyctaginaceae	
Hairy four o'clock	<i>Oxybaphus hirsutus</i>
Narrowleaf four o'clock	<i>Oxybaphus linearis</i>

<i>Common Name</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Scientific Name</i>
Heartleaf four o'clock	<i>Oxybaphus nyctagineus</i>	Johnsongrass	<i>Sorghum halipense</i>
Smallflower sandverbena	<i>Tripterocalyx micranthus</i>	Mat muhly	<i>Muhlenbergia richardsonis</i>
Oleaceae		Nuttall's alkali grass	<i>Puccinellia nuttalliana</i>
Common lilac	<i>Syringa vulgaris</i>	Phragmites	<i>Phragmites australis</i>
Onagraceae		Prairie wedgegrass (Reedgrass)	<i>Spennopholis obtusata</i>
Yellow evening-primrose	<i>Oenothera flava</i>	Rabbitfoot grass	<i>Polypogon monspeliensis</i>
Fringed willowherb	<i>Epilobium ciliatum</i>	Reed canarygrass	<i>Phalaris arundinaceae</i>
Crownleaf evening-primrose	<i>Oenothera coronopifolia</i>	Reedgrass	<i>Calimagrostis neglecta</i>
Pale evening-primrose	<i>Oenothera pallida</i>	Saltgrass	<i>Distichlis spicata</i>
Hairy evening-primrose	<i>Oenothera villosa</i>	Sand dropseed	<i>Sporobolus cryptandrus</i>
Orchidaceae		Sandhill muhly	<i>Muhlenbergia pungens</i>
Northern green orchid	<i>Platanthera aquilonis</i>	Short-awn foxtail	<i>Alopecurus aequalis</i>
Orobanchaceae		Slender wheatgrass	<i>Agropyron trachycaulum</i>
Louisiana broomrape	<i>Orobanche ludoviciana</i>	Slimstem reedgrass	<i>Calamagrostis neglecta</i>
Yellow owl's-clover	<i>Orthocarpus luteus</i>	Sloughgrass	<i>Beckmannia syzigachne</i>
Phrymaceae		Spike bentgrass	<i>Agrostis exarata</i>
Roundleaf monkeyflower	<i>Mimulus glabratus</i>	Spikedropseed	<i>Sporobolus contractus</i>
Pinaceae		Squirrel tail	<i>Elymus elymoides</i>
Engelmann spruce	<i>Picea engelmannii</i>	Timothy	<i>Phleum pratense</i>
Blue spruce	<i>Picea pungens</i>	Tufted hairgrass	<i>Deschampsia cespitosa</i>
Plantaginaceae		Weeping alkaligrass	<i>Puccinellia distans</i>
Common plantain	<i>Plantago major</i>	Western wheatgrass	<i>Pascopyrum smithii</i>
Nodding buckwheat	<i>Eriogonum cernuum</i>	Sleepygrass	<i>Achnatherum robustum</i>
Longroot smartweed	<i>Persicaria amphibia</i>	Crested wheatgrass	<i>Agropyron cristatum</i>
Curlytop knotweed	<i>Persicaria lapathifolia</i>	Redtop	<i>Agrostis gigantea</i>
Redwool plantain	<i>Plantago eriopoda</i>	Shortawn foxtail	<i>Alopecurus aequalis</i>
Oval-leaf knotweed	<i>Polygonum arenastrum</i>	Creeping meadow foxtail	<i>Alopecurus arundinaceus</i>
Silversheath knotweed	<i>Polygonum argyrocoleon</i>	Purple threeawn	<i>Aristida purpurea</i>
Poaceae		American sloughgrass	<i>Beckmannia syzigachne</i>
Alkali cordgrass	<i>Spartina gracilis</i>	Smooth brome	<i>Bromopsis inermis</i>
Alkali muhly	<i>Muhlenbergia asperifolia</i>	Cheatgrass	<i>Bromus tectorum</i>
Alkali sacaton	<i>Sporobolus airoides</i>	Slimstem reedgrass	<i>Calamagrostis stricta</i>
Barnyard grass	<i>Echinochloa crusgalli</i>	Blue grama	<i>Chondrosium gracile</i>
Beardless wildrye	<i>Leymus triticoides</i>	Foxtail barley	<i>Critesion jubatum</i>
Blue grama	<i>Bouteloua gracilis</i>	MacKenzie's hairgrass	<i>Deschampsia caespitosa</i>
Bluejoint reedgrass	<i>Calamagrostis canadensis</i>	Saltgrass	<i>Distichlis stricta</i>
Brome spp.	<i>Bromus</i> spp.	Quackgrass	<i>Elytrigia repens</i>
Common rye	<i>Secale cereale</i>	Stinkgrass	<i>Eragrostis cilianensis</i>
Creeping wildrye	<i>Elymus triticoides</i>	American mannagrass	<i>Glyceria grandis</i>
Foxtail barley	<i>Hordeum jubatum</i>	Needle and thread	<i>Hesperostipa comata</i>
Grass spp.	<i>Gramanacea</i> spp.	Prairie Junegrass	<i>Koeleria macrantha</i>
Indian ricegrass	<i>Oryzopsis hymenoides</i>	False buffalograss	<i>Monroa squarrosa</i>
		Scratchgrass	<i>Muhlenbergia asperifolia</i>

