

**COLORADO'S
COMPREHENSIVE WILDLIFE
CONSERVATION STRATEGY**

and Wildlife Action Plans

November 2, 2006

**Prepared for the
Citizens of Colorado and its Visitors
By the Colorado Division of Wildlife**



*In fulfillment of requirements of Title IX, Public Law 106-553
and Title 1, Public Law 107-63
(State Wildlife Grants program)*

Foreword

United States' laws and policies place the primary responsibility for wildlife management in the hands of the states. The states have a lengthy success record of conserving species, including those that are hunted or fished and those that are not. In Colorado, these successes with both "game" and "nongame" species have been paid for largely with hunter and angler license fees and federal excise taxes on hunting and fishing equipment, although in recent years lottery proceeds (GOCO) and Species Conservation Trust Fund dollars have expanded the funding base. It is no surprise that the task of conserving all species will take more than traditional funding sources.

The State Wildlife Grants program (*Title IX, Public Law 106-553 and Title 1, Public Law 107-63*), created through federal legislation, is meant to help close the funding gap by providing federal dollars for a state to use on conservation projects aimed at preventing wildlife from becoming endangered. This Comprehensive Wildlife Conservation Strategy (CWCS) for Colorado has been prepared in fulfillment of the requirements of that legislation. Beyond those requirements is a more fundamental goal for this Strategy, a goal of the Colorado Division of Wildlife and the state as a whole, which is to secure wildlife populations such that they do not require protection *via* federal or state listing regulations.

Colorado's CWCS has assembled for the first time a catalog on the status of our knowledge about native wildlife, most of which are not commonly hunted or fished, the threats to the habitats upon which they depend, and an articulation of strategies that can be employed to lessen those threats. Thus, Colorado's CWCS is comprehensive in scope, and strategic in nature. This CWCS reflects the data that currently exist for Colorado species and their habitats, the collective judgment of many of Colorado's scientists, and also reflects the interests and concerns of citizens with a stake in Colorado wildlife conservation.

Species conservation is not new to Colorado and the Division of Wildlife. Starting with the down-listing of greenback cutthroat trout to federally-threatened status in 1979, Colorado has down-listed, de-listed, or received federal decisions to not place wildlife species on federal T&E or candidate lists for 20 species. Our pro-active, on-the-ground programs continue today, as evidenced by dozens of operational or "action" plans referenced herein that are currently being implemented. Division of Wildlife direct expenditures toward species conservation and habitat conservation exceed \$20 million annually, financed in large part by funds from Great Outdoors Colorado (GOCO), Species Conservation Trust Fund, and the State Wildlife Grants program as alternatives to traditional hunting and fishing license fees. As further evidence of the Division of Wildlife's commitment, we created the Wildlife Conservation Section in 2005 with principal responsibility for the Division of Wildlife's aquatic and terrestrial species conservation programs (threatened, endangered, special concern, non-game) and the integration of those programs with habitat conservation and management for all wildlife species. In 2006, the Division committed over \$20 million above these annual expenditures for habitat protection, soliciting partnerships through a request for proposals. This has resulted in current

negotiations for 10 conservation easements for critical Gunnison and greater sage-grouse habitat and for a host of special status wildlife species in short-grass prairie habitat. Clearly, we and our many partners fully intend that the track record of successfully securing populations of Colorado's at-risk wildlife species and their habitats continue.

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Executive Summary

Colorado's Comprehensive Wildlife Conservation Strategy (CWCS) catalogs the status of our knowledge about many wildlife species, most of which are not hunted or fished, the threats to the species and habitats upon which they depend, and an articulation of strategies that can be employed to lessen those threats. It is based upon the best science available at this time, the collective judgment of many of Colorado's scientists, and also reflects the interests and concerns of citizens with a stake in Colorado wildlife conservation. It reflects the fundamental goal of the Colorado Division of Wildlife and the state as a whole, which is to secure wildlife populations such that they do not require protection *via* federal or state listing regulations. Further, it fulfills the requirements of the State Wildlife Grants program (*Title IX, Public Law 106-553 and Title 1, Public Law 107-63*) by addressing the eight elements stipulated in that legislation.

Element 1: Information on the distribution and abundance of species of wildlife – 210 species were identified as Species of Greatest Conservation Need (SGCN) or, in a few cases, were included for specific reasons as noted in the document. Criteria for identifying species of greatest conservation need were based upon status under the federal ESA, state classification, and level of imperilment according to generally accepted evaluation systems or broad status assessments. Evaluations of additional species suggested for inclusion through the public comment processes are included for informational purposes. The CWCS summarizes available information and expert opinion on distribution, population status, and population trend for each SGCN. Although knowledge about many species has increased substantially in recent years, there are no data or other bases for science-based opinion about the population status for 33 (16%) of those species, or the population trend for 81 (39%) of the 210 species.

Element 2: Locations and relative condition of key habitats – A total of 41 land cover types comprise the Colorado landscape. Although species – land cover type associations (i.e., habitat) are well documented in Colorado by CDOW, Colorado Natural Heritage Program, U.S. Forest Service and others, only in relatively few cases do data exist that adequately describe their ability to support native wildlife (i.e., “condition”). To bridge that gap, the CWCS relied heavily upon the judgment of the panels of scientists to assess those relative habitat conditions. Those panels as well as interested publics encouraged a more integrative, landscape-level view of those 41 types to address their interrelatedness. Following this approach, and pooling across all taxonomic groupings demonstrated that the landscape of eastern Colorado - eastern plains river and stream systems (including riparian), tallgrass and midgrass prairie – and sagebrush were judged as being among those in the poorest condition to support native species, while most other types were considered adequate or good for at least some taxonomic groupings. The greatest proportion of land cover types assessed as “poor” occurred for birds, with roughly one-quarter of the land cover types receiving that assessment. Perhaps of even greater concern,

given the longer-range perspective of the Strategy, was that trends in habitat conditions were judged to be declining in most land cover types across all taxa, with the notable exceptions (“stable”) tending to be in the higher elevation streams and forested lands and in agricultural croplands.

Element 3: Issues that may adversely affect species of greatest conservation need or their habitats and priority research and survey efforts needed – Key issues identified during the CWCS development process included habitat conversion, infrastructure and other resource demands from a growing Colorado population, recreational demands, invasive, exotic species, and organizational capacity (coordination, funding, and information gaps). The CWCS directly ties these and other general threats, as well as specific threats, to each SGCN and habitat. The many “unknowns” discussed (e.g., 16% species of unknown status, 39% species of unknown trends) indicates priority research and survey needs for the subject species or habitats. A more overarching need, repeatedly stressed during conversations among contributors to the CWCS, is an efficient, streamlined system, including a common data repository, for rapid data integration and sharing among all entities conducting species and habitat surveys.

Element 4: Conservation actions necessary to conserve the identified species and habitats and priorities for implementing – The CWCS includes conservation actions in 5 strategic areas that should be considered when actions affecting wildlife are undertaken in the state. The strategic areas include:

- conserving wildlife habitat,
- maintaining and re-establishing habitat and landscape connectivity,
- wildlife management (including expansion of partnerships with private interests),
- public education and law enforcement to benefit wildlife and wildlife habitat, and
- representing wildlife values in multi-purpose planning or other decision-making processes.

Partners may use this strategy document to identify wildlife conservation priorities to consider in proposing and implementing specific projects. General and specific conservation actions are identified and prioritized for the SGCN and their habitats. For some species, recovery or other conservation plans and agreements (referenced in the CWCS) have been written. These documents include specific operational priorities, frequently using similar science-and-stakeholder processes that were used in the development of the CWCS. This Comprehensive Strategy is intended to complement, not replace, the operational planning and prioritization processes that are in place for the Division of Wildlife or other conservation agencies and organizations in Colorado. To facilitate the integration of action plans with the Conservation Strategy, the Division of Wildlife has initiated a central location on its web site to provide access to all conservation, recovery, or other action plans for Colorado’s wildlife species.

Element 5: Strategies for monitoring identified species, their habitats, and the effectiveness of conservation actions – Beyond monitoring needs for species, species assemblages, and habitats listed in the CWCS, utmost in priority is the ability to monitor progress toward benchmark measures of success and population security thresholds. Input from experts and stakeholders clearly reflected the need for a comprehensive system that allows information from past and future inventories, surveys, research, and management actions to be accumulated from all entities, consolidated at multiple scales, and easily and rapidly distributed and compared to benchmarks.

Element 6: Procedures to review the Comprehensive Wildlife Conservation Strategy – In the near term, CWCS review and incorporation of new information will be performed in traditional fashion using similar procedures to this initial effort, at an interval of not less than 5, and no more than 10 years. This will allow the effects of the Strategy and the operational or action plans and activities that flow from it to be adequately expressed and evaluated before modification. The preferred option over the longer term, however, is to follow a more aggressive adaptive management strategy, with the CWCS residing on a database platform (vs. a fixed text document), allowing ongoing updates to reflect changes in species and habitat status, conservation accomplishments as they occur, and to allow continuous, instead of punctuated, public involvement and feedback (i.e., a “living” strategy). Oversight and maintenance of such a systems approach would be accomplished *via* pooled resources of collaborating entities, including an oversight committee of those collaborators. Given current fiscal, logistical, and technological constraints, contributors to the CWCS who recommended this approach typically acknowledged it as a longer-term vision rather than an initiative to be undertaken in the immediate future.

Element 7: Coordination with federal, state, and local agencies and Native American tribes – The CWCS calls for a transparent and participatory approach to coordination with partners and the integration of the priorities identified in this CWCS into the substantial wildlife management infrastructure that already exists in Colorado (an extensive listing of current multi-agency plans and agreements is provided). The recommendations repeatedly heard during the development of the CWCS for improved and streamlined information and data-sharing systems will work to improve this coordination.

Element 8: Ensure public participation – Public participation in the development of the CWCS was encouraged and accomplished through multiple means, including direct mailings (2 mailings to about 1,000 individuals and organizations), publicity and posting of the draft document and mechanisms to provide input *via* CDOW's web site, additional publicity through periodic news releases and media interviews, 2 sets of public meetings around the state (4 locations each), and other meetings with groups of conservation organization representatives (e.g., the CDOW-sponsored

Environmental Round Table, Partners in Flight). The final round of public input resulted in formal comments and suggestions from 91 members of the public, organizational representatives, and agency personnel. There were over 1,600 visits to the CWCS postings on CDOW's CWCS web site during the period of public input. For the most part, those suggestions regarding style (editorial) and those that were strategic in nature have been addressed in the CWCS. Future public involvement will, at a minimum, mimic this initial process, although the preferred option is to allow continuous public contributions as part of the review process previously described.

PART 1 - INTRODUCTION

1.1 Background

CWCS Purpose

For many years fish and wildlife conservation in Colorado, and in the nation, has been funded primarily by sportsmen and sportswomen. That funding has come largely from two sources: (1) revenue from the sale of fishing, hunting, and a few other types of licenses; and (2) federal excise tax revenue from sales of fishing and hunting equipment, apportioned back to states through a set formula. However, the use of this funding typically has been weighted toward the conservation of hunted or fished species. Many other species have not been covered by a reliable funding mechanism; although in recent years, Colorado's lottery funds (GOCO) and the Species Conservation Trust Fund have contributed substantially to narrowing this gap. Species identified as federally threatened or endangered under the Endangered Species Act receive additional attention but not necessarily adequate funding.

Recognizing that there has not been enough revenue at a national level available for conservation of all wildlife species, leaders in the conservation community have sought to provide a new source of funding. Teaming With Wildlife, a diverse national coalition of conservationists, hunters, anglers, and conservation-minded agencies, organizations, and businesses lobbied for passage of the necessary national legislation for this new source of funding. The results have been encouraging.

The Commerce, Justice and State Appropriations Act of Fiscal Year 2001, Title IX, Public Law 106-553 created the Wildlife Conservation and Restoration Program (WCRP), designed to provide funding for the conservation needs of wildlife, as well as for education and wildlife-related recreation. The WCRP was only funded for one year. A second act, the Department of the Interior and Related Agencies Appropriations Act of 2002, Public Law 107-63, Title 1, created a State Wildlife Grants program (SWG), which provides annual funding for conservation of wildlife and wildlife habitats. The SWG requires that each state develop a Comprehensive Wildlife Conservation Strategy (CWCS) by October 2005, to remain eligible for SWG funding. This CWCS meets Colorado's obligation under this law.

Colorado's CWCS Approach and Guiding Principles

Although development of Colorado's CWCS was coordinated by the Colorado Division of Wildlife (CDOW), it is not simply a strategy for that agency. It is a strategy for all of Colorado. The task of preserving and managing Colorado's fish and wildlife is too big for any one group or agency to achieve alone. This document identifies a roadmap of conservation priorities that can be used by everyone in Colorado as a guide for planning, partnership building, and project design.

The CWCS articulates a set of conservation priorities from a statewide perspective that considers an expansive array of wildlife across the whole state. The CWCS is intended to be a strategic plan, not an operational or specific action plan. Its purpose is to foster greater coordination between CDOW's current and future conservation actions and those already underway in Colorado's wildlife conservation community, to meet the state's wildlife conservation needs. As such, this CWCS is designed to complement the substantial planning and active management programs that already exist in Colorado (~70 relevant plans were identified and considered). It is intended that Colorado's CWCS not re-invent the work others are doing and that it not pre-empt ongoing wildlife management processes for single species or small groups of species. When appropriate, it is intended that cooperation with adjacent states will result in range-wide conservation of species of greatest conservation need.

Colorado's CWCS is not a legal document, a regulatory document, a Recovery Plan under the Endangered Species Act (ESA), nor a NEPA (National Environmental Policy Act) decision document. While representatives from appropriate agencies such as the U.S. Forest Service, Bureau of Land Management, National Park Service, and U.S. Fish and Wildlife Service participated in the preparation of this plan, all parties should consider this guidance along with other information as they implement actions that follow established public participation protocols and legal requirements when preparing decision documents and project proposals.

The guiding principles of this strategy are to:

- (1) encourage and support conservation actions that meet the needs of species of greatest conservation need;
- (2) manage for healthy key habitats and ecosystems so that all species of greatest conservation need will benefit;
- (3) create a strategy that will be flexible enough to incorporate new research findings and successful management innovations into conservation actions;
- (4) acknowledge the pivotal role that private landowners and local stakeholders play in conservation;
- (5) enhance, not replace, other planning efforts; and
- (6) maintain an atmosphere of cooperation, participation, and commitment among wildlife managers, landowners, private and public land managers, and other stakeholders in development and implementation of conservation actions.

A major tenet of Colorado's strategy is that conservation works best and is more efficient and enduring when accomplished at the local level. Ultimately, the aim is to achieve within Colorado "civic environmentalism" (Shutkin 2000:14) – interest groups working together rather than vying to defeat each other. It is a process and an end point that develops consensus resulting in benefits to the environment and the community (The Nature Conservancy 2004, Zeller 1999).

Federal CWCS Requirements: The Eight Elements

The Colorado CWCS meets the requirements of guiding federal legislation. It is based on the best available information and identifies data gaps where they exist. It is, and will continue to be, the result of involving virtually all of Colorado's conservation agencies and organizations, federal and tribal managers, and affected stakeholders.

The enabling legislation and regulations governing the SWG and related programs stipulate that a state's CWCS contain the following eight elements (referred to throughout the CWCS as "Element 1, Element 2, etc.):

- Element 1. Information on the distribution and abundance of species of wildlife, including low population and declining species as the State fish and wildlife department deems appropriate, that are indicative of the diversity and health of (Colorado's wildlife)" (P.L.106-553 Title IX Sec. 902);
- Element 2. Descriptions of locations and relative condition of key habitats and community types essential to conservation of species identified in (1);
- Element 3. Descriptions of issues that may adversely affect species identified in (1) or their habitats, and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and habitats;
- Element 4. Descriptions of conservation actions determined to be necessary to conserve the identified species and habitats and priorities for implementing such actions;
- Element 5. Proposed strategies for monitoring species identified in (1) and their habitats, for monitoring the effectiveness of the conservation actions proposed in (4), and for adapting these conservation actions to respond appropriately to new information or changing conditions;
- Element 6. Descriptions of procedures to review the Comprehensive Wildlife Conservation Strategy at intervals not to exceed 10 years;
- Element 7. Approach for coordinating, to the extent feasible, the development, implementation, review, and revision of the CWCS with federal, state, and local agencies and Native American tribes that manage significant land and water areas within Colorado or administer programs that significantly affect the conservation of identified species and habitats; and
- Element 8. Provisions to ensure public participation in the development, revision, and implementation of projects and programs. Congress has affirmed that broad public participation is an essential element of this process.

Roadmap to the Eight Required Elements

The CWCS addresses the eight required elements using both species and habitat approaches. Table 1 lists the locations within the CWCS where information pertaining to each of the eight required elements may be found.

Table 1. Locations of Required Elements in the CWCS

Required Element	Location(s)
1 – Distribution and abundance of wildlife species	
a. sources of information	Section 1.2 (CWCS development process); Section 1.4 (overview of wildlife species); Part 2 (expert input); Part 5 (literature cited).
b. abundance and distribution	Tables 4-11 (status/trend tables by major taxonomic group); Table 16 (species accounts); Appendix D (key to species distributions).
c. low and declining populations	Tables 4-11 (status/trend tables by major taxonomic group)
d. consideration of all major wildlife groups	Section 1.4 (overview of wildlife species); Section 2.1 (species of greatest conservation need).
e. process for selecting SGCNs	Section 2.1 (species of greatest conservation need); Table 3 (criteria used to develop list of SGCN); Appendix A (application of criteria used to select SGCN).
2 – Locations and conditions of key habitats	
a. level of detail	Section 2.2 (key habitats and relative conditions for SGCN)
b. location, relative condition, and conservation actions needed	Section 2.2 (key habitats and relative conditions for SGCN); Table 12 (relative condition of key habitats); Figure 2 (vegetative communities and habitat types); Table 17 (key habitats – priorities, threats, and conservation actions); Appendix B (land cover descriptions); Appendix C (relative condition of key habitats).
3 – Problems that may adversely affect species and habitats	
a. sources of information	Section 1.2 (CWCS development process); Section 2.3 (problems affecting SGCN and habitats); Part 5 (literature cited).

Required Element	Location(s)
b. detailed threats	Section 2.3 (expert input on problems affecting SGCN and habitats); Table 13 (key issues affecting wildlife); Section 3.3 (threats); Tables 16 and 17 (priorities, threats, and conservation actions for SGCN and habitats); Appendix G (taxonomy of threats).
c. threats relevant to species and habitats	Section 2.3 (expert input on problems affecting SGCN and habitats); Table 13 (key issues affecting wildlife); Section 3.3 (threats); Tables 16 and 17 (priorities, threats, and conservation actions for SGCN and habitats); Appendix G (taxonomy of threats).
d. research and survey efforts needed	Section 2.4 (additional research and survey efforts); Table 14 (research and survey emphasis areas); Table 16 (priorities, threats, and conservation actions for SGCN).
<i>4 – Conservation actions that may conserve species and habitats, and priorities for implementing actions</i>	
a. how conservation actions address threats	Section 2.3 (expert input on problems affecting SGCN and habitats); Tables 16 and 17 (priorities, threats, and conservation actions for SGCN and habitats).
b. descriptions of conservation actions	Section 2.3 (expert input on problems affecting SGCN and habitats); Tables 16 and 17 (priorities, threats, and conservation actions for SGCN and habitats); Appendix H (taxonomy of conservation actions).
c. linking actions to objectives and indicators	Section 2.6 (proposed monitoring plans); Figure 3 (example of CDOW work package, demonstrating management objectives and security benchmarks).

Required Element	Location(s)
d. actions for partners	Section 2.3 (expert input on problems affecting SGCN and habitats); Tables 16 and 17 (priorities, threats, and conservation actions for SGCN and habitats); Section 4.1 (coordination of conservation actions with partners).
e. research and survey efforts needed	Tables 16 and 17 (priorities, threats, and conservation actions for SGCN and habitats).
5 – Proposed plans for monitoring species and habitats	
a. plans for monitoring SGCN and habitats	Section 2.6 (proposed monitoring plans)
b. monitoring outcomes of conservation actions	Section 2.6 (proposed monitoring plans); Figure 3 (example of CDOW work package, demonstrating management objectives and security benchmarks).
c. species not monitored	Section 2.6 (proposed monitoring plans).
d. monitoring at multiple levels	Section 2.6 (proposed monitoring plans).
e. relationship to existing monitoring/survey systems and determining effectiveness of conservation actions	Section 2.6 (proposed monitoring plans).
f. geographic scale	Section 2.6 (proposed monitoring plans).
g. adaptive management	Section 2.6 (proposed monitoring plans).
6 – Procedures to review the CWCS	
a. review process	Section 4.2 (incorporating new information); Section 4.3 (review and updates to the CWCS).
7 – Coordination with other land management agencies	
a. involvement of federal, state, and local agencies and Indian tribes in development of CWCS	Section 1.2 (CWCS development process).
b. continued involvement of agencies and tribes in implementation, review, and revision	Section 4.3 (review and updates to CWCS).
8 – Public participation	
a. public involvement in development of CWCS	Section 1.2 (CWCS development process).
b. continued public involvement in implementation and revision	Section 4.3 (review and updates to CWCS).

1.2 Colorado CWCS Development Process

Several progressive steps were involved in developing the CWCS, generally following the Required Elements in the federal legislation (Fig.1 and sidebar). The CWCS development process began with identifying “species of greatest conservation need.” This was prepared by reviewing available information on wildlife species distribution and abundance (Element 1) and then ascertaining which species were most at risk of decline. The location and condition of habitats that are important for these species of greatest conservation need were then assessed (Element 2). Both panels of experts as well as stakeholder meetings identified issues potentially impacting these key habitats (Element 3) as well as possible conservation actions to address the issues (Element 4). Options for research and surveying efforts were prioritized, and potential monitoring plans were proposed (Elements 4 and 5).

Progressive Steps Used to Create Colorado's CWCS	Required Elements Addressed by This Activity
Step 1. Draft initial list of species of greatest conservation concern by CDOW staff.	1
Step 2. Internet questionnaire to Colorado's scientific community to review Step 1 and create initial assessments of species' population status and condition of key habitats.	1,2,8
Step 3. Stakeholder meetings to scope out concerns and opportunities.	3,4,6,7,8
Step 4. Science Forum to refine content developed in Steps 1 and 2 and establish priorities.	1,2,3,4,5,7,8
Step 5. Draft of the CWCS	2,6,7,8
Step 6. Stakeholder meetings to review the draft CWCS (from Step 5).	1,2,3,4,5,6,7,8
Step 7. Internet-based review of the draft CWCS (from Step 5).	1,2,3,4,5,6,7,8
Step 8. Final draft of the CWCS responding to information received in Steps 6 and 7).	1,2,3,4,5,6,7,8

Technical expert advice on the conservation of Colorado's mammals, birds, fish, amphibians, reptiles, mollusks, insects, and arachnids was explicitly solicited (Fig. 1). In February, 2005, a questionnaire (guided in part by the results of the November 2004 public meetings) was sent to 117 experts to gather their assessments of the status and trends of Colorado's wildlife species and their habitats. A meeting of Colorado's scientific community (Science Forum) was conducted in March, 2005. The Science Forum served to further quantify and articulate species and habitat status and to identify issues facing the species as well as potential conservation actions to address the issues.

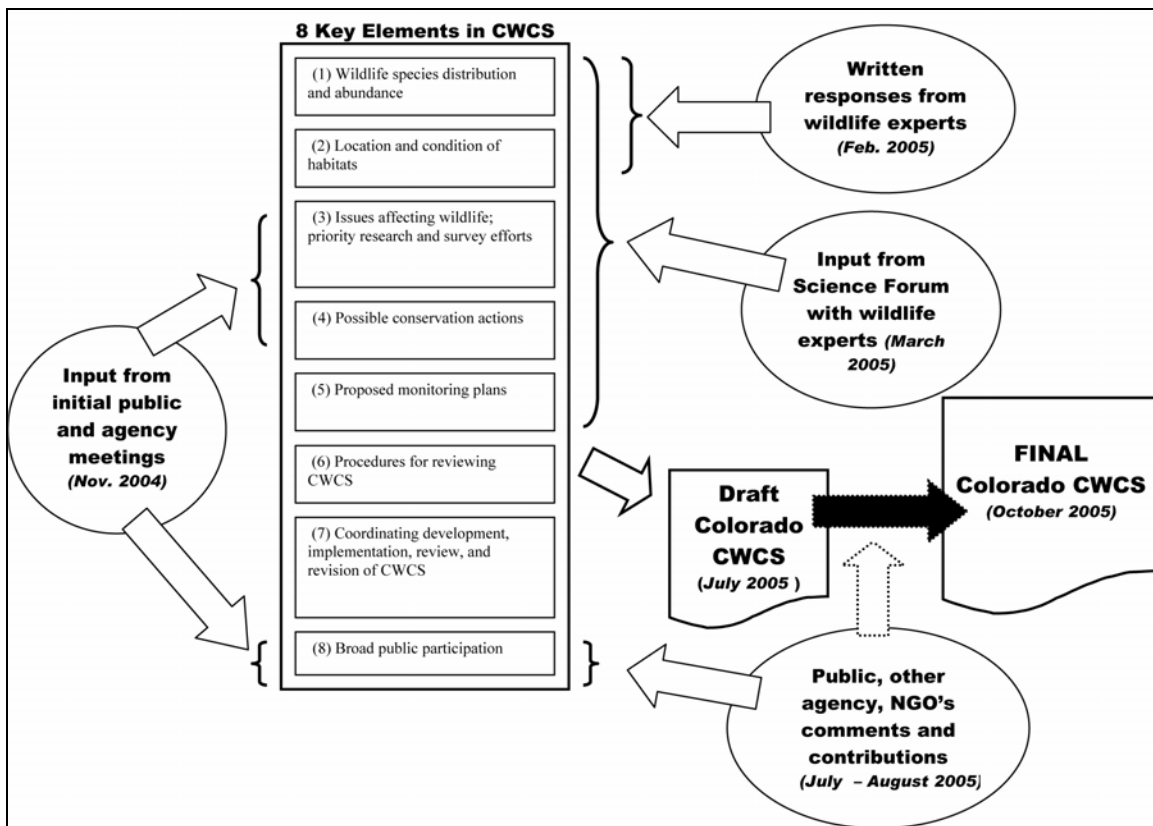


Figure 1. Colorado CWCS development process.

Public and Technical Expert Participation

Public participation involved both internal (CDOW) and external stakeholders. Expert participation involved a broad array of wildlife experts with knowledge about Colorado wildlife. Vehicles for providing this information and inviting participation were:

- two direct mailings (September 2004 and July 2005), of approximately 1,000 letters each, to CDOW's existing constituent and mailing lists,
- news releases and newspaper articles announcing the initiation of the process and providing updates,
- periodically updated information on the CDOW website since September 2004,
- initial meetings around the state in November 2004, one in each of the four CDOW regions, with internal (CDOW) and external agency/public audiences,
- monthly meetings with the CDOW-sponsored Environmental Round Table, consisting of representatives of Colorado's environmental organizations,
- briefings to the Wildlife Commission,

- internal and external briefings (e.g., the 50-60 people who attended the April 2005 Partners in Flight Group),
- communications over the internet with technical experts,
- a questionnaire sent to 117 experts to gather basic information on Colorado's wildlife species (considering the scientific community as stakeholders),
- a meeting of Colorado's scientific community (i.e., the Science Forum), reported later in this document (March 2005) providing technical information and scientific opinions,
- a second round of meetings around the state in July 2005, one in each of the four CDOW regions, with internal and external agency/public audiences, and
- a mechanism to submit written and electronic (e-mail) comments on the draft CWCS.

Partnership Solicitation

Identification of potential partners began early in the process and continued throughout development of the CWCS. In addition, a listing of potential partners was generated during the Science Forum and the second round of stakeholder meetings. Some of these potential partners may be viewed as "generalists," with concerns across all taxa. Others seem suited for assessments of particular taxonomic groups and habitats, implementing conservation actions, and/or for monitoring the taxonomic groups indicated (Table 2).

Table 2. Potential partners and likely areas of concern.

Potential Partners						
Organization or Type of Organization	Taxonomic Group(s)					
	All Taxonomic Groups	Invertebrates	Fish and Mollusks	Reptiles and Amphibians	Birds	Mammals
Federal Agencies						
USDA Forest Service	X					
Bureau of Land Management	X					
U.S. Fish and Wildlife Service	X					
National Park Service	X					
U.S. Geological Survey	X					
Natural Resources Conservation Service / Farm Service Agency	X					
Bureau of Indian Affairs	X					
Bureau of Reclamation	X					
U.S. Corps of Engineers	X					
Federal Emergency Management Agency	X					
Tribes	X					
State Agencies						
Colorado Division of Wildlife	X					

Potential Partners						
Organization or Type of Organization	Taxonomic Group(s)					
	All Taxonomic Groups	Invertebrates	Fish and Mollusks	Reptiles and Amphibians	Birds	Mammals
State Forest Service	X					
State Universities	X					
Department of Natural Resources	X					
Department of Agriculture	X					
Department of Transportation	X					
Department of Health and Environment	X					
Water Quality Control Commission	X					
Colorado Natural Heritage Program	X					
Colorado State University Extension Offices	X					
Division of Parks and Outdoor Recreation	X					
Division of Water Resources	X					
Oil and Gas Commission	X					
Division of Minerals and Geology	X					
Water Conservation Board	X					
Great Outdoors Colorado	X					
Local government						
Cities	X					
Counties	X					
Water Conservancy districts	X					
State agriculture and ranching associations (e.g., Colorado Cattlemen's Association, Farm Bureau, Colorado Wool Grower's Association)	X					
Non-governmental Organizations						
Rocky Mountain Bird Observatory					X	
Audubon (e.g., important bird area programs)					X	
The Nature Conservancy	X					
Colorado Natural Heritage Program	X					
Local land trusts	X					
Ducks Unlimited; Quail Unlimited; Pheasants Forever; Trout Unlimited; sport groups, etc.			X		X	X
Joint Ventures (e.g., Playa Lakes)					X	
Bird Conservation Initiative					X	
Partners in Amphibian and Reptile Conservation				X		
Colorado Weed Management Association	X					
Colorado Association of Conservation Districts	X					
Environmental Defense	X					

Potential Partners						
Organization or Type of Organization	Taxonomic Group(s)					
	All Taxonomic Groups	Invertebrates	Fish and Mollusks	Reptiles and Amphibians	Birds	Mammals
Southern Rockies Ecosystem Project	X					
Museums	X					
Zoos	X					
Biological professional societies (e.g., Colorado Herpetological Society, American Fisheries Society, The Wildlife Society)	X					
Private Sector (e.g., land owners, pet shops, nurseries)	X					

First Round of Stakeholder Meetings – Purpose: Scoping

During the week of November 15, 2004, public and staff meetings were held in each of the four CDOW regions of the state. In these meetings participants were given a short presentation on the intent for Colorado's CWCS and then asked to comment on the issues they thought would fit into a CWCS and the advice (solutions) they thought would help a CWCS address the most pressing issues. In these facilitated meetings the participants defined the content they thought important in a CWCS. Across the state 103 members of the public and 27 staff provided input. Their input was collated into the following unranked summary of the main strategic themes that emerged across the state:

Place and Date of CWCS Meetings

Colorado Springs – November 16
Denver – November 17
Grand Junction – November 18
Durango – November 19

Habitat-related Issues

- Habitat loss and fragmentation associated with urban and industrial development without adequate habitat safeguards
- Water quality and quantity
- Preserving property rights
- Local government land-use planning impacting wildlife
- Working with/on critical habitat types (e.g., sagebrush, shortgrass prairie, riparian, etc.)
- Wildlife corridors and crossings
- Grazing on public lands (may include wild and domestic animals)

Wildlife Population Issues

- Managing individual species that are under stress (e.g., Lynx, prairie dogs, piping plovers, boreal toads, kit foxes, bats)
- Predator management (both for and against)
- Diseases
- Lack of information about important wildlife issues and/or species (e.g., badgers)
- Lack of baseline information
- Invasive, exotic species (terrestrial and aquatic)

Societal issues

- Insufficient agency staffing
- Politicization of wildlife management
- Lack of stable funding for wildlife management activities
- Poor general public understanding of wildlife values and needs

Advice for Achieving an Effective CWCS - Biological

- Use sound science
- Manage for “keystone” species as indicators of larger needs
- Manage beyond individual species to something more comprehensive like ecosystems or watersheds and using or mimicking natural processes (e.g., fire regimes)
- Focus on key, threatened types of habitat (e.g., roadless areas, wetlands)
- Improve science-based management tools (e.g., for habitat assessment, monitoring)
- Keep species from declining to the status where a listing might be considered
- Develop / use a cooperative approach with willing partners
- Manage with clear (and understandable) priorities and objectives (i.e., get the most bang for the buck)

Advice for Achieving an Effective CWCS - Organizational

- Ensure funding is available for a long enough term to fit the scale of projects that are needed (i.e., match fiscal allocations to the needed planning horizons)
- Feature landowner incentives
- Compensate landowners
- Strengthen legal / regulatory tools to protect declining species
- Broaden public involvement in wildlife management
- Explore alternative forms of public participation in selection of Wildlife Commissioners
- Improve inter-agency cooperation across local, state, federal, tribal lines

Unclassified or Operational (non-Strategic) Issues

- Need a better or common definition of what ‘species conservation’ means
- Balance resource allocations between charismatic and other, potentially more needy but less popular, species
- Transparent fiscal management of the CWCS
- Have a simple process for allocating funds
- Make operation and maintenance costs eligible
- Have a healthy information and education component

Second Round of Stakeholder Meetings and Written Input - Purpose: Review Draft CWCS

The Draft CWCS and various input mechanisms were released for public comment and contributions on July 11, 2005, with the comment period extending through August 8, 2005. During the week of July 25, 2005 public and staff meetings were held in each CDOW region of the state, repeating the pattern of the November 2004 scoping meetings. In these meetings participants were asked to provide specific suggestions to improve the draft CWCS which was made available on the CDOW website beginning on July 11

Place and Date of CWCS Meetings

Denver – July 25
Colorado Springs – July 26
Grand Junction – July 27
Durango – July 28

and publicized through the media prior to the meetings. These were facilitated question, answer, and listening sessions to collect comments and suggested deletions, changes, and additions to the draft CWCS. Across the state 74 members of the public and 17 staff provided input and/or attended one of the meetings. Over 200 specific comments were received, and there were over 1,600 visits to the CWCS postings on CDOW's CWCS web site during the comment period. The detailed, point-by-point input was collated and considered in revising the draft CWCS. The following is an unranked summary of the main strategic themes that emerged across the state:

- A number of editorial concerns (e.g., clarifying how our process led to priority, species and habitat assessments; language and style issues),
- Be more explicit about priorities,
- Describe next steps and how the public/partners will be involved,
- Define how the document will be maintained and updated,
- Clarify the state's commitment to the long-term CWCS process,
- Increase the emphasis on invasive, exotic species,
- Increase the emphasis on base-line assessments,
- Increase the emphasis on habitat conservation in wildlife corridors, habitat/population connectivity, and crossings,
- Increase the emphasis on road / transportation management,
- Broaden management attention to heretofore unacknowledged 'wildlife' species (e.g., insects, mollusks, spiders)
- Add additional species to the list of Species of Greatest Conservation Need

Outcome of Stakeholder Meetings

For both rounds of stakeholder input, suggestions that were strategic in nature as well as those regarding presentation/organization of the document (editorial) have usually been addressed in the CWCS. A number of suggestions were operational in nature and thus more appropriate for specific action plans. Many of these are accommodated through the species-specific action plans referenced elsewhere in the CWCS (see Sections I and K).

Coordination with Federal, State, and Local Agencies, and Native American Tribes

Other government managers received informational mailings and invitations to participate in the stakeholder meetings, participate in the Science Forum, and submit comments independently. The two Colorado Native American tribes with management programs received letters inviting comments and participation, invitations to the public meetings and Science Forum, and were contacted by CDOW staff to seek their participation in development of the CWCS. All Native American

tribes on Colorado's Colorado Tribal Contacts List ¹received two mailings about the CWCS and an invitation to participate.

The governmental organizations and government leaders receiving informational letters and invitations to participate in development of the CWCS included a wide range of federal, state, and local governments (see table, above).

1.3 Management and Legal Authorities

A diversity of state, federal, and county regulations offer protection to Colorado's species of greatest conservation need, and there are many management programs that support population and habitat conservation actions. More broadly, there is a diversity of entities that directly or indirectly manage or affect wildlife through their actions. The job of coordinating this diversity of managers is an important institutional determinant of success for Colorado's Comprehensive Wildlife Conservation Strategy. That job falls to the CDOW. The following statutory authorities and policies provide necessary guidance the Division's duties in its role as the state's CWCS coordinator.

The Colorado Division of Wildlife, a branch of the Colorado Department of Natural Resources, has the statutory charge for managing and conserving wildlife resources within state borders, for hunted, fished, and non-game wildlife, including threatened and endangered species².

In addition, the 5-year Strategic Plan for the Division of Wildlife, adopted by the Colorado Wildlife Commission on January 11, 2002, emphasizes the importance of wildlife conservation (Colorado Wildlife Commission. 2002. http://wildlife.state.co.us/about/strategicplan/Final_Adoption.pdf). The plan lists 10 management principles, or 'core beliefs' that guide the agency in fulfilling its mission. These beliefs underscore the importance of wildlife conservation and maintenance of healthy, diverse and abundant wildlife. A specific section of the Colorado Wildlife Commission's Strategic Plan addresses species conservation. The vision statement of this section states: "Recognizing the pitfalls of single species management, the Division of Wildlife will emphasize the development of management approaches encompassing multi-species communities across the landscape. The Division of Wildlife defines species conservation as conserving, protecting, and enhancing

¹ Maintained by the Colorado Commission of Indian Affairs and the Colorado Historical Society at: <http://www.coloradohistory-oahp.org/publications/pubs/1550.pdf>.

² Colorado Revised Statutes, Title 33 Article 1-101 states: "It is the policy of the state of Colorado that the wildlife and their environment are to be protected, preserved, enhanced, and managed for the use, benefit, and enjoyment of the people of this state and its visitors. It is further declared to be the policy of this state that there shall be provided a comprehensive program designed to offer the greatest possible variety of wildlife-related recreational opportunity to the people of this state and its visitors and that, to carry out such program and policy, there shall be a continuous operation of planning, acquisition, and development of wildlife habitats and facilities for wildlife-related opportunities." Title 33 Article 2-102 states, "The general assembly finds and declares that it is the policy of this state to manage all nongame wildlife, recognizing the private property rights of individual property owners, for human enjoyment and welfare, for scientific purposes, and to insure their perpetuation as members of ecosystems; that species or subspecies of wildlife indigenous to this state which may be found to be endangered or threatened within the state should be accorded protection in order to maintain and enhance their numbers to the extent possible; that this state should assist in the protection of species or subspecies of wildlife which are deemed to be endangered or threatened elsewhere; and that adequate funding be made available to the division annually by appropriations from the general fund."

Colorado's native wildlife, by taking the actions necessary to assure the continued existence of each species and thereby precluding or eliminating the need for state and/or federal listing. The Division of Wildlife will form partnerships with landowners, land management agencies, and others to manage, protect, enhance, and restore wildlife and their habitat. The Division of Wildlife will lead efforts to monitor wildlife communities and manage them as needed to prevent their decline. The Division of Wildlife will work aggressively with others to recover threatened and endangered species. The Division of Wildlife encourages partnerships to share in the vision to protect, enhance, and restore wildlife communities that need assistance to survive."

This CWCS is consistent with the Wildlife Commission's Strategic Plan and specifically addresses two of the Desired Achievements outlined in that plan:

S-1.1 The Division will strive to maintain, create, and manage habitat to support the broadest sustainable wildlife populations in Colorado.

S-2.1 The Division will continue its efforts to preserve, protect, and enhance wildlife species that may be at risk of becoming threatened or endangered.

1.4 Overview of Colorado Wildlife Species

Colorado's native species occur across our state's 103,000 square miles, including 480 square miles of waters. There are over 960 native species for which the Division of Wildlife has statutory authority, including mammals, birds, fish, reptiles, amphibians, mollusks, and crustaceans. This strategy also includes insects and arachnids³ that are outside of the Division of Wildlife's authorities.

About 186 species are pursued recreationally (e.g., via hunting, fishing, and falconry) and are classified as game wildlife. Over 740 of the wildlife species (excluding insects and arachnids) are classified as nongame wildlife and recreational take is not permitted. All species are of interest for recreational uses such as bird watching, nature study, and photography.

Most of Colorado's wildlife species or populations appear reasonably stable and numerous enough to satisfy recreational demand while not disrupting economic interests and communities in the state. The quality and quantity of Information about Colorado's wildlife species has increased greatly in recent years but, as noted during the public comment period, is often variable in accessibility and presentation, thus not realizing its full potential and utility (e.g., CDOW's Natural Diversity Information Source (NDIS) <http://ndis.nrel.colostate.edu/>, Colorado Natural Heritage Program and NatureServe <http://www.natureserve.org/>, USDA Natural Resource Conservation Service <http://www.whmi.nrcs.usda.gov/technical/leaflet.htm>); Partners in Flight and Rocky Mountain Bird Observatory <http://www.rmbo.org/pif/downloads/downloads.html>; U.S. Forest Service <http://www.fs.fed.us/r2/projects/scp/>).

³ The group of animals that include spiders.

Colorado manages wildlife at the species, subspecies, and population level, depending on various factors such as legal requirements, interagency coordination needs, stakeholder concerns, funding eligibility, national or international reporting conventions, and/or taxonomic determinations through scientific documentation. Colorado also attempts to manage assemblages of species and the array of habitats important to them (i.e., ecosystem management). There is a broad community of interest concerned with Colorado wildlife with significant contributions coming from the non-governmental sector (e.g., see: Southern Rockies Ecosystem Project, 2004 and Southern Rockies Ecosystem Project, et. al, 2003) and the private sector (e.g., the comments of landowners during the stakeholder meetings about the importance of private property to wildlife).

PART 2 – EXPERT INPUT FROM SCIENCE FORUMS AND STAKEHOLDER MEETINGS

2.1 Species of Greatest Conservation Need

The species of greatest conservation need identified in this CWCS represent the diversity and health of the State's wildlife most in need of attention. The specific criteria used to include or exclude species in the list of species of greatest conservation need are shown in Table 3. In a few cases, additional species were included for other specific reasons, as noted in the document. All species considered as potential species of greatest conservation need, including those that were suggested during the public comment period but which were ultimately excluded from the final list, are listed in Appendix A. Tables 5 – 11 present the final list of 210 Species of Greatest Conservation Need by taxonomic grouping, along with evaluations of each species' population status and trend. Although CDOW's statutory authority does not extend to insects or arachnids, they are included in keeping with the guiding principle that this is a plan for all of Colorado, not simply the Division of Wildlife.

Table 3. Criteria used to develop list of Species of Greatest Conservation Need

Inclusion Criteria	<i>Meeting any of the Following</i>
	Listed as federal candidate, threatened or endangered species under the ESA.
	Classified as state endangered or threatened species, or species of special concern.
	Global ranking scores of G1, G2 or G3 by the Colorado Natural Heritage Program ⁴ .
	Identified as conservation priorities through a range-wide status assessment or assessment of large taxonomic divisions.
	Assigned state ranking scores of S1 or S2 AND a global ranking score of G4 by the Colorado Natural Heritage Program ⁵ .
Exclusion Criteria	<i>Species meeting the inclusion criteria were eliminated from the Species of Greatest Conservation Need listing if they met any of the following:</i>
	Occurs peripherally in Colorado but is common elsewhere AND for which management actions in Colorado are likely to have no population-level effect.
	Very common but were placed on lists due to economic considerations (e.g., Mallard).

Information from numerous sources and the opinions of wildlife experts in the questionnaire and Science Forum were used to derive the status/trend assessments for the Species of Greatest Conservation Need (summarized in Table 4). There are

⁴ G1 is critically imperiled globally because of rarity (5 or fewer occurrences in the world; or very few remaining individuals), or because some factor of its biology makes it especially vulnerable to extinction. G2 is imperiled globally because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range. G3 is vulnerable throughout its range or found locally in a restricted range (21 to 100 occurrences). From: Colorado Natural Heritage Program, <http://www.cnhp.colostate.edu>.

⁵ S1 is critically imperiled in state because of rarity (5 or fewer occurrences in the state; or very few remaining individuals), or because some factor of its biology makes it especially vulnerable to extinction. S2 is imperiled in state because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range. G4 is apparently secure in state, though it might be quite rare in parts of its range, especially at the periphery. From: Colorado Natural Heritage Program, <http://www.cnhp.colostate.edu>.

no data or other bases for science-based opinion about the population status for 33 (16%) species, or the population trend for 81 (39%) of the 210 species. Of the 167 species for which population assessments were made, approximately half were judged by panels to exist at low population levels and half were thought to occur at medium to abundant levels. Readers are cautioned, however, that the utility of these judgments is weakened by the lack of consistent standards for the relative terms of “low,” “medium,” and “high” population levels. Seventeen percent of the species were believed to be exhibiting downward population trends, and slightly over 40% were thought to be stable or increasing.

In Tables 5 – 11, findings that are supported by data are indicated by a “D.” For species where data were not known to exist, status and trend estimates are based on the collective judgment of panels of experts participating in the questionnaire and Science Forum, and are denoted by “X” in the tables. Hence, data/information gaps are highlighted in these tables, implying priority for further inventory and surveys.

At the Science Forum, panels were also charged with identifying those species within each taxonomic grouping they felt had the most pressing needs, indicated by a “+” in the far right column of each table. While “need” is one important component of any prioritization system, it rarely can be the only criteria a management agency or NGO will use in prioritizing their work. Ability to impact, potential funding and partnership opportunities, and responsiveness to “one-time-only” opportunities are among the other factors to be considered in such prioritization.

Table 4. Summary of population status and trends for Species of Greatest Conservation Need in Colorado.

Summary Of Population Status By Major Taxonomic Groups						
Species Group	Total Number of Species of Conservation Concern	Number of Species in Each Category				Not Rated
		Population Status				
		as of March 2005				
		Low	Medium	Abundant	Unknown	
Insects	38	8	7	3	20	
Arachnids ^{1/}	1					1
Mollusks	9	9				
Fish	26	11	13	1	1	
Amphibians	9	3	4		2	
Reptiles	14	6	4		4	
Birds ^{2/}	87	40	39	3	4	1
Mammals ^{2/}	26	9	8		6	3
Total	210	85	75	7	33	5
		Population Trend				Not Assessed
		as of March 2005				
		Declining	Stable	Increasing	Unknown	
Insects		4	14		20	1
Arachnids ^{1/}						
Mollusks		5			4	
Fish		5	9	6	6	
Amphibians		3	4		2	
Reptiles		1	4		9	1
Birds ^{2/}		12	36	5	33	
Mammals ^{2/}		5	5	2	11	
Total		35	71	13	81	5
1/ One species of lampshade spider (<i>Hypochilus bonneti</i>) was identified for listing but a population status determination was not made.						
2/ Whooping crane, bison, gray wolf, and grizzly bear were discussed by the panels at the Science Forum, but since free-ranging populations are not known in Colorado their population status and trends are moot.						

Table 5. Insects - status of species of greatest conservation need. Given the absence of data on insects, the collective judgment of the panel of Science Forum experts is denoted with an "X" (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
Stoneflies (Plecoptera)										
<i>Capnia arapahoe</i> ^{1/}	Arapahoe snowfly				X				X	
<i>Capnia nelsoni</i> ^{1/}	Nelson's snowfly				X				X	
<i>Mesocapnia frisoni</i> ^{1/}	Plains snowfly				X				X	
Mayflies (Ephemeroptera)										
<i>Ametropus albrighti</i> ^{1/}	Mayfly, spp.				X				X	
Dragonflies and Damselflies (Odonata)										
<i>Argia alberta</i>	Paiute dancer				X				X	
<i>Gomphus intricatus</i>	Brimstone clubtail				X				X	
<i>Libellula nodisticta</i>	Hoary skimmer				X				X	
<i>Somatochlora ensigera</i>	Lemon-faced emerald				X				X	
<i>Sympetrum madidum</i>	Red-veined meadowfly				X				X	
<i>Tetragoneuria petechialis</i>	Stripe-winged baskettail				X				X	
Beetles (Coleoptera)										
<i>Amblyderus wernerii</i>	Great Sand Dunes Anthicid beetle				X				X	

Table 5. Insects - status of species of greatest conservation need. Given the absence of data on insects, the collective judgment of the panel of Science Forum experts is denoted with an "X" (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Cicindela theatina</i>	San Luis Dunes tiger beetle				X				X	
Butterflies and Moths (Lepidoptera)										
<i>Atrytone arogos</i>	Arogos skipper		X				X			
<i>Euphyes bimacula</i>	Two-spotted skipper				X	X				
<i>Hesperia leonardus montana</i>	Pawnee montane skipper	X				X				+
<i>Hesperia ottoe</i>	Ottoe skipper		X				X			+
<i>Polites rhesus</i>	Rhesus skipper		X				X			
<i>Pyrgus xanthus</i>	Xanthus skipper		X						X	
<i>Erynnis martialis</i>	Mottled Duskywing			X			X			
Gossamer-winged Butterflies										
<i>Callophrys comstocki</i>	Comstock's hairstreak				X		X			+
<i>Callophrys mcfarlandi</i>	Sandia hairstreak	X					X			
<i>Callophrys mossii schryveri</i>	Moss's elfin		X				X			
<i>Celastrina humulus</i>	Hops feeding azure			X			X			+
<i>Euphilotes rita coloradensis</i>	Colorado blue			X			X			
<i>Euphilotes rita emmeli</i>	Desert buckwheat blue	X					X			

Table 5. Insects - status of species of greatest conservation need. Given the absence of data on insects, the collective judgment of the panel of Science Forum experts is denoted with an "X" (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Euphilotes spaldingi</i>	Spalding's blue		X				X			
<i>Eurystrymon favonius Ontario</i>	Northern hairstreak	X					X			
<i>Incisalia fotis</i>	Early elfin		X				X			
Brush-footed Butterflies										
<i>Boloria improba acrochema</i> ^{2/}	Uncompahgre fritillary	X					X			+
<i>Speyeria idalia</i>	Regal fritillary	X				X				
<i>Speyeria nokomis nokomis</i>	Great Basin silverspot butterfly	X				X				
Satyrids										
<i>Agapema homogena</i>	Rocky Mountain Agapema				X				X	
<i>Anisota oslari</i>	Oslar's oakworm moth				X				X	
<i>Coloradia luski</i>	Lusk's Pinemoth				X				X	
<i>Hemileuca neumoegeni</i>	A Buckmoth				X				X	
Sphinx moths										
<i>Euproserpinus wiesti</i>	Wiest's sphinx moth	X							X	
<i>Proserpinus flavofasciata</i>	Yellow-banded day sphinx				X				X	
<i>Sagenosoma elsa</i>	A sphinx moth				X				X	

Table 5. Insects - status of species of greatest conservation need. Given the absence of data on insects, the collective judgment of the panel of Science Forum experts is denoted with an "X" (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<p>* At the Science Forum, panels were also charged with identifying the species within each taxonomic grouping where they had higher concerns for that species.</p> <p>^{1/} Added at the Science Forum.</p> <p>^{2/} Added after public involvement. The population status and trends taken from: Fish and Wildlife Service. 1994. Uncompahgre fritillary butterfly recovery plan. Denver, CO. 20pp.</p>										

Table 6. Mollusks - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter “D” is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an “X”. In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Acroloxus coloradensis</i>	Rocky Mountain capshell	D							X	+
<i>Anodontoides ferussacianus</i>	Cylindrical papershell	X				X				+
<i>Ferrissia fragilis</i>		X				X				+
<i>Ferrissia walkeri</i>		X				X				+
<i>Physa cupreonitens</i>	Hot Springs Physa	X							X	+
<i>Physa utahensis</i>	Banded Physa	X							X	+
<i>Promenetus exacuus</i>		X				X				+
<i>Promenetus umbilicatellus</i>		X				X				+
<i>Uniomerus tetralasmus</i>	Pondhorn	X							X	+

* At the Science Forum, panels were also charged with identifying the species within each taxonomic grouping where they had higher concerns for that species.

Table 7. Fish - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter “D” is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an “X”. In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
Sunfishes										
<i>Lepomis humilis</i>	Orangespotted sunfish		D			D				
Catfishes										
<i>Noturus flavus</i>	Stonecat	D							X	
Perch										
<i>Etheostoma cragini</i>	Arkansas darter		D				D			
<i>Etheostoma exile</i>	Iowa darter		D				D			
<i>Etheostoma spectabile</i>	Plains orangethroat darter	D				D				+
Suckers										
<i>Catostomus discobolus</i>	Bluehead sucker		D						X	
<i>Catostomus latipinnis</i>	Flannelmouth sucker		D						X	
<i>Catostomus playthrynchus</i>	Mountain sucker				X				X	
<i>Catostomus plebeius</i>	Rio Grande sucker	D						D		
<i>Xyrauchen texanus</i>	Razorback Sucker	D						D		+
Minnows										

Table 7. Fish - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter “D” is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an “X”. In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Gila elegans</i>	Bonytail	D						D		+
<i>Ptychocheilus lucius</i>	Colorado Pikeminnow		D			D				+
<i>Hybognathus hankinsoni</i>	Brassy minnow	D							X	+
<i>Luxilus cornutus</i>	Common shiner		D				D			
<i>Platygobio gracilis</i>	Flathead chub			D			D			
<i>Gila cypha</i>	Humpback chub	D				D				+
<i>Couesius plumbeus</i>	Lake chub		D				D			
<i>Hybognathus placitus</i>	Plains minnow	D							X	+
<i>Phoxinus eos</i>	Northern Redbelly Dace	D					D			
<i>Gila pandora</i>	Rio Grande chub		D				D			
<i>Gila robusta</i>	Roundtail chub		D			D				
<i>Phoxinus erythrogaster</i>	Southern Redbelly Dace	D					D			
<i>Phenacobius mirabilis</i>	Suckermouth minnow	D					D			+
Trout										
<i>Oncorhynchus clarki pleuriticus</i>	Colorado River Cutthroat Trout		D					D		

Table 7. Fish - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter “D” is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an “X”. In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Oncorhynchus clarki stomias</i>	Greenback Cutthroat Trout		D					D		+
<i>Oncorhynchus clarki virginalis</i>	Rio Grande Cutthroat Trout		D					D		

* At the Science Forum, panels were also charged with identifying the species within each taxonomic grouping where they had higher concerns for that species.

Table 8. Amphibians - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter "D" is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an "X". In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
Toads										
<i>Scaphiopus couchii</i>	Couch's spadefoot		X				X			
<i>Bufo boreas boreas</i>	Boreal toad (Southern Rocky Mountain Population)	D					D ¹ / ₂			+
<i>Bufo debilis</i>	Green toad				X				X	
Frogs										
<i>Acris crepitans</i>	Northern cricket frog	D				D				
<i>Hyla arenicolor</i>	Canyon tree frog		X				X			
<i>Gastrophryne olivacea</i>	Great Plains narrowmouth toad				X				X	
<i>Rana blairi</i>	Plains leopard Frog		X			X				+
<i>Rana pipiens</i>	Northern leopard Frog	X				X				+
<i>Rana sylvatica</i>	Wood Frog		D				D			

* At the Science Forum, panels were also charged with identifying the species within each taxonomic grouping where they had higher concerns for that species.

^{1/} Based on number of breeding sites

Table 9. Reptiles - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter “D” is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an “X”. In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
Turtles										
<i>Kinosternon flavescens</i>	Yellow mud turtle	X							X	+
Lizards										
<i>Gambelia wislizenii</i>	Longnose leopard lizard	X					X			
<i>Phrynosoma cornutum</i>	Texas horned lizard		D				X			+
<i>Phrynosoma modestum</i>	Roundtail horned lizard				X				X	
<i>Cnemidophorus neotesselatus</i>	Triploid checkered whiptail		X				X			+
Snakes										
<i>Leptotyphlops dulcis</i>	Texas blind snake				X				X	
<i>Hypsiglena torquata</i>	Night snake	X							X	
<i>Lampropeltis getula</i>	Common kingsnake	X							X	
<i>Rhinocheilus lecontei</i>	Long-nosed snake	X							X	
<i>Tantilla horbartsmlthi</i>	Southwestern black-headed snake				X				X	

Table 9. Reptiles - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter “D” is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an “X”. In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Thamnophis cyrtopsis</i>	Blacknecked garter snake	X							X	
<i>Thamnophis sirtalis</i>	Common garter snake		X			X				+
<i>Crotalus viridis concolor</i>	Midget faded rattlesnake				X				X	
<i>Sistrurus catenatus</i>	Massasauga		D				D			+

* At the Science Forum, panels were also charged with identifying the species within each taxonomic grouping where they had higher concerns for that species.

Table 10. Birds - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter “D” is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an “X”. In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
Grebes										
<i>Podiceps nigricollis</i>	Eared grebe	D							X	
<i>Aechmophorus occidentalis</i>	Western grebe	D					D			
Pelicans										
<i>Pelecanus erythrorhynchos</i>	American white pelican	D					D			
Hérons										
<i>Botaurus lentiginosus</i>	American bittern				X				X	+
<i>Egretta thula</i>	Snowy egret	D					D			
<i>Plegadis chihi</i>	White-faced ibis	D						D		
Swans, Geese, and Ducks										
<i>Anas acuta</i>	Northern pintail	D					D			
<i>Aythya affinis</i>	Lesser scaup		D				D			
<i>Bucephala islandica</i>	Barrow's goldeneye	D					D			
Kites, Eagles, and Hawks										
<i>Pandion haliaetus</i>	Osprey	D						D		
<i>Haliaeetus leucocephalus</i>	Bald eagle	D						D		+
<i>Circus cyaneus</i>	Northern harrier		D				D			
<i>Accipiter gentilis</i>	Northern goshawk				X				X	+

Table 10. Birds - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter "D" is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an "X". In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

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		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Buteo swainsoni</i>	Swainson's hawk		D			D				+
<i>Buteo regalis</i>	Ferruginous hawk	D					D			+
<i>Aquila chrysaetos</i>	Golden eagle		X				D			+
Falcons										
<i>Falco peregrinus anatum</i>	American peregrine falcon		D					D		+
<i>Falco mexicanus</i>	Prairie falcon		D						X	+
Partridges, Grouse, Turkeys, and Quail										
<i>Centrocercus urophasianus</i>	Greater sage-grouse		D				D			+
<i>Centrocercus minimus</i>	Gunnison sage-grouse	D				D				+
<i>Lagopus leucurus</i>	White-tailed ptarmigan		D				D			
<i>Tympanuchus cupido</i>	Greater prairie-chicken		D				D			+
<i>Dendragapus obscurus</i>	Blue grouse		D				D			
<i>Tympanuchus phasianellus columbianus</i>	Columbian sharp-tailed grouse		D				D			
<i>Tympanuchus phasianellus jamesii</i>	Plains sharp-tailed grouse	D							X	+
<i>Tympanuchus pallidicinctus</i>	Lesser prairie-chicken	D						D		+

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		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Callipepla squamata</i>	Scaled quail		D				D			+
Rails, Gallinules, and Coots										
<i>Laterallus jamaicensis</i>	Black rail	D							X	
Cranes										
<i>Grus canadensis tabida</i>	Greater sandhill crane		D				D			
<i>Grus americana</i>	Whooping crane	Not known to have breeding population in Colorado								
Plovers										
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	D							X	
<i>Charadrius melodus</i>	Piping plover	D					D			
<i>Charadrius montanus</i>	Mountain plover	D					D			+
Sandpipers and Phalaropes										
<i>Bartramia longicauda</i>	Upland sandpiper	D							X	+
<i>Numenius americanus</i>	Long-billed curlew	D					D			+
<i>Limosa fedoa</i>	Marbled godwit	D							X	
<i>Phalaropus tricolor</i>	Wilson's phalarope		D						X	
Jaegers, Gulls, and Terns										

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		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Sterna forsteri</i>	Forster's tern	D					D			
<i>Sterna antillarum</i>	Least tern	D					D			
Pigeons and Doves										
<i>Patagioenas fasciata</i>	Band-tailed pigeon	D							X	+
Cuckoos, Roadrunners, and Anis										
<i>Coccyzus americanus</i>	Western yellow-billed cuckoo	D							X	+
Owls										
<i>Athene cunicularia hypugaea</i> ^{1/}	Western burrowing owl		D				D			+
<i>Otus flammeolus</i>	Flammulated owl				X				X	+
<i>Strix occidentalis lucida</i>	Mexican spotted owl	D							X	+
<i>Asio flammeus</i>	Short-eared owl	D				D				+
<i>Aegolius funereus</i> ^{2/}	Boreal owl				X				X	+
Swifts										
<i>Cypseloides niger</i>	Black swift	D					D			
<i>Aeronautes saxatalis</i>	White-throated swift		X				D			
Hummingbirds										
<i>Archilochus alexandri</i>	Black-chinned hummingbird		X						X	
<i>Selasphorus platycercus</i>	Broad-tailed hummingbird			D			D			

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Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Selasphorus rufus</i>	Rufous hummingbird		D						X	
Woodpeckers										
<i>Melanerpes lewis</i>	Lewis's woodpecker		D			X				+
<i>Sphyrapicus thyroideus</i>	Williamson's sapsucker		D				D			+
<i>Sphyrapicus nuchalis</i>	Red-naped sapsucker		D				X			+
<i>Picoides dorsalis</i>	American three-toed woodpecker	D							X	
Flycatchers										
<i>Contopus cooperi</i>	Olive-sided flycatcher		D						X	+
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	D					D			+
<i>Empidonax wrightii</i>	Gray flycatcher		D				X			
<i>Empidonax oberholseri</i>	Dusky flycatcher			D			X			
<i>Empidonax occidentalis</i>	Cordilleran flycatcher		D				X			
Shrikes										
<i>Lanius ludovicianus</i>	Loggerhead shrike		D				D			+
Vireos										
<i>Vireo vicinior</i>	Gray vireo	D							X	+
Jays, Magpies, and Crows										

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Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Gymnorhinus cyanocephalus</i>	Pinyon jay		D			D				+
Swallows										
<i>Progne subis hesperia</i>	Western purple Martin	D							X	+
Chickadees and Titmice										
<i>Baeolophus ridgwayi</i>	Juniper titmouse		D			D				+
Nuthatches										
<i>Sitta pygmaea</i>	Pygmy nuthatch		D				X			
Dippers										
<i>Cinclus mexicanus</i>	American dipper		D						X	
Kinglets, Gnatcatchers, and Thrushes										
<i>Catharus fusceceus</i>	Veery	D							X	
<i>Toxostoma curvirostre</i>	Curve-billed thrasher	D							X	
Wood-Warblers										
<i>Vermivora virginiae</i>	Virginia's warbler		D				D			
<i>Dendroica nigrescens</i>	Black-throated gray warbler		D						X	+
<i>Dendroica graciae</i>	Grace's warbler	D							X	
New World Sparrows										
<i>Aimophila cassinii</i>	Cassin's sparrow		X			X				+

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Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Spizella breweri</i>	Brewer's sparrow			D		D				+
<i>Amphispiza belli</i>	Sage sparrow		X			X				+
<i>Calamospiza melanocorys</i>	Lark bunting	D				D				+
<i>Pooecetes gramineus</i>	Vesper sparrow		D				D			
<i>Zonotrichia querula</i>	Harris' sparrow	D							X	
<i>Calcarius mccownii</i>	McCown's longspur	D							X	+
<i>Calcarius ornatus</i>	Chestnut-collared longspur	D							X	
Grosbeaks and Buntings										
<i>Passerina amoena</i>	Lazuli bunting		D			D				
Blackbirds and Orioles										
<i>Dolichonyx oryzivorus</i>	Bobolink	D					D			+
Finches										
<i>Leucosticte atrata</i>	Black rosy-finch	D							X	
<i>Leucosticte australis</i>	Brown-capped rosy-finch		D						X	+
<i>Coccothraustes vespertinus</i>	Evening grosbeak		D						X	
<i>Carpodacus cassinii</i>	Cassin's finch		D			D				
<i>Loxia curvirostra</i>	Red crossbill		D						X	

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Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<p>* At the Science Forum, panels were also charged with identifying the species within each taxonomic grouping where they had higher concerns for that species.</p> <p>^{1/} Division of Wildlife staff reported at the second round of stakeholder meetings that the USDA Forest Service should have some unpublished information from a nest box program.</p> <p>^{2/} Division of Wildlife staff reported at the second round of stakeholder meetings that there may be a difference between the East side (stable populations) and West side (declining populations) of the state</p>										

Table 11. Mammals - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter "D" is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an "X". In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
Shrews										
<i>Sorex nanus</i>	Dwarf shrew				X				X	+
<i>Sorex preblei</i>	Preble's shrew				X				X	
Bats										
<i>Euderma maculatum</i>	Spotted bat	D					D			+
<i>Idionycteris phyllotis</i>	Allen's big-eared bat				X				X	
<i>Myotis occultus</i>	Arizona myotis				X				X	
<i>Myotis thysanodes</i>	Fringed myotis	D							X	+
<i>Plecotus (Chorynorhinus) townsendii pallescens</i>	Townsend's big-eared bat ssp.	D							X	+
Rabbits and Hares										
<i>Lepus townsendii</i>	White-tailed jackrabbit		X						X	+
Squirrels										
<i>Cynomys gunnisoni</i>	Gunnison's prairie dog		X			X				+
<i>Cynomys leucurus</i>	White-tailed prairie dog		X				X			+

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Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
<i>Cynomys ludovicianus</i>	Black-tailed prairie dog		D				D			+
Pocket Gophers										
<i>Thomomys bottae rubidus</i>	Botta's pocket gopher (rubidus ssp)		X						X	
<i>Thomomys talpoides macrotis</i>	Northern pocket gopher (macrotis ssp)		X			X				
<i>Perognathus fasciatus</i>	Olive-backed pocket mouse	X				X				+
Jumping Mice										
<i>Zapus hudsonius</i>	Meadow jumping mouse (both subspecies)	X				X				+
Dogs and Allies										
<i>Canis lupus</i>	Gray wolf - two subspecies (Northern and Mexican)	Wild populations extirpated. See Gray Wolf Management Plan;: http://wildlife.state.co.us/species_cons/GrayWolf/ .								+
<i>Vulpes macrotis</i>	Kit fox	D				D				+
<i>Vulpes velox</i>	Swift fox		D				D			
Bears										
<i>Ursus arctos</i>	Grizzly bear	Not known in Colorado since 1979								

Table 11. Mammals - status of species of greatest conservation need. When, in the judgment of the Colorado Division of Wildlife scientific staff, data exist that reflects upon the status of a species the letter “D” is used. When data are absent, the collective judgment of the panel of Science Forum experts is denoted with an “X”. In both cases the judgments expressed in this table are those that emerged from the Science Forum (except when noted by footnotes).

Scientific Name	Common Name	Population Status				Population Trend				Science Forum Species of Most Concern*
		as of March 2005				as of March 2005				
		Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown	
Weasels and Allies										
<i>Conepatus leuconotus</i>	Common Hog-nosed skunk				X				X	
<i>Gulo gulo</i>	Wolverine				X				X	
<i>Lontra canadensis</i>	River otter	D						D		
<i>Mustela nigripes</i>	Black-footed ferret	D							X	+
Cattle and Allies										
<i>Bison bison</i>	Bison	Wild populations extirpated. Classified as domestic species by Wildlife Commission Regulation – Ch. 11, Art. II, Sct 1103 A.								
<i>Ovis canadensis</i>	Bighorn sheep		D				D			
Cats										
<i>Lynx canadensis</i>	Lynx	D						D		+
* At the Science Forum, panels were also charged with identifying the species within each taxonomic grouping where they had higher concerns for that species.										

2.2 Key Habitats and Relative Conditions for Species of Greatest Conservation Need

Panels of experts at the Science Forum provided their judgement of species-habitat associations for Species of Greatest Conservation Need. The State of Colorado also has detailed habitat requirement descriptions for many species and has completed considerable work cataloging habitat associations and habitat status assessments for wildlife. These include:

Colorado Gap Analysis (Schrupp, et. al 2000)	585 Species (Modeled Distribution) http://ndis1.nrel.colostate.edu/cogap/
Colorado SW-ReGap	578 Colorado Species (854 species total) (Modeled Distribution) (web site under development, due Oct 1 2005) http://fws-nmcfwru.nmsu.edu/swregap/
CDOW/SAM Mapping	45 Species (Mapped Data –Economic Importance, T&E species) http://ndis.nrel.colostate.edu/ftp/ftp_response.asp
Colorado Vegetation Classification (“Basinwide”)	Habitat Evaluation http://ndis.nrel.colostate.edu/ftp/ftp_response.asp#Veg
Riparian Mapping Project	Habitat Evaluation http://ndis1.nrel.colostate.edu/riparian/riparian.htm
COVERS Ranking Project (Melcher et al. 2001)	630 Species (Status Assessment) (unavailable online)
Additional examples include the Colorado Natural Heritage Program http://www.cnhp.colostate.edu/site_map.html , part of a global network of more than eighty conservation data centers and programs associated with NatureServe.	

The 41 land cover types used for this CWCS are from the Colorado GAP Analysis (Schrupp et al. 2000), with the exception of the “lakes” category which was added at the request of Science Forum participants. Detailed descriptions and mapped distributions of habitats are presented in Appendix B and Figure 2. In the opinion of the experts in the technical questionnaire and Science Forum, the list of land cover types used here was helpful but not universally applicable. For example, for fish the participants at the Science Forum felt a more detailed stratification delineating different kinds of “open water” habitats would be helpful, specifically adding lakes as a land cover type, and there were some verbal expressions of interest in more detailed stratifications of grass lands. Consequently there is a need to maintain flexibility for re-stratifying habitat in the future to meet the unique needs of the species under consideration.

In many cases, few data exist that allow an assessment of these land cover types relative to their ability to support native wildlife (i.e., “condition”). To bridge that gap, the CWCS relied heavily upon the judgment of the panels of scientists to assess those relative habitat conditions (Appendix C, Table 12).

Those panels as well as interested publics encouraged a more integrative, landscape-level view of the 41 types to address their interrelatedness. Following this approach, and pooling across all taxonomic groupings demonstrated that the landscape of eastern Colorado - eastern plains river and stream systems (including riparian), tallgrass and midgrass prairie – was judged as being in the poorest condition to support native species, followed by sagebrush, and pinyon-juniper and ponderosa pine. Other land cover types were considered adequate or good for at least half their associated taxonomic groupings. The greatest proportion of land cover types assessed as “poor”

occurred for birds, with roughly one-quarter of the land cover types receiving that assessment (Appendix C). Perhaps of even greater concern, given the longer-range perspective of the Strategy, was that trends in habitat conditions were judged to be declining in most land cover types across all taxa, with the notable exceptions (“stable”) tending to be in the higher elevation streams and forested lands, and in agricultural croplands (Table 12).

Table 12. Relative condition of key habitats in Colorado as assessed by panels of scientists at the March, 2005, Science Forum

Habitat Category	Land Cover Type	Habitat Condition Status				Habitat Condition Trend			
		Number of Taxonomic Groupings Affected (n _{max} =6)				Number of Taxonomic Groupings Affected (n _{max} =6)			
		Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
Urban and Croplands	Urban	1	1		1			3	
	Dryland Crops		1		2		2		1
	Irrigated Crops		1		2	1	1		1
Riparian / Wetlands	Open Water		6			1	5		
	Shrub-dominated Wetlands		5		1	6			
	Grass/Forb Dominated Wetlands		4		2	6			
	Eastern Plains Rivers	6				6			
	Eastern Plains Streams	5	1			6			
	Transition Streams	2	4			5	1		
	Mountain Streams		6				6		
	West Slope Rivers	1	4		1	5			1
	West Slope Streams	1	4		1	4	1		1
	Playas	1	1		2	3	1		
Grasslands	Tallgrass Prairie	2	1			3			
	Midgrass Prairie	2	1		1	3			1
	Shortgrass Prairie		4			4			
	Foothill / Mountain Grassland		3			3			
	Sand Dune Complex (Grassland)	1	1		1	1			2
Shrublands	Upland Shrub		2		1	2			1
	Deciduous Oak		3			1	2		
	Sagebrush	3	1			3	1		
	Desert Shrub		4			1	1		2
	Saltbrush Fans & Flats		4			1	3		
	Greasewood Fans & Flats	1	2		1	1	2		1
	Sand Dune Complex (Shrubland)		1		2	1			2
Forestlands	Aspen Forest		4			2	1		1

Table 12. Relative condition of key habitats in Colorado as assessed by panels of scientists at the March, 2005, Science Forum

Habitat Category	Land Cover Type	Habitat Condition Status				Habitat Condition Trend			
		Number of Taxonomic Groupings Affected (n _{max} =6)				Number of Taxonomic Groupings Affected (n _{max} =6)			
		Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
	Spruce-Fir		2		2	1	2		1
	Douglas Fir		3			1	2		
	Lodgepole Pine		1	1	2		2		2
	Limber Pine		1	1	1		2		1
	Ponderosa Pine	2	1			2	1		
	White Fir		2		1		1	1	1
	Pinyon-Juniper	2	1			2	1		
	Rocky Mountain Bristlecone Pine		2		1		2		1
	Mixed Conifer		2		2		3		1
	Mixed Forest				3				3
Tundra	Shrub Tundra		2		1		2		1
	Meadow Tundra		2		1		1	1	1
Unvegetated	Sandy Areas		1	1	2		2		2
	Exposed Rock		1	1	1		2		1
Lakes	Added at Science Forum (Fish)		1				1		

Location of Habitats in Colorado

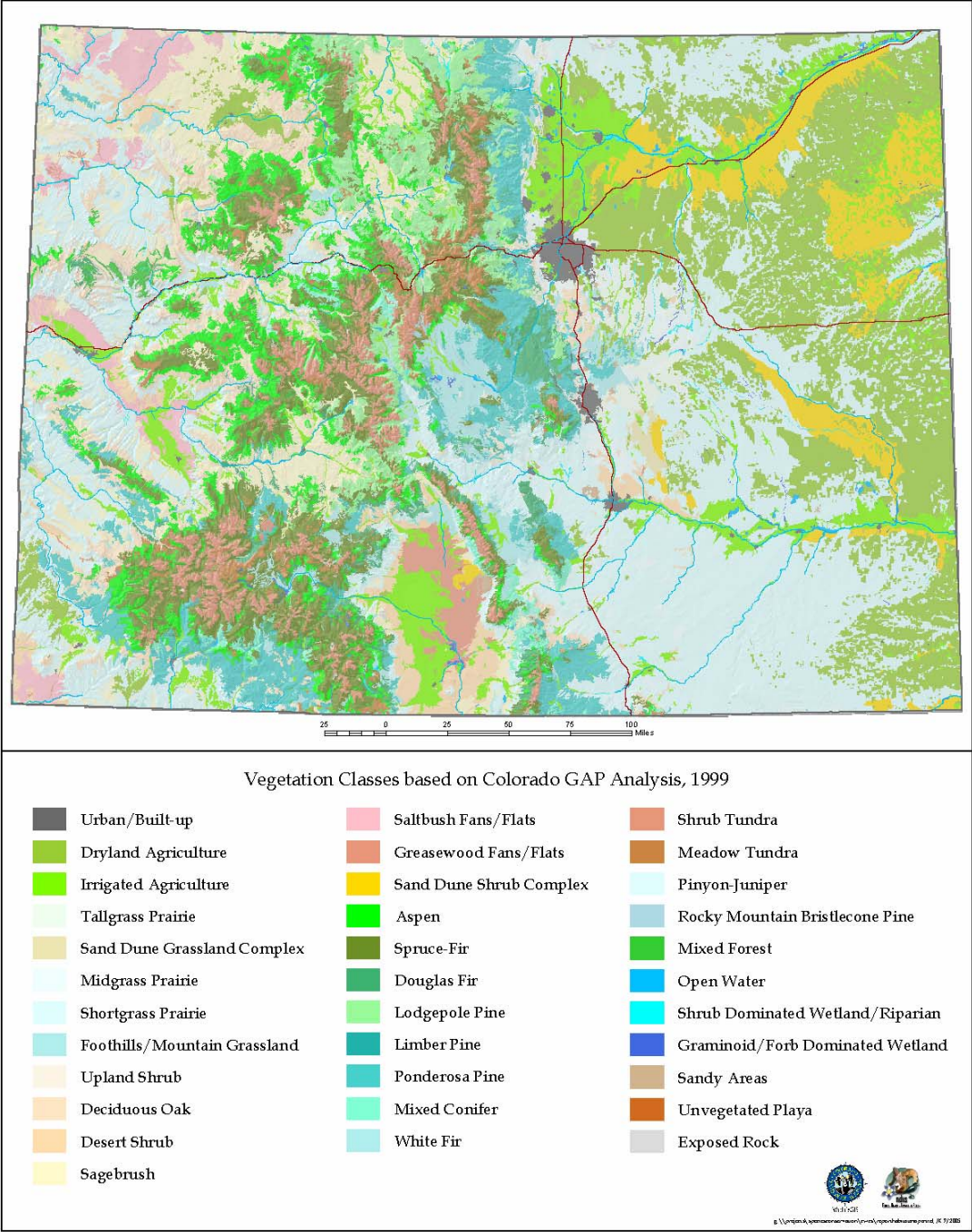


Figure 2. Vegetative communities and habitat types in Colorado’s CWCS (river and stream habitats are not mappable at this scale)

2.3 Problems Affecting Species of Concern and their Habitats

Colorado's geographical latitude and the variations in elevation— from 3,500 feet to over 14,300 feet— provide a wide variety of habitats for wildlife. Across this geography there are a variety of 'life-zones'— the prairies, foothills, montane, subalpine, and alpine— resulting in many land forms and accompanying vegetative environments. Since pre-settlement times, this landscape has changed dramatically from a rapidly increasing human presence. For example, the population of Colorado grew from 1.8 million in 1960 to 4.3 million in 2000⁶, and developed acres nearly doubled between 1970 and 2000 (Colorado Conservation Trust 2005). Modeled projections for future population growth and development indicate >50% population growth, and development of > 1 million more acres in Colorado through the year 2030, (Colorado Conservation Trust 2005).

We asked the experts to look at the landscapes as they exist today, evaluate their condition for key species of greatest conservation need, and suggest problems, issues, and/or threats that if addressed would make meaningful improvements to benefit those particular species. Table 13 summarizes the major themes that emerged from the Technical Questionnaire and Science forum concerning threats to the status and needs of the various species groups in Colorado. Issues specific to taxonomic groups and habitat types are presented below this table.

Table 13. Key Issues Affecting the Future of Wildlife in Colorado for All Taxonomic Groupings.	
Kind of Issue	Kind of Activity Most Frequently Mentioned
Organizational capacity, management, and information gaps – coordination, funding, lack of common goals, confused or gaps in authorities, etc.	Information fragmentation - of population and habitat objectives, data, and effort/accountability among multiple organizations; too-severe constraints on funding, workforce
Habitat Conversion - Intentional conversion of natural habitat usually affecting wildlife by causing displacement and/or loss or degradation of wildlife habitat.	Housing, urban, and "ex-urban" development
	Agricultural operations
	Recreation area developments
	Water storage
Transportation and Infrastructure - Development of corridors/passages for transportation, pipelines, communication structures, etc. usually affecting wildlife by increasing wildlife mortality and fragmentation of wildlife habitat.	Roads
	Railroads
	Overhead utility lines and towers
Resource Extraction – Extraction of rock, minerals, metals, fuels, and water, etc. usually affecting wildlife by displacing species, lowering carrying capacity of the habitat, and contamination issues.	Drilling
	Mining
	Water use, management
Consumptive Use of Biological Resources – Harvest or use of plant and animal populations usually affecting wildlife by direct negative impact, altering wildlife distribution and fitness, or ecosystem processes. (Note: Throughout this document, the terms "grazing" and "grazing	Forest and woodland management
	Grazing

⁶ Source: U.S. Census Bureau, <http://www.census.gov/population/cencounts/co190090.txt> and http://factfinder.census.gov/servlet/QTTable?_bm=n&_lang=en&q_r_name=DEC_2000_SF1_U_DP1&ds_name=DEC_2000_SF1_U&geo_id=04000US08. Accessed June 17, 2005.

Table 13. Key Issues Affecting the Future of Wildlife in Colorado for All Taxonomic Groupings.	
management” may refer to both wild and domestic animals unless specifically noted otherwise.)	
Non-consumptive Resource Use – Wildlife viewing, alternative recreation on the land such as snowmobiling, etc. usually affecting wildlife by displacing wildlife, disturbance to herds and sensitive species, etc.	Motor-powered recreation
	Non-motorized recreation
Pollution - Introduction and spread of unwanted matter and energy into ecosystems from point and non-point sources that usually affects wildlife by causing increased direct mortality of wildlife and degradation of their habitats and available forage.	Chemicals and toxins
	Nutrient loads
	Solid waste
	Waste or residual materials
Invasive, Exotic Species - Introduction and/or spread of unwanted exotic organisms into ecosystems that usually affects wildlife by increasing competition, reducing habitat, or otherwise reducing the welfare of native species.	Invasive plants
	Invasive animals
	Pathogens
	Introduced genetic material
Changes in Ecological Processes - Alteration of ecological processes outside of the natural range of a species ability to adapt usually caused by large-scale habitat modifications such as water table reductions, etc.	Water over-allocation (e.g., de-watering streams)
	Septic system failures
	Riparian area deforestation
<i>Credit – we are grateful to the Arizona Game and Fish Department for providing this format from their CWCS that is parallel to our findings.</i>	

Participants at the Science Forum identified the key habitats for the subset of species in each taxonomic grouping for which they had greatest concerns (see Tables 5 - 11 and Appendix C). They then provided the following evaluations of threats and potential actions to conserve those habitats. Further insight was gained from the stakeholder meetings and these were added using *italic text*.

Mollusks. Assessment of key landcover types (Science Forum Results). Round 2 Stakeholder input in *italics*.

- Grass/Forbs Wetlands
 - Threat: Water quality (e.g., grazing impacts, agricultural chemicals)
 - Potential actions: Identify non-point source pollution and control / isolate impacts. Better monitoring and enforcement of point source pollution. Identify new pollutants and develop proactive standards. Management of grazing; fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
 - Threat: Conversion to agricultural or development
 - Potential actions: Land protection (easements / purchase; fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc) County-level land use management and protection.
 - Threat: Maintaining functionality of hydrology (e.g., deforestation, grazing management)
 - Potential actions: Grazing management. Logging management. Water diversion management.
 - Lakes
 - Threat: Water quality
 - Potential actions: Identify non-point source pollution and control / isolate impacts. Better monitoring and enforcement of point source pollution. Identify new pollutants and develop proactive standards. Management of grazing. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc).
 - Threat: Water level fluctuations
 - Potential actions: Reservoir level management to promote natural flow patterns. Leasing / buying water rights. Increased efficiency of water use.
 - Threat: Land use surrounding lakes
 - Potential actions: Manage recreation use. County-level land use management. Lake-shore buffer zones. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
 - Eastern Plains streams
 - Threat: Water quality
 - Potential actions: Identify non-point source pollution and control / isolate impacts. Better monitoring and enforcement of point source pollution. Identify new pollutants and develop proactive standards. Management of grazing; fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc).
 - Threat: Quantity of water flow (timing)
 - Potential actions: Maintaining natural instream flows. Leasing / buying water rights.
 - Threat: Riparian land use
 - Potential actions: Maintain buffer zones. Grazing management (to maintain water quality). Recreation management (to control sedimentation). Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
 - Threat: Invasive plant species
 - Potential actions: Regulate use of ornamental species. Control invasive exotic species. Restoration of native plant species.
-

Invertebrates (insects and arachnids combined). Assessment of key landcover types (Science Forum Results).

- Eastern Plains streams
 - Transition streams (e.g., Little Thompson)
 - West Slope streams (rivers, canyon streams, not high elevation, e.g., Colorado River) (Yampa and Dolores, not impacted)
 - High Plains steppe lands (Eastern Plains) (all grass types, short-, mid-, and tall grass plains)
 - Greasewood fans and flats
- Threats (combined for the land cover types listed above):
- Threat: Water quality
 - Threat: Water quantity
 - Threat: *Unclear management authority (especially for insects and spiders)*
- Potential actions (combined for the threats listed above)

- Maintain natural hydrological cycles
 - Maintain natural burn cycles
 - Restore grasslands
 - Conservation easements
 - Open space / GOCO / land trusts (acquisitions)
 - Maintain linkages and connectivity
 - Grazing management
 - Prevent fragmentation
 - Control or eliminate invasive plants and insects
-

Reptiles and Amphibians. Assessment of key landcover types (Science Forum Results). Round 2 Stakeholder input in italics.

- Shortgrass prairie
 - Threats: Conversion, fragmentation, invasive exotic species, urbanization, and roadways.
 - Potential actions: Re-vegetation, conservation easements, fee title acquisition, landowner incentives, habitat conservation in wildlife corridors, *crossings*, control or eliminate invasive exotic species, education, mitigation, and burn prescriptions. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
- Open water (especially for Boreal toads and Northern leopard frogs)
 - Threats: Water quality, recreation, invasive exotic species (plants and animals), diversions, over utilization, livestock overuse, drought, and point and non-point source pollution.
 - Potential actions: Conservation easements, land owner incentives, water conservation (voluntary and regulatory), growth management, control or eliminate invasive exotic species, exclosures, education, and mitigation.
- Shrub dominated wetlands
 - Threats: Invasive exotic species (Tamarisk issues), water quality, drainage conversion, drought, fire suppression, livestock overuse, point source and non-point source pollution, fragmentation, and recreation.
 - Potential actions: Re-vegetation, control or eliminate invasive exotic species, conservation easements, land owner incentives, water conservation, growth management, exclosures, education, and mitigation. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
- Grass / forbs dominated wetlands
 - Threats: Invasive exotic species (Tamarisk issues), water quality, drainage conversion, drought, fire suppression, livestock overuse, point source and non-point source pollution, fragmentation, and recreation.
 - Potential actions: Re-vegetation, control or eliminate invasive exotic species, conservation easements, land owner incentives, water conservation, growth management, exclosures, education, and mitigation. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
- Sagebrush (sand sage and big sage land cover types)
 - Threats: Conversion, fragmentation, invasive exotic species, urbanization, roadways, and extraction.
 - Potential actions: Conservation easements, re-vegetation, control or eliminate invasive exotic species, fee title acquisition, landowner incentives, education, *habitat conservation in wildlife corridors*, *wildlife crossings*, and mitigation. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
- Eastern plains rivers
 - Threats: Water quality, recreation, invasive exotic species, diversion, overuse, livestock overuse, drought, point source and non-point source pollution, bank stabilization, channelization, silt load and sedimentation, and flood control.
 - Potential actions: Conservation easements, land owner incentives, water conservation, control or eliminate invasive exotic species, growth management, education, mitigation, exclosures, and minimum flow requirements. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
- Midgrass prairie
 - Threats: Conversion, fragmentation, invasive exotic species, urbanization, and roadways.

- Potential actions: Burn prescriptions, re-vegetation, conservation easements, fee title acquisition, landowner incentives, habitat conservation in wildlife corridors, control or eliminate invasive exotic species, *wildlife crossings*.
-

Fish. Assessment of key landcover types (Science Forum Results). Round 2 Stakeholder input in italics.

This Science Forum group defined riparian habitat types as a better way to focus fish conservation efforts.

- Eastern Plains rivers and streams
 - Threat: Maintaining flows (base flow quantity, ground water depletion)
 - Potential actions: Leasing / buying water rights. Managing reservoir water supplies and releases to promote natural flow patterns (BOR or other operators / owners as target group). Increased efficiency of water use (e.g., reducing loss in canals, check dams). Increased precision of ground water measurement.
 - Threat: Water quality (Platte, Arkansas) (ammonium, nitrogen)
 - Potential actions: Identify non-point source pollution and control / isolate these (both agricultural and urban). Better monitoring and enforcement of point source pollution. Identifying new pollutants and developing protective standards.
 - Threat: Riparian land use (overgrazing in riparian areas [mostly stream-associated habitat], agriculture [riparian flood plains conversion to agriculture])
 - Potential actions: Manage grazing. Incentive programs for maintaining riparian areas. Protective buffers for riparian corridors. Fully use existing federal programs like the Farm Bill-related programs (EQUIP, WRP, CRP, CREP, etc)
 - Threat: Invasive plant species (e.g., Tamarisk, Russian olive)
 - Potential actions: Regulate use of ornamental species. Control of exotic species. Restoration of native plant species.
 - Threat: Invasive exotic species (e.g., mosquito fish, *bullfrogs*, *New Zealand mud snail*)
 - Potential actions: Regulate use and importation of non-native fish. Control of invasive exotic species. Restoration of native species.
 - Threat: Instream barriers
 - Potential actions: Remove or notch aesthetic barriers. Utilize natural stream morphology to replace the function of barriers. Provide fish passages.
 - Threat: Change from agriculture to municipal use (e.g., return flow changes)
 - Potential actions: Monitor impacts to the drainage.
 - Threat: *Loss of genetic connection between populations.*
 - Potential actions: Maintain genetic database information on isolated populations to monitor in-breeding status; restore independent movement around instream barriers; translocate between unavoidably isolated populations; provide secure passage across, over or under roadways acting as barriers.
 - Threat: *Selenium contamination in the Arkansas River.*
 - Potential actions: Identify and isolate selenium input sources within immediate drainage via barriers or redirect runoff away from low-flow stream channels or important standing water habitats; reduce irrigation water inputs into selenium-rich soils resulting in return flow of selenium-laden runoff to stream channels.
- Western rivers
 - Threat: Non-native fish predation and competition
 - Potential actions: Regulate use and importation of non-native fish. Control of invasive exotic species. Restoration of native species.
 - Threat: Altered flow patterns
 - Potential actions: Coordinated reservoir operations. *Increased water efficiency.* Leasing / buying water rights. Managing reservoir water supplies and releases to promote natural flow patterns (BOR or other operators / owners as target group). Increased efficiency of water use (e.g., reducing loss in canals, check dams). Increased precision of ground water measurement.
 - Threat: *Water quality*
 - Potential actions: *Identify non-point source pollution and control / isolate these (both agricultural and urban). Better monitoring and enforcement of point source pollution. Identifying new pollutants and developing protective standards.*
 - Threat: Reduced water quantity
 - Potential actions: Coordinated reservoir operations. Increased water efficiency.
 - Threat: Riparian land use

- Potential actions: Removing / notching dikes to reconnect riparian areas to the river/stream. Leasing / buying riparian areas.
 - Threat: Invasive plant species (e.g., Tamarisk, Russian olive)
 - Potential actions: Regulate use of ornamental species. Control of invasive exotic species. Restoration of native plant species.
 - Threat: Instream barriers
 - Potential actions: Fish passage management. Notching / removing barriers.
 - Threat: Fish loss in irrigation canals
 - Potential actions: Screening irrigation intakes to avoid entrainment.
 - Threat: *Loss of genetic connection between populations.*
 - Potential actions: Maintain genetic database information on isolated populations to monitor in-breeding status; restore independent movement around instream barriers; translocate between unavoidably isolated populations; provide secure passage across, over or under roadways acting as barriers.
-

Birds. Assessment of key landcover types (Science Forum Results). Round 2 Stakeholder input in italics.

- Eastern Plains rivers
 - Threat: Lack of water because of urban growth
 - Potential actions: Adding wildlife management into water control (dam control, water conservation). Return water flows for downstream use (urban return and wetland recharge). Instream flow water rights. Growth management (urban water conservation management).
 - Threat: Decreased understory, too much understory, lack of regeneration in various riparian areas;
 - Potential actions: Grazing management to benefit wildlife (off-river water sources, stream fencing, and rotation of grazing). Landowner outreach (incentive programs, education). Conservation easements to manage grazing.
 - Threat: Water controls, flow regimes, general water management
 - Potential actions: Adding wildlife management into water control (dam control, water conservation). Return water flows for downstream use (urban return and wetland recharge). Establish/acquire instream flow water rights. Growth management (urban water conservation management). Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
 - Threat: Invasive exotic species (e.g., Russian olive, Tamarisk)
 - Potential actions: Active management (cutting, killing, re-planting). Proper land management (e.g., grazing management); control or eliminate invasive exotic species.
 - Threat: Development along floodplains
 - Potential actions: Land acquisition (e.g., easements). Maintaining (e.g., incentives) for healthy land use (e.g., agriculture practices). Growth management / zoning.
 - Threat: Mineral extraction (gravel)
 - Potential actions: Land acquisition / easements. Maintaining healthy land (e.g., reclamation of land).
- Playas
 - Threat: Tilling
 - Potential actions: *Implementation of Farm Bill (CP23A)*. Education. Incentive payments. Playa buffers. Easements.
 - Threat: Pitting (digging holes to drain soil)
 - Potential actions: Hydrologic restoration (e.g., sealing pits). Incentive programs. Education. Easements. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)
 - Threat: How to locate 'real' playas
 - Potential actions: Encourage mapping / ground truthing inventories (e.g., RMBO efforts)
 - Threat: Soil erosion and filling-in of playas due to agriculture practices
 - Potential actions: Determine whether Farm Bill (CP23A) is working / implemented. Education. Incentive payments. Playa buffers. Easements.
 - Threat: *Draining*
- Shortgrass prairie
 - Threat: *Development* (conversion of agriculture lands or pastures, *fragmentation, etc.*)

- Threat: Grazing practices leading to homogenous habitats
- Threat: Fire (lack of)
- Threat: Potential loss of federal programs (e.g., Farm Bill)
- Threat: Loss of native herbivores (e.g., Prairie dogs)
 - Potential actions for all threats: Implementation of the Colorado Division of Wildlife's 2003 Grassland Plan (Colorado Division of Wildlife 2003) (http://wildlife.state.co.us/species_cons/Grasslands/conservationplan.asp#ConservationPlan) expanded to include wind farm development (where research and a policy are needed). *Land protection (easements / purchase. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)*
- Sagebrush
 - Threat: Grazing management (i.e., domestic stock and wildlife) / practices (e.g., chaining)
 - Threat: Invasive exotic species (e.g., cheat grass) and encroachment of pinyon/juniper woodlands
 - Potential actions: Control or eliminate invasive exotic species, implement land-use, forest practices to restore healthy habitat
 - Threat: Fragmentation / loss (energy, housing, infrastructure development without adequate habitat safeguards),
 - *Potential actions: Maintain connectivity and improve linkages between fragments. Reclamation and restoration standards (e.g., development, enforcement, and funding sources for these). Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc)*
 - Threat: Fire regime control
 - Threat: Diseases and insects that are exacerbated by drought
 - Threat: Conversion (e.g., development and agriculture)
 - *Potential actions: Incorporate management strategies outlined in the Gunnison Sage Grouse R.C.P. across all sagebrush habitats.*
 - *Potential action for all threats: Integrate existing plans to benefit all sagebrush obligate species. Incorporate management strategies outlined in the Gunnison Sage Grouse R.C.P. across all sagebrush habitats. Develop best management practices for public and private lands for all sagebrush habitats. Work with counties to implement weed management. Education and outreach. Incentives for weed management (Eastern counties).*
- Pinyon/Juniper
 - Threat: Loss / die off (e.g., leading to even age stands, imbalance of species composition)
 - Potential actions: Increase awareness of management agencies. Implement restoration strategies. Bird population monitoring (potential population declines).
 - Threat: Fragmentation/loss (energy, housing, infrastructure development without adequate habitat safeguards)
 - Potential actions: Land use planning. Easements. Growth management (e.g., zoning at county and local government level).
 - Threat: Conflicting land use and management on both private and public lands.
 - Potential actions: Land use planning. Easements. Growth management (e.g., zoning at county and local government level).
 - Threat: Invasive exotic species
- Grass / forbs dominated wetlands
 - Threat: Change in hydrology (urban demand, groundwater pumping for agricultural use)
 - Potential actions: Improve water management (urban water management). Conservation. Outreach and education.
 - Threat: Conversion of wetlands (conversion and draining)
 - Potential actions: Outreach / incentive programs *for restoration or enhancement* (e.g., state and federal programs such as the Farm Bill). Easement and fee title land acquisition.
 - Threat: Removal / change of 404 Rules (implementation)
 - Potential actions: Legislative / regulatory changes. State assumes responsibilities.
- West Slope rivers
 - Potential action for broad application: Complete the ongoing development of a habitat conservation plan for Southwest Willow Flycatcher in San Luis Valley
 - Threat: Lack of water

- Potential actions: Adding wildlife management into water control (dam control, water conservation). Return water flows for downstream use (urban return and wetland recharge). Instream flow water rights. Growth management (urban water conservation management).
 - Threat: *Water quality*
 - Potential actions: *Identify non-point source pollution and control / isolate these (both agricultural and urban). Better monitoring and enforcement of point source pollution. Identifying new pollutants and developing protective standards.*
 - Threat: Grazing (decreased understory; lack of regeneration)
 - Potential actions: Management change (off-river water sources, stream fencing, and seasonal rotation of stock). Landowner outreach (incentive programs, education). Conservation easements to decrease grazing.
 - Threat: Water controls, flow regimes, general water management
 - Potential actions: Adding wildlife management into water control (dam control, water conservation). Return water flows for downstream use (urban return and wetland recharge). Instream flow water rights. Growth management (urban water conservation management).
 - Threat: Invasive exotic species (e.g., Russian olive, Tamarisk)
 - Potential actions: Active management (cutting, killing, re-planting). Proper land management (e.g., domestic and wildlife grazing management).
 - Threat: Development along floodplains
 - Potential actions: Land acquisition (e.g., easements). Maintaining (e.g., incentives) healthy land use (e.g., agriculture practices). Growth management / zoning.
 - Threat: Mineral extraction (gravel)
 - Potential actions: Land acquisition / easements. Maintaining healthy land (e.g., reclamation of land).
 - Threat: Development of dams and diversions
 - Potential actions: Improve water conservation practices. Adding wildlife management into water control (dam control, water conservation). Return water flows for downstream use (urban return and wetland recharge). Instream flow water rights. Growth management (urban water conservation management).
- Mid-grass Prairie
 - Threat: Urbanization (conversion of agriculture lands or pastures)
 - Threat: Grazing practices (over grazing and under grazing leading to homogenous habitats)
 - Threat: Fire (lack of)
 - Threat: Potential loss of federal programs (e.g., Farm Bill)
 - Threat: Loss of native herbivores (e.g., Prairie dogs)
 - Potential actions for all threats: Implement the Colorado Division of Wildlife's 2003 Grassland Plan expanded to include wind farm development (where research and a policy are needed. Fully use existing federal programs like the Farm Bill-related programs(EQUIP, WRP, CRP, CREP, etc). *Land protection (easements / purchase.*
 - Threat: *Invasive exotic species*
 - Potential actions: Control or eliminate invasive exotic species
- Aspen forest
 - Threat: Grazing by native and domestic animals (e.g., lack of regeneration)
 - Potential actions: Create / implement agency (e.g., USDA Forest Service) management plans. Manage native species (e.g., elk).
 - Threat: Fire regime change from suppression activities (e.g., lack of regeneration)
 - Potential actions: Public land fire management (e.g., mechanical treatment) and restoration. Research (particularly for restoration techniques on bird populations). Education and outreach to private land owners. *Prescribed burning.*
 - Threat: Development (oil and gas, housing, ski resort development without adequate habitat safeguards)
 - Potential actions: Growth management. Education and outreach (e.g., better integration with wildlife needs. Easements.
 - Threat: *Invasive exotic species*
 - Potential actions: Control or eliminate invasive exotic species
- Ponderosa pine
 - Threat: Development (e.g., housing) causing fragmentation
 - Potential actions: Growth management (e.g., working with county governments). Education and outreach (e.g., better integration with State Forest Service, wild-land urban interface fire protection activities). Easements. *Work with land managers on land-use planning.*

- Threat: Fire regime change from suppression activities
 - Potential actions: Public land fire management (e.g., mechanical treatment) and restoration. Research (particularly for restoration techniques on bird populations). Education and outreach to private land owners. *Prescribed burning*.
-

Mammals. Assessment of Key Landcover Types (Science Forum Results)

- Shortgrass prairie
 - Threat: Habitat loss (development and agriculture conversion)
 - Potential actions: Design conservation programs (set goals, focus on important conservation areas, etc.). Conserve areas (through purchase, incentive programs, easements, conservation agreements, best management practices, etc.). Work with counties already involved in land-use planning. Encourage counties not already doing land-use planning to do so. Fully use existing federal programs like the Farm Bill-related programs (EQUIP, WRP, CRP, CREP, etc)
 - Threat: Fragmentation (roads, urbanization, declining patch size, etc.)
 - Potential actions: Identify and manage large blocks of habitat. Facilitate connectivity. Work with transportation departments to minimize damage from road development, e.g., habitat conservation in wildlife corridors, wildlife crossings. Influence zoning and development policy to protect habitat. Education and outreach.
 - Threat: Degradation (homogenization through grazing patterns, noxious weeds, etc.)
 - Potential actions: Involve all counties in weed management programs. Implement rotational grazing for heterogeneity of pasture habitat. Grass banking. *U.S. Department of Agriculture Grassland Reserve Program*.
- Pinyon / Juniper
 - Threat: Most threats to this habitat are considered local in extent. For example, on the East Slope residential development is causing significant habitat loss.
 - Potential actions: Design conservation programs (set goals, focus on important conservation areas, etc.). Conserve areas (through purchase, incentive programs, easements, conservation agreements, best management practices, etc.). Work with counties already involved in land-use planning. Encourage counties not already doing land-use planning to do so. Habitat conservation in wildlife corridors, wildlife crossings.
- Foothills / mountain grassland
 - Threat: Development (loss of acreage and fragmentation)
 - Potential actions: Identify and manage large blocks of habitat. Facilitate connectivity. Work with transportation departments to minimize damage from road development. Influence zoning and development policy to protect habitat. Education and outreach. Easements and fee title acquisitions to protect game species (e.g., ungulate winter range) that also provides protection for other species. Transportation planning to reduce fragmentation, e.g., habitat conservation in wildlife corridors, wildlife crossings. *Work with land managers on land-use planning*.
 - Threat: Grazing issues (e.g., elk and livestock)
 - Potential actions: Incorporate best management practices (different approaches for public and private lands). Development of a management strategy to effectively meet population goals for elk. Relocation or corralling facilities to focus on alternative vegetation.
 - Threat: Noxious weeds
 - Potential actions: Implement best management practices (different approaches for public and private lands). Work with counties to implement weed management. Education and outreach. Incentives for weed management (Eastern counties).
- Sagebrush
 - Threat: Degradation (e.g. too much or too little grazing, fire and weeds)
 - Potential actions for grazing: Incorporate best management practices (different approaches for public and private lands). Development of a management strategy to effectively meet population goals for elk. Relocation of corralling facilities to focus on alternative vegetation.
 - Potential actions for weeds: Implement best management practices (different approaches for public and private lands). Work with counties to implement weed management. Education and outreach. Incentives for weed management (Eastern counties).

- Threat: Conversion (e.g., development and agriculture)
 - Potential actions: Incorporate management strategies outlined in the Gunnison Sage Grouse R.C.P. across all sagebrush habitats. *Develop translocation techniques for species where population isolation cannot be avoided naturally.* Fully use existing federal programs like the Farm Bill-related programs (EQUIP, WRP, CRP, CREP, etc)
- Threat: Fragmentation (e.g., energy and utilities infrastructure, *ranchette development* without adequate habitat safeguards)
 - Potential actions: Development best management practices for public and private lands for all sagebrush habitats. Maintain connectivity and improve linkages between fragments. Reclamation and restoration standards (e.g., development, enforcement, and funding sources for these).
- *Threat: Diseases and insects that are exacerbated by drought*
- Exposed rock (cliffs, caves, mines, etc.)
 - Threat: Mine closures
 - Potential actions: Evaluate mines. Use bat-friendly closures. Restrict access. Recruit volunteers to help implement evaluations. Outreach and education.
 - Threat: Recreational use of caves
 - Potential actions: Outreach and education (encouraging ethical use of caves). Seasonal restrictions. Ongoing inventory and evaluation of caves. Explore ways to develop more effective management of the resource (e.g., multi-agency audits of cave use and users).
 - Threat: Reopening old mines
 - Potential actions: Work with developers and agencies for mitigation (recognize high-bat production mines as off-site mitigation opportunities). Education of developers and the public to raise awareness. Advanced notification of mine re-openings to allow consultation for mitigation opportunities.

2.4 Additional Research and Survey Efforts

Research and survey needs were identified throughout the CWCS development process, including the contributions of the panels of scientists as well as contributions from the public and other organizations (Table 14). The many “unknowns” as shown in the reports of Section 2.1 and Appendix C (e.g., 16% of species with unknown status, 39% of species with unknown trends) certainly indicate research and survey needs for the subject species or habitats. A more overarching need, repeatedly stressed during conversations among contributors to the CWCS, is an efficient, streamlined system for rapid data integration and sharing among all entities conducting species and habitat surveys. As demonstrated by the many and varied information sources and web links cited throughout the CWCS, it is difficult to “know what we know and know what we don’t know.”

In addition to addressing the “unknowns” that appear in the tables and reports, the Science Forum participants also identified the following needs for future research and survey. Further insight gained from the stakeholder meetings is added here using *italic* text.

2.5 Potential Conservation Actions for Colorado’s CWCS

The Science Forum participants identified a wide array of potential conservation actions (Section 2.3) in the context of taxonomic groupings and their associated habitats. The tone of the question posed at the Science Forum was to have the experts suggest ways to deal with the issues they thought present the greatest risk to the highest-ranking species and their habitats. Table 15 summarizes the potential conservation actions that emerged as themes broadly applicable to the array of key habitats in Colorado.

Table 14. Research and Survey Emphasis Areas for Colorado's CWCS	
Emphasis Area	Examples of Needs
Improve data, information, and analysis support systems	Comprehensive and consistent wildlife-related data, information, and analysis support systems from diverse sources such as the CDOW, other state agencies, tribes, colleges and universities, NGOs, private sector vendors, etc. along with ensuring effective management and sharing of information.
Determine status, distribution, and species needs	Dealing with basic distribution, population status, habitat requirements of Species of Greatest Conservation Need,
Research species biology	Characteristics that make particular species more invasive, other species, important keystone species or other species more sensitive to stressors such as long-term drought.
Research ecosystem conditions	Projections of future conditions related to land conversion, water usage, species re/introductions, dam removal, road building, invasive exotic species, etc. and how these impact wildlife and wildlife habitat; likely involving adaptive management principles for large-scale biological systems.
Research stressors/threats; especially focusing predictive capacity	Improve ability to predict threats to vulnerable species including such variables as areas of future human disturbance; migration pathway barriers; baseline vegetation changes, etc.
Develop conservation, research, and monitoring tools	<i>Evaluating</i> alternative tools with respect to efficiency and effectiveness for species, suites of species, and/or habitats.
Credit – we are grateful to the Arizona Game and Fish Department for providing this format from their CWCS that is parallel to our findings.	

Table 15. Potential Conservation Actions for Colorado's CWCS identified during the Science Forums. Potential actions specific to species groups and habitat types are presented in Section 2.3. Further insight gained from the stakeholder meetings were added using *italic* text.

Kind of Strategy	Kind of Activity Most Frequently Mentioned
Conserving wildlife habitat	Perform landscape analyses to identify habitats and critical wildlife areas, etc. that would be most efficient and effective at preserving wildlife values
	All entities (state, federal, tribal, local government, private-sector, NGO) should share common benchmark measures of success to better coordinate objectives and efforts, if not directly, then <i>via</i> a comprehensive, consistent information system supported by, and accessible to, all organizations.
	Acquire ecologically important lands, access agreements, conservation easements, and/or water rights.
	Promote the restoration and protection of aquifers, springs, streams, rivers, lakes, and riparian systems. Support regulations ensuring minimum instream flow and water rights for wildlife resources. Address drought issues as they relate to wildlife.
	Instill more proactive use of 'regime management' approaches (e.g., fire management) to maintain desired successional stages for target wildlife species; <i>Control invasive exotic species.</i>
Maintaining and re-establishing habitat and landscape connectivity	Removing or modifying barriers, protecting corridors (<i>and approaches</i>), riparian areas, using wildlife-friendly roadway crossings, <i>improving planning for wildlife needs in transportation projects</i> , etc.
	Promote maintenance and restoration of habitat connectivity by removing unneeded fences and by using wildlife-friendly barriers in future projects.
	Develop standards for new road, utility, power line, <i>and wind farm</i> construction, modification of existing structures and corridors; <i>and recreation management</i> to reduce impacts to wildlife.
	Perform landscape analyses to identify wildlife corridors, and best management practices, etc. that would be most efficient and effective at preserving wildlife values.
Wildlife management	Promote implementation of existing recovery plans, habitat conservation plans, and other cooperative agreements. Develop consistent benchmark measures of success shared by all organizations. Develop plans to conserve priority species that are not sufficiently addressed under existing plans. <i>Examples are the U.S. Fish and Wildlife Service Landowner Incentive Program and Safe Harbor Agreements.</i>
	Manage to sustain or enhance sport fish and native fish populations.
	Develop programs for species that are not yet of high priority concern so they do not become a concern in the future.
	Maintain and construct new wildlife-friendly partnerships with private landowners such as ranchers and farmers.
Public education and law enforcement to benefit wildlife and wildlife	Educate the public about the impacts of activities detrimental to sensitive wildlife species (e.g., release of exotic species, illegal fish stocking, <i>wildlife – vehicle collisions, “rescuing” wildlife “orphans”</i>)

Table 15. Potential Conservation Actions for Colorado's CWCS identified during the Science Forums. Potential actions specific to species groups and habitat types are presented in Section 2.3. Further insight gained from the stakeholder meetings were added using *italic* text.

Kind of Strategy	Kind of Activity Most Frequently Mentioned
habitat	Utilize education and enforcement to promote human behavior that does not encourage wildlife to become a nuisance (for example: feeding wildlife, securing waste containers, and storage of food). Increase awareness of effects of feeding and litter on wildlife.
	Increase public awareness of how water conservation and ensuring instream flow can benefit wildlife.
	Encourage the use of native plants and other low water-use plants in landscaping.
	Educate the public regarding identification of contaminants, release prevention, and impacts to wildlife and habitats. Promote alternatives that reduce release of contaminants.
	Increase public awareness of the potential effects of various types of recreation on wildlife resources. Encourage responsible outdoor recreation through education (for example "Be Bear Aware," "Stop Aquatic Hitchhikers", enforce existing laws, and encourage development of new legislation.
	Educate development industries (e.g., housing, mineral extraction, communication, power generation) about avoiding and/or mitigating wildlife impacts.
	Educate the public on the importance of community focal species (including predators, prey, wide-ranging species, keystone species, etc.) for ecosystem health.
Representing wildlife values in multiple-use planning and representing wildlife values in other processes	Provide recommendations to <i>and coordinate with</i> state, federal, and local government agencies that are creating new or revising land management plans.
	Promote adoption of sustainability standards or best management practices for forage management for livestock and wildlife.
	Promote conservation of sensitive areas and habitats for wildlife.
	Encourage development and implementation of standards and guidelines for commercial activities that convert important wildlife landscapes to alternative uses (e.g., mining, landfill operations).
	Encourage land management agencies to manage road and trail networks to ensure sustainable wildlife resources in balance with recreational opportunities, economic pursuits, and rural development.
	Encourage transportation and other infrastructure development organizations to ensure sustainable wildlife resources are incorporated in their planning and project designs <i>as well as promote the adoption of best management practices.</i>
	Coordinate with land managers, counties, municipalities and private sector partners to promote ecologically sensitive design of recreational facilities such as campgrounds, parks, golf courses, ski resorts, <i>urban and suburban development, etc.</i>
	Encourage the operation of dams, canals, and diversions for improving or maintaining wildlife resources. Promote wildlife values in building new, renovating existing, or removing old water retaining structures.

Table 15. Potential Conservation Actions for Colorado's CWCS identified during the Science Forums. Potential actions specific to species groups and habitat types are presented in Section 2.3. Further insight gained from the stakeholder meetings were added using *italic text*.

Kind of Strategy	Kind of Activity Most Frequently Mentioned
	Promote programs for eliminating or limiting the spread of invasive plants and animals, and the recovery or reintroduction of native populations.
	Limit the spread of invasive exotic plants and promote the restoration of native vegetation in disturbed areas.
	<i>Protect natural wetlands and promote the use of engineered wetlands, discharge basins, and augmented riparian vegetation to pre-treat water prior to release into riparian systems. Promote the use of treated effluent to create wildlife habitat.</i>

2.6 Proposed Monitoring Plans

As a strategic action, monitoring involves more than tracking the status and trends of wildlife populations and their habitats. Utmost in priority to achieving the goals of the CWCS is the ability to monitor progress toward benchmark measures of success and population security thresholds for species, species assemblages, and habitat/land cover types. This allows conservation organizations and others to adaptively manage their activities and make more efficient use of their resources as new information accumulates. Input received from our citizens, as well as advice from conservation organizations and agencies clearly reflects the need for a comprehensive system that allows information from past and future inventories, surveys, research, and management actions to be accumulated from all entities, consolidated at multiple scales, and easily and rapidly distributed and compared to benchmarks (sidebar). Various organizations in Colorado currently have many of the elements needed for such a system, but the unifying platform, whether virtual or traditional, is incomplete.

CDOW and CNHP maintain databases that house biological and location information on wildlife species and habitats in the state. The Colorado Ownership, Management, and Protection project (COMaP) consolidates ownership data on protected lands in the state. The system is designed to acquire and consolidate a comprehensive inventory of protected lands statewide, whether those lands are protected by state or federal agencies, local governments, or private land trusts or conservation organizations (Theobald et al. 2005). These data management tools can be used together to build a comprehensive model for a unified wildlife/protected lands data system.

Key recommendations for CWCS monitoring, adapted from Illahee (2005) and contributions from panels of experts, conservation organizations and members of the public.

The basic elements of a monitoring program include the following:

1. Identify partners, other affected interests, and needed resources
2. Establish common and collective benchmark measures of success and monitoring tools (including predictive models) applicable at multiple scales
3. Identify available information sources and determine whether existing data structures and data capture systems are adequate to allow comprehensive "roll up" of information from multiple entities. If not, design a suitable structure.
4. Allocate responsibilities for system maintenance, monitoring, quality assurance among various partners (may include agencies, ngo's, private citizens or interests)
5. Evaluate the success of conservation actions against benchmarks periodically and make adjustments as necessary within an adaptive management framework.
6. Develop an efficient and effective communication system for reporting and disseminating information to decision-makers and other stakeholders, including the public.

At the level of species and habitat monitoring, and in keeping with the concepts behind the design of Comprehensive Wildlife Conservation Strategies, advice from the United States Fish and Wildlife Service, and the International Association of Fish and Wildlife Agencies, Colorado's monitoring will first employ existing surveys and inventories, including monitoring being done by conservation partners. Monitoring will also be used to determine when conservation actions have adequately solved conservation issues and when conservation success is not achieved leading to new plan actions. In a number of cases monitoring or research will need to be the first step when existing conditions are unknown (Tables 5 – 11).

Science Forum participants as well as contributors during the public comment period recommended that the following monitoring issues and approaches be considered for each taxonomic group.

Amphibians and Reptiles Monitoring Concerns

- Surveys
- Remote sensing
- Satellite imagery
- Disease monitoring
- Movement monitoring
- Breeding sites (survey sampling)
- DNA sampling
- Net sampling
- Herpetological web site (Citizen Survey)
- Predictive modeling
- Ground truthing
- Taxonomic affinities / reclassification

Birds Monitoring Concerns

- Population monitoring
 - Identify species to act as indicator species for specific habitat of interest (e.g., index of healthy habitat). These target species could be species of conservation concern, umbrella species, specialist species, etc.
 - Identify the question(s) that monitoring could answer.
 - Reference North American Bird Conservation Initiative
 - Integration of existing programs
 - Multi-agency / organization planning and coordination (long-term funding) – link to “Identify the question(s),” above
 - Identify population trends of the species of greatest conservation need by group (develop appropriate species monitoring techniques; develop of sampling / trend monitoring techniques)
- Habitat monitoring
 - Adequate delineation of existing habitats (i.e., baselines)
 - Project tracking (within and among projects; individual and multi-project tracking)
 - Identify priority areas (where and how much) for projects and targets
 - Monitor habitat loss and cause of loss (habitat degradation)
 - Include quantity and quality (class and condition); recognizing that “quality” depends on species of interest
- Project-level monitoring
 - Evaluate habitat quality for specific species
 - Basic research into habitat relationships
 - Evaluate effects of specific projects on bird populations
 - Adaptive management practice

Fish and Mollusks Monitoring Concerns

- Presence / absence (distribution) information. Use repeatable methods. Define / identify occupied habitat. Define / identify available habitat. Identify the number of populations.

- Population estimates for large-bodied species including trend and recruitment information.
- Length frequency distributions (i.e., develop demographic indices).
- Community-level monitoring (e.g., IBI).
- For small-bodied species presence / absence; relative abundance, and evidence of successful reproduction information.
- Randomize appropriately (e.g., stratify and represent by randomizing the range of habitat).
- Replication.
- Adequate frequency of monitoring.
- Provide measures of reliability.
- Estimate the habitat / population link.
- Monitor implementation of conservation actions.

Invertebrates Monitoring Concerns

None listed at Science Forum

- *Lack of clear management authority. (public comment).*

Mammals Monitoring Concerns

- Baseline information on biological status / population health on species and habitats.
- Use current land cover base to design systematic sampling to assess and rank conditions of habitat (e.g., a multi-agency effort).
- Conduct threats assessment (historical, current, and trend predictions).
- Create progress measurements for goal attainment (e.g., measurable components, policy, and feasibility).
- Set specific objectives, monitoring standards, coordination requirements, and consistency between agencies. Application methods and standards may vary by type of land ownership.
- Set up effectiveness monitoring.
- Identify and/or develop best monitoring methodologies for targeted mammals (e.g., documentation of standards, training).
- For fragmentation issues measurements of patch size, frequency, distribution, and context (i.e., what is around the patches).
- Increase presence / absence surveys to monitor changes over time that are simple, easy to implement, and reflects community sampling.
- Increased coordination in acquisition and application of data to maximize effectiveness and efficiency of resources.
- Coordination and standards between states (i.e., create the ability to roll-up information in the future).

PART 3 – PRIORITIES FOR SPECIES OF GREATEST CONSERVATION NEED AND KEY HABITATS, THREATS, AND CONSERVATION ACTIONS

This CWCS is based on extensive expert input on wildlife species and their habitats, as described in Part 2 of this document. In order to synthesize all this input into a clear and concise strategy, CDOW biologists integrated the information gathered through the science forums and stakeholder meetings with other existing information (e.g., management and recovery plans, staff experience and expertise) to identify the State's highest priorities for Species of Greatest Conservation Need and key habitats, as well as actions necessary to conserve those species and habitats. Final results – key threats and prioritized conservation actions – are presented in Table 16 (Species of Greatest Conservation Need) and Table 17 (Key Habitats). By referring to these tables, partners and stakeholders interested in participating in wildlife conservation in Colorado will be able to easily identify needs and priorities, whether their work is species- or habitat-based.

3.1 Priorities for Species of Greatest Conservation Need

The CWCS planning process resulted in a list of 210 Species of Greatest Conservation Need for Colorado. In order to help direct the future conservation efforts of CDOW and its partners, this list has been prioritized using a two-tier system. Eight criteria were used to draft the initial list of Tier 1 species:

1. Knowledge of management techniques needed for recovery
2. Impact on federal recovery
3. Cost of recovery or management action implementation
4. Direct cost of recovery action to others
5. Public appeal or interest in the species
6. Economic impacts of listing (cost incurred by listing)
7. Importance to state biological diversity
8. Multiple species benefits from management of target species.

Fifty-two Species of Greatest Conservation Need were identified as Tier 1 species using these criteria. In addition, all federally listed species and species identified by experts during the science forums as “of most concern” (Tables 5 – 11) were added to the Tier 1 list, for a total of 107 Tier 1 species. The remaining 103 Species of Greatest Conservation Need were placed in Tier 2 (Appendix E). What separates Tier 1 from Tier 2 species primarily is the species' status in a declining trend as designated by federal or state listing designation, our perceived ability to effectively implement conservation/recovery actions on the ground, and our ability to contribute to a meaningful change in federal status through actions in Colorado. Tier 2 species remain important in light of forestalling population trends or habitat conditions that may lead to a threatened or endangered listing status, but the urgency of such action in the face of limited personnel and funding has been judged to be less. When planning future conservation work, these tier rankings should be considered along with other important factors, including ability to impact, potential funding and partnership opportunities, and responsiveness to “one-time-only” opportunities. Specific actions for many species have already been identified in associated recovery or conservation plans (see Part 4, Table 18).

3.2 Priorities for Key Habitats Across Taxonomic Groups

Results from the Science Forums and stakeholder meetings highlighted key habitats for species of most concern in each taxonomic group. Using this information, combined with staff experience and expertise, CDOW biologists prioritized habitat types across all taxonomic groups using qualitative ranks of High, Medium, and Low. These ranks are based on CDOW's best professional judgement of current condition, relative amount of habitat in protected status, and level of threat for each habitat type across the state (Appendix F). For this iteration of the CWCS, specific threats and prioritized conservation actions have been identified for high priority habitats only. The same process will be used to determine priorities for medium and low priority habitats (see also Section 3.3 and 3.4).

3.3 Threats

Information on problems which may adversely affect species or their habitats (i.e., "threats") was compiled from a number of different sources, including expert input via the Science Forums, and a variety of existing plans and conservation assessments. Many of these sources used subtly different language to describe essentially the same problems. In order to maintain consistency of threats descriptions across species and habitats, a "taxonomy of threats" was created for species and for habitats that summarizes all available information in a standard format (Appendix G). The threats taxonomies were adapted from the Central Shortgrass Prairie Ecoregional Assessment and Partnership Initiative (Neely et al. 2006), and modified to encompass input gathered during this CWCS planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS. See Table 16 (Species of Greatest Conservation Need) for threats to species, and Table 17 (Key Habitats) for threats to habitats. The process of identification of threats to many species could well include those occurring within the species' range in habitats outside Colorado or the U.S. We acknowledge the possible significance of these threats and the need to ameliorate them to reverse a declining trend observed in Colorado, but the focus of this action plan is to identify threats that can be addressed within the State with conservation actions that will improve the status and trends of the target species. Colorado will continue to work with partners to develop rangewide conservation strategies and objectives to address this issue.

3.4 Conservation Actions

As in the discussion on threats in Section 3.3 above, a variety of sources provided input on potential conservation actions. A "taxonomy of actions" was developed for species and for habitats to summarize this information in a consistent format (Appendix H). The actions taxonomies were adapted from formats used by The Nature Conservancy and the Arizona Game and Fish Department, and modified to encompass input gathered from experts and stakeholders during this CWCS planning process. CDOW biologists prioritized conservation actions for species and key habitats on a scale of High, Medium, or Low, based on expert input, existing recovery/management plans, and staff experience/expertise. See Table 16 for prioritized conservation actions for species, and Table 17 for prioritized conservation actions for high priority habitats.

Table 16. Species of Greatest Conservation Need – Priorities, Threats, and Conservation Actions
Sorted by priority (Tier 1 and 2), then by Taxonomic Group, then by Common Name.

Key to distribution field is in Appendix D. A complete list of Tier 1 and Tier 2 Species of Greatest Conservation Need is available in Appendix E.

Tier 1 Amphibians

Boreal toad (Southern Rocky Mountain Population) <i>Bufo boreas boreas</i> Tier 1 Amphibians	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Stable	D	Southern Rocky Mountains	P	Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>
							Mountain Streams	<input checked="" type="checkbox"/>
							Open Water	<input checked="" type="checkbox"/>
							Shrub-dominated Wetlands	<input checked="" type="checkbox"/>
							Aspen Forest	<input type="checkbox"/>
							Lodgepole Pine	<input type="checkbox"/>
							Mixed Conifer	<input type="checkbox"/>
							Spruce-Fir	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered animal community (loss of beaver)		Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat		M
Habitat Degradation		Campsite and hiking or OHRV trail development and use		Protected Area Management		Manage public use to be compatible with biodiversity		M
Habitat Degradation		Altered hydrological regime (surface or aquifer)		Research and Monitoring		Monitor population status		M
Invasive or Exotic Species		Pathogen - chytrid fungus		Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		M
Invasive or Exotic Species		Pathogen - chytrid fungus		Invasive Species Control and Prevention		Avoid transfer of chytrid fungus, follow established protocols for species research		H
Northern leopard Frog <i>Rana pipiens</i> Tier 1 Amphibians	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Declining	X	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>
					Colorado Plateau	P	Eastern Plains Streams	<input checked="" type="checkbox"/>
					Front Range	P	Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Mountain Streams	<input checked="" type="checkbox"/>
					Utah High Plateau	P	Open Water	<input checked="" type="checkbox"/>
					Wyoming Basin	P	Shrub-dominated Wetlands	<input checked="" type="checkbox"/>
							Transition Streams	<input checked="" type="checkbox"/>
							West Slope Rivers	<input checked="" type="checkbox"/>
							West Slope Streams	<input checked="" type="checkbox"/>
							Mixed Conifer	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, and ex-urban development		Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		H
Habitat Degradation		Altered hydrological regime (surface or aquifer)		Maintain or Restore Natural Processes		Remove dam, or diversion where applicable		M
Invasive or Exotic Species		Invasive animals		Invasive Species Control and Prevention		Control bullfrogs and other introduced species (including predatory fishes)		H
Pollution		Air and water pollution		Research and Monitoring		Monitor population status (including monitoring water quality, temperature, pH)		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Plains leopard Frog <i>Rana blairi</i> Tier 1 Amphibians		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Medium	X	Declining	X	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>	
								Eastern Plains Streams	<input checked="" type="checkbox"/>	
								Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>	
								Shrub-dominated Wetlands	<input checked="" type="checkbox"/>	
								Open Water	<input type="checkbox"/>	
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority		
Climate		Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)		Research and Monitoring		Monitor population status		L		
Habitat Degradation		Altered animal community (loss of herbivores, predators, pollintors, etc.)		Invasive Species Control and Prevention		Control bullfrogs and other introduced species (including predatory fishes)		H		
Habitat Degradation		Conversion to cropland and/or altered hydrological regime (surface or aquifer)		Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easements and/or water rights		M		
Pollution		Water pollution		Compliance and Enforcement		Enforce 404 wetlands regulations and monitor water quality		H		

Tier 1 Birds

American bittern		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Unknown	X	Unknown	X	Central Shortgrass Prairie	P	Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>	
Botaurus lentiginosus						Southern Rocky Mountains	P	Dryland Crops	<input type="checkbox"/>	
						Colorado Plateau		Irrigated Crops	<input type="checkbox"/>	
						Front Range		Shortgrass Prairie	<input type="checkbox"/>	
						Utah High Plateau				
						Utah-Wyoming Rocky Mountains				
						Wyoming Basin				
Tier 1	Birds									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Education and Communication		Implement public outreach/education program		M
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Habitat Degradation		Natural system modification - wetland filling, eutrophication, siltation				Compliance and Enforcement		Enforce 404 wetlands regulations		M
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		L
Pollution		Herbicide/pesticide spraying or runoff				Compatible Resource Use		Implement compatible agricultural/landscaping practices		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

American peregrine falcon		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Medium	D	Increasing	D				
Tier 1		Birds				Central Shortgrass Prairie	P	Exposed Rock	<input checked="" type="checkbox"/>
						Colorado Plateau	P	Eastern Plains Rivers	<input type="checkbox"/>
						Southern Rocky Mountains	P	Eastern Plains Streams	<input type="checkbox"/>
						Utah High Plateau	P	Grass/Forb Dominated	<input type="checkbox"/>
						Utah-Wyoming Rocky Mountains	P	Wetlands	
						Wyoming Basin	P	Mountain Streams	<input type="checkbox"/>
								Open Water	<input type="checkbox"/>
								Pinyon-Juniper	<input type="checkbox"/>
								Playas	<input type="checkbox"/>
								Ponderosa Pine	<input type="checkbox"/>
								Shrub-dominated Wetlands	<input type="checkbox"/>
								Transition Streams	<input type="checkbox"/>
								Urban	<input type="checkbox"/>
								West Slope Rivers	<input type="checkbox"/>
						West Slope Streams	<input type="checkbox"/>		
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority	
				Species Management		Implement existing management/recovery plan		H	
Disturbance	Non-motorized recreation (rock-climbing etc.)		Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		M		
Disturbance	Scientific research		Research and Monitoring		Follow established protocols for species research		L		

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Bald eagle		Population Status		Population Trend		Distribution	Type	Habitat	Primary					
		Low	D	Increasing	D	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>					
Haliaeetus leucocephalus		Tier 1		Birds		Colorado Plateau	P	Eastern Plains Streams	<input checked="" type="checkbox"/>					
						Front Range	P	Open Water	<input checked="" type="checkbox"/>					
						Southern Rocky Mountains	P	Transition Streams	<input checked="" type="checkbox"/>					
						Utah High Plateau	P	West Slope Rivers	<input checked="" type="checkbox"/>					
						Utah-Wyoming Rocky Mountains	P	West Slope Streams	<input checked="" type="checkbox"/>					
						Wyoming Basin	P	Dryland Crops	<input type="checkbox"/>					
								Foothill/Mountain Grassland	<input type="checkbox"/>					
								Grass/Forb Dominated Wetlands	<input type="checkbox"/>					
								Irrigated Crops	<input type="checkbox"/>					
								Midgrass Prairie	<input type="checkbox"/>					
								Mountain Streams	<input type="checkbox"/>					
								Playas	<input type="checkbox"/>					
								Shortgrass Prairie	<input type="checkbox"/>					
								Shrub-dominated Wetlands	<input type="checkbox"/>					
								Tallgrass Prairie	<input type="checkbox"/>					
						General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Poisoning		Compliance and Enforcement		Enforce hunting, fishing, collecting regulations (e.g. poison bait, lead shot and weights)		M						
Direct Mortality		Collision (e.g., powerilne)		Voluntary Standards		Implement Best Management Practices for energy development		M						
Disturbance		Flight paths, Motorized and non-motorized recreation, proximal non-recreation disturbance		Education and Communication		Implement public and landowner outreach/education program		M						
Habitat Degradation		Altered native vegetation (loss of shoreline nesting,roosting, and perching habitat)		Maintain or Restore Habitat		Plant trees/shrubs, encourage natural regeneration of old growth riparian habitats		L						
Pollution		Herbicide/pesticide spraying or runoff		Compatible Resource Use		Implement compatible agricultural/landscaping practices		L						
Band-tailed pigeon		Population Status		Population Trend		Distribution	Type	Habitat	Primary					
		Low	D	Unknown	X	Front Range	P	Deciduous Oak	<input checked="" type="checkbox"/>					
Patagioenas fasciata		Tier 1		Birds		Southern Rocky Mountains	P	Mixed Conifer	<input checked="" type="checkbox"/>					
						Colorado Plateau		Mixed Forest	<input checked="" type="checkbox"/>					
						Utah High Plateau		Pinyon-Juniper	<input checked="" type="checkbox"/>					
						Utah-Wyoming Rocky Mountains		Ponderosa Pine	<input checked="" type="checkbox"/>					
						Wyoming Basin		Aspen Forest	<input type="checkbox"/>					
								Douglas Fir	<input type="checkbox"/>					
								Irrigated Crops	<input type="checkbox"/>					
								Limber Pine	<input type="checkbox"/>					
								Lodgepole Pine	<input type="checkbox"/>					
								Spruce-Fir	<input type="checkbox"/>					
								Upland Shrub	<input type="checkbox"/>					
								Urban	<input type="checkbox"/>					
								White Fir	<input type="checkbox"/>					
								General Threat		Specific Threat		General Conservation Action		Specific Conservation Action
						Habitat Conversion		Housing, urban, and ex-urban development		Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
						Indirect Mortality		Forest and woodland management		Compatible Resource Use		Implement compatible logging practices		L
Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		L						

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Table 16 - Continued.

Black-throated gray warbler		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Unknown	X	Colorado Plateau	P	Pinyon-Juniper	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P	Deciduous Oak	<input type="checkbox"/>	
						Utah High Plateau	P	Sagebrush	<input type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	P			
Tier 1		Birds				Central Shortgrass Prairie	O			
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		M
Natural Factors		Habitat loss due to insect damage and fire				Maintain or Restore Habitat		Restore native habitat		L

Bobolink		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	D	Stable	D	Central Shortgrass Prairie	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>		
Dolichonyx oryzivorus						Southern Rocky Mountains	P	Irrigated Crops	<input checked="" type="checkbox"/>		
						Utah High Plateau	P	Midgrass Prairie	<input checked="" type="checkbox"/>		
						Wyoming Basin	O	Tallgrass Prairie	<input checked="" type="checkbox"/>		
Tier 1	Birds										
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority
Habitat Degradation		Decrease in hay field area, earlier/more frequent hay-cropping, shift in vegetative structure				Compatible Resource Use		Implement compatible grazing/hay-crop management			M

Boreal owl		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Unknown	X	Unknown	X	Southern Rocky Mountains	P	Lodgepole Pine	<input checked="" type="checkbox"/>	
Aegolius funereus		Tier 1		Birds				Spruce-Fir	<input checked="" type="checkbox"/>	
								Aspen Forest	<input type="checkbox"/>	
								Pinyon-Juniper	<input type="checkbox"/>	
								Ponderosa Pine	<input type="checkbox"/>	
								Rocky Mtn Bristlecone Pine	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered native vegetation				Voluntary Standards		Implement Best Management Practices for forestry		L
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		L

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Table 16 - Continued.

Brewer's sparrow <i>Spizella breweri</i> Tier 1 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Abundant	D	Declining	D	Central Shortgrass Prairie	P	Sagebrush	<input checked="" type="checkbox"/>	
						Colorado Plateau	P	Desert Shrub	<input type="checkbox"/>	
						Front Range	P	Dryland Crops	<input type="checkbox"/>	
						Southern Rocky Mountains	P	Greasewood Fans and Flats	<input type="checkbox"/>	
						Utah High Plateau	P	Irrigated Crops	<input type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	P	Saltbrush Fans and Flats	<input type="checkbox"/>	
						Wyoming Basin	P	Sand Dune Complex (Grassland)	<input type="checkbox"/>	
						General Threat		Specific Threat		General Conservation Action
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance		Compatible Resource Use		Limit disturbance during nest building period		L		
Habitat Conversion		Conversion to cropland		Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M		
Habitat Conversion		Housing, urban, and ex-urban development		Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M		
Habitat Degradation		Range improvement operations		Compatible Resource Use		Implement compatible grazing management		H		
Habitat Degradation		Altered fire regime (from cheatgrass)		Invasive Species Control and Prevention		Implement integrated weed/pest management plan		M		
Habitat Degradation		Fragmentation		Maintain or Restore Habitat		Protect and restore shrub/shrub-steppe habitat, avoid destruction of large tracts of native habitat and large scale insect or weed control		H		
Invasive or Exotic Species		Invasive plants- cheatgrass		Invasive Species Control and Prevention		Implement integrated weed/pest management plan		M		
Brown-capped rosy-finch <i>Leucosticte australis</i> Tier 1 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Unknown	X	Southern Rocky Mountains	P	Exposed Rock	<input checked="" type="checkbox"/>	
								Meadow Tundra	<input checked="" type="checkbox"/>	
								Shrub Tundra	<input checked="" type="checkbox"/>	
								Sagebrush	<input type="checkbox"/>	
								Urban	<input type="checkbox"/>	
		General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
		Climate		Habitat shifting and alteration due to climate change		Maintain or Restore Habitat		Reduce CO2 emissions		M
		Disturbance		Non-motorized recreation (rock-climbing ect.)		Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		L
Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		L		
Pollution		Air pollution (precipitating/concentrating on high elevation snow fields)		Compliance and Enforcement		Enforce state/federal/local pollution standards		M		

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Cassin’s sparrow		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	X	Declining	X	Central Shortgrass Prairie Front Range	P O	Midgrass Prairie Sand Dune Complex (Grassland) Sand Dunes Complex (Shrubland) Shortgrass Prairie Dryland Crops Irrigated Crops Sagebrush Tallgrass Prairie Upland Shrub	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Aimophila cassinii										
Tier 1	Birds									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland				Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		L
Habitat Degradation		Altered vegetation structure (e.g. shrub removal, over grazing)				Compatible Resource Use		Implement compatible grazing management		M
Habitat Degradation		Altered vegetation structure (e.g. shrub removal, over grazing)				Legislation, Policies and Regulations		Encourage use of Farm Bill programs (CRP-re-seed native species)		M
Columbian sharp-tailed grouse		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Southern Rocky Mountains Wyoming Basin	P P	Sagebrush Deciduous Oak Foothill/Mountain Grassland Irrigated Crops Upland Shrub	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Tympanuchus phasianellus columbianus										
Tier 1	Birds									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance on leks				Education and Communication		Implement industry, landowner, and public outreach/education program		M
Habitat Conversion		Housing, urban, and ex-urban development, conversion to cropland				Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easement for habitat protection		M
Habitat Degradation		Altered native vegetation (grazing intensity)				Compatible Resource Use		Implement compatible grazing management		M
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime		M
Resource Extraction		Oil and gas drilling				Voluntary Standards		Implement Best Management Practices for energy development and mining		M

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Table 16 - Continued.

Ferruginous hawk		Population Status		Population Trend		Distribution	Type	Habitat	Primary		
		Low	D	Stable	D	Central Shortgrass Prairie	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>		
Buteo regalis	Tier 1	Birds					Utah-Wyoming Rocky Mountains	P	Midgrass Prairie	<input checked="" type="checkbox"/>	
									Shortgrass Prairie	<input checked="" type="checkbox"/>	
								Wyoming Basin	P	Tallgrass Prairie	<input checked="" type="checkbox"/>
								Colorado Plateau	O	Desert Shrub	<input type="checkbox"/>
								Front Range	O	Dryland Crops	<input type="checkbox"/>
								Southern Rocky Mountains	O	Exposed Rock	<input type="checkbox"/>
								Utah High Plateau	O	Greasewood Fans and Flats	<input type="checkbox"/>
										Irrigated Crops	<input type="checkbox"/>
										Pinyon-Juniper	<input type="checkbox"/>
										Sagebrush	<input type="checkbox"/>
										Saltbrush Fans and Flats	<input type="checkbox"/>
										Sand Dune Complex (Grassland)	<input type="checkbox"/>
										Sand Dunes Complex (Shrubland)	<input type="checkbox"/>
										Upland Shrub	<input type="checkbox"/>
			General Threat		Specific Threat				General Conservation Action		Specific Conservation Action
Direct Mortality		Poisoning (mortality and prey reduction through rodent control)				Education and Communication		Implement landowner outreach/education program		L	
Direct Mortality		Collision (e.g., turbine, powerline)				Voluntary Standards		Implement Best Management Practices for energy development		L	
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance of nest locations				Education and Communication		Implement industry, landowner, and public outreach/education program		L	
Habitat Conversion		Housing, urban, and ex-urban development, conversion to cropland				Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M	
Invasive or Exotic Species		Invasive plants- cheatgrass, Russian thistle				Invasive Species Control and Prevention		Implement integrated weed/pest management plan		L	
Flammulated owl		Population Status		Population Trend		Distribution	Type	Habitat	Primary		
		Unknown	X	Unknown	X	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>		
Otus flammeolus	Tier 1	Birds					Southern Rocky Mountains	P	Ponderosa Pine	<input checked="" type="checkbox"/>	
							Utah High Plateau	P	Douglas Fir	<input type="checkbox"/>	
							Front Range	O	Limber Pine	<input type="checkbox"/>	
							Utah-Wyoming Rocky Mountains	O	Mixed Conifer	<input type="checkbox"/>	
									Mixed Forest	<input type="checkbox"/>	
							Wyoming Basin	O	Spruce-Fir	<input type="checkbox"/>	
									White Fir	<input type="checkbox"/>	
			General Threat		Specific Threat				General Conservation Action		Specific Conservation Action
Habitat Degradation		Altered native vegetation (salvage logging removing cavity trees)				Compatible Resource Use		Implement compatible logging practices (especially for old stands of ponderosa pine)		L	
Invasive or Exotic Species		Invasive animals- European starlings				Maintain or Restore Habitat		Limit effects of European starlings by maintaining natural, unfragmented landscapes with little human disturbance		L	
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		L	
Natural Factors		Low reproductive rate				Research and Monitoring		Monitor population status		L	
Pollution		Pesticide spraying (prey reduction)				Voluntary Standards		Implement Best Management Practices for forestry and forest pesticide use		M	

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Table 16 - Continued.

Golden eagle		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Medium	X	Stable	D					
Aquila chrysaetos	Tier 1	Birds				Central Shortgrass Prairie	P	Dryland Crops	<input checked="" type="checkbox"/>	
						Colorado Plateau	P	Exposed Rock	<input checked="" type="checkbox"/>	
						Front Range	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P	Irrigated Crops	<input checked="" type="checkbox"/>	
						Utah High Plateau	P	Sagebrush	<input checked="" type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	P	Shortgrass Prairie	<input checked="" type="checkbox"/>	
								Tallgrass Prairie	<input checked="" type="checkbox"/>	
						Wyoming Basin	P	Aspen Forest	<input type="checkbox"/>	
								Deciduous Oak	<input type="checkbox"/>	
								Desert Shrub	<input type="checkbox"/>	
								Douglas Fir	<input type="checkbox"/>	
								Eastern Plains Rivers	<input type="checkbox"/>	
								Eastern Plains Streams	<input type="checkbox"/>	
								Grass/Forb Dominated Wetlands	<input type="checkbox"/>	
								Greasewood Fans and Flats	<input type="checkbox"/>	
								Limber Pine	<input type="checkbox"/>	
								Lodgepole Pine	<input type="checkbox"/>	
								Meadow Tundra	<input type="checkbox"/>	
								Midgrass Prairie	<input type="checkbox"/>	
								Mixed Conifer	<input type="checkbox"/>	
								Mixed Forest	<input type="checkbox"/>	
								Mountain Streams	<input type="checkbox"/>	
								Open Water	<input type="checkbox"/>	
								Pinyon-Juniper	<input type="checkbox"/>	
								Playas	<input type="checkbox"/>	
								Ponderosa Pine	<input type="checkbox"/>	
								Rocky Mtn Bristlecone Pine	<input type="checkbox"/>	
								Saltbrush Fans and Flats	<input type="checkbox"/>	
								Sand Dune Complex (Grassland)	<input type="checkbox"/>	
								Sand Dunes Complex (Shrubland)	<input type="checkbox"/>	
								Sandy Areas	<input type="checkbox"/>	
								Shrub Tundra	<input type="checkbox"/>	
								Shrub-dominated Wetlands	<input type="checkbox"/>	
								Spruce-Fir	<input type="checkbox"/>	
								Transition Streams	<input type="checkbox"/>	
								Upland Shrub	<input type="checkbox"/>	
								West Slope Rivers	<input type="checkbox"/>	
								West Slope Streams	<input type="checkbox"/>	
								White Fir	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Poisoning (mortality and prey reduction through rodent control)				Education and Communication		Implement landowner outreach/education program		M
Direct Mortality		Collision (e.g., powerline)				Voluntary Standards		Implement Best Management Practices for energy development		M
Habitat Conversion		Conversion to cropland				Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M

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Table 16 - Continued.

Gray vireo		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Low	D	Unknown	X	Central Shortgrass Prairie	P	Pinyon-Juniper	<input checked="" type="checkbox"/>	
<i>Vireo vicinior</i>						Colorado Plateau	P			
						Utah High Plateau	P			
Tier 1	Birds					Southern Rocky Mountains	O			
						Utah-Wyoming Rocky Mountains	O			
						Wyoming Basin	O			
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered native vegetation (grazing intensity, tree/shrub clearing)				Compatible Resource Use		Implement compatible grazing management		M
Habitat Degradation		Natural system modification - illegal firewood cutting				Compliance and Enforcement		Enforce cutting regulations		L
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		L
Natural Factors		Habitat loss due to insect damage and fire				Maintain or Restore Habitat		Restore native habitat		L
Greater prairie-chicken		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Medium	D	Stable	D	Central Shortgrass Prairie	P	Dryland Crops	<input checked="" type="checkbox"/>	
<i>Tympanuchus cupido</i>								Irrigated Crops	<input checked="" type="checkbox"/>	
								Midgrass Prairie	<input checked="" type="checkbox"/>	
Tier 1	Birds							Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>	
								Shortgrass Prairie	<input checked="" type="checkbox"/>	
								Tallgrass Prairie	<input checked="" type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland				Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M
Habitat Degradation		Fragmentation of native prairie				Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easement for habitat protection		M
Invasive or Exotic Species		Invasive animals- ringnecked pheasant				Invasive Species Control and Prevention		Control pheasant populations		L
Pollution		Pesticide spraying (prey reduction)				Voluntary Standards		Implement Best Management Practices for agricultural production		M

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Table 16 - Continued.

Greater sage-grouse		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Southern Rocky Mountains	P	Sagebrush	<input checked="" type="checkbox"/>	
Tier 1 Birds						Utah High Plateau	P	Dryland Crops	<input type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	P	Grass/Forb Dominated Wetlands	<input type="checkbox"/>	
						Wyoming Basin	P	Irrigated Crops	<input type="checkbox"/>	
						Colorado Plateau	O	Shrub-dominated Wetlands	<input type="checkbox"/>	
								West Slope Streams	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		L
Habitat Conversion		Conversion to cropland				Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime		M
Habitat Degradation		Altered native vegetation (chaining sagebrush)				Voluntary Standards		Implement Best Management Practices for livestock grazing		M
Invasive or Exotic Species		Invasive plants				Invasive Species Control and Prevention		Implement integrated weed/pest management plan		M
Pollution		Pesticide spraying (prey reduction)				Voluntary Standards		Implement Best Management Practices for agricultural production		M
Resource Extraction		Oil and gas drilling				Voluntary Standards		Implement Best Management Practices for energy development and mining		H
Greater sandhill crane		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Southern Rocky Mountains	P	Grass/Forb Dominated	<input checked="" type="checkbox"/>	
Tier 1 Birds						Utah-Wyoming Rocky Mountains	P	Wetlands	<input checked="" type="checkbox"/>	
						Wyoming Basin	P	Irrigated Crops	<input type="checkbox"/>	
						Colorado Plateau	O	Dryland Crops	<input type="checkbox"/>	
								Foothill/Mountain Grassland	<input type="checkbox"/>	
								Mountain Streams	<input type="checkbox"/>	
								Open Water	<input type="checkbox"/>	
								Shrub-dominated Wetlands	<input type="checkbox"/>	
								West Slope Rivers	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Collision (e.g., powerline)				Voluntary Standards		Implement Best Management Practices for energy development and mining		L
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		M
Habitat Degradation		Natural system modification - wetland filling				Compliance and Enforcement		Enforce 404 wetlands regulations		M
Natural Factors		Low annual recruitment				Research and Monitoring		Monitor population status		L

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Table 16 - Continued.

Gunnison sage-grouse		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	D	Declining	D	Colorado Plateau	P	Sagebrush	<input checked="" type="checkbox"/>		
						Southern Rocky Mountains	P	Shrub-dominated Wetlands	<input checked="" type="checkbox"/>		
								West Slope Streams	<input checked="" type="checkbox"/>		
								Grass/Forb Dominated Wetlands	<input type="checkbox"/>		
						Irrigated Crops	<input type="checkbox"/>				
<i>Centrocercus minimus</i>											
Tier 1	Birds										
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority
Habitat Conversion		Conversion to cropland				Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.			H
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.			H
Habitat Degradation		Altered native vegetation (sagebrush removal, overgrazing)				Compatible Resource Use		Implement compatible grazing management			M
Habitat Degradation		Fragmentation (roads, powerlines ect.)				Maintain or Restore Habitat		Restore sagebrush			M
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime			M
Invasive or Exotic Species		Invasive plants- cheatgrass				Invasive Species Control and Prevention		Control cheatgrass			M
Resource Extraction		Oil and gas drilling				Voluntary Standards		Implement Best Management Practices for energy development and mining			H
Juniper titmouse		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Medium	D	Declining	D	Central Shortgrass Prairie	P	Pinyon-Juniper	<input checked="" type="checkbox"/>		
						Colorado Plateau	P				
						Southern Rocky Mountains	P				
						Utah High Plateau	P				
				Utah-Wyoming Rocky Mountains	P						
				Wyoming Basin	P						
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority
Habitat Degradation		Altered native vegetation (grazing intensity, tree/shrub clearing)				Compatible Resource Use		Implement compatible grazing management			M
Habitat Degradation		Natural system modification - illegal firewood cutting, commercial pinon nut collecting				Compliance and Enforcement		Enforce cutting and collecting regulations			L
Natural Factors		Habitat loss due to insect damage and fire				Maintain or Restore Habitat		Restore native habitat			L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Lark bunting <i>Calamospiza melanocorys</i> Tier 1 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Declining	D	Central Shortgrass Prairie	P	Desert Shrub	<input checked="" type="checkbox"/>	
						Front Range	P	Dryland Crops	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P	Irrigated Crops	<input checked="" type="checkbox"/>	
						Utah High Plateau	P	Midgrass Prairie	<input checked="" type="checkbox"/>	
						Wyoming Basin	P	Shortgrass Prairie	<input checked="" type="checkbox"/>	
						Colorado Plateau	O	Tallgrass Prairie	<input checked="" type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	O	Foothill/Mountain Grassland	<input type="checkbox"/>	
								Playas	<input type="checkbox"/>	
				Sagebrush	<input type="checkbox"/>					
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority	
Direct Mortality		Mortality at stock tanks from drowning			Voluntary Standards		Implement Best Management Practices for livestock grazing		L	
Habitat Degradation		Intensive agricultural operations			Voluntary Standards		Implement Best Management Practices for agricultural production		M	
Pollution		Herbicide/pesticide spraying or runoff (grasshopper control)			Voluntary Standards		Implement Best Management Practices for agricultural production		M	
Least tern <i>Sterna antillarum</i> Tier 1 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Stable	D	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>	
								Open Water	<input checked="" type="checkbox"/>	
								Playas	<input checked="" type="checkbox"/>	
								Sandy Areas	<input checked="" type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority	
Disturbance		Scientific research, motorized and non-motorized recreation, proximal non-recreation disturbance			Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		L	
Habitat Degradation		Altered hydrological regime (surface or aquifer)			Land Protection (Public, Private), Easements, and Resource Rights		Acquire water rights		M	
Habitat Degradation		Decreased water quality and/or quantity (water level, desalination projects)			Voluntary Standards		Implement Best Management Practices for reservoir projects		L	
Indirect Mortality		Grazing (egg trampling)			Compatible Resource Use		Implement compatible grazing management		M	
Natural Factors		Predation			Research and Monitoring		Monitor population status, manage predation where deemed appropriate		L	
Pollution		Water pollution			Compliance and Enforcement		Monitor water quality standards		M	

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Lesser prairie-chicken		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Low	D	Increasing	D	Central Shortgrass Prairie	P	Midgrass Prairie	<input checked="" type="checkbox"/>
								Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>
<i>Tympanuchus pallidicinctus</i>								Shortgrass Prairie	<input checked="" type="checkbox"/>
Tier 1 Birds								Tallgrass Prairie	<input checked="" type="checkbox"/>
								Dryland Crops	<input type="checkbox"/>
								Irrigated Crops	<input type="checkbox"/>
General Threat	Specific Threat	General Conservation Action		Specific Conservation Action		Priority			
Disturbance	Motorized and non-motorized recreation, proximal non-recreation disturbance	Education and Communication		Implement landowner and public outreach/education program		L			
Habitat Conversion	Conversion to cropland, overgrazed or improved range	Compatible Resource Use		Implement compatible grazing management		H			
Habitat Degradation	Fragmentation	Maintain or Restore Habitat		Avoid destruction or fragmentation of large tracts of native habitat		H			
Invasive or Exotic Species	Invasive animals- ringnecked pheasant	Invasive Species Control and Prevention		Control pheasant populations		L			
Natural Factors	Predation and parasites	Research and Monitoring		Monitor population status		M			
Lewis's woodpecker		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Medium	D	Declining	X	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>
						Colorado Plateau	P	Eastern Plains Streams	<input checked="" type="checkbox"/>
						Front Range	P	Pinyon-Juniper	<input checked="" type="checkbox"/>
						Southern Rocky Mountains	P	Ponderosa Pine	<input checked="" type="checkbox"/>
						Utah-Wyoming Rocky Mountains	O	Transition Streams	<input checked="" type="checkbox"/>
						Wyoming Basin	O	West Slope Rivers	<input checked="" type="checkbox"/>
								West Slope Streams	<input checked="" type="checkbox"/>
								Irrigated Crops	<input type="checkbox"/>
								Urban	<input type="checkbox"/>
General Threat	Specific Threat	General Conservation Action		Specific Conservation Action		Priority			
Habitat Conversion	Housing, urban, and ex-urban development	Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M			
Habitat Degradation	Altered native vegetation (overgrazing)	Compatible Resource Use		Implement compatible grazing management		M			
Habitat Degradation	Altered native vegetation (removal of snags)	Compatible Resource Use		Implement compatible logging practices		L			
Habitat Degradation	Altered fire regime	Maintain or Restore Natural Processes		Restore natural fire regime		M			
Invasive or Exotic Species	Invasive plants - tamarisk	Invasive Species Control and Prevention		Control tamarisk		L			
Invasive or Exotic Species	Invasive animals- European starlings	Maintain or Restore Habitat		Limit effects of European starlings by maintaining natural, unfragmented landscapes with little human disturbance		L			

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Table 16 - Continued.

Loggerhead shrike		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Medium	D	Stable	D				
Lanius ludovicianus	Tier 1	Birds				Central Shortgrass Prairie	P	Desert Shrub	<input checked="" type="checkbox"/>
						Colorado Plateau	P	Dryland Crops	<input checked="" type="checkbox"/>
						Front Range	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>
						Southern Rocky Mountains	P	Greasewood Fans and Flats	<input checked="" type="checkbox"/>
						Utah High Plateau	P	Irrigated Crops	<input checked="" type="checkbox"/>
						Utah-Wyoming Rocky Mountains	P	Midgrass Prairie	<input checked="" type="checkbox"/>
						Wyoming Basin	P	Sagebrush	<input checked="" type="checkbox"/>
								Saltbrush Fans and Flats	<input checked="" type="checkbox"/>
								Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>
								Shortgrass Prairie	<input checked="" type="checkbox"/>
								Tallgrass Prairie	<input checked="" type="checkbox"/>
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Pollution		Herbicide/pesticide spraying or runoff			Voluntary Standards		Implement Best Management Practices for agricultural production		M

Long-billed curlew		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Low	D	Stable	D	Central Shortgrass Prairie	P	Open Water	<input checked="" type="checkbox"/>	
<i>Numenius americanus</i>						Front Range	O	Playas	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	O	Shortgrass Prairie	<input checked="" type="checkbox"/>	
						Wyoming Basin	O	Dryland Crops	<input type="checkbox"/>	
								Eastern Plains Rivers	<input type="checkbox"/>	
								Eastern Plains Streams	<input type="checkbox"/>	
								Grass/Forb Dominated Wetlands	<input type="checkbox"/>	
								Irrigated Crops	<input type="checkbox"/>	
								Midgrass Prairie	<input type="checkbox"/>	
								Sand Dune Complex (Grassland)	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Education and Communication		Implement public and landowner outreach/education program		L
Habitat Conversion		Conversion to cropland				Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M
Habitat Degradation		Altered native vegetation (degradation of native shortgrass prairie)				Compatible Resource Use		Implement compatible grazing management		M
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		M
Pollution		General water pollution, herbicide/pesticide spraying or runoff				Compliance and Enforcement		Monitor water quality standards		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

McCown's longspur <i>Calcarius mccownii</i> Tier 1 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Unknown	X	Central Shortgrass Prairie	P	Midgrass Prairie	<input checked="" type="checkbox"/>
							Shortgrass Prairie	<input checked="" type="checkbox"/>
							Dryland Crops	<input type="checkbox"/>
							Irrigated Crops	<input type="checkbox"/>
							Playas	<input type="checkbox"/>
							Tallgrass Prairie	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance		Education and Communication		Implement public and landowner outreach/education program		L
Habitat Conversion		Housing, urban, ex-urban development, and conversion to cropland		Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M
Habitat Degradation		Altered native vegetation (degradation of native shortgrass prairie)		Compatible Resource Use		Implement compatible grazing management		M
Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		L
Natural Factors		Nest predation		Compatible Resource Use		Implement compatible grazing management (predation rates higher in heavily grazed pastures)		M
Pollution		Herbicide/pesticide spraying or runoff		Voluntary Standards		Implement Best Management Practices for agricultural production		M
Mexican spotted owl <i>Strix occidentalis lucida</i> Tier 1 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Unknown	X	Colorado Plateau	P	Douglas Fir	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Exposed Rock	<input checked="" type="checkbox"/>
					Central Shortgrass Prairie	O	Mixed Conifer	<input checked="" type="checkbox"/>
					Front Range	O	Mountain Streams	<input checked="" type="checkbox"/>
							Pinyon-Juniper	<input checked="" type="checkbox"/>
							Ponderosa Pine	<input checked="" type="checkbox"/>
							Transition Streams	<input checked="" type="checkbox"/>
	General Threat		Specific Threat		General Conservation Action		Specific Conservation Action	
					Species Management		Implement existing management/recovery plan	
Habitat Degradation		Altered fire regime		Maintain or Restore Natural Processes		Restore natural fire regime		M
Habitat Degradation		Altered native vegetation (even-age timber management)		Voluntary Standards		Implement Best Management Practices for forestry		L
Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Mountain plover <i>Charadrius montanus</i> Tier 1 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Stable	D	Central Shortgrass Prairie	P	Dryland Crops	<input checked="" type="checkbox"/>
					Front Range	P	Irrigated Crops	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Shortgrass Prairie	<input checked="" type="checkbox"/>
							Desert Shrub	<input type="checkbox"/>
							Foothill/Mountain Grassland	<input type="checkbox"/>
							Midgrass Prairie	<input type="checkbox"/>
							Saltbrush Fans and Flats	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, ex-urban development, and conversion to cropland		Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M
Habitat Degradation		Altered native vegetation (degradation of native shortgrass prairie)		Compatible Resource Use		Implement compatible grazing management		M
Habitat Degradation		Altered animal community (loss of prairie dog colonies)		Maintain or Restore Habitat		Maintain prairie dogs		M
Habitat Degradation		Fragmentation		Voluntary Standards		Implement Best Management Practices for transportation projects		L
Indirect Mortality		Farm equipment running on fallow fields late in season (e.g. sunflower and millet fields)		Voluntary Standards		Implement Best Management Practices for agricultural production		M
Resource Extraction		Energy development		Voluntary Standards		Implement Best Management Practices for energy development and mining		L
Northern goshawk <i>Accipiter gentilis</i> Tier 1 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Unknown	X	Unknown	X	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>
					Front Range	P	Douglas Fir	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Lodgepole Pine	<input checked="" type="checkbox"/>
					Utah-Wyoming Rocky Mountains	P	Mixed Conifer	<input checked="" type="checkbox"/>
							Mixed Forest	<input checked="" type="checkbox"/>
					Central Shortgrass Prairie	O	Pinyon-Juniper	<input checked="" type="checkbox"/>
					Utah High Plateau	O	Ponderosa Pine	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered fire regime		Maintain or Restore Natural Processes		Restore natural fire regime		M
Habitat Degradation		Altered native vegetation (timber harvest)		Voluntary Standards		Implement Best Management Practices for forestry		L
Habitat Degradation		Fragmentation		Voluntary Standards		Implement Best Management Practices for transportation projects		M
Indirect Mortality		Forest and woodland management		Compatible Resource Use		Implement compatible logging practices		L
Lack of knowledge		Population status unknown		Research and Monitoring		Monitor population status		L
Natural Factors		Predation (Great Horned Owls)		Research and Monitoring		Monitor population status		L

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Table 16 - Continued.

Olive-sided flycatcher		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Medium	D	Unknown	X	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>		
Contopus cooperi		Tier 1		Birds		Southern Rocky Mountains	P	Douglas Fir	<input checked="" type="checkbox"/>		
						Front Range	O	Limber Pine	<input checked="" type="checkbox"/>		
						Utah High Plateau	O	Lodgepole Pine	<input checked="" type="checkbox"/>		
								Mixed Conifer	<input checked="" type="checkbox"/>		
								Mixed Forest	<input checked="" type="checkbox"/>		
								Pinyon-Juniper	<input checked="" type="checkbox"/>		
								Ponderosa Pine	<input checked="" type="checkbox"/>		
								Rocky Mtn Bristlecone Pine	<input checked="" type="checkbox"/>		
								Spruce-Fir	<input checked="" type="checkbox"/>		
								White Fir	<input checked="" type="checkbox"/>		
						General Threat		Specific Threat			
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M	
Habitat Degradation		Altered native vegetation (removal of snags)				Compatible Resource Use		Implement compatible logging practices		L	
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime		M	
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		L	
Pinyon jay		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Medium	D	Declining	D	Central Shortgrass Prairie	P	Limber Pine	<input checked="" type="checkbox"/>		
Gymnorhinus cyanocephalus		Tier 1		Birds		Colorado Plateau	P	Pinyon-Juniper	<input checked="" type="checkbox"/>		
						Southern Rocky Mountains	P	Ponderosa Pine	<input checked="" type="checkbox"/>		
						Utah High Plateau	P	Urban	<input checked="" type="checkbox"/>		
						Front Range	O				
						Utah-Wyoming Rocky Mountains	O				
						Wyoming Basin	O				
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation		Altered native vegetation (grazing intensity, tree/shrub clearing)				Compatible Resource Use		Implement compatible grazing management		M	
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		M	
Natural Factors		Habitat loss due to insect damage and fire				Maintain or Restore Habitat		Restore native habitat		L	

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Table 16 - Continued.

Piping plover <i>Charadrius melodus</i> Tier 1 Birds		Population Status		Population Trend		Distribution		Type	Habitat		Primary	
		Low	D	Stable	D	Central Shortgrass Prairie		P	Eastern Plains Rivers		<input checked="" type="checkbox"/>	
										Open Water		<input checked="" type="checkbox"/>
										Playas		<input checked="" type="checkbox"/>
										Sandy Areas		<input checked="" type="checkbox"/>
										Grass/Forb Dominated Wetlands		<input type="checkbox"/>
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority	
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Species Management		Implement existing management/recovery plan, implement public and landowner outreach/education program			M	
Habitat Degradation		Altered hydrological regime (surface or aquifer)				Voluntary Standards		Implement Best Management Practices for water resource development			M	
Natural Factors		Predation				Research and Monitoring		Monitor population status			L	
Pollution		General water pollution, herbicide/pesticide spraying or runoff				Compliance and Enforcement		Monitor water quality standards			M	
Plains sharp-tailed grouse <i>Tympanuchus phasianellus jamesii</i> Tier 1 Birds		Population Status		Population Trend		Distribution		Type	Habitat		Primary	
		Low	D	Unknown	X	Front Range		P	Deciduous Oak		<input checked="" type="checkbox"/>	
										Foothill/Mountain Grassland		<input checked="" type="checkbox"/>
										Midgrass Prairie		<input checked="" type="checkbox"/>
										Sand Dune Complex (Grassland)		<input type="checkbox"/>
										Shortgrass Prairie		<input type="checkbox"/>
								Tallgrass Prairie		<input type="checkbox"/>		
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority	
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness			M	
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.			H	
Habitat Degradation		Altered native vegetation (grazing intensity)				Compatible Resource Use		Implement compatible grazing management			M	
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime			M	
Invasive or Exotic Species		Invasive plants				Invasive Species Control and Prevention		Implement integrated weed/pest management plan			M	
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status			L	
Natural Factors		Scarcity (leading to inbreeding depression)				Species Management		Reintroduce extirpated native species			M	

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Table 16 - Continued.

Prairie falcon		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Medium	D	Unknown	X					
Falco mexicanus	Tier 1	Birds					Central Shortgrass Prairie	P	Exposed Rock	<input checked="" type="checkbox"/>
							Colorado Plateau	P	Desert Shrub	<input type="checkbox"/>
							Front Range	P	Dryland Crops	<input type="checkbox"/>
							Southern Rocky Mountains	P	Eastern Plains Rivers	<input type="checkbox"/>
							Utah High Plateau	P	Eastern Plains Streams	<input type="checkbox"/>
							Utah-Wyoming Rocky Mountains	P	Foothill/Mountain Grassland	<input type="checkbox"/>
							Wyoming Basin	O	Grass/Forb Dominated	<input type="checkbox"/>
									Wetlands	<input type="checkbox"/>
									Greasewood Fans and Flats	<input type="checkbox"/>
									Irrigated Crops	<input type="checkbox"/>
									Meadow Tundra	<input type="checkbox"/>
									Midgrass Prairie	<input type="checkbox"/>
									Mountain Streams	<input type="checkbox"/>
									Open Water	<input type="checkbox"/>
									Pinyon-Juniper	<input type="checkbox"/>
									Playas	<input type="checkbox"/>
									Sagebrush	<input type="checkbox"/>
									Saltbrush Fans and Flats	<input type="checkbox"/>
									Sand Dune Complex (Grassland)	<input type="checkbox"/>
									Sand Dunes Complex (Shrubland)	<input type="checkbox"/>
									Sandy Areas	<input type="checkbox"/>
									Shortgrass Prairie	<input type="checkbox"/>
									Shrub Tundra	<input type="checkbox"/>
									Shrub-dominated Wetlands	<input type="checkbox"/>
									Tallgrass Prairie	<input type="checkbox"/>
									Transition Streams	<input type="checkbox"/>
									West Slope Rivers	<input type="checkbox"/>
									West Slope Streams	<input type="checkbox"/>
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		M
Habitat Degradation		Altered native vegetation (grazing intensity)				Compatible Resource Use		Implement compatible grazing management		M
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime		L
Invasive or Exotic Species		Invasive plants- cheatgrass				Invasive Species Control and Prevention		Implement integrated weed/pest management plan		M
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		L

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Table 16 - Continued.

Red-naped sapsucker		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Medium	D	Stable	X	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>		
<i>Sphyrapicus nuchalis</i> Tier 1 Birds						Front Range	P	Shrub-dominated Wetlands	<input checked="" type="checkbox"/>		
						Southern Rocky Mountains	P	Douglas Fir	<input type="checkbox"/>		
						Utah High Plateau	P	Limber Pine	<input type="checkbox"/>		
						Utah-Wyoming Rocky Mountains	P	Lodgepole Pine	<input type="checkbox"/>		
								Mixed Conifer	<input type="checkbox"/>		
						Central Shortgrass Prairie	O	Mixed Forest	<input type="checkbox"/>		
						Wyoming Basin	O	Mountain Streams	<input type="checkbox"/>		
								Ponderosa Pine	<input type="checkbox"/>		
								Rocky Mtn Bristlecone Pine	<input type="checkbox"/>		
								Spruce-Fir	<input type="checkbox"/>		
								Transition Streams	<input type="checkbox"/>		
								West Slope Streams	<input type="checkbox"/>		
								White Fir	<input type="checkbox"/>		
		General Threat		Specific Threat				General Conservation Action		Specific Conservation Action	
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M	
Habitat Degradation		Altered native vegetation (decline of aspen regeneration/loss of aspen stands, loss or decline of willow carr and cottonwood)				Compatible Resource Use		Implement compatible logging or grazing practices and and/or stream hydrology		L	
Habitat Degradation		Altered native vegetation (decline of aspen regeneration/loss of aspen stands, loss or decline of willow carr and cottonwood)				Maintain or Restore Natural Processes		Restore natural fire regime and/or beaver and elk populations		M	
Sage sparrow		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Medium	X	Declining	X	Colorado Plateau	P	Greasewood Fans and Flats	<input checked="" type="checkbox"/>		
<i>Amphispiza belli</i> Tier 1 Birds						Southern Rocky Mountains	P	Sagebrush	<input checked="" type="checkbox"/>		
						Utah High Plateau	P				
						Utah-Wyoming Rocky Mountains	P				
						Wyoming Basin	P				
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority	
Habitat Conversion		Housing, urban, ex-urban development, road or power right of way, and conversion to agriculture				Planning and Zoning		Promote consideration of biodiversity issues in transportation and land use planning processes		H	
Habitat Degradation		Altered native vegetation (burning, herbicide, or mechanical sagebrush removal)				Compatible Resource Use		Implement compatible grazing management		H	
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime		M	
Invasive or Exotic Species		Invasive plants- cheatgrass				Invasive Species Control and Prevention		Implement integrated weed/pest management plan		M	

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Table 16 - Continued.

Scaled quail		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Medium	D	Stable	D	Central Shortgrass Prairie	P	Desert Shrub	<input checked="" type="checkbox"/>		
Callipepla squamata						Colorado Plateau	P	Pinyon-Juniper	<input checked="" type="checkbox"/>		
						Front Range	O	Sagebrush	<input checked="" type="checkbox"/>		
Tier 1	Birds							Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>		
								Sand Dunes Complex (Shrubland)	<input checked="" type="checkbox"/>		
								Shortgrass Prairie	<input checked="" type="checkbox"/>		
								Dryland Crops	<input type="checkbox"/>		
								Greasewood Fans and Flats	<input type="checkbox"/>		
								Irrigated Crops	<input type="checkbox"/>		
								Midgrass Prairie	<input type="checkbox"/>		
								Playas	<input type="checkbox"/>		
								Urban	<input type="checkbox"/>		
								General Threat		Specific Threat	
Direct Mortality		Poisoning (pesticides)				Voluntary Standards		Implement Best Management Practices for agricultural production		M	
Habitat Degradation		Altered native vegetation				Compatible Resource Use		Implement compatible grazing management		M	
Short-eared owl		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	D	Declining	D	Central Shortgrass Prairie	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>		
Asio flammeus						Southern Rocky Mountains	P	Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>		
						Colorado Plateau	O	Midgrass Prairie	<input checked="" type="checkbox"/>		
Tier 1	Birds					Front Range	O	Sagebrush	<input checked="" type="checkbox"/>		
								Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>		
								Shortgrass Prairie	<input checked="" type="checkbox"/>		
								Upland Shrub	<input checked="" type="checkbox"/>		
								Dryland Crops	<input type="checkbox"/>		
								Irrigated Crops	<input type="checkbox"/>		
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority	
Habitat Conversion		Housing, urban, ex-urban development, and conversion to cropland				Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easement for habitat protection		M	
Habitat Degradation		Altered native vegetation (wetland loss)				Compliance and Enforcement		Enforce 404 wetlands regulations		M	
Habitat Degradation		Altered native vegetation				Voluntary Standards		Implement Best Management Practices for forestry		L	
Natural Factors		Predation and competition (Barn owls)				Research and Monitoring		Monitor population status		M	

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Southwestern willow flycatcher <i>Empidonax traillii extimus</i> Tier 1 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Stable	D	Southern Rocky Mountains	P	Shrub-dominated Wetlands	<input checked="" type="checkbox"/>
							West Slope Rivers	<input checked="" type="checkbox"/>
							West Slope Streams	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
				Species Management		Implement existing management/recovery plan		H
Habitat Degradation		Altered native vegetation (cottonwood/willow degradation)		Maintain or Restore Habitat		Restore riparian vegetation		M
Lack of knowledge		Complete distribution in Colorado unknown		Research and Monitoring		Conduct field inventory to refine known distribution		H
Swainson's hawk <i>Buteo swainsoni</i> Tier 1 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	D	Declining	D	Central Shortgrass Prairie	P	Deciduous Oak	<input checked="" type="checkbox"/>
					Colorado Plateau	P	Desert Shrub	<input checked="" type="checkbox"/>
					Front Range	P	Dryland Crops	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>
					Wyoming Basin	P	Eastern Plains Streams	<input checked="" type="checkbox"/>
					Utah High Plateau	O	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>
							Irrigated Crops	<input checked="" type="checkbox"/>
							Midgrass Prairie	<input checked="" type="checkbox"/>
							Playas	<input checked="" type="checkbox"/>
							Sagebrush	<input checked="" type="checkbox"/>
							Saltbrush Fans and Flats	<input checked="" type="checkbox"/>
							Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>
							Sand Dunes Complex (Shrubland)	<input checked="" type="checkbox"/>
							Shortgrass Prairie	<input checked="" type="checkbox"/>
							Tallgrass Prairie	<input checked="" type="checkbox"/>
							Upland Shrub	<input checked="" type="checkbox"/>
							West Slope Rivers	<input checked="" type="checkbox"/>
							West Slope Streams	<input checked="" type="checkbox"/>
							Urban	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Poisoning (mortality and prey reduction through rodent control)		Education and Communication		Implement landowner outreach/education program		L
Direct Mortality		Collision (e.g., turbine)		Voluntary Standards		Implement Best Management Practices for energy development		L
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance		Education and Communication		Implement public and landowner outreach/education program		M
Habitat Conversion		Housing, urban, and ex-urban development		Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Upland sandpiper <i>Bartramia longicauda</i> Tier 1 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Unknown	X	Central Shortgrass Prairie	P	Midgrass Prairie	<input checked="" type="checkbox"/>	
								Tallgrass Prairie	<input checked="" type="checkbox"/>	
								Dryland Crops	<input type="checkbox"/>	
								Irrigated Crops	<input type="checkbox"/>	
								Sand Dune Complex (Grassland)	<input type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority	
Habitat Conversion		Conversion to cropland			Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M	
Habitat Degradation		Early/often pasture and hayfield cutting (nest destruction)			Voluntary Standards		Implement Best Management Practices for agricultural production		M	
Lack of knowledge		Population trend unknown			Research and Monitoring		Monitor population status		L	
Pollution		Herbicide/pesticide spraying or runoff			Voluntary Standards		Implement Best Management Practices for agricultural production		M	
Western burrowing owl <i>Athene cunicularia hypugaea</i> Tier 1 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Central Shortgrass Prairie	P	Desert Shrub	<input checked="" type="checkbox"/>	
								Colorado Plateau	<input checked="" type="checkbox"/>	
								Front Range	<input checked="" type="checkbox"/>	
								Southern Rocky Mountains	<input type="checkbox"/>	
								Utah High Plateau	<input type="checkbox"/>	
									<input type="checkbox"/>	
									<input type="checkbox"/>	
									<input type="checkbox"/>	
									<input type="checkbox"/>	
									<input type="checkbox"/>	
		General Threat		Specific Threat			General Conservation Action		Specific Conservation Action	
Direct Mortality		Poisoning			Education and Communication		Implement landowner outreach/education program		L	
Habitat Conversion		Housing, urban, ex-urban development, and conversion to cropland			Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easement for habitat protection		M	
Habitat Degradation		Altered animal community (loss/control of burrowing rodents)			Species Management		Implement existing management/recovery plan		M	
Natural Factors		Predation			Invasive Species Control and Prevention		Manage feral cats and dogs		L	
Western purple Martin <i>Progne subis hesperia</i> Tier 1 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Unknown	X	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>	
								Southern Rocky Mountains	<input type="checkbox"/>	
								Utah High Plateau	<input type="checkbox"/>	
								Wyoming Basin	<input type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation		Altered native vegetation (loss of older aspen stands from logging and gas development)			Voluntary Standards		Implement Best Management Practices for forestry and energy development		L	
Lack of knowledge		Population trend unknown			Research and Monitoring		Monitor population status		L	

Table 16 - Continued.

Western snowy plover	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	D	Unknown	X	Central Shortgrass Prairie	P	Playas	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains	P	Sandy Areas	<input checked="" type="checkbox"/>	
Charadrius alexandrinus nivosus									
Tier 1	Birds								
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance			Education and Communication		Implement public and landowner outreach/education program		M
Habitat Degradation		Altered hydrological regime (surface or aquifer)			Voluntary Standards		Implement Best Management Practices for water resource development		M
Lack of knowledge		Population trend unknown			Research and Monitoring		Monitor population status		L
Western yellow-billed cuckoo	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	D	Unknown	X	Colorado Plateau	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>	
							Eastern Plains Streams	<input checked="" type="checkbox"/>	
Coccyzus americanus							West Slope Rivers	<input checked="" type="checkbox"/>	
Tier 1	Birds							West Slope Streams	<input checked="" type="checkbox"/>
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, ex-urban development, and conversion to cropland or grazing			Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easement for habitat protection		M
Habitat Degradation		Altered native vegetation (cottonwood/willow degradation)			Maintain or Restore Habitat		Restore riparian vegetation		M
Habitat Degradation		Fragmentation			Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat		L
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals			Maintain or Restore Natural Processes		Restore natural hydrological regime		M
Invasive or Exotic Species		Invasive plants - tamarisk			Invasive Species Control and Prevention		Implement integrated weed/pest management plan		M
Lack of knowledge		Population trend unknown			Research and Monitoring		Monitor population status		L
Pollution		Herbicide/pesticide spraying or runoff			Voluntary Standards		Implement Best Management Practices for agricultural production		M
Whooping crane	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
					Central Shortgrass Prairie	O	Dryland Crops	<input checked="" type="checkbox"/>	
							Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>	
Grus americana							Irrigated Crops	<input checked="" type="checkbox"/>	
Tier 1	Birds								
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Collision (e.g., powerline)			Voluntary Standards		Implement Best Management Practices for energy development		L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Williamson's sapsucker		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>	
<i>Sphyrapicus thyroideus</i> Tier 1 Birds						Front Range	P	Douglas Fir	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P	Limber Pine	<input checked="" type="checkbox"/>	
						Utah High Plateau	P	Lodgepole Pine	<input checked="" type="checkbox"/>	
								Mixed Conifer	<input checked="" type="checkbox"/>	
								Mixed Forest	<input checked="" type="checkbox"/>	
								Ponderosa Pine	<input checked="" type="checkbox"/>	
								Spruce-Fir	<input checked="" type="checkbox"/>	
								White Fir	<input checked="" type="checkbox"/>	
						General Threat		Specific Threat		
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Habitat Degradation		Altered native vegetation (decline of aspen regeneration/loss of aspen stands, loss or decline of willow carr and cottonwood)				Compatible Resource Use		Implement compatible logging or grazing practices and and/or stream hydrology		L
Habitat Degradation		Altered native vegetation (decline of aspen regeneration/loss of aspen stands, loss or decline of willow carr and cottonwood)				Maintain or Restore Natural Processes		Restore natural fire regime and/or beaver and elk populations		M

Tier 1 Fish

Arkansas darter		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
						Front Range	O	Eastern Plains Rivers	<input type="checkbox"/>	
								Open Water	<input type="checkbox"/>	
Tier 1 Fish							Transition Streams	<input type="checkbox"/>		
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
						Species Management		Implement existing management/recovery plan (2001)		H
Habitat Degradation		Altered hydrological regime (surface or aquifer) - stream dewatering				Maintain or Restore Habitat		Maintain hydrological regime (sufficient flow and maintenance of refuge pools)		H
Habitat Degradation		Altered native vegetation (streambank cover reduction) primarily from livestock grazing				Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements		M
Habitat Degradation		Altered hydrological regime (surface or aquifer)				Maintain or Restore Natural Processes		Maintain adequate flow levels by limiting stream dewatering.		H
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control non-native fish - especially northern pike		M
Resource Extraction		Water use, management				Maintain or Restore Habitat		Maintain hydrological regime		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Bonytail chub <i>Gila elegans</i> Tier 1 Fish		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Increasing	D	Colorado Plateau	P	West Slope Rivers	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P			
						Utah High Plateau	O			
						Utah-Wyoming Rocky Mountains	O			
						Wyoming Basin	O			
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
						Species Management		Implement existing management/recovery plan (2001)		H
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate diversion/impoundment management.		H
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control non-native fish		H
Brassy minnow <i>Hybognathus hankinsoni</i> Tier 1 Fish		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Unknown	X	Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
						Front Range	O	Eastern Plains Rivers	<input type="checkbox"/>	
								Open Water	<input type="checkbox"/>	
								Transition Streams	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered hydrological regime (surface or aquifer) - stream dewatering				Maintain or Restore Habitat		Maintain hydrological regime (sufficient flow and maintenance of refuge pools)		H
Habitat Degradation		Natural system modification (hydrological)				Maintain or Restore Habitat		Maintain processes that create deep summer refuge pools		H
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control non-native fish		M
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		M
Colorado Pikeminnow <i>Ptychocheilus lucius</i> Tier 1 Fish		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Declining	D	Colorado Plateau	P	West Slope Rivers	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P	Open Water	<input type="checkbox"/>	
						Utah High Plateau	O			
						Utah-Wyoming Rocky Mountains	O			
						Wyoming Basin	O			
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
						Species Management		Implement existing management/recovery plan (2001)		H
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate dam management.		H
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control non-native fish		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Colorado River Cutthroat Trout <i>Oncorhynchus clarki pleuriticus</i> Tier 1 Fish	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	D	Increasing	D	Southern Rocky Mountains	P	Lakes	<input checked="" type="checkbox"/>	
							Mountain Streams	<input checked="" type="checkbox"/>	
							West Slope Streams	<input type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
					Species Management		Implement existing conservation agreement and strategy (CRCT Task Force 2006)		H
Direct Mortality		Hunting, trapping, fishing			Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		M
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals			Maintain or Restore Habitat		Maintain linkages and connectivity (e.g., minimize diversions that fragment streams)		M
Habitat Degradation		Fragmentation			Species Management		Maintain genetic connection/integrity within and between populations		M
Invasive or Exotic Species		Invasive animals			Invasive Species Control and Prevention		Control non-native fish		M
Common shiner <i>Luxilus cornutus</i> Tier 1 Fish	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	D	Stable	D	Front Range	P	Transition Streams	<input checked="" type="checkbox"/>	
					Central Shortgrass Prairie	O	Open Water	<input type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered hydrological regime (surface or aquifer) - siltation and sedimentation			Maintain or Restore Natural Processes		Improve erosion and excess sedimentation conditions		H
Lack of knowledge		Complete distribution in Colorado unknown			Research and Monitoring		Conduct field inventory to refine known distribution		M
Greenback Cutthroat Trout <i>Oncorhynchus clarki stomias</i> Tier 1 Fish	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	D	Increasing	D	Southern Rocky Mountains	P	Mountain Streams	<input checked="" type="checkbox"/>	
					Front Range	O	Lakes	<input type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
					Species Management		Implement existing management/recovery plan (USFWS 1998)		H
Direct Mortality		Hunting, trapping, fishing			Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		M
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals			Maintain or Restore Habitat		Maintain linkages and connectivity (e.g., minimize diversions that fragment streams)		M
Habitat Degradation		Fragmentation			Species Management		Maintain genetic connection/integrity within and between populations		M
Invasive or Exotic Species		Invasive animals			Invasive Species Control and Prevention		Control non-native fish		M

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Table 16 - Continued.

Humpback chub		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Declining	D	Utah High Plateau	P	West Slope Rivers	<input checked="" type="checkbox"/>	
						Wyoming Basin	P	Open Water	<input type="checkbox"/>	
Gila cypha						Utah-Wyoming Rocky Mountains	O			
Tier 1	Fish									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
						Species Management		Implement existing management/recovery plan		H
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate dam management.		M
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control Asian tapeworm		M
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control non-native fish		H
Lake chub		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Front Range	P	Lakes	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P			
Couesius plumbeus										
Tier 1	Fish									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Gathering for bait or aquarium trade				Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Habitat Degradation		Altered hydrological regime (surface or aquifer) - stream dewatering				Maintain or Restore Habitat		Maintain hydrological regime		H
Habitat Degradation		Altered hydrological regime (surface or aquifer)				Maintain or Restore Natural Processes		Improve erosion and excess sedimentation conditions		H
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control non-native fish		M
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		M
Pollution		Herbicide/pesticide spraying or runoff and nonpoint source pollution				Compliance and Enforcement		Identify and control point-source and non-point source pollution		M
Northern Redbelly Dace		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Stable	D	Front Range	P	Transition Streams	<input checked="" type="checkbox"/>	
								Lakes	<input type="checkbox"/>	
Phoxinus eos										
Tier 1	Fish									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, and ex-urban development				Maintain or Restore Habitat		Maintain hydrological regime (sufficient discharge)		H
Habitat Degradation		Decreased water quality				Compliance and Enforcement		Monitor water quality standards		M
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Manage for/reduce stream channelization		H
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		M

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Table 16 - Continued.

Plains minnow		Population Status	Population Trend	Distribution	Type	Habitat	Primary
		Low	D Unknown	X Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>
						Eastern Plains Streams	<input type="checkbox"/>
						Open Water	<input type="checkbox"/>
<i>Hybognathus placitus</i>							
Tier 1 Fish							
General Threat	Specific Threat	General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation	Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals	Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate dam management.		M	
Habitat Degradation	Altered hydrological regime (surface or aquifer). Altered flow and fluctuating water temperatures	Maintain or Restore Natural Processes		Maintain adequate flow levels by limiting stream dewatering.		H	
Pollution	Herbicide/pesticide spraying or runoff and nonpoint source pollution	Compliance and Enforcement		Identify and control point-source and non-point source pollution		M	
Plains orangethroat darter		Population Status	Population Trend	Distribution	Type	Habitat	Primary
		Low	D Declining	D Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>
						Eastern Plains Rivers	<input type="checkbox"/>
						Open Water	<input type="checkbox"/>
						Transition Streams	<input type="checkbox"/>
<i>Etheostoma spectabile</i>							
Tier 1 Fish							
General Threat	Specific Threat	General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation	Altered hydrological regime (surface or aquifer)	Maintain or Restore Natural Processes		Maintain adequate flow levels by limiting stream dewatering.		H	
Invasive or Exotic Species	Invasive animals	Invasive Species Control and Prevention		Control non-native fish		M	
Resource Extraction	Water use, management	Maintain or Restore Habitat		Maintain hydrological regime		M	
Razorback Sucker		Population Status	Population Trend	Distribution	Type	Habitat	Primary
		Low	D Increasing	D Utah High Plateau	P	West Slope Rivers	<input checked="" type="checkbox"/>
				Utah-Wyoming Rocky Mountains	P	Open Water	<input type="checkbox"/>
				Colorado Plateau	O		
				Wyoming Basin	O		
<i>Xyrauchen texanus</i>							
Tier 1 Fish							
General Threat	Specific Threat	General Conservation Action		Specific Conservation Action		Priority	
		Species Management		Implement existing management/recovery plan (USFWS 1998; CDOW 2001)		M	
Habitat Degradation	Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals	Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate dam management.		H	
Invasive or Exotic Species	Invasive animals	Invasive Species Control and Prevention		Control non-native fish		H	
Pollution	Herbicide/pesticide spraying or runoff and sources associated with resource extraction	Compliance and Enforcement		Identify and control point-source and non-point source pollution		M	

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Rio Grande chub <i>Gila pandora</i> Tier 1 Fish		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Southern Rocky Mountains	P	Transition Streams	<input checked="" type="checkbox"/>	
								Lakes	<input type="checkbox"/>	
								Mountain Streams	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered hydrological regime (surface or aquifer) - stream dewatering				Maintain or Restore Habitat		Maintain hydrological regime		H
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Manage for/reduce stream channelization		H
Rio Grande Cutthroat Trout <i>Oncorhynchus clarki virginalis</i> Tier 1 Fish		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Increasing	D	Southern Rocky Mountains	P	Mountain Streams	<input checked="" type="checkbox"/>	
								Lakes	<input type="checkbox"/>	
		General Threat		Specific Threat				General Conservation Action		Specific Conservation Action
						Species Management		Implement existing management/recovery plan (2001)		H
Direct Mortality		Hunting, trapping, fishing				Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		M
Habitat Degradation		Altered native vegetation (streambank cover reduction) primarily from livestock grazing				Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements		H
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Maintain linkages and connectivity (e.g., minimize diversions that fragment streams)		M
Habitat Degradation		Fragmentation				Species Management		Maintain genetic connection/integrity within and between populations		M
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control non-native fish		M
Rio Grande sucker <i>Catostomus plebeius</i> Tier 1 Fish		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Increasing	D	Southern Rocky Mountains	P	Mountain Streams	<input checked="" type="checkbox"/>	
								Open Water	<input type="checkbox"/>	
		General Threat		Specific Threat				General Conservation Action		Specific Conservation Action
						Species Management		Implement existing management/recovery plan (1994)		H
Habitat Degradation		Altered hydrological regime (surface or aquifer) - dewatering				Maintain or Restore Habitat		Maintain hydrological regime (sufficient flow)		H
Habitat Degradation		Altered hydrological regime (surface or aquifer) - sedimentation				Maintain or Restore Natural Processes		Improve erosion and excess sedimentation conditions		H
Invasive or Exotic Species		Invasive animals - white sucker				Invasive Species Control and Prevention		Control non-native fish		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Roundtail chub <i>Gila robusta</i> Tier 1 Fish		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Declining	D	Utah High Plateau	P	West Slope Rivers	<input checked="" type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	P	Open Water	<input type="checkbox"/>	
								West Slope Streams	<input type="checkbox"/>	
						Colorado Plateau	O			
Wyoming Basin	O									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate dam management.		H
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control non-native fish		H
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control Oriental snail		L
Southern Redbelly Dace <i>Phoxinus erythrogaster</i> Tier 1 Fish		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Stable	D	Central Shortgrass Prairie	P	Transition Streams	<input checked="" type="checkbox"/>	
								Eastern Plains Streams	<input type="checkbox"/>	
								Lakes	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, and ex-urban development				Maintain or Restore Habitat		Maintain hydrological regime (sufficient discharge)		H
Habitat Degradation		Decreased water quality				Compliance and Enforcement		Monitor water quality standards		M
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Manage for/reduce stream channelization		H
Suckermouth minnow <i>Phenacobius mirabilis</i> Tier 1 Fish		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Stable	D	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>	
								Eastern Plains Streams	<input checked="" type="checkbox"/>	
								Open Water	<input type="checkbox"/>	
								Transition Streams	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered hydrological regime (surface or aquifer) - dewatering				Maintain or Restore Habitat		Maintain hydrological regime (sufficient flow)		H
Habitat Degradation		Altered hydrological regime (surface or aquifer) - siltation and sedimentation				Maintain or Restore Natural Processes		Improve erosion and excess sedimentation conditions		H
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		M
Lack of knowledge		Population status unknown				Research and Monitoring		Research critical life history/habitat components		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Tier 1 Insects

Comstock's hairstreak		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Unknown	X	Stable	X	Colorado Plateau	P	Desert Shrub	<input checked="" type="checkbox"/>
						Utah High Plateau	P	Pinyon-Juniper	<input checked="" type="checkbox"/>
								Midgrass Prairie	<input type="checkbox"/>
								Sagebrush	<input type="checkbox"/>
<i>Callophrys comstocki</i>									
Tier 1	Insects								
General Threat	Specific Threat	General Conservation Action		Specific Conservation Action		Priority			
Disturbance	Motorized recreation	Compliance and Enforcement		Manage off-road travel		M			
Habitat Degradation	Altered fire regime	Maintain or Restore Natural Processes		Restore natural fire regime (mitigate cheatgrass induced increase in frequency and intensity of fire)		H			
Invasive or Exotic Species	Invasive plants	Invasive Species Control and Prevention		Manage cheatgrass		H			
Lack of knowledge	Complete distribution in Colorado unknown	Research and Monitoring		Conduct field inventory to refine known distribution		H			
Lack of knowledge	Population status unknown	Research and Monitoring		Monitor population status		H			

Hops feeding azure		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Low	X	Declining	X	Front Range	P	Transition Streams	<input checked="" type="checkbox"/>
<i>Celastrina humulus</i>									
Tier 1	Insects								
General Threat	Specific Threat	General Conservation Action		Specific Conservation Action		Priority			
Disturbance	Non-motorized recreation	Protected Area Management		Manage public use to be compatible with biodiversity		H			
Habitat Conversion	Housing, urban, and ex-urban development	Planning and Zoning		Promote consideration of biodiversity issues in transportation and land use planning processes		H			
Habitat Conversion	Housing, urban, and ex-urban development	Voluntary Standards		Implement Best Management Practices for urban development, landscaping, etc.		H			
Habitat Degradation	Altered fire regime	Maintain or Restore Natural Processes		Restore natural fire regime (mitigation of the cheatgrass induced increase in frequency and intensity of fire)		M			
Invasive or Exotic Species	Invasive plants	Invasive Species Control and Prevention		Manage cheatgrass		M			
Lack of knowledge	Complete distribution in Colorado unknown	Research and Monitoring		Conduct field inventory to refine known distribution		H			
Lack of knowledge	Population status unknown	Research and Monitoring		Monitor population status		H			

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Ottoe skipper	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	X	Stable	X	Front Range	P	Midgrass Prairie	<input checked="" type="checkbox"/>	
					Central Shortgrass Prairie	O	Tallgrass Prairie	<input checked="" type="checkbox"/>	
							Deciduous Oak	<input type="checkbox"/>	
<i>Hesperia ottoe</i>									
Tier 1	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion	Conversion to cropland				Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat (sod-busting)		H
Habitat Conversion	Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Habitat Degradation	Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime (eliminate fire suppression - institute 3 year fire period?)		H
Indirect Mortality	Grazing				Compatible Resource Use		Implement compatible grazing management		H
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge	Population status unknown				Research and Monitoring		Monitor population status		H
Pawnee montane skipper	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	D	Declining	D	Southern Rocky Mountains	P	Ponderosa Pine	<input checked="" type="checkbox"/>	
							Foothill/Mountain Grassland	<input type="checkbox"/>	
<i>Hesperia leonardus montana</i>									
Tier 1	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion	Water storage				Economic Incentives		Increase efficiency of water use		H
Habitat Degradation	Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime (through active forest thinning)		H
Natural Factors	Scarcity (limited distribution)				Species Management		Implement existing management/recovery plan		H
Uncompahgre fritillary	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Stable	X	Southern Rocky Mountains	P	Shrub Tundra	<input checked="" type="checkbox"/>	
							Shrub-dominated Wetlands	<input type="checkbox"/>	
<i>Boloria improba acrochema</i>									
Tier 1	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Climate	Habitat shifting and alteration due to climate change				Maintain or Restore Habitat		Reduce CO2 emissions		H
Direct Mortality	Gathering				Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		H
Disturbance	Non-motorized recreation				Protected Area Management		Manage public use to be compatible with biodiversity		M
Natural Factors	Scarcity (limited distribution)				Species Management		Implement existing management/recovery plan		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Tier 1 Mammals

Black-footed ferret <i>Mustela nigripes</i> Tier 1 Mammals	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Unknown	X	Central Shortgrass Prairie	P	Shortgrass Prairie	<input checked="" type="checkbox"/>
					Wyoming Basin	P	Desert Shrub	<input type="checkbox"/>
							Foothill/Mountain Grassland	<input type="checkbox"/>
							Midgrass Prairie	<input type="checkbox"/>
							Sagebrush	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
				Species Management		Implement existing management/recovery plan		M
Habitat Degradation		Altered animal community (loss of prairie dogs)		Maintain or Restore Habitat		Maintain prairie dogs		H
Invasive or Exotic Species		Pathogen - canine distemper		Invasive Species Control and Prevention		Implement existing management/recovery plan regarding distemper		M
Invasive or Exotic Species		Pathogen - sylvatic plague		Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		M
Lack of knowledge		Population status unknown		Research and Monitoring		Monitor population status		H
Natural Factors		Scarcity (leading to inbreeding depression)		Species Management		Reintroduce extirpated native species		H
Black-tailed prairie dog <i>Cynomys ludovicianus</i> Tier 1 Mammals	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	D	Stable	D	Central Shortgrass Prairie	P	Shortgrass Prairie	<input checked="" type="checkbox"/>
					Front Range	P	Midgrass Prairie	<input type="checkbox"/>
							Sand Dunes Complex (Shrubland)	<input type="checkbox"/>
							Urban	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Poisoning		Education and Communication		Implement landowner outreach/education program		M
Habitat Conversion		Conversion to cropland		Economic Incentives		Provide economic assistance for private land habitat improvements and/or species conservation		M
Habitat Conversion		Housing, urban, and ex-urban development		Land Protection (Public, Private), Easements, and Resource Rights		Acquire land or conservation easement for habitat protection		M
Habitat Conversion		Housing, urban, and ex-urban development		Voluntary Standards		Implement Best Management Practices for urban development, landscaping, etc.		H
Invasive or Exotic Species		Pathogen - sylvatic plague		Invasive Species Control and Prevention		Dust for fleas to prevent plague outbreaks		L
Invasive or Exotic Species		Pathogen - sylvatic plague		Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Botta's pocket gopher (rubidus ssp)	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	X	Unknown	X	Central Shortgrass Prairie	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Pinyon-Juniper	<input type="checkbox"/>
<i>Thomomys bottae rubidus</i>								
Tier 1	Mammals							
General Threat	Specific Threat				General Conservation Action	Specific Conservation Action		Priority
Direct Mortality	Poisoning				Education and Communication	Implement landowner outreach/education program		L
Habitat Conversion	Housing, urban, and ex-urban development				Land Protection (Public, Private), Easements, and Resource Rights	Acquire land or conservation easement for habitat protection		M
Habitat Conversion	Housing, urban, and ex-urban development				Voluntary Standards	Implement Best Management Practices for urban development, landscaping, etc.		M
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring	Conduct field inventory to refine known distribution		H
Lack of knowledge	Genetic relationship with other subspecies				Research and Monitoring	Further analyze genetic relatedness with other subspecies. This subspecies may not be distinct from T.b. internatus.		H
Lack of knowledge	Population status unknown				Research and Monitoring	Monitor population status		M
Dwarf shrew	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Unknown	X	Unknown	X	Southern Rocky Mountains	P	Aspen Forest	<input checked="" type="checkbox"/>
<i>Sorex nanus</i>					Colorado Plateau	O	Douglas Fir	<input checked="" type="checkbox"/>
					Utah High Plateau	O	Lodgepole Pine	<input checked="" type="checkbox"/>
							Mixed Conifer	<input checked="" type="checkbox"/>
Tier 1	Mammals							
							Mixed Forest	<input checked="" type="checkbox"/>
							Mountain Streams	<input checked="" type="checkbox"/>
							Ponderosa Pine	<input checked="" type="checkbox"/>
							Spruce-Fir	<input checked="" type="checkbox"/>
							Limber Pine	<input type="checkbox"/>
							Pinyon-Juniper	<input type="checkbox"/>
							White Fir	<input type="checkbox"/>
General Threat	Specific Threat				General Conservation Action	Specific Conservation Action		Priority
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring	Conduct field inventory to refine known distribution		H
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring	Fill data gaps		M
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring	Ground-truth habitat and species distribution model(s)		M
Lack of knowledge	Population status unknown				Research and Monitoring	Research critical life history/habitat components		H

Table 16 - Continued.

Fringed myotis		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Low	D	Unknown	X				
Myotis thysanodes	Tier 1	Mammals				Colorado Plateau	P	Deciduous Oak	<input checked="" type="checkbox"/>
						Front Range	P	Exposed Rock	<input checked="" type="checkbox"/>
						Wyoming Basin	P	Mixed Conifer	<input checked="" type="checkbox"/>
						Central Shortgrass Prairie	O	Pinyon-Juniper	<input checked="" type="checkbox"/>
						Southern Rocky Mountains	O	Aspen Forest	<input type="checkbox"/>
								Desert Shrub	<input type="checkbox"/>
								Douglas Fir	<input type="checkbox"/>
								Foothill/Mountain Grassland	<input type="checkbox"/>
								Lodgepole Pine	<input type="checkbox"/>
								Mixed Forest	<input type="checkbox"/>
								Mountain Streams	<input type="checkbox"/>
								Ponderosa Pine	<input type="checkbox"/>
								Sagebrush	<input type="checkbox"/>
								Spruce-Fir	<input type="checkbox"/>
								Transition Streams	<input type="checkbox"/>
								Upland Shrub	<input type="checkbox"/>
								West Slope Rivers	<input type="checkbox"/>
								West Slope Streams	<input type="checkbox"/>
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Disturbance		Proximal non-recreation disturbance			Species Management		Manage to limit disturbance, especially to roost sites, maternity colonies, and hibernacula		H
Habitat Degradation		Cave/mine closures			Maintain or Restore Habitat		Manage caves/mines for native bats		M
Lack of knowledge		Complete distribution in Colorado unknown			Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Population status unknown			Research and Monitoring		Monitor population status		H
Lack of knowledge		Population status unknown			Research and Monitoring		Research critical life history/habitat components		M
Pollution		Herbicide/pesticide spraying or runoff			Compatible Resource Use		Reduce pesticide use		L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Gray wolf - two subspecies (Northern and Mexican)*Canis lupus*

Tier 1 Mammals

Population Status	Population Trend
Wild populations extirpated. See Gray Wolf Management Plan: http://wildlife.state.co.us/species_cons/GrayWolf/ .	

Habitat	Primary
Aspen Forest	<input checked="" type="checkbox"/>
Deciduous Oak	<input checked="" type="checkbox"/>
Douglas Fir	<input checked="" type="checkbox"/>
Lodgepole Pine	<input checked="" type="checkbox"/>
Meadow Tundra	<input checked="" type="checkbox"/>
Mixed Conifer	<input checked="" type="checkbox"/>
Mixed Forest	<input checked="" type="checkbox"/>
Pinyon-Juniper	<input checked="" type="checkbox"/>
Ponderosa Pine	<input checked="" type="checkbox"/>
Shrub Tundra	<input checked="" type="checkbox"/>
Spruce-Fir	<input checked="" type="checkbox"/>
Upland Shrub	<input checked="" type="checkbox"/>
Foothill/Mountain Grassland	<input type="checkbox"/>
Limber Pine	<input type="checkbox"/>
Rocky Mtn Bristlecone Pine	<input type="checkbox"/>
Sagebrush	<input type="checkbox"/>
White Fir	<input type="checkbox"/>

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Direct Mortality	Illegal take	Compliance and Enforcement	Enforce wildlife and habitat protection laws	L
Habitat Degradation	Fragmentation	Maintain or Restore Habitat	Maintain linkages and connectivity (e.g., wildlife over/under passes, habitat corridors, wildlife-friendly fences)	H
Natural Factors	Scarcity (leading to inbreeding depression)	Species Management	Implement existing working group recommendations	H
Organizational capacity and management	Lack of common goals	Education and Communication	Implement landowner outreach/education program	H

Gunnison's prairie dog*Cynomys gunnisoni*

Tier 1 Mammals

Population Status	Population Trend
Medium X	Declining X

Distribution	Type	Habitat	Primary
Colorado Plateau	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>
Southern Rocky Mountains	P	Deciduous Oak	<input type="checkbox"/>
		Desert Shrub	<input type="checkbox"/>
		Greasewood Fans and Flats	<input type="checkbox"/>
		Sagebrush	<input type="checkbox"/>

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Direct Mortality	Poisoning	Education and Communication	Implement landowner outreach/education program	M
Habitat Conversion	Conversion to cropland	Economic Incentives	Provide economic assistance for private land habitat improvements and/or species conservation	H
Habitat Conversion	Housing, urban, and ex-urban development	Land Protection (Public, Private), Easements, and Resource Rights	Acquire land or conservation easement for habitat protection	M
Habitat Conversion	Housing, urban, and ex-urban development	Voluntary Standards	Implement Best Management Practices for urban development, landscaping, etc.	H
Invasive or Exotic Species	Pathogen - sylvatic plague	Invasive Species Control and Prevention	Dust for fleas to prevent plague outbreaks	M
Invasive or Exotic Species	Pathogen - sylvatic plague	Maintain or Restore Habitat	Maintain appropriate patch size and habitat mosaic	M

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Table 16 - Continued.

Kit fox <i>Vulpes macrotis</i> Tier 1 Mammals	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Declining	D	Colorado Plateau	P	Desert Shrub	<input checked="" type="checkbox"/>
							Greasewood Fans and Flats	<input checked="" type="checkbox"/>
							Sagebrush	<input checked="" type="checkbox"/>
							Saltbrush Fans and Flats	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Illegal take		Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Lack of knowledge		Population status low and declining trend		Research and Monitoring		Monitor population status		H
Lynx <i>Lynx canadensis</i> Tier 1 Mammals	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Increasing	D	Southern Rocky Mountains	P	Douglas Fir	<input checked="" type="checkbox"/>
							Lodgepole Pine	<input checked="" type="checkbox"/>
							Mixed Conifer	<input checked="" type="checkbox"/>
							Spruce-Fir	<input checked="" type="checkbox"/>
							White Fir	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Illegal take		Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Habitat Degradation		Fragmentation		Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat (e.g., ski area development, sod-busting)		H
Habitat Degradation		Fragmentation		Maintain or Restore Habitat		Maintain linkages and connectivity (e.g., wildlife over/under passes, habitat corridors, wildlife-friendly fences)		H
Natural Factors		Scarcity (leading to inbreeding depression)		Species Management		Reintroduce extirpated native species		M
Meadow jumping mouse (both subspecies) <i>Zapus hudsonius</i> Tier 1 Mammals	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Declining	X	Front Range	P	Eastern Plains Streams	<input checked="" type="checkbox"/>
					Central Shortgrass Prairie	O	Mountain Streams	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	O	Shrub-dominated Wetlands	<input checked="" type="checkbox"/>
							Eastern Plains Rivers	<input type="checkbox"/>
							Transition Streams	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, and ex-urban development		Land Protection (Public, Private), Easements, and Resource Rights		Acquire land or conservation easement for habitat protection		M
Habitat Conversion		Housing, urban, and ex-urban development		Legislation, Policies and Regulations		Establish mitigation requirements for developments and other projects that impact species/habitats		H
Habitat Conversion		Housing, urban, and ex-urban development		Voluntary Standards		Implement Best Management Practices for urban development, landscaping transportation and utility corridors, etc.		M
Habitat Degradation		Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)		Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		H
Habitat Degradation		Altered hydrological regime (surface or aquifer)		Maintain or Restore Natural Processes		Maintain hydrological regime		M
Natural Factors		Scarcity (leading to inbreeding depression)		Species Management		Maintain genetic connection/integrity within and between populations		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Northern pocket gopher (<i>macrotis ssp</i>)	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	X	Declining	X	Front Range	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>	
							Midgrass Prairie	<input checked="" type="checkbox"/>	
							Shortgrass Prairie	<input checked="" type="checkbox"/>	
<i>Thomomys talpoides macrotis</i>									
Tier 1	Mammals								
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Poisoning			Education and Communication		Implement landowner outreach/education program		L
Habitat Conversion		Conversion to cropland			Economic Incentives		Provide economic assistance for private land habitat improvements and/or species conservation		M
Habitat Conversion		Housing, urban, and ex-urban development			Land Protection (Public, Private), Easements, and Resource Rights		Acquire land or conservation easement for habitat protection		M
Habitat Conversion		Housing, urban, and ex-urban development			Voluntary Standards		Implement Best Management Practices for urban development, landscaping, etc.		H
Lack of knowledge		Genetic relationship with other subspecies			Research and Monitoring		Further analyze genetic relatedness with other subspecies		H
Olive-backed pocket mouse	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Declining	X	Central Shortgrass Prairie	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>	
					Utah-Wyoming Rocky Mountains	P	Midgrass Prairie	<input checked="" type="checkbox"/>	
					Wyoming Basin	P	Shortgrass Prairie	<input checked="" type="checkbox"/>	
<i>Perognathus fasciatus</i>									
Tier 1	Mammals								
					Front Range	O			
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland			Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		M
Habitat Conversion		Housing, urban, and ex-urban development			Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		M
Lack of knowledge		Complete distribution in Colorado unknown			Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Population status unknown			Research and Monitoring		Monitor population status		H
Lack of knowledge		Population status unknown			Research and Monitoring		Research species/habitat response to management		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

River otter		Population Status		Population Trend		Distribution	Type	Habitat	Primary							
		Low	D	Increasing	D	Southern Rocky Mountains	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>							
Lontra canadensis	Tier 1	Mammals				Central Shortgrass Prairie	O	Mountain Streams	<input checked="" type="checkbox"/>							
								Colorado Plateau	O	West Slope Rivers	<input checked="" type="checkbox"/>					
								Front Range	O	Eastern Plains Streams	<input type="checkbox"/>					
Utah-Wyoming Rocky Mountains								O	Grass/Forb Dominated Wetlands	<input type="checkbox"/>						
									Open Water	<input type="checkbox"/>						
									Shrub-dominated Wetlands	<input type="checkbox"/>						
									Transition Streams	<input type="checkbox"/>						
West Slope Streams								<input type="checkbox"/>								
General Threat								Specific Threat			General Conservation Action		Specific Conservation Action		Priority	
Direct Mortality								Illegal take			Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L	
Direct Mortality		Hunting, trapping (incidental to beaver control)			Species Management		Minimize conflict between beaver control and otter conservation		M							
Habitat Degradation		Decreased water quality			Compliance and Enforcement		Identify and control point-source and non-point source pollution		M							
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals			Maintain or Restore Habitat		Maintain appropriate habitat		M							
Habitat Degradation		Altered hydrological regime (surface or aquifer)			Maintain or Restore Natural Processes		Maintain hydrologic processes		M							
Spotted bat		Population Status		Population Trend		Distribution	Type	Habitat	Primary							
		Low	D	Stable	D	Utah-Wyoming Rocky Mountains	P	Exposed Rock	<input checked="" type="checkbox"/>							
Euderma maculatum	Tier 1	Mammals				Wyoming Basin	P	Aspen Forest	<input type="checkbox"/>							
								Desert Shrub	<input type="checkbox"/>							
								Douglas Fir	<input type="checkbox"/>							
Mixed Conifer								<input type="checkbox"/>								
Mixed Forest								<input type="checkbox"/>								
Pinyon-Juniper								<input type="checkbox"/>								
Ponderosa Pine								<input type="checkbox"/>								
Upland Shrub								<input type="checkbox"/>								
West Slope Rivers								<input type="checkbox"/>								
West Slope Streams								<input type="checkbox"/>								
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority							
Lack of knowledge		Complete distribution in Colorado unknown			Research and Monitoring		Conduct field inventory to refine known distribution		H							
Lack of knowledge		Complete distribution in Colorado unknown			Research and Monitoring		Ground-truth habitat and species distribution model(s)		M							
Lack of knowledge		Critical life history/habitat components unknown			Research and Monitoring		Research critical life history/habitat components		M							
Natural Factors		Scarcity			Research and Monitoring		Monitor population status		H							
Pollution		Herbicide/pesticide spraying or runoff			Compatible Resource Use		Reduce pesticide use		L							

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Swift fox <i>Vulpes velox</i> Tier 1 Mammals	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	D	Stable	D	Central Shortgrass Prairie	P	Dryland Crops	<input checked="" type="checkbox"/>
					Front Range	O	Midgrass Prairie	<input checked="" type="checkbox"/>
							Shortgrass Prairie	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
				Species Management		Implement existing conservation strategy (Kahn et al. 1997)		H
Direct Mortality		Illegal take		Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Habitat Conversion		Conversion to cropland		Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		H
Habitat Conversion		Housing, urban, and ex-urban development		Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		H
Habitat Degradation		Fragmentation		Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		H
Habitat Degradation		Altered animal community (loss of herbivores, predators, pollinators, etc.)		Species Management		Monitor/control loss of prairie dog and other prey species		H
Natural Factors		Altered animal community (change in herbivores, predators, pollinators, etc.)		Species Management		Monitor/control coyote predation and red fox competition		L
Townsend's big-eared bat ssp. <i>Plecotus (Chorynorhinus) townsendii pallescens</i> Tier 1 Mammals	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Unknown	X	Colorado Plateau	P	Mixed Conifer	<input checked="" type="checkbox"/>
					Front Range	P	Mixed Forest	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Pinyon-Juniper	<input checked="" type="checkbox"/>
					Utah High Plateau	P	Ponderosa Pine	<input checked="" type="checkbox"/>
					Utah-Wyoming Rocky Mountains	P	Aspen Forest	<input type="checkbox"/>
					Wyoming Basin	O	Deciduous Oak	<input type="checkbox"/>
							Desert Shrub	<input type="checkbox"/>
							Douglas Fir	<input type="checkbox"/>
							Foothill/Mountain Grassland	<input type="checkbox"/>
							Mountain Streams	<input type="checkbox"/>
							Sagebrush	<input type="checkbox"/>
							Spruce-Fir	<input type="checkbox"/>
							Transition Streams	<input type="checkbox"/>
							Upland Shrub	<input type="checkbox"/>
							West Slope Rivers	<input type="checkbox"/>
							West Slope Streams	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Disturbance		Proximal non-recreation disturbance		Species Management		Manage to limit disturbance, especially to roost sites, maternity colonies, and hibernacula		H
Habitat Degradation		Cave/mine closures		Maintain or Restore Habitat		Manage caves/mines for native bats		H
Lack of knowledge		Complete distribution in Colorado unknown		Research and Monitoring		Conduct field inventory to refine known distribution (especially roost sites, maternity colonies, hibernacula, etc.)		H
Lack of knowledge		Critical life history/habitat components unknown		Research and Monitoring		Research critical life history/habitat components		M
Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		H
Pollution		Herbicide/pesticide spraying or runoff		Compatible Resource Use		Reduce pesticide use		L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

White-tailed jackrabbit		Population Status		Population Trend		Distribution	Type	Habitat	Primary							
		Medium	X	Unknown	X	Central Shortgrass Prairie	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>							
<i>Lepus townsendii</i> Tier 1 Mammals						Front Range	P	Midgrass Prairie	<input checked="" type="checkbox"/>							
						Southern Rocky Mountains	P	Shortgrass Prairie	<input checked="" type="checkbox"/>							
						Utah High Plateau	