Land Protection Plan

Sangre de Cristo Conservation Area

Colorado and New Mexico

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In accordance with the National Environmental Policy Act and U.S. Fish and Wildlife Service policy, an environmental assessment and land protection plan have been prepared to analyze the effects of establishing the Sangre de Cristo Conservation Area in southern Colorado and northern New Mexico.

- The environmental assessment analyzes the environmental effects of establishing the Sangre de Cristo Conservation Area.
- The Sangre de Cristo Conservation Area land protection plan describes the priorities for acquiring up to 250,000 acres through voluntary conservation easements.

Both documents, which stand alone, are contained within this volume.

Note: Information contained in the maps within these documents is approximate and does not represent a legal survey. Ownership information may not be complete.

Contents

Abbreviations IV

Chapter 1—Introduction and Project Description 1

Purpose of the Sangre de Cristo Conservation Area 3
San Luis Valley National Wildlife Refuge Complex 3
Alamosa and Monte Vista Refuge Complex 3
Baca National Wildlife Refuge 4

Issues Identified and Selected for Analysis 4

Public Review of and Comments on the Draft EA and LPP 5

National Wildlife Refuge System and Authorities 6

Related Actions and Activities 6
San Luis Valley National Wildlife Refuge Complex (Service) 6
USDA Forest Service (USFS) 6
Bureau of Land Management (BLM) 6
National Park Service (NPS) 7
Natural Resources Conservation Service (NRCS) 7
State of Colorado 7
Land Trusts 7

Habitat Protection and the Easement Acquisition Process 7

Conservation Easements 7

Chapter 2—Area Description and Resources 9

Physical Environment 9
Geology 9
Minerals 9
Water and Hydrology 9
Climate 10

Biological Environment 10
Plant Communities 10
Wildlife 13

Cultural Resources 17
Prehistory 18
Early History 19
Political Boundaries, Land Grants, and Public Lands 21
Native Peoples 23
Settlement 23
Summary of Known Historic Resources 24

Socioeconomic Environment 25
Socioeconomic Profile 25
Land Use and Ownership Changes Surrounding the Conservation Area 28
Sangre de Cristo Conservation Area Land Conservation Efforts 30
Water Law 30

Chapter 3—Threats to and Status of Resources 33

Threats to Resources . . . 33
Development . . . 33
Fragmentation . . . 34
Invasive Species . . . 34
Water Resources . . . 34
Cultural Resources . . . 34
Climate Change . . . 34
Effects on the Natural and Human Environment . . . 35

Chapter 4—Project Implementation . . . 37
Land Protection Choices . . . 37
No Action . . . 37
Conservation Easements under the Sangre de Cristo Conservation Area (Proposed Action) . . . 37
Project Objectives and Actions . . . 37
Easement Terms and Requirements . . . 37
Contaminants or Hazardous Materials . . . 38
Acquisition Money . . . 38
Protection Priorities . . . 38
Species-Habitat Mapping Method . . . 38
Landscape Prioritization . . . 39
Evaluation of Easement Potential . . . 45
Ecosystem Management and Landscape Conservation . . . 45
Incorporating Science and Strategic Habitat Conservation in the Sangre de Cristo Conservation Area . . . 47
Socioeconomic Considerations . . . 48
Public Involvement and Coordination . . . 48
Scoping . . . 48
Public Review of the Draft Environmental Assessment and Land Protection Plan . . . 49
Distribution and Availability . . . 49

Appendixes
Appendix A. Environmental Assessment . . . 51
Appendix B. List of Preparers and Reviewers . . . 65
Appendix C. Species List of the San Luis Valley Conservation Area . . . 67
Appendix D. Public Comments . . . 107
Appendix E. Finding of No Significant Impact . . . 143
Appendix F. Environmental Action Statement . . . 147
Appendix G. Environmental Compliance Certificate . . . 149
Appendix H. Director's Approval . . . 153
Appendix I. Section 7 Biological Evaluation . . . 155

Literature Cited . . . 163

Glossary . . . 171

FIGURES

Figure 1. Boundary and location of the Sangre de Cristo Conservation Area, Colorado and New Mexico 2
Figure 2. Southwestern willow flycatcher and Lewis' woodpecker habitat, Sangre de Cristo Conservation Area, Colorado and New Mexico 40
Figure 3. Canada lynx habitat, Sangre de Cristo Conservation Area, Colorado and New Mexico 41
Figure 4. Rio Grande cutthroat trout conservation populations, Sangre de Cristo Conservation Area, Colorado and New Mexico 42
Figure 5. Gunnison sage-grouse habitat, Sangre de Cristo Conservation Area, Colorado and New Mexico 43
Figure 6. Sage thrasher shrubland habitat, Sangre de Cristo Conservation Area, Colorado and New Mexico 44
Figure 7. Spatial conservation prioritization, Sangre de Cristo Conservation Area, Colorado and New Mexico 46

TABLES

Table 1. Population statistics for the counties in Colorado and New Mexico that contain the Sangre de Cristo Conservation Area 25
Table 2. Income, education, unemployment, and poverty rates for counties in Colorado and New Mexico that contain the Sangre de Cristo Conservation Area 26
Table 3. Percentage employment by sector for counties in Colorado and New Mexico that contain the San Luis Valley region 26

Abbreviations

BLM	Bureau of Land Management
CCP	comprehensive conservation plan
CWCB	Colorado Water Conservation Board
EA	environmental assessment
LPP	land protection plan
NEPA	National Environmental Policy Act
NAWCA	North American Wetland Conservation Act
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NWR	national wildlife refuge
SCCA	Sangre de Cristo Conservation Area
Service	U. S. Fish and Wildlife Service
SLVCA	San Luis Valley Conservation Area
USFS	USDA Forest Service
USFWS	U. S. Fish and Wildlife Service
USGS	U. S. Geological Survey
WRP	Wetland Reserve Program

Chapter 1—Introduction and Project Description

"The Sangre de Cristo Mountains…have the glamour of lost history – dim memories of Indian bands, of French explorers and Spanish troops; they have the spell of the remote, the mystery of recesses that are little known; they are the kind of mountains one's imagination builds."

– Albert Ellingwood after completing the first ascent of Crestone Needle, 1916

Rising as a singular wall of rock to heights of more than 14,000 feet from the surrounding valleys and plains, the Sangre de Cristo Mountains strike an impressive and poetically inspiring profile. They are also the southernmost range of the Rocky Mountains, and thus mark a transition from the Intermountain West to the ecosystems of the shortgrass prairie and desert southwest. Through the Sangre de Cristo Conservation Area (SCCA; figure 1), the U.S. Fish and Wildlife Service (Service or USFWS) hopes to permanently protect an important piece of these mountains.

As with many of the mountain ranges of the western United States, much of the Sangre de Cristo Mountains are conserved in perpetuity as national forest land. However, the central part of the range, from Blanca Peak in Colorado to northern Taos County in New Mexico, is entirely private. While there are some large ranches protected by conservation easements in this part of the range, there are still large gaps. This region has been identified as an important corridor linking populations of federally threatened Canada lynx in northern New Mexico with the larger population in the Rockies. In addition to the montane forests and alpine areas of the mountains themselves, the western slope of these mountains borders the San Luis Valley, a large intermountain valley bounded by the San Juan Mountains on the west and the Sangre de Cristo Mountains on the east, whose rain shadows result in high desert conditions. The southeastern corner of the valley is essentially the edge of the West's "sagebrush sea," and contains potential habitat for the Endangered Species Act candidate Gunnison sage-grouse and other declining sagebrush-dependent species. This western slope is also riddled with riparian corridors that provide important habitat for the Endangered Species Act candidate Rio Grande cutthroat trout, the federally endangered southwestern willow flycatcher, and countless other migratory birds.

Anthropogenic factors, including agriculture, changes in fire regime, and climate change, have changed the historical vegetation of the San Luis Valley. Low human population density associated with the largely agricultural economy of the valley have enabled the San Luis Valley and central Sangre de Cristo Mountains to keep substantial parts of their biological value, particularly for migratory birds. However, rising agricultural costs, including those resulting from the recent State of Colorado requirement to augment surface flows to offset the impacts of ground water use, have led to an unsettled agricultural economy. The risk of second home development in the already heavily subdivided Costilla County continues, and would substantially reduce the quality of that habitat for sagebrush-dependent species. Substantial residential development or unsustainable logging practices in the Sangre de Cristo Mountains would also degrade that habitat for threatened and endangered species.

The SCCA will conserve a network of vital wildlife habitat through up to 250,000 acres of voluntary conservation easements. The SCCA acquisitions will focus on the protection of sagebrush habitat as well as riparian corridors and associated uplands.

Planning for the SCCA began as part of the proposed San Luis Valley Conservation Area (SLVCA), for which a draft environmental assessment and land protection plan (EA and LPP) was released in May 2012. The Service has chosen to decelerate planning for the SLVCA to more effectively incorporate its goals with those of the ongoing comprehensive conservation plan (CCP) process for the San Luis Valley National Wildlife Refuge (NWR) Complex. The SLVCA LPP, should be completed sometime in or before 2014. In the interim, the Service recognizes the conservation need and opportunity on the west slope of the central Sangre de Cristo Mountains, and because this land is less integrated with the goals of the three refuges in the valley, we are moving forward to authorize the smaller Sangre de Cristo Conservation Area as part of the original vision.

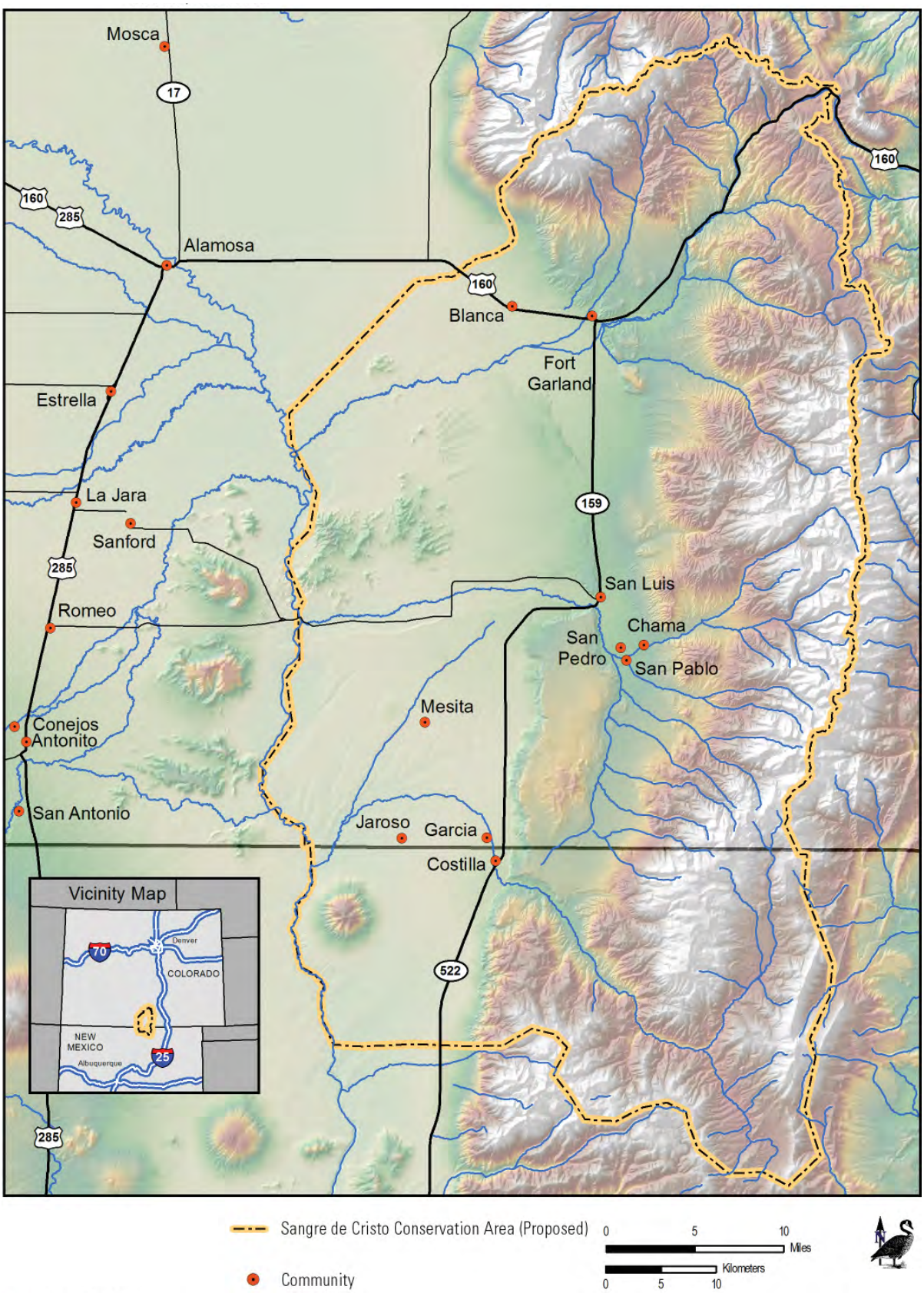

Figure 1. Boundary and Location of the Sangre de Cristo Conservation Area, Colorado and New Mexico.

Purpose of the Sangre de Cristo Conservation Area

The purpose of the SCCA is to protect the high-elevation wildlife habitats of the Sangre de Cristo Mountains and the uplands of the southeastern San Luis Valley, with an emphasis on migratory birds and imperiled species. Acquisitions within, and administration of, the SCCA will focus on promoting the adaptive capacity and resilience of these ecosystems by ensuring connectivity between existing protected areas and by protecting wildlife movement corridors, particularly riparian areas.

This aligns with, but does not supersede, the vision and purposes of the three existing refuges—Alamosa, Monte Vista, and Baca—within the San Luis Valley National Wildlife Refuge Complex, as described below.

San Luis Valley National Wildlife Refuge Complex

Vision:

The San Luis Valley National Wildlife Refuge Complex, set in a high expansive desert valley, is cradled between the snowcapped peaks of the San Juan and Sangre de Cristo Ranges. Mountain snowmelt feeds the Rio Grande, numerous streams, and a dynamic ground water system, creating a diverse mix of playas, wet meadows, and willow and cottonwood riparian corridors that are in stark contrast with the surrounding arid landscape. As reflected by 12,000 years of human history in the valley, the San Luis Valley National Wildlife Refuge Complex attracts many people. Visitors experience the ancient song of the sandhill crane, witness evening flights of thousands of waterfowl, and listen to bugling elk. Through ever changing conditions, the refuges support and foster a collaborative spirit between their neighbors and partners to conserve the valley's treasured resources.

Alamosa and Monte Vista National Wildlife Refuge Complex

Vision:

Lands of the Alamosa and Monte Vista National Wildlife Refuge Complex and those owned by our partners will be managed in a way that

© Trinchera Ranch

The Sangre de Cristo Conservation Area contains a rich mosaic of working ranch lands and important wildlife habitat.

contributes to the migratory bird resource in the San Luis Valley to the greatest extent possible to benefit people of the valley and the United States. Management will emphasize protection, enhancement, restoration, and, where proper, creation of a variety of wetland and riparian habitats in this water-rich yet arid mountain valley. Local residents and visitors will view refuge lands with a sense of pride and value their relationships and accomplishments with the U.S. Fish and Wildlife Service.

Purpose:

Alamosa and Monte Vista National Wildlife Refuges were established under the authority of the Migratory Bird Conservation Act "…for use as inviolate sanctuaries, or for any other management purpose, for migratory birds."

Baca National Wildlife Refuge

Purpose:

The purpose of the Baca National Wildlife Refuge shall be to restore, enhance, and maintain wetland, upland, riparian, and other habitats for native wildlife, plant, and fish species in the San Luis Valley. In administering the Baca National Wildlife Refuge, the Secretary shall, to the maximum extent practicable – (A) emphasize migratory bird conservation; and (B) take into consideration the role of the refuge in broader landscape conservation efforts; and (C) subject to any agreement in existence as of the date of enactment of this paragraph, and to the extent consistent with the purposes of the refuge, use decreed water rights on the refuge in approximately the same manner that the water rights have been used historically.

Issues Identified and Selected for Analysis

The Service solicited comments about the SLVCA from the public through direct mailings, news releases, public meetings, and direct contacts. These comments were incorporated into what has become the SCCA.

- On March 15, 2011, the Service opened a scoping period for the public with the publication of a notice of intent in the Federal Register (FR Doc. 2011–5924). The notice of intent notified the public of the Service's intention to begin the coplanning and NEPA review for the CCP and LPP for the San Luis Valley National Wildlife Refuge Complex.
- Public scoping meetings were held on March 29, 2011, in Alamosa, Colorado; March 30, 2011, in Monte Vista, Colorado; and March 31, 2011, in Moffat, Colorado. The scoping meetings were attended by approximately 50 people, many of whom provided input for the scoping process. Additionally, 14 written comments were received from organizations and members of the public.
- A press event and public meeting was held at Adams State College in Alamosa, Colorado, on January 4, 2012, at which the Secretary of the Interior, Ken Salazar, organized the presentation of several complementary initiatives for the San Luis Valley and Sangre de Cristo Mountains. One of these initiatives was landscape scale conservation, which Dan Ashe, the Director of the Service, presented as being embodied by the SLVCA. Questions were answered and comments taken at a breakout session following the main meeting.
- The project's planning Web site (http://www.fws.gov/alamosa/planning) was established in early March of 2011. The site provides information about meetings and downloadable versions of public documents. Individuals can also sign up to be on the project mailing list through the Web site.

During scoping, the CCP and LPP were still being planned simultaneously. However, the two plans have since been separated and the LPP process has been moved up to take advantage of conservation opportunities that may not exist in the future. As such, many of the issues identified during scoping are not specific or relevant to the LPP. The applicable issues and questions identified during the scoping process and during internal conversations among the SCCA planning team are:

- The SCCA must protect the wildlife habitat, specifically wetlands, riparian corridors, grasslands, and shrublands, of the San Luis Valley, while also supporting the rural agricultural aesthetic that defines the region.
- What role can the conservation area play in protecting listed species and species of concern?
- How will the SCCA affect water use in the valley?
- The SCCA should not negatively affect private property rights in the valley.
- Develop partnerships for land protection.
- How will the public be able to use lands protected under the SCCA?
- Make sure that the SCCA planning process incorporates the importance of protecting cultural resources.
- How will the SCCA increase the capacity to adapt to climate change on the existing refuges and habitat throughout the valley?

- The plan should account for air, soil, sound, and visibility effects.

Public Review of, and Comments on, the Draft Environmental Assessment and Land Protection Plan

The Service released the draft SLVCA EA and LPP on May 9, 2012 for a 30-day public review period. This draft has become the basis for the final SCCA EA and LPP. The draft documents were made available to the public via the project Web site, as well as to Federal officials and agencies, State officials and agencies, 17 Native American tribes with aboriginal interests, and members of the public who had asked to be added to the project mailing list. In addition, three public meetings were held in Alamosa, San Luis, and Moffat, Colorado on May 14, 15, and 16, 2012, respectively. Approximately 50 members of the public attended these three meetings. In addition to several comments voiced at these public meetings, the Service received eight written comments from government agencies and nongovernmental organizations and corporations, and six written comments from individuals. Comments were reviewed and incorporated into the administrative record. Comments and responses to substantive comments are included in appendix D.

Of those comments that showed a clear opinion in favor or opposed to the project, 75 percent were supportive in nature. The comments generally in favor of the SLVCA (which then included what has since become the SCCA) mention items such as:

- The SLVCA is entirely a willing seller program, not an imposition
- The Service has emphasized the collaborative nature of the project – The SLVCA is one of many conservation initiatives
- The plan was comprehensive
- The Service's conservation goals are complementary with those of residents in Crestone and Baca Grande who would like to see perpetual conservation easements in those municipalities
- The prioritization strategy emphasizes promoting capacity for climate change adaptation
- Easement language should allow changes in water use only if beneficial to wildlife; and similar comments arguing for a more aggressive stance by USFWS to restore historical hydrology in the San Luis Valley
- An emphasis on sustainability in the San Luis Valley could help bolster its already strong or growing nonagriculture sectors such as finance, services, and tourism.
- The land protection strategy is transparent and guided by habitat needs for identified trust species
- Recognition that conservation easements are effective and more popular than new Federal land acquisition
- Appreciation of the landscape-scale nature of the project
- In addition to full market value, the Service should consider bargain sales for easements
- Appreciation for the gradual nature of and phased approach to the SLVCA
- Suggestions to include more areas in northern New Mexico (Chama Peaks area, Jicarilla Apache lands) in project boundary
- In addition to habitat value, the Service consider other qualities such as historical, open space, and public access
- Easement program should accommodate small parcels, such as the vara strips associated with acequia irrigation practices.
- Program will protect both wildlife and agriculture

Comments not in support of the project identified the following concerns:

- Bad past experiences with easements restricting changes in agricultural operations
- Request that the Service consider impacts of easement restrictions on ability of utility companies to promote electrical reliability and renewable energy
- Industry was not reached during scoping
- General dissatisfaction with the impact of the Federal Government on land access and quality of life
- Concerns by the Rio Grande Water Conservation District about the potential competition between the USFWS easement program and their attempts to acquire land for mitigation for the San Luis Valley Habitat Conservation Plan.

The following substantive questions were raised that were neither in opposition to nor in support of the SLVCA and SCCA:

- How will being within the SLVCA boundary influence decisionmaking (for example grazing permits) by other Federal agencies?
- How will the presence of an easement on an adjacent property affect a landowner who chooses not to sell an easement?
- How will the SLVCA's establishment affect traditional use rights for Hispanos in Costilla County?

National Wildlife Refuge System and Authorities

The SCCA will be part of the National Wildlife Refuge System, whose mission is "…to administer a national network of lands and waters for the conservation, management, and where proper, 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). National wildlife refuges provide important habitat for native plants and many species of mammals, birds, fish, insects, amphibians, and reptiles. They also play a vital role in conserving threatened and endangered species. Refuges offer a wide variety of wildlife-dependent recreational opportunities, and many have visitor centers, wildlife trails, and environmental education programs.

Conservation of more wildlife habitat in the SCCA will be consistent with the following policies and management plans:

- Migratory Bird Treaty Act (1918)
- Migratory Bird Hunting and Conservation Stamp Act (1934)
- U.S. Fish and Wildlife Act (1956)
- Bald and Golden Eagle Protection Act (1962)
- Land and Water Conservation Fund Act (1965)
- Endangered Species Act (1973)
- Migratory Non-Game Birds of Management Concern in the U.S. (2002)
- Alamosa and Monte Vista National Wildlife Refuge Complex Comprehensive Conservation Plan (2003)
- Baca National Wildlife Refuge Conceptual Management Plan (2005)

The acquisition authorities for the proposed easements and property acquisition are the U.S. Fish and Wildlife Act of 1956 (16 U.S.C. 742a–j) and the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd–668ee), as amended. Land will be acquired with the use of the Land and Water Conservation Fund, which is derived primarily from oil and gas leases on the Outer Continental Shelf, motorboat fuel taxes, and the sale of surplus Federal property. As proper, the Service could also buy land interest through the use of Federal Duck Stamp revenue from the Migratory Bird Hunting and Conservation Stamp Act of 1934. There could also be more money to acquire lands, water, and interests for fish and wildlife conservation purposes as identified by Congress or donations from nonprofit organizations. Any acquisition from willing sellers would be subject to available money.

Related Actions and Activities

The Sangre de Cristo Mountains and San Luis Valley contain many public lands and private protected areas, some of which are contiguous with other protected areas and some of which are isolated. Several existing State, Federal, and private land trust programs promote the conservation of habitats in the SCCA.

San Luis Valley National Wildlife Refuge Complex (Service)

The San Luis Valley National Wildlife Refuge Complex has three existing units: the Alamosa, Baca, and Monte Vista National Wildlife Refuges. These refuges were established for different purposes, as outlined earlier in this chapter, and protect 12,026 acres, 92,500 acres, and 14,800 acres, respectively. All three refuges now contain a variety of habitats, with a special emphasis on wetlands and riparian systems. Management practices include vegetation manipulation and the artificial movement of water.

USDA Forest Service (USFS)

The Rio Grande, San Isabel, and Carson National Forests border the SCCA to the north, east, and south. These forests contain nearly 4.5 million acres of public lands in the Sangre de Cristo, Saguache, and San Juan Mountains. The forests contain habitat ranging from pinyon-juniper savanna in the lower areas up to alpine tundra and scree fields at elevations more than 14,000 feet. Much of this is designated wilderness. These national forests are important habitat for Federal trust species, including Canada lynx and Rio Grande cutthroat trout, and for nonlisted but climate change-imperiled species, such as American pika and white-tailed ptarmigan.

Bureau of Land Management (BLM)

Much of the land between the national forest boundaries and the largely private valley floor is administered by the BLM as the San Luis Resource Area. The BLM is actively working to restore the historical playa wetlands in the South San Luis Lakes and Blanca Wetlands areas, the latter of which has been designated as an Area of Critical Environmental Concern. These intermittent wetlands are particularly important for migratory shorebirds, some of which nest in the valley, and are also a priority habitat for the Service. There is also a proposal to establish a Rio Grande del Norte National Conservation Area in northern New Mexico next to the SCCA boundary. This initiative would place certain added management guidelines on public lands within that boundary.

National Park Service (NPS)

Just to the northwest of the SCCA boundary is the Great Sand Dunes National Park and Preserve. Together these comanaged NPS units protect approximately 150,000 acres, from valley floor rabbitbrush scrub and the tallest sand dunes in North America to peaks more than 13,000 feet in the Sangre de Cristo Mountains.

Natural Resources Conservation Service (NRCS)

The NRCS actively works in the San Luis Valley through its Wetlands Reserve Program, a voluntary easement program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. They do not own land in fee title, but rather provide technical and financial support to help landowners with wetlands restoration efforts.

State of Colorado

The State of Colorado owns thousands of acres throughout the region and administers State Wildlife Areas and State Habitat Areas on many private lands. There are several school sections, managed by the State Land Board to provide revenue for K–12 education in the State. Some of these State Land Board parcels, such as La Jara Reservoir, allow recreational use as part of the Public Access program with Colorado Parks and Wildlife. There are a handful of regionally important wetlands and riparian corridors managed as State Wildlife Areas, including Russel Lakes; San Luis Lakes; and Rio Grande, Higel, and Hot Creek State Wildlife Areas. South of Baca National Wildlife Refuge and west of Great Sand Dunes National Park and Preserve is San Luis Lakes State Park, which provides important habitat for migratory birds as well as opportunities for wildlife-dependent recreation and watersports.

Land Trusts

Tens of thousands of acres are protected in either fee title and easement programs paid for, or administered by, several conservation and land trust organizations, including but not limited to the Wetlands America Trust, The Nature Conservancy, the Rocky Mountain Elk Foundation, the Colorado Open Lands, the American Farmland Trust, Ducks Unlimited, the Rio Grande Headwaters Land Trust, and the Colorado Cattleman's Agricultural Land Trust. These organizations have many different objectives; some focus on the preservation of undeveloped agricultural land to provide resources for the future, some are interested in protecting specific wildlife resources such as wetlands, and some have cultural or recreational objectives. The efforts of each of these organizations complement each other as well as efforts being undertaken by public agencies, including the Service. The locations of easements on private land are largely confidential, but there are some important land trust properties held in fee title as well, such as The Nature Conservancy's Medano-Zapata Ranch, which borders Baca National Wildlife Refuge and Great Sand Dunes National Park and Preserve. This property is a 103,000-acre working ranch and is home to a herd of 2,500 bison that are managed to mimic natural grazing patterns in the high desert shrub and grasslands.

Habitat Protection and the Easement Acquisition Process

Habitat protection will occur through the purchase of conservation easements. It is the Service's long-established policy to acquire the minimum interest in land from willing sellers to achieve habitat protection goals, and conservation easements are an effective tool for achieving these goals.

The acquisition authority for the SCCA is the U.S. Fish and Wildlife Act of 1956 (16 U.S.C. 742a–j). The Federal money used to acquire conservation easements will largely come from the Land and Water Conservation Fund, which is derived from oil and gas leases on the Outer Continental Shelf, motorboat fuel tax revenues, and the sale of surplus Federal property. There could be more money to acquire interests in habitat and water through direct congressional appropriations, donations, and the Federal Land Trust Facilitation Act if Congress votes to reauthorize it.

Conservation Easements

An easement is a conservation tool that has been extensively employed in the SCCA project area and throughout the larger region by other organizations. Easements involve the acquisition of certain rights to the property, such the right to subdivide or develop certain types of new infrastructure, while leaving the land title in the hands of the private property owner. Easements tend to be a cost-effective and socially acceptable means of habitat conservation. Many of the current agricultural land use practices are consistent with wildlife resource protection, and the use of easements will help ensure a strong and vibrant rural lifestyle.

Chapter 2—Area Description and Resources

This chapter describes the biological, cultural, and socioeconomic resources within the proposed SCCA that could be affected by its establishment. The SCCA consists of approximately 1 million acres within the Southern Rockies and Arizona and New Mexico Plateau ecoregions (U.S. Environmental Protection Agency 2011). The project encompasses nearly all of Costilla County in Colorado, as well as a part of northern Taos County, New Mexico. Almost the entire project area is privately owned.

Because of the nearly 7,000 feet in elevation change across the project area, the SCCA contains a diverse array of plant communities, ranging from rabbitbrush scrub and sagebrush on the valley floor to alpine tundra and scree fields on the peaks of the surrounding mountains. As described in detail in this chapter, the habitats of the valley and surrounding mountains are crucial to the breeding and migration of migratory birds, and provide important opportunities for persistence or reintroduction of populations of imperiled species that are protected under the Endangered Species Act.

Physical Environment

Geology

The project area is in the southeast corner of the San Luis Valley, which in turn is part of the much larger Rio Grande Rift Zone that extends from southern New Mexico northward through the San Luis and Upper Arkansas valleys to its northern termination near Leadville, Colorado (McCalpin 1996). The San Luis Valley is bordered on the east by the linear Sangre de Cristo Mountains, which were created by extensive block faulting during the Laramide Orogeny. The north-northwest part of the valley is bordered by the southernmost reach of the Sawatch Mountains. The west side of the valley is flanked by the San Juan Mountains, the result of extensive Tertiary-aged volcanism. In sharp contrast to the steeply rising mountains on the eastern side of the valley floor, the Oligocene volcanic rocks of the San Juan Mountains dip gently eastward into the valley floor, where they are interbedded with valley-fill deposits. Valley-fill deposits consist of sedimentary rocks that interfinger with volcanic deposits. Quaternary deposits include alluvium, sand dunes, and pediments along the mountain fronts (USFWS 2011).

Minerals

Sand and gravel are the major mineral commodities that are mined near the San Luis Valley. Rock, sand, and gravel mines are scattered throughout the valley, but are concentrated around the cities of Alamosa and Monte Vista and the town of Del Norte, Colorado. No coal mining permits are active in the SCCA (Colorado Division of Reclamation, Mining, and Safety 2012). Other minerals that are mined in the area include gold, silver, peat, and limestone. There is also nascent oil and gas exploration in the valley (USFWS 2011). Little active mining occurs within the SCCA boundary.

Water and hydrology

The SCCA is located in the upper headwaters of the Rio Grande watershed, of which the drainages from the west slope of the Sangre de Cristo Mountains are tributary. Because of its position in a high-mountain desert, the valley floor receives little precipitation, and most surface and ground water is a result of runoff from the surrounding mountains. There are many perennial and intermittent drainages that descend from the Sangre de Cristo Mountains, including Sangre de Cristo, Trinchera, and Costilla Creeks.

The project area is in the San Luis Valley part of the Rio Grande Aquifer System. The San Luis Valley is the northernmost part of the aquifer system that stretches from Saguache County, Colorado, to west Texas (Robson and Banta 1995). The thick basin-fill deposits in the San Luis Valley consist of interbedded clay, silt, sand, gravel, and volcanic rock. These form many separate aquifer systems, which are generally grouped into two major aquifers, a shallow unconfined aquifer and a deep confined aquifer, though the lines between these features are not absolute. The unconfined aquifer is separated, but not totally disconnected, from the confined aquifer by clay layers and lava flows. The unconfined aquifer is recharged through infiltration of precipitation, irrigation water, runoff, and upward seepage of ground water from the confining bed. Discharge from the unconfined aquifer is from ground water withdrawals, ground water flow to the south, discharge to streams or drains, and evapotranspiration. Water levels in the unconfined aquifer respond to local climatic events and fall or rise with the availability of precipitation. Wells drilled into the deep confined aquifer are artesian and are buffered from climatic conditions. The confined aquifer is recharged

from precipitation and snowmelt in the high San Juan Mountains and Sangre de Cristo Mountains. Discharge from the confined aquifer is from ground water withdrawals, ground water flow to the south, and upward leakage through the confining bed (USFWS 2012).

Climate

The climate of the San Luis Valley is consistent with its high mountain desert setting, with substantial 24-hour temperature swings because of cold air drainage from the surrounding mountains. This cold air also creates winter overnight temperatures that are often much lower than at many other places at similar elevations and latitudes. The mid-January high averages 34 °F while the low averages –2 °F, and the mid-July high averages 83 °F while the low averages 37 °F. The montane and alpine parts of the SCCA have much cooler weather because of their 10–14,000-foot elevations.

Precipitation in the valley is strongly influenced by the surrounding mountains. The windward side of the mountain ranges, particularly the San Juan Mountains, receives a substantial amount of orographic precipitation, which is caused when air masses rise and subsequently cool, dumping their precipitation at higher elevations. This results in a marked rain shadow effect on the lee side of the mountains, with annual precipitation in Alamosa, the nearest major city to the SCCA, averaging 7.25 inches per year (National Weather Service 2012).

Biological Environment

Plant Communities

The vegetation across the project area varies greatly, depending on hydrology, slope, aspect, and elevation. The San Luis Valley's hydrology is strongly influenced by surface runoff and ground water flows from the surrounding mountains. These conditions have created a network of riparian corridors and wetlands that break up large expanses of associated desert and upland habitats across a 7,000-foot elevation gradient, resulting in high plant diversity. The broader San Luis Valley ecosystem contains 1,132 species of plants (appendix B; Colorado State University Herbarium 2012), which is more than a third of the total plant species present in Colorado. However, the more limited area of the SCCA suggests that the number actually present inside the project boundary may be somewhat lower. Similarly, the discussion of vegetation types below, particularly about wetlands, applies to the San Luis Valley and its surrounding mountains, though some of these vegetation types are only found in restricted patches in the SCCA itself.

Wetlands

Wet Meadows. Wet meadow habitat is naturally present in the San Luis Valley in both areas that have shallow water tables and areas that are periodically shallowly inundated early in the growing season. Wet meadows are the most widespread wetland type in the San Luis Valley. Dominant plants include Baltic rush, hair grass, and sedges. Most of the naturally occurring wet meadows have been modified by changes in water use, but in some areas this has resulted in an expansion of wet meadow areas because of artificial irrigation for hay fields and cattle grazing. These agricultural uses, while not without their own problems, do create habitat for a variety of wildlife (USFWS 2005).

The combination of plant structure and density coupled with water depth and duration creates rich habitat diversity within each larger area of wet meadow. This richness of habitat creates tremendous foraging and nesting opportunities for a variety of bird species. Among these are many species of ducks and geese as well as sora, Virginia rail, white-faced ibis, American avocet, Wilson's snipe, and Wilson's phalarope. Wet meadows provide critical roosting and foraging areas for the Rocky Mountain population of greater sandhill cranes, which migrate through the valley in the spring and fall. Wet meadows also provide habitat for a variety of regionally rare or unusual amphibian species, such as northern leopard frog and Plains spadefoot toad (USFWS 2005). Also present in this habitat, particularly in areas of alkali soils, is the somewhat rare slender spiderflower, which once had a wide range in the southern Rocky Mountains but now occurs almost exclusively in the San Luis Valley.

Seasonal and Semipermanent Wetlands. Seasonal and semipermanent wetlands have hydrologic regimes that typically allow for the persistence of water throughout the growing season. Water in these areas is often deeper than 1 foot. Semipermanent wetlands may have substantial areas of open water with aquatic vegetation beds, and are often fringed by tall emergent vegetation. Tall emergent wetlands can also be seasonal and are typically dominated by bulrush and cattails.

Swimming birds, including grebes, coots, and waterfowl, as well as aerial species such as swallows and terns, use open-water areas of these wetlands for foraging. Emergent vegetation provides breeding habitat for diving and dabbling ducks, Canada geese, American bitterns, snowy and cattle egrets, black-crowned night-herons, white-faced ibis, and marsh passerines such as marsh wrens, common yellowthroats, and yellow-headed blackbirds. Northern harriers and short-eared owls will also nest in residual patches of tall emergent vegetation. Tall emergent wetlands with a high density of sedges and a shallow seasonal water regime host rails and provide nesting sites for dabbling ducks.

Riparian Habitats

Riparian habitat has trees, shrubs, and other streamside vegetation and is associated with intermittent and perennial waterways . This community may flood every year. Its historical extent on the valley floor has been reduced because of surface water diversion. Woody riparian habitat is sensitive to excessive grazing, which limits regeneration of the dominant willows and narrowleaf cottonwood trees. Shrubs that contribute to the structural diversity of riparian habitat include redosier dogwood and greasewood. These shrublands and forests provide important stopover habitat for migratory passerines, as well as nesting habitat for species such as Lewis' woodpecker, willow flycatcher, and possibly yellow-billed cuckoo. In addition, the shade and streambank stabilization provided by riparian vegetation is important in keeping temperature and water quality in streams and rivers for species such as the endemic Rio Grande cutthroat trout, Rio Grande chub, and Rio Grande sucker.

Upland Vegetation

Semidesert Shrublands and Grasslands. Shrublands are the most common natural vegetation on the San Luis Valley floor. Many of the plants within these communities are drought resistant and tolerant of high soil salinity. These shrublands are characterized by an open to moderately dense assemblage of rubber rabbitbrush, greasewood, fourwing saltbush, shadscale, and winterfat. Also present in these communities are yucca, cactus, and various grasses. At slightly higher elevations, rabbitbrush shrublands transition to desert scrub and shrub-steppe habitats that have a substantial cover of big sagebrush or sand sagebrush and that intergrade with the pinyon-juniper woodlands above. Grasses in these areas include Indian ricegrass, alkali sacaton, western wheat grass, and blue grama.

Bird diversity and density tend to be relatively low in semidesert shrublands because of structural and floristic simplicity (Wiens and Rotenberry 1981). Species common to this habitat include the horned lark, mourning dove, western meadowlark, and loggerhead shrike. Upland grassland habitats have the potential to support grassland-dependent species such as burrowing owl, long-billed curlew, and a variety of sparrows. The sagebrush-dominated habitats are also home to the declining sage thrasher and the Endangered Species Act candidate Gunnison sage-grouse.

Sue Oliveira / USFWS

Riparian habitats provide both habitat and movement corridors for wildlife. Streams such as this one are important habitat for the imperiled Rio Grande cutthroat trout.

© Trinchera Ranch

The semidesert shrublands and sagebrush habitats of the Sangre de Cristo Conservation Area, while stark in appearance, are important habitat for declining bird species such as the sage sparrow and sage thrasher.

Montane Forests. Above the semidesert shrubland, the vegetation transitions into pinyon-juniper woodland. This open-canopy forest is dominated by pinyon pines and junipers, with an understory consisting of shrubs and grasses. According to the Colorado Natural Heritage Program, this woodland's threat status is "fair" and its protection status is "poor–fair." Pinyon-juniper woodland is particularly threatened by the spread of invasive grasses that increase its susceptibility to fire (Colorado Natural Heritage Program and The Nature Conservancy 2008). Much of the existing pinyon-juniper woodland in the San Luis Valley is managed by BLM, though there are extensive stands on private lands in Costilla County. Pinyon jays are obligate nesters in the pinyon-juniper woodlands, and although their population is stable in Colorado, they are effective indicators of forest health and are therefore a priority species for Partners in Flight throughout the Intermountain West (Colorado Partners in Flight 2000). Other pinyon-juniper associated species include black-throated gray warbler and juniper titmouse.

As the elevation increases, the forest becomes a mixed conifer forest, which is sometimes part aspen, and finally becomes a subalpine spruce-fir forest. These forests are home to some bird species, including olive-sided flycatcher, yellow warbler, and mountain chickadee; they also provide habitat and migration corridors for some important large mammals such as elk, black bear, and the threatened Canada lynx.

Above Treeline. The highest elevations in the SCCA are dominated by alpine tundra, scree fields, and bare stone, which can have the appearance of being stark or even lifeless. Upon closer inspection, however, one observes a remarkable diversity of plants adapted to this cold and arid environment, including impressive displays of summer wildflowers. These plants provide the foundation for an ecosystem containing a suite of charismatic fauna, many of which are imperiled by habitat shifts because of climate change such as the American pika. The high elevations are also home to State game species such bighorn sheep.

Wildlife

The diverse mix of wetland, riparian, shrubland, forest, and alpine habitats throughout the SCCA provide for the habitat needs of many assemblages of reptiles and amphibians, aquatic species, birds, and mammals, including several species of special concern. Appendix

Sue Oliveira / USFWS

The conifer and aspen forests of the Sangre de Cristo Mountains

Steve Torbit / USFWS

The American pika "hays" the alpine grasses as a means of surviving the harsh winters above the treeline in the Sangre de Cristo mountains.

B lists the wildlife species found in the San Luis Valley and surrounding mountains.

Amphibians and Reptiles

The San Luis Valley is a cold desert, so it supports only a limited number of reptiles and amphibians. The large areas of semidesert shrubland and the scattered wetlands and riparian areas are home to a handful of snakes and lizards as well as the snapping turtle. The arid nature of the region restricts amphibians largely to wetlands and riparian corridors; these areas provide habitat for tiger salamander and seven species of frogs, toads, and spadefoot toads. Among the latter group is the boreal toad, a high-elevation toad that appears to have declined substantially because of infection by *Batrachochytrium dendrobatadis*, a pathogenic fungus. This species is State listed as endangered by both Colorado and New Mexico (Colorado Parks and Wildlife 2012).

Fish and Aquatic Species

The project area contains the headwaters of the Rio Grande. The Rio Grande and its tributaries and the valley's marshes are home to several native fish as well as a range of introduced species. Most of the challenges faced by these aquatic species are due at

least in part to anthropogenic causes such as competition with exotic species and water diversions. These impacts have been magnified by persistent drought conditions since the 1990s. The SCCA easement program will help in the conservation of these species by ensuring that water use is tied to the land on which the easement is bought.

The Rio Grande chub is thought to have once been the most common fish throughout the Rio Grande drainage and in the San Luis Closed Basin, but it has been extirpated from much of its range, including from the main stem of the Rio Grande. The Rio Grande chub is now found in several small streams in the San Luis Valley, including Crestone Creek on Baca National Wildlife Refuge. The Colorado Natural Heritage Program considers the Rio Grande chub to be an S1 (critically imperiled) species. It is thought to have declined because of habitat fragmentation by impoundments for diversions, habitat destruction because of poor land use practices, and predation by, and competition with, introduced fish species (Rees et al. 2005a).

The Rio Grande sucker had a historical range similar to that of the Rio Grande chub, and faces similar threats. It appears to have been particularly hard hit by competition with the introduced white sucker. At one point, the Rio Grande sucker was reduced to a single population in Hot Creek in Conejos County, Colorado, but it has since been reintroduced to several more streams. It is considered a State endangered fish in Colorado (Rees et al. 2005b).

In historical times, Rio Grande cutthroat trout[1] were found in large numbers in the main stem of the Rio Grande and its major tributaries, such as the Conejos River; one account from the Conejos River in 1877 states that "fishing was so successful… our catch amounted to over a hundred pounds by midafternoon," which the fishermen shipped off to a restaurant in Denver (Sanford 1933). Now, the native trout are restricted to high-elevation streams descending from the San Juan and Sangre de Cristo Mountains. The Rio Grande cutthroat trout occupies approximately 10 percent of its historical range. Threats to the species include competition and hybridization with, and predation by, introduced trout; reduction in habitat quality because of water diversions and other hydrological changes; and changes in stream temperature because of human water use and global climate change. It is now a candidate species under the Federal Endangered Species Act, and a decision on whether to list the species is due in 2014.

Some 57 species of nonnative fish have been introduced to the San Luis Valley, either as naturalized aquarium fish, escaped aquaculture species, or intentionally introduced sport fish. The latter category has rainbow, golden, brook, and brown trout; northern pike; bluegill; pumpkinseed; yellow bullhead; common carp; large and small mouth bass; blue, flathead, and channel catfish; walleye; and yellow perch. Nongame species such as white suckers, Mozambique tilapia, grass carp, American eel, and even neotropical tetras and armored catfish have become naturalized in the Rio Grande drainage as well (USGS 2012).

Birds

The diverse range of habitats along the elevational and hydrologic gradient of the SCCA provide habitat for at least 274 species of birds. Some of these birds are year-round residents, but many migrate through the valley on their way to and from wintering and breeding grounds while others come to the valley to breed or spend the winter. Among the migratory species are neotropical migrants that winter in Central and South America and breed in North America. Riparian corridors and forests are particularly important to these species.

Cordilleran flycatchers breed in forested areas of the SCCA, including cottonwood riparian forest. These gallery riparian forests are also thought to host a limited number of yellow-billed cuckoos, a Federal candidate for listing as endangered. Olive-sided flycatchers breed in the coniferous forests of the mountains surrounding the valley. The southwestern willow flycatcher, a subspecies of the more widespread willow flycatcher, breeds in shrub riparian and tree riparian with a willow understory; the southwestern willow flycatcher is federally and State listed as endangered. Examples of other neotropical migrants in the SCCA include two species of phoebe, several more flycatchers, western tanager, gray catbird, Bullock's oriole, and many species of warblers.

USFWS

The Rio Grande cutthroat trout, once found throughout the Rio Grande and Pecos River watersheds, is now found only in scattered cold-water, high-elevation streams.

[1] *76 Federal Register No. 207, Wednesday, October 26, 2011. Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions. 66403*

Passerines are not the only migrants to make use of the area. Black-necked stilts and American avocets are shorebirds that migrate from winter ranges in Mexico and Central and South America to breed in the wetlands of the San Luis Valley. At least 25 other species of shorebirds use these wetlands as either stopover or breeding habitat. Six of these shorebirds, including the snowy plover, which breeds in the playa wetlands of the Closed Basin, are either focal species for the USFWS Migratory Bird Program or are USFWS Region 6 Birds of Conservation Concern.

Given the scarcity of water in high desert and mountain environments, it is perhaps not surprising that the San Luis Valley is regionally important for both resident and migrant waterbirds. The marshes of the valley support 27 species of waterfowl. Approximately 30 percent of the cinnamon teal that summer in Colorado breed in the valley (S. Johnson, USFWS Migratory Birds, personal communication 2012). The secretive American bittern breeds in the valley, and has experienced population declines throughout its range, likely because of wetland disturbance. The white-faced ibis breeds in wet meadows and makes extensive use of natural and agricultural habitats in the valley. Nearly the entire Rocky Mountain population of sandhill cranes uses the San Luis Valley as migratory stopover habitat, particularly on and around the Monte Vista National Wildlife Refuge, where they are the focus of an annual crane festival and a draw for thousands of tourists every year. Rookeries of great blue herons, snowy egrets, and black-crowned night-herons are also present. Conservation of wet meadow, playa, and emergent wetland habitat is crucial for these species. While there are fewer wetlands in the SCCA than there are in other parts of the San Luis Valley, many of the aforementioned species are likely to use this area from time to time.

The San Luis Valley hosts an array of diurnal raptors and owls throughout the year. Prairie falcons are common year-round residents and use uplands extensively for feeding and resting. The trees and snags along waterways are nesting sites for great horned and long-eared owls, red-tailed hawks, American kestrels, and Swainson's hawks (USFWS 2011). The latter species is a bird of conservation concern in USFWS Region 6 and is known to be sensitive to habitat fragmentation. Northern harriers and short-eared owls nest in wet meadows and emergent wetlands. These two species as well as ferruginous hawks, rough-legged hawks, and golden and bald eagles overwinter in the valley, where they forage for small mammals and other prey in riparian areas, uplands, and short-emergent wetlands where cover is abundant (USFWS 2011). The higher elevation parts of the project area are home to the northern goshawk, a generalist predator of rodents and birds that inhabits the montane forests of the surrounding mountains. It is probable that the forested canyons above the valley floor provide habitat for the Colorado and federally threatened Mexican spotted owl; these species are both State (Colorado) and federally listed as threatened, although no designated critical habitat for the species occurs in the project area.

C. Suzanne Langbridge / USGS

The endangered southwestern willow flycatcher nests in the willows along the Rio Grande and its tributaries.

The San Luis Valley is also in the eastern corner of the sagebrush region of the Intermountain West (Pitkin and Quattrini 2010) and, as such, has some strongly sagebrush-associated or sagebrush-obligate bird species, meaning those species whose life history needs cannot be met in other habitats. The Gunnison sage-grouse has a small population at the north end of the San Luis Valley (D. Reinkensmeyer, personal communication with M. Dixon, February 2012). This species is now a candidate for listing under the Federal Endangered Species Act and is a species of special concern in Colorado. Gunnison sage-grouse likely had much broader distribution than they do now (Schroeder et al. 2004), and the Colorado Parks and Wildlife has identified that some of this former range is still potential habitat for the species (Gunnison Sage-Grouse Rangewide Steering Committee 2005). This potential range is mostly in Conejos and Costilla Counties, Colorado, but because the area of potential habitat crosses the State border, there is also some potential habitat in Rio Arriba and Taos Counties, New Mexico. Sage sparrows have similar habitat associations, preferring sagebrush-dominated habitats with open to closed canopies (Williams et al. 2011). Sage thrasher is another denizen of the upland shrub habitats of the valley, including sagebrush and rabbitbrush scrub. It is a USFWS Migratory Bird focal species and a USFWS Region 6 species of concern. It is thought that the primary reasons for the decline of

Gunnison sage-grouse are the loss and fragmentation of sagebrush habitat (Oyler-McCance et al. 2001), so this species is likely to benefit from the protection of remaining potential habitat that the proposed action would provide. Given the overlap in habitat needs of sage-grouse and other sagebrush obligates (Rowland et al. 2006), species like sage thrasher and sage sparrow would likely benefit from conservation of sagebrush and steppe habitat as well.

Mammals

The arid uplands, wetlands, and stream and river corridors of the SCCA provide habitat for large game species, including pronghorn, elk, and mule deer. The higher elevations hold Rocky Mountain bighorn sheep. American bison were once an important part of both the San Luis Valley ecosystem and the socioeconomic system of the Ute and Pueblo peoples; however, the last bison were extirpated from the San Luis Valley by 1870 (Colville 1995). The Nature Conservancy now manages a bison herd on their Medano-Zapata Ranch as a means of simulating natural grazing regimes; however, their stated goal is to introduce a free-ranging genetically pure bison herd of at least 3,000 animals to the valley by 2015 (The Nature Conservancy 2008). These megafauna provide opportunities for hunting and wildlife viewing, but are not without controversy. Perceived overpopulation of elk, in particular, is contentious among farmers and ranchers in the valley, who are concerned about the crop damage and competition for forage between elk and cattle. The elk herd on the east side of the valley has been estimated to number approximately 5,000 animals (R. Rivale, Wildlife Biologist – CPW, personal communication, cited in USFWS 2005). A recent study of elk carrying capacity in the Great Sand Dunes ecosystem found that, under current management practices, the carrying capacity of the region should be 6,104 elk (Wockner et al. 2010). Development of plans for elk management in the valley is ongoing.

Small mammals in the SCCA are those typical of the greater southern Rockies ecosystem. Riparian areas and marshes provide resources for beaver and common muskrat. Forested areas are home to North American porcupine and snowshoe hare. Uplands contain other rabbits, such as white-tailed jackrabbits and mountain cottontails, as well as the Ord's kangaroo rat. In the highest reaches of the project area, primarily above the tree line, are the charismatic American pika and the vocal and inquisitive yellow-bellied marmot. Of conservation concern is the Gunnison's prairie dog, which inhabits the valley floor. This species has suffered a sharp decline for reasons that include human persecution and outbreaks of plague. It is a candidate for Federal Endangered Species Act protection, and a listing decision will be made following a genetic reevaluation of its taxonomic status.[2]

The aforementioned species serve as prey for several predator species in the project area. Black bear is a generalist omnivore whose flexibility makes it common in many habitat types in the valley. The coyote is often found hunting small mammals and occasionally larger prey throughout the study area. Similarly, both mountain lion and bobcat are quite catholic in their habitat needs, though the mountain lion has much larger home ranges and tends to specialize in hunting ungulates, whereas the bobcat is more opportunistic. In contrast to those two cats, the State endangered and federally threatened Canada lynx is largely a specialist predator of snowshoe hare; in the SCCA, it is primarily found in the spruce-fir forests of

[2] *Federal Register 76, No. 207. October 26, 2011. Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions. 66389*

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The San Luis Valley and Sangre de Cristo Mountains are home to thousands of elk.

the Sangre de Cristo Mountains, where its preferred prey are found.