<i>Common Name</i>	<i>Scientific Name</i>
Pullup muhly	<i>Muhlenbergia filiformis</i>
Annual muhly	<i>Muhlenbergia minutissima</i>
Witchgrass	<i>Panicum capillare</i>
Canada bluegrass	<i>Poa compressa</i>
Kentucky bluegrass	<i>Poa pratensis</i>
Sand dropseed	<i>Sporobolus cryptandrus</i>
Polemoniaceae	
Scarlet gilia	<i>Ipomopsis aggregata</i>
Flaxflowered ipomopsis	<i>Ipomopsis longiflora</i>
Polygonaceae	
Curly dock	<i>Rumex crispus</i>
Erect knotweed	<i>Polygonum erectum</i>
Smartweed	<i>Polygonum amphibium</i>
Western dock	<i>Rumex occidentalis</i>
Mexican dock	<i>Rumex triangulivalvis</i>
Portulacaceae	
Little hogweed	<i>Portulaca oleracea</i>
Potamogetonaceae	
Horned pondweed	<i>Zannichellia palustris</i>
Pondweed	<i>Potamogeton</i> spp.
Sago pondweed	<i>Potamogeton pectinatus</i>
Primulaceae	
Sea milkwort	<i>Glaux maritima</i>
Ranunculaceae	
Buttercup	<i>Ranunculus cymbalaria</i>
Western white clematis	<i>Clematis ligusticifolia</i>
Threadleaf crowfoot	<i>Ranunculus aquatilis</i>
Macoun's buttercup	<i>Ranunculus macounii</i>
Rhamnaceae	
Common buckthorn	<i>Rhamnus cathartica</i>
Rosaceae	
Herbaceous cinquefoil	<i>Potentilla nivea</i>
Silverweed cinquefoil	<i>Argentina anserine</i>
Apple	<i>Malus</i>
Paradox cinquefoil	<i>Potentilla paradoxa</i>
Platte River cinquefoil	<i>Potentilla plattensis</i>
Woods' rose	<i>Rosa woodsii</i>
Rubiaceae	
Northern bedstraw	<i>Galium boreale</i>
Salicaceae	
Coyote willow	<i>Salix exigua</i>
Crack willow	<i>Salix fragilis</i>
Narrow-leaf cottonwood	<i>Populus angustifolia</i>

<i>Common Name</i>	<i>Scientific Name</i>
Peach-leaf willow	<i>Salix amygladoides</i>
Plains cottonwood	<i>Populus deltoides</i>
Lombardy poplar	<i>Populus nigra</i>
Quaking aspen	<i>Populus tremuloides</i>
Strapleaf willow	<i>Salix ligulifolia</i>
Greenleaf willow	<i>Salix lucida</i>
Santalaceae	
Pale bastard toadflax	<i>Comandra umbellata</i>
Scrophulariaceae	
Water speedwell	<i>Veronica anagallis-aquatica</i>
Neckweed	<i>Veronica peregrina</i>
Butter and eggs	<i>Linaria vulgaris</i>
Meadow lousewort	<i>Pedicularis crenulata</i>
Oneside penstemon	<i>Penstemon virgatus</i>
Common mullein	<i>Verbascum thapsus</i>
Solanaceae	
Matrimony vine	<i>Lycium barbarum</i>
Cutleaf nightshade	<i>Solanum triflorum</i>
Sparganiaceae	
Giant Bur-reed	<i>Sparganium eurycarpum</i>
Tamaricaceae	
Matrimony vine	<i>Lycium barbarum</i>
Cutleaf nightshade	<i>Solanum triflorum</i>
Saltcedar	<i>Tamarix ramosissima</i>
Typha	
Cattail	<i>Typha latifolia</i>
Ulmaceae	
Siberian elm	<i>Ulmus pumila</i>
Urticaceae	
Stinging nettle	<i>Urtica gracilis</i>
Valerianaceae	
Tobacco root	<i>Valeriana edulis</i>
Verbenaceae	
Bigbract verbena	<i>Verbena bracteata</i>
Vitaceae	
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Zygophyllaceae	
Puncturevine	<i>Tribulus terrestris</i>

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