The grizzly bear once roamed the mountains of the area but was extirpated from Colorado in the early 20th century; the San Luis Valley grizzlies are remembered now as the mascot of Adams State College in Alamosa, Colorado. Similarly, the gray wolf historically hunted in the San Luis Valley and surrounding mountains, but was extirpated from Colorado by 1945 (though it is still State and federally listed as endangered in Colorado). A mounting body of research shows the potential ecological benefits of natural or human-facilitated reintroduction of wolves, particularly on vegetation adversely affected by unnaturally high elk browsing (Ripple and Beschta 2012). However, this possibility was received with opposition by some local ranchers and some members of the big game hunting community during scoping meetings for the CCP for the San Luis Valley National Wildlife Refuge Complex in 2012; reintroduction will be discussed as part of one alternative during the NEPA review for the CCP.

Finally, the SCCA is home to nine species of bats. All are insectivorous and hunt primarily by capturing insects in flight. The hoary bat and silver-haired bat are solitary tree-roosting bats that are present during the summer and migrate to warmer climates during the winter. The presence of mature cottonwood riparian forests likely supports their presence on the valley floor. The migratory Mexican free-tailed bat has an exceptionally large summer colony of approximately 100,000 individuals (Freeman and Wunder 1988) in the historic Orient Mine in the northern San Luis Valley outside the SCCA, though there are certainly other old mines within the project area that may provide roosts for smaller colonies. The remaining species are either resident or regionally migratory hibernators.

Cultural Resources

On the hottest days it is cool in the shade, and on the very coldest days it is comfortable in the sunshine.

– Geologist C.E. Siebenthal, describing the San Luis Valley in 1910

Humans have inhabited the San Luis Valley and surrounding mountains for more than 12,000 years. Their uses of the land reflect both the traditions of those who moved to the valley and local adaptations. The following summary of the prehistory and history of the valley provides an overview of some of the major themes and events that illustrate the human interaction with the land. There is an abundance of prehistoric evidence as well as early historical accounts, records, photographs, and local histories for the valley. This synopsis provides only a glimpse into the resources and information available with an emphasis on environmental references.

Prehistory

Paleo-Indian Stage

Current archaeological evidence shows that the earliest humans, called the paleo-Indians, migrated to the region near the close of the last ice age approximately 12,000 years ago. These people had a highly mobile lifestyle that depended on the hunting of large, now-extinct mammals, including mammoths and a huge ancient bison. The hallmark of most paleo-Indian sites are the beautiful but deadly spear points that were launched with the aid of a simple yet expertly engineered spear-thrower called an atlatl. These projectile points are generally recovered as isolated occurrences

Steve Torbit / USFWS

The central Sangre de Cristo mountains are an important movement corridor for the threatened Canada lynx.

or in association with animal kills, butchering sites, or small temporary camps. Although the timing of this stage varies throughout the region and is constantly being refined as more data become available, the stage generally lasted until about 7,500 years ago.

Information from the Colorado Office of Archaeology and Historic Preservation shows that 62 paleo-Indian resources have been identified in the San Luis Valley and surrounding mountains. These sites are often located near wetlands and along the shorelines of ancient lakes, reflecting the use of abundant floral and faunal resources available in these locations. Several paleo-Indian sites in the valley and surrounding mountains have been excavated, including the high altitude Black Mountain Site (5HN55) located at 10,000 feet in the San Juan Mountains south of Lake City on the opposite side of the San Luis Valley from the proposed SCCA. This campsite dates from approximately 10,000 to 7,000 years ago and has yielded a variety of stone tools suggesting animal procurement and processing (Jodry 1999a).

Several paleo-Indian sites on the valley floor have been excavated and provide an extensive record of the early occupations. Three of these sites, the Cattle Guard site (5Al101), the Linger site (5AL91), and the Zapata site (5AL90), are located just south of Great Sand Dunes National Park and Preserve and represent camps with an abundance of bison bone and associated stone tools (Cassells 1997, Jodry 1999a). The Reddin site (5SH77) near the town of Hooper yielded nearly 500 paleo-Indian artifacts suggesting a variety of activities and uses (Cassells 1997, Jodry 1999a).

Climatic fluctuations during the Holocene Epoch (which started about 12,000 years ago and has continued to the present) are often reflected in the archaeological record. Pollen remains, faunal assemblages, and geomorphological deposits suggest periods of significant and rather abrupt vegetation changes and variations in the amount of moisture (Jodry 1999b, Martorano 1999a). Bison remains associated with archaeological sites on the southern plains also show oscillations in bison numbers in response to climatic conditions (Creel et al. 1990). Although more research is needed and archaeologists' ability to recover and interpret the prehistoric record is continually improving, these preliminary studies are an intriguing look

Meg Van Ness / USFWS

The San Luis Valley contains archaeological sites extending thousands of years into prehistory.

into the evidence for and the consequences of long-term climatic change.

Archaic Stage

There was a gradual but definite shift in the pattern of human use of the region that began about 7,500 years ago and continued until approximately 1,500 years ago. The changes were the result of a combination of regional climatic fluctuations and an increasing population coupled with technological innovation and regional influences. Although the Archaic stage is better represented in the archaeological record than the preceding paleo-Indian stage, the identification and interpretation of the remains continues to be expanded and refined. Evidence of a greater diversity of tools and the use of a larger variety of plants and animals than during the preceding paleo-Indian stage is found on many sites.

There have been 618 Archaic stage resources recorded in the Colorado part of the study area. As with the earlier inhabitants, the Archaic peoples made extensive use of the valley's wetland resources and occupied the rockshelters and several high-altitude locations found in the surrounding mountains. Speaking of Archaic sites in the northeastern part of the valley, Hoefer states: "Most of the Closed Basin archaeological sites are open camps containing debitage and fire-cracked rock scatters, approximately half of which contain ground stone implements such as metate fragments or manos. Many of these sites are located around seasonal wetland marshes and lakes" (Hoefer 1999).

The use of the atlatl with spear points continued and basketry, cloth, and cordage came into use. Although still mobile, the population increasingly made short-term use of small groupings of structures with storage features. Former hunting blinds and other rock structures are fairly common but often difficult to interpret. Archaic Stage rock art is scattered throughout the region and the influences of surrounding regions, particularly the Plains and the Great Basin, are identifiable at several sites.

Late Prehistoric Stage

Beginning approximately 1,500 years ago, several innovations greatly influenced life in the valley (Martorano 1999b). Although these changes were adopted at different rates and degrees throughout the area, the advent of pottery and the bow and arrow coupled with a larger and more sedentary population defines the period until approximately 600 years ago. Early archaeological research in the valley identified many regional influences, with several sites exhibiting pueblo-inspired attributes (Renaud 1942). In 1694, Don Diego de Vargas documented his visit to the valley, thus providing an early historical written account and ushering in the historical period.

The 442 Late Prehistoric resources in the Office of Archaeology and Historic Preservation database are listed under a variety of designations for this stage, but all date to about the same time period. The distribution of Late Prehistoric sites in the valley reinforces the trend of intensive use of wetland habitats (Martorano 1999b). This is not surprising as the available resources—both floral and faunal—would have continued to be abundant in these areas. Site types include camps, stone tool scatters, rock art, rock alignments and enclosures, and quarries where the lithic material for stone tools was collected.

Protohistoric Stage

By the late 1600s, Spanish incursions into the valley were beginning to affect the lives of the native populations. The Utes, who, based on archaeological evidence, came to the valley sometime after A.D. 1100 (Reed 1994) and were the most prevalent occupants of the valley, quickly acquired horses and other trade items. Although many other Native American groups probably visited or traveled through the valley, the Comanche, Apache, Navajo, Arapaho, Cheyenne, and several northern Pueblos also had a significant if not sustained presence (Martorano 1999c).

The 59 recorded Office of Archaeology and Historic Preservation sites from this stage include the traditional stone tools and ceramics mixed with used or flaked glass, trade beads, and metal projectile points. Wickiups (conical timbered structures) and trees with peeled bark (indicating the harvesting of the edible cambium layer) were common, as is rock art with motifs and depictions of postcontact goods.

Early History

The historical period for the valley began with the reoccurring contact of the native peoples with people of European decent and ended in the mid-twentieth century. This interaction generally followed many years of occasional contact, often for the exchange of trade goods. The narrative below briefly summarizes some of the major historical influences, patterns, and themes in the region.

Early Exploration and Trade

> *"...I take and seize one, two, and three times, one, two, and three times, one, two, and three times, and all those which I can and ought, the Royal tenancy and possession, actual, civil, and criminal, at this aforesaid River of the North, without excepting anything and without any limitation, with the meadows, glens, and their pastures and watering places. And I take this aforesaid possession, and I seize upon it, in the voice and name of the other lands, towns, cities, villas, castles, and strong houses and dwellings, which are now founded*

in the said kingdoms and provinces of New Mexico, and those neighboring to them, and shall in future time be founded in them, with their mountains, glens, watering places, and all its Indian natives..."

– Capitán Gaspar Pérez de Villagrá in La Historia de la Nuevo Mexico, 1610

With these bold words in 1598, Spain claimed all lands, structures, and people along the Rio Grande—including the San Luis Valley—forever. This followed several years of sporadic Spanish incursions into northern New Mexico and southern Colorado, which ushered in several decades of trade, conflict, and settlement. Many Spanish traveled along the North Branch of the Spanish Trail, which had both western and eastern routes through the valley. Although the Spanish relinquished ownership of the valley in 1821, their influence survives as a vital part of the landscape and people today.

There are many explorers and settlers who left a legacy of journals, maps, and other accounts of their time in the San Luis Valley. These documents offer a wide variety of historical and environmental information. The examples summarized below provide a glimpse into the types of information and insight available in these early accounts.

Don Diego de Vargas: 1694. The 1694 journal of Don Diego de Vargas survives as the earliest written account of the San Luis Valley. The journal is a wealth of information about the native peoples, topography, and environment (Colville 1995). After leaving Santa Fe, De Vargas followed the North Branch of the Spanish Trail northward, traveling east of the Rio Grande, and entering the valley just southeast of Ute Mountain. From there he continued north, crossing what would become the New Mexico and Colorado State line and paralleling the western side of San Pedro Mesa before heading west along Culebra Creek. When he reached the Rio Grande, he turned south and crossed the river about five miles south of the confluence. His return trip to Santa Fe took him along the Rio San Antonito on the west side of the Rio Grande, exiting the valley on the west side of San Antonio Mountain (Colville 1995).

His six days in the valley included contact, trade, and occasional skirmishes with the Utes and confrontations with Taos Puebloans. He also documented large herds of bison and some "very large deer." This reference is the earliest known historical account of bison in the valley (Colville 1995), the last being a brief mention of bison by Juan Bautista Silva along the Rio San Antonio south of present-day Antonito in the spring of 1859 (Kessler 1998). During de Vargas's travels, the use of sign language and smoke signals for communication is well documented, as is the need to be near water during midsummer.

Notable features of the de Vargas journal include the advantageous yet temporary alliance of de Vargas' men with the Utes and Apaches to combat a mutual enemy: the Comanche. As he traveled along the west side of the valley, de Vargas refers to the San Juan Mountains by their early Spanish name: Sierra de la Grulla, or Mountains of the Cranes. And, in an interesting meteorological observation, de Vargas states on August 24 that: "From the beginning of the march we suffered from bitter cold"—this during a month that now has an average daytime high temperature in the upper 70s.

Juan Bautista de Anza: 1779. Eighty-five years later in 1779, Juan Bautista de Anza, the Governor and Military Commander of New Mexico, left Santa Fe and headed north to quell the Comanche raids that were devastating Spanish settlements in the region. Traveling by night to avoid detection, de Anza followed the North Branch of the Spanish Trail along the eastern foothills of the San Juan Mountains, crossed Poncha Pass, and then headed east to the plains near Pikes Peak. From there he headed south along the foothills, through the areas that would become Colorado Springs and Pueblo, where he fought several victorious battles with the Comanche. He concluded his campaign by crossing back into the valley at Sangre de Cristo Pass (which is also known as La Veta Pass) and taking the eastern route of the North Branch of the Spanish trail back to Santa Fe (Kessler 1998). He initially entered the valley on August 19, 1779, and by September 4 of that year he had reentered the valley near Fort Garland on his return trip to Santa Fe.

Zebulon Montgomery Pike: 1807. Unlike the earlier Spanish explorers, Captain Zebulon Montgomery Pike entered the San Luis Valley from the east, having traveled west from St. Louis across Missouri, Kansas, and the plains of Colorado. Pike's mission was to map and describe the southern parts of the newly acquired Louisiana Purchase. On January 27, 1807, he and most of his men (except five that were left along the trail because they were unable to walk on their frozen feet) crossed the Sangre de Cristo Mountains and entered the valley near the Great Sand Dunes (Carter 1978, Hart and Hulbert 2006, Ubbelohde et al. 2001). Pike built a simple stockade near where the current town of Sanford is located and stayed there until February 26, when Spanish officials took him prisoner and escorted him down to Santa Fe because "...it was necessary his Excellency should receive an explanation of my business on his frontier..." (Zebulon Pike, Thursday, February 26, 1807).

Although Pike's journal in the days preceding the ascent into the valley often mentions seeing "a gang of buffalo," including in the Wet Valley, there is no

mention of buffalo after he enters the San Luis Valley. In contrast, deer are often mentioned in the valley and goose was a part of at least one meal. Pike grew fond of the valley and concluded that "...it was at the same time one of the most sublime and beautiful prospects ever presented to the eyes of man" (Zebulon Pike, Thursday, February 5, 1807).

Jacob Fowler: 1821 to 1822. The journal of Jacob Fowler, which dates from 1821 to 1822 and which *The New York Times* referred to as "quaint and interesting" (*The New York Times* 1898), is a wealth of information about the environment and the interactions between the various peoples who occupied the valley (Coues 1965). *The New York Times* further describes the journal—just published by noted ornithologist Elliott Coues—as "…a notable contribution to our knowledge of early adventure and pioneering in the Great West. His style is straightforward and his wonderful power of observation has made the narrative very attractive."

Fowler was a fur trader who left Fort Smith, Arkansas, in September 1821 and entered the valley via La Veta Pass on February 4, 1822. For the next 3 months, he traveled between Taos and the central part of the valley, going as far north as near where Fort Garland would be later established. Many animals are noted in the valley, including beaver, elk, deer, bear, pronghorn, otter, big-horned sheep, wild horses, geese, ducks, and a wolf. Although great herds of "buffelow" were noted as the party crossed the Plains, and as far west as the Wet Valley, there is no mention of them once they reach the San Luis Valley. As with the references to animals, the descriptions of plants, particularly the distribution (or lack thereof) of cottonwoods and willows along specific creeks, is frequent and often detailed. These descriptions are mixed with wonderful accounts of life in the many small Spanish settlements that dotted the landscape and interactions with the native peoples.

Fowler recorded an exceptionally astute observation while crossing the southern part of the valley on February 18, 1822:

> *I Have no doubt but the River from the Head of those Rocks up for about one Hundred miles has once been a lake of about from forty to fifty miles Wide and about two Hundred feet deep – and that the running and dashing of the Watter Has Woren a Way the Rocks So as to form the present Chanel.*

With this Robert Fowler had speculated about some of the complex geological processes that formed the valley—processes that were studied and confirmed a hundred years later.

Many other explorers and settlers visited the valley and left behind journals of varying detail (Hart and Hulbert 2006, Kessler 1998, Preuss 1958, Richmond 1990, Sanchez 1997). Among these are:

- George Frederick Ruxton, 1846
- John C. Fremont, 1848 to 1849
- Charles Preuss, 1848 to 1849 (traveling with Fremont)
- Gwinn Harris Heap, 1853
- John Williams Gunnison, 1853
- John Heinrich Schiel, 1853 (traveling with Gunnison)
- Randolph Barnes Marcy, 1858
- William Wing Loring, 1858
- Juan Bautista Silva, 1859

Political Boundaries, Land Grants, and Public Lands

The San Luis Valley has endured many changes in governance over the last 300 years. Following nearly 12,000 years of sovereignty by various Native Americans, the control (or at least the declared control) and political boundaries of the region shifted continually until Colorado and New Mexico obtained statehood. The brief timeline below summarizes some of these changes in "ownership" of the San Luis Valley:

1598 Don Juan de Onate claims the San Luis Valley and surrounding areas for Spain.

1763 The Treaty of Paris at the end of the French and Indian War divides much of the North American interior between Spain and France. The San Luis Valley is considered Spanish territory.

1803 The Louisiana Purchase is negotiated between the United States and France but the western boundaries are not clarified and remain ambiguous.

1819 The United States negotiates the Adams-Onis Treaty with Spain to clarify the boundaries of the Louisiana Purchase. The San Luis Valley remains part of Spain's New Mexico Territory.

1821 Mexican War of Independence (1810 to 1821). The valley becomes a part of the new nation of Mexico.

1836 The Republic of Texas achieves independence from Mexico. Texas claims the land in the valley east and north of the Rio Grande. Mexico does not recognize the Republic, disputes this boundary, and continues to claim the entire valley.

1837 The United States recognizes the Republic of Texas, including the San Luis Valley.

1845 The United States annexes Texas, including the San Luis Valley, and Texas achieves statehood.

1848 Following the Mexican-American War (1846 to 1848), the Treaty of Guadalupe Hidalgo establishes the present Mexico–United States border except for the later 1853 Gadsden Purchase (southern Arizona and southern New Mexico).

1850 Amid much controversy about the admittance of free versus slave States, and as a result of the Compromise of 1850, Texas surrenders its claim to New Mexico, and the New Mexico Territory, including the San Luis Valley generally south of the Rio Grande (38th parallel), is established.

1854 The Kansas Territory, which includes the northern part of the San Luis Valley (above the 38th parallel), is established out of unorganized lands of the Louisiana Purchases.

1861 The Colorado Territory is created by the Colorado Organic Act with the same boundaries that would later become the State of Colorado.

1876 Colorado becomes a State.

1912 New Mexico becomes a State.

Beginning in 1833, many Mexican land grants were issued in the valley as a direct result of the political turmoil noted above and the desire for Mexico City to keep control over the distant northern borderlands of their newly independent nation. These land grants were intended to encourage Mexican settlement in the borderlands, thereby dissuading any thoughts of Texas independence and discouraging encroachment by American fur traders.

The first grants consisted of many small parcels along the Conejos River in Colorado in 1833 (Athearn 1985). These small grants were ineffective in establishing permanent settlement, but the much larger 1842 Conejos Grant proved to have more success in persuading the founding of farms and towns. This grant covered more than 2.5 million acres and included all of what would become the Colorado counties of Conejos and Rio Grande with parts of the counties of Mineral, Saguache, and Alamosa. As with other Mexican land grants in the valley, the grants were considered invalid following the Mexican-American War. The Court of Private Land Claims in 1900 ruled against the grantees and negated the claim (Colorado State Archives 2001).

The Sangre de Cristo grant included all of what is now Costilla County and extended a short distance into the current State of New Mexico. The grant consisted of 1 million acres and was originally awarded to two Mexican nationals in 1844, but following their deaths during the Pueblo Revolt of 1847, the land was sold to Charles (Carlos) Beaubien. Unlike the Conejos Grant, Beaubien's claim to the land was upheld by the courts in 1860. The land was later sold to William Gilpin (Colorado's first Territorial Governor) in 1864. Large tracts of the grant have been sold to various developers and disputes over the rights of local people to use the land have continued through 2009 (The Center for Grant Studies 2003, *The Pueblo Chieftain* 2009).

The Baca "Land Grant" in the San Luis Valley was the result of a land dispute. The Baca land patents, of which there are five, were granted to the heirs of Luis Maria Baca in replacement for his 1825 grant near Las Vegas, New Mexico, which was also claimed by Juan de Dios Maiese in 1835. These conflicting claims came to light when the United States took control of the lands in the mid-1840s. The Baca claim was settled in 1860 and patented in 1903, when the Baca heirs were given five parcels of land: two in New Mexico, two in Arizona, and one in the San Luis Valley—Baca #4. In various configurations and sizes, the Baca #4 lands have changed hands many times over the ensuing hundred years, with a large part established as the Baca National Wildlife Refuge in 2000.

While there is little public land in the SCCA, the broader San Luis Valley region is about 40 percent public land. This includes large parts of the Rio Grande and the Pike-San Isabel National Forests in Colorado, with small sections of the Carson National Forest in New Mexico. The national forest system was established at the turn of the 20th century as the American public became alarmed at the destruction of forests by timber and mining interests. The BLM was established in 1946 as a result of combining several agencies and policies into one Bureau and now owns large parcels of land in the area, primarily in the western and northern parts of the valley floor. Great Sand Dunes National Park and Preserve was initially established as a national monument in 1932 and was expanded to include many upland parcels in 2004. Three national wildlife refuges, Monte Vista (1953), Alamosa (1962), and Baca (2003), were established to protect wetland habitat for migratory birds along the central flyway. Additional lands are owned by the Bureau of Reclamation and the State of Colorado.

Native peoples

The postcontact history of Native Americans in the San Luis Valley involves both cooperation and conflict and ends with the establishment of reservations outside of the valley. Although several Native American tribes are now represented in the valley, today they compose less than 1 percent of the current population.

The Utes consist of several bands and at the time of contact were the primary Native American inhabitants of much of Utah, central and western Colorado, and parts of northern New Mexico. Increased settlement after the United States gained possession of the valley in 1848 and the surrounding gold rush of

1859 brought new people to the valley and ushered in several decades of escalating pressure to remove the Utes (Ellis 1996). Fort Massachusetts (1852 to 1858) and Fort Garland (1858 to 1883) were established in the valley primarily to protect settlers from Ute attacks. The 1863 and 1868 treaties between the United States and the Utes gave parts of Colorado, including the San Luis Valley, to the United States. Over the next four decades, a series of treaties and agreements continued to reduce Ute lands and relocate the Ute peoples, with the eventual establishment of three reservations in southwestern Colorado and northern Utah by the early years of the 20th century.

Many other Native Americans visited or lived in the valley, including the Apache, Arapaho, Cheyenne, Comanche, Kiowa, and Navajo (NPS 2011). Early historical accounts frequently mention various members of pueblos along the Rio Grande coming north into the central San Luis Valley to hunt bison, causing occasional confrontations with the Utes (Carson 1998, Colville 1995). The first Pueblo revolt of 1680, a response to the expanding Spanish control in northern New Mexico, effectively ceased Spanish rule in the region until Don Diego de Vargas reestablished control over the pueblos in 1692 and 1696. The Taos Pueblo rebelled against the occupation of United States troops during the Mexican-American War in 1847, but the rebellion was soon repelled, effectively ending major conflicts in the region.

Settlement

Settlement of the San Luis Valley reflects cultural, economic, and political influences as well as creative adaptation to a unique environment. Following the 1610 establishment of Santa Fe as the capital of the New Mexico province, explorers and traders slowly made their way north into the central San Luis Valley. Jacob Fowler encountered several small Spanish settlements during his travels north of Taos and into southern Colorado in 1821 and 1822 (Coues 1965).

The Catholic Church, which was a primary influence during the initial exploration of the region, continued to play a major role in the establishment of settlements and in the day-to-day lives of most of the inhabitants. Members of various church orders were often part of the early explorations, such as the 22 Franciscans who accompanied de Onate during his 1598 exploration and settlement in northern New Mexico (Athearn 1989). The church was instrumental not only in matters of faith, but also as educators, trade coordinators, keepers of public records, and builders of comparatively grand architecture. On the other hand, the oppressive condemnation and suppression of the Native American religious practices were a major contributor to the unrest that led to the Pueblo Revolt of 1680 and the destruction of several missions. Nonetheless, the Catholic church began the 18th century as one of the few institutions in the area to prosper, and soon missions were established throughout the region (Athearn 1989). The journals of a Jesuit order near Conejos from 1871 to 1875 reveal days full of baptisms, marriages, deaths, prayers, attending to the sick, and rituals, with a persistent concern for obtaining basic supplies (Stoller and Steele 1982).

In her 1997 book on the San Luis Valley, Olibama Lopez-Tushar describes the first attempted settlement of the valley as that of George Gold (Gould) near the town of Costilla in 1848 (Lopez-Tushar 1997. This settlement was found to be in trespass of the lands held by the Sangre de Cristo Grant and Gold was evicted before establishing a colony, although the town of San Luis de Culebra was established on the land grant 3 years later (Athearn 1985, Wyckoff 1999). The establishment of towns on the land grants was encouraged and within a few years the towns of San Pedro, San Acacio, Chama, and San Francisco were on the Sangre de Cristo Grant and the towns of Conejos, Guadelupe, Ortiz, and Magote were on the Conejos Grant.

Early settlements in the valley were established based on the traditional pattern of the Spanish plaza with homes, churches, and public buildings clustered around a central square and long narrow fields radiating out around the buildings and fronting a nearby creek—sometimes referred to as cordillera or plaza farming (Colville 1995). The extensive systems of early irrigation canals and water control structures supported small grain fields and gardens, some of which are still in use today. Several large canals and their associated laterals, including the Travelers Canal, the Empire Canal, and the Monte Vista Canal, were built in the 1880s in response to the increasing demand for the valley's beans, corn, grains, and other vegetables. The extensive irrigation in the valley was recognized early as a source of future problems as noted by Major John Wesley Powell in his 1890 testimony before the Senate Special Committee on Irrigation and Reclamation of Arid Lands:

> *Passing into New Mexico, then, the water that practically heads in the high mountains of Colorado is largely, almost wholly, cut off from the Rio Grande, so that no portion of the water that heads in these mountains where there is great precipitation will cross the line into New Mexico (in the dry season). In a dry season, nothing can be raised in the lower region and sometimes the dry seasons come two or three together. (Siebenthal 1910)*

The mining boom in the surrounding mountains in 1859, the completion of the Denver & Rio Grande Railroad over the Sangre de Cristo Mountains and into the valley in 1877, and a vigorous advertising effort by land speculators led to a slow but steady increase in population in the latter half of the 19th century.

Before the discovery of gold in 1859, the valley was the home of Colorado's largest non-Native American population, and by 1870 the population of Conejos, Costilla, and Saguache Counties is estimated to have been approximately 5,000 (Wyckoff 1999). Speculators capitalized on the increasing number of immigrants heading west from the eastern United States and Europe, as is illustrated by the description of the valley in a 1884 promotional brochure:

> *Society is very good. The intelligence of average western people is far above those of the eastern States. Under the duck or buckskin coat of many a miner, farmer or stockman of Colorado is concealed diplomas from the best colleges of the east and Europe.*
>
> *The climate is almost perfect. Extremes of heat or cold are unknown, and the land is one of almost perpetual sunshine by day, and cloudless skies at night. The healthfulness of the country is notorious, sickness almost unknown. No malaria, no cyclones, no deluges, and when the orchards of small fruits, apples, cherries and plums, and groves of shade trees are planted, the country will be as fruitful and beautiful as the land of Italy. (The Republican Publishing Company 1884)*

By the early 1870s, the effect of hunting and development was already taking a toll on Colorado's wildlife. In 1872, the Colorado Territorial Governor Edward N. Cook passed the first game laws to protect certain birds, bison, deer, elk, and bighorn sheep (Colville 1995). His words sounded the alarm that the wildlife needed protection:

> *I desire to say a word in favor of protecting our game—birds, beasts, and fishes—all of which are being wastefully destroyed…and unless some law is passed…the buffalo, elk, deer antelope and trout will soon become extinct, and Colorado will be robbed of the many attractions she today possesses.*

Summary of known historic resources

Information about the recorded resources in the Colorado part of the San Luis Valley is summarized from data obtained from the Colorado Office of Archaeology and Historic Preservation in February 2012. Similar trends can be extrapolated for the New Mexico part of the area. The Office of Archaeology and Historic Preservation data represent the efforts of hundreds of agencies, organizations, and individuals to document and study the past. The counts include sites, buildings, structures, and isolated finds; however, an individual resource may have many of these elements and may represent more than one time period (multicomponent) and therefore may be counted more than once. It is also important to note that the distribution of the known resources often shows where modern activities have mandated cultural resource surveys and may also potentially show recorder bias as much as actual prehistoric or historic settlement or use patterns.

A total of 6,490 cultural resource sites or properties have been recorded in the Colorado part of the San Luis Valley. Another 2,740 isolated artifacts or features have also been recorded in this area. These resources include 4,719 prehistoric components, 4,091 historic components, 62 components lacking a temporal designation, and 3 paleontological locations, with some resources representing multiple components.

Nearly 20 percent of the prehistoric components are lithic scatters. These locations consist of stone tools or the remains associated with stone tool manufacture. Camps, which are lithic scatters in association with the remains of a campfire, are only slightly less common and have been recorded at approximately 19 percent of the sites. The third most frequent prehistoric site type, representing 4 percent of the sites, is architectural, and generally consist of stone circles or alignments. Other relatively frequent site types found in the valley but never consisting of more than 1 percent include peeled trees, rock art, and human burials. More than half of the prehistoric components on sites in the valley have not been classified into a particular type.

The 4,091 historic components include standing buildings or structures or historic archaeological deposits. Many of these are homes, commercial buildings, or public buildings within the towns in the valley, with 100 or more each recorded in Alamosa, San Luis, and Monte Vista. Rural sites with historical components often include water control structures (111 recorded), cabins or homesteads (68 recorded), roads or trails (62 recorded), and railroad-related features (28 recorded). The 1,635 historical archaeology components include both isolated rubbish scatters and small features in addition to artifacts or deposits associated with a building or structure.

Two resources in the valley have been designated as National Historic Landmarks. These include Pike's Stockade (5CN75) from 1808 and the Pedro Trujillo Homestead (5AL706) from the late 19th century. Approximately 100 cultural resources in the valley are listed on the National or State Register of Historic Places. Another 435 resources are officially eligible to be listed on the National or State Registers but have yet to be formally nominated.

Socioeconomic Environment

Socioeconomic Profile

Population

The SCCA includes two counties: Costilla County in Colorado and Rio Arriba County and northeastern Taos County in New Mexico. Table 1 lists population statistics for these counties, which have a combined population of roughly 36,000 people (U.S. Census Bureau 2010a), though most of the population of Taos County is outside of the project boundary. Over the past decade, population growth in the broader San Luis Valley region has been slow, and the region has experienced some out-migration. Slow growth may be the result of increasing unemployment, decreasing nonresidential construction, and declining prices of key agriculture commodities (such as barley, alfalfa, and potatoes in 2009) (Colorado Legislative Council Staff 2011). From 2000 to 2010, the nine-county region experienced a 2-percent increase in population, representing slow growth relative to the statewide figures for Colorado (which had a 17-percent increase from 2000 levels) and New Mexico (which had a 13-percent increase from 2000 levels). In the SCCA, Taos County (10-percent increase from 2000 levels) experienced the largest increase in population. Costilla County experienced negative growth during these years (U.S. Census Bureau 2010a).

Population growth in the San Luis Valley region is expected to continue at a slow pace over the next decade. From 2010 to 2025, the population of the local area is projected to increase by 14 percent, indicating slow growth compared to the projected statewide figures for Colorado (which has a projected 26-percent increase) and New Mexico (which has a projected 19-percent increase) (Colorado Department of Local Affairs 2002, University of New Mexico 2002). In the SCCA, the smallest projected increases are in Costilla County (8 percent) (Colorado Department of Local Affairs 2002, University of New Mexico 2002).

Race, Ethnicity, and Education

Hispanic and Latino residents (57 percent of the total population) represent the largest ethnicity in the nine-county San Luis Valley region. The prevalence of this ethnic group is because of the presence of two large Hispanic communities in the local area. The region is home to a large population of White residents who consider themselves to be of Hispanic or Latino ethnicity. This is particularly true in Alamosa, Conejos, Costilla, Saguache, Rio Arriba, and Taos Counties, where, collectively, White Hispanics represent 32 percent of the county-wide population on average (U.S. Census Bureau 2010a). The occurrence of this race-ethnicity pairing in the San Luis Valley may be because of residents of Hispano heritage (such as descendants from Spaniards) (Sangre de Cristo National Heritage Area 2012). Hispanics of Mexican descent also represent a substantial share of the population in Costilla County (34 percent) (U.S. Census Bureau 2010a).

Whites (including Whites of Hispanic and Latino origin) represent the largest race in the nine-county region (66 percent of the total population). Native Americans and Alaska Natives account for 8 percent of the total population of the region, though this percentage is lower within the SCCA boundary. Collectively, Black or African-American residents, Asians, and native Hawaiians and other Pacific islanders account for about 1 percent of the total population of the region (U.S. Census Bureau 2010a).

Table 2 shows the percent of the population that has obtained a bachelor's degree or higher within each of the SCCA states and counties. Of the two States, Colorado has the highest percentage of individuals with a bachelor's degree or higher (36 percent of the population), followed by New Mexico (26 percent) (U.S. Census Bureau 2010a). Costilla County residents were less likely to hold a bachelor's degree than the average Colorado resident; in New Mexico, the opposite is true for Taos County (30 percent of the county-wide population with a bachelor's degree or higher) relative to the State average (26 percent) (U.S. Census Bureau 2010a).

Table 1. Population statistics for the counties in Colorado and New Mexico that contain the Sangre de Cristo Conservation Area.

	Residents (2010)	*Persons per square mile (2010)*	*Percentage population change (2000–2010)*	*Percentage population change (2010–2025)†*
Colorado	5,029,196	48.5	17	26
Costilla County	3,524	2.9	–4	8
New Mexico	2,059,179	17	13	19
Taos County	32,937	15	10	17

Sources: U.S. Census Bureau 2010a and †Colorado Department of Local Affairs 2002, University of New Mexico 2002

Regional Economy, Employment, and Income

Table 2 also shows median household income and poverty rates for each of the SCCA States and counties. Among the two States, Colorado had the highest median household income in 2010 ($56,456 per year), followed by New Mexico ($43,820 per year) (U.S. Census Bureau 2010b). At a statewide level, New Mexico had the highest poverty rate at 18.4 percent, and Colorado had the lowest at 12.2 percent. However, the San Luis Valley is one of the most impoverished regions of Colorado. Costilla County has the highest poverty level, more than twice the State average, and its median household income is less than half the State average at $24,388 per year. Taos County has somewhat higher median household income ($35,441 per year) and its poverty level is lower than the State of New Mexico's. (U.S. Census Bureau 2010b).

Table 3 shows the percent of employment by sector within the San Luis Valley region. The combined nine-county region had a total employment of more than 62,000 individuals in 2009 (U.S. Department of Commerce 2009). The highest percentage of total employment in 2009 was in public administration (18 percent of total local employment), the second highest was in the arts, entertainment, recreation, and accommodation and food services (11 percent), and the third highest was in agriculture, forestry, fishing, hunting, and mining (11 percent) (U.S. Department of Commerce 2009).

Agriculture, Recreation, and Tourism

Agriculture is a prominent industry in the San Luis Valley. Crops grown in the valley include alfalfa, native grass hay, wheat, barley, sorghum, canola, spinach,

Table 2. Income, education, unemployment, and poverty rates for counties in Colorado and New Mexico that contain the Sangre de Cristo Conservation Area.

	Median household income (average 2006-2010)†	*Percentage bachelor's degree or higher†*	*Percentage unemployed‡*		*Percentage of individuals below poverty (average 2006-2010)†*
			2008	*2011*	
Colorado	$56,456	36	4.8	7.9	12
Costilla County	$24,388	14	7.7	12.4	28
New Mexico	$43,820	26	4.5	6.6	18
Taos County	$35,441	30	5.5	10.4	17

Sources: †U.S. Census Bureau 2010b and ‡ Bureau of Labor Statistics 2011a, Bureau of Labor Statistics 2011b, Bureau of Labor Statistics 2008

Table 3. Percentage employment by sector for counties in Colorado and New Mexico that contain the San Luis Valley region.

Employment sectors	*Percentage of nine-county region employed*
Total employment in 2009[a] was 62,121	
Agriculture, forestry, fishing, hunting, and mining	11
Arts, entertainment, recreation, and accommodation and food services	11
Construction	6
Educational services, health care, and social aid	8
Finance and insurance, real estate, rental, and leasing	6
Information	1
Manufacturing	2
Other services, except public administration	4
Professional, scientific, management, administrative, and waste-management services	5
Public administration	18
Retail trade	10
Transportation and warehousing, and utilities	2
Wholesale trade	2

Source: U.S. Department of Commerce 2009
[a]Not every sector category for every county was fully disclosed because of confidentiality requirements; the table reflects the best and most correct information available.

lettuce, carrots, and potatoes (Colorado Division of Wildlife 2010). Agriculture, forestry, fishing, hunting, and mining accounted for roughly 11 percent of the total jobs in the region in 2009 (U.S. Census Bureau 2009). The total number of agricultural jobs in the local area increased from about 3,700 jobs in 1970 to 4,446 in 2009 (U.S. Department of Commerce 2010a). Costilla County, Colorado, had the largest percentage of employment in agriculture in the region (22 percent) (U.S. Department of Commerce 2010a, U.S. Department of Commerce 2010b [data complied using EPS–HDT]). Approximately 29 percent of the land in the nine-county region is in agriculture (U.S. Department of Agriculture, 2009 [data complied using EPS–HDT]).

Tourism is a cornerstone of the local economy, and the tourism industry in the San Luis Valley shows strong development potential. With a diverse collection of natural and heritage assets, the local tourism industry is able to cater to a variety of recreationalists, including outdoor recreationalists; visitors to the Great Sand Dunes National Park and Preserve; resort tourists; vacation and second home owners; ecotourists; heritage, arts, and cultural tourists; and visitors who pass through the area on their way to other regional attractions (Center for Rural Entrepreneurship 2008). According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, approximately 3.1 million residents took part in wildlife-associated recreation activities in Colorado and New Mexico in 2006 (USFWS 2008). It was estimated that residents and visitors combined spent $3.8 billion on wildlife-associated recreational activities in 2006 in the two States combined, with Colorado accounting for approximately 79 percent of this spending. Among participants, wildlife watching was the most frequently reported activity, followed by fishing and hunting. In Colorado, 82 percent of individuals' surveyed watched wildlife, 30 percent fished, and 12 percent hunted, while in New Mexico, 83 percent watched wildlife, 26 percent fished, and 10 percent hunted (USFWS 2008).

Land Use and Ownership Changes Surrounding the Conservation Area

Current Land Use

Unlike the broader San Luis Valley region where more than 40 percent of the land is protected and managed by the Service, the USFS, the BLM, the National Park Service, and the State of Colorado, the SCCA is largely comprised of private land.

USFWS

Agricultural practices such as haying and grazing are a primary part of the economy in the San Luis Valley, and often provide habitat for wildlife as well.

The nine-county region is relatively rural, and population densities in the San Luis Valley are among the lowest in Colorado. Only 2 percent of land cover in the region area is urban (NASA 2006 [data complied using EPS–HDT]), U.S. Census Bureau 2010a). Major municipalities in the region include Alamosa, San Luis, Saguache, Crestone, and Del Norte. Of these, only San Luis is within the SCCA boundary. San Luis is a historic community with Hispano heritage.

Changes in Land Use

The SCCA contains a rich diversity of trust species and habitat types. The San Luis Valley is the southernmost significant waterbird production area in the central flyway and is the most important waterfowl production area in Colorado. According to Partners in Flight, riparian habitats in the region support the highest bird diversity of any western habitat type (USFWS 2010a). That said, the SCCA part of the San Luis Valley contains fewer wetlands relative to the broader region, and waterbird production is a lower priority there.

Historically, land use remained unchanged in the San Luis Valley until the early 1800s, when Euro-American settlement began to alter the presettlement landscape (USFWS 2010a). During this period, livestock grazing, farming, and water development began to affect ecosystem processes such as the natural hydrological regime. Since then, nearly 50 percent of Colorado's wetlands have been lost (Dahl 1990, 2000).

Development pressure started to increase during the 1990s and early 2000s as land prices and agricultural operation costs in the SCCA began to rise. To continue ranching operations, many rural landowners were forced to sell parts of their property for housing and commercial development, creating more fragmentation and loss of critical wildlife habitat, including riparian habitat, in the SCCA (USFWS 2010a). As agricultural lands are subdivided, the resulting fragmentation can affect habitat use for a wide array of waterfowl, shorebirds, colonial waterbirds, and songbird species. Many of these species require specific habitat conditions for successful reproduction and building energy reserves for breeding and migration (USFWS 2010a). As habitats are lost, the spatial juxtaposition of available habitat is altered, disrupting wildlife movement, dispersal, and migration patterns. In addition to the direct loss of wildlife habitat from fragmentation, the water rights associated with these properties are often sold with the property, resulting in not only the loss of wetland habitat and wetland functions on the subdivided property, but also on adjoining lands as the water is redistributed off of the property (USFWS 2010a). Keeping the current connectedness of habitat through permanent protection would limit the risk for species movement patterns to be disrupted because of fragmentation and would also keep important migration corridors and linkages between seasonal ranges necessary to meet the life history needs for many wildlife species (USFWS 2010a).

Because of the small agriculture-based human population in the area, however, the landscape has not been altered to the same extent as many other western regions with more rapid population growth (USFWS 2010). In recent years, the downturn in the national and regional economy has slowed growth and development pressures in the SCCA. See description of population trends above.

In 2000, the American Farmland Trust identified 4.9 million acres of prime ranchlands in Colorado and 2.6 million acres in New Mexico as being vulnerable to low-density development by the year 2020. Within the Rocky Mountain region (which includes 263 counties in Idaho, Montana, Wyoming, Utah, Colorado, Arizona, and New Mexico), Saguache County, Colorado, and Rio Arriba County, New Mexico (both close to the project area), ranked in the top 25 counties for acres of strategic ranchland at risk (American Farmland Trust 2000). While population densities are still low in these counties, development has been occurring within sensitive riparian areas in the valley floor. Taking added steps to conserve wildlife habitat in the San Luis Valley now, while land prices are still affordable and irreplaceable habitat has not been lost, may be proper. Protecting this land from development is the only way to ensure the long-term resiliency of the ecosystem and support viable wildlife populations and habitats in the face of climate change and other threats (USFWS 2010a).

Water quantity, quality, and use issues are major threats to the sustainability of wetland and riparian habitats in the SCCA. Changes in water quality and quantity have adverse effects on the function of the wetland complex located in the valley floor. There are, for example, growing concerns about the impacts of new contaminants, such as endocrine-disrupting chemicals, that can affect water quality on both private and public lands (USFWS 2010a).

Ground water usage, especially artesian well development, started during the early 1900s. The result has been the construction of more than 7,000 wells in the San Luis Valley and development of one of the world's largest concentrations of center pivot irrigation systems, many of which depend solely upon ground water. As a consequence, water users and regulators have acknowledged that annual ground water use chronically exceeds recharge. Because legal and political circumstances, new ground water rules are now being developed by the Colorado Division of Water Resources and may soon be applied to water users in the San Luis Valley (USFWS 2010a).

Once the new ground water rules are carried out, ground water users will be responsible for eliminating injury to senior water rights through a formal

augmentation planning process with the State (USFWS 2010a). In most cases, this will require ground water users to acquire, and in many cases, remove senior water rights from other properties to augment their well use.

These circumstances threaten healthy riparian systems along the tributaries of the Rio Grande, including in the SCCA, where senior water rights are now used in the floodplain. The evolving economic and regulatory environment in the SCCA will likely result in the acquisition of some of these water rights to augment distant wells, moving water out of the floodplain and degrading migratory bird habitat (USFWS 2010a). Additionally, this will increase the State's difficulty in managing water in the Rio Grande and administering the Rio Grande Compact.

Energy development is also an emerging threat to wildlife in the SCCA. Colorado is among the most promising sources of solar energy nationwide, and the San Luis Valley receives more direct solar radiation than any other part of the State (National Renewable Energy Laboratory 2007a, National Renewable Energy Laboratory 2007b). Interest in the development of the solar energy industry in the San Luis Valley continues to expand, especially because Colorado State legislation requires that 30 percent of large utilities' electricity come from renewable sources by 2020 (Galbraith 2010). Prospective solar development in the local area is supported by Federal initiatives and money from the U.S. Department of Energy (U.S. Department of Energy 2011, Jaffe 2011). The growth of the solar industry in the local area, however, is dependent on the ability of solar producers to obtain power purchase agreements from the Public Service Company of Colorado and may also be dependent on the future provision of transmission lines out of the valley (Colorado Department of Local Affairs 2011). Other norenewable (oil and gas) and renewable (wind) forms of energy development occur to a lesser extent in the SCCA than many western States (USFWS 2010a).

Sangre de Cristo Conservation Area Land Conservation Efforts

Land protection is a relatively new practice in the San Luis Valley, as most conservation easements have been completed within the last 10 years. However, during this short timeframe, more than 232,000 acres of land have been protected in the region, which suggests that public support for land protection in the SCCA is strong (USFWS 2010a). In fact, there are so many landowners interested in entering into conservation easements that organizations like the Rio Grande

Sue Olievira / USFWS

The tributaries of the Rio Grande in the Sangre de Cristo Conservation Area are some of the last refuges of genetically pure populations of Rio Grande cutthroat trout, and provide important nesting and migration habitat for countless birds.

Headwaters Land Trust, The Nature Conservancy, Ducks Unlimited, and the NRCS cannot handle the demand, either for time or money (USFWS 2010a). Citizens of the San Luis Valley understand that the rural lifestyle and wildlife habitat is what makes this area unique and have voiced their concern over the loss of these values. They recognize that conservation easements are a tool to keep both ranches and wildlife habitat intact (USFWS 2010a).

The Service plans to conserve approximately 250,000 acres to protect the remaining expanses of wildlife habitat in the SCCA. This would be accomplished primarily through the purchase of conservation easements by the Service on a voluntary basis from private landowners. Other Federal, State, and nongovernmental partners may help in acquiring conservation easements. Acquisition of these lands will occur over a period assumed to range from 15 to 20 years, but based on past acquisition rates, could reasonably be expected to occur over a longer period, possibly up to 100 years.

Conservation Easements

One of the Service's high-priority objectives is to guide residential and commercial development away from high-priority conservation areas by securing proper conservation easements. The SCCA will focus on the protection of wetlands, riparian areas, montane forests, and sagebrush habitats on private land within the area through acquisition of conservation easements from willing. Conservation easements leave land in private ownership, protecting private property rights, while providing the Service with a cost-effective conservation strategy that enables the conservation of large blocks of habitat.

A conservation easement is a voluntary legal agreement entered into between a landowner and a conservation entity. Conservation easements are binding in perpetuity; the landowner reserves the right to sell or bequeath the property, but the easement and its associated restrictions remain with the property forever. Owners of land that does not contain a conservation easement have a set of rights associated with their land. For example, landowners have the right to run cattle, grow crops, harvest trees, build structures, and subdivide and sell their land. Under a conservation easement, landowners keep ownership of their property, but transfer some of their ownership rights to the conservation entity. The most common right transferred under a conservation easement is the right to develop or subdivide the land.

Conservation easements in the SCCA may require the transfer of more rights. A conservation easement on a parcel of land may have restrictions for all types of human development, such as surface disturbance from solar, mineral, or wind energy development, depending upon the particular wildlife values of the habitat.

Small areas of wetland habitat is present in the SCCA on private lands in areas where ranchers irrigate and use habitat for native hay meadows and pastureland for livestock. Protection of wetland habitat types will make sure that there are proper drying and flooding cycles while keeping historical water use patterns in wetland basins that are beneficial to wildlife.

In most cases, a conservation easement acquired for wetland values will be associated with appurtenant irrigation water rights that have resulted in desirable wildlife habitat. Doing anything less may often result in separation of water use from the land, reducing the easement's value to trust wildlife species. Water laws are sensitive to State requirements; therefore, water issues will need to be addressed individually for each easement. In all cases, the terms of a conservation easement must be mutually agreed-upon by the landowner and the easement holder. Conservation easements acquired from private landowners would not affect their property rights beyond those purchased through conservation easement.

Subsurface rights are often severed from the surface rights of a parcel of land. Conservation easements apply only to surface rights; therefore, the mineral interest may be extracted at any time by the person who holds the qualified mineral right (Byers and Ponte 2005). For this reason, the Service is unlikely to enter into a conservation easement agreement for a parcel of land that has a viable subsurface mineral interest. Exceptions may be made if the parcel has high habitat value and the probability of mineral extraction is low.

Water Law

Colorado

Colorado is divided into seven water divisions using watershed boundaries. Each division has a Water Court and a division engineer who administers water rights by priority. The Rio Grande is in Division 3.

Water rights in Colorado are subject to the prior appropriation doctrine; the first entity to claim the water right has the first right to use the full amount of water they claimed for beneficial use. The prior appropriation doctrine allows State officials to properly manage and distribute water according to the decreed priority dates. There are four elements of a water right under the prior appropriation doctrine: intent, diversion, beneficial use, and priority. An applicant must show that there is intent to use the water, construct the diversion works, put the water to beneficial use, and establish a priority date. In Colorado, every water right must be adjudicated through the Water Court. There are now legal avenues to use water for beneficial use without a diversion, such as instreamflows.

If there is not enough water to satisfy all water right holders in a particular stream, the State may shut off junior rights as necessary to make sure that

senior water right holders receive their full appropriation. The Rio Grande basin in Colorado is considered over appropriated.

Ground water in Colorado is designated as either tributary or nontributary. Tributary ground water is water contained in aquifers that have a direct hydraulic connection to surface water. The unconfined aquifer in the San Luis Valley is tributary ground water. Tributary ground water is treated administratively the same as a surface water diversion. The confined aquifer in the San Luis Valley is also considered tributary, though the hydraulic connection to the surface water system is poorly understood.

Water rights in Colorado can be transferred from one entity to another, but a change application must be filed and approved by the State Engineer and the Water Court. The amount available for transfer is limited to the consumptive use part of the right. Water rights in Colorado are considered real property and they may be bought or sold. A water right can be conveyed either as part of a piece of property or separate from a property, as long as that water right has been severed from the land by an approved application through the State engineer and the Water Court.

In 1973, the Colorado Legislature passed Senate Bill 97, creating the State's Instream Flow Program. This program, one of the first of its kind, vested the Colorado Water Conservation Board (CWCB) with exclusive authority to protect streamflow through a reach of stream rather than just at a point, and to protect levels in natural lakes. Until this law was passed, all appropriations of water in Colorado were required to divert water from the natural stream.

Since 1973, Colorado clarified the CWCB's authority to acquire existing, decreed senior water rights on a voluntary basis from willing owners for instream flow uses. New appropriations are new, junior water rights claimed by the CWCB to preserve the natural environment. New appropriations are considered by the CWCB each year and are filed annually with the Water Court for adjudication. New appropriations are generally limited to the minimum amount necessary to fulfill the purpose of the instream flow.

New Mexico

New Mexico's water law is also based on the doctrine of prior appropriation. All waters in New Mexico are declared to be public and subject to appropriation for beneficial use. Apart from water rights acquired before 1907 and small-scale stockwatering (10 acre-feet or less), a permit from the State engineer is required to appropriate water, change the point of diversion, change the location of wells in declared basins, divert or store water, or change the place or purpose of water use. There is a new requirement in New Mexico that before obtaining a water right involving the use of public lands, the person seeking the right must prove that he or she actually has a permit to use the public lands.

The New Mexico ground water code was enacted in 1931. Ground water procedures closely parallel those for surface water, with several important differences. A permit to drill a well and appropriate water is not required in areas outside of declared "undergroundwater basins." Within undergroundwater basins, however, use is regulated by the State engineer. The State engineer has the authority to establish these basins when regulation is necessary to protect prior appropriations, make sure that water is put to beneficial use, and support orderly development of the State's water resources. There are now 33 declared undergroundwater basins throughout New Mexico.

Water rights in New Mexico can be transferred from one entity to another, but a change application must be filed and approved by the State engineer. Water rights in New Mexico are considered real property and they may be bought or sold. A water right can be conveyed as part of a piece of property or separate from a property, as long as that water right has been severed from the land by an approved application through the State engineer.

New Mexico has had adjudicated water rights since 1907. In an adjudication suit, each claimant has an opportunity to present evidence of water right to the court. The completion of adjudication results in a court decree outlining the priority, amount, purpose (determination of use), periods, and place of water use.

New Mexico's instream flow program is complex, unclear, and continually evolving. New Mexico does not have a legislated instream flow program, and instream flow is not a recognized beneficial use. Recent case law, however, has allowed the development of an instream flow program in New Mexico. In 1998, the New Mexico Attorney General issued a legal opinion concluding that the transfer of a consumptive water right to an instream flow right is allowable under State law. The legal opinion found that instream uses such as recreation and fish and wildlife habitat are beneficial uses, and that transfers of existing water rights to instream flows are not expressly prohibited. Before this opinion, New Mexico was the only State that did not recognize instream flow as a beneficial use.

The 1998 Attorney General's opinion is limited to the transfer of existing water rights. The opinion notes that new appropriations of water for instream flow are not subject to this precedent. Although the opinion concludes that there are no legal barriers to the transfer of existing water rights to an instream flow right, the State engineer still has the responsibility for approving such a transfer. Although instream flow in itself is not recognized as a beneficial use, it appears that water can be dedicated to instream flow for the purpose of recreation or fish and wildlife habitat.

The Attorney General's opinion does not explicitly address the issue of ownership of instream flow rights. Since ownership of other types of water rights are not limited, it could be interpreted that instream flow rights could be held by a public or private entity. Current law is unclear and continues to develop.

Chapter 3—Threats to and Status of Resources

Threats to Resources

The land cover of the San Luis Valley was largely unaltered, except by natural processes, until the 19th century, when human land use associated with settlers of European origin began to alter the landscape. During this period, livestock grazing, farming, and water development also began to affect ecosystem processes such as the historical hydrological regime. Since then, Colorado has lost nearly 50 percent of its wetlands (Dahl 1990, 2000). The highest remaining concentration of wetlands in Colorado occurs in the San Luis Valley, and their protection is a high conservation priority. Sagebrush-dependent birds are often sensitive to vertical structure in their habitat, and thus the protection of these habitats from development is a priority. The spine of the Sangre de Cristo Mountains provides an important wildlife migration corridor for many species that could be deterred from moving through them if development or unsustainable logging practices were carried out in the montane forests.

Development

Population growth, primarily exurban development, led to habitat fragmentation in the San Luis Valley in the latter part of the 20th and first part of the 21st centuries. The population of Colorado increased by nearly 17 percent between 2000 and 2010 (U.S. Census Bureau 2010a). The absolute population numbers and densities are still low in the project area, but habitat loss and fragmentation because of residential and commercial development remain a major recent threat to trust species in the SCCA. This rapid growth has tempered somewhat during the current economic downturn, with relatively stable populations in the counties of the San Luis Valley from 2000 to 2010 (U.S. Census Bureau 2010a). However, that same downturn, coupled with depressed agricultural markets and pending expensive changes to Colorado's ground water law, have forced many farmers and ranchers to subdivide their properties so that they can continue operating. This proliferation of 5-, 10-, and 40-acre parcels that have appeared on the market is likely to exacerbate the ongoing impacts of exurban housing development on the habitats of the SCCA.

Energy development is also an emerging threat to wildlife in the SCCA. The impacts to wildlife populations from solar energy development are of particular concern in the San Luis Valley, as interest in industrial solar-electric generating facilities has increased during the last decade. In fact, one of the largest photovoltaic plants in the United States is in the San Luis Valley. Economically viable wind energy potential is generally quite low in most of the valley (Hanser 2010) and thus unlikely to be an issue in the near term. Hydrocarbon potential is low throughout the valley (Copeland et al. 2009), although some oil has been found during mineral exploration (Watkins et al. 1995). There is potential for further oil and gas exploration in this region, which the Service has found is unlikely to have significant impacts on the living resources of the valley (USFWS 2011). Reviews of hydrocarbon development impacts on ground nesting birds (Naugle et al. 2011), ungulates (Hebblewhite 2011), and songbirds (Bayne and Dale 2011) have all found some evidence of mortality or behavior modification (such as avoidance of an area) associated with petroleum extraction. If commercially exploitable hydrocarbons are found during the planned exploration, petroleum extraction could be an added threat to the living resources of the SCCA.

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The forests along the Sangre de Cristo Mountains are a corridor for movement of wide-ranging species such as mountain lions.

Fragmentation

Changes in land cover because of exurban development, energy development, roads, and changes in agricultural land use (such as transition from flood irrigation to center-pivot irrigation) not only cause a loss of habitat, they also fragment the remaining habitat. There is a robust body of literature on the effects of habitat fragmentation, summarized eloquently by Collinge (2009). Countless manipulative and observational studies have shown that habitat area and connectivity among types of similar habitat are important for everything from soil decomposers (Rantalainen et al. 2005) to passerine birds (Telleria and Santos 1995). Corridors between fragments promote use of, and persistence in, those habitats by migratory birds (Haas 1995), large carnivores (Shepherd and Whittington 2006, Tremblay 2001), and ungulates (Tremblay 2001) that are native to the SCCA. Perhaps the most obvious way to protect corridors throughout the SCCA, while protecting valuable habitat at the same time, is to focus on the conservation of the riparian corridors that cross and connect existing protected areas. This action would protect wildlife movement corridors for both seasonal migration and colonization following large-scale disturbance or environmental change.

Invasive species

Increased human disturbance associated with development has also been shown to negatively affect adjoining habitat because of the invasion and establishment of invasive plant species. Invasive plants can have many detrimental effects; besides displacing native vegetation, they can alter nutrient cycling and soil chemistry, change hydrology, increase erosion, and change fire regimes (Dukes and Mooney 2004). Noxious weeds, such as tall whitetop, Canada thistle, and Russian knapweed, can have severe negative effects on wildlife habitat (such as reducing the quality of nesting and foraging areas) when these weed species begin to replace native vegetation. The San Luis Valley already has one of the densest concentrations of Russian knapweed in the State of Colorado(Goslee et al. 2003). Other invasive species that could threaten resources in the SCCA include New Zealand mudsnail, quagga and zebra mussels, and Asian clam. Diseases such as white nose syndrome, chytrid fungus, whirling disease, and chronic wasting disease also threaten wildlife and fish in the San Luis Valley.

Water resources

In addition to the threats of the direct loss of habitat and fragmentation that accompany subdivision for exurban development, water rights can be sold with the property, or can be severed and sold to other landholders. This can result in the loss of wetland habitat and wetland functions not only on the property, but also on adjoining lands as the water is redistributed off of the property, directly affecting wildlife populations that depend on the wetlands to complete their life cycle. As fragmentation increases, remaining habitats become geographically isolated and wildlife populations with limited dispersal abilities may potentially become genetically and spatially isolated.

Another threat to the sustainability of wetland and riparian habitat in the SCCA is the chronic overuse of ground water. Because of legal and political circumstances, new ground water rules have been developed by the Colorado Division of Water Resources and will be applied to water users in the San Luis Valley starting in 2012. Ground water usage, especially artesian well development, started during the early 1900s. The result has been construction of more than 7,000 wells and development of one of the world's largest concentration of center pivot irrigation systems, many of which depend solely upon ground water. As a consequence, water users and regulators have acknowledged that annual ground water use chronically exceeds recharge. It is important to note that in addition to traditional agricultural irrigation, the existing national wildlife refuges in the San Luis Valley also use ground water adjudicated for both wildlife and irrigation extensively for irrigation and impoundments to create wildlife habitat. Ways to reduce reliance on ground water are being explored in the planning process for the comprehensive conservation plan for the San Luis Valley National Wildlife Refuge Complex.

Cultural resources

The SCCA is considered an important area for cultural resources because of the abundance of cultural sites that date to almost 12,000 years ago that are located throughout the valley; however, much of the archaeological research associated with the San Luis Valley has been conducted on public lands, such as the Closed Basin, San Juan National Forest, and Great Sand Dunes National Park and Preserve (Jones 2000). Permanent protection of wildlife habitat on private land would benefit the preservation of cultural sites from future disturbance on all acquired lands.

Climate change

Climate change has quickly moved to the forefront of conservation challenges during the 21st century, and the Service has made it a high priority in conservation planning (USFWS 2010b). Mountain ecosystems in the western United States are expected to be especially sensitive to climate change. In fact, data show that many places in the Rocky Mountains have experienced three times the global average temperature increase over the past century. Measurements have shown that Colorado's temperature has increased by approximately 2°F between 1977 and 2006 (Ray et al. 2008). The western United States has seen a shift toward earlier spring snowmelt (Karl et al. 2009).

Wetland and riparian habitats, such as those found in the SCCA, that are dependent on snowmelt from surrounding high mountain ecosystems would be expected to be more acutely affected than other ecosystems. The San Luis Valley is predicted to have a 10-to -20-percent reduction in runoff by midcentury compared to the 1900 to 1970 baseline (Karl et al. 2009). As with many areas across the West, it is difficult to predict what the specific effects of climate change may be in a given area, particularly because of the complex interplay between the timing of temperature change and precipitation. The Western Water Assessment predicted that Colorado's ecosystems will be affected by climate change in nine broad ways: increased frequency and severity of forest-insect interactions; increased frequency and severity of wildfires; changes in the hydrologic cycle that affect aquatic species, including reduction in overall streamflow, shift to earlier spring runoff, and warming of water temperatures; northward and upward shift in animal ranges, causing shifts in ecosystem composition; increased range and spread of wildlife pathogens; increase in tree mortality because of drought stress; increased risk of desertification in dryland ecosystems; and an overall reduction in biodiversity because of the above impacts (Averyt et al. 2011). We must be cognizant of the potential impacts that climate change may have on wetland, riparian, and upland habitat in the SCCA.

The SCCA intends to support and restore habitat connectivity to promote San Luis Valley and southern Rockies ecosystems that will be robust in the face of climate change. Protection of large intact expanses of wetland habitat types where natural ecosystem processes can be sustained will help wetland-dependent species resist some of the impacts of a changing climate. Some of these may not be the same type of wetland in the future, but the use of hydrogeomorphic modeling to assess historical hydrology should allow us to predict where and what kind of wetlands will persist in a potentially warmer and more arid future. We will respond by targeting these habitats for acquisition in the SCCA. Besides intrinsically providing habitat for wildlife, riparian areas also serve as corridors, as do the montane forests along the western flanks of the Sangre de Cristo Mountains. Protection of such corridors will preserve a network through which wildlife can recolonize or disperse following disturbance, making the ecosystem more resilient to short-term change and increasing its adaptive capacity to long-term change.

Effects on the Natural and Human Environment

For a thorough discussion of the effects of the proposed easement program, see the EA (appendix A) in this volume. Effects of the land protection strategy discussed in this volume are analyzed as alternative B in the EA.

Chapter 4—Project Implementation

Land Protection Choices

No action

Under the no-action alternative, the areas outside of existing protected areas would largely remain in private ownership and subject to changes in land use and land cover. Some protection in addition to the SCCA is likely because of ongoing conservation easement initiatives in the San Luis Valley and Sangre de Cristo Mountains by public entities such as NRCS and nongovernmental organizations such as The Nature Conservancy and Colorado Open Lands.

Conservation easements under the Sangre de Cristo Conservation Area (Proposed Action)

It is the Service's policy to acquire the minimum interest in a property necessary to accomplish its conservation objectives. It can be possible to achieve most of these objectives with conservation easements. The preservation of working landscapes such as farms and rangeland is more cost effective, socially acceptable, and politically popular than acquiring fee-title land, and it often promotes the preservation of unfragmented, quality habitat. Under the proposed action, the Service seeks to protect up to 250,000 acres through conservation easements in the SCCA.

Project Objectives and Actions

The SCCA sits in the San Luis Valley and the adjoining Sangre de Cristo Mountains of central southern Colorado and northern New Mexico. The project area contains land in Costilla County in Colorado, as well as a small part of Taos County in New Mexico. The SCCA boundary includes the Sangre de Cristo's tributaries of the Rio Grande between Blanca Peak and the watershed of Costilla Creek. Within the project boundary, the Service will strategically find and acquire from willing sellers a proper interest in upland, wetland, and riparian habitats on privately owned lands.

The Service plans to buy or receive donated conservation easements on those identified areas within the project boundaries, and would consider accepting donated fee-title lands as well. These easements will connect and expand existing lands under public and private conservation protection. Based upon the area of privately held priority habitat in the SCCA boundary, and to allow for some flexibility in easement acquisition, the objective of the SCCA project is to protect 250,000 acres of uplands, wetlands, and riparian areas through easements.

Easement terms and requirements

The Service has successfully carried out easements in many projects, and existing language and guidelines would contribute substantially to the drafting of the SCCA easement language. Given the Service's conservation goals in the SCCA, the easements will be drafted with standard language to preclude subdivision and development and conversion of native vegetation to cropland, as well as to protect existing wetlands from being drained or filled.

In addition, because of the scarcity of water resources in the valley and impending changes to ground water law in the State of Colorado, there may be provisions about water use. The types of wetland and associated upland habitats in which we are interested are largely supported by current water use practices. Easements may include a stipulation that changes in water use cannot adversely affect the quality of habitats that we seek to protect in the easements, and that water rights now owned for use on a property under an easement could not be sold or transferred for use on other properties unless such a transfer was deemed beneficial to wildlife. These would be new easement terms for the Service, and require further investigation before they could be carried out as part of the SCCA program.

The protection of riparian corridors is important in the SCCA, particularly because much of the lower-elevation habitat has, or has the potential to have, the constituent elements of critical habitat for the southwestern willow flycatcher[3]. While easement language would not prescribe specific management practices on these lands, landowners with suitable or potentially

[3] *FR 76(157), 50542–50629. Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for Southwestern Willow Flycatcher. Agency: U.S. Fish and Wildlife Service. Action: Proposed Rule. August 15, 2011*

suitable riparian habitat would be encouraged to work with the Partners for Fish and Wildlife Program or the new Working Lands for Wildlife Program (NRCS 2012) to develop alternative strategies such as fencing of riparian corridors and off-river stock watering to prevent overgrazing of regenerating riparian vegetation.

Contaminants or Hazardous Materials

Level 1 pre-acquisitionsite assessments will be conducted on individual tracts before the purchase of any land interests. The Service's environmental contaminants specialists from the Ecological Services offices in Colorado and New Mexico will be contacted to make sure that policies and guidelines are followed before acquisition of conservation easements or fee title.

Acquisition Money

The Service will acquire easements in the SCCA primarily through Land and Water Conservation Fund monies. These monies are derived primarily through revenue generated from oil and gas leases on the Outer Continental Shelf, motorboat fuel taxes, and the sale of surplus Federal property. These monies are not derived from general taxes. While Land and Water Conservation Fund monies are intended for land and water conservation projects, payment is subject to annual appropriations by Congress for specific acquisition projects. If it is reauthorized by Congress, the Federal Land Trust Facilitation Act could also be used to pay for specific acquisitions. This act is a law that allows the BLM to dispose of certain public lands to generate revenue for strategic conservation of habitat not now in Federal trust.

The SCCA project area has several other government and nongovernmental organizations with overlapping conservation objectives. In the development of the SCCA, land for acquisition has been ranked by the Service, but the LPP may also guide acquisitions for conservation by the NRCS (WRP), The Nature Conservancy, Colorado Open Lands, and the Rio Grande Headwaters Land Trust, among others.

Protection Priorities

The Service, in consultation with internal divisions (Migratory Birds, Fisheries, Ecological Services), nongovernmental organization partners, Colorado Parks and Wildlife, and BLM, selected six focal species whose habitat needs have driven the prioritization of the SCCA. Each of these focal species represents a group of species that are vulnerable to the same threat processes (Lambeck 1997). The species selected were Canada lynx, Rio Grande cutthroat trout, willow flycatcher, Lewis' woodpecker, Gunnison sage-grouse, and sage thrasher. All of these are Federal trust species or have State or regional conservation status, making them worthy of protection on their own; however, conserving habitat for these species will also protect habitat for other species with similar habitat needs.

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Protection of habitat for Federal trust species will also ensure connectivity for state-managed species such as the American black bear.

Species-Habitat Mapping Method

Some of the chosen species, by virtue of their having special conservation status, had already been the subject of detailed habitat mapping in the project area. For others, simple conceptual models were developed based upon literature reviews.

The southwestern willow flycatcher is a genetically distinct subspecies (Paxton 2000) of willow flycatcher that inhabits the woody riparian corridors of the desert southwest. Its population has declined significantly because of habitat loss, and it is listed as endangered by the States of Colorado and New Mexico as well as under the Federal Endangered Species Act. The willow and cottonwood riparian habitats necessary for willow flycatcher breeding in the San Luis Valley have been mapped in detail as part of the development of the draft San Luis Valley Habitat Conservation Plan for that species (ERO Resources, unpublished data).

The data also capture the gallery cottonwood habitat needed for both the Lewis' woodpecker in this part of its range and for the breeding habitat of the yellow-billed cuckoo. The existing data were used as core habitat in this prioritization scheme; as a second priority, a n approximately 656-foot (200-meter) buffer was used to decrease disturbance of the core habitat (Terry Ireland, USFWS Ecological Services, personal communication, February 2012). These priorities are illustrated in figure 2.

Canada lynx are federally listed as threatened and State listed in Colorado as endangered. Lynx range through the montane forests of the Rocky Mountains. They are resident in the Sangre de Cristo Mountains, and the junction between the Sangre de Cristo Range and the Culebra Range of the Sangre de Cristo Mountains has been identified as a particularly important corridor for the species (L. Ellwood, USFWS Ecological Services Colorado Field Office, personal communication, January 2012). Its habitat in the project area has already been mapped by Colorado Parks and Wildlife and the USDA Forest Service. A small part of the project area in northern New Mexico had not been covered by earlier mapping but is known to be actively used by lynx. Therefore, a minimum convex polygon for this region was created that captured the land cover that largely composes the Colorado Parks and Wildlife habitat (Rocky Mountain aspen forest and woodland, Rocky Mountain lodgepole pine forest, Southern Rocky Mountain mesic montane mixed conifer forest and woodland, and Rocky Mountain subalpine dry-mesic spruce-fir forest and woodland) using approximately 98-foot (30-meter) Landfire data (USGS 2010). Lynx habitat is identified in figure 3.

The habitat of the Endangered Species Act candidate Rio Grande cutthroat trout has been mapped throughout the species' range; in addition, information on barriers to fish passage and data on genetic integrity has incorporated into a spatial database. Because interbreeding has been a problem for cutthroat trout species, the signatory parties to the 2009 Rio Grande Cutthroat Trout Conservation Agreement identified populations with less than 10-percent genetic introgression and defined them as conservation populations (Rio Grande Cutthroat Trout Conservation Team 2009). These conservation populations were chosen as representing priority habitat for the species in this land protection plan (figure 4).

The range of the Gunnison sage-grouse is much more geographically limited than it once was. The Gunnison Sage-Grouse Steering Committee revised earlier, coarser-scale historical range mapping for the species (Schroeder et al. 2004) and identified current and suitable but unoccupied habitat (Gunnison Sage-grouse Rangewide Steering Committee 2005). In the project area, there are no known leks, but there is a large expanse of vacant or unknown habitat identified in Costilla County. Current range polygons were selected to represent priority habitat for this species; the historical range is also displayed for reference (figure 5).

Sage thrasher is a migratory bird that has been declining throughout its range because of habitat loss and degradation, and is a Service Region 6 bird of conservation concern as well as a Migratory Birds focal species. A range-wide conceptual model for the species was developed by the American Bird Conservancy based on Rocky Mountain Bird Observatory sampling data (Beason, Levad, and Leukering 2005) and ReGap land cover data. The population estimates they assign to these land cover classes are further stratified based on the classification of vegetation quality as good, fair, or poor, which was in turn derived from shrub cover density and prevalence of invasive plants. In the absence of data on vegetation quality for the San Luis Valley, the "fair" quality was selected for all land cover types. The model developers found that Inter-Mountain Basins Big Sagebrush Shrubland, Inter-Mountain Basins Montane Sagebrush Steppe, and Colorado Plateau Mixed Low Sagebrush Shrubland would support, on average, 0.0528252 birds per acre; this group of vegetation types was selected as the first priority in the sage thrasher-specific map. Inter-Mountain Basins Mixed Salt Desert Scrub, Inter-Mountain Basins Greasewood Flat, and Inter-Mountain Basins Semi-Desert Shrub Steppe support 0.009348 birds per acre; these vegetation classes were selected as the second priority for the species. Within these two priority levels, only polygons greater than approximately 247 acres (100 hectares) in area were included because sage thrasher are known to be somewhat area sensitive and are found most commonly in patches of that size or greater (Knick and Rotenberry 1995). Priority habitat for this species is displayed in figure 6.

Landscape Prioritization

The species-specific maps are useful for determining where in the landscape the key habitats are for the identified focal species. However, they do not help decisionmakers with determining which areas would provide the most effective conservation returns overall. In addition to the presence or absence of habitat for individual species, it is important to take into account issues such as connectivity, cost, and unequal conservation need for each species. Therefore, the simulated-annealing algorithm conducted in the software package Marxan (Ball, Possingham, and Watts 2009) was used to find "optimal" solutions for conservation prioritization within the SCCA. Marxan allows the user to specify individual conservation targets for conservation features (in this case, area of focal species habitat) and species-specific penalties for models that do not meet conservation targets. This allows the user

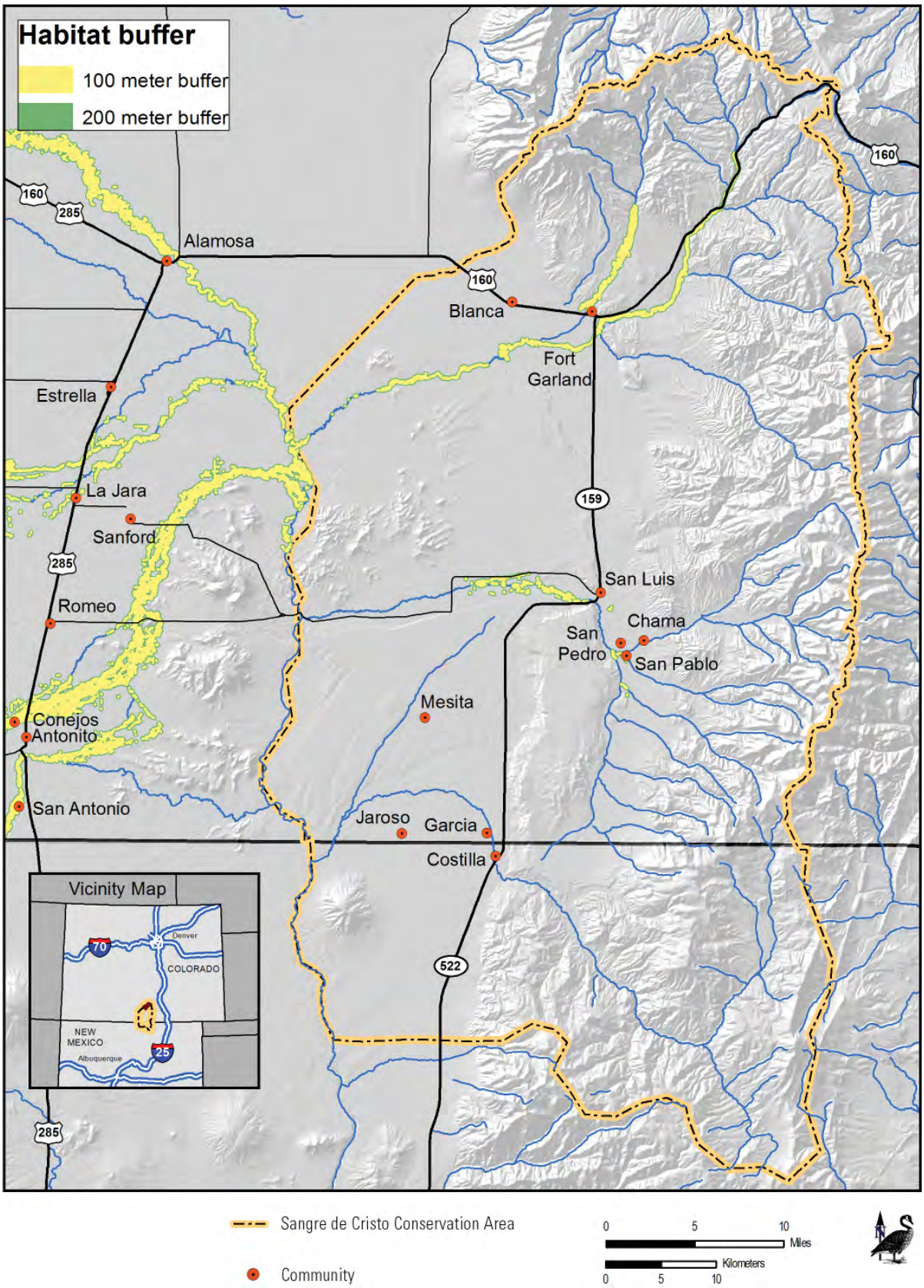

Figure 2. Southwestern willow flycatcher and Lewis' woodpecker habitat, Sangre de Cristo Conservation Area, Colorado and New Mexico.

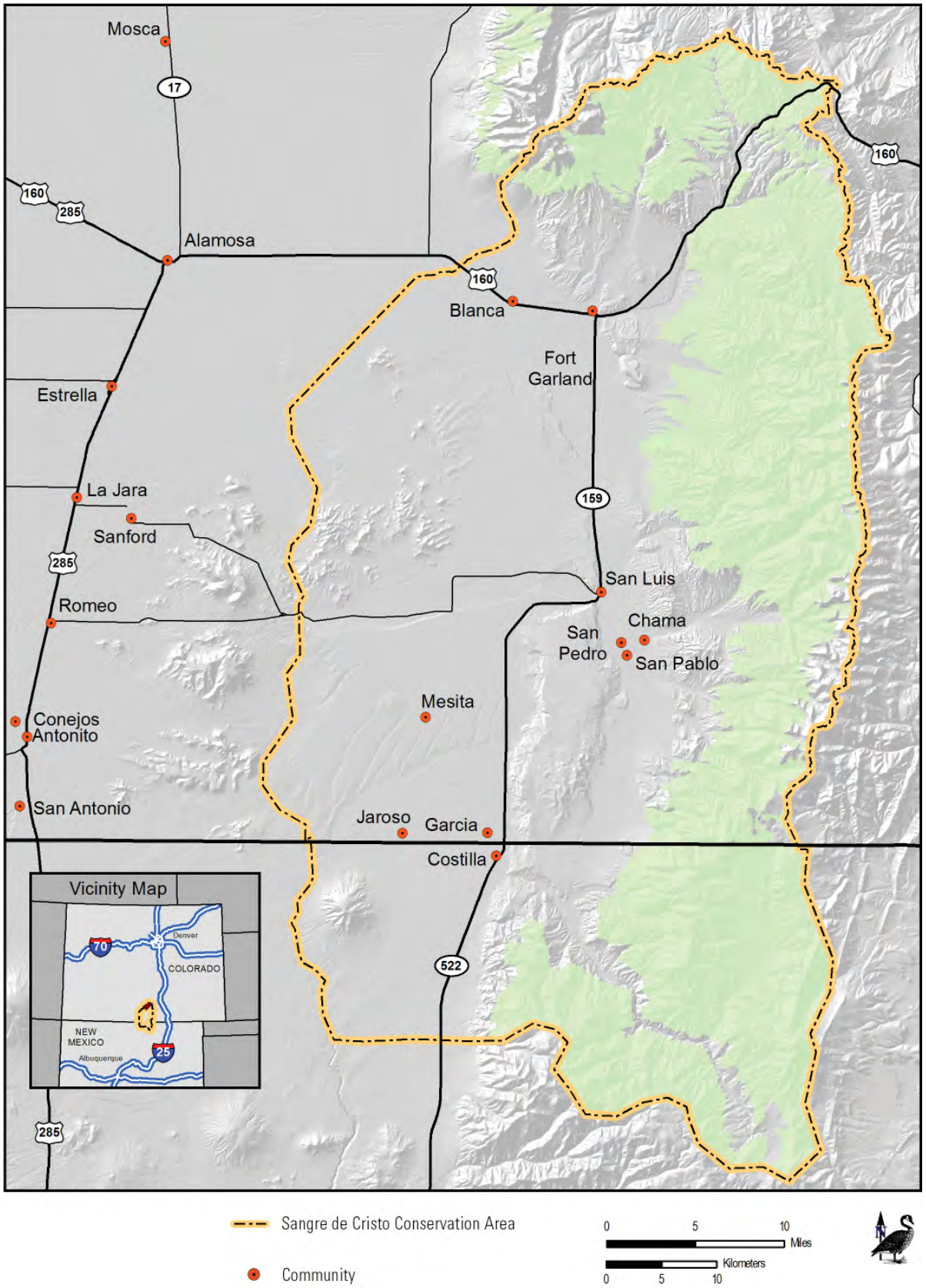

Figure 3. Canada lynx habitat, Sangre de Cristo Conservation Area, Colorado and New Mexico.

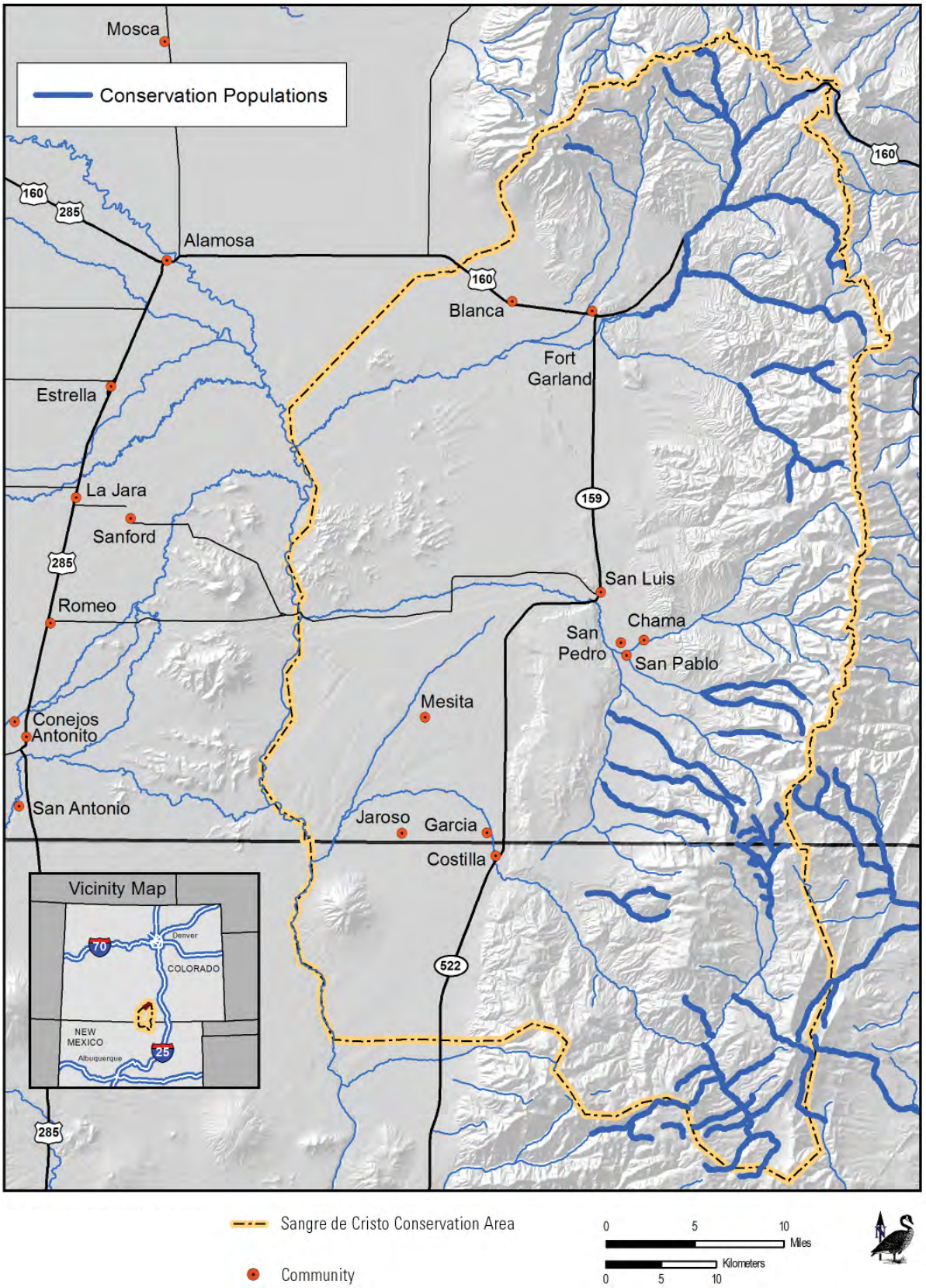

Figure 4. Rio Grande cutthroat trout conservation populations, Sangre de Cristo Conservation Area, Colorado and New Mexico.

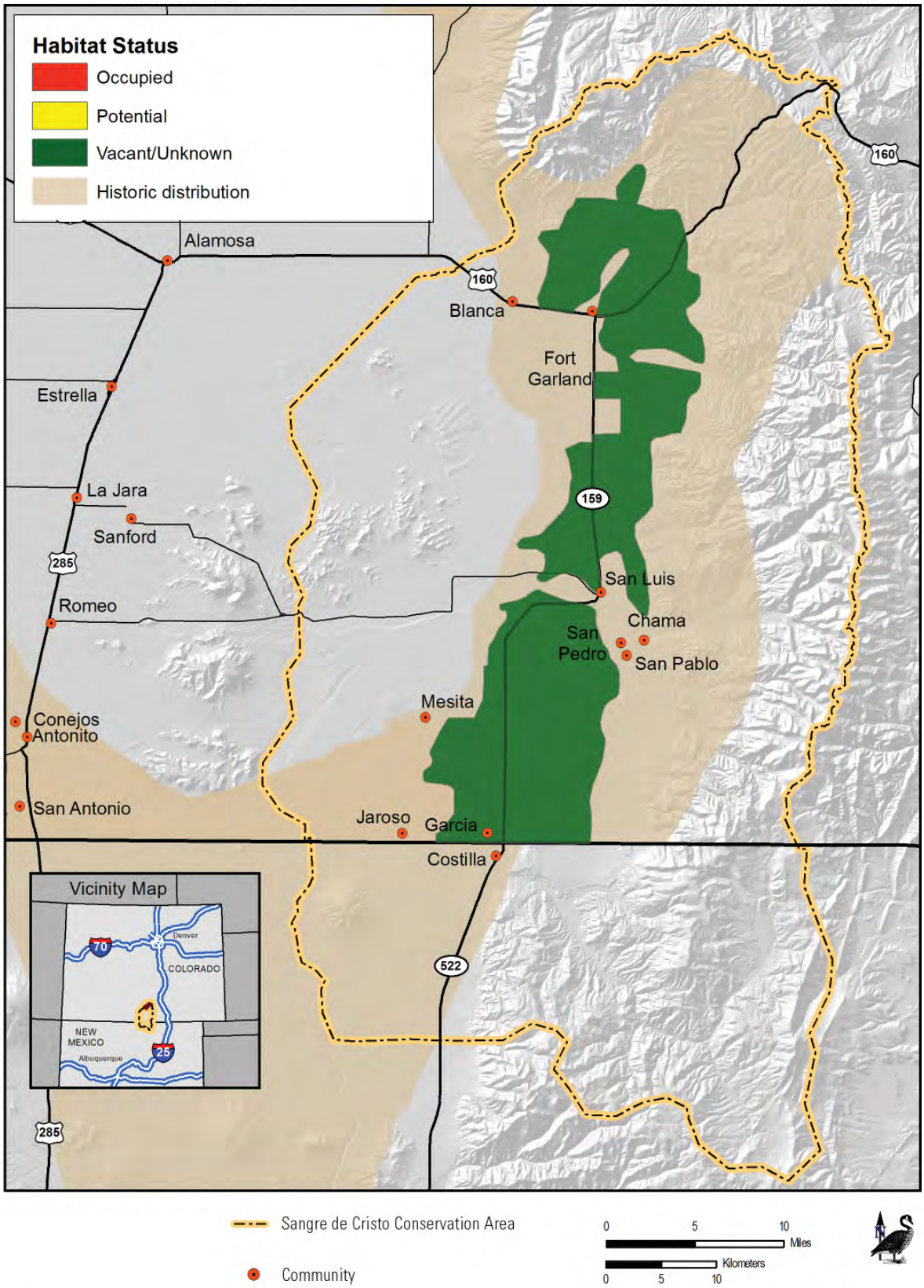

Figure 5. Gunnison sage-grouse habitat, Sangre de Cristo Conservation Area, Colorado and New Mexico.

[Note that there is no occupied or potential habitat for the Gunnison sage-grouse in the project area.]

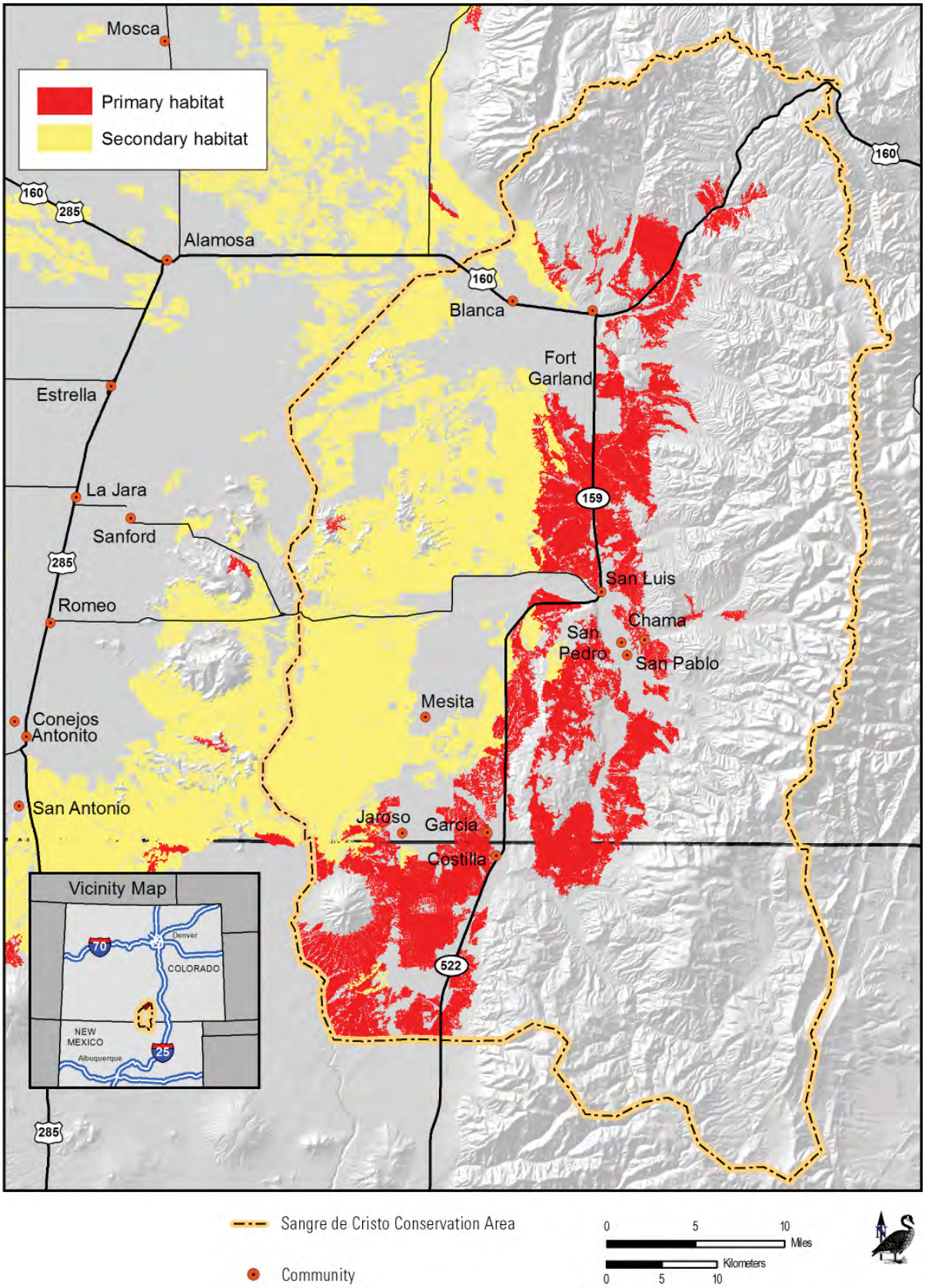

Figure 6. Sage thrasher shrubland habitat, Sangre de Cristo Conservation Area, Colorado and New Mexico.

to individually weight features, for example, upweight penalties for not including enough habitat for species of higher conservation concern, or reduce the amount of land necessary for generalist widespread species. By designating a boundary length modifier, the user can generate a more compact reserve system. The landscape can also be classified by cost, which can be made as simple as just land area or made more complex and meaningful by accounting for variables like land costs or metrics of the human footprint.

Because of the degree of flexibility allowed by Marxan, the values for these parameters need to be optimized by successive iterations of the program. For this analysis, hexagonal planning units were selected, as these have been shown to result in less fragmented, more efficient reserve networks (Nhancale and Smith 2011). Hexagons were 15 acres in area (approximately 6.1 hectares), which provides resolution that is sufficient for making land protection decisions while covering the SCCA in few enough planning units to not be computationally overwhelming. Hexagons already in a permanent protected status (existing conservation easements) may be locked out of the model, but because those easements may or may not meet the objectives of the Service, easement-encumbered lands were left in the model. Marxan was run for 100 runs at 100 million iterations. The species-specific data were included as features in the Marxan model. In addition, we included the "Potential Conservation Areas" identified by the Colorado Natural Heritage Program (Colorado Natural Heritage Program 2011). These potential conservation areas were selected based on their biodiversity value, and serve to incorporate State interests, in addition to Federal interests in the model. A boundary length modifier of 0.0001 was used to create a slightly more compact reserve network. Increasing that value to 0.001 oversimplified the reserve network and did not meet the intent of the SCCA. Targets for protection were set at 50 percent of the land holding a particular conservation feature, except southwestern willow flycatcher and Rio Grande cutthroat trout, which because of inherently connective nature of their habitat, had their targets set at 75 percent. The frequency with which individual hexagons were selected in the final solution for each of the 100 models is shown in figure 7.

Evaluation of Easement Potential

As described earlier, acquisition of conservation easements is not a new tool for achieving conservation objectives within the SCCA; the NRCS has a small number of easements, and nongovernmental organizations hold tens of thousands of acres of easements in the project area. These organizations have overlapping, but not identical missions to the Service. The Service does not now hold easements in the project area; however, the Service has more than 50 years of experience acquiring conservation easements in other parts of the country.

The landscape modeling described above has generated maps of species-specific conservation priorities for each of the priority species, as well as a consensus map that shows where conservation returns for Federal money would be maximized for the suite of species examined. Biologists and realty specialists will work cooperatively to use these tools to find parcels whose conservation will result in the greatest benefit to trust species.

When a willing seller approaches the Service or if the Service wishes to proactively seek out sellers, the following criteria will guide their decisionmaking:

- *Overall conservation value*—Is the property located, in whole or in part, in an area that was selected in 70 percent or more of the spatial conservation priority runs in Marxan, as shown by figure 7.
- *Trust species value*—Does the parcel contain priority habitat that was identified in any of the species-specific maps in the earlier section?
- *Previously unidentified conservation value*—If neither of the preceding thresholds are reached, is there another compelling reason (for example securing of important water rights, promoting critical habitat connectivity, identification of new species of conservation concern, simplified management of an existing refuge unit, or donation of intact or easily restored habitat) which justifies the property's protection?

Nothing in these guidelines is intended to limit the proper exercising of discretion and professional judgment by realty specialists and refuge staff. Acquisition would comply with realty policy and potential acquisitions would be scrutinized to see if the habitat for which the property was found to be a priority is, in fact, present on the parcel. As mentioned in the third criterion, there may also be more reasons why acquisition of interest in a parcel is justified, even if it did not rank highly in models for selected priority trust species at the time that this plan was approved.

Ecosystem Management and Landscape Conservation

To carry out the project, the Service will engage the Southern Rockies Landscape Conservation Cooperative, which is intended to deliver applied science to inform resource management decisions on landscape-scale issues such as climate change. The Landscape Conservation Cooperative incorporates State, Federal, nonprofit, and university partners; this planning across agency jurisdictions and boundaries is necessary to

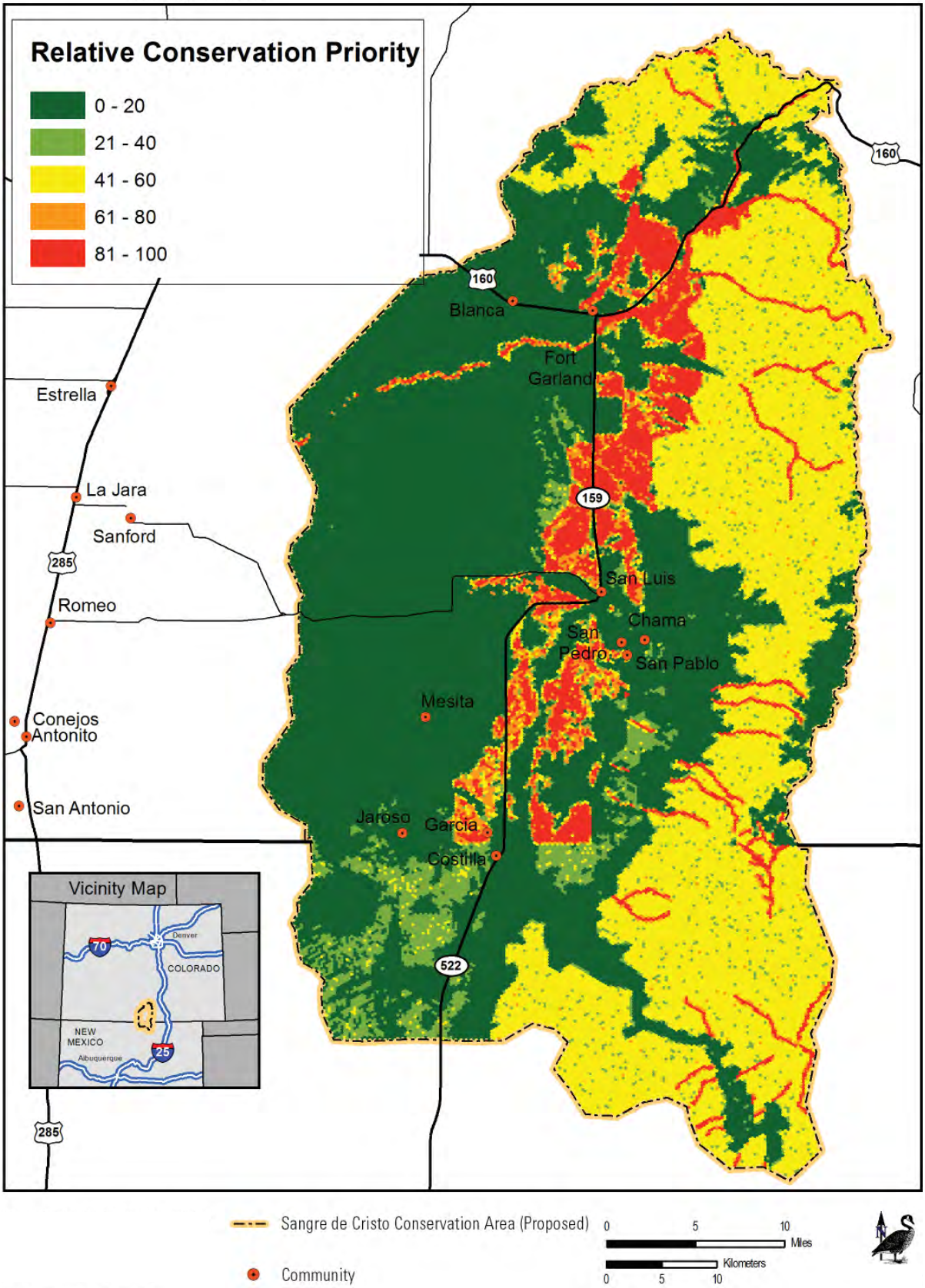

Figure 7. Spatial conservation prioritization, Sangre de Cristo Conservation Area, Colorado and New Mexico.

make sure that conservation happens at the scale necessary to make sure that wildlife can adapt, migrate, and colonize new areas in response to environmental change. The Southern Rockies Landscape Conservation Cooperative is still in its formative stages, but the framework for collaborative conservation in its area of responsibility, including the SCCA, has been developed.

Incorporating Science and Strategic Habitat Conservation in the Sangre de Cristo Conservation Area

The SCCA encompasses approximately one million acres in a region where demand for conservation easements already far exceeds available money. Given the likelihood that there may be more land available for conservation easements than appropriated money, it is important to make sure that the money that is available is spent in a way that maximizes returns for trust species or helps ensure the connectivity, resiliency, and long-term function of the ecosystems in the project area. Toward this end, the SCCA will incorporate the elements of strategic habitat conservation. Strategic habitat conservation is based on an adaptive management framework and entails starting with strategic conservation planning, followed by conservation design, conservation delivery, and monitoring and research to assess results.

Strategic Biological Planning

Biological planning requires the identification of specific biological objectives or focal species so that the relative success of a strategy can be assessed following implementation. The focal species identified to guide prioritization of the SCCA were chosen because of the Service's obligations to them as Federal trust species (candidate, threatened, and endangered species and migratory birds), and because land protection undertaken to benefit these species is likely to have conservation benefits for other species of conservation concern, such as species that are federally or State listed as threatened or endangered, USFWS Region 6 Birds of Conservation Concern, and USFWS Migratory Birds focal species. For example, protection of cottonwood riparian habitat for Lewis' woodpecker, a conspicuous regional bird of conservation concern, may also protect habitat for the more elusive yellow-billed cuckoo, an Endangered Species Act candidate species. Because of a lack of systematic nesting surveys for these species in the project area, assumptions were made based on scientific literature and expert opinion about which types of habitat were important for supporting viable populations of the focal species. In particular, given the limited amount of quality wetland and riparian habitat present compared to presettlement conditions, it was assumed that the continued presence of those riparian types was a limiting resource in the life history of species that are thought to be obligate breeders in such habitat.

These focal species were chosen with the knowledge that there are gaps in existing data and that the habitat in the project area is likely to evolve over time in the face of environmental change and changes in human water use. As new data become available or as conditions change to the point that this conservation strategy is no longer effective, biological planning will be revisited.

Conservation Design and Delivery

Preventing loss of habitats identified for the diverse suite of focal species is the goal of the prioritization scheme outlined earlier in this chapter. Decisions about how to rank competing parcels with limited available money will follow the outline described in that section.

The recovery plan for southwest willow flycatcher requires a minimum of 50 occupied breeding territories in the San Luis Valley (USFWS 2002), and specific reaches of the Rio Grande and Conejos River were identified to support that level.[4] As discussed earlier, this habitat will be granted highest priority for land protection, and all easement opportunities within the priority lands for that species should be considered in the interest of providing redundancy to occupied habitat, even if they are unoccupied.

In the absence of specific population goals for the remaining focal species, no acreage numbers or breeding pair densities have been selected. Following the principle that between 25 and 75 percent of a region must be conserved to meet targets for biodiversity (Noss et al. 2012), the initial targets for easement delivery are to protect 50 percent of existing priority habitat that now exists on private lands for the other focal species. As survey data for the valley informs the role of the SCCA in meeting specific regional or continental population objectives for other species, the delivery of easement and limited fee-title acquisition can be adjusted accordingly.

Monitoring and Research

Essential to the success of strategic habitat conservation is an effective monitoring program to make sure that conservation delivery is resulting in net positive benefits for the focal species around which the project was designed. While the consensus conservation model is primarily meant to guide effective easement acquisition, the individual species maps are intended to guide conservation delivery for those species. Checking populations will help ensure the efficacy of the program; if negative population trends for those species are detected within the project area or at a regional or continental scale, then further literature review or targeted research can be applied to adjust

[4] *FR 76(157): Endangered and Threatened Wildlife and Plants: Designation of Revised Critical Habitat for Southwestern Willow Flycatcher. pp. 50542–50629*

conservation planning for the SCCA. Some of the monitoring phase of strategic habitat conservation can be carried out using the capacity of the refuge biologist and Service Inventory and Monitoring help. However, it is important to recognize that similar monitoring programs will be carried out by partner agencies, and communication among these agencies is crucial for effectiveness in the face of limited staff and financial resources. Furthermore, Service staff should leverage biological expertise at regional academic institutions to facilitate basic and applied research while addressing research gaps as they are identified.

Specifically, monitoring and research should include:

- Developing, improving, and assessing landscape models for priority species. Emphasis will be placed on the highest priority species with the greatest degree of uncertainty about limiting factors and the effectiveness of management actions, including acquisition under the SCCA program, at minimizing and reducing the limiting factors for those species. Data from existing surveys such as Breeding Bird Survey routes in the project area will be evaluated and incorporated into spatial models. When necessary, more data will be collected to evaluate assumptions used in the modeling process and assessments will be adjusted accordingly. These methods will provide an estimate of the population response of trust species on easement lands and on noneasement properties. Similar modeling approaches may be developed or incorporated for priority nontrust species in cooperation with partners such as State wildlife agencies, nongovernmental organizations, and universities.
- Evaluating assumptions and addressing uncertainties identified through the biological planning, conservation design, and conservation delivery elements. When warranted, assumptions such as increased redundancy of occupied southwest willow flycatcher habitat through protection of riparian vegetation will be evaluated.
- Naming proper population goals for priority species and assessing the contribution of land protection toward meeting the population goals. This will allow the Service and conservation partners to evaluate the contribution of the program to meeting the population goals and refine conservation delivery to ensure the greatest effectiveness.
- Determining how changing environmental conditions may influence the effectiveness of this conservation design as increased evaporation, social and economically driven changes in water use, and evolution of the type and timing of precipitation and runoff influence the hydrology of the SCCA.

Socioeconomic Considerations

As discussed in detail earlier, the population in the project area is relatively low. Much of the land is cropland or rangeland. Landownership patterns vary widely, from dense 5 to 10-acre parcel subdivisions to ranches of more than 90,000 acres. Some facets of the agricultural economy are likely to be challenged by new ground water augmentation laws. The potential infusion of capital from the SCCA conservation easement program may provide farmers with resources to invest that would allow them to continue operation. That money will largely be invested within the San Luis Valley, so there will be short-term benefits to the local economy as well. Local governments are supportive of the initiative for these reasons, and because the program is easement based and therefore should not significantly affect revenues.

Because the wildlife resources for which the SCCA was designed already occur in these agricultural lands, sustaining this cornerstone of the regional economy is important to the mission of the Service. Keeping these practices will also preserve the rural aesthetic that defines the region's culture and the character of the San Luis Valley.

Public Involvement and Coordination

Scoping

At the beginning of the planning process, the planning for the SCCA was conducted in tandem with that for the San Luis Valley National Wildlife Refuge Complex CCP, at the time in the context of a broader, valley wide conservation area. Public scoping meetings were held on March 29, 2011, in Alamosa, Colorado; March 30, 2011, in Monte Vista, Colorado; and March 31, 2011, in Moffat, Colorado. The scoping meetings were attended by approximately 50 people, many of whom provided input for the scoping process. Additionally, 14 written comments were received from organizations and members of the public. A press event and public meeting was held at Adams State College in Alamosa, Colorado, on January 4, 2012, at which the Secretary of the Interior, Ken Salazar, organized the presentation of several complementary initiatives for the San Luis Valley and Sangre de Cristo Mountains. One of these initiatives was landscape-scale conservation, which the Director of the Service presented as being embodied by the then SLVCA. Questions were

answered and comments taken at a breakout session following the main meeting. The meeting was attended by more than 300 members of the public.

Together, these meetings and subsequent feedback helped the Service to see the questions and concerns of the public, as well as to refine the project boundary.

Public Review of the Draft Environmental Assessment and Land Protection Plan

The Service released the draft EA and LPP on May 9, 2012 for a 30-day public review period. The draft documents were made available to Federal elected officials and agencies, State elected officials and agencies, 17 Native American tribes with aboriginal interests, and other members of the public who asked to be added to our mailing list.

In February and May of 2012, refuge staff met with members of the land protection community in the San Luis Valley to discuss conservation priorities in the region. At these meetings, the Service discussed the SCCA with representatives from entities including Rio Grande Headwaters Trust, Colorado Open Lands, Orient Land Trust, The Nature Conservancy, Colorado Cattlemen's Agricultural Land Trust, the Natural Resources Conservation Service, Trust for Public Lands, and Colorado Parks and Wildlife. Positive, constructive feedback received at those meetings guided the Service in the development of the draft and final LPP and EA.

In addition, three public meetings were held in Alamosa, San Luis, and Moffat, Colorado on May 14, 15, and 16, respectively. Approximately 50 residents and representatives of elected officials attended the 3 meetings. While the meetings presented a broader, valley-wide vision for the conservation area, the SCCA is encompassed entirely within that boundary, and the Service is considering the SLVCA NEPA review to have captured the potential impacts of the SCCA. The Service received 14 written comments that have been entered into the administrative record. Please see appendix D for the submitted comments and responses.

Distribution and Availability

Copies of the land protection plan and environmental assessment were made available to Federal and State legislative delegations, tribes, agencies, landowners, private groups, and other interested individuals. Additional copies of the document are available from the following offices and contacts:

U.S. Fish and Wildlife Service
Region 6 Division of Refuge Planning
P.O. Box 25486–DFC
Denver, CO 80225
303 / 236-8132
http://mountain-prairie.fws.gov/planning/lpp.htm

U.S. Fish and Wildlife Service
San Luis Valley National Wildlife Refuge Complex
8249 Emperius Road
Alamosa, CO 81101
719 / 589 4021

Appendix A

Environmental Assessment

Chapter 1—Purpose of and Need for Action

This environmental assessment (EA) documents the purpose of and the issues, alternatives, and analysis for the Sangre de Cristo Conservation Area (SCCA). This conservation area grew out of initial planning for the San Luis Valley Conservation Area (SLVCA), that represents a broader vision for the headwaters of the Rio Grande. Planning for that conservation area will continue as the Service works to find more specific goals for the SLVCA as it relates to the existing national wildlife refuges in the San Luis Valley. The Service is moving forward to establish the SCCA within the original SLVCA boundary. The SCCA will be located largely in southern Colorado, but a small part will be in northern New Mexico. See the LPP for background information and descriptions on the conditions that led to the U.S. Fish and Wildlife Service (Service or USFWS) proposal to create the SCCA for the protection of important wetland and upland habitats, primarily through conservation easements with willing landowners.

Introduction

The SCCA is a landscape-level strategic habitat conservation initiative within the Southern Rockies Landscape Conservation Cooperative. The SCCA is in the headwaters of the Rio Grande in the southeastern corner of the San Luis Valley. The San Luis Valley is a large intermountain valley bounded by the San Juan and Sangre de Cristo mountain ranges, whose rain shadows create high desert conditions in the region. However, the complex hydrology of the valley, as well as the snowmelt runoff from the mountains, have created a variety of dynamic wetlands and riparian corridors on the mountain slopes and valley floor. These wetland areas support a diverse assemblage of plants and wildlife, including habitat for many trust species such as the southwestern willow flycatcher, western snowy plover, many species of migrating and nesting waterfowl, and 95 percent of the Rocky Mountain population of greater sandhill crane. The mountains themselves are also ecologically important, providing habitat for imperiled species such as Canada lynx and Mexican spotted owl, as well as serving as migration corridors for wildlife in this southernmost extension of the Rocky Mountains.

Anthropogenic practices including agriculture, changes in fire regime, and climate change have changed the historical vegetation of the San Luis Valley. Low human population density associated with the largely agricultural economy of the valley have resulted in the San Luis Valley and central Sangre de Cristo Mountains keeping substantial parts of their biological value, particularly for migratory birds. However, rising agricultural costs, including those resulting from the recent State of Colorado requirement to augment surface flows to offset the impacts of ground water use, have led to an unsettled agricultural economy. The risk of second home development of the already heavily subdivided Costilla County continues, and would substantially reduce the quality of that habitat for sagebrush-dependent species. Substantial residential development or unsustainable logging practices in the Sangre de Cristo's would also degrade that habitat for the species discussed before. Through the SCCA, the Service hopes to protect a large part of the wildlife habitat in the region from such degradation.

Proposed Action

The Service is moving to create the one-million-acre SCCA to conserve vital wildlife habitats and migration corridors through voluntary conservation easements. The SCCA acquisitions will focus on the protection of riparian corridors, wetlands, sagebrush, and montane forests in the valley through the purchase of up to 250,000 acres of conservation easements. The lands protected via easement would remain in private ownership. These lands could continue to be grazed, hayed, farmed, or otherwise managed in accordance with current practices. However, subdivision and development would be restricted, subject to stipulations agreed-upon by the landowner and the Service.

Furthermore, some easements may include stipulations that the exercise of water rights associated with these lands could be changed only if the proposed changes would be beneficial to wildlife.

Unlike some other conservation areas of the National Wildlife Refuge System, in which objectives and the setting of priorities are largely based on modeling for one species or a guild of species, the SCCA is intended to meet all the objectives of a complex geographic, ecological, and political environment. It therefore has a diverse range of goals:

- conserve, restore, enhance, and protect wetland and riparian habitat, an important breeding and foraging resource in the high mountain desert for migratory shorebirds, waterfowl, and neotropical passerine birds
- support the recovery and protection of threatened and endangered species that occur in the SCCA, and reduce the likelihood of future listings under the Endangered Species Act by prioritizing key habitat for listed species and species that are candidates for listing
- protect the integrity of these habitats by preventing fragmentation and conversion of native vegetation
- conserve working landscapes based on ranching and farming activities that support a viable agricultural industry
- promote ecological resiliency and adaptive capacity by connecting together the existing network of public and private conservation lands

Decisions to Be Made

Based on the analysis provided in this final EA, the Regional Director of the Service will make two decisions:

1. Figure out if the Service should establish the SCCA, in accordance with its land protection planning policy.
2. If yes, figure out if the selected alternative will have a significant impact on the quality of the human environment. This decision is required by the National Environmental Policy Act (NEPA). If the quality of the human environment would not be affected, a "finding of no significant impact" will be signed and will be made available to the public. If the preferred alternative would have a significant impact, an environmental impact statement will be prepared to further address those impacts.

Issues Identified and Selected for Analysis

Please see a description of issues identified and selected for analysis in chapter 1 of the land protection plan in this volume.

Related Actions and Activities

Please see a description of related actions and activities in chapter 1 of the land protection plan in this volume:

Chapter 2—Alternatives

This chapter describes the two alternatives identified for this project:

- no-action alternative
- proposed action, giving the Service the authority to create the SCCA

These alternatives were developed according to NEPA §102(2)(E) requirements to "study, develop, and describe proper alternatives to recommend courses of action in any proposal that involves unresolved conflicts concerning alternatives uses of available resources." The alternatives consider the effects of a conservation easement program with limited fee-title acquisition within the project area boundary identified in this EA.

In addition, alternatives that were dropped from detailed study are briefly discussed.

Alternative A (No Action)

Under the no-action alternative, the areas outside of existing protected areas would largely remain in private ownership and subject to changes in land use or habitat type. Some added protection is likely because of ongoing conservation easement initiatives in the San Luis Valley by public entities such as the NRCS and nongovernmental organizations such as the Colorado Cattleman's Agricultural Land Trust and Colorado Open Lands.

Alternative B (Preferred Alternative)

Under the preferred alternative, the Service will establish the SCCA in southern Colorado and northern New Mexico. The project boundary encompasses approximately one million acres. Within this boundary, the Service would strategically acquire from willing sellers perpetual conservation easements on up to 250,000 acres through purchase or donation. The Service would also consider accepting fee-title donations, but does not plan to buy lands in fee title.

Conservation easements are both a cost-effective and politically effective means of land protection. They stem from the "bundle of rights" concept of land ownership (Merenlender et al. 2004), wherein, like severed surface and mineral rights for a given parcel, a part of the land title is severed and transferred to a land trust or public agency for conservation purposes. They are quite popular for a variety of reasons. Because they allow the property owner to continue using the land, subject to agreed-upon stipulations, they protect working landscapes, which is a priority of the America's Great Outdoors initiative. Perpetual conservation easements provide a one-time source of income to the seller or a tax incentive to the donor, and can even be an estate planning tool (Engel 2007). In many cases, they can meet the conservation objectives of the Service without our incurring the costs associated with managing fee-title land; furthermore, the land remains on the county tax rolls. In the SCCA, the Service seeks to protect up to 250,000 acres through conservation easements.

Potential easements will be ranked based on wildlife needs in the project area, which include areas of wetland, riparian, montane forest, and upland habitats. See the LPP in this volume for detailed descriptions of these priorities.

Alternatives Considered but Dropped from Further Analysis

Voluntary landowner zoning or county zoning

Under this alternative, landowners would voluntarily petition their county commissioners to create a zoning district to direct the types of development that can occur in an area. An example of citizen-initiated zoning is when landowners would petition the county government to zone an area as agricultural, precluding certain types of nonagricultural development, such as residential subdivision or construction of a solar energy facility. However, zoning decisions are easily changed and thus do not ensure perpetual habitat protection. Also, agricultural zoning would be inadequate because water has become an increasingly expensive and limiting resource and it thus would not in itself stop continued conversion from flood-irrigated vegetation to less biologically diverse cultivated crops. This conversion has often been accompanied by the replacement of flood irrigation practices with center-pivot irrigation. Although center-pivot irrigation offers onsite water efficiency, it results in land cover that is far less suitable to wildlife than native vegetation or even flood-irrigated agriculture. Because of these reasons, this alternative was not investigated further.

Management by others

Some governmental and nongovernmental organizations are active in promoting conservation within the SCCA and the broader San Luis Valley region. Current land managers include the Colorado Parks and Wildlife, the Colorado State Land Board, the BLM, the NPS, the USFS, and the Service. Additional land is conserved in fee title by The Nature Conservancy, and conservation easements are held by Ducks Unlimited, Rio Grande Headwaters Trust, the NRCS, and the Colorado Parks and Wildlife, among others. There are active conservation initiatives underway by these organizations, but none has the scope necessary to achieve the conservation objectives of the SCCA, nor do other organizations have the same wildlife habitat objectives.

Fee-title acquisition

Much of the publicly owned land mentioned in the previous section has been managed for conservation purposes for decades; indeed, Great Sand Dunes National Park and Preserve was originally established in 1932 as a National Monument. Fee-title ownership allows the strongest protection for the habitat and allows the greatest flexibility for adaptive management in response to new data or changing conditions. However, acquisition of new public land on the scale of the SCCA is politically untenable and, given the low appropriation of Land and Water Conservation Fund monies, it is also financially unrealistic. For these reasons as well as the expense of managing more public lands, it is the Service's policy to acquire the minimum interest necessary to reach conservation objectives.

Chapter 3—Affected Environment

Please see a discussion of the resources and affected environment in chapter 2 of the LPP in this volume.

Chapter 4—Environmental Consequences

For alternatives A and B described earlier, the following narrative documents the analysis of environmental effects expected to occur from carrying out each of the alternatives.

Effects on the Physical Environment

The estimated effects of each alternative on mineral, soil, and water resources, and on the Service's ability to address climate change, are described below.

Alternative A (No Action)

Development and associated habitat loss could continue on lands outside of existing protected areas; in riparian areas, development may cause erosion and sedimentation that ultimately could adversely affect aquatic species like the Rio Grande cutthroat trout.. Further land protection would be limited to the efforts of other agencies and organizations. The Service's role would be limited to programs such as Partners for Fish and Wildlife; no Land and Water Conservation Fund monies would be expended in the project area by the Service for further land protection outside of the immediate vicinity of existing refuge units. Important water-dependent wildlife habitat would remain vulnerable to reallocation of surface water offsite or changes to how existing water rights are exercised.

Alternative B (Preferred Alternative)

The implementation of the goals of the SCCA will primarily support current land use practices, and is therefore unlikely to substantially affect soil resources in the valley. There may be some reduction in erosion and sedimentation because of the prevention of subdivision and development. The SCCA wouldn't supersede existing third party mineral rights, and the program is therefore unlikely to affect mineral resources. If the mineral estate has not been severed, the easement may include restrictions on surface occupancy, but the Service would not, and cannot, prevent a mineral owner from accessing their minerals. The Service is unlikely to pursue acquisition of interests in lands with outstanding surface mineral leases or rights because the associated destruction of surface vegetation and need for reclamation would diminish the wildlife value of such land. In some circumstances, habitat that depends on continuation of current water use practices would be protected from degradation caused by the sale of surface water rights or substantial changes to water use.

Effects on the Biological Environment

This section describes the likely effects of the project on species and their habitats.

Alternative A (No Action)

The Service's Partners for Fish and Wildlife Program would remain active within the project area, where it works cooperatively with landowners to voluntarily improve habitat on private land. Habitats would continue to be protected because of the ongoing efforts of agency partners and nongovernmental organizations, primarily through easements paid for by private donations, the NRCS Wetland Reserve Program (WRP), and North American Wetlands Conservation Act (NAWCA) grants. These efforts are laudable and have conserved valuable habitat, particularly wetlands. However, they tend to underrepresent nonwetland riparian forest and uplands such as sagebrush steppe, both of which are particularly important for federally listed species and candidates for listing in the project area. Further, the demand for both NAWCA and WRP money is much higher than for historically available money. Also, unlike a Land and Water Conservation Fund easement program, NAWCA requires matching funds, which may or may not be available. Therefore, there would likely continue to be erosion of habitat quality and a decrease in ecological resiliency because of land cover changes and associated fragmentation, introduction of exotic species, and construction of

structures that are incompatible with habitat use by some wildlife.

Outright habitat loss because of conversion of land to other uses is perhaps the most obvious threat to wildlife in most areas. In the SCCA, this can take the form of conversion from natural to agricultural land cover, changes to irrigation regimes, and development of land for commercial or residential use. This habitat destruction, along with construction of associated infrastructure such as water diversion structures, can result in the fragmentation of habitat. The effects of fragmentation on wildlife have been intensively studied in ecology and wildlife biology (for a conceptual review, see Collinge 2009).

Both the loss and fragmentation of riparian habitat are real concerns in the SCCA. Riparian areas are necessary for the maintenance of medium and large mammal diversity in agricultural landscapes (for example, Hilty and Merenlender 2004), and for both breeding and stopover habitat for neotropical migratory songbirds in human-altered landscapes (Pennington, Hansel, and Blair 2008). Riparian areas provide nest habitat for the threatened southwestern willow flycatcher and the candidate yellow-billed cuckoo, and the slow but continued loss of this habitat under alternative A would have an impact not just on regional species diversity, but also on the potential persistence of imperiled species.

Besides providing habitat in and of themselves, riparian areas also serve as corridors for animal movement. Facilitating animal movement across complex mosaic landscapes is essential in a time of global environmental change. One of the greatest ecological threats of climate change is that species and varieties that are adapted to specific environmental conditions may die out because they are isolated from habitats that may have those conditions in the future (Loss et al. 2011). Under alternative A, there is continued risk of development in riparian corridors that were contiguous before, as well as in unprotected areas along the Sangre de Cristo Mountains in Costilla County, Colorado, and northern Taos County, New Mexico, which could endanger the future existence of populations and species under future climate conditions. The latter area is also habitat for the Canada lynx, which is federally listed as threatened. Development of that region, which could occur under alternative A, may isolate lynx in the southern Sangre de Cristos from those in the rest of the Rocky Mountains.

Alternative B (Preferred Alternative)

Establishment of the SCCA will enable the Service to permanently protect up to 250,000 acres of vital wildlife habitat in the San Luis Valley and Sangre de Cristo Mountains. While there are conservation initiatives by other government agencies and private land trusts underway in the project area, the SCCA specifically targets habitat that is necessary for migration or breeding of Federal trust species, namely migratory birds and a handful of federally listed and candidate nonbird species. The conservation area should complement and enhance the ecological benefits of existing public and private conservation lands and habitat improvement programs by capturing habitats not included in these programs and by helping to link together the existing protected area.

The use of easements to protect and buffer riparian habitats under alternative B will benefit both obligate riparian species like the southwest willow flycatcher, bats like the Yuma myotis, and species that simply use the riparian areas as corridors to move from point to point, like bobcat and black bear. Of particular interest are the willow and cottonwood riparian forests along the tributaries of the Rio Grande, which are used by dozens of species of migratory songbirds. In the rivers and tributaries themselves, the use of easements could support conditions suitable for imperiled fish such as the Rio Grande cutthroat trout, Rio Grande chub, and Rio Grande sucker by preventing development of houses and roads, which can cause siltation and changes in water chemistry and temperature. Easements would also prevent conversion of shrub steppe near riparian areas to cropland, which can lead to increases in sediment, nitrogen loads, and temperatures in associated streams.

The presence of mesic [wet] habitats in the midst of a high-mountain desert provides an irreplaceable resource to regional, and in some cases continental, populations of breeding and migrating shorebirds, wading birds, and waterfowl. Water costs in the San Luis Valley are increasing because of restrictions on the use of ground water, and water is likely to become an increasingly complex issue because of projected changes in runoff timing and uncertainty about future precipitation trends (Ray et al. 2008). This may encourage landowners who have quality wetlands to change how they exercise their water rights, to the detriment of species that use those wetlands. On some properties with such water-dependent habitat, the easements may include language restricting changes to existing beneficial uses of water, meaning that willing sellers would agree to support practices that are of value to wildlife. For example, water could not be sold off of the property where water rights were being exercised when the easement was bought unless the new use was deemed more beneficial to wildlife. Many of these wetlands would not exist now without current land use practices.

Sagebrush shrubland and steppe are not widespread in the project area, but are found in a ring above the desert scrubland and below the pinyon-juniper woodland in the far northern, southeast, and southwest parts of the valley. Much of this land is managed by the BLM. The largest areas of this vegetation in the

region are in Costilla County, Colorado, and these areas are almost entirely privately owned and not under conservation easements. Colorado Parks and Wildlife has identified that area as potential but unoccupied habitat for the Endangered Species Act candidate Gunnison sage-grouse. Sage-grouse, as well as other sagebrush obligates, are particularly sensitive to disturbance, especially the construction of vertical structures in their habitat, which could happen if homes and associated power lines were constructed. Much of that area has been subdivided into small parcels, but little real development has occurred to date outside of small towns and cities. Given those factors, and the lack of attention being given to that habitat type by conservation partners now, land protection under alternative B is likely to play an important role in preventing modification of this important ecosystem. It is unknown if there will be future attempts to reintroduce Gunnison sage-grouse to that area, but certainly it would be unlikely to happen if the existing habitat were altered.

As discussed under alternative A, there are large unprotected areas along the spine of the Sangre de Cristo Mountains in Costilla County, Colorado, extending into Taos County, New Mexico. Alternative B will allow the Service to use its acquisition authority to complement efforts by private land trusts to protect this important wildlife corridor and Canada lynx habitat.

Effects on Cultural Resources

The estimated effects of each alternative on cultural resources are described below.

Alternative A (No Action)

Some cultural resources could be adversely affected by activities such as development and road construction on lands outside of existing public and private conservation lands. While the rate of development is not rapid now, the San Luis Valley is rich with millennia of human history, and much of the valley's history is poorly documented. There are legitimate concerns that important sites may be destroyed or irreparably disturbed in the absence of protection.

Alternative B (Preferred Alternative)

There is the potential for greater protection of cultural resources than under alternative A because the easement terms that prevent development of land in ways that could adversely affect wildlife could also prevent destruction of Native American, Hispano, and other historic American sites.

Effects on the Socioeconomic Environment

This section describes the estimated effects of the alternatives on land use, ecosystem services, land ownership, and the regional economy.

Alternative A (No Action)

Landownership patterns will continue to change in accordance with market forces, as will resulting modification of ecosystem services and changes in cost of public service delivery by local government. Landowner compensation through conservation easements would remain available through other Federal programs and the efforts of nongovernmental organizations.

Alternative B (Preferred Alternative)

Social and Economic Impacts of Conservation Easements

Conservation easements provide public benefits for local residents, communities, and governments. Easements and fee-title acquisitions also reshape future development patterns, affect property values, and inject new money into local communities. There are many dynamic variables at play when considering the social and economic effects of conservation easements, especially given that potential purchases may span decades. Because of future uncertainty surrounding such factors as the likelihood and timing of easements; the availability of Service money to buy lands; and population growth, land values, and agricultural commodity prices, the social and economic impacts of the easements cannot be quantified in this analysis. However, these impacts can be described qualitatively. This analysis discusses the following effects of conservation easements in the SCCA:

- conservation values in the region
- benefits to local communities
- landowner compensation
- effects to local government net revenue

Table A, located at the end of this section, provides a summary of the social and economic impacts of conservation easements and fee-title acquisitions in the SCCA.

Conservation Value. Conservation easements can protect values associated with biodiversity and wildlife abundance, keep aesthetic beauty, and protect social and culturally significant features of landscapes and livelihoods (Millennium Ecosystem Service Assessment 2005, Ehrlich and Ehrlich 1992, Daily 1997). Ecosystem services, such as water purification, oxygen production, pollination, and waste breakdown,

are also supported for local residents through land preservation (Millennium Ecosystem Service Assessment 2005). The primary public benefit of Service conservation easements is enhanced and preserved wildlife habitat. As development stressors increase over time, many key off-refuge habitat areas may become less available because of conversion to non-wildlife habitat uses. Habitat preservation has been shown to stabilize and increase wildlife populations (Reynolds and others 2001). Conservation easements on private lands strengthen the resiliency of species habitat and provide opportunities for wildlife movement and adaptation for years to come.

Benefits to Local Communities. Although local residents may not be able to explicitly use or access land protected by conservation easements, protected lands act as a buffer that benefits residents through increased biodiversity, recreational quality, and hunting opportunities on publicly accessible wildlife refuges and on some private lands (Rissman et al. 2007). It is well documented that open space carries positive values to local residents and communities, as well as to passersby (McConnell and Walls 2005). This is evidenced by the success of open space preservation ballot initiatives at the local, county, and State levels. Banzhaf et al. (2006) point out that between 1997 and 2004, more than 75 percent of the more than 1,100 referenda on open space conservation that appeared on ballots across the United States passed, most by a wide margin.

It is also well documented that open space and protected natural areas can increase surrounding property values (see McConnell and Walls 2005 for a comprehensive review). The reciprocating value of open space on property values will vary depending on landscape characteristics and location attributes (for example, distance to the conserved area) (Kroger 2008). The permanence of the open space is also an influencing factor. Typically, open space that is permanently protected (such as refuge lands and lands protected with perpetual conservation easements) will generate a higher enhancement value to local properties than land that has the potential for future development (Geoghegan et al. 2003). Location and demographic factors in the region can also influence the relative level of property enhancement value. For instance, open space may generate larger amenity premiums for property in more urbanized areas and where median incomes are higher (Netusil et al. 2000), which isn't to say there isn't the chance for property values to increase substantially in rural areas as well (Vrooman 1978, Phillips 2000, Crompton 2001, Thorsnes 2002).

Conservation easements would also inject new money into the local economy. The sale of conservation easements provides landowners with more revenue. Some percentage of this money may be spent in the local economy, including purchasing new real estate, consumer goods, or services in the local area. Conservation easements may also help keep the character of a region by protecting a traditional and historical way of life and the associated working landscape. Land with historical commercial use, such as ranching, forestry, and farming, is often compatible with or beneficial to wildlife refuge objectives (Jordan et al. 2007, Rissman et al. 2007). Conservation easements provide financial benefits for landowners that may enable them to preserve the natural and historical value of their farm, ranch, and open space lands, and to pass this legacy on to their children and grandchildren. In addition to supporting a cultural heritage, the preservation of farming and ranching operations can result in economic benefits to the local economy. Farmers' costs for equipment, supplies, and materials may be spent in the local economy, thus stimulating local businesses and supporting local employment. Farm workers will also spend their salaries in the local economy, thus supporting further local employment. Conservation easements may also result in increased recreation-related spending by visitors.

Landowner Compensation. The Service will buy conservation easements from willing sellers at fair market value. The fair market value of a conservation easement is found through an appraisal process. An appraiser estimates how much the land would sell for unencumbered by the conservation easement (the "before" value) and how much the land would sell for with the conservation easement in place (the "after" value). The value of the conservation easement is equal to the before value minus the after value, or the difference in the fair market value of the property with and without the easement. Landowners may also choose to donate conservation easements to the Service. The donation of a conservation easement may qualify as a tax-deductible charitable donation, which may result in Federal income tax benefits. The sale of a conservation easement for less than its fair market value (called a "bargain sale") may also qualify for tax deductions. Landowners may be able to claim a charitable income tax donation equal to the difference between the fair market value and the bargain sale price of their easement. Income from the sale of a conservation easement may be taxable. Please note that the Service does not give tax advice. Landowners considering entering into a conservation agreement with the Service should consult a tax advisor or attorney for advice on how a conservation easement would affect their taxes and estate.

Conservation easements reduce the value of the encumbered property. A conservation easement will reduce the fair market value of an estate because the easement permanently removes some of the estate's development potential. The reduction in value depends

on the potential development value of the land and the level of restriction agreed-upon in the easement. In general, an easement on land located in an area with high development pressure will have a greater effect on the value of the land than an easement on land located in an area with low development pressure, and an easement that is more restrictive will have a greater effect on the value of the land than an easement that is less restrictive. The Service will buy easements at their appraised fair market value; therefore, easements on lands with high development pressure will receive higher payments.

Effects on Local Government Net Revenue. The effects of conservation easements on the net revenue of local government are complex and speculative; many variables are at play, and realizing the effects often requires time. Local governments collect revenue through intergovernmental transfers, property taxes, sales taxes, personal income taxes, and other charges, such as permitting. These revenues are then spent to provide community services such as fire and police services, schools, infrastructure, and public spaces. Conservation easements affect the location of future development, and therefore affect both future revenues and costs for local governments. The following sections describe the possible effects to local government revenues and costs. Overall, the SCCA conservation easement program is expected to have negligible effects on local government net revenues (revenues minus costs).

Effects on Local Government Revenues. Property taxes constitute the largest source of local governments' own revenue (Urban Institute and Brookings Institution 2008), and are not expected to be substantially affected by conservation easements in the SCCA. Property taxes are assessed based on the value of property. For most types of properties, county assessors use fair market value to find property tax liabilities; however, agricultural land is often assessed differently. In many States, the assessed value of agricultural land is found based on the productive value of the land rather than on the fair market value of the property. The fair market value of land is the amount that a property is estimated to sell for. This value includes both the productive value of the land and any speculative value associated with the possibility of developing the land. Conservation easements reduce the fair market value of property by removing the speculative value associated with possible development; however, conservation easements generally do not affect the productive value of agricultural land.

The SCCA will include land in two States: Colorado and New Mexico. In both States, property taxes for agricultural land are assessed based on the productive value of the land or farm income[1] (Colorado Division of Property Taxation 2006; New Mexico Taxation and Revenue Department 2011). In the SCCA, most properties that will enter into conservation easement agreements with the Service will be classified as agricultural land; thus, there will be little effect on the current property tax base for the nine-county area. Some of the lands in the SCCA that will enter into easements are now fallow and do not classify as agricultural lands. For these properties, assessors may assess the fair market value of the land based only on the uses allowed by the easement. This could result in a small reduction in property tax revenue in some counties within the region. The reduction in property taxes will be dependent on the percent of easement acres that are bought on fallow land (versus agricultural land), and on the reduction in the market value of the fallow lands.

The donation of any fee-title lands will reduce the amount of property tax revenue collected by local governments because the Service is exempt from taxation on its property holdings. Under Federal fee-title ownership, counties would qualify for reimbursement of some property tax revenue foregone under the Refuge Revenue Sharing Act of 1935, which allows the Service to make annual payments to local governments in areas where fee-title purchases have removed land from the tax rolls. Under provisions of the Refuge Revenue Sharing Act, local counties receive an annual payment for lands that have been bought by full fee-title acquisition by the Service. Payments are based on the greater of 75 cents per acre or 0.75 percent of the fair market value. The exact amount of the annual payment depends on Congressional appropriations, which in recent years have tended to be substantially less than the amount required to fulfill the authorized level of payments. In fiscal year 2010, actual Refuge Revenue Sharing payments were 22 percent of authorized levels.

Local government revenue associated with personal income is expected to remain relatively constant within the nine-county area. Conservation easements and fee-title acquisitions in the SCCA would affect the location and distribution of development, but are not expected to change the rate or density of human population growth. Redistribution of population growth could affect the distribution of personal-income-related revenues across the counties, but is expected to have little effect on total revenues within the nine-county area. There would be a one-time increase in landowner income as the Service buys the easements.

Effects on Local Government Costs. Land protection through conservation easements could result in a reduction in future expenditures for local governments

[1]*Special rules and statutes apply in each State to figure out if land in agricultural production and land in conservation easements is eligible to be assessed as agricultural land*

and municipalities. New residential developments require local governments to provide services such as fire protection, police services, and schools, and to construct new infrastructure such as roads, parks, and water and electric-delivery systems. The costs to provide government services for new residential developments often exceed new revenues derived from the developments. This is especially true for rural residences, which tend to have higher costs for county governments and school districts than urban residences. In 2001, the American Farmland Trust found that, on average, the cost to provide community services to new residential developments was $1.15 for every $1.00 of revenue generated by those developments (American Farmland Trust, 2001; Coupal et al. 2002). A study conducted in Wyoming found that community service costs averaged $2.01 for every $1.00 of revenue for rural residential lands; in contrast, the average cost to provide services for lands under agricultural production averaged $0.54 for every $1.00 of revenue (Taylor and Coupal 2000).

Impacts to Federal permitting and property rights of nonparticipants. Neither the authorization nor the establishment of the SCCA would affect the administration of lands by other Federal agencies; the SCCA boundary is simply an acquisition boundary within which the Service could acquire easements or property. Landowners who choose to take part in the program would sell or donate certain property rights to the Service. There would be no impact on adjacent property owners. Traditional land use rights awarded to certain residents of the former Sangre de Cristo land grant would not be affected by sale or donation of easements on those properties, as those property rights have been found by the Colorado Supreme Court to not belong to the landowner; therefore, they are not available for sale to the Service.

Unavoidable Adverse Impacts

This section describes adverse effects which may be unavoidable when carrying out alternatives A and B.

Alternative A (No Action)

Loss of wetland, riparian, and upland vegetation and their associated habitat values would continue because of development of areas outside of those protected by partner agencies and land trusts.

Alternative B (Preferred Alternative)

No direct or indirect unavoidable adverse impacts to the environment would result from choosing alternative B. An easement program would not result in adverse impacts on the physical or biological environment. Choosing an approved boundary for the SCCA and concurrent authorization to go forward with an easement program would not, by itself, affect land ownership or value, or other aspects of the socioeconomic environment.

Irreversible and Irretrievable Commitment of Resources

Any commitments of resources that may be irreversible or irretrievable because of carrying out alternatives A or B are described below.

Alternative A (No Action)

There would be no commitment of resources by the Service if alternative A were selected. The Service could still exercise its authority to acquire inholdings or for minor expansions of existing refuges, but would not be obligated to do so.

Alternative B (Preferred Alternative)

The establishment of the SCCA would not, of itself, constitute an irreversible or irretrievable commitment of resources. However, if interests in land were acquired through the use of Land and Water Conservation Fund or donations, the administration of the easement provisions or donated property would require an irreversible and irretrievable commitment of resources. Checking easements would represent a minor increase in overall Service costs borne by the San Luis Valley National Wildlife Refuge Complex.

Short-Term versus Long-Term Productivity

Following is a discussion of short- and long-term effects.

Alternative A (No Action)

Continued efforts to conserve habitats would be ongoing through the efforts of Service activities like Partners for Fish and Wildlife and the efforts of other agency and nonprofit partners. Important wetland and upland habitats would be expected to continue to be lost at current rates of conversion, which would have long-term negative implications on the maintenance of the ecological communities they support.

Alternative B (Preferred Alternative)

The Service would be authorized to buy perpetual easements only from willing sellers, providing an

immediate short-term economic benefit to landowners. This may provide capital for expansion of agricultural operations, or simply allow struggling operators to stay in business. This is particularly relevant given the changes to Colorado water law, which now requires ground water users to buy increasingly expensive surface water to decrease their impact on senior surface water users. This infusion of capital at an opportune time would likely have important long-term benefits to the economy of the San Luis Valley. The conservation of habitats under this program would also have important short- and long-term ecological benefits. The program will preserve habitat now used by wildlife, including federally protected species. This will result in the preservation of the area's biodiversity, which is important for long-term ecosystem stability and function in arid environments (Maestre et al. 2012). By preventing fragmentation, particularly in wildlife corridors like riparian areas and along the Sangre de Cristo Mountains, the program will promote long-term ecological resiliency to habitat perturbations such as large wildfires and climate change.

Cumulative Impacts

As defined by NEPA regulations, a cumulative impact on the environment "results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). The following describes the past, present, and reasonably foreseeable actions related to the proposed SCCA. A discussion follows about the cumulative impacts of these actions in combination with the actions of alternatives A and B.

Past, Present, and Reasonably Foreseeable Future Actions

Some private and public organizations have successfully conducted land protection programs in the San Luis Valley through negotiation of conservation easements with willing landowners. One specific example is a coalition of local governments, landowners, and nonprofit organizations that is working to conserve land as part of their mitigation strategy in the draft San Luis Valley Habitat Conservation Plan that was released in June of 2012. The Service assumes this will likely continue in the future.

The State of Colorado is carrying out new laws about ground water augmentation, wherein landowners who use ground water for irrigation will have to buy surface water rights to offset any adverse impacts on downstream users.

There is ongoing interest in the San Luis Valley for renewable energy development. There are small-scale commercial solar facilities now deployed in the San Luis Valley, and the Department of Energy and the BLM are studying the impacts of more facilities being developed on public land (BLM and DOE 2010). The BLM is now reviewing the potential impacts of expanded geothermal leasing on public lands in the San Luis Valley (BLM 2012). The potential for increased energy production, and the desire for redundancy in the electrical transmission system in the San Luis Valley has led to planning for the construction of a high-capacity transmission corridor through the valley, crossing the Sangre de Cristo Mountains at La Veta Pass.

Alternative A (No Action)

Under this alternative, there would be no cumulative impacts on the environment because the Service would not undertake any more land protection measures.

Alternative B (Proposed Action)

The continuing land protection efforts of others, combined with the proposed action, may have nonlinear, positive effects on wildlife populations. Because this alternative would focus on federally regulated species (such as priority migratory bird species and species listed or being considered for listing under the Endangered Species Act), implementation would result in accelerated protection of habitats for those species. Service seeks to coordinate its land protection efforts by promoting active communication with our conservation partners on land protection opportunities as they arise so that the organization whose program is most proper can seek the acquisition of a particular land interest. The public and private conservation entities in the San Luis Valley have a longstanding friendly relationship and view each other's conservation objectives as largely complementary. However, there are specific instances where potential conflict could arise without this communication, such as riparian habitat of the southwestern willow flycatcher. The Service's does not intend to compromise the ability of local government to meet their mitigation targets in the San Luis Valley Habitat Conservation Plan. To this end, the Service would not undertake any acquisition of southwestern willow flycatcher habitats along the Rio Grande or its tributaries without discussing the opportunity with our conservation partners. The Service would defer to partners in all instances where they need to seek an interest in the land first.

The impacts of new Colorado water law on water availability and cost may be cumulative with the impacts of the Service's easements, which, depending upon the habitat present on a specific property, may include language restricting the sale of surface water rights from lands protected under this program. Because the easements would keep current water use

practices on lands where an interest is acquired, these impacts are unlikely to be significant.

The presence of a Service interest in land could preclude construction of commercial energy production or transmission infrastructure on that property if such activity is deemed to be incompatible with the purpose of the SCCA. This would result in unknown effects because of potentially limiting where such facilities could be sited, but the impacts of such limitations on economics and the attainment State and Federal renewable energy requirements would be speculative at best, and are outside of the scope of this analysis.

Any impacts of the proposed action that are cumulative with the actions of others will largely be decided by 1) the number of landowners willing to enter into easement agreements with the Service and 2) the amount of money available for acquisition of these easements.

Table A. Social and economic impacts of conservation easements and fee-title acquisitions.

	Social and economic impacts	
Issue	*Conservation easements*	*Fee-title acquisitions*
Conservation value	■ Migration corridors and habitat for deer, elk, moose, and migratory birds will be preserved.	■ Same as for easements plus the conservation value of fee-title lands may be greater than easement lands because the Service would have the ability to increase conservation value through projects on the land.
Affects to local communities	■ The public will enjoy increased biodiversity, recreational quality, and hunting opportunities on nearby publicly accessible refuges and some private lands. ■ Neighboring property values may increase. ■ Positive economic impacts may result from new landowner money injected into the local economy. ■ Traditional and historical ranching and farming landscapes will be preserved.	■ Same as for easements except traditional and historical ranching and farming landscapes may not be preserved. ■ Positive economic impacts may also result from increased Service habitat improvement expenditures injected into the local economy. ■ Possible increase in refuge visitation and associated impacts of visitor spending in the local economy. However, neighbors and other public may be affected by increased accesses to refuge lands.
Landowner compensation	■ Landowners will be compensated for the fair market value of the easement. ■ Easements will reduce the fair market value of the encumbered property. ■ Landowners keep most use rights, but forfeit their right to develop or subdivide the land. Other possible restrictions include development of vertical structures, diversion or sale of water rights.	■ Landowners will be compensated for the fair market value of the land. ■ Landowners forfeit all rights of ownership and turn the property over to the Service.
Affects on local government net revenue	■ No changes to property tax revenues are expected for agricultural lands. ■ Property tax revenues from fallow lands will decrease. ■ Other government revenues, such as personal income tax, may be redistributed throughout the region. ■ Land protection through conservation easements could result in reduced future service costs for local governments and municipalities.	■ The Service does not pay property taxes on land they own; thus, county tax revenue would decline. ■ Lost property tax revenues are partially replaced with Refuge Revenue Sharing payments.

Chapter 5—Coordination and Environmental Review

This chapter describes how the Service coordinated with others and conducted environmental reviews of various aspects of the project proposal and analysis. Additional coordination and review would be needed to carry out the proposed action, if selected.

Agency Coordination

The Service has discussed the proposed establishment of the SCCA with other Federal (USFS, National Park Service, BLM, NRCS), State of Colorado (Colorado Parks and Wildlife, Colorado Water Conservation Board), local county governments, and regional entities (Rio Grande Water Conservation District) through a series of meetings and correspondence. Tribes with an aboriginal interest in the San Luis Valley and surrounding mountains (Pueblo of Picuris, Cochiti Pueblo, Jemez Pueblo, Jicarilla Apache Nation, Navajo Nation, San Juan Pueblo, Pueblo of Acoma, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Ildefonso, Pueblo of Santa Ana, Pueblo of Santa Clara, Pueblo of Taos, Pueblo of Zuni, Southern Ute Tribe, Uintah and Ouray Ute Indian Tribe, and Ute Mountain Ute Tribe) were invited to take part or formally consult in the planning process. The Service's regional archaeologist consulted with the State Historic Preservation Officer, and was intimately involved with the development of this EA. Some nongovernmental organizations that are active in and around the San Luis Valley were also consulted, including Colorado Cattleman's Agricultural Land Trust, Colorado Open Lands, The Nature Conservancy, Rio Grande Headwaters Trust, Orient Land Trust, and Colorado Water Trust.

The Service coordinated internally in the development of this EA as well. Region 6 refuge planning staff and San Luis Valley National Wildlife Refuge Complex staff conducted the analysis and prepared this document, as well as the LPP. An intraservice Endangered Species Act section 7 consultation was conducted, and resulted in a finding of "May affect but not likely to affect" Endangered Species Act protected or candidate species (appendix H). Region 6 Migratory Birds staff guided the development of our focal species list, and both that office and staff from the Region 6 Fisheries office reviewed the document (See appendix A, List of Preparers and Reviewers).

Contaminants and Hazardous Waste

The Service is required to invest in healthy lands. At a minimum, a Level I pre-acquisitionsite assessment by the USFWS Ecological Services – Colorado Field Office or New Mexico Field Office, as proper, would be required before acquisition.

National Environmental Policy Act

The Service conducted this analysis under the authority of and in compliance with NEPA, which requires an evaluation of reasonable alternatives that will meet stated objectives, and an assessment of the possible effects on the natural and human environment.

Environmental Assessment

This will be the basis for determining whether the implementation of the proposed action would constitute a major federal action significantly affecting the quality of natural and human environments. It involved other government agencies and the public in naming issues and alternatives for the proposed project.

Distribution and Availability

The Service made available the final EA (with the associated LPP in the same volume) to the project mailing list, which includes Federal and State legislative delegations; tribes; Federal, State, and local agencies; nongovernmental organizations; and interested individuals. Copies can be requested from the USFWS Region 6 office. The documents are also available electronically on the refuge planning Web site.

- Project Web site: http://www.fws.gov/mountain-prairie/planning/lpp/index.html
- Project email: slvrefugesplanning@fws.gov
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Appendix B

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Appendix C

Species List of the Sangre de Cristo Conservation Area

Sources: Colorado Natural Diversity Information Source, San Luis Valley National Wildlife Refuge Complex Species List, USGS Nonindigenous Aquatic Species Database, NRCS Plants Database
* Nonnative (Because of the number of plant species in the project area, introduced plants are not shown)

Scientific name	*Common name*	*Status*
Birds		
Recurvirostra americana	American avocet	
Botaurus lentiginosus	American bittern	
Fulica americana	American coot	
Corvus brachyrhynchos	American crow	
Cinclus mexicanus	American dipper	
Carduelis tristis	American goldfinch	
Pluvialis dominica	American golden plover	
Falco sparverius	American kestrel	
Falco peregrinus anatum	American peregrine falcon	
Anthus rubescens	American pipit	
Turdus migratorius	American robin	
Spizella arborea	American tree sparrow	
Pelecanus erythrorhynchos	American white pelican	
Anas americana	American wigeon	
Calypte anna	Anna's hummingbird	
Gavia arctica	Arctic loon	
Myiarchus cinerascens	Ash-throated flycatcher	
Calidris bairdii	Baird's sandpiper	
Haliaeetus leucocephalus	Bald eagle	SC
Columba fasciata	Band-tailed pigeon	
Riparia riparia	Bank swallow	
Tyto alba	Barn owl	
Hirundo rustica	Barn swallow	
Bucephala islandica	Barrow's goldeneye	
Ceryle alcyon	Belted kingfisher	
Thryomanes bewickii	Bewick's wren	
Sayornis nigricans	Black phoebe	
Leucosticte atrata	Black rosy finch	
Cypseloides niger	Black swift	
Chlidonias niger	Black tern	
Mniotilta varia	Black-and-white warbler	
Pluvialis squatarola	Black-bellied plover	
Pica pica	Black-billed magpie	
Poecile atricapillus	Black-capped chickadee	
Archilochus alexandri	Black-chinned hummingbird	

Scientific name	*Common name*	*Status*
Nycticorax nycticorax	Black-crowned night-heron	
Pheucticus melanocephalus	Black-headed grosbeak	
Himantopus mexicanus	Black-necked stilt	
Dendroica striata	Blackpoll warbler	
Dendroica caerulescens	Black-throated blue warbler	
Dendroica nigrescens	Black-throated gray warbler	
Amphispiza bilineata	Black-throated sparrow	
Guiraca caerulea	Blue grosbeak	
Dendragapus obscurus	Blue grouse	
Cyanocitta cristata	Blue jay	
Polioptila caerulea	Blue-gray gnatcatcher	
Anas discors	Blue-winged teal	
Dolichonyx oryzivorus	Bobolink	
Bombycilla garrulus	Bohemian waxwing	
Larus philadelphia	Bonaparte's gull	
Aegolius funereus	Boreal owl	
Euphagus cyanocephalus	Brewer's blackbird	
Spizella breweri	Brewer's sparrow	
Selasphorus platycercus	Broad-tailed hummingbird	
Certhia americana	Brown creeper	
Toxostoma rufum	Brown thrasher	
Leucosticte australis	Brown-capped rosy finch	
Molothrus ater	Brown-headed cowbird	
Bucephala albeola	Bufflehead	
Icterus bullockii	Bullock's oriole	
Athene cunicularia	Burrowing owl	ST
Psaltriparus minimus	Bushtit	
Branta hutchinsii	Cackling goose	
Larus californicus	California gull	
Stellula calliope	Calliope hummingbird	
Branta canadensis	Canada goose	
Aythya valisineria	Canvasback	
Pipilo fuscus	Canyon towhee	
Catherpes mexicanus	Canyon wren	
Hydroprogne caspia	Caspian tern	
Carpodacus cassinii	Cassin's finch	
Tyrannus vociferans	Cassin's kingbird	
Aimophila cassinii	Cassin's sparrow	
Bubulcus ibis	Cattle egret	
Bombycilla cedrorum	Cedar waxwing	
Dendroica pensylvanica	Chestnut-sided warbler	
Corvus cryptoleucus	Chihuahuan raven	
Spizella passerina	Chipping sparrow	
Anas cyanoptera	Cinnamon teal	
Aechmophorus clarkii	Clark's grebe	
Nucifraga columbiana	Clark's nutcracker	

Scientific name	*Common name*	*Status*
Spizella pallida	Clay-colored sparrow	
Petrochelidon pyrrhonota	Cliff swallow	
Bucephala clangula	Common goldeneye	
Quiscalus quiscula	Common grackle	
Gavia immer	Common loon	
Mergus merganser	Common merganser	
Chordeiles minor	Common nighthawk	
Phalaenoptilus nuttallii	Common poorwill	
Corvus corax	Common raven	
Carduelis flammea	Common redpoll	
Gallinago gallinago	Common snipe	
Sterna hirundo	Common tern	
Geothlypis trichas	Common yellowthroat	
Accipiter cooperii	Cooper's hawk	
Empidonax occidentalis	Cordilleran flycatcher	
Junco hyemalis	Dark-eyed junco	
Spiza americana	Dickcissel	
Phalacrocorax auritus	Double-crested cormorant	
Picoides pubescens	Downy woodpecker	
Empidonax oberholseri	Dusky flycatcher	
Dendragapus obscurus	Dusky grouse	
Podiceps nigricollis	Eared grebe	
Tyrannus tyrannus	Eastern kingbird	
Streptopelia decaocto	Eurasian collared-dove*	
Sturnus vulgaris	European starling*	
Coccothraustes vespertinus	Evening grosbeak	
Buteo regalis	Ferruginous hawk	SC
Otus flammeolus	Flammulated owl	
Sterna forsteri	Forster's tern	
Passerella iliaca	Fox sparrow	
Larus pipixcan	Franklin's gull	
Anas strepera	Gadwall	
Callipepla gambelii	Gambel's quail	
Larus glaucescens	Glaucous-winged gull	
Aquila chrysaetos	Golden eagle	
Regulus satrapa	Golden-crowned kinglet	
Dendroica graciae	Grace's warbler	
Ammodramus savannarum	Grasshopper sparrow	
Dumetella carolinensis	Gray catbird	
Empidonax wrightii	Gray flycatcher	
Perisoreus canadensis	Gray jay	
Leucosticte tephrocotis	Gray-crowned rosy finch	
Ardea herodias	Great blue heron	
Ardea alba	Great egret	
Bubo virginianus	Great horned owl	
Geococcyx californianus	Greater roadrunner	

Scientific name	*Common name*	*Status*
Grus canadensis tabida	Greater sandhill crane	SC
Aythya marila	Greater scaup	
Anser albifrons	Greater white-fronted goose	
Tringa melanoleuca	Greater yellowlegs	
Quiscalus mexicanus	Great-tailed grackle	
Butorides virescens	Green heron	
Pipilo chlorurus	Green-tailed towhee	
Anas crecca	Green-winged teal	
Centrocercus minimus	Gunnison sage-grouse	SC
Picoides villosus	Hairy woodpecker	
Empidonax hammondii	Hammond's flycatcher	
Zonotrichia querula	Harris' sparrow	
Catharus guttatus	Hermit thrush	
Larus argentatus	Herring gull	
Lophodytes cucullatus	Hooded merganser	
Podiceps auritus	Horned grebe	
Eremophila alpestris	Horned lark	
Carpodacus mexicanus	House finch	
Passer domesticus	House sparrow*	
Troglodytes aedon	House wren	
Passerina cyanea	Indigo bunting	
Baeolophus griseus	Juniper titmouse	
Charadrius vociferus	Killdeer	
Calcarius lapponicus	Lapland longspur	
Calamospiza melanocorys	Lark bunting	
Chondestes grammacus	Lark sparrow	
Passerina amoena	Lazuli bunting	
Ixobrychus exilis	Least bittern	
Empidonax minimus	Least flycatcher	
Calidris minutilla	Least sandpiper	
Sternula antillarum	Least tern	FE, SE
Carduelis psaltria	Lesser goldfinch	
Aythya affinis	Lesser scaup	
Tringa flavipes	Lesser yellowlegs	
Melanerpes lewis	Lewis' woodpecker	
Melospiza lincolnii	Lincoln's sparrow	
Egretta caerulea	Little blue heron	
Lanius ludovicianus	Loggerhead shrike	
Numenius americanus	Long-billed curlew	SC
Limnodromus scolopaceus	Long-billed dowitcher	
Asio otus	Long-eared owl	
Oporornis tolmiei	MacGillivray's warbler	
Eugenes fulgens	Magnificent hummingbird	
Anas platyrhynchos	Mallard	
Limosa fedoa	Marbled godwit	
Cistothorus palustris	Marsh wren	

Scientific name	*Common name*	*Status*
Falco columbarius	Merlin	
Strix occidentalis lucida	Mexican spotted owl	FT, ST
Sialia currucoides	Mountain bluebird	
Poecile gambeli	Mountain chickadee	
Charadrius montanus	Mountain plover	SC
Zenaida macroura	Mourning dove	
Vermivora ruficapilla	Nashville warbler	
Cardinalis cardinalis	Northern cardinal	
Colaptes auratus	Northern flicker	
Accipiter gentilis	Northern goshawk	
Circus cyaneus	Northern harrier	
Mimus polyglottos	Northern mockingbird	
Parula americana	Northern parula	
Anas acuta	Northern pintail	
Glaucidium gnoma	Northern pygmy-owl	
Stelgidopteryx serripennis	Northern rough-winged swallow	
Aegolius acadicus	Northern saw-whet owl	
Anas clypeata	Northern shoveler	
Lanius excubitor	Northern shrike	
Seiurus noveboracensis	Northern waterthrush	
Contopus cooperi	Olive-sided flycatcher	
Vermivora celata	Orange-crowned warbler	
Pandion haliaetus	Osprey	
Seiurus aurocapillus	Ovenbird	
Gavia pacifica	Pacific loon	
Calidris melanotos	Pectoral sandpiper	
Falco peregrinus	Peregrine falcon	SC
Podilymbus podiceps	Pied-billed grebe	
Pinicola enucleator	Pine grosbeak	
Carduelis pinus	Pine siskin	
Gymnorhinus cyanocephalus	Pinyon jay	
Vireo plumbeus	Plumbeous vireo	
Falco mexicanus	Prairie falcon	
Porphyrio martinica	Purple gallinule	
Progne subis	Purple martin	
Sitta pygmaea	Pygmy nuthatch	
Loxia curvirostra	Red crossbill	
Mergus serrator	Red-breasted merganser	
Sitta canadensis	Red-breasted nuthatch	
Vireo olivaceus	Red-eyed vireo	
Aythya americana	Redhead	
Melanerpes erythrocephalus	Red-headed woodpecker	
Sphyrapicus nuchalis	Red-naped sapsucker	
Phalaropus lobatus	Red-necked phalarope	
Buteo jamaicensis	Red-tailed hawk	
Agelaius phoeniceus	Red-winged blackbird	

Scientific name	*Common name*	*Status*
Larus delawarensis	Ring-billed gull	
Aythya collaris	Ring-necked duck	
Phasianus colchicus	Ring-necked pheasant*	
Columba livia	Rock pigeon*	
Salpinctes obsoletus	Rock wren	
Pheucticus ludovicianus	Rose-breasted grosbeak	
Chen rossii	Ross' goose	
Buteo lagopus	Rough-legged hawk	
Regulus calendula	Ruby-crowned kinglet	
Oxyura jamaicensis	Ruddy duck	
Selasphorus rufus	Rufous hummingbird	
Aimophila ruficeps	Rufous-crowned sparrow	
Xema sabini	Sabine's gull	
Centrocercus urophasianus	Sage-grouse	
Amphispiza belli	Sage sparrow	
Oreoscoptes montanus	Sage thrasher	
Calidris alba	Sanderling	
Grus canadensis	Sandhill crane	
Passerculus sandwichensis	Savannah sparrow	
Sayornis saya	Say's phoebe	
Tyrannus forficatus	Scissor-tailed flycatcher	
Cistothorus platensis	Sedge wren	
Charadrius semipalmatus	Semipalmated plover	
Calidris pusilla	Semipalmated sandpiper	
Accipiter striatus	Sharp-shinned hawk	
Limnodromus griseus	Short-billed dowitcher	
Asio flammeus	Short-eared owl	
Chen caerulescens	Snow goose	
Egretta thula	Snowy egret	
Charadrius alexandrinus	Snowy plover	SC
Tringa solitaria	Solitary sandpiper	
Melospiza melodia	Song sparrow	
Porzana carolina	Sora	
Empidonax traillii extimus	Southwestern willow flycatcher	FE, SE
Strix occidentalis	Spotted owl	
Actitis macularia	Spotted sandpiper	
Pipilo maculatus	Spotted towhee	
Cyanocitta stelleri	Steller's jay	
Calidris himantopus	Stilt sandpiper	
Melanitta perspicillata	Surf scoter	
Piranga rubra	Summer tanager	
Buteo swainsoni	Swainson's hawk	
Catharus ustulatus	Swainson's thrush	
Melospiza georgiana	Swamp sparrow	
Vermivora peregrina	Tennessee warbler	
Picoides tridactylus	Three-toed woodpecker	

Scientific name	*Common name*	*Status*
Myadestes townsendi	Townsend's solitaire	
Dendroica townsendi	Townsend's warbler	
Tachycineta bicolor	Tree swallow	
Cygnus columbianus	Tundra swan	
Cathartes aura	Turkey vulture	
Ixoreus naevius	Varied thrush	
Catharus fuscescens	Veery	
Pyrocephalus rubinus	Vermilion flycatcher	
Pooecetes gramineus	Vesper sparrow	
Tachycineta thalassina	Violet-green swallow	
Rallus limicola	Virginia rail	
Vermivora virginiae	Virginia's warbler	
Vireo gilvus	Warbling vireo	
Sialia mexicana	Western bluebird	
Athene cunicularia	Western burrowing owl	
Aechmophorus occidentalis	Western grebe	
Tyrannus verticalis	Western kingbird	
Sturnella neglecta	Western meadowlark	
Calidris mauri	Western sandpiper	
Otus kennicottii	Western screech-owl	
Aphelocoma californica	Western scrub jay	
Charadrius alexandrinus nivosus	Western snowy plover	
Piranga ludoviciana	Western tanager	
Contopus sordidulus	Western wood-pewee	
Numenius phaeopus	Whimbrel	
Eudocimus albus	White ibis	
Sitta carolinensis	White-breasted nuthatch	
Zonotrichia leucophrys	White-crowned sparrow	
Plegadis chihi	White-faced ibis	
Calidris fuscicollis	White-rumped sandpiper	
Lagopus leucurus	White-tailed ptarmigan	
Zonotrichia albicollis	White-throated sparrow	
Aeronautes saxatalis	White-throated swift	
Loxia leucoptera	White-winged crossbill	
Melanitta fusca	White-winged scoter	
Meleagris gallopavo	Wild turkey	
Grus americana	Whooping crane	FE, SE
Catoptrophorus semipalmatus	Willet	
Sphyrapicus thyroideus	Williamson's sapsucker	
Empidonax traillii	Willow flycatcher	
Phalaropus tricolor	Wilson's phalarope	
Gallinago delicata	Wilson's snipe	
Wilsonia pusilla	Wilson's warbler	
Aix sponsa	Wood duck	
Helmitheros vermivorum	Worm-eating warbler	
Hylocichla mustelina	Wood thrush	

Scientific name	*Common name*	*Status*
Dendroica petechia	Yellow warbler	
Coccyzus americanus	Yellow-billed cuckoo	SC
Icteria virens	Yellow-breasted chat	
Xanthocephalus xanthocephalus	Yellow-headed blackbird	
Dendroica coronata	Yellow-rumped warbler	
Amphibians		
Bufo boreas boreas	Boreal toad	SE
Rana catesbeiana	Bullfrog*	
Hyla arenicolor	Canyon treefrog	
Bufo cognatus	Great Plains toad	
Spea multiplicata	New Mexico spadefoot	
Rana pipiens	Northern leopard frog	SC
Spea bombifrons	Plains spadefoot	
Ambystoma tigrinum	Tiger salamander	
Pseudacris triseriata	Western chorus frog	
Bufo woodhousii	Woodhouse's toad	
Mammals		
Sciurus aberti	Abert's squirrel	
Taxidea taxus	American badger	
Castor canadensis	American beaver	
Cervus elaphus	American elk	
Martes americana	American marten	
Ochotona princeps	American pika	
Eptesicus fuscus	Big brown bat	
Ovis canadensis	Bighorn sheep	
Ursus americanus	Black bear	
Mustela nigripes	Black-footed ferret	FE, SE
Lepus californicus	Black-tailed jackrabbit	
Lynx rufus	Bobcat	
Thomomys bottae	Botta's pocket gopher	SC
Tadarida brasiliensis	Brazilian free-tailed bat	
Neotoma cinerea	Bushy-tailed woodrat	
Tamias quadrivittatus	Colorado chipmunk	
Conepatus mesoleucus	Common hog-nosed skunk	
Ondatra zibethicus	Common muskrat	
Erethizon dorsatum	Common porcupine	
Canis latrans	Coyote	
Peromyscus maniculatus	Deer mouse	
Sylvilagus audubonii	Desert cottontail	
Mustela erminea	Ermine	
Myotis thysanodes	Fringed myotis	
Spermophilus lateralis	Golden-mantled ground squirrel	
Urocyon cinereoargenteus	Gray fox	
Cynomys gunnisoni	Gunnison's prairie dog	
Phenacomys intermedius	Heather vole	
Lasiurus cinereus	Hoary bat	

Scientific name	*Common name*	*Status*
Mus musculus	House mouse*	
Tamias minimus	Least chipmunk	
Myotis lucifugus	Little brown myotis	
Myotis evotis	Long-eared myotis	
Myotis volans	Long-legged myotis	
Microtus longicaudus	Long-tailed vole	
Mustela frenata	Long-tailed weasel	
Lynx canadensis	Lynx	FT, SE
Sorex cinereus	Masked shrew	
Microtus pennsylvanicus	Meadow vole	
Neotoma mexicana	Mexican woodrat	
Mustela vison	Mink	
Sorex monticolus	Montane shrew	
Microtus montanus	Montane vole	
Alces alces	Moose	
Sylvilagus nuttallii	Mountain cottontail	
Oreamnos americanus	Mountain goat	
Felis concolor	Mountain lion	
Odocoileus hemionus	Mule deer	
Onychomys leucogaster	Northern grasshopper mouse	
Thomomys talpoides	Northern pocket gopher	SC
Lutra canadensis	Northern river otter	
Peromyscus nasutus	Northern rock mouse	
Dipodomys ordii	Ord's kangaroo rat	
Tamiasciurus hudsonicus	Pine squirrel	
Perognathus flavescens	Plains pocket mouse	
Antilocapra americana	Pronghorn	
Procyon lotor	Raccoon	
Vulpes vulpes	Red fox	
Bassariscus astutus	Ringtail	
Perognathus flavus	Silky pocket mouse	
Lasionycteris noctivagans	Silver-haired bat	
Lepus americanus	Snowshoe hare	
Clethrionomys gapperi	Southern red-backed vole	
Mephitis mephitis	Striped skunk	
Spermophilus tridecemlineatus	Thirteen-lined ground squirrel	
Plecotus townsendii	Townsend's big-eared bat	SC
Sorex palustris	Water shrew	
Reithrodontomys megalotis	Western harvest mouse	
Zapus princeps	Western jumping mouse	
Myotis ciliolabrum	Western small-footed myotis	
Spilogale gracilis	Western spotted skunk	
Odocoileus virginianus	White-tailed deer	
Lepus townsendii	White-tailed jackrabbit	
Gulo gulo	Wolverine	SE
Spermophilus elegans	Wyoming ground squirrel	

Scientific name	*Common name*	*Status*
Marmota flaviventris	Yellow-bellied marmot	
Myotis yumanensis	Yuma myotis	
Reptiles		
Sceloporus undulatus	Fence lizard	
Pituophis catenifer	Gopher snake	
Eumeces multivirgatus	Many-lined skink	
Crotalus viridis concolor	Midget faded rattlesnake	SC
Lampropeltis triangulum	Milk snake	
Phrynosoma hernandesi	Short-horned lizard	
Liochlorophis vernalis	Smooth green snake	
Eumeces gaigeae	Variable skink	
Crotalus viridis	Western rattlesnake	
Thamnophis elegans	Western terrestrial garter snake	
Fish		
Anguilla rostrata	American eel*	
Thymallus arcticus	Arctic grayling*	
Ameiurus melas	Black bullhead	
Pomoxis nigromaculatus	Black crappie*	
Gymnocorymbus ternetzi	Black tetra*	
Ictalurus furcatus	Blue catfish*	
Oreochromis aureus	Blue tilapia*	
Lepomis macrochirus	Bluegill*	
Culaea inconstans	Brook stickleback*	
Salvelinus fontinalis	Brook trout*	
Salmo trutta	Brown trout*	
Ictalurus punctatus	Channel catfish*	
Oncorhynchus clarkii pleuriticus	Colorado River cutthroat*	
Cyprinus carpio	Common carp*	
Corydoras sp.	Corydoras catfish*	
Oncorhynchus clarkii x mykiss	Cutbow trout (hybrid)*	
Pimephales promelas	Fathead minnow	
Oncorhynchus clarkii carmichaeli	Fine-spotted Snake River cutthroat*	
Pylodictis olivaris	Flathead catfish*	
Platygobio gracilis	Flathead chub*	
Pterophyllum sp.	Freshwater angelfish*	
Oncorhynchus aguabonita	Golden trout*	
Carassius auratus	Goldfish*	
Ctenopharyngodon idella	Grass carp*	
Xiphophorus hellerii	Green swordtail*	
Lepomis cyanellus	Green sunfish	
Poecilia reticulata	Guppy*	
Hemigrammus ocellifer	Head-and-taillight tetra*	
Oncorhynchus nerka	Kokanee*	
Salvelinus namaycush	Lake trout*	
Salmo salar sebago	Landlocked Atlantic salmon*	
Micropterus salmoides	Largemouth bass*	

Scientific name	*Common name*	*Status*
Rhinichthys cataractae	Long-nose dace	
Catostomus catostomus	Longnose sucker*	
Cottus bairdii	Mottled sculpin*	
Oreochromis mossambicus	Mozambique tilapia*	
Paracheirodon innesi	Neon tetra*	
Esox lucius	Northern pike*	
Fundulus zebrinus	Plains killifish*	
Fundulus sciadicus	Plains topminnow*	
Lepomis gibbosus	Pumpkinseed*	
Oncorhynchus mykiss	Rainbow trout*	
Symphysodon discus	Red discus*	
Gila pandora	Rio Grande chub	SC
Oncorhynchus clarki virginalis	Rio Grande cutthroat trout	SC; Candidate
Catostomus plebeius	Rio Grande sucker	SE
Poecilia latipinna	Sailfin molly*	
Poecilia mexicana	Shortfin molly*	
Micropterus dolomieu	Smallmouth bass*	
Xiphophorus maculatus	Southern platyfish*	
Hypostomus sp.	Suckermouth catfish*	
Otocinclus sp.	Suckermouth catfish*	
Tinca tinca	Tench*	
Dorosoma petenense	Threadfin shad*	
Xiphophorus variatus	Variable platyfish*	
Pterygoplichthys disjunctivus	Vermiculated sailfin*	
Sander vitreus	Walleye*	
Lepomis gulosus	Warmouth*	
Oncorhynchus clarkii lewisi	West slope cutthroat*	
Gambusia affinis	Western mosquitofish*	
Catostomus commersonii	White sucker*	
Ameiurus natalis	Yellow bullhead*	
Perca flavescens	Yellow perch*	
Oncorhynchus clarkii bouvieri	Yellowstone cutthroat*	
Plants		
Abies concolor	White fir	
Abies lasiocarpa	Subalpine fir	
Abies lasiocarpa var. *arizonica*	Corkbark fir	
Abies lasiocarpa var. *lasiocarpa*	Subalpine fir	
Acer glabrum	Rocky Mountain maple	
Achillea millefolium	Common yarrow	
Achillea millefolium var. *occidentalis*	Western yarrow	
Achnatherum ×bloomeri		
Achnatherum hymenoides	Indian ricegrass	
Achnatherum lettermanii	Letterman's needlegrass	
Achnatherum nelsonii	Columbia needlegrass	
Achnatherum nelsonii ssp. *nelsonii*	Columbia needlegrass	
Achnatherum robustum	Sleepygrass	

Scientific name	*Common name*	*Status*
Achnatherum scribneri	Scribner needlegrass	
Aconitum columbianum	Columbian monkshood	
Aconitum columbianum ssp. *columbianum*	Columbian monkshood	
Acroptilon repens	Hardheads	
Actaea rubra	Red baneberry	
Actaea rubra ssp. *arguta*	Red baneberry	
Adoxa moschatellina	Muskroot	
Agastache pallidiflora	Bill Williams Mountain giant hyssop	
Agastache pallidiflora ssp. *pallidiflora*	Bill Williams Mountain giant hyssop	
Agastache pallidiflora ssp. *pallidiflora* var. *greenei*	Bill Williams Mountain giant hyssop	
Agoseris aurantiaca	Orange agoseris	
Agoseris glauca	Pale agoseris	
Agrostis exarata	Spike bentgrass	
Agrostis gigantea	Redtop	
Agrostis humilis	Alpine bentgrass	
Agrostis scabra	Rough bentgrass	
Agrostis variabilis	Mountain bentgrass	
Aletes anisatus	Rocky Mountain Indian parsley	
Aliciella pinnatifida	Sticky gilia	
Alisma gramineum	Narrowleaf water plantain	
Alisma triviale	Northern water plantain	
Allium cernuum	Nodding onion	
Allium geyeri	Geyer's onion	
Allium geyeri var. *tenerum*	Bulbil onion	
Almutaster pauciflorus	Alkali marsh aster	
Alnus incana	Gray alder	
Alnus incana ssp. *tenuifolia*	Thinleaf alder	
Alopecurus aequalis	Shortawn foxtail	
Alopecurus aequalis var. *aequalis*	Shortawn foxtail	
Alopecurus alpinus	Boreal alopecurus	
Alyssum simplex	Alyssum	
Amaranthus albus	Prostrate pigweed	
Amaranthus blitoides	Mat amaranth	
Amaranthus retroflexus	Redroot amaranth	
Ambrosia acanthicarpa	Flatspine bur ragweed	
Amelanchier alnifolia	Saskatoon serviceberry	
Amelanchier alnifolia var. *alnifolia*	Saskatoon serviceberry	
Amelanchier utahensis	Utah serviceberry	
Amelanchier utahensis var. *utahensis*	Utah serviceberry	
Anaphalis margaritacea	Western pearly everlasting	
Androsace chamaejasme	Sweetflower rockjasmine	
Androsace chamaejasme ssp. *carinata*	Sweetflower rockjasmine	
Androsace occidentalis	Western rockjasmine	
Androsace septentrionalis	Pygmyflower rockjasmine	
Anemone canadensis	Canadian anemone	
Anemone multifida	Pacific anemone	

Scientific name	*Common name*	*Status*
Angelica ampla	Giant angelica	
Angelica grayi	Gray's angelica	
Antennaria anaphaloides	Pearly pussytoes	
Antennaria corymbosa	Flat-top pussytoes	
Antennaria marginata	Whitemargin pussytoes	
Antennaria media	Rocky Mountain pussytoes	
Antennaria microphylla	Littleleaf pussytoes	
Antennaria parvifolia	Small-leaf pussytoes	
Antennaria rosea	Rosy pussytoes	
Antennaria rosulata	Kaibab pussytoes	
Antennaria umbrinella	Umber pussytoes	
Apocynum androsaemifolium	Spreading dogbane	
Apocynum cannabinum	Indianhemp	
Aquilegia coerulea	Colorado blue columbine	
Aquilegia elegantula	Western red columbine	
Arabis ×divaricarpa	Spreadingpod rockcress	
Arabis drummondii	Drummond's rockcress	
Arabis fendleri	Fendler's rockcress	
Arabis fendleri var. *fendleri*	Fendler's rockcress	
Arabis gunnisoniana	Gunnison's rockcress	
Arabis hirsuta	Hairy rockcress	
Arabis hirsuta var. *pycnocarpa*	Creamflower rockcress	
Arabis holboellii	Holboell's rockcress	
Arabis holboellii var. *pinetorum*	Holboell's rockcress	
Arabis lignifera	Desert rockcress	
Arabis oxylobula	Glenwood Springs rockcress	
Arctostaphylos uva-ursi	Kinnikinnick	
Arenaria fendleri	Fendler's sandwort	
Arenaria fendleri var. *fendleri*	Fendler's sandwort	
Arenaria hookeri	Hooker's sandwort	
Arenaria hookeri ssp. *hookeri*	Hooker's sandwort	
Arenaria lanuginosa	Spreading sandwort	
Arenaria lanuginosa ssp. *saxosa*	Spreading sandwort	
Argentina anserina	Silverweed cinquefoil	
Argyrochosma fendleri	Fendler's false cloak fern	
Aristida purpurea	Purple threeawn	
Aristida purpurea var. *longiseta*	Fendler threeawn	
Aristida purpurea var. *purpurea*	Purple threeawn	
Arnica chamissonis	Chamisso arnica	
Arnica chamissonis ssp. *foliosa*	Chamisso arnica	
Arnica chamissonis ssp. *foliosa* var. *andina*	Chamisso arnica	
Arnica cordifolia	Heartleaf arnica	
Arnica mollis	Hairy arnica	
Artemisia biennis	Biennial wormwood	
Artemisia biennis var. *biennis*	Biennial wormwood	
Artemisia bigelovii	Bigelow sage	

Scientific name	*Common name*	*Status*
Artemisia campestris	Field sagewort	
Artemisia campestris ssp. *borealis*	Field sagewort	
Artemisia campestris ssp. *borealis* var. *borealis*	Field sagewort	
Artemisia campestris ssp. *borealis* var. *scouleriana*	Field sagewort	
Artemisia campestris ssp. *caudata*	Field sagewort	
Artemisia cana	Silver sagebrush	
Artemisia cana ssp. *cana*	Silver sagebrush	
Artemisia carruthii	Carruth's sagewort	
Artemisia dracunculus	Tarragon	
Artemisia franserioides	Ragweed sagebrush	
Artemisia frigida	Prairie sagewort	
Artemisia longifolia	Longleaf wormwood	
Artemisia ludoviciana	White sagebrush	
Artemisia ludoviciana ssp. *albula*	White sagebrush	
Artemisia ludoviciana ssp. *incompta*	White sagebrush	
Artemisia ludoviciana ssp. *ludoviciana*	White sagebrush	
Artemisia michauxiana	Michaux's wormwood	
Artemisia parryi	Parry's wormwood	
Artemisia scopulorum	Alpine sagebrush	
Artemisia tridentata	Big sagebrush	
Artemisia tridentata ssp. *tridentata*	Basin big sagebrush	
Artemisia tridentata ssp. *vaseyana*	Mountain big sagebrush	
Asclepias hallii	Hall's milkweed	
Asclepias speciosa	Showy milkweed	
Asparagus officinalis	Garden asparagus	
Asplenium septentrionale	Forked spleenwort	
Aster alpinus	Alpine aster	
Aster alpinus var. *vierhapperi*	Vierhapper's aster	
Astragalus agrestis	Purple milkvetch	
Astragalus allochrous	Halfmoon milkvetch	
Astragalus allochrous var. *playanus*	Halfmoon milkvetch	
Astragalus alpinus	Alpine milkvetch	
Astragalus alpinus var. *alpinus*	Alpine milkvetch	
Astragalus bisulcatus	Twogrooved milkvetch	
Astragalus bodinii	Bodin's milkvetch	
Astragalus brandegeei	Brandegee's milkvetch	
Astragalus ceramicus	Painted milkvetch	
Astragalus ceramicus var. *ceramicus*	Painted milkvetch	
Astragalus cerussatus	Powdery milkvetch	
Astragalus crassicarpus	Groundplum milkvetch	
Astragalus crassicarpus var. *crassicarpus*	Groundplum milkvetch	
Astragalus drummondii	Drummond's milkvetch	
Astragalus flexuosus	Flexile milkvetch	
Astragalus flexuosus var. *flexuosus*	Flexile milkvetch	
Astragalus hallii	Hall's milkvetch	
Astragalus hallii var. *hallii*	Hall's milkvetch	

Scientific name	*Common name*	*Status*
Astragalus kentrophyta	Spiny milkvetch	
Astragalus kentrophyta var. *tegetarius*	Mat milkvetch	
Astragalus laxmannii	Laxmann's milkvetch	
Astragalus laxmannii var. *robustior*	Prairie milkvetch	
Astragalus miser	Timber milkvetch	
Astragalus miser var. *oblongifolius*	Timber milkvetch	
Astragalus pattersonii	Patterson's milkvetch	
Astragalus ripleyi	Ripley's milkvetch	
Astragalus scopulorum	Rocky Mountain milkvetch	
Astragalus tenellus	Looseflower milkvetch	
Atriplex ×aptera	Moundscale	
Atriplex argentea	Silverscale saltbush	
Atriplex canescens	Fourwing saltbush	
Atriplex canescens var. *canescens*	Fourwing saltbush	
Atriplex patula	Spear saltbush	
Atriplex rosea	Tumbling saltweed	
Atriplex truncata	Wedgescale saltbush	
Atriplex wolfii	Wolf's saltweed	
Bahia dissecta	Ragleaf bahia	
Balsamorhiza sagittata	Arrowleaf balsamroot	
Bassia hyssopifolia	Fivehorn smotherweed	
Bassia scoparia	Burningbush	
Beckmannia syzigachne	American sloughgrass	
Berberis fendleri	Colorado barberry	
Besseya alpina	Alpine besseya	
Besseya plantaginea	White River coraldrops	
Betula occidentalis	Water birch	
Bidens cernua	Nodding beggartick	
Bidens frondosa	Devil's beggartick	
Bidens tenuisecta	Slimlobe beggarticks	
Bidens vulgata	Big devils beggartick	
Blepharoneuron tricholepis	Pine dropseed	
Botrychium hesperium	Western moonwort	
Botrychium pinnatum	Northern moonwort	
Botrychium simplex	Little grapefern	
Bouteloua gracilis	Blue grama	
Bouteloua simplex	Matted grama	
Brassica juncea	India mustard	
Brassica napus	Rape	
Brickellia eupatorioides	False boneset	
Brickellia eupatorioides var. *chlorolepis*	False boneset	
Brickellia grandiflora	Tasselflower brickellbush	
Bromus ciliatus	Fringed brome	
Bromus ciliatus var. *ciliatus*	Fringed brome	
Bromus inermis	Smooth brome	
Bromus inermis ssp. *inermis*	Smooth brome	

Scientific name	*Common name*	*Status*
Bromus inermis ssp. *inermis* var. *inermis*	Smooth brome	
Bromus lanatipes	Woolly brome	
Bromus porteri	Porter brome	
Bromus tectorum	Cheatgrass	
Calamagrostis canadensis	Bluejoint	
Calamagrostis purpurascens	Purple reedgrass	
Calamagrostis purpurascens var. *purpurascens*	Purple reedgrass	
Calamagrostis stricta	Slimstem reedgrass	
Callitriche palustris	Vernal water-starwort	
Calochortus gunnisonii	Gunnison's mariposa lily	
Calochortus gunnisonii var. *gunnisonii*	Gunnison's mariposa lily	
Caltha leptosepala	White marsh marigold	
Caltha leptosepala ssp. *leptosepala*	White marsh marigold	
Caltha leptosepala ssp. *leptosepala* var. *leptosepala*	White marsh marigold	
Camelina microcarpa	Littlepod false flax	
Campanula parryi	Parry's bellflower	
Campanula parryi var. *parryi*	Parry's bellflower	
Campanula rotundifolia	Bluebell bellflower	
Campanula uniflora	Arctic bellflower	
Capsella bursa-pastoris	Shepherd's purse	
Cardamine cordifolia	Heartleaf bittercress	
Cardamine cordifolia var. *incana*	Heartleaf bittercress	
Cardaria chalepensis	Lenspod whitetop	
Cardaria draba	Whitetop	
Cardaria pubescens	Hairy whitetop	
Carex albonigra	Blackandwhite sedge	
Carex aquatilis	Water sedge	
Carex aquatilis var. *aquatilis*	Water sedge	
Carex atherodes	Wheat sedge	
Carex aurea	Golden sedge	
Carex bella	Southwestern showy sedge	
Carex brunnescens	Brownish sedge	
Carex brunnescens ssp. *sphaerostachya*	Brownish sedge	
Carex canescens	Silvery sedge	
Carex canescens ssp. *canescens*	Silvery sedge	
Carex diandra	Lesser panicled sedge	
Carex disperma	Softleaf sedge	
Carex douglasii	Douglas' sedge	
Carex duriuscula	Needleleaf sedge	
Carex ebenea	Ebony sedge	
Carex elynoides	Blackroot sedge	
Carex geophila	White Mountain sedge	
Carex geyeri	Geyer's sedge	
Carex hallii	Deer sedge	
Carex haydeniana	Cloud sedge	
Carex heteroneura	Different-nerve sedge	

Scientific name	*Common name*	*Status*
Carex heteroneura var. *brevisquama*	Different-nerve sedge	
Carex heteroneura var. *chalciolepis*	Holm sedge	
Carex inops	Long-stolon sedge	
Carex inops ssp. *heliophila*	Sun sedge	
Carex microptera	Smallwing sedge	
Carex nebrascensis	Nebraska sedge	
Carex nelsonii	Nelson's sedge	
Carex nigricans	Black alpine sedge	
Carex norvegica	Norway sedge	
Carex norvegica ssp. *stevenii*	Steven's sedge	
Carex nova	Black sedge	
Carex obtusata	Obtuse sedge	
Carex occidentalis	Western sedge	
Carex parryana	Parry's sedge	
Carex parryana var. *parryana*	Parry's sedge	
Carex pellita	Woolly sedge	
Carex perglobosa	Globe sedge	
Carex phaeocephala	Dunhead sedge	
Carex praegracilis	Clustered field sedge	
Carex praticola	Meadow sedge	
Carex pyrenaica	Pyrenean sedge	
Carex pyrenaica ssp. *pyrenaica*	Pyrenean sedge	
Carex scopulorum	Mountain sedge	
Carex siccata	Dryspike sedge	
Carex simulata	Analogue sedge	
Carex utriculata	Northwest Territory sedge	
Carex vernacula	Native sedge	
Carex vesicaria	Blister sedge	
Carex vesicaria var. *vesicaria*	Blister sedge	
Carum carvi	Caraway	
Castilleja flava	Yellow Indian paintbrush	
Castilleja flava var. *flava*	Yellow Indian paintbrush	
Castilleja haydenii	Hayden's Indian paintbrush	
Castilleja integra	Wholeleaf Indian paintbrush	
Castilleja integra var. *integra*	Wholeleaf Indian paintbrush	
Castilleja linariifolia	Wyoming Indian paintbrush	
Castilleja miniata	Giant red Indian paintbrush	
Castilleja miniata ssp. *miniata*	Giant red Indian paintbrush	
Castilleja occidentalis	Western Indian paintbrush	
Castilleja rhexiifolia	Splitleaf Indian paintbrush	
Castilleja sulphurea	Sulphur Indian paintbrush	
Ceanothus fendleri	Fendler's ceanothus	
Ceanothus velutinus	Snowbrush ceanothus	
Ceanothus velutinus var. *velutinus*	Snowbrush ceanothus	
Cerastium arvense	Field chickweed	
Cerastium arvense ssp. *strictum*	Feld chickweed	

Scientific name	*Common name*	*Status*
Cerastium beeringianum	Bering chickweed	
Cerastium beeringianum ssp. *earlei*	Bering chickweed	
Cercocarpus montanus	Alderleaf mountain mahogany	
Chaenactis douglasii	Douglas' dustymaiden	
Chaenactis douglasii var. *alpina*	Alpine dustymaiden	
Chaetopappa ericoides	Rose heath	
Chamaerhodos erecta	Little rose	
Chamaerhodos erecta ssp. *nuttallii*	Nuttall's little rose	
Chamaesyce serpyllifolia	Thymeleaf sandmat	
Chamaesyce serpyllifolia ssp. *serpyllifolia*	Thymeleaf sandmat	
Chamerion angustifolium	Fireweed	
Chamerion angustifolium ssp. *circumvagum*	Fireweed	
Cheilanthes feei	Slender lipfern	
Cheilanthes fendleri	Fendler's lipfern	
Chenopodium album	Lambsquarters	
Chenopodium atrovirens	Pinyon goosefoot	
Chenopodium berlandieri	Pitseed goosefoot	
Chenopodium botrys	Jerusalem oak goosefoot	
Chenopodium desiccatum	Aridland goosefoot	
Chenopodium foliosum	Leafy goosefoot	
Chenopodium fremontii	Fremont's goosefoot	
Chenopodium fremontii var. *fremontii*	Fremont's goosefoot	
Chenopodium glaucum	Oakleaf goosefoot	
Chenopodium graveolens	Fetid goosefoot	
Chenopodium leptophyllum	Narrowleaf goosefoot	
Chenopodium pratericola	Desert goosefoot	
Chenopodium rubrum	Red goosefoot	
Chenopodium watsonii	Watson's goosefoot	
Chionophila jamesii	Rocky Mountain snowlover	
Chrysothamnus greenei	Greene's rabbitbrush	
Chrysothamnus vaseyi	Vasey's rabbitbrush	
Chrysothamnus viscidiflorus	Yellow rabbitbrush	
Chrysothamnus viscidiflorus ssp. *lanceolatus*	Yellow rabbitbrush	
Cicuta maculata	Spotted water hemlock	
Cirsium arvense	Canada thistle	
Cirsium canescens	Prairie thistle	
Cirsium centaureae	Fringed thistle	
Cirsium ochrocentrum	Yellowspine thistle	
Cirsium ochrocentrum ssp. *ochrocentrum*	Yellowspine thistle	
Cirsium pallidum	Pale thistle	
Cirsium parryi	Parry's thistle	
Cirsium parryi ssp. *parryi*	Parry's thistle	
Cirsium scariosum	Meadow thistle	
Cirsium scopulorum	Mountain thistle	
Claytonia megarhiza	Alpine springbeauty	
Claytonia megarhiza var. *megarhiza*	Alpine springbeauty	

Scientific name	*Common name*	*Status*
Clematis columbiana	Rock clematis	
Clematis columbiana var. *columbiana*	Rock clematis	
Clematis hirsutissima	Hairy clematis	
Clematis hirsutissima var. *scottii*	Scott's clematis	
Clematis ligusticifolia	Western white clematis	
Clematis ligusticifolia var. *ligusticifolia*	Western white clematis	
Cleome multicaulis	Slender spiderflower	
Cleome serrulata	Rocky Mountain beeplant	
Collomia linearis	Tiny trumpet	
Comandra umbellata	Bastard toadflax	
Comandra umbellata ssp. *pallida*	Pale bastard toadflax	
Comarum palustre	Purple marshlocks	
Conioselinum scopulorum	Rocky Mountain hemlockparsley	
Convolvulus arvensis	Field bindweed	
Conyza canadensis	Canadian horseweed	
Corallorhiza maculata	Summer coralroot	
Corallorhiza striata	Hooded coralroot	
Corallorhiza trifida	Yellow coralroot	
Coreopsis tinctoria	Golden tickseed	
Coreopsis tinctoria var. *tinctoria*	Golden tickseed	
Corispermum americanum	American bugseed	
Corispermum americanum var. *rydbergii*	American bugseed	
Corispermum villosum	Hairy bugseed	
Cornus canadensis	Bunchberry dogwood	
Cornus sericea	Redosier dogwood	
Cornus sericea ssp. *sericea*	Redosier dogwood	
Corydalis aurea	Scrambled eggs	
Corydalis caseana	Sierra fumewort	
Corydalis caseana ssp. *brandegeei*	Brandegee's fumewort	
Corydalis curvisiliqua	Curvepod fumewort	
Corydalis curvisiliqua ssp. *occidentalis*	Curvepod fumewort	
Crataegus rivularis	River hawthorn	
Crepis occidentalis	Largeflower hawksbeard	
Crepis occidentalis ssp. *occidentalis*	Largeflower hawksbeard	
Crepis runcinata	Fiddleleaf hawksbeard	
Crepis runcinata ssp. *runcinata*	Fiddleleaf hawksbeard	
Cryptantha bakeri	Baker's cryptantha	
Cryptantha cinerea	James' cryptantha	
Cryptantha cinerea var. *jamesii*	James' cryptantha	
Cryptantha cinerea var. *pustulosa*	James' cryptantha	
Cryptantha fendleri	Sanddune cryptantha	
Cryptantha minima	Little cryptantha	
Cryptantha weberi	Weber's cryptantha	
Cryptogramma acrostichoides	American rockbrake	
Cycloloma atriplicifolium	Winged pigweed	
Cymopterus acaulis	Plains springparsley	

Scientific name	*Common name*	*Status*
Cymopterus montanus	Mountain springparsley	
Cynoglossum officinale	Gypsyflower	
Cyperus squarrosus	Bearded flatsedge	
Cystopteris fragilis	Brittle bladderfern	
Cystopteris reevesiana	Reeves' bladderfern	
Dalea leporina	Foxtail prairie clover	
Danthonia californica	California oatgrass	
Danthonia intermedia	Timber oatgrass	
Danthonia parryi	Parry's oatgrass	
Dasiphora fruticosa	Shrubby cinquefoil	
Dasiphora fruticosa ssp. *floribunda*	Shrubby cinquefoil	
Delphinium alpestre	Colorado larkspur	
Delphinium barbeyi	Subalpine larkspur	
Delphinium nuttallianum	Twolobe larkspur	
Delphinium ramosum	Mountain larkspur	
Delphinium robustum	Wahatoya Creek larkspur	
Deschampsia cespitosa	Tufted hairgrass	
Descurainia incana	Mountain tansymustard	
Descurainia incana ssp. *incisa*	Mountain tansymustard	
Descurainia incana ssp. *viscosa*	Mountain tansymustard	
Descurainia pinnata	Western tansymustard	
Descurainia pinnata ssp. *filipes*	Western tansymustard	
Descurainia ramosissima	Villa Grove tansymustard	
Distichlis spicata	Saltgrass	
Dodecatheon pulchellum	Darkthroat shootingstar	
Dodecatheon pulchellum ssp. *pulchellum*	Darkthroat shootingstar	
Draba aurea	Golden draba	
Draba crassa	Thickleaf draba	
Draba crassifolia	Snowbed draba	
Draba fladnizensis	Austrian draba	
Draba grayana	Gray's draba	
Draba helleriana	Heller's draba	
Draba helleriana var. *helleriana*	Heller's draba	
Draba rectifructa	Mountain draba	
Draba smithii	Smith's draba	
Draba spectabilis	Showy draba	
Draba streptobrachia	Alpine tundra draba	
Draba streptocarpa	Pretty draba	
Dracocephalum parviflorum	American dragonhead	
Dryas octopetala	Eightpetal mountain-avens	
Dryas octopetala ssp. *hookeriana*	Hooker's mountain-avens	
Dryopteris filix-mas	Male fern	
Dyssodia papposa	Fetid marigold	
Echinocereus triglochidiatus	Kingcup cactus	
Echinocereus triglochidiatus var. *triglochidiatus*	Kingcup cactus	
Echinocereus viridiflorus	Nylon hedgehog cactus	

Scientific name	*Common name*	*Status*
Echinocereus viridiflorus var. *viridiflorus*	Nylon hedgehog cactus	
Echinochloa crus-galli	Barnyardgrass	
Echinocystis lobata	Wild cucumber	
Elaeagnus commutata	Silverberry	
Eleocharis acicularis	Needle spikerush	
Eleocharis palustris	Common spikerush	
Eleocharis palustris var. *palustris*	Common spikerush	
Eleocharis quinqueflora	Fewflower spikerush	
×*Elyhordeum macounii*	Macoun's barley	
Elymus canadensis	Canada wildrye	
Elymus elymoides	Squirreltail	
Elymus elymoides ssp. *brevifolius*	Squirreltail	
Elymus lanceolatus	Thickspike wheatgrass	
Elymus lanceolatus ssp. *lanceolatus*	Thickspike wheatgrass	
Elymus repens	Quackgrass	
Elymus scribneri	Spreading wheatgrass	
Elymus trachycaulus	Slender wheatgrass	
Elymus trachycaulus ssp. *trachycaulus*	Slender wheatgrass	
Epilobium brachycarpum	Tall annual willowherb	
Epilobium ciliatum	Fringed willowherb	
Epilobium ciliatum ssp. *glandulosum*	Fringed willowherb	
Epilobium halleanum	Glandular willowherb	
Epilobium hornemannii	Hornemann's willowherb	
Epilobium hornemannii ssp. *hornemannii*	Hornemann's willowherb	
Epilobium saximontanum	Rocky Mountain willowherb	
Equisetum arvense	Field horsetail	
Equisetum hyemale	Scouringrush horsetail	
Equisetum hyemale var. *affine*	Scouringrush horsetail	
Equisetum laevigatum	Smooth horsetail	
Equisetum pratense	Meadow horsetail	
Equisetum variegatum	Variegated scouringrush	
Equisetum variegatum var. *variegatum*	Variegated scouringrush	
Eragrostis pilosa	Indian lovegrass	
Ericameria nauseosa	Rubber rabbitbrush	
Ericameria nauseosa ssp. *consimilis*	Rubber rabbitbrush	
Ericameria nauseosa ssp. *consimilis* var. *oreophila*	Rubber rabbitbrush	
Ericameria nauseosa ssp. *nauseosa*	Rubber rabbitbrush	
Ericameria nauseosa ssp. *nauseosa* var. *bigelovii*	Rubber rabbitbrush	
Ericameria nauseosa ssp. *nauseosa* var. *glabrata*	Rubber rabbitbrush	
Ericameria nauseosa ssp. *nauseosa* var. *nauseosa*	Rubber rabbitbrush	
Ericameria parryi	Parry's rabbitbrush	
Ericameria parryi var. *affinis*	Parry's rabbitbrush	
Ericameria parryi var. *parryi*	Parry's rabbitbrush	
Erigeron acris	Bitter fleabane	
Erigeron acris ssp. *debilis*	Bitter fleabane	
Erigeron acris ssp. *politus*	Bitter fleabane	

Scientific name	*Common name*	*Status*
Erigeron canus	Hoary fleabane	
Erigeron colomexicanus	Running fleabane	
Erigeron compositus	Cutleaf daisy	
Erigeron coulteri	Large mountain fleabane	
Erigeron divergens	Spreading fleabane	
Erigeron elatior	Tall fleabane	
Erigeron engelmannii	Engelmann's fleabane	
Erigeron engelmannii var. *engelmannii*	Engelmann's fleabane	
Erigeron eximius	Sprucefir fleabane	
Erigeron flagellaris	Trailing fleabane	
Erigeron formosissimus	Beautiful fleabane	
Erigeron glabellus	Streamside fleabane	
Erigeron leiomerus	Rockslide yellow fleabane	
Erigeron lonchophyllus	Shortray fleabane	
Erigeron melanocephalus	Blackhead fleabane	
Erigeron peregrinus	Subalpine fleabane	
Erigeron peregrinus ssp. *callianthemus*	Subalpine fleabane	
Erigeron peregrinus ssp. *callianthemus* var. *callianthemus*	Subalpine fleabane	
Erigeron philadelphicus	Philadelphia fleabane	
Erigeron philadelphicus var. *philadelphicus*	Philadelphia fleabane	
Erigeron pinnatisectus	Featherleaf fleabane	
Erigeron pumilus	Shaggy fleabane	
Erigeron pumilus ssp. *pumilus*	Shaggy fleabane	
Erigeron simplex	Onestem fleabane	
Erigeron speciosus	Aspen fleabane	
Erigeron speciosus var. *speciosus*	Aspen fleabane	
Erigeron subtrinervis	Threenerve fleabane	
Erigeron subtrinervis var. *subtrinervis*	Threenerve fleabane	
Erigeron ursinus	Bear River fleabane	
Erigeron vetensis	Early bluetop fleabane	
Erigeron vreelandii	Vreeland's erigeron	
Eriodictyon angustifolium	Narrowleaf yerba santa	
Eriogonum alatum	Winged buckwheat	
Eriogonum alatum var. *alatum*	Winged buckwheat	
Eriogonum cernuum	Nodding buckwheat	
Eriogonum cernuum var. *cernuum*	Nodding buckwheat	
Eriogonum coloradense	Colorado buckwheat	
Eriogonum effusum	Spreading buckwheat	
Eriogonum effusum var. *effusum*	Spreading buckwheat	
Eriogonum jamesii	James' buckwheat	
Eriogonum jamesii var. *flavescens*	James' buckwheat	
Eriogonum jamesii var. *jamesii*	James' buckwheat	
Eriogonum jamesii var. *xanthum*	James' buckwheat	
Eriogonum lachnogynum	Woollycup buckwheat	
Eriogonum microthecum	Slender buckwheat	
Eriogonum racemosum	Redroot buckwheat	

Scientific name	*Common name*	*Status*
Eriogonum umbellatum	Sulphur-flower buckwheat	
Eriogonum umbellatum var. *aureum*	Sulphur-flower buckwheat	
Eriogonum umbellatum var. *majus*	Sulphur-flower buckwheat	
Eriogonum umbellatum var. *umbellatum*	Sulphur-flower buckwheat	
Eriophorum angustifolium	Tall cottongrass	
Eriophorum angustifolium ssp. *angustifolium*	Tall cottongrass	
Eritrichium nanum	Arctic alpine forget-me-not	
Erysimum capitatum	Sanddune wallflower	
Erysimum capitatum var. *capitatum*	Sanddune wallflower	
Erysimum cheiranthoides	Wormseed wallflower	
Erysimum inconspicuum	Shy wallflower	
Erysimum inconspicuum var. *inconspicuum*	Shy wallflower	
Escobaria vivipara	Spinystar	
Escobaria vivipara var. *vivipara*	Spinystar	
Euphorbia brachycera	Horned spurge	
Euthamia graminifolia	Flat-top goldentop	
Euthamia graminifolia var. *graminifolia*	Flat-top goldentop	
Euthamia occidentalis	Western goldentop	
Fallugia paradoxa	Apache plume	
Festuca arizonica	Arizona fescue	
Festuca brachyphylla	Alpine fescue	
Festuca brachyphylla ssp. *coloradensis*	Colorado fescue	
Festuca earlei	Earle's fescue	
Festuca idahoensis	Idaho fescue	
Festuca idahoensis ssp. *idahoensis*	Idaho fescue	
Festuca minutiflora	Smallflower fescue	
Festuca rubra	Red fescue	
Festuca saximontana	Rocky Mountain fescue	
Festuca sororia	Ravine fescue	
Festuca thurberi	Thurber's fescue	
Fragaria vesca	Woodland strawberry	
Fragaria vesca ssp. *bracteata*	Woodland strawberry	
Fragaria virginiana	Virginia strawberry	
Fragaria virginiana ssp. *glauca*	Virginia strawberry	
Frasera speciosa	Elkweed	
Gaillardia aristata	Blanketflower	
Galium boreale	Northern bedstraw	
Galium trifidum	Threepetal bedstraw	
Galium trifidum ssp. *subbiflorum*	Threepetal bedstraw	
Gaura coccinea	Scarlet beeblossom	
Gayophytum diffusum	Spreading groundsmoke	
Gayophytum diffusum ssp. *parviflorum*	Spreading groundsmoke	
Gayophytum ramosissimum	Pinyon groundsmoke	
Gentiana affinis	Pleated gentian	
Gentiana algida	Whitish gentian	
Gentiana fremontii	Moss gentian	

Scientific name	*Common name*	*Status*
Gentiana parryi	Parry's gentian	
Gentiana prostrata	Pygmy gentian	
Gentianella amarella	Autumn dwarf gentian	
Gentianella amarella ssp. *acuta*	Autumn dwarf gentian	
Gentianella amarella ssp. *heterosepala*	Autumn dwarf gentian	
Gentianella tenella	Dane's dwarf gentian	
Gentianella tenella ssp. *tenella*	Dane's dwarf gentian	
Gentianopsis barbellata	Perennial fringed gentian	
Gentianopsis thermalis	Rocky Mountain fringed gentian	
Geranium caespitosum	Pineywoods geranium	
Geranium caespitosum var. *caespitosum*	Pineywoods geranium	
Geranium richardsonii	Richardson's geranium	
Geum aleppicum	Yellow avens	
Geum macrophyllum	Largeleaf avens	
Geum macrophyllum var. *perincisum*	Largeleaf avens	
Geum rivale	Purple avens	
Geum rossii	Ross' avens	
Geum rossii var. *turbinatum*	Ross' avens	
Geum triflorum	Old man's whiskers	
Geum triflorum var. *triflorum*	Old man's whiskers	
Glaux maritima	Sea milkwort	
Glyceria grandis	American mannagrass	
Glyceria grandis var. *grandis*	American mannagrass	
Glyceria striata	Fowl mannagrass	
Glycyrrhiza lepidota	American licorice	
Gnaphalium uliginosum	Marsh cudweed	
Goodyera oblongifolia	Western rattlesnake plantain	
Goodyera repens	Lesser rattlesnake plantain	
Gratiola neglecta	Clammy hedgehyssop	
Grindelia decumbens	Reclined gumweed	
Grindelia decumbens var. *decumbens*	Reclined gumweed	
Grindelia nuda	Curlytop gumweed	
Grindelia nuda var. *aphanactis*	Curlytop gumweed	
Grindelia squarrosa	Curlycup gumweed	
Gutierrezia sarothrae	Broom snakeweed	
Gymnocarpium dryopteris	Western oakfern	
Hackelia floribunda	Manyflower stickseed	
Halogeton glomeratus	Saltlover	
Hedysarum occidentale	Western sweetvetch	
Helianthella parryi	Parry's dwarf-sunflower	
Helianthella quinquenervis	Fivenerve helianthella	
Helianthus annuus	Common sunflower	
Helianthus nuttallii	Nuttall's sunflower	
Helianthus petiolaris	Prairie sunflower	
Heliomeris multiflora	Showy goldeneye	
Heliotropium curassavicum	Salt heliotrope	

Scientific name	*Common name*	*Status*
Heliotropium curassavicum var. *obovatum*	Seaside heliotrope	
Heracleum maximum	Common cowparsnip	
Hesperostipa comata	Needle and thread	
Hesperostipa comata ssp. *comata*	Needle and thread	
Hesperostipa neomexicana	New Mexico feathergrass	
Heterotheca fulcrata	Rockyscree false goldenaster	
Heterotheca pumila	Alpine false goldenaster	
Heterotheca villosa	Hairy false goldenaster	
Heterotheca villosa var. *minor*	Hairy false goldenaster	
Heterotheca villosa var. *nana*	Hairy false goldenaster	
Heterotheca villosa var. *villosa*	Hairy false goldenaster	
Heuchera parvifolia	Littleleaf alumroot	
Heuchera parvifolia var. *parvifolia*	Littleleaf alumroot	
Hieracium gracile	Slender hawkweed	
Hieracium gracile var. *gracile*	Slender hawkweed	
Hierochloe hirta	Northern sweetgrass	
Hierochloe hirta ssp. *arctica*	Northern sweetgrass	
Hoffmannseggia glauca	Indian rushpea	
Holodiscus dumosus	Rockspirea	
Hordeum brachyantherum	Meadow barley	
Hordeum brachyantherum ssp. *brachyantherum*	Meadow barley	
Hordeum jubatum	Foxtail barley	
Hordeum jubatum ssp. *jubatum*	Foxtail barley	
Humulus lupulus	Common hop	
Humulus lupulus var. *neomexicanus*	Common hop	
Hydrophyllum fendleri	Fendler's waterleaf	
Hydrophyllum fendleri var. *fendleri*	Fendler's waterleaf	
Hymenopappus filifolius	Fineleaf hymenopappus	
Hymenopappus filifolius var. *cinereus*	Fineleaf hymenopappus	
Hymenopappus filifolius var. *parvulus*	Fineleaf hymenopappus	
Hymenopappus newberryi	Newberry's hymenopappus	
Hymenoxys helenioides	Intermountain rubberweed	
Hymenoxys hoopesii	Owl's-claws	
Hymenoxys richardsonii	Pingue rubberweed	
Hymenoxys richardsonii var. *richardsonii*	Pingue rubberweed	
Hyoscyamus niger	Black henbane	
Hypericum scouleri	Scouler's St. Johnswort	
Hypericum scouleri ssp. *nortoniae*	Norton's St. Johnswort	
Ipomopsis aggregata	Scarlet gilia	
Ipomopsis aggregata ssp. *candida*	Scarlet gilia	
Ipomopsis aggregata ssp. *collina*	Scarlet gilia	
Ipomopsis longiflora	Flaxflowered ipomopsis	
Ipomopsis longiflora ssp. *longiflora*	Flaxflowered ipomopsis	
Ipomopsis multiflora	Manyflowered ipomopsis	
Iris missouriensis	Rocky Mountain iris	
Iva axillaris	Povertyweed	

Scientific name	*Common name*	*Status*
Ivesia gordonii	Gordon's ivesia	
Jamesia americana	Fivepetal cliffbush	
Jamesia americana var. *americana*	Fivepetal cliffbush	
Juncus arcticus	Arctic rush	
Juncus arcticus ssp. *littoralis*	Mountain rush	
Juncus bufonius	Toad rush	
Juncus bufonius var. *bufonius*	Toad rush	
Juncus castaneus	Chestnut rush	
Juncus castaneus ssp. *castaneus*	Chestnut rush	
Juncus castaneus ssp. *castaneus* var. *castaneus*	Chestnut rush	
Juncus drummondii	Drummond's rush	
Juncus interior	Inland rush	
Juncus longistylis	Longstyle rush	
Juncus longistylis var. *longistylis*	Longstyle rush	
Juncus mertensianus	Mertens' rush	
Juncus saximontanus	Rocky Mountain rush	
Juncus torreyi	Torrey's rush	
Juniperus communis	Common juniper	
Juniperus communis var. *depressa*	Common juniper	
Juniperus scopulorum	Rocky Mountain juniper	
Kalmia microphylla	Alpine laurel	
Kobresia myosuroides	Bellardi bog sedge	
Koeleria macrantha	Prairie Junegrass	
Krascheninnikovia lanata	Winterfat	
Lactuca tatarica	Blue lettuce	
Lactuca tatarica var. *pulchella*	Blue lettuce	
Lappula occidentalis	Flatspine stickseed	
Lappula occidentalis var. *occidentalis*	Flatspine stickseed	
Lathyrus eucosmus	Bush vetchling	
Lathyrus lanszwertii	Nevada pea	
Lathyrus lanszwertii var. *leucanthus*	Nevada pea	
Lathyrus latifolius	Perennial pea	
Lemna minuta	Least duckweed	
Lemna turionifera	Turion duckweed	
Lepidium alyssoides	Mesa pepperwort	
Lepidium alyssoides var. *alyssoides*	Mesa pepperwort	
Lepidium densiflorum	Common pepperweed	
Lepidium latifolium	Broadleaved pepperweed	
Lepidium ramosissimum	Manybranched pepperweed	
Leptochloa fusca	Malabar sprangletop	
Leptochloa fusca ssp. *fascicularis*	Bearded sprangletop	
Leptosiphon nuttallii	Nuttall's linanthus	
Leptosiphon nuttallii ssp. *nuttallii*	Nuttall's linanthus	
Lesquerella montana	Mountain bladderpod	
Levisticum officinale	Garden lovage	
Lewisia pygmaea	Alpine lewisia	

Scientific name	*Common name*	*Status*
Leymus ambiguus	Colorado wildrye	
Leymus cinereus	Basin wildrye	
Leymus triticoides	Beardless wildrye	
Liatris punctata	Dotted blazing star	
Ligusticum porteri	Porter's licorice-root	
Ligusticum porteri var. *porteri*	Porter's licorice-root	
Limosella aquatica	Water mudwort	
Linanthus pungens	Granite prickly phlox	
Linnaea borealis	Twinflower	
Linnaea borealis ssp. *americana*	Twinflower	
Linum australe	Southern flax	
Linum australe var. *australe*	Southern flax	
Linum lewisii	Lewis flax	
Linum lewisii var. *lewisii*	Prairie flax	
Listera cordata	Heartleaf twayblade	
Listera cordata var. *nephrophylla*	Heartleaf twayblade	
Lithophragma tenellum	Slender woodland-star	
Lithospermum incisum	Narrowleaf stoneseed	
Lithospermum multiflorum	Manyflowered stoneseed	
Lloydia serotina	Common alplily	
Lloydia serotina var. *serotina*	Common alplily	
Lonicera involucrata	Twinberry honeysuckle	
Lonicera involucrata var. *involucrata*	Twinberry honeysuckle	
Lupinus argenteus	Silvery lupine	
Lupinus bakeri	Baker's lupine	
Lupinus bakeri ssp. *bakeri*	Baker's lupine	
Lupinus caespitosus	Stemless dwarf lupine	
Lupinus caespitosus var. *caespitosus*	Stemless dwarf lupine	
Lupinus caudatus	Tailcup lupine	
Lupinus kingii	King's lupine	
Lupinus pusillus	Rusty lupine	
Lupinus pusillus ssp. *pusillus*	Rusty lupine	
Lupinus sericeus	Silky lupine	
Lupinus sericeus ssp. *sericeus*	Silky lupine	
Luzula parviflora	Smallflowered woodrush	
Luzula spicata	Spiked woodrush	
Lycopus asper	Rough bugleweed	
Lygodesmia juncea	Rush skeletonplant	
Machaeranthera bigelovii	Bigelow's tansyaster	
Machaeranthera bigelovii var. *bigelovii*	Bigelow's tansyaster	
Machaeranthera canescens	Hoary tansyaster	
Machaeranthera canescens ssp. *glabra*	Hoary tansyaster	
Machaeranthera canescens ssp. *glabra* var. *glabra*	Hoary tansyaster	
Machaeranthera coloradoensis	Colorado tansyaster	
Machaeranthera coloradoensis var. *coloradoensis*	Colorado tansyaster	
Machaeranthera parviflora	Smallflower tansyaster	

Scientific name	*Common name*	*Status*
Machaeranthera pinnatifida	Lacy tansyaster	
Machaeranthera pinnatifida ssp. *pinnatifida*	Lacy tansyaster	
Machaeranthera pinnatifida ssp. *pinnatifida* var. *pinnatifida*	Lacy tansyaster	
Machaeranthera tanacetifolia	Tanseyleaf tansyaster	
Mahonia repens	Creeping barberry	
Maianthemum racemosum	Feathery false lily of the valley	
Maianthemum racemosum ssp. *amplexicaule*	Feathery false lily of the valley	
Maianthemum stellatum	Starry false lily of the valley	
Malva neglecta	Common mallow	
Marsilea vestita	Hairy waterclover	
Medicago sativa	Alfalfa	
Medicago sativa ssp. *sativa*	Alfalfa	
Melilotus officinalis	Sweetclover	
Mentha arvensis	Wild mint	
Mentzelia albicaulis	Whitestem blazingstar	
Mentzelia multiflora	Adonis blazingstar	
Mentzelia multiflora var. *multiflora*	Adonis blazingstar	
Mentzelia nuda	Bractless blazingstar	
Mentzelia rusbyi	Rusby's blazingstar	
Mentzelia speciosa	Jeweled blazingstar	
Menyanthes trifoliata	Buckbean	
Mertensia alpina	Alpine bluebells	
Mertensia brevistyla	Shortstyle bluebells	
Mertensia ciliata	Tall fringed bluebells	
Mertensia ciliata var. *ciliata*	Tall fringed bluebells	
Mertensia franciscana	Franciscan bluebells	
Mertensia lanceolata	Prairie bluebells	
Mertensia lanceolata var. *lanceolata*	Prairie bluebells	
Mertensia oblongifolia	Oblongleaf bluebells	
Mimulus floribundus	Manyflowered monkeyflower	
Mimulus glabratus	Roundleaf monkeyflower	
Mimulus guttatus	Seep monkeyflower	
Minuartia obtusiloba	Twinflower sandwort	
Minuartia rubella	Beautiful sandwort	
Mirabilis linearis	Narrowleaf four o'clock	
Mirabilis multiflora	Colorado four o'clock	
Mirabilis oxybaphoides	Smooth spreading four o'clock	
Mitella pentandra	Fivestamen miterwort	
Mitella stauropetala	Smallflower miterwort	
Mitella stauropetala var. *stenopetala*	Drywoods miterwort	
Moehringia lateriflora	Bluntleaf sandwort	
Moehringia macrophylla	Largeleaf sandwort	
Monarda fistulosa	Wild bergamot	
Monarda fistulosa ssp. *fistulosa*	Wild bergamot	
Monarda fistulosa ssp. *fistulosa* var. *menthifolia*	Mintleaf bergamot	

Scientific name	*Common name*	*Status*
Monarda pectinata	Pony beebalm	
Moneses uniflora	Single delight	
Monolepis nuttalliana	Nuttall's povertyweed	
Monotropa hypopithys	Pinesap	
Montia chamissoi	Water minerslettuce	
Muhlenbergia andina	Foxtail muhly	
Muhlenbergia asperifolia	Scratchgrass	
Muhlenbergia brevis	Short muhly	
Muhlenbergia filiculmis	Slimstem muhly	
Muhlenbergia filiformis	Pullup muhly	
Muhlenbergia minutissima	Annual muhly	
Muhlenbergia montana	Mountain muhly	
Muhlenbergia pungens	Sandhill muhly	
Muhlenbergia richardsonis	Mat muhly	
Muhlenbergia torreyi	Ring muhly	
Munroa squarrosa	False buffalograss	
Myriophyllum sibiricum	Shortspike watermilfoil	
Nassella viridula	Green needlegrass	
Nasturtium officinale	Watercress	
Neoparrya lithophila	Bill's neoparrya	
Noccaea montana	Alpine pennycress	
Noccaea montana var. *montana*	Alpine pennycress	
Nuphar lutea	Yellow pond-lily	
Nuphar lutea ssp. *polysepala*	Rocky Mountain pond-lily	
Oenothera albicaulis	Whitest evening primrose	
Oenothera caespitosa	Tufted evening primrose	
Oenothera caespitosa ssp. *caespitosa*	Tufted evening primrose	
Oenothera coronopifolia	Crownleaf evening primrose	
Oenothera elata	Hooker's evening primrose	
Oenothera elata ssp. *hirsutissima*	Hooker's evening primrose	
Oenothera flava	Yellow evening primrose	
Oenothera flava ssp. *flava*	Yellow evening primrose	
Oenothera pallida	Pale evening primrose	
Oenothera pallida ssp. *runcinata*	Pale evening primrose	
Oenothera villosa	Hairy evening primrose	
Oenothera villosa ssp. *strigosa*	Hairy evening primrose	
Opuntia polyacantha	Plains pricklypear	
Opuntia polyacantha var. *polyacantha*	Hairspine pricklypear	
Oreochrysum parryi	Parry's goldenrod	
Oreoxis alpina	Alpine oreoxis	
Oreoxis alpina ssp. *alpina*	Alpine oreoxis	
Oreoxis alpina ssp. *puberulenta*	Alpine oreoxis	
Oreoxis bakeri	Baker's alpineparsley	
Orobanche fasciculata	Clustered broomrape	
Orthilia secunda	Sidebells wintergreen	
Orthocarpus luteus	Yellow owl's-clover	

Scientific name	*Common name*	*Status*
Oryzopsis asperifolia	Roughleaf ricegrass	
Osmorhiza depauperata	Bluntseed sweetroot	
Oxypolis fendleri	Fendler's cowbane	
Oxyria digyna	Alpine mountainsorrel	
Oxytropis campestris	Field locoweed	
Oxytropis deflexa	Nodding locoweed	
Oxytropis deflexa var. *sericea*	Blue nodding locoweed	
Oxytropis lambertii	Purple locoweed	
Oxytropis lambertii var. *lambertii*	Purple locoweed	
Oxytropis parryi	Parry's oxytrope	
Oxytropis sericea	White locoweed	
Oxytropis sericea var. *sericea*	White locoweed	
Oxytropis splendens	Showy locoweed	
Packera cana	Woolly groundsel	
Packera crocata	Saffron ragwort	
Packera dimorphophylla	Splitleaf groundsel	
Packera dimorphophylla var. *intermedia*	Splitleaf groundsel	
Packera fendleri	Fendler's ragwort	
Packera neomexicana	New Mexico groundsel	
Packera neomexicana var. *mutabilis*	New Mexico groundsel	
Packera pseudaurea	Falsegold groundsel	
Packera pseudaurea var. *pseudaurea*	Falsegold groundsel	
Packera streptanthifolia	Rocky Mountain groundsel	
Packera tridenticulata	Threetooth ragwort	
Packera werneriifolia	Hoary groundsel	
Parietaria pensylvanica	Pennsylvania pellitory	
Parnassia palustris	Marsh grass of Parnassus	
Parnassia palustris var. *montanensis*	Mountain grass of Parnassus	
Paronychia pulvinata	Rocky Mountain nailwort	
Paronychia sessiliflora	Creeping nailwort	
Parthenium tetraneuris	Arkansas River feverfew	
Pascopyrum smithii	Western wheatgrass	
Pastinaca sativa	Wild parsnip	
Paxistima myrsinites	Oregon boxleaf	
Pectis angustifolia	Lemonscent	
Pectis angustifolia var. *angustifolia*	Narrowleaf pectis	
Pedicularis canadensis	Canadian lousewort	
Pedicularis canadensis ssp. *fluviatilis*	Canadian lousewort	
Pedicularis crenulata	Meadow lousewort	
Pedicularis groenlandica	Elephanthead lousewort	
Pedicularis parryi	Parry's lousewort	
Pedicularis parryi ssp. *parryi*	Parry's lousewort	
Pedicularis procera	Giant lousewort	
Pedicularis racemosa	Sickletop lousewort	
Pedicularis racemosa ssp. *alba*	Sickletop lousewort	
Pediocactus simpsonii	Mountain ball cactus	

Scientific name	*Common name*	*Status*
Penstemon barbatus	Beardlip penstemon	
Penstemon caespitosus	Mat penstemon	
Penstemon griffinii	Griffin's beardtongue	
Penstemon hallii	Hall's beardtongue	
Penstemon procerus	Littleflower penstemon	
Penstemon procerus var. *procerus*	Pincushion beardtongue	
Penstemon rydbergii	Rydberg's penstemon	
Penstemon secundiflorus	Sidebells penstemon	
Penstemon strictus	Rocky Mountain penstemon	
Penstemon unilateralis	Oneside penstemon	
Penstemon whippleanus	Whipple's penstemon	
Pericome caudata	Mountain tail-leaf	
Petasites frigidus	Arctic sweet coltsfoot	
Petasites frigidus var. *sagittatus*	Arrowleaf sweet coltsfoot	
Phacelia alba	White phacelia	
Phacelia bakeri	Baker's phacelia	
Phacelia glandulosa	Glandular phacelia	
Phacelia glandulosa var. *glandulosa*	Glandular phacelia	
Phacelia heterophylla	Varileaf phacelia	
Phacelia heterophylla ssp. *heterophylla*	Varileaf phacelia	
Phacelia sericea	Silky phacelia	
Phacelia sericea ssp. *sericea*	Silky phacelia	
Phalaris arundinacea	Reed canarygrass	
Phleum alpinum	Alpine timothy	
Phleum pratense	Timothy	
Phlox austromontana	Mountain phlox	
Phlox condensata	Dwarf phlox	
Phlox hoodii	Spiny phlox	
Phlox pulvinata	Cushion phlox	
Physaria floribunda	Oointtip twinpod	
Physocarpus monogynus	Mountain ninebark	
Picea engelmannii	Engelmann spruce	
Picea engelmannii var. *engelmannii*	Engelmann spruce	
Picea pungens	Blue spruce	
Picradeniopsis oppositifolia	Oppositeleaf bahia	
Pinus aristata	Bristlecone pine	
Pinus edulis	Twoneedle pinyon	
Pinus flexilis	Limber pine	
Pinus ponderosa	Ponderosa pine	
Pinus ponderosa var. *brachyptera*	Ponderosa pine	
Pinus ponderosa var. *scopulorum*	Ponderosa pine	
Pinus strobiformis	Southwestern white pine	
Piptatherum micranthum	Littleseed ricegrass	
Piptatherum pungens	Mountain ricegrass	
Plagiobothrys scouleri	Scouler's popcornflower	
Plagiobothrys scouleri var. *hispidulus*	Sleeping popcornflower	

Scientific name	*Common name*	*Status*
Plantago eriopoda	Redwool plantain	
Plantago major	Common plantain	
Platanthera dilatata	Scentbottle	
Platanthera dilatata var. *albiflora*	Scentbottle	
Platanthera obtusata	Bluntleaved orchid	
Platanthera obtusata ssp. *obtusata*	Bluntleaved orchid	
Platanthera sparsiflora	Sparse-flowered bog orchid	
Platanthera sparsiflora var. *ensifolia*	Sparse-flowered bog orchid	
Poa alpina	Alpine bluegrass	
Poa annua	Annual bluegrass	
Poa arctica	Arctic bluegrass	
Poa arctica ssp. *aperta*	Arctic bluegrass	
Poa compressa	Canada bluegrass	
Poa fendleriana	Muttongrass	
Poa glauca	Glaucous bluegrass	
Poa glauca ssp. *rupicola*	Timberline bluegrass	
Poa leptocoma	Marsh bluegrass	
Poa lettermanii	Letterman's bluegrass	
Poa nemoralis	Wood bluegrass	
Poa nemoralis ssp. *interior*	Inland bluegrass	
Poa palustris	Fowl bluegrass	
Poa pratensis	Kentucky bluegrass	
Poa pratensis ssp. *pratensis*	Kentucky bluegrass	
Poa reflexa	Nodding bluegrass	
Poa secunda	Sandberg bluegrass	
Podistera eastwoodiae	Eastwood's podistera	
Polemonium brandegeei	Brandegee's Jacob's-ladder	
Polemonium confertum	Rocky Mountain Jacob's-ladder	
Polemonium foliosissimum	Towering Jacob's-ladder	
Polemonium occidentale	Western polemonium	
Polemonium occidentale ssp. *occidentale*	Western polemonium	
Polemonium pulcherrimum	Jacob's-ladder	
Polemonium pulcherrimum ssp. *delicatum*	Jacob's-ladder	
Polemonium viscosum	Sticky polemonium	
Polygonum amphibium	Water knotweed	
Polygonum amphibium var. *emersum*	Longroot smartweed	
Polygonum arenastrum	Oval-leaf knotweed	
Polygonum argyrocoleon	Silversheath knotweed	
Polygonum bistortoides	American bistort	
Polygonum douglasii	Douglas' knotweed	
Polygonum pensylvanicum	Pennsylvania smartweed	
Polygonum persicaria	Spotted ladysthumb	
Polygonum viviparum	Alpine bistort	
Populus ×acuminata	Lanceleaf cottonwood	
Populus angustifolia	Narrowleaf cottonwood	
Populus tremuloides	Quaking aspen	

Scientific name	*Common name*	*Status*
Portulaca oleracea	Little hogweed	
Potamogeton alpinus	Alpine pondweed	
Potamogeton foliosus	Leafy pondweed	
Potamogeton foliosus ssp. *foliosus*	Leafy pondweed	
Potamogeton nodosus	Longleaf pondweed	
Potamogeton pusillus	Small pondweed	
Potamogeton pusillus ssp. *pusillus*	Small pondweed	
Potentilla ambigens	Silkyleaf cinquefoil	
Potentilla concinna	Elegant cinquefoil	
Potentilla concinna var. *concinna*	Elegant cinquefoil	
Potentilla diversifolia	Varileaf cinquefoil	
Potentilla diversifolia var. *diversifolia*	Varileaf cinquefoil	
Potentilla gracilis	Slender cinquefoil	
Potentilla hippiana	Woolly cinquefoil	
Potentilla hippiana var. *hippiana*	Woolly cinquefoil	
Potentilla norvegica	Norwegian cinquefoil	
Potentilla norvegica ssp. *monspeliensis*	Norwegian cinquefoil	
Potentilla paradoxa	Paradox cinquefoil	
Potentilla pensylvanica	Pennsylvania cinquefoil	
Potentilla pensylvanica var. *pensylvanica*	Pennsylvania cinquefoil	
Potentilla plattensis	Platte River cinquefoil	
Potentilla pulcherrima	Beautiful cinquefoil	
Potentilla rivalis	Brook cinquefoil	
Potentilla subjuga	Colorado cinquefoil	
Potentilla uniflora	Oneflower cinquefoil	
Primula angustifolia	Alpine primrose	
Primula parryi	Parry's primrose	
Prunella vulgaris	Common selfheal	
Prunella vulgaris ssp. *lanceolata*	Lance selfheal	
Prunus pensylvanica	Pin cherry	
Prunus pensylvanica var. *pensylvanica*	Pin cherry	
Prunus virginiana	Chokecherry	
Prunus virginiana var. *melanocarpa*	Black chokecherry	
Psathyrostachys juncea	Russian wildrye	
Pseudocymopterus montanus	Alpine false springparsley	
Pseudotsuga menziesii	Douglas-fir	
Pseudotsuga menziesii var. *glauca*	Rocky Mountain Douglas-fir	
Psoralidium lanceolatum	Lemon scurfpea	
Pteridium aquilinum	Western brackenfern	
Pteridium aquilinum var. *pubescens*	Hairy brackenfern	
Pterospora andromedea	Woodland pinedrops	
Pteryxia hendersonii	Henderson's wavewing	
Puccinellia nuttalliana	Nuttall's alkaligrass	
Pulsatilla patens	Eastern pasqueflower	
Pulsatilla patens ssp. *multifida*	Cutleaf anemone	
Pyrola asarifolia	Liverleaf wintergreen	

Scientific name	*Common name*	*Status*
Pyrola asarifolia ssp. *asarifolia*	Liverleaf wintergreen	
Pyrola chlorantha	Greenflowered wintergreen	
Pyrola minor	Snowline wintergreen	
Pyrrocoma clementis	Tranquil goldenweed	
Pyrrocoma clementis var. *clementis*	Tranquil goldenweed	
Pyrrocoma lanceolata	Lanceleaf goldenweed	
Pyrrocoma lanceolata var. *lanceolata*	Lanceleaf goldenweed	
Pyrrocoma uniflora	Plantain goldenweed	
Pyrrocoma uniflora var. *uniflora*	Plantain goldenweed	
Quercus gambelii	Gambel oak	
Quercus gambelii var. *gambelii*	Gambel oak	
Ranunculus abortivus	Littleleaf buttercup	
Ranunculus alismifolius	Plantainleaf buttercup	
Ranunculus alismifolius var. *montanus*	Waterplantain buttercup	
Ranunculus cardiophyllus	Heartleaf buttercup	
Ranunculus cymbalaria	Alkali buttercup	
Ranunculus gmelinii	Gmelin's buttercup	
Ranunculus hyperboreus	High northern buttercup	
Ranunculus inamoenus	Graceful buttercup	
Ranunculus macauleyi	Rocky Mountain buttercup	
Ranunculus macounii	Macoun's buttercup	
Ranunculus sceleratus	Cursed buttercup	
Ranunculus sceleratus var. *multifidus*	Cursed buttercup	
Ranunculus sceleratus var. *sceleratus*	Cursed buttercup	
Ranunculus trichophyllus	Threadleaf crowfoot	
Ranunculus trichophyllus var. *trichophyllus*	Threadleaf crowfoot	
Ranunculus uncinatus	Woodland buttercup	
Redfieldia flexuosa	Blowout grass	
Rhinanthus minor	Little yellow rattle	
Rhinanthus minor ssp. *minor*	Little yellow rattle	
Rhodiola integrifolia	Ledge stonecrop	
Rhodiola rhodantha	Redpod stonecrop	
Rhus trilobata	Skunkbush sumac	
Rhus trilobata var. *trilobata*	Skunkbush sumac	
Ribes aureum	Golden currant	
Ribes cereum	Wax currant	
Ribes cereum var. *pedicellare*	Whisky currant	
Ribes inerme	Whitestem gooseberry	
Ribes inerme var. *inerme*	Whitestem gooseberry	
Ribes laxiflorum	Trailing black currant	
Ribes leptanthum	Trumpet gooseberry	
Ribes montigenum	Gooseberry currant	
Ribes wolfii	Wolf's currant	
Rorippa alpina	Alpine yellowcress	
Rorippa curvipes	Bluntleaf yellowcress	
Rorippa curvipes var. *curvipes*	Bluntleaf yellowcress	

Scientific name	*Common name*	*Status*
Rorippa curvipes var. *truncata*	Bluntleaf yellowcress	
Rorippa palustris	Bog yellowcress	
Rorippa palustris ssp. *hispida*	Hispid yellowcress	
Rorippa sinuata	Spreading yellowcress	
Rorippa sphaerocarpa	Roundfruit yellowcress	
Rosa acicularis	Prickly rose	
Rosa acicularis ssp. *sayi*	Prickly rose	
Rosa woodsii	Woods' rose	
Rosa woodsii var. *ultramontana*	Woods' rose	
Rubus deliciosus	Delicious raspberry	
Rubus idaeus	American red raspberry	
Rubus idaeus ssp. *strigosus*	Grayleaf red raspberry	
Rubus parviflorus	Thimbleberry	
Rubus parviflorus var. *parviflorus*	Thimbleberry	
Rudbeckia hirta	Blackeyed Susan	
Rudbeckia hirta var. *pulcherrima*	Blackeyed Susan	
Rudbeckia laciniata	Cutleaf coneflower	
Rudbeckia laciniata var. *ampla*	Cutleaf coneflower	
Rumex aquaticus	Western dock	
Rumex aquaticus var. *fenestratus*	Western dock	
Rumex densiflorus	Denseflowered dock	
Rumex maritimus	Golden dock	
Rumex salicifolius	Willow dock	
Rumex salicifolius var. *mexicanus*	Mexican dock	
Rumex venosus	Veiny dock	
Sagina saginoides	Arctic pearlwort	
Sagittaria cuneata	Arumleaf arrowhead	
Salix amygdaloides	Peachleaf willow	
Salix bebbiana	Bebb willow	
Salix brachycarpa	Shortfruit willow	
Salix brachycarpa var. *brachycarpa*	Shortfruit willow	
Salix drummondiana	Drummond's willow	
Salix exigua	Narrowleaf willow	
Salix geyeriana	Geyer willow	
Salix ligulifolia	Strapleaf willow	
Salix lucida	Shining willow	
Salix lucida ssp. *caudata*	Greenleaf willow	
Salix monticola	Park willow	
Salix nivalis	Snow willow	
Salix orestera	Sierra willow	
Salix petrophila	Alpine willow	
Salix planifolia	Diamondleaf willow	
Salix planifolia ssp. *planifolia*	Diamondleaf willow	
Salix scouleriana	Scouler's willow	
Salix wolfii	Wolf's willow	
Salsola tragus	Prickly Russian thistle	

Scientific name	*Common name*	*Status*
Salvia reflexa	Lanceleaf sage	
Sambucus racemosa	Red elderberry	
Sambucus racemosa var. *racemosa*	Red elderberry	
Sarcobatus vermiculatus	Greasewood	
Saxifraga bronchialis	Yellowdot saxifrage	
Saxifraga bronchialis ssp. *austromontana*	Matted saxifrage	
Saxifraga caespitosa	Tufted alpine saxifrage	
Saxifraga caespitosa ssp. *delicatula*	Tufted alpine saxifrage	
Saxifraga cernua	Nodding saxifrage	
Saxifraga chrysantha	Goldbloom saxifrage	
Saxifraga flagellaris	Whiplash saxifrage	
Saxifraga flagellaris ssp. *crandallii*	Crandall's saxifrage	
Saxifraga odontoloma	Brook saxifrage	
Saxifraga rhomboidea	Diamondleaf saxifrage	
Saxifraga rivularis	Weak saxifrage	
Schedonnardus paniculatus	Tumblegrass	
Schizachyrium scoparium	Little bluestem	
Schizachyrium scoparium var. *scoparium*	Little bluestem	
Schkuhria multiflora	Manyflower false threadleaf	
Schoenocrambe linearifolia	Slimleaf plainsmustard	
Schoenoplectus acutus	Hardstem bulrush	
Schoenoplectus acutus var. *acutus*	Hardstem bulrush	
Schoenoplectus maritimus	Cosmopolitan bulrush	
Schoenoplectus pungens	Common threesquare	
Schoenoplectus pungens var. *longispicatus*	Common threesquare	
Schoenoplectus tabernaemontani	Softstem bulrush	
Scirpus microcarpus	Panicled bulrush	
Scirpus nevadensis	Nevada bulrush	
Scrophularia lanceolata	Lanceleaf figwort	
Scutellaria galericulata	Marsh skullcap	
Sedum lanceolatum	Spearleaf stonecrop	
Sedum lanceolatum ssp. *lanceolatum*	Spearleaf stonecrop	
Selaginella densa	Lesser spikemoss	
Selaginella weatherbiana	Weatherby's spikemoss	
Senecio amplectens	Showy alpine ragwort	
Senecio amplectens var. *amplectens*	Showy alpine ragwort	
Senecio amplectens var. *holmii*	Holm's ragwort	
Senecio atratus	Tall blacktip ragwort	
Senecio bigelovii	Nodding ragwort	
Senecio bigelovii var. *hallii*	Hall's ragwort	
Senecio crassulus	Thickleaf ragwort	
Senecio eremophilus	Desert ragwort	
Senecio eremophilus var. *kingii*	King's ragwort	
Senecio fremontii	Dwarf mountain ragwort	
Senecio fremontii var. *blitoides*	Dwarf mountain ragwort	
Senecio pudicus	Bashful ragwort	

Scientific name	*Common name*	*Status*
Senecio soldanella	Colorado ragwort	
Senecio spartioides	Broom-like ragwort	
Senecio spartioides var. *multicapitatus*	Broom-like ragwort	
Senecio taraxacoides	Dandelion ragwort	
Senecio triangularis	Arrowleaf ragwort	
Senecio wootonii	Wooton's ragwort	
Sesuvium verrucosum	Verrucose seapurslane	
Setaria viridis	Green bristlegrass	
Setaria viridis var. *viridis*	Green bristlegrass	
Shepherdia canadensis	Russet buffaloberry	
Sibbaldia procumbens	Creeping sibbaldia	
Sidalcea candida	White checkerbloom	
Sidalcea neomexicana	Salt spring checkerbloom	
Sidalcea neomexicana ssp. *neomexicana*	Salt spring checkerbloom	
Silene acaulis	Moss campion	
Silene acaulis var. *subacaulescens*	Moss campion	
Silene drummondii	Drummond's campion	
Silene drummondii var. *drummondii*	Drummond's campion	
Silene menziesii	Menzies' campion	
Silene menziesii ssp. *menziesii*	Menzies' campion	
Silene menziesii ssp. *menziesii* var. *menziesii*	Menzies' campion	
Silene scouleri	Simple campion	
Silene scouleri ssp. *hallii*	Simple campion	
Sisymbrium altissimum	Tall tumblemustard	
Sisyrinchium demissum	Stiff blue-eyed grass	
Sisyrinchium montanum	Strict blue-eyed grass	
Sisyrinchium montanum var. *montanum*	Strict blue-eyed grass	
Sisyrinchium pallidum	Pale blue-eyed grass	
Sium suave	Hemlock waterparsnip	
Smelowskia calycina	Alpine smelowskia	
Smelowskia calycina var. *americana*	American false candytuft	
Solanum triflorum	Cutleaf nightshade	
Solidago canadensis	Canada goldenrod	
Solidago missouriensis	Missouri goldenrod	
Solidago multiradiata	Rocky Mountain goldenrod	
Solidago multiradiata var. *scopulorum*	Manyray goldenrod	
Solidago simplex	Mt. Albert goldenrod	
Solidago simplex ssp. *simplex*	Mt. Albert goldenrod	
Solidago simplex ssp. *simplex* var. *simplex*	Mt. Albert goldenrod	
Solidago velutina	Threenerve goldenrod	
Sonchus arvensis	Field sowthistle	
Sonchus arvensis ssp. *uliginosus*	Moist sowthistle	
Sophora nuttalliana	Silky sophora	
Spartina gracilis	Alkali cordgrass	
Sphaeralcea coccinea	Scarlet globemallow	
Sphaeralcea coccinea ssp. *coccinea*	Scarlet globemallow	

Scientific name	*Common name*	*Status*
Sphaerophysa salsula	Alkali swainsonpea	
Sphenopholis obtusata	Prairie wedgescale	
Spiranthes romanzoffiana	Hooded lady's tresses	
Sporobolus airoides	Alkali sacaton	
Sporobolus contractus	Spike dropseed	
Sporobolus cryptandrus	Sand dropseed	
Stachys pilosa	Hairy hedgenettle	
Stachys pilosa var. *pilosa*	Hairy hedgenettle	
Stellaria calycantha	Northern starwort	
Stellaria crassifolia	Fleshy starwort	
Stellaria crassifolia var. *crassifolia*	Fleshy starwort	
Stellaria longifolia	Longleaf starwort	
Stellaria longifolia var. *longifolia*	Longleaf starwort	
Stellaria longipes	Longstalk starwort	
Stellaria longipes ssp. *longipes*	Chickweed, starwort	
Stellaria umbellata	Umbrella starwort	
Stephanomeria pauciflora	Brownplume wirelettuce	
Streptopus amplexifolius	Claspleaf twistedstalk	
Streptopus amplexifolius var. *chalazatus*	Tubercle twistedstalk	
Suaeda calceoliformis	Pursh seepweed	
Suaeda moquinii	Mojave seablite	
Swertia perennis	Felwort	
Symphoricarpos occidentalis	Western snowberry	
Symphoricarpos rotundifolius	Roundleaf snowberry	
Symphoricarpos rotundifolius var. *rotundifolius*	Roundleaf snowberry	
Symphyotrichum ascendens	Western aster	
Symphyotrichum boreale	Northern bog aster	
Symphyotrichum eatonii	Eaton's aster	
Symphyotrichum ericoides	White heath aster	
Symphyotrichum ericoides var. *ericoides*	White heath aster	
Symphyotrichum falcatum	White prairie aster	
Symphyotrichum falcatum var. *falcatum*	White prairie aster	
Symphyotrichum foliaceum	Alpine leafybract aster	
Symphyotrichum frondosum	Short-rayed alkali aster	
Symphyotrichum lanceolatum	White panicle aster	
Symphyotrichum lanceolatum ssp. *hesperium*	White panicle aster	
Symphyotrichum lanceolatum ssp. *hesperium* var. *hesperium*	White panicle aster	
Symphyotrichum spathulatum	Western mountain aster	
Symphyotrichum spathulatum var. *spathulatum*	Western mountain aster	
Taraxacum lyratum	Harp dandelion	
Taraxacum officinale	Common dandelion	
Taraxacum officinale ssp. *ceratophorum*	Common dandelion	
Tetradymia canescens	Spineless horsebrush	
Tetraneuris acaulis	Stemless four-nerve daisy	
Tetraneuris acaulis var. *acaulis*	Stemless four-nerve daisy	

Scientific name	*Common name*	*Status*
Tetraneuris acaulis var. *caespitosa*	Caespitose four-nerve daisy	
Tetraneuris brandegeei	Brandegee's four-nerve daisy	
Tetraneuris grandiflora	Graylocks four-nerve daisy	
Teucrium canadense	Canada germander	
Teucrium canadense var. *occidentale*	Western germander	
Thalictrum alpinum	Alpine meadow-rue	
Thalictrum fendleri	Fendler's meadow-rue	
Thalictrum fendleri var. *fendleri*	Fendler's meadow-rue	
Thalictrum sparsiflorum	Fewflower meadow-rue	
Thalictrum sparsiflorum var. *saximontanum*	Fewflower meadow-rue	
Thelesperma filifolium	Stiff greenthread	
Thelesperma filifolium var. *intermedium*	Stiff greenthread	
Thelesperma subnudum	Navajo tea	
Thelesperma subnudum var. *subnudum*	Navajo tea	
Thermopsis divaricarpa	Spreadfruit goldenbanner	
Thermopsis montana	Mountain goldenbanner	
Thermopsis montana var. *montana*	Mountain goldenbanner	
Thermopsis rhombifolia	Prairie thermopsis	
Thlaspi arvense	Field pennycress	
Tonestus pygmaeus	Pygmy goldenweed	
Townsendia eximia	Tall Townsend daisy	
Townsendia exscapa	Stemless Townsend daisy	
Townsendia grandiflora	Largeflower Townsend daisy	
Townsendia hookeri	Hooker's Townsend daisy	
Townsendia leptotes	Common Townsend daisy	
Tragopogon porrifolius	Salsify	
Trautvetteria caroliniensis	Carolina bugbane	
Trautvetteria caroliniensis var. *occidentalis*	Western bugbane	
Trifolium attenuatum	Rocky Mountain clover	
Trifolium brandegeei	Brandegee's clover	
Trifolium dasyphyllum	Alpine clover	
Trifolium dasyphyllum ssp. *dasyphyllum*	Alpine clover	
Trifolium hybridum	Alsike clover	
Trifolium longipes	Longstalk clover	
Trifolium longipes ssp. *pygmaeum*	Pygmy clover	
Trifolium nanum	Dwarf clover	
Trifolium parryi	Parry's clover	
Trifolium parryi ssp. *salictorum*	Parry's clover	
Trifolium repens	White clover	
Trifolium wormskioldii	Cows clover	
Triglochin maritima	Seaside arrowgrass	
Triglochin palustris	Marsh arrowgrass	
Tripterocalyx micranthus	Smallflower sandverbena	
Trisetum spicatum	Spike trisetum	
Trollius laxus	American globeflower	
Trollius laxus ssp. *albiflorus*	American globeflower	

Scientific name	*Common name*	*Status*
Typha latifolia	Broadleaf cattail	
Urtica dioica	Stinging nettle	
Urtica dioica ssp. *gracilis*	California nettle	
Utricularia ochroleuca	Yellowishwhite bladderwort	
Vaccinium cespitosum	Dwarf bilberry	
Vaccinium myrtillus	Whortleberry	
Vaccinium scoparium	Grouse whortleberry	
Valeriana acutiloba	Sharpleaf valerian	
Valeriana acutiloba var. *acutiloba*	Sharpleaf valerian	
Valeriana arizonica	Arizona valerian	
Valeriana edulis	Tobacco root	
Valeriana edulis var. *edulis*	Tobacco root	
Veratrum tenuipetalum	Colorado false hellebore	
Verbena bracteata	Bigbract verbena	
Verbena macdougalii	MacDougal verbena	
Verbesina encelioides	Golden crownbeard	
Verbesina encelioides ssp. *encelioides*	Golden crownbeard	
Verbesina encelioides ssp. *exauriculata*	Golden crownbeard	
Veronica americana	American speedwell	
Veronica peregrina	Neckweed	
Veronica peregrina ssp. *xalapensis*	Hairy purslane speedwell	
Veronica serpyllifolia	Thymeleaf speedwell	
Veronica serpyllifolia ssp. *humifusa*	Brightblue speedwell	
Veronica wormskjoldii	American alpine speedwell	
Veronica wormskjoldii var. *wormskjoldii*	American alpine speedwell	
Vicia americana	American vetch	
Vicia americana ssp. *americana*	American vetch	
Vicia sativa	Garden vetch	
Vicia sativa ssp. *nigra*	Garden vetch	
Viola adunca	Hookedspur violet	
Viola adunca var. *adunca*	Hookedspur violet	
Viola biflora	Arctic yellow violet	
Viola biflora ssp. *biflora*	Arctic yellow violet	
Viola canadensis	Canadian white violet	
Viola canadensis var. *scopulorum*	Canadian white violet	
Viola labradorica	Alpine violet	
Viola macloskeyi	Small white violet	
Viola macloskeyi ssp. *pallens*	Smooth white violet	
Viola nephrophylla	Northern bog violet	
Viola renifolia	White violet	
Woodsia oregana	Oregon cliff fern	
Woodsia oregana ssp. *cathcartiana*	Oregon cliff fern	
Woodsia scopulina	Rocky Mountain woodsia	
Yucca glauca	Soapweed yucca	
Zigadenus elegans	Mountain deathcamas	
Zigadenus elegans ssp. *elegans*	Mountain deathcamas	

Appendix D

Public Comments

Please note that, because this final document is based upon the draft EA and LPP for the SLVCA, the comments enclosed herein were on the broader SLVCA and were responded to accordingly. Some of these comments and responses are less relevant to the smaller SCCA discussed in this final land protection plan.

Letter #1— Biosphere Coalition (page 1 of 14)

Biosphere Coalition

COMMENTS, Re: USFWS EA-LPP

Date: 2012, June 8

To: Dr. Michael Dixon, Land-use Planning Team Leader
US Fish & Wildlife Service
PO Box 25486 DFC
Denver, CO 80225

From: Michael Monterey, PC, Director of Program Development, Planning & Project Coordination, Biosphere Coalition; and T. Glyder Tucker, MA, PC, Biosphere Coalition & Baca Grande POA Natural Surroundings Committee

Re: USFWS Draft Environmental Assessment & "CE" Land Protection Plan for the proposed San Luis Valley Conservation Area

INTRODUCTION

The Biosphere Coalition planning policy team analyzed the key issues, principles, stratagems and methods embodied in the current draft Environmental Assessment. In response to the USFWS Planning Team presentation by Dr. Michael Dixon (June 16, 2012, at Moffat, CO), we support LPP "Alternative B" and submit our comments to support effective recovery of regional aquifers, for optimal protection of Areas of Critical Ecological Concern (ACEC), enabling best practice for restoration, conservation, and protection of the Great Sand Dunes National Park & Preserve (GSDNPP), its Hydrogeologic Region, its integral bioregion, and optimum support for sustainable economic development in the San Luis Valley (SLV) and greater Southern Rocky Mountain Ecoregion (SRME).

As referenced repeatedly in the current draft Environmental Assessment (EA) and draft Land Protection Plan (LPP, dated May 2012), the ACEC, sensitive and threatened habitats within the proposed San Luis Valley Conservation Area (SLVCA), include Globally Rare, Outstanding & Very High Biodiversity areas, montane, and submontane riparian habitats threatened by current planning, management policy, and unsustainable agriculture in the proposed SLVCA. Therefore, our comments and recommendations focus on supporting the best aspects of the current draft LPP, and actual protection of the most imperiled species, habitats, and stakeholders in the SLV and the greater SRME.

First, we are glad that Public Trust species and eight "Focal Species" have been identified by the USFWS Planning Team as essential to adaptive ecological response, planning, and management. Our main concerns are for CE implementation in the Crestone-Baca Grande Subdivision (Crestone-BGS) area, since seven of the eight Focal Species are documented (by Biosphere Coalition and other observers) as residing here. These Focal Species and habitat concerns require expedited collaboration for realizing the goals of the SLVCA and CE program.

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Service Response to Letter #1

Thank you for your support of the conservation vision described in the Draft SLVCA EA and LPP. Responses to comments on specific points follows.

Letter #1—Biosphere Coalition (page 2 of 14)

COMMENTS, Re: USFWS EA & LPP, page 2

We now realize that some of the most difficult problems and issues impacting local officials, land managers, planners, ranchers, and farmers are due to failure to address the importance of certain sensitive ecological areas and their role in sustaining functional riparian habitat [in a timely manner], wildlife corridors, recharge zones, and wetlands hydrology in the BNWR and GSDNPP. Therefore, we address the problem and recommend a resolution supporting optimal fulfillment of the intent and mission critical objectives of the USFWS and the SLVRC LPP. Our specific comments are followed by conclusions and general recommendations.

SECTION A

It is well understood that there are endangered, threatened, and "candidate" species and habitat.

> "Surface and ground water diversions have significantly changed the amounts and timing of flows in most valley streams. In addition, ground water use has exceeded recharge rates in large portions of the valley.
>
> "...The potential for farmers and ranchers to sell water rights from their lands or even convert current land use practices from agricultural to residential, industrial, or municipal uses will continue to grow and threaten the biological integrity of the San Luis Valley." – USFWS EA, chap. 1, p. 1, May 2012 (published date of document, typical)

In the last 40 years, these problems have severely injured and eradicated over an estimated twenty thousand acres of wetlands and historic riparian areas, threatening or locally eliminating endangered species, among others. To ensure optimal realization of the beneficial objectives of the draft EA-LPP (and a truly effective CCP), a truly "win-win" best case outcome can and must include restoration and actual conservation — with on-the-ground work and durable legal protection — for historic riparian habitat and wetlands adjacent to the BNWR, GSDNPP, and other refuge areas sustained by essential habitat in peril.

Biosphere Coalition's primary concerns, related to the CE LPP program proposed for the SLVCA, is watershed and habitat protection in the GSDNPP Hydrogeologic Region, which includes the town of Crestone and Baca Grande POA greenbelt riparian/wetland areas, very appropriate to the stated SLVCA project goals:

1: "conserve, restore, enhance, and protect wetland and riparian habitat, an important breeding and foraging resource in the high mountain desert for migratory shorebirds, waterfowl, and neotropical passerine birds"

We strongly agree with goal 1 and 2, especially for the Crestone-BGS area.

2: "support the recovery and protection of threatened and endangered species that occur in the SLVCA, and reduce the likelihood of future listings under the Endangered Species Act by prioritizing key habitat for listed species and species that are candidates for listing"

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Service Response to Letter #1

A1–A3, A5, A6

We agree that the wetland and riparian areas in the Crestone and Baca Grande area have important wildlife value. While they were not specifically identified in the prioritization map on page 64 of the draft LPP, we would certainly consider working with willing sellers to provide easements on those partials to ensure their permanent protection.

Letter #1—Biosphere Coalition (page 3 of 14)

COMMENTS, Re: USFWS EA & LPP, page 3

3: "protect the integrity of these habitats by preventing fragmentation and off-parcel sale of surface water"

We strongly emphasize the importance of goal 3 for the Crestone-BGS.

4: "conserve working landscapes based on ranching and farming activities that support a viable agricultural industry "

We recognize the importance of agriculture to the SLV economy and its rural agrarian esthetic, but insist on qualifying the terms to foster viable agriculture based on "Optimal Use" (supporting both economic and ecological sustainability); yet current practices counteract the goals of the current draft LPP (documentary evidence is available), causing serious ongoing injuries to the critical habitats and Focal Species the SLVCA is designed to protect and restore.

5: "promote ecological resiliency and adaptive capacity by connecting together the existing network of public and private conservation lands"

Goal 5 is an exact example of what would occur with specific inclusion of the Crestone-BGS area as a demonstration of the benefits of the LPP and SLVCA.

6: "protect, restore, or, when necessary, emulate the ***historic*** hydrologic regime of the valley to ensure the presence of wildlife habitat"

Goal 6 is important, because we recognize that the historic hydrologic regime of the Crestone-BGS area must be emulated or restored to sustain proper functioning and the goals of the LPP. This also applies to the rest of the watersheds within the greater GSDNPP Hydrogeologic Region.

We are concerned by the language and implications in the paragraph that follows the SLVCA and LPP goals, quoted below:

"The Service will phase in implementation of the overall project. We anticipate focusing first on the southern Sangre de Cristo mountains, with conservation on the valley floor to follow. During this comment period we want to hear from all interested parties and partners to ensure we understand and consider any concerns or comments about the acquisition of easements in these areas. A Habitat Conservation Plan for the southwestern willow flycatcher is currently in development by local governments and pertains to the valley floor. ***This and considerations about the actual easement language as it relates to water use and rights may take longer to resolve.*** These issues are less likely to be concerns in the southern Sangre de Cristo mountains. ***Therefore, we anticipate that, if the overall plan is approved, we will focus our initial implementation efforts there.***"

Starting the SLVCA program in the Southern Sangre de Cristos area will be to the detriment of the seven Focal Species in our area of the SLV. There is no reason to think that the local-regional Habitat Conservation Plan ("HCP") should be given greater priority or status than an optimal LPP for the SLVCA as a whole. Our area includes some of the SLV's rarest habitats of Outstanding & Very High Biodiversity.

Biosphere Coalition comments on and emphasizes the following, derived from (EA, p. 3) previous LPP scoping process, as follows:

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Service Response to Letter #1

A1–A3, A5, A6

We agree that the wetland and riparian areas in the Crestone and Baca Grande area have important wildlife value. While they were not specifically identified in the prioritization map on page 64 of the draft LPP, we would certainly consider working with willing sellers to provide easements on those partials to ensure their permanent protection.

A4

Certainly not all agricultural activities are compatible with the persistence of wildlife habitat that would be considered for protection under the SLVCA. Service biologists have identified overgrazing of riparian areas as having serious negative impacts on the capacity of that vegetation to regenerate in much of Colorado. However, an easement will prevent other types of potentially harmful habitat alteration, and landowners participating in the SLVCA would be encouraged to discuss opportunities for habitat management or restoration such as funding through the Partners for Fish and Wildlife Program.

Letter #1—Biosphere Coalition (page 4 of 14)

COMMENTS, Re: USFWS EA & LPP, page 4

A: "How will the SLVCA affect water use in the valley?"

The best implementation of an optimal SLVCA LPP will vastly improve the quality of water-use, conservation, and recovery of SLV ground waters and aquifer levels.

B: "Develop partnerships for land protection."

This essential challenge to fostering and supporting all the best elements and objectives embodied in the SLVCA and LPP; and Biosphere Coalition supports a proactive public education and interagency forums with timely presentations from any and all stakeholders. The EA mentions the major neighboring stakeholder adjacent to the BNWR, the GSNPP, which receives little focus in the EA and LPP, though the huge combined acreage of the two "units" are "co-managed."

C: "Ensure that the SLVCA planning process incorporates the importance of protecting cultural resources."

There is no better way to protect and enhance cultural resources than to provide optimal restoration, protection, and conservation of natural beauty, resources, and critical habitats that sustain the SLV's resident species and its economy.

D: "How will the SLVCA increase the capacity to adapt to climate change on the existing refuges and habitat throughout the valley?"

The best scientific research shows conclusively that restoration of ecologically critical habitat, wise water-use, and optimal protection of the land and focal species will support optimal hydrologic recharge of groundwater, aquifers, and moderation of the effects of climate change and cyclic drought impacts. Hence, optimal implementation of the proposed SLVCA will greatly increase adaptability, resilience, and sustainability of all habitats and species, including ours.

E: "The plan should account for air, soil, sound, and visibility effects."

We deeply appreciate the inclusion of this complex set of inseparably interdependent, interactive elements of the optimal solution. The quality of air, soil, sound, and visibility in the SLV are essentially important to our regional quality of life and our economy.

The following section includes language addressing some of the lands and protected habitat areas subject to various public and private conservation programs. In the first subsection text on the San Luis Valley National Wildlife Refuge (SLVNWR) Complex, we see mention of "an emphasis on wetlands and riparian systems" and that "management practices include vegetation manipulation and the artificial movement of water." The text also says that "limited water availability presents significant challenges" aggravated by climate change and ramifications of Colorado water law.

Present refuge resource management gives cause for serious concern. Yet, it is encouraging that the "secondary goal of the SLVCA is to help restore the hydrology of the San Luis Valley both on and off existing refuges to help ameliorate some of the problem."

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Service Response to Letter #1

One of the most challenging but important issues being investigated during the ongoing development of a comprehensive conservation plan (CCP) for the San Luis Valley National Wildlife Refuge Complex regards future changes in water use on the refuges. We encourage you to stay involved in the planning for the CCP as it goes forward.

Letter #1—Biosphere Coalition (page 5 of 14)

COMMENTS, Re: USFWS EA & LPP, page 5

The Crestone-BGS area is adjacent to the BNWR, BLM ACEC, and GSDNPP. It offers a unique opportunity, an inter-agency, public-private demonstration of the potential of the proposed SLVCA, its CE program, and the optimal LPP.

The unique private lands and Greenbelts of Crestone and the Baca Grande Property Owners Association (BGPOA) are ecologically essential corridors connecting the Rio Grande National Forest, Baca National Wildlife Refuge (BNWR), and Great Sand Dunes National Park (GSDNP), all within its Hydrogeologic Region. The streams and groundwaters of the Crestone-Baca area recharge the BNWR, BLM, and GSDNPP groundwater, running from and through the Sangre de Cristo mountains into the Eastern SLVCA aquifer recharge zones. The "greenbelts" and historic riparian wildlife corridors within the town of Crestone and Baca Grande Subdivision, serve as a unique nexus of the area's biological connectivity and ground water resources (including North Crestone Creek, South Crestone Creek, Willow Creek, Spanish Creek, Cottonwood Creek, and other privately owned riparian zones in the SLVCA) at the San Luis basin's hydrologic recharge zones provide an example and an ideal model for best case planning, restoration, and protection.

The mention of important habitat for declining Rio Grande cutthroat trout and other imperiled species, re: the USFS is encouraging. The native trout and other aquatic and avian species of the Crestone-Baca area have declined severely. As mentioned in the draft EA subsection on BLM lands, the local streams, riparian corridors, and intermittent wetlands of the Baca Grande are important for many migratory species, including the focal species of concern featured in the SLVCA EA & LPP.

Biosphere Coalition is especially committed to supporting the stated mission (EA, p. 5) of the USFWS NWR System:

> "...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)

SECTION B

> "As described in detail in this chapter, the habitats of the valley and surrounding mountains are crucial to the breeding and migration of migratory birds, band provide important opportunities for persistence or reintroduction of populations of imperiled species that are protected under the Endangered Species Act." – USFWS, EA, chap. 3, p. 10

Ecologically viable and legally durable Conservation Easements placed on the wildlife corridors and riparian habitat within BGPOA land [and other lands between the surrounding Public Lands] could secure area-wide connectivity.

> "The San Luis Valley's hydrology is strongly influenced by the surface runoff and ground water flows from the surrounding mountains. This hydrology has created a

Service Response to Letter #1

Section A

Discussion of phased implementation: The Service is committed to collaborating with the local governments in their efforts to obtain land for mitigation under the HCP and in their work to resolve the long-term challenges about water in the San Luis Valley. It is important to recognize that we view the LPP as a long-term vision, and an initial focus on the southeastern part of the project area will not negate that long-term vision.

Section B

Agreed. We look forward to working with property owners in the Baca Grande area as we start rolling out conservation delivery in other parts of the SLVCA.

Letter #1—Biosphere Coalition (page 6 of 14)

network of riparian corridors and wetlands that break up large expanses of associated desert and upland habitats across a 7,000-foot elevation gradient, resulting in high plant diversity...

"The combination of plant structure and density coupled with water depth and duration creates rich habitat diversity within each larger area of wet meadow. This richness of habitat creates tremendous foraging and nesting opportunities for a variety of bird species. Among these are numerous species of waterfowl as well as sora, Virginia rail, white-faced ibis, American avocet, Wilson's snipe, and Wilson's phalarope." – EA, p. 12-13

Many species listed in the quote above are or were present in or throughout the Crestone-BGS area (re: personal report on Spanish Wetlands). Restoration of natural instream flow and riparian hydrologic regimes will protect such species and their habitats and fulfill LPP goals. Current management practices are actually accelerating the excessive depletion and injury of SLV streams, groundwater, and aquifers that have historically sustained the lands now owned by the FWS SLVNWR Complex, the BLM, GSDNPP, and other public and private lands in the valley floor.

According to the CO Water Court decree for Case 04CW35 (relying on scientific findings drawn from federally funded surveys for establishing the GSDNPP), pumping San Luis Closed Basin water not only lowers the water table in its immediate vicinity, but more rapidly drains the valley margin recharge zones, from below. The pumping artificially increases the virtual steepness of the flow gradient. Projections about local climate impacts and typical generalizations that ignore the hydrology of the unique groundwater and aquifer recharge area adjacent to the BNWR (i.e., the Crestone-BGS area to the East) are inappropriate for effective planning and land protection,

"Riparian habitat includes trees, shrubs, and other streamside vegetation and is associated with intermittent and perennial waterways. This community may flood every year. Its historic extent on the valley floor has been reduced due to surface water diversion. Woody riparian habitat is sensitive to excessive grazing, which limits regeneration of the dominant willows and narrow-leaf cottonwood trees. Shrubs that contribute to the structural diversity of riparian habitat include red-osier dogwood and greasewood.

"These shrublands and forests provide important stopover habitat for migratory passerines, as well as nesting habitat for species such as Lewis' woodpecker, willow flycatcher, and possibly yellow-billed cuckoo. In addition, the shade and stream bank stabilization provided by riparian vegetation is important in maintaining temperature and water quality in streams and rivers for species such as the endemic Rio Grande cutthroat trout, Rio Grande chub, and Rio Grande sucker." – EA, p. 14

We strongly recommend expediting CE R&D that includes perpetual retention and/or long-term leasing of water rights for success of the SLVCA. Many species of plants and birds that depend on the rich diversity and connectivity of the riparian corridors in the hydrogeologically unique Crestone-BGS area are among the most endangered or of

Service Response to Letter #1

It is likely that the Closed Basin Project has broader impacts on the San Luis Closed Basin system than just the aquifer levels in its immediate vicinity. However, this is not an issue over which the Service has authority, nor can it be addressed through a conservation easement program. The SLVCA is only one piece of what will need to be a cooperative, multifaceted approach to resolve long-term water issues in the valley.

Letter #1—Biosphere Coalition (page 7 of 14)

COMMENTS, Re: USFWS EA & LPP, page 7

special concern. Some of the SLV's rare and endangered reptiles and amphibians have already declined to near local extinction.

Two more years may be too long to wait to save and restore some of the SLVCA's Public Trust Waters that sustain Public Trust Species, ACEC, historic riparian areas, Globally Rare, Outstanding, and Very High Biodiversity habitats. So, we appreciate the great emphasis placed on the importance of the southwestern willow flycatcher which, like other indicator species, has all but disappeared from some riparian corridors of the SLV margins. We appreciate the extensive listing and consideration of critically imperiled aquatic species as well. Eagles used to catch native fish and nest in the Baca Grande area, but not now. The sage thrasher is another native of the area above the BNWR. In fact, most of the mammals listed throughout the EA & LPP use the Crestone-BGS greenbelts as habitat and/or riparian corridors to move between the montane zone and the valley floor. Some, like the native beaver, are keystone species, essential to quality and quantity of SLV water, wetlands, and other species. Biosphere Coalition recommends relatively rapid response to the crisis in progress.

We recognize the serious educational and budgetary challenges facing anyone devoted to real solutions. Yet, appropriate R&D, realistic planning, and well coordinated, tightly coupled, public-private collaboration will expedite optimal results, ecologically, economically, and legally.

> "Tourism is a cornerstone of the local economy, and the tourism industry in the San Luis Valley shows strong development potential. With a diverse collection of natural and heritage assets, the local tourism industry is able to cater to a variety of recreationalists, including outdoor recreationalists; visitors to the Great Sand Dunes NPP; resort tourists; vacation and second home owners; eco-tourists; heritage, arts, and cultural tourists; and visitors who pass through the area on their way to other regional attractions (Center for Rural Entrepreneurship 2008). According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, approximately 3.1 million residents participated in wildlife-associated recreation activities in Colorado and New Mexico in 2006 (USFWS 2008). It was estimated that residents and visitors combined spent $3.8 billion on wildlife-associated recreational activities in 2006 in the two States combined, with Colorado accounting for approximately 79 percent of this spending." – EA, p. 29

Those facts bode well for the hospitality, services, and food service sectors, and for stronger focus on nonfarm, nonextractive, "green" development in the SLV. Approximately 70% of the strength of our formerly affluent national economy was supported by consumer spending, driven by real wage growth, the importance of the SLVCA's nonfarm sectors transcends the dollar amounts of revenue. Over 75% of Alamosa County's economic occupations are in the business, management, finance, service, sales & office, professional (and related) segments of the nonfarm sectors. That translates to jobs and votes and nonfarm related activities. Although the number of farms and productive agricultural acres may be among the highest in the SLV,

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Service Response to Letter #1

We appreciate your recognition of the conservation challenges in the San Luis Valley, and the factors that require a careful, pragmatic approach to delivering conservation there

Letter #1—Biosphere Coalition (page 8 of 14)

approximately 3.7% of Alamosa County's population in farming, mining, and forestry segments. Hence, the confluence of declining agricultural product values, increasing likelihood of drought, radical climate change impacts, and lack of effectively adaptive transition to a greener economy, countered by responsive land protection and greener water-use policy in the SLV could provide a pathway to sustainable success.

Therefore, Biosphere Coalition urges the most progressive possible leadership and seeks to assist the USFWS in fulfilling its purpose and mandated objectives, especially in light of the following facts and issues:

> "...The SLVCA is the southernmost significant waterbird production area in the central flyway and is the most important waterfowl production area in Colorado. According to Partners in Flight, riparian habitats in the region support the highest bird diversity of any western habitat type (USFWS 2010a).
>
> "The highest-remaining concentration of wetlands in Colorado occurs in the San Luis Valley and protection of every remaining wetland acre is a high priority (USFWS 2010a). Manipulation of the natural hydrological cycle in the San Luis Valley for agricultural purposes has resulted in the loss of significant wetland habitat (USFWS 2010a). Most of the remaining wetlands in the SLVCA occur on private ranch and farm land and are reliant on the water diverted out of rivers and creeks or from artesian wells to maintain their value to wetland-dependent wildlife (USFWS 2010a).
>
> "Maintaining the current connectedness of the wetland complex through permanent protection would limit the risk for species movement patterns to be disrupted due to fragmentation and would also maintain important migration corridors and linkages between seasonal ranges necessary to meet the life-history requirements for many wildlife species (USFWS 2010a)." – EA, p. 30-31

We recognize the validity and critical importance of the data and related realizations stated in the quoted text above. The final sentence quoted (underlined) is of greatest importance in understanding the urgency and necessity of an optimal LPP for the SLVCA. Again, we must emphasize that the points and issues of greatest concern are especially critical in the Crestone-BGS area, possessing the most uniquely rich biodiversity and critically important connectivity in the montane and submontane areas between Medano Creek and the Orient Land Trust along the recharge margin of the SLV at the foot of the Northern Sangre de Cristos.

We appreciate the USFWS initiative for creating new CEs for the proposed SLVCA Land Protection Plan, potentially protecting historic riparian areas and habitat identified in a Colorado Natural Heritage Program's (CNHP) biological survey (for Crestone-Baca Land Trust, 2005). Such areas include Saguache County Open Space (purchased with GOCO funds) and Crestone-Baca Land Trust lands (shown on the USFWS Focal Species habitat maps), neither of which are protected by durable CEs. Providing adequate protection in perpetuity, with sufficient consideration of water-rights issues, realistic resource management practices, and policies will serve the best interests of all SLVCA species and stakeholders. We urge best practices to ensure best results, re:

Letter #1—Biosphere Coalition (page 9 of 14)

COMMENTS, Re: USFWS EA & LPP, page 9

> "Water quantity, quality, and use issues are major threats to the sustainability of wetland and riparian habitats in the SLVCA. Changes in water quality and quantity have adverse effects on the function of the wetland complex located in the valley floor. There are, for example, growing concerns about the impacts of new contaminants, such as endocrine-disrupting chemicals, that can affect water quality on both private and public lands (USFWS 2010a)."

Current litigation (late May, 2012) involves the Rio Grande Water Conservation District-Subdistrict 1, re: numerous technical objections to their Annual Replacement Plan. Biosphere Coalition emphasizes restoration of historic zones of aquifer recharge as the focus of the LPP. Thus, we recommend best practices for aquifer depletion protection in the interim, and for maintenance of riparian habitat in the critical Crestone-BGS area. In concert with the LPP objectives, we recommend restoration of five historic flows, requiring up to 2500 A/ft/yr. For reference on the issues, we quote your EA, below:

> "These circumstances threaten healthy riparian systems along the Rio Grande, Conejos, and Alamosa rivers, where senior water rights are currently used in the floodplain. The evolving economic and regulatory environment in the SLVCA will likely result in the acquisition of some of these water rights to augment distant wells, moving water out of the floodplain and degrading migratory bird habitat (USFWS 2010a). Additionally, this will increase the State's difficulty in managing water in the Rio Grande and administering the Rio Grande Compact. For these reasons, the Rio Grande Water Conservation District and other water users in the San Luis Valley will support the SLVCA in acquiring conservation easements along these rivers (USFWS 2010a)." – EA, p. 32

So, to foster best case implementation, in addition to the proposed CE program, we urge expedited Partnering with Biosphere Coalition in conservation grant funding programs for habitat restoration, maintenance, and monitoring. We agree that effective implementation of the LPP cannot be realized without new monitoring locations and methods for groundwater levels and quality, riparian soil hydration and temperature testing, on-the-ground biological survey updates, species reintroduction, and critical habitat support work, especially for Focal Species and native bats. To ensure economical implementation, we will support Green Jobs programs and use of interns and volunteers.

Biosphere Coalition presents the above information for consideration in the final EA-LPP to support optimal realization of the SLVCA objectives. We also strongly recommend Partnering with USFWS Division of Wildlife Management & Habitat Restoration to access optimal grant funding for the SLVCA. Refer to Appendix B for ideal agency guidelines on this opportunity. We would appreciate the agency guidelines being included in the final EA-LPP.

We strongly agree with and encourage the most effective use of "exceptions" to protect lands with "high habitat value" over subsurface mineral rights unlikely to be developed. Acquiring sustainably perpetual CEs for the Northeastern SLV is especially important to realizing our best mutual interests, initiatives, and the results we wish to

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Service Response to Letter #1

Through the SLVCA, the Service hopes to achieve protection for certain types of wildlife habitat, much of it dependent on water. However, larger issues of regional water use, policy, and monitoring programs are outside of the scope of this plan and outside of the authority granted to the Service.

Letter #1—Biosphere Coalition (page 10 of 14)

see for all generations. Additionally, collaborating with the GSDNPP supports the ecological integrity of their Management Plan, ensuring biological connectivity with adjacent lands and ecosystems within the greater GSDNP Bioregion. Making best use of water law is clearly essential to optimal realization of the SLVCA and CE conservation efforts. Hence, with certain reservations, we appreciate inclusion of the following in the draft EA:

> "In Colorado, every water right must be adjudicated through the Water Court. There are now legal avenues to use water for beneficial use without a diversion, such as instream flows.
>
> "If there is not enough water to satisfy all water right holders in a particular stream, the State may shut off junior rights as necessary to ensure that senior water right holders receive their full appropriation. The Rio Grande basin in Colorado is considered over-appropriated.
>
> **Note: We recommend another approach to best fulfill LPP goals. We suggest basing appropriation on time instead of volume, per Huerfano River acequia allocation system, such as in the Redwing (CO) area, among others. If this is implemented as a "beneficial use without a diversion," then every water stakeholder in this Northeastern SLV would receive water and desired legal avenues are opened for restorative nonconsumptive use, i.e., in historic riparian flow regimes (pre-dating roads, ditches, diversions, dikes, etc.), also including more recent riparian zones.**
>
> "Ground water in Colorado is designated as either tributary or non-tributary. Tributary ground water is water contained in aquifers that have a direct hydraulic connection to surface water. The unconfined aquifer in the San Luis Valley is tributary ground water. Tributary ground water is treated administratively the same as a surface water diversion. The confined aquifer in the San Luis Valley is also considered tributary, though the hydraulic connection to the surface water system is poorly understood." – EA, p. 33, re: Water Law, Colorado

The "poorly understood" connection of the aquifers has been studied and used in Water Court findings and decrees, re: Cases # 04CW35 and 86CW46, among other cases. More importantly, the submontane recharge process must be recognized as necessary to the success of the LPP and for long-term aquifer recovery and stabilization.

Though the Biosphere Coalition favors a more extensive application of the legal term "Optimal Use" (as a superior prescription for sustainable water-use policy and practice), we approve the intent to take advantage of "legal avenues to use water for beneficial use without a diversion."

Biosphere Coalition (and others) will play an increasingly active role in supporting effective multi-agency cooperation. We already support the CE efforts of the expanded BLM ACEC restoration project (EA in progress), while continuing to play an active role in on-the-ground reintroduction of native habitat (for southwestern willow flycatcher and other Focal Species, while also including ducks, shorebirds, muskrat, beaver, buffalo, amphibians, phreatophytes, slender spider flower, native willows, etc.).

Service Response to Letter #1

The San Luis Valley refuges are water users, subject to Colorado water law. While there are likely alternatives in how water rights are adjudicated and how water is appropriated, this is outside of the scope of this LPP and outside of the authority of the Service.

Letter #1—Biosphere Coalition (page 11 of 14)

COMMENTS, Re: USFWS EA & LPP, page 11

Biosphere Coalition is committed to fostering the Colorado Water Conservation Board's "Instream Flow" conservation initiatives, all essential protections, and nonconsumptive use projects supporting optimal management of natural resources, ACEC's, and LPP CE areas.

With the Closed Basin Project in operation, a long-term Land Protection Plan for the SLVCA Bioregion is unworkable, because any CEs and similar protections within the Saguache County area would be jeopardized. Adopting and implementing the mandated program initiatives of the BLM's "Riparian-Wetland Initiative" of the 1990s will expedite success throughout the USFWS jurisdiction. (see the four major goals of that program in Appendix C).

Biosphere Coalition also supports optimal re-use, "green" upgrading, and development of the historic ranch and farm buildings remaining on BNWR land. In reference to our previous comments (May 7), the upgraded facilities can serve as a model of rural ecotourism development, featuring habitat restoration, species re-introduction, ecological education, training, and research center facilities. We propose and support multi-agency and private funding and recommend inclusion of this option in an Appendix to the final draft EA.

CONCLUDING SUMMARY

Albert Einstein noticed that problems are not solved with the kind of thinking that caused them in the first place.

We strongly agree that "conservation of additional wildlife habitat in the SLVCA would be consistent with the policies, management, and plans listed on page 5 of the EA. We also look forward to helping with strategic alliance building, advisory, and consulting services for adequate funding acquisition, program R&D, on-the-ground project supervision, monitoring, and performance assessment.

Clearly, the time is ripe for realistic sustainability policy, planning for best case conservation, real commitment to compliance and enforcement, and actually fostering sustainable economics throughout the SLVCA.

The USFWS conservation program initiative calls for protecting 530,000 acres of the SLVCA over a period of 100 years. At the rate (and cost) of current CE acquisition, 100 years may not be enough for sustainability. So, we specifically propose more effective funding and CE strategy. We also urge inclusion of approximately 3,600 acres of local riparian areas (in Crestone, the Baca Grande subdivision, and neighboring areas) as essential to sustain connectivity and continuity of GSDNP Bioregion ecosystems (including the BNWR). These areas and their recharge zones in the montane and submontane areas, encompassing the BGPOA Subdivision. depend on their historic streams and groundwater flows, which also sustain recharge of both confined and unconfined aquifers.

Sustaining the essential ecosystem services and riparian-wetland functions of the Crestone-BGS area requires managing from 2200 to 2500 A/ft/yr of water for aquifer

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Service Response to Letter #1

We encourage you to stay actively involved with the CCP process for the three San Luis Valley refuges, which may explore the choices for infrastructure development and public use of the Baca National Wildlife Refuge.

Letter #1—Biosphere Coalition (page 12 of 14)

recovery, restoration, and/or preservation of historic flow regimes. Riparian zones also provide 90% of the Natural Capital sustaining human life (see Lovins, Hawkins, et al).

Accomplishing real sustainability and mandated aquifer recovery and satisfying treaty obligations urgently requires phasing out the Closed Basin Project (CBP) to conserve all allocated CBP water by mid-2014. Realistic updating of the Rio Grande Compact (RGC) for reversion to supply of obligations with the prior sources and annual indexing for climate change is also essential.

Finally, in Saguache County, "Open Space" designation for some of the areas of our concern exists, but the legal protections are not durable. CEs providing perpetual protection are essential for optimal implementation of the USFWS CE Land Protection Plan proposed for the SLVCA.

Local ecosystems and the and global biosphere are indivisible. The SLVCA is an inseparably interdependent part of the Rio Grande Watershed and the greater Rocky Mountain environment. What happens in the "margins" of the SLVCA is crucial to what happens elsewhere. We intend to vigorously support the best case outcome.

Sincere thanks for your time, attention, commitment to excellence, and good stewardship. Feel free to call with questions, etc.

For Biosphere Coalition...

T. Glyder Tucker & Michael Monterey

Michaelm.biospherecc@gmail.com

APPENDIX A

"...the San Luis Valley is one of the most impoverished regions of Colorado with Costilla, Saguache, and Alamosa Counties representing the first, second, and third highest poverty levels statewide. Within the nine-county region, Hinsdale County, Colorado, had the highest median household income ($74,659 per year) and the lowest poverty rate (3.7 percent). Costilla County, Colorado, had the lowest median household income ($24,388 per year) and the highest poverty rate (28.4 percent). With the exceptions of Hinsdale and Mineral Counties....all of the counties in [the Colorado SLV] region had poverty levels above the statewide average, with Costilla and Alamosa Counties having poverty rates nearly twice Colorado's average." (U.S. Census Bureau 2010b) – EA, p. 28

Based on our comparative study of the economics of the Colorado portion of the SLVCA, an approximate assessment of the total data integrated with compiled EA data supports an unpromising scenario for the resident populations without more effective planning and rapid transition to sustainable development. While per county population growth projections may be off by wide margins, if current policies and trends continue the growing disparity of poverty and affluence will grow, roughly in proportion with the disparity in levels of education. Hence, we can safely draw useful inferences from the

Letter #1—Biosphere Coalition (page 13 of 14)

economics profile of Alamosa, bearing in mind the similar statistics on per capita poverty and farm related occupational components.

Alamosa County's percentage distributions of occupations is very close to the national averages, with the exception of the farming-mining-forestry segment, which is over three times the national population in the same segment. Using US Census data from 2007 to 2010, we find that Alamosa County may have approximately 700 farms/ranches (largely family owned) with an approximate average of $300,000 in per farm gross sales, but approximately $200,000 in costs per farm.

That means that Alamosa County's farming-mining-forestry industries realize a gross margin of about 33% and gross profit (before tax) of nearly $70 million, from gross receipts of about $210 million. We recognize the declining market value of agricultural products, but the large increase in real inflation probably gives roughly similar dollar numbers today. That contrasts with the county's estimated numbers for retail, wholesale, hospitality & food service sectors, with combined revenues of nearly $378 million.

Hence, the LPP objectives must give adequate weight to nonAg economic potentials. Farming, mining, and forestry are highly mechanized, thus proportional to the high poverty and unemployment rates in the SLVCA area. Smaller, more sustainable family farm operations would be much more advantageous to overall LPP objectives.

APPENDIX B

USFWS Funding Program Initiatives:

Initiative A: Support for locally-based field biologists' one-on-one work with private landowners and other "partners" to plan, implement, and monitor their projects.

Initiative B: Use the USFWS "Partners Program" field staff to help landowners find other sources of funding and help them through permitting and transition [to Optimal Use] for long-term ecological and economic sustainability.

Initiative C: Restore injured & eradicated habitat, Instream Flow resources & wetlands with appropriate Nonconsumptive Use regimes and fencing to protect riparian habitat & species & neighboring properties (to "improve habitat for Federal Trust Species, including migratory birds; threatened and endangered species; inter-jurisdictional fish;" and, other declining species)

Initiative D: "Complement activities on National Wildlife Refuge System lands, or contribute to the resolution of problems on refuges that are caused by off-refuge practices"... foster and support effective planning, restoration, conservation, sustainable water resource management, providing seminars, webinars, and workshops on climate change impacts, alternatives and options for ground water recovery, and project quality assurance

Initiative E: "Address species and habitat priorities... identified [by "USFWS"] planning teams with our partners or in collaboration with state fish and wildlife

Letter #1—Biosphere Coalition (page 14 of 14)

agencies." (re: Southwestern Willow Flycatcher, ducks, native Rio Grande Cutthroat trout, frogs, muskrat, beaver, buffalo, native phreatophytes, etc.)

Initiative F: "Reduce habitat fragmentation [or create buffers] for other important Federal or state conservation lands." (re: adjacent to the BNWR and GSDNP, with optimal CEs for wildlife corridors & buffering in the San Luis Valley aquifer recharge margins)

Initiative G: Plan and manage best practices & results "in self-sustaining systems that are not dependent on artificial structures." In other words, support healthy ecosystems without man-made ditches, dams, or destructive diversion gates in historic streams, wetlands, and sensitive riparian zones essential to natural hydrologic viability and proper functioning of the GSDNP Hydrogeologic Region and its ground water recharge zones.

APPENDIX C

BLM Riparian-Wetland Habitat Conservation Program Goals (1990s)

Goal 1 :: To restore and maintain riparian-wetland areas so that at least 75% are in "proper functioning condition"

Goal 2 :: To protect riparian-wetland areas and uplands through proper land management and by avoiding or mitigating negative impacts

Goal 3 :: To carry out a riparian-wetland information and outreach program that includes training and research (to raise awareness and understanding of the importance of the health of these areas)

Goal 4 :: To maintain existing and form new public-private partnerships (to supplement and accelerate the work, drawing on the talents of volunteers and a mix of private and public funding)

Letter #2—Dave Miller

Comment form sent from: U.S. Fish and Wildlife Service
Name: Dave S. Miller
Organization:
NoneComment: Comments in strong support for the Draft Plan to underscore the importance of the following planning principles, assumptions and strategies:

1. Avoiding "loss and fragmentation" of the SLV wetlands, upland habitats and riparian corridors through a "strategic network of public and private conservation lands".
2. The importance of the SLV as "the most important waterbird production area in Colorado" and the need to protect these migratory birds.
3. The vital strategy of allowing a change of water rights "only if beneficial to wildlife" and once a conservation easement is in place then "no off parcel sales of surface water".
4. The long term strategy of "protecting and restoring the historic hydrologic regime of the SLV'.
5. The statements in the Draft Plan calling for a conservation plan to protect species such as the SW willow flycatcher, the gray wolf and the "non-listed but climate-change imperiled American pike" are of special note and speak to the ecological sensitivity of the plan.
6. The rationale of using conservation easements rather than relying on new federal funds for conservation land acquisition is appropriately defended by stating many of the alternatives are "financially unrealistic and politically untenable.
7. The Draft Plan's sensitivity to the protection of over 100 cultural resource sites and that another 435 sites may be officially eligible for namination is another reflection of the Plans concerns beyond the mere protection of "water and birds".
8. The propose methods for valuation of proposed easements (fair market value based on appraisals) is appropriate and I presume that official existing appraisal guidelines such as BLM"s will be utilized.
9. The Draft Plan's language regarding the use of conservation easements "mean an irreversible and irretrievable commitment of resources" reflects the federal governments to marketing the easements and then enforcing them over the next 25-50 years.
10. A Comprehensive Master Resource Management/Conservation Plan and Map reflecting all the plans of all federal agencies for the entire SLV would be useful to all stakeholder groups. In the meantime, the Plans coordination with many federal and state agencies is noted and supported.

In closing, congratulations on a very comprehensive, realistic and well conceived Draft Plan for the proposed SLV Conservation Area. The Plan reflects strong staff work and agency leadership committed to the conservation of our precious San Luis Valley. Your hard work is both noted and appreciated.

Best Regards,

Dave S. Miller
P.O. Box 896
Crestone, Colorado
pearlbisbeenellie@yahoo.com

Service Response to Letter #2

Thank you for your comments and support of our agency's efforts to deliver conservation in the San Luis Valley.

Letter #3—Glyder

Comment form sent from: U.S. Fish and Wildlife Service
Name: Dave S. Miller
Organization:
NoneComment: Comments in strong support for the Draft Plan to underscore the importance of the following planning principles, assumptions and strategies:

1. Avoiding "loss and fragmentation" of the SLV wetlands, upland habitats and riparian corridors through a "strategic network of public and private conservation lands".
2. The importance of the SLV as "the most important waterbird production area in Colorado" and the need to protect these migratory birds.
3. The vital strategy of allowing a change of water rights "only if beneficial to wildlife" and once a conservation easement is in place then "no off parcel sales of surface water".
4. The long term strategy of "protecting and restoring the historic hydrologic regime of the SLV'.
5. The statements in the Draft Plan calling for a conservation plan to protect species such as the SW willow flycatcher, the gray wolf and the "non-listed but climate-change imperiled American pike" are of special note and speak to the ecological sensitivity of the plan.
6. The rationale of using conservation easements rather than relying on new federal funds for conservation land acquisition is appropriately defended by stating many of the alternatives are "financially unrealistic and politically untenable.
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8. The propose methods for valuation of proposed easements (fair market value based on appraisals) is appropriate and I presume that official existing appraisal guidelines such as BLM"s will be utilized.
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10. A Comprehensive Master Resource Management/Conservation Plan and Map reflecting all the plans of all federal agencies for the entire SLV would be useful to all stakeholder groups. In the meantime, the Plans coordination with many federal and state agencies is noted and supported.

In closing, congratulations on a very comprehensive, realistic and well conceived Draft Plan for the proposed SLV Conservation Area. The Plan reflects strong staff work and agency leadership committed to the conservation of our precious San Luis Valley. Your hard work is both noted and appreciated.

Best Regards,

Dave S. Miller
P.O. Box 896
Crestone, Colorado
pearlbisbeenellie@yahoo.com

Service Response to Letter #3

Thank you for your comments and support of our agency's efforts. We recognize the importance of the Baca Grande riparian corridors to wildlife, and look forward to easement discussions with willing landowners in and around the greenbelts in the Baca Grande subdivision.

Letter #4—Margey Herrington

mkherrin@adams.edu
06/02/2012 08:09 AM

To: sLVrefugesplanning@fws.gov
cc:
Subject: San Luis Valley Conservation Area

Dear Sirs:

I was very pleased to read about the landscape-scale project for wildlife conservation in southern Colorado and northern New Mexico. I appreciate the work that has gone into the SLVCA project and support it wholeheartedly. I will look forward to seeing the results of this careful planning in the years ahead.

Sincerely,

Margery Herrington
38 Morris St.
Monte Vista, CO 81144
719 852-0793

Service Response to Letter #4

Thank you for your comments and support of our agency's efforts to deliver conservation in the San Luis Valley.

Letter #5—Rockard Finlay

Comments to US Fish and Wildlife Service at the open meeting in Moffat, Colorado, on May 16, 2012

I am opposed to any governmental expansion of control over any of the lands within Saguache County.

Projects such as this have in the past started out as one thing and wind up encompassing far more than ever was intended in the original project. For Example: San Luis Valley Conservation Project, continued pumping of water badly needed in the Closed Basin.

We have the LaGarita Wilderness Area, The Sangre de Christo Wilderness Area, the Baca Wildlife Refuge, the Russell Lakes Wildlife Area, The Sand Dunes National Park (with very restrictive citizen use), the BLM and the Forest Service (which every year becomes more restrictive for citizen use). We have enough "wildlife and fowl protection" in Saguache County to satisfy most of the environmentalists in the County. There is a Colorado Conservation Fund that is already serving the San Luis Valley and at least it is accessible at the State level.

Projects such as this one might sound more feasible if it were not coming from the most overextended federal government in the history of the United States.

Who's to say what the regulations for such a project might be two years, 10 years, 25 years from now with changing administrations.

Ronald Reagan said " the most terrifying words in the English language are "I'M FROM THE GOVERNMENT AND I'M HERE TO HELP YOU'.

I oppose the project as an individual at present, but when elected Saguache County Commissioner, I will oppose it as a Saguache County Representative for these reasons.

Rockard E Finley
514 Warden St.
Center, CO 81125

Service Response to Letter #4

Thank you for your comments. As in much of the west, the San Luis Valley has large areas of public lands. While there are already conservation initiatives, including state efforts, underway in the San Luis Valley, including Saguache County, the SLVCA proposes to bring another source of money to the table. Conversations with local nongovernmental organizations and other land protection entities have repeatedly emphasized that there is more demand for conservation easements among landowners than there is money available for that purpose. Regarding future changes in regulations associated with the project under another administration, the SLVCA does not include the establishment of any new regulations. The SLVCA will be a largely conservation easement focused new unit of the National Wildlife Refuge System, in which the Service will seek to buy specific, clearly define property rights from willing landowners. The Service has neither the intent nor the authority to impose regulations on nonparticipating landowners under this program.

Letter #6—Colorado Open Lands (page 1 of 2)

June 8, 2012

Dr. Michael Dixon
U.S. Fish and Wildlife Service, Region 6
Division of Refuge Planning
Lakewood, Colorado 80228

Dr. Dixon:

Colorado Open Lands (COL) would like to express its support for the proposed San Luis Valley Conservation Area Land Protection Plan. Colorado Open Lands is a state-wide conservation organization whose mission is to preserve the significant open lands and diminishing natural heritage of Colorado through private and public partnerships, innovative land conservation techniques, and strategic leadership. We have been working in the Southern Sangre de Cristo Mountains for many years and hold the conservation easement on the Trinchera Ranch. Most recently, we have been focused in Costilla County, working with the County Commissioners on comprehensive land protection and recreation planning and we have conducted significant outreach with local landowners regarding conservation easements as a tool for protecting land and associated water rights. 1. 2.

We applaud the US Fish and Wildlife Service for recognizing the value and unique nature of the San Luis Valley and we welcome their proposed efforts as outlined in the Environmental Assessment and Land Protection Plan. Our comments are limited to the following:

1) Partnership with land trusts
As noted in the report, land trusts have been working in the proposed conservation area successfully for quite some time and we invite and encourage the USFWS to work collaboratively with organizations like COL to further the common conservation goals that we share.

2) Consideration of multiple Conservation Purposes
In the report, the USFWS insightfully describes the context of the area, including its rich archaeological, cultural, and agricultural resources and the report recognizes that tourism is a cornerstone of the economy of the San Luis Valley. The IRS recognizes "relatively natural habitat" as a Conservation Purpose for which a conservation easement can be donated, but it also recognizes open space, public access, and historic resources as valid Conservation Purposes. We urge the USFWS to consider complementary Conservation Purposes, such as archaeological, cultural, agricultural, and recreation resources, in addition to species' habitat when evaluating parcels for conservation easement acquisition.

3) Strategic use of Bargain Sale conservation easements
In its Land Protection Plan, the USFWS proposes to utilize conservation easements as its 3.

274 UNION BOULEVARD, SUITE 320 LAKEWOOD, CO 80228 www.coloradoopenlands.org T 303 988 2373 F 303 988 2383

PHOTO COMPLIMENTS OF JOHN FIELDER

ACCREDITED LAND TRUST

Service Response to Letter #6

Thank you for your comments and support of our agency's efforts to deliver conservation in the San Luis Valley.

1. Thank you for your comments.
2. As mentioned in #1, the many entities involved in land protection in the San Luis Valley have slightly different missions derived from their charter or enabling legislation. While we recognize the value of open space, public access, and historical resources, and some of our easements may be able to protect those values in addition to wildlife values, the Service is specifically charged by the National Wildlife Refuge System Administration Act of 1966, as amended, to "plan and direct the continued growth of the System in a manner that is best designed to accomplish the mission of the System, to contribute to the conservation of the ecosystems of the United States, to complement efforts of States and other Federal agencies to conserve fish and wildlife and their habitats, and to increase support for the System and participation from conservation partners and the public." Certainly we could contribute to fulfilling our obligation under the last part of that statement by working with organizations such as your own to find areas where we can conserve multiple values simultaneously.
3. The Service is required by law to offer a landowner fair market value. This does not preclude us from paying less than the market value (bargain purchase) if the landowner would prefer to receive less than full market value for reasons such as tax benefits. This may be an appealing choice for some landowners.

Letter #6—Colorado Open Lands (page 2 of 2)

primary tool to accomplish protection objectives. We support this strategy, not only for its efficient use of public funds, but also because it illustrates the agency's understanding of local sentiment regarding fee land acquisition. The USFWS notes that it proposes to purchase conservation easements at full fair market value. In some cases, this may be ideal and appropriate; however, when there are budgetary constraints, we encourage the USFWS to consider bargain purchase of conservation easements to increase the number of landowners that may be able to participate in the program. Additionally, because income from the sale of a conservation easement is taxable income, it may be in the interest of landowners to donate a portion of their easement value to be able to take advantage of federal and state tax benefits.

4) Consideration of small land parcels (vara strips associated with acequias) 4.
Costilla County encompasses multiple priority conservation areas for key species of interest as identified in the Land Protection Plan. As noted in the report, this area was settled as part of a Mexican land grant and this unique history has shaped the land ownership patterns we see today – notably, there is a stark contrast between the mountain areas (a few very large land tracts) and the valley floor (thousands of very small parcels). Some of these small tracts are the unfortunate result of a period of intense land speculation and subdivision, but others (called vara strips or long lots) are the result of the Spanish acequia irrigation system. The acequia system, tracing back to the Moors, is an irrigation systems largely comprised of unlined ditches and flood irrigated agriculture which supports a healthy riparian system and species such as the Rio Grande Cutthroat Trout. Because the traditional vara strips tend to be small acreage, it is very difficult for donated conservation easements to be a financially feasible tool to protect the acequia-irrigated land and surface water rights (the oldest in the state). Consequently, we urge the USFWS to consider these lands, despite the small parcel size. COL has been working closely with acequia landowners in Costilla County and is happy to facilitate targeted outreach efforts.

We appreciate the research and careful planning that went into the Land Protection Plan and Environmental Assesment of the proposed San Luis Valley Conservation Area and we look forward to working with the USFWS to protect this special landscape.

Sincerely,

Dan Pike
President

Service Response to Letter #6

4. The SLVCA LPP did not name a minimum parcel size that would be considered for the purchase of conservation easements. We recognize that there is a real conservation need in Costilla County, which is dominated by small parcels both because of the acequia system and because of subdivision in the latter part of the 20th century. We look forward to working with your organization, and will likely ask for your help with outreach to the acequia landowners in the future.

Letter #7—Trust for Public Land

THE TRUST for PUBLIC LAND

Colorado Office
1410 Grant St.
Suite D200
Denver, CO
80203
T 303-837-1414
F 303-837-1313
www.tpl.org

April 30, 2012

U.S. Fish and Wildlife Service
Region 6, Mountain-Prairie Region
Division of Refuge Planning
134 Union Boulevard, Suite 300
Lakewood, CO 80228

VIA EMAIL: slvrefugesplanning@fws.org

Re: San Luis Valley Conservation Area

To Whom It May Concern::

I am pleased to offer The Trust for Public Land's support for the San Luis Valley Conservation Area (SLVCA) designation, a landscape-level strategic habitat conservation initiative. The SLVCA would enhance the U.S. Fish and Wildlife Service's ability to protect important wetland and upland habitats, primarily through the purchase of conservation easements from willing landowners.

The Trust for Public Land has been proud to work with traditional, multi-generational ranchers in the San Luis Valley for many years. Our work allows these landowners to permanently protect their properties, and helps ensure that these lands will remain available for agriculture for generations to come. In doing so, we have raised tens of millions of dollars from local, state, and federal sources for the purchase of perpetual conservation easements. These public investments demonstrate the importance of these landscapes not only to the local communities, but to people from across the state and country. In addition to helping preserve the viability of the agricultural industry in the Valley, these investments protect critical wildlife habitat, since most of the highest quality and threatened habitat occurs along the Valley's riparian corridors of which the vast majority are in private ownership.

The Trust for Public Lands commends the U.S. Fish and Wildlife Service for proactively taking this step. We look forward to working closely with agency staff to implement the vision for the SLVCA over the coming years for the benefit of the local community, the region and the entire state of Colorado.

Sincerely,

Tim Wohlgenant
Colorado and Southwest Director

Service Response to Letter #7

Thank you for your comments and support of our agency's efforts to deliver conservation in the San Luis Valley. It is particularly valuable to have the support of an organization with whom the Service has a strong working relationship, and that already has experience with, and recognizes the value of, conservation easements as a tool in the San Luis Valley. We look forward to working with you in the future as we move forward with our efforts to conserve the important habitats of that region.

Letter #8—Trinchera Ranch

June 8, 2012

Dr. Michael Dixon
U.S. Fish and Wildlife Service, Region 6
Division of Refuge Planning
Lakewood, Colorado 80228

Dear Dr. Michael Dixon:

Thank you and your staff for your efforts to date on the important work captured in the Draft Environmental Assessment (EA) for the San Luis Valley Conservation Area. We also appreciate the opportunity to comment on this proposal.

Based on our review of the Draft EA, and as Trinchera Ranch consists of the Trinchera and Blanca Ranches, which are both located within the proposed Conservation Area, Trinchera Ranch respectfully submits the below comments in support of the Proposed Action (Alternative B).

We are encouraged that the United States Fish and Wildlife Service (USFWS) has formally recognized this region and its environmental significance. We agree with the USFWS Draft Environmental Assessment that the land outlined in the Conservation Area deserves an official federal designation regarding its significance to the wildlife and habitat unique to southern Colorado and northern New Mexico.

We fully support your efforts as outlined in the Draft EA and again, urge USFWS to adopt the Proposed Action and finalize this important and significant conservation effort.

Sincerely,

Trinchera Ranch

Service Response to Letter #8

Thank you for your comments and support of our agency's efforts to deliver conservation in the San Luis Valley. The backing of land holders and ranchers in the valley will be invaluable to the success of this conservation initiative.

Letter #9—Tri-State Energy (page 1 of 3)

TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.
HEADQUARTERS: P.O. BOX 33695 DENVER, COLORADO 80233-0695 303-452-6111

June 8, 2012

Laurie Shannon
Planning Team Leader
Division of Refuge Planning
P.O. Box 25486
Denver, CO 80225

RE: Response to Request for Comments on the U. S. Fish and Wildlife Draft Environmental Assessment (EA) and Land Protection Plan (LPP) - San Luis Valley Conservation Area

Dear Ms. Shannon:

Tri-State Generation and Transmission Assoc., Inc. (Tri-State) is a not-for-profit wholesale electric power producer/supplier that serves 44 rural electric cooperatives and public power districts in Colorado, Nebraska, New Mexico and Wyoming. Tri-State's member distribution systems serve nearly 578,000 metered customers (translating to a population of more than 1.4 million people). Tri-State's 250,000-square-mile member service territory includes all or parts of 56 of Colorado's 64 counties, all or parts of 27 counties throughout New Mexico, all or parts of 20 counties in western Nebraska and all or parts of 14 counties in central and northern Wyoming. Tri-State's transmission system includes approximately 5,213 miles of high-voltage transmission line and 135 substations and switching stations. Tri-State, and its member/owner San Luis Valley Rural Electric Cooperative, Inc., (SLVREC) own and operate transmission and distribution lines and substations within the proposed San Luis Valley Conservation Area. Through our electric systems, Tri-State and SLVREC provide the power that supports the economy and the homes of those living in the San Luis Valley.

Tri-State respectively submits the following comments on the Draft EA and LPP for the San Luis Valley Conservation Area.

Tri-State utilizes a comprehensive siting and routing approach for all new transmission and substation facilities. Tri-State attempts to utilize designated corridors, parallel existing utility rights-of-way (ROW), disturbed areas, and existing access to the greatest extent feasible to minimize overall environmental impacts from projects. This routing process allows us to carefully evaluate environment and locate transmission lines outside of sensitive habitats, land uses, etc. to the greatest extent feasible. For future long linear utility projects, complete avoidance of the proposed San Luis Valley Conservation Area is likely infeasible.

Development Restrictions

The EA indicates that the Service "...may place development restrictions on parcels of land and seek to guide development into areas with lower conservation priority." "One of the Service's high-priority objectives is to guide residential and commercial development away from high priority conservation areas by securing appropriate conservation easements." Tri-State requests the Service consider the effects to linear utility projects in their attempt to limit development in areas of higher conservation priority and allow it in lower conservation priority areas.

Given the proposed extent of habitat to be conserved over time, it will be difficult if not impossible to site transmission facilities entirely outside of priority habitat areas and areas currently proposed to be placed under conservation easement. Tri-State requests that the Service's EA considers the allowance for utility

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CRAIG STATION
P.O. BOX 1307
CRAIG, CO 81626-1307
970-824-4411

ESCALANTE STATION
P.O. BOX 577
PREWITT, NM 87045
505-476-2271

NUCLA STATION
P.O. BOX 698
NUCLA, CO 81424-0698
970-864-7316

Service Response to Letter #9

Development restrictions

We agree with the commenter that the network of lands of conservation importance that the Service aims to protect is spread throughout the valley, and thus it would be difficult to site transmission facilities entirely outside of these lands. Certainly the environmental consequences of this type of development are often lower if they follow existing disturbed corridors such as roads, as the commenter observes. We are sensitive to Tri-State's obligations to serve their member and owners, and would like to reassure the commenter that the presence of a Service easement does not, in and of itself, preclude the construction of a power line corridor unless language to that effect is specifically inserted into an easement because of a known environmental risk that cannot be mitigated, or at the request of the landowner selling the easement. If such language is not included in the easement (that would be the typical situation), the refuge manager would follow the Service policy on compatibility determination to make sure that the proposed power line would not be in conflict with the stated purpose of the conservation area. If the power line were deemed compatible, the refuge would issue a special use permit to the company wishing to develop the power line. Following construction of the power line, the value of the resulting right-of-way would be found, the permittee would be billed the cost of the right-of-way plus nominal fees for administrative costs, and a right-of-way would be issued.

Letter #9—Tri-State Energy (page 2 of 3)

Ms. Laurie Shannon
June 8, 2012
Page 2

corridors within conservation easements where appropriate, especially where such corridors could be located along existing linear features (i.e. roads, other transmission, etc.). Tri-State understands that habitat fragmentation can be a concern when new development is proposed. However, with careful transmission routing and design measures we believe we can minimize impacts to the environment. Areas with existing disturbances such as existing roads and existing linear rights-of-way could qualify as suitable areas to allow utilities to benefit local communities, etc.

In addition, while Tri-State's routing process seeks to minimize impacts to resources of concern and sensitive land uses, the general location of electric facilities is dictated by the location of the electrical need. For example, electric transmission line projects are typically initiated through an electrical system planning process that identifies a 'point A to B' project need. Environmental review and routing studies are performed to determine more specific routing alternatives to evaluate and eventually identify a preferred route. The routing process will take into account sensitive areas, but due to their linear nature, some electric transmission projects would likely cross both resources of concern and sensitive lands.

Tri-State is obligated to serve the power requirements of our Member/owners as well as maintain a reliable power delivery system. Restricting residential and commercial development except in areas with low conservation priority is a lofty goal. Even if residential and commercial development is curtailed in the higher priority areas, utility infrastructure may have to cross higher priority areas in order to provide services in areas deemed suitable for development by the Service. Tri-State would like to work with Service to ensure we are able to meet our responsibility of providing power to customers in and around the San Luis Valley.

Tri-State is concerned with the language in the Cumulative Effects section of Chapter 4, page 42. The second paragraph states "the presence of a Service interest in land could preclude construction of commercial energy production or transmission infrastructure on that property if such activity is deemed to be incompatible with the purpose of the SLVCA." Chapter 4, page 57 has similar language pertaining to restricted development. It is not clear what process the Service will use to determine if project is incompatible with the purpose of the SLVCA project and impacts from such restrictions are not described.

Renewable Energy

The EA states "Prospective solar development in the local area is supported by Federal initiatives and funding from the U.S. Department of Energy. The growth of the solar industry, however, is dependent on the ability of solar producers to obtain power purchase agreements from Public Service Company of Colorado and may also be dependent on the future provision of transmission lines out of the valley (Colorado Department of Local Affairs 2011).

The Cumulative Impacts section in Chapter 4 page 41 identifies a proposed transmission line "through the valley, crossing the Sangre de Cristo Mountains at La Veta Pass. Planning for that corridor has stalled; however, interest in building another corridor to promote energy reliability is ongoing".

The EA analysis fails to specifically address how this project would affect federal and state renewable energy standards and also fails to discuss the potential impacts to utilities that need to provide their customers with required electrical service. Impacts to energy projects should be identified and disclosed.

Service Response to Letter #9

Renewable energy

The impact of a proposed easement program on state and federal renewable energy standards would be speculative at best, particularly because the compatibility of renewable energy infrastructure is highly dependent on the location of such infrastructure. It may even be compatible for a landowner to develop new energy infrastructure on one part of a property under easement, but not others. Such speculation is well outside the scope of this analysis.

Letter #9—Tri-State Energy (page 3 of 3)

Ms. Laurie Shannon
June 8, 2012
Page 3

Habitat Priority Maps

The habitat maps included in Chapter 4 - Project Implementation show large scale overviews of priority habitat according to priority species, which were identified through landscape modeling. Have these areas been assessed on the ground and did they take into account existing infrastructure and disturbance? Additional site specific analysis and mapping of resources and existing infrastructure in the proposed conservation areas would help identify areas where mutual objectives for habitat conservation and commercial and industrial development needs can be met.

Socio-Economics

The socio-economic section does not address the project's impact to the energy and electrical industry, or commercial or residential developers. It fails to address how the project could affect the ability to provide reliable power to meet load requirements in this area. Restricting commercial, residential or utility development in the San Luis Valley might have adverse effects on communities both inside and outside of the Valley who could be affected by restricting development options.

The NEPA Process-Scoping

In reading Chapter 5, Coordination and Environmental Review, it appears that the Service reached out directly to other agencies, NGOs, land trusts, and local governments, but there is no mention of industry contacts. Industry was included as part of the general public scoping, though neither Tri-State nor SLVREC received scoping letters. Working with industry and local developers during the conservation planning process would ensure an open dialogue occurs regarding the conservation of species and habitats while ensuring other federal policy objectives and local utilities services needs can be met as well. Please include us going forward.

Thank you for the opportunity to comment on these important issues. Please feel free to contact me at 303-254-3211 or Karl Myers 303-254-3448 with any additional questions on our response.

Sincerely,

Rick L. Thompson
Senior Manager, Transmission Land Rights and Permitting

Service Response to Letter #9

Habitat priority maps

Except for the southwestern willow flycatcher data that was produced in part by on the ground surveys associated with the development of the San Luis Valley Habitat Conservation Plan, the habitat priority maps were created solely from remote sensing data or existing data layers. They are meant to serve as a general primer to inform the public and Service realty staff on the types of habitats that are biologically important. No easements would be granted without on-the-ground surveys to decide if the land truly holds conservation value.

Socioeconomics

Our analysis did not uncover any impacts to on the socioeconomic environment that are likely to be significant. Furthermore, per NEPA regulations, the purpose of an environmental assessment is to find if there are significant impacts on the human environment (the relationship between people and the biological and physical environment) that would require the preparation of an environmental impact statement, and "economic or social effects are not intended by themselves to require preparation of an environmental impact statement." (Sec.1508.14).

The NEPA process – scoping

We apologize that Tri-State was overlooked during our scoping process. It is challenging to account all possible entities. We will include you in further correspondence related to the project.

Letter #10—Costilla County

COSTILLA COUNTY
BOARD OF COUNTY COMMISSIONERS
"Where Colorado Began"

352 Main Street
PO Box 100
San Luis, CO 81152
(719) 672-3372
(719) 672-3962 fax
www.costillacounty-co.gov

April 12, 2012

Ken Salazar
Secretary of the Interior
U.S. Department of the Interior
1849 C Street NW
Washington, D.C. 20240

Dear Secretary Salazar,

The Costilla County Board of Commissioners is writing you to express our support for the land protection planning efforts proposed by the U.S. Fish and Wildlife Service. We understand that establishment of the San Luis Valley Conservation Area will allow the U.S. Fish and Wildlife Service to acquire conservation easements from willing landowners based upon the following principles:

1. Protection efforts will be guided by priority biological needs of species entrusted to the U.S. government. In the case of the San Luis Valley this means migratory birds and species listed or being considered for listing under the Endangered Species Act.

2. Conservation easements would be acquired only from willing sellers following the U.S. Fish and Wildlife Service policy of acquiring the minimum property rights needed to achieve conservation goals.

3. Acquisition of conservation easements would be conducted in collaboration with the land protection community active in the San Luis Valley.

4. Acquisition of easements would be limited by availability of appropriated funds, primarily the Land and Water Conservation Fund (recognizing some rights might be donated to the Service).

These principles are consistent with Costilla County's Trails, Recreation and Open Space Master Plan project and our overall goal to balance natural resource protection of the county while maintaining the present working landscape, which is so important to our economy and culture.

We look forward to working with the Department of the Interior and U.S. Fish and Wildlife Service in Costilla County on this important project.

Sincerely,

COSTILLA COUNTY BOARD OF COUNTY COMMISSIONERS:

Dolores Burns

Dolores Burns, Chair

DOLORES BURNS CHAIR CRESTINA MARTINEZ VICE-CHAIR EDDIE ROYBAL COMMISSIONER TO CONVEY

Letter #11—Reio Grande County (page 1 of 2)

RIO GRANDE COUNTY
BOARD OF COUNTY COMMISSIONERS

Ken Salazar
Secretary of the Interior
U.S. Department of the Interior
1849 C Street NW
Washington, D.C. 20240

April 11, 2012

Dear Secretary Salazar,

The Rio Grande County Board of Commissioners is writing you to voice our support for the land protection planning efforts proposed by the U.S. Fish and Wildlife Service. We understand that establishment of the San Luis Valley Conservation Area will allow the U.S. Fish and Wildlife Service to acquire conservation easements from willing landowners based upon the following principles:

1. Protection efforts will be guided by priority biological needs of species entrusted to the U.S. government. In the case of the San Luis Valley this means migratory birds and species listed or being considered for listing under the Endangered Species Act.

2. Conservation easements would be acquired only from willing sellers, based upon appraised market value of the rights acquired and following the U.S. Fish and Wildlife Service policy of acquiring the minimum property rights needed to achieve conservation goals.

3. Acquisition of conservation easements would be conducted in collaboration with the land protection community active in the San Luis Valley.

4. Acquisition of easements would be limited by availability of appropriated funds, primarily the Land and Water Conservation Fund (recognizing some rights might be donated to the Service).

These principles are consistent with Rio Grande County land use guidelines and our overall goal to balance natural resource protection of the county while maintaining the present working landscape, so important to our economy and culture.

We look forward to working with the Department of the Interior and U.S. Fish and Wildlife Service in Rio Grande County on this important project.

Letter #11—Reio Grande County (page 2 of 2

Sincerely,

Dennis Murphy, Jr.
Chairman of the Board

MB/slh

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Letter #12—Saguache County

SAGUACHE COUNTY GOVERNMENT
501 Fourth Street · P. O. Box 655
Saguache, Colorado 81149
Phone: (719) 655-2231 · Fax: (719) 655-2635

April 10, 2012

Ken Salazar
Secretary of the Interior
U.S. Department of the Interior
1849 C Street NW
Washington, D.C. 20240

Dear Secretary Salazar,

The Saguache County Board of Commissioners is writing you to voice our support for the land protection planning efforts proposed by the U.S. Fish and Wildlife Service. We understand that establishment of the San Luis Valley Conservation Area will allow the U.S. Fish and Wildlife Service to acquire conservation easements from willing landowners based upon the following principles:

1. Protection efforts will be guided by priority biological needs of species entrusted to the U.S. government. In the case of the San Luis Valley this means migratory birds and species listed or being considered for listing under the Endangered Species Act.

2. Conservation easements would be acquired only from willing sellers, based upon appraised market value of the rights acquired and following the U.S. Fish and Wildlife Service policy of acquiring the minimum property rights needed to achieve conservation goals.

3. Acquisition of conservation easements would be conducted in collaboration with the land protection community active in the San Luis Valley.

4. Acquisition of easements would be limited by availability of appropriated funds, primarily the Land and Water Conservation Fund (recognizing some rights might be donated to the Service).

These principles are consistent with Saguache County land use guidelines and our overall goal to balance natural resource protection of the county while maintaining the present working landscape, so important to our economy and culture.

We look forward to working with the Department of the Interior and U.S. Fish and Wildlife Service in Saguache County on this important project.

Sincerely,

Mike Spearman, Chairman
Saguache County Board of Commissioners

EXECUTIVE
2012 APR 17 PM 1:25
511305

Letter #13—Rio Grande Water Conservation District (page 1 of 5)

Rio Grande Water Conservation District
10900 Highway 160 East • Alamosa, Colorado 81101
Phone: (719) 589-6301 • Fax: (719) 589-4331
Protecting & Conserving San Luis Valley Water

June 8, 2012

Secretary Ken Salazar
Secretary of the Interior
1849 C. Street, NW
Washington, DC 20240

Re: **San Luis Valley Conservation Area (SLVCA) and Land Protection Plan (LPP)**

Dear Secretary Salazar:

At the Rio Grande Water Conservations District's quarterly meeting, held on April 17, 2012, the highly respected Project Leader for the U S Fish and Wildlife Service, Mr. Michael Blenden, appeared before the Board of Directors to explain the above-referenced program. He did a thorough job of explaining the concept proposal and requested that the Board of Directors prepare a letter to you in support. Several weeks later the LPP and associated Environmental Assessment (EA) were made available for our review.

At the time of Mike's presentation a series of questions and concerns about the program and how it would interact with other initiatives currently ongoing in the San Luis Valley were expressed by the Board and staff. Now, as the result of our review of the actual proposed SLVCA, the LPP and its EA, several other concerns and comments have arisen. The Board directed that I provide these comments to you concerning the proposed SLVCA and the LLP in lieu of a letter of support.

Our initial concern was that you should be aware of two specific programs that our District has sponsored in an effort to insure that landscape values and species protection were addressed in manner that was based on grassroots support and which sought to provide realistic and effective solutions that water users and land owners could buy in to without being subjected to the mandates or coercion of the Federal government. The first of the two programs to which I refer is the Rio Grande Natural Area, established by Congress in 2006 by PL 109-337 (16 USC 460rrr), which has as its current principal goal the development of a management plan for the riparian corridor of the Rio Grande. The management plan will apply to private land and will be coincident with the management plan for adjacent public land along the Rio Grande riparian corridor. The purpose of the management plan is to restore and protect the riparian ecosystem in

THE SECRETARY OF THE INTERIOR
WASHINGTON
June 29, 2012

George Whitten Jr., President
Rio Grande Water Conservation District
Saguache County
52501 CR U
Saguache, CO 81149

Dear Mr. Whitten:

You know how much I respect you and the members of the Rio Grande Water Conservation District. Over the years, I have given much of my life to battle the forces that threaten the water supplies of the San Luis Valley and the sustainable agriculture lifestyle that depends on that water supply. That has been my north star in my public service roles that have included Director of the Department of Natural Resources, Colorado Attorney General, United States Senator, and United States Secretary of the Interior. That is why I found the substance and tone of your June 8, 2012, letter regarding the proposed San Luis Valley Conservation Area and Land Protection Plan to be very troubling.

Over the many years, I worked with many people in the San Luis Valley to fight against the threats brought by American Water Development Inc. (AWDI) and the so-called "Son of AWDI." I also helped lead the efforts to defeat statewide political initiatives on the ballot that were intended to provide opportunities to drain the San Luis Valley aquifers for water supplies to the north, or as punitive measures against San Luis Valley efforts to protect its way of life. Indeed, when a former State Engineer and Attorney General were ready to consent to an AWDI proposed water decree, I stopped them because of the precedential effect the decree would have created.

I am also proud of the work I did in helping create the Great Sand Dunes National Park and its associated protection of the Valley's water resources.

As part of the President's and my commitment to all of rural America, we have ushered in a new era of opportunity for rural communities around the Nation, including our efforts on commodity exports, broadband to rural America, and investments in rural infrastructure. The San Luis Valley, like other parts of the United States, deserves no less attention.

Because of this focus on rural America, we have worked in various places in Colorado, including the San Luis Valley. In the San Luis Valley, local communities and the State identified key priorities for us, including the possibility of creating a national historical park, a system of recreational trails, and additional conservation areas. These initiatives, if implemented, would help diversify the economy of the San Luis Valley through enhanced tourism, hunting, fishing and heritage preservation.

Letter #13—Rio Grande Water Conservation District (page 2 of 5)

this reach of the river through local cooperation instead of through federal mandate or control. The Rio Grande Natural Area Commission is in the process of developing the management plan at this time.

The second of the two programs involves the development of the San Luis Valley Habitat Conservation Plan (HCP) for the Southwestern Willow Flycatcher and the Yellow-Billed Cuckoo. Over the course of the last ten years, the District has spent tens of thousands of dollars and thousands of hours on the development of this plan, as has the State of Colorado and the U S Fish and Wildlife Service. It is important to note that a fundamental underpinning of this plan is the availability of privately funded and held conservation easements and other habitat protection measures that provide the mitigation bank upon which the HCP is predicated. With the mitigation bank in place, it has been anticipated that the agricultural community in the San Luis Valley would be able to continue to manage the privately held lands containing Flycatcher habitat in a way that does not interfere with their agricultural operations, but still maintains the mosaic of habitat that has historically provided successful conditions for the Flycatcher. As your staff has undoubtedly told you, the HCP has been effectively completed and we are only awaiting final comments from the U S Fish and Wildlife Service. In fact, at the April 17th Board meeting, the Board approved the submission of the application for an incidental take permit. This is the final stage of the internal HCP drafting process and the initial step for the public comment stage of the HCP. One of the requirements of the draft HCP is that land that is acquired and held for conservation purposes by federal agencies using federal dollars is not eligible for mitigation credit under the HCP. As you can undoubtedly understand the proposal which Mike Blenden described to our Board and that is contained in the LPP appears to frustrate these grassroots efforts by seeking to transfer conservation easement acquisition from private control or Non-Governmental Organization (NGO) control into the hands of a federal agency, thereby defeating the mitigation opportunity that might have been available to insure the success of the HCP.

The District Board does not understand why it is now important to the Federal government that conservation easements be acquired and held by a Federal agency when our local organization, with the support of the land owners and water users, has over the last ten years developed and provided completely viable alternatives to protect the Rio Grande riparian corridor and the Southwestern Willow Flycatcher habitat that is not top-down management, but is rather a grassroots community supported effort to achieve the same results.

We would also like to express our concern that the ongoing conservation easement program operated by the Rio Grande Headwaters Land Trust (RiGHT) not be placed in a position of competition or that it be overshadowed by competing federal efforts. RiGHT is one of the most successful land trusts in the Rocky Mountains and has a long and distinguished record of protecting conservation values while maintaining the land owners rights and interest in the property. In particular RiGHT has been instrumental in acquiring many thousands of acres of easements on riparian land that is usable by the Flycatcher HCP as mitigation. It seems unnecessary, duplicative and certainly overly bureaucratic to suggest that federal money ought to be spent on the acquisition of similar easement by federal agencies instead of encouraging, applauding and supporting the efforts of RiGHT and the cooperating land owners.

To the extent that the Federal government has extra resources we would encourage you to reconsider your proposal and to instead make those resources available to organizations like

We are making progress on each of these initiatives. With respect to the proposed the San Luis Valley Conservation Area, I anticipate the focus will be on the Sangre de Cristo Mountain range, which essentially will protect the watershed of the Sangre de Cristo Mountains south of the Great Sand Dunes. Without this major conservation project in the Sangre de Cristo Mountains, that part of the watershed, which feeds the intricate water sources of the San Luis Valley and helps sustain the Valley's agricultural economy, would not be protected.

As noted in the *Valley Courier* June 16, 2012, news story titled "A breathtaking act of generosity," I believe we should all applaud Mr. Bacon's intended donation of the conservation easement on the Blanca Ranch.

I understand that the floor of the San Luis Valley is another matter because of its complex land ownership and already existing programs. That is why I have instructed the United States Fish and Wildlife Service to ensure that it works closely with the residents of the San Luis Valley, including governmental organizations such as the Rio Grande Water Conservation District, before moving forward with additional conservation areas on the Valley floor.

As the Secretary of the Interior, I have significant roles and authority concerning the Closed Basin Project, Platoro Reservoir, and many other water and public land matters that affect the San Luis Valley. I hope the Board of the Rio Grande Water Conservation District would recognize my work is guided by the same principles of preserving the Valley's water and protecting its agricultural economy that have guided my water, agriculture and conservation efforts for the last three decades.

I am aware the District and the United States Fish and Wildlife Service have had productive discussions regarding the proposed conservation efforts and the District's concerns, and I urge that continued constructive dialogue.

Please again know how much I appreciate the leadership and the members of the Rio Grande Water Conservation District. I would ask you as Chairman to call me directly on any matter of concern that you might have. My telephone number is 202-208-6087.

Respectfully,

Ken Salazar

Ken Salazar

CC: Brian David
Lewis Entz
Greg Higel
Dwight Martin
Mike McClure
Cory Off
Kent Palmgren
Steve Vandiver
Michael J. Willett

Letter #13—Rio Grande Water Conservation District (page 3 of 5)

RiGHT so that they can be included in the current and ongoing private conservation easement efforts in the San Luis Valley. The goals are the same, but the tools are significantly different.

Mr. Secretary, after reviewing the actual written materials developed by the U S Fish and Wildlife Service, we must tell you that we cannot support the SLVCA. The reason for that position is made apparent at page 5 of the EA where the statement is made that "the SLVCA will be part of the National Wildlife Refuge system, whose mission 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 habitat within the United States for the benefit of present and future generations of Americans." Because your proposed action is to acquire easements covering up to 500,000 acres of private land within the San Luis Valley and because the map defining the proposed SLVCA incorporates effectively all of the productive agricultural land in the San Luis Valley we believe it is inappropriate for you to proceed under these terms. We do not want to live within a part of the National Wildlife Refuge system. We value the refuges as neighbors but not as our big brother.

Secondly, as a general comment, throughout the EA there are constant references to the SLVCA's goal of restoring the hydrology of the San Luis Valley. These statements are made in the context of the allegedly adverse impacts on that hydrology that occurs as a result of the social and economic activities of the very citizens of the Valley whose livelihoods are dependent upon those modifications to the hydrology. In reading the EA, it is immediately apparent that among the significant purposes behind the SLVCA is the acquisition of land and the associated water rights. We do not support the conversion of existing senior water rights to federal control. In particular, we do not support the acquisition of water rights by the federal government so that "the exercise of water rights associated with these lands could be changed only if the proposed changes would be beneficial to wildlife." Unfortunately, in reading the EA, there is little relationship to the general description provided to us by Mr. Blenden at our April meeting and there is little or no recognition of efforts of the local citizens to address these same issues without significant federal control.

Some limited additional comments are in order. In Chapter 3, Water and Hydrology, the description of "Surface Water" is utterly inadequate. It completely fails to describe the interrelationship between diversions through canals from the Rio Grande and other streams and the wetlands and water supplies in the Closed Basin. It fails to identify significant contributory streams to the San Luis Valley and it bounces back and forth between discussions of the San Luis Valley generally and the Closed Basin system. It is confusing and generally misleading. In the "Groundwater Section" of Chapter 3, there are also statements that are misleading or inaccurate. In the first paragraph there is the assertion that in the groundwater system there are "more than 140 million acre-feet estimated to be recoverable." Obviously the author is utterly uninformed given the existing efforts to ensure that no further groundwater development occurs within the San Luis Valley and that all depletions from existing groundwater use that create injurious depletions to surface streams are replaced. It is not physically possible to "recover" further groundwater without greatly exacerbating the very problems that other sections of the EA suggest the SLVCA could help resolve. Although the members of our Board have spent considerable time reading about the San Luis Valley and its geology and hydrology, no one is aware of any report suggesting that the Valley fill is anywhere near 30,000 feet thick. To the contrary, most learned papers suggest that the fill material is approximately half that thick and a

Letter #13—Rio Grande Water Conservation District (page 4 of 5)

significant portion of it, although made up of sedimentary material, is not water bearing. Further, some significant portion of the deepest aquifers is highly saline and effectively unusable. The discussion about the interaction between the Confined Aquifer, the Unconfined Aquifer and the surrounding environment is similarly confusing and misleading.

In the portion of Chapter 3 that addresses the early history, your authors imply that the "Baca Land Grant" is in fact a land grant. Contrary to the assertion in the article, a Colorado District Court has determined that the Baca Ranch is not a Spanish or Mexican land grant at all but is, in fact, a patent from the Congress of the United States. No land grant, as such, was ever confirmed at the location of the Baca No. 4 and to refer to this congressionally patented land as a "land grant" is misleading and inaccurate. The Colorado Supreme Court subsequently confirmed the District Court's determination that no Spanish or Mexican land grant exists at the location of Baca No. 4.

Of probably the greatest concern to our District and our citizens in the San Luis Valley is the discussion on pages 30, 31 and 32 of the Environmental Assessment under the heading "Changes in Land Use." This discussion makes it abundantly clear that it will be the ultimate goal of the U S Fish and Wildlife Service and the federal government to try and prevent or impede opportunities to protect and enhance economic development in the San Luis Valley in order to "preserve the landscape from alteration." In particular, the discussion where the efforts to require the replacement of injurious depletions by several means, including the purchase of senior water rights, is of great concern. We believe that the expressed desire to intervene through the federal purchase of senior water rights to prevent the irrigation and well economy in the San Luis Valley from taking the steps necessary to replace those injurious depletions is frightening, offensive and directly contrary to the economic interests of the people of the San Luis Valley. In particular, the full paragraph at the head of page 32 makes it absolutely clear what the Service's intentions will be and how directly contrary they are to the agricultural and economic interests of the San Luis Valley community. Water right transfers are an inherent and necessary aspect of the Colorado water rights system. Moving water from one use to another and utilizing consumptive use credits generated by retiring senior water rights to allow other uses to occur is at the heart of that system. This proposal aims to interfere with the efforts of the District and the Valley's farm community to achieve a sustainable water system. It is not an acceptable position for a federal agency to adopt.

The Board of Directors of the District certainly understood Mr. Blenden's need to present strong advocacy for this program. He is our friend and we respect him. However, we do not believe that the full effect and implications of this program have been adequately considered and we sincerely request that you allow additional time to allow the U S Fish and Wildlife Service to consider how the goals of the SLVCA might be achieved without the inclusion of all of our private property into the National Wildlife Refuge System, the imposition of federally held conservation easements on our community and the use of conservation to interfere or prevent the development of successful well depletion replacement programs.

We trust that you are fully aware of our commitment to agricultural sustainability, protection of the environment and the species that inhabit our valley, but our community wishes to do so in a way that is driven by our local efforts not through the imposition of a federally mandated program. To the extent that there are funds available to advance these goals we

Letter #13—Rio Grande Water Conservation District (page 5 of 5)

certainly stand ready to work with you to achieve them using our local initiatives, but we don't wish to do so through a program that simply increases the federal role in managing our private lands and hampers the long-term goals of the community.

Very truly yours,
STEVEN E. VANDIVER
Steven E. Vandiver RGWCD Manager
for George Whitten
President

cc: Board or Directors
Steven Vandiver, General Manager
David W. Robbins, General Counsel
Board of Commissioners of Alamosa, Rio Grande, Saguache, Conejos and Mineral Counties
Alan Gilbert, Senior Advisor to the Secretary, SW and Rocky Mountain Regions
Rio de la Vista, RiGHT
Christine Arbogast

Appendix E

Finding of No Significant Impact

U.S. Department of the Interior
FISH AND WILDLIFE SERVICE
Region 6, Denver, Colorado

FINDING OF NO SIGNIFICANT IMPACT

Sangre de Cristo Conservation Area
Costilla County, Colorado and Taos County, New Mexico

The U.S. Fish and Wildlife Service (Service) has completed the *Sangre de Cristo Conservation Area Land Protection Plan and Environmental Assessment.* This planning process considered the authorization of a new unit of the National Wildlife Refuge System, the Sangre de Cristo Conservation Area. The Service conducted a National Environmental Policy Act (NEPA) review of the proposed easement program. The resulting Environmental Assessment (EA) evaluates two alternatives: Alternative A, a no action alternative; and Alternative B, the preferred alternative, to establish the Sangre de Cristo Conservation Area.

Alternative B, the preferred alternative, was selected for implementation because it best meets the Service's mission to sustain fish and wildlife populations and to conserve a network of lands that provide their habitats. The Sangre de Cristo Conservation Area will use conservation easements to conserve these habitats in a working agricultural landscape by maintaining current land management practices while preventing the conversion of native vegetation to other uses. In so doing, this project will protect habitat for federal trust species of wildlife, the water quality of the upper Rio Grande River, and the rural agricultural aesthetic which defines the region.

Public Involvement

As part of the public scoping process associated with this action, comments were solicited from the public through news releases and public meetings. On March 15, 2011, a press release was issued by the USFWS Region 6 which announced the beginning of the NEPA review and solicited scoping comments from the public. Public scoping meetings were held March 29, 30, and 31, 2012 in Alamosa, Monte Vista, and Moffat, Colorado, respectively. Everyone in attendance was given an opportunity to express their ideas and concerns. Approximately 50 people attended these meetings, and an additional 14 written comments were received and used to define the scope of the NEPA review and identify potential issues. On January 4, 2012 in Alamosa, CO the Secretary of the Interior held a public and media event to highlight San Luis Valley projects under the America's Great Outdoors initiative, of which the Sangre de Cristo Conservation Area was a component. This was followed by a news release on May 9, 2012 which announced the release of a draft environmental assessment and land protection plan (LPP) for 30 days of public comment. Formal public meetings were held on May 14, 15, and 16, 2012 in Alamosa, San Luis, and Moffat, Colorado, respectively. The public comment period ended on June 8, 2012. In addition to comments presented by some of the approximately 50 people who attended these meetings, another 14 written comments were received from individuals, NGOs and agencies. Public comments and responses are included as appendices in Appendix D of the LPP/EA.

Effects of Proposed Action

This EA has taken a hard look at the environmental impacts to inform the public and ourselves about the consequences of the proposed action (the Service's preferred alternative).

In determining whether this project is a major action significantly affecting the quality of the human environment, we looked at both the context and intensity of the action (40 CFR § 1508.27, 40 CFR § 1508.14) as required by NEPA. In terms of context, the preferred alternative will occur on the western slope of the central Sangre de Cristo mountains in south central Colorado and north central New Mexico, but we have evaluated whether it will have effects on the human environment on a broader scale. The project will be implemented over time, dependent on the Service's ability to obtain funding needed for easement acquisition. Of the roughly one million acres within the overall project boundary, easements may be purchased by the Service only from willing sellers on a strictly voluntary basis on up to 250,000 acres. Because the human environment is interpreted by NEPA to mean the natural and physical environment and the relationship of people with that environment (40 CFR § 1508.14), in addition to our thorough analysis of physical environmental effects, we carefully assessed the manner in which the local people and natural resources relate to the environment in the San Luis Valley, though economic or social effects are not intended by themselves to require the preparation of an environmental impact statement (40 CFR § 1508.14).

Establishment of the Sangre de Cristo Conservation Area would enable the Service to seek permanent protection for important wildlife habitat for federal trust species including the federally threatened Canada lynx, the candidate Rio Grande cutthroat trout, and migratory birds such as the southwestern willow flycatcher and sage thrasher, as well as over 300 other species of birds. This protection would also positively benefit state-managed species such as bighorn sheep and elk.

Conservation easements in the Sangre de Cristo Conservation Area would increase the capacity for ecosystems in that region to adapt to climate change and increase their resiliency to temporary environmental disturbances such as drought and fire. These benefits would result from ensuring connectivity between permanently protected areas to the north and south of the conservation area, which will allow migration and colonization by variants better adapted to changing conditions. Easements will also prevent the negative local effects of habitat fragmentation resulting from land cover changes due to subdivision and infrastructure development.

The easements would be a source of capital for local landowners. It is likely that much of this money would be reinvested locally, so easements in the Sangre de Cristo Conservation Area may be a one-time positive benefit to the local economy. By placing restrictions on where willing landowners could build structures, the Sangre de Cristo Conservation Area would affect the location and distribution, but not the rate or density, of human population growth in the project area. There may be benefits to non-participating landowners due to the preservation of habitat which may provide for wildlife-dependent recreation off of easement lands, and due to the preservation of the open-space aesthetic on participating properties. The purchase of an easement would reduce the sale value of a property, which could result in a minor reduction in tax

revenues if the land was being taxed on its market, rather than agricultural, value. However, such reduction in revenue is likely to be more than offset by a reduction in local government costs associated with providing services to lands converted to residential development.

The establishment of a Sangre de Cristo Conservation Area will not impact how other state and federal agencies manage their lands or how they allot permits for things such as grazing on public lands. The purchase of an easement would not affect the rights of third parties to exercise their preexisting legal rights on that property (e.g. third-party mineral owners and those descendants of settlers of former Spanish land grants who have been awarded certain traditional use rights on lands in the conservation area)

Unless explicitly stated in the easement due to the requirement of a participating land owner, the Sangre de Cristo Conservation Area will not necessarily preclude the development of certain energy infrastructure. The proposed development would be subject to a compatibility determination by the refuge manager. If it were found compatible, the Service would work with the landowner and developer to minimize the negative environmental effects of the proposed development.

Conservation easements purchased on private land would not change the landowners' rights to manage public access to their properties. Private landowners would retain full control over their property access rights, including allowing or restricting recreational access.

Decision and Finding of No Significant Impact

The analysis indicates that there will not be a significant impact[1], individually or cumulatively, on the quality of the human environment[2] as a result of this proposed action. I agree with this conclusion and therefore find that an EIS need not be prepared. This determination is based on the following factors.

1. Environmental consequences will be beneficial to wildlife habitat, migratory bird populations, and water quality. Based upon informal intra-Service section 7 consultation, the proposed action will not result in the jeopardy of any federally threatened or endangered species, or adversely modify existing designated critical habitat. The proposed conservation area may permanently protect tens of thousands of acres of habitat for Endangered Species Act listed and candidate species.

---

[1] 40 CFR § 1508.27 "Significantly' as used in NEPA requires considerations of both context and intensity (a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world *as a* whole. Both short- and long-term effects are relevant; and (b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action.

[2] 40 CFR § 1508.14 "Human environment" shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. (See the definition of "effects" (40 CFR § 1508.8).) This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment.

2. The proposed action would pose no known risk to public health and safety.

3. The effects on the quality of the human environment are not highly controversial. There is the potential for some restriction in the potential siting for energy infrastructure, but there is unlikely to be substantial conflict over this land use issue because the Sangre de Cristo Conservation Area easement program is a voluntary initiative with willing sellers only.

4. The proposed easements will not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor would they likely cause any loss or destruction of significant scientific, cultural, or historical resources.

5. No significant cumulative effects were identified through this assessment. The EA discussed the cumulative effects on and off the refuge with those actions proposed by others.

6. The proposed action will be in compliance with all federal, state, and local laws.

Therefore, in light of the compelling science in support of the project, and my review of the information contained in the supporting reference, I have determined that authorizing the Sangre de Cristo Conservation Area is not a major federal action that would significantly affect the quality of the human environment within the meaning of Section 102(2)(C) of NEPA.

The Finding of No Significant Impact (FONSI) and supporting NEPA analysis will be available to the public upon request. Copies of the EA are available for all affected landowners, agencies, private groups, and other interested parties. These documents are on file at the U.S. Fish and Wildlife Service, Refuges, Division of Planning, P.O. Box 25486-DFC, Denver, Colorado 80225 (telephone: 303-236-8132).

8/1/2012

Regional Director, Region 6 — Date
U.S. Fish and Wildlife Service

Supporting Reference

U.S. Fish and Wildlife Service. 2012. *Sangre de Cristo Conservation Area - Land Protection Plan and Environmental Assessment*, Denver, Colorado.

Appendix F

Environmental Action Statement

U.S. Department of the Interior
FISH AND WILDLIFE SERVICE
Region 6, Denver, Colorado

ENVIRONMENTAL ACTION STATEMENT

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and have determined that the action to establish the Sangre de Cristo Conservation Area and associated easement program:

_ is a categorical exclusion as provided by 516 DM 2, Appendices 1 and 2, and 516 DM 6, Appendix 1. No further documentation will be made.
X is found not to have significant environmental effects as determined by the attached Finding of No Significant Impact and Environmental Assessment.
_ is found to have special environmental conditions as described in the attached environmental assessment. The attached Finding of No Significant Impact will not be final nor any actions taken pending a 30-day period for public review [40CFR 1501.4(e)(2)].
_ is found to have significant effects and, therefore, a notice of intent will be published in the *Federal Register* to prepare an environmental impact statement before the project is considered further.
_ is denied because of environmental damage, Service policy, or mandate.
_ is an emergency situation. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

Other supporting document:

U.S. Fish and Wildlife Service. 2012. *Sangre de Cristo Conservation Area - Land Protection Plan and Environmental Assessment*, Denver, Colorado.

Bud Oliver
Assistant Regional Director
National Wildlife Refuge System, Region 6

7/30/2012
Date

Stephen Martin
Regional Director, Region 6
U.S. Fish and Wildlife Service

8/1/2012
Date

Appendix G

Environmental Compliance Certificate

U.S. FISH AND WILDLIFE SERVICE, REGION 6
ENVIRONMENTAL COMPLIANCE CERTIFICATE

PROJECT: **Sangre de Cristo Conservation Area**
STATE: **Colorado and New Mexico**

ACTION (indicate if not applicable)	DATE
NEPA (NATIONAL ENVIRONMENTAL POLICY ACT) (INDICATE ONE)	
Categorical Exclusion	N/A
Environmental Assessment/Finding of No Significant Impact	8/01/2012
Environmental Impact Statement/Record of Decision	N/A
Executive Order 11593, Protection of Historical, Archaeological, and Scientific Properties	8/01/2012
Executive Order 11988, Floodplain Management	8/01/2012
Executive Order 11990, Protection of Wetlands	8/01/2012
Executive Order 12372, Intergovernmental Review of Federal Programs	8/01/2012
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations	8/01/2012
Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System	8/01/2012
Endangered Species Act, Section 7	6/28/2012
Coastal Zone Management Act, Section 307	N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act	Various
Level I Contaminants and Hazardous Waste (Secretarial Order 3127: 602DM2)	Various

I hereby certify that all requirements of the law, rules, and Service regulations or policies applicable to planning for the above project have met with compliance. I approve the establishment of the Sangre de Cristo Conservation Area to be administered and managed as part of the National Wildlife Refuge System.

Regional Director, Region 6
U.S. Fish and Wildlife Service

8/1/2012
Date

STATEMENT OF COMPLIANCE

The following Executive Orders and legislative acts have been reviewed as they apply to the establishment of the Sangre de Cristo Conservation Area:

1. **Executive Order 11593. Protection of Historical, Archaeological, and Scientific Properties.** Per the regional archaeologist, the creation of this document constitutes an Undertaking as defined by the National Historic Preservation Act (NHPA: 36CFR 800.16(y)). It is an undertaking that has no potential to cause effects on historic properties and therefore there are no further review obligations under NHPA. If, in the future, there are undertakings planned that would potentially cause adverse effects on historic properties, including ground disturbance or alterations to buildings or structures over 50 years of age, those projects should be reviewed under Section 106 of NHPA prior to the start of the project.

2. **Executive Order 11988. Floodplain Management**. No structures that could be damaged by or that would significantly influence the movement of floodwater are planned for construction by the Fish and Wildlife Service on land acquired as part of this project.

3. **Executive Order 11990. Protection of Wetlands.** Conveyance of the lands and interests herein shall not exempt such lands and interests from all federal, state, and local laws and regulations as applicable thereto by virtue of their characteristics as wetlands, subject to Executive Order 11990 (May 24, 1990).

4. **Executive Order 12372. Intergovernmental Review.** The Service has discussed or offered to discuss the proposal to establish the Sangre de Cristo Conservation Area with landowners; conservation organizations; state, federal, and county agencies; tribes; and other interested groups and individuals.

   At the federal level, the Service staff has coordinated with the U.S. Forest Service, the Bureau of Land Management, the National Park Service, and the Natural Resource Conservation Service, as well as the congressional delegations for the affected region. At the State level, the service has worked with the Colorado Water Conservation Board and Colorado Parks and Wildlife. The Service has consulted representatives from local governments, including Costilla County, Colorado and Taos County, New Mexico. In addition, the Service has provided information to seventeen Tribes with potential interest in this project.

5. **Executive Order 12898. Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.** Establishing the Sangre de Cristo Conservation Area will not have a disproportionately high or adverse human health or environmental effect on minority or low-income populations. Therefore, this action complies with this Executive Order.

6. **Executive Order 12996. Management and General Public Use of the National Wildlife Refuge System**. The public has been invited to participate in the planning process and has

been very engaged. The Service held three public scoping meetings and three public comment meetings, and released the draft environmental assessment and land protection plan for 30 days to get input on the project. The Service received 4 written public comments on the draft EA. Comments and issues raised by the public have been incorporated into the Environmental Assessment and a copy of the final document will be sent to all interested landowners, agencies, private groups, and other parties. While the Sangre de Cristo Conservation Area will be, by definition, a unit of the National Wildlife Refuges System, the project only involves easement acquisition, so the Service will not manage or have control over public access to private lands. This right will remain with the private landowner and, therefore, a compatibility determination is not needed for this project.

7. **Endangered Species Act, section 7.** An informal intra-Service section 7 consultation with the Ecological Services field offices in Colorado and New Mexico concluded with their concurrence that the establishment of the Sangre de Cristo Conservation Area may affect, but is not likely to adversely affect, ESA-protected species.

8. **Coastal Zone Management Act**. Due to the location of the project area, compliance of this Act was determined not to be needed.

9. **Uniform Relocation Assistance and Real Property Acquisition Policies Act.** Since the Service is not seeking to acquire any land within the project area in fee title, no relocation assistance will be needed. The relevant portions of the Uniform Act relating to tax reimbursements, etc. will be implemented on a case-by-case basis as appropriate.

10. **Secretarial Order 3127. Contaminants and Hazardous Waste**. A Level 1 pre-acquisition contaminant survey will be completed before the purchase of any easement.

I hereby certify that the Service has complied with all requirements of law, rules, or regulations applicable to pre-acquisition planning for the above project. I approve the establishment of an acquisition boundary for the Sangre de Cristo Conservation Area and the subsequent acquisition of up to 250,000 acres of easements from willing sellers.

Regional Director, Region 6
U.S. Fish and Wildlife Service

8/1/2012
Date

Appendix H

Director's Approval

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

In Reply Refer To:
FWS/ANRS/R6/052366

AUG 23 2012

Memorandum

To: Regional Director, Region 6

From: Director

Subject: Approval to Proceed with Publication and Distribution of the Final Planning Documents for the Authorization of the Sangre de Cristo Conservation Area, Colorado and New Mexico.

I approve your request dated August 1, 2012, to authorize the acquisition boundary of the Sangre de Cristo Conservation Area, Colorado and New Mexico.

The Decision Package you submitted for my consideration demonstrates the application of Strategic Habitat Conservation and uses spatially explicit decision support tools for targeting conservation delivery. It also contains an Environmental Assessment, Finding of No Significant Impact, and other related documents indicative of detailed planning. These documents comply with the requirements of the Director's land acquisition planning procedures memo dated August 11, 2000.

The lands targeted for protection will conserve up to 250,000 acres of habitat, within a larger 1,000,000 acre area, for four candidate and listed threatened and endangered species, 300 species of birds, buffer against the adverse impacts associated with a variety of environmental stressors, and ensure progress in achieving the mission of the National Wildlife Refuge System.

Attachments

Appendix I

Section 7 Biological Evaluation

Intra-Service Section 7 Biological Evaluation Form - Region 6

Originating Person: Mike Blenden Date Submitted: 19March2012

Telephone Number: 303-289-0350

I. **Service Program and Geographic Area or Station Name**:
San Luis Valley NWR Complex

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

III. **Location**: Location of the project including County, State and TSR (township, section & range):

Saguache, Alamosa, Rio Grande, Mineral, Hinsdale, Conejos, and Costilla Counties, CO; and Rio Arriba and Taos Counties, NM

The San Luis Valley Conservation Area (SLVCA) is a new, proposed unit of the National Wildlife Refuge System which encompasses the headwaters HUC6 of the Rio Grande River in south-central Colorado and northern New Mexico. It is comprised of the San Luis Valley and the slopes of the Sangre de Cristo and San Juan Mountains which border the valley. The elevation of the SLVCA extends from approximately 7500' on the valley floor to 14, 345' at Blanca Peak. Please see attached map.

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

Mexican spotted owl (*Strix occidentalis lucida*) (Threatened)

Southwestern willow flycatcher (*Empidonax traillii extimus*) (Endangered; proposed critical habitat present)

Yellow-billed cuckoo (*Coccyzus americanus*) (Candidate)

Gunnison sage-grouse (*Centrocercus minimus*) (Candidate)

Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*) (Candidate)

Canada lynx (*Lynx canadensis*) (Threatened)

Gunnison's prairie dog (*Cynomys gunnisoni*) (Candidate)

New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) (Candidate; presence in project area uncertain)

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

The Service proposes to establish the SLVCA, a new, 5.2 million acre unit of the San Luis Valley NWR Complex. Within the proposed acquisition boundary of the SLVCA, the Service will seek to acquire an interest in up to 430,000 acres. Acquisition will primarily be in the form of conservation easements which will restrict subdivision, development, and sale of surface water rights; however, the acquisition of up to 30,000 acres in fee-title was approved in the preliminary project proposal, and this tool would be used judiciously as appropriate. Any lands acquired in fee would be managed in accordance with the Comprehensive Conservation Plan for the existing 3 refuges in the complex.

The San Luis Valley is a high desert basin which forms the headwaters of the Rio Grande River. Much of the valley is irrigated for agriculture. Most of the natural vegetation on the valley floor is semi-desert shrubland. However, the precipitation captured in the surrounding valley contributes to a network of surface and groundwater-driven wetlands and riparian corridors which provide breeding and migration stopover habitat for dozens of species of migratory birds. At higher elevations, the habitat transitions to sagebrush scrub, pinon juniper woodland, montane forests, and finally alpine vegetation.

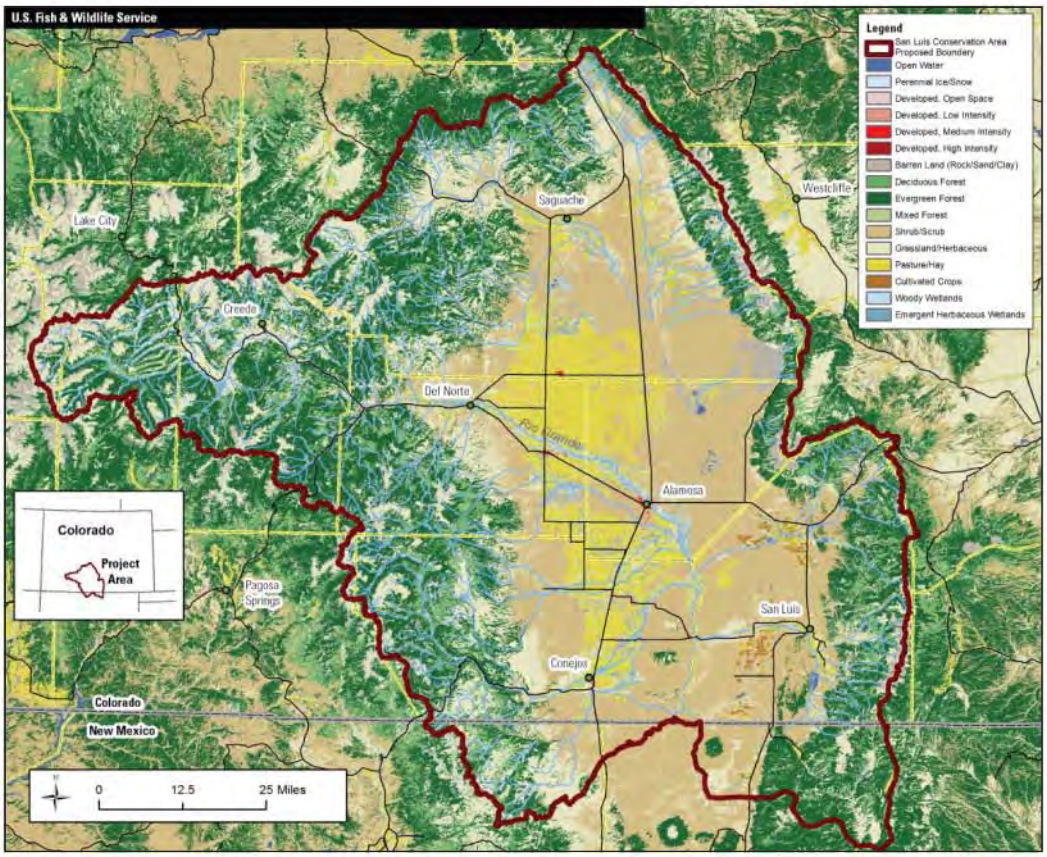
Acquisition within the SLVCA boundary has been prioritized based upon the needs of 8 focal species: southwestern willow flycatcher, Lewis' woodpecker, Rio Grande cutthroat trout, sage thrasher, Gunnison sage grouse, Canada lynx, Wilson's phalarope, and American bittern.

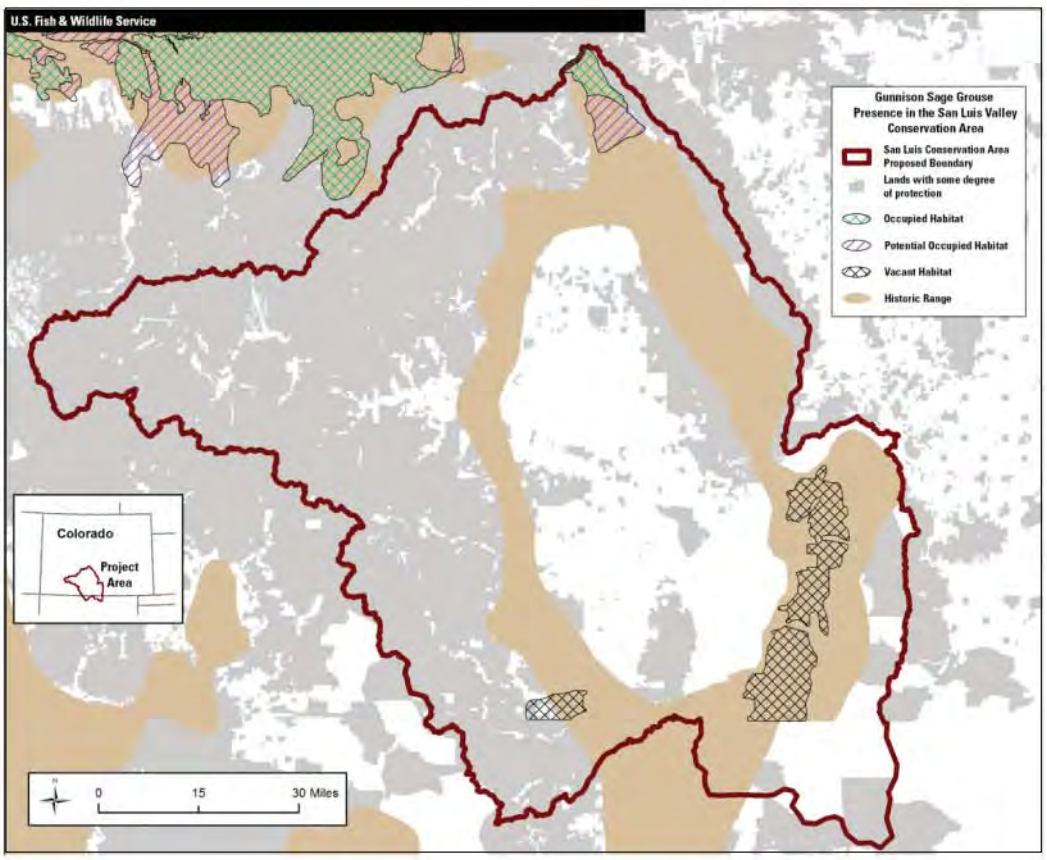
VI. **Determination of Effects:**

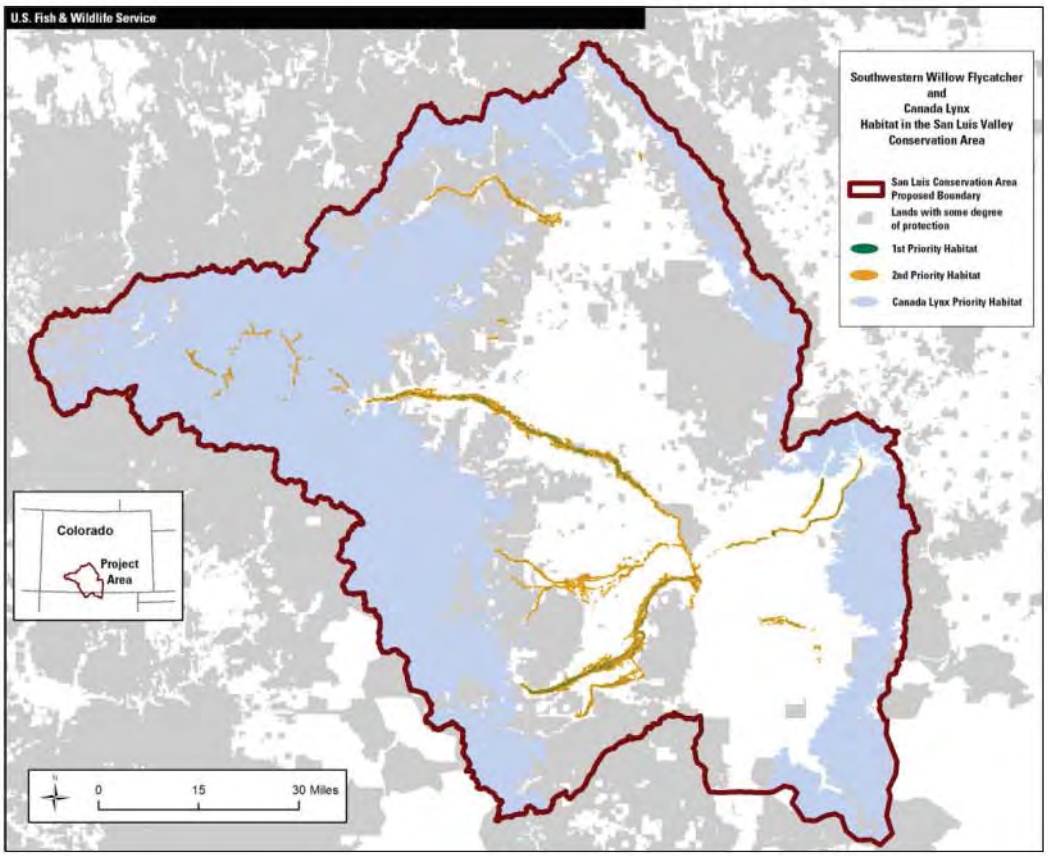
(A) Description of Effects: Describe the action(s) that may affect the species and critical habitats listed in item IV. Your rationale for the Section 7 determinations made below (B) should be fully described here.

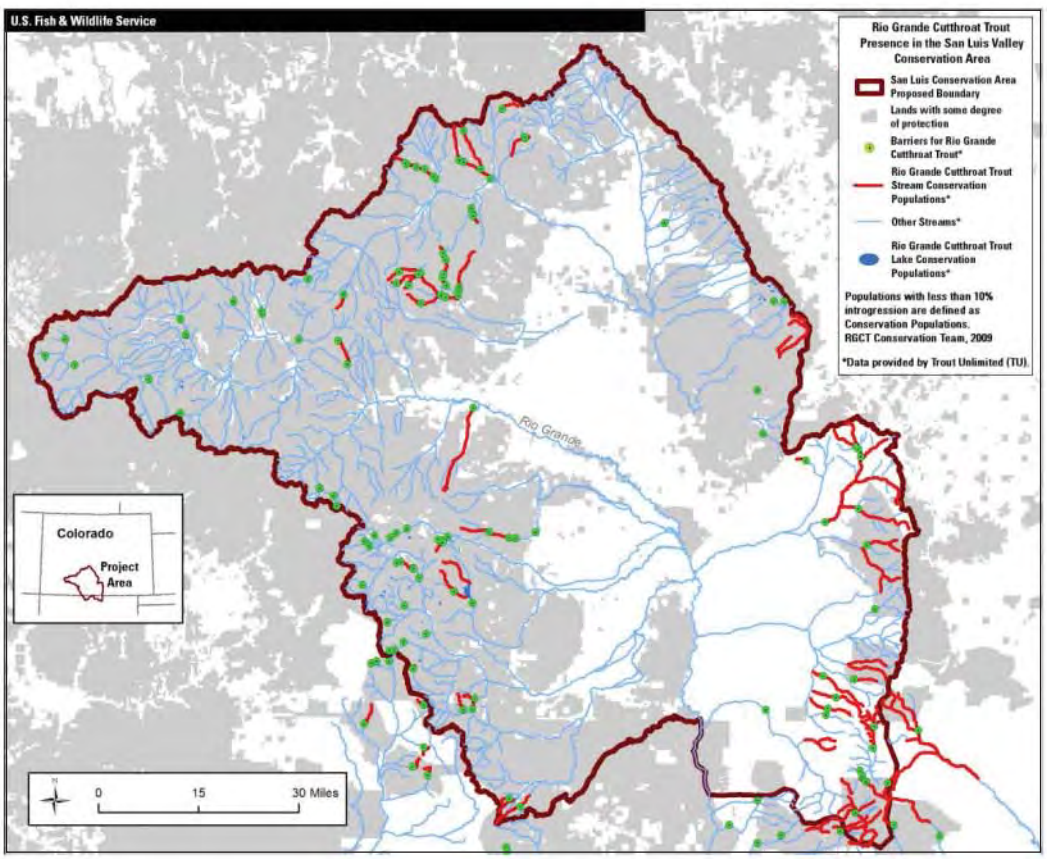
We anticipate the effects of our proposed action to be entirely beneficial to ESA listed and candidate species. In the spatial conservation prioritization for the project, the highest weights were granted to protection of lands in a 200m buffer around southwestern willow flycatcher and yellow-billed cuckoo habitat, as identified by mapping for the draft SLV HCP; and to protection of a 100m buffer around designated conservation populations of Rio Grande cutthroat trout. Included in the Marxan model for spatial conservation prioritization were the occupied, vacant, and potential habitat for Gunnison sage-grouse identified in the GUSG Rangewide Conservation Plan, which may allow for future expansion of the Poncha Pass population and potential reintroduction elsewhere in the valley. Also included was the Canada lynx habitat identified by Colorado Parks and Wildlife (and extended into New Mexico using the land cover classes which comprise most of that habitat). The conservation area includes the montane forests of Costilla County, of which much is currently unprotected. Bringing them into the conservation estate will ensure that this area, identified as an important movement corridor (Leslie Ellwood, CO ES Field Office, pers. comm. with Mike Dixon), will remain largely undeveloped and unfragmented. Please see attached maps.

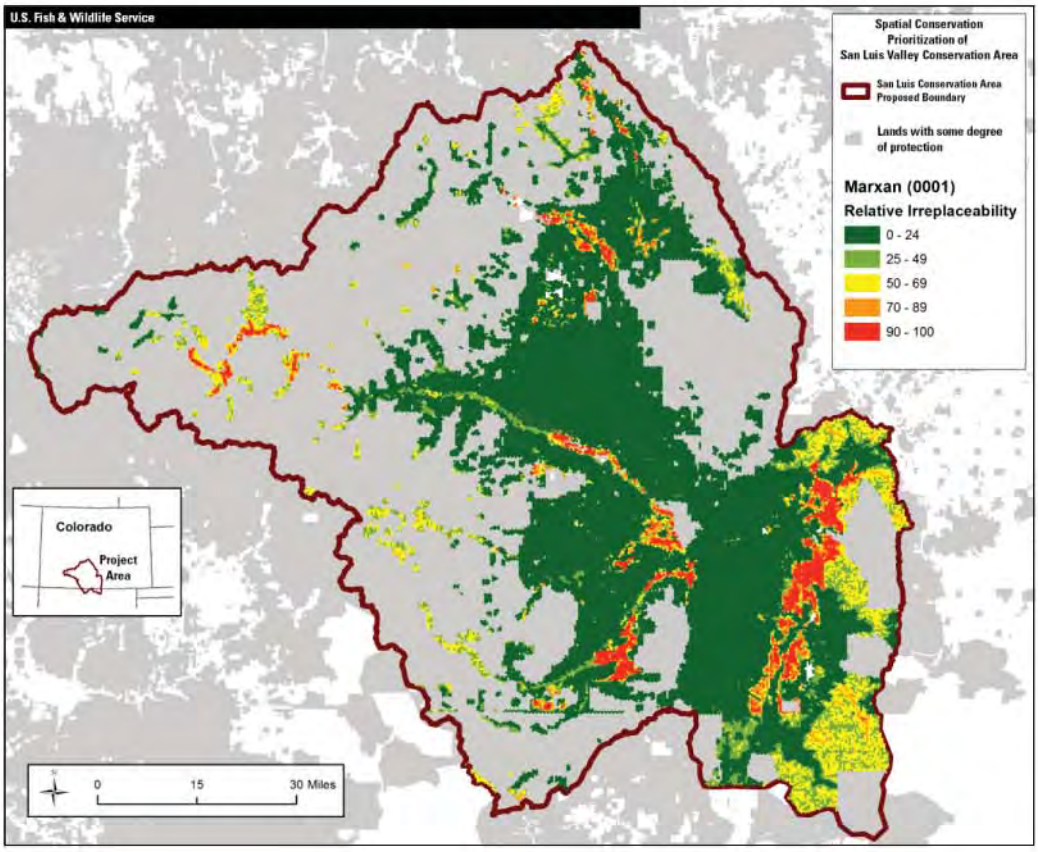
No explicit population goals are associated with the conservation prioritization strategy at present. However, we expect that the permanent protection of these habitats will allow these imperiled species to maintain their existing populations and/or provide opportunities for future growth.


U.S. Fish & Wildlife Service
Legend
San Luis Conservation Area Proposed Boundary
Open Water
Perennial Ice/Snow
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Barren Land (Rock/Sand/Clay)
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrub/Scrub
Grassland/Herbaceous
Pasture/Hay
Cultivated Crops
Woody Wetlands
Emergent Herbaceous Wetlands
Lake City
Creede
Saguache
Westcliffe
Del Norte
Rio Grande
Alamosa
Pagosa Springs
San Luis
Conejos
Colorado
New Mexico
Colorado
Project Area
0
12.5
25 Miles


U.S. Fish & Wildlife Service
Gunnison Sage Grouse Presence in the San Luis Valley Conservation Area
San Luis Conservation Area Proposed Boundary
Lands with some degree of protection
Occupied Habitat
Potential Occupied Habitat
Vacant Habitat
Historic Range
Colorado
Project Area
0
15
30 Miles


U.S. Fish & Wildlife Service
Southwestern Willow Flycatcher and Canada Lynx Habitat in the San Luis Valley Conservation Area
San Luis Conservation Area Proposed Boundary
Lands with some degree of protection
1st Priority Habitat
2nd Priority Habitat
Canada Lynx Priority Habitat
Colorado
Project Area
0
15
30 Miles


U.S. Fish & Wildlife Service
Rio Grande Cutthroat Trout Presence in the San Luis Valley Conservation Area
San Luis Conservation Area Proposed Boundary
Lands with some degree of protection
Barriers for Rio Grande Cutthroat Trout*
Rio Grande Cutthroat Trout Stream Conservation Populations*
Other Streams*
Rio Grande Cutthroat Trout Lake Conservation Populations*
Populations with less than 10% introgression are defined as Conservation Populations. RGCT Conservation Team, 2009
*Data provided by Trout Unlimited (TU).
Rio Grande
Colorado
Project Area
0
15
30 Miles


U.S. Fish & Wildlife Service
Spatial Conservation Prioritization of San Luis Valley Conservation Area
San Luis Conservation Area Proposed Boundary
Lands with some degree of protection
Marxan (0001)
Relative Irreplaceability
0 - 24
25 - 49
50 - 69
70 - 89
90 - 100
Colorado
Project Area
0
15
30 Miles

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

	Determination
No Effect: This determination is appropriate when the proposed project will not directly or indirectly affect (neither negatively nor beneficially) individuals of listed/proposed/candidate species or designated/proposed critical habitat of such species. **No concurrence from ESFO required.**	_____
May Affect but Not Likely to Adversely Affect: This determination is appropriate when the proposed project is likely to cause insignificant, discountable, or wholly beneficial effects to individuals of listed species and/or designated critical habitat. **Concurrence from ESFO required.**	X
May Affect and Likely to Adversely Affect: This determination is appropriate when the proposed project is likely to adversely impact individuals of listed species and/or designated critical habitat. **Formal consultation with ESFO required.**	_____
May affect but Not Likely to Jeopardize candidate or proposed species/critical habitat: This determination is appropriate when the proposed project may affect, but is not expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Concurrence from ESFO optional.**	_____
Likely to Jeopardize candidate or proposed species/critical habitat: This determination is appropriate when the proposed project is reasonably expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Conferencing with ESFO required.**	_____

Signature Michael Blenden Date 3/14/2012
[Supervisor at originating station]

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

A. **Concurrence** ✓ **Nonconcurrence** _____
Explanation for nonconcurrence:

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

C. Conference required _____
List species or critical habitat unit

Name of Reviewing ES Office (Colorado) Susan C. Linner

Signature

Susan C Linner

Date 6/28/2012

Name of Reviewing ES Office (New Mexico) _____

Signature

_____

Date _____

Revised 3/2010

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

A **Concurrence** ✓ **Nonconcurrence** _____
Explanation for nonconcurrence

B Formal consultation required _____
List species or critical habitat unit

C. Conference required _____
List species or critical habitat unit

Name of Reviewing ES Office _____
(Colorado)

Signature

_____ Date _____

Name of Reviewing ES Office George D. Dennis
(New Mexico)
Consultation Number 02ENNM00-2012-I-0057

Signature

_____ 5/10/2012 Date

Revised 3/2010

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Glossary

adaptive strategy—The ability of an ecosystem to keep ecological function while adjusting to long-term changes in the environment, or shifting to a new normal (such as climate change, established invasive species).

anthropogenic—Caused by human activity.

candidate species—A species of plant or animal for which the USFWS has sufficient information on its biological status and threats to propose it for listing as endangered or threatened under the Endangered Species Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

CFR—See Code of Federal Regulations.

Code of Federal Regulations (CFR)—Codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. Each volume of the CFR is updated once each calendar year.

comprehensive conservation plan—A 15-year plan providing overall management guidance to a unit or complex of the National Wildlife Refuge System.

conservation easement—A legally enforceable encumbrance or transfer of property rights to a government agency or land trust for the purposes of conservation. Rights transferred could include discretion to subdivide or develop land, to change current land use practices, to sever water rights, or others as proper, and are specified by contract between the landowner and the conservation entity.

ecological resilience—The ability of an ecosystem to rebound from short-term changes to a landscape (such as wildfires, floods, pest outbreaks).

endangered species—A species of plant or animal that is in danger of extinction throughout all or a substantial part of its range.

Endangered Species Act—A United States law passed by Congress in 1973 with the purpose of protecting and recovering imperiled species and the ecosystems on which they depend.

environmental assessment—A National Environmental Policy Act (NEPA) compliance document that analyzes whether to prepare an environmental impact statement or a finding of no significant impact, facilitates compliance when no EIS is necessary, or facilitates preparation of an EIS when one is necessary.

focal species—Species that represent a group of species vulnerable to similar threats.

HUC—Hydrologic Unit Code, a hierarchical system created by USGS to find locations and regions by hydrology.

land protection plan—A document required by USFWS policy before the establishment of new units of the National Wildlife Refuge System, or major expansions of existing units.

landscape conservation cooperative—A public-private partnership intended to facilitate cross-political boundary conservation in the face of a changing environment through application of science.

Marxan—A software package used as a decision support tool for spatial conservation prioritization.

Region 6—An administrative unit of the Service known as the Mountain–Prairie Region, which covers eight States: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming.

Service—U.S. Fish and Wildlife Service.

strategic habitat conservation—An iterative adaptive management framework designed to make sure that decisionmaking and management within the Service is science-based. Consists of four stages: biological planning, conservation design, delivery of conservation action, and monitoring and research.

threatened species—A species of plant or animal that is likely to become endangered in the future.

trust species—Species for which the Federal Government has statutory responsibility, including threatened and endangered species, migratory birds, marine mammals, and interjurisdictional fish.

U.S.C.—United States Code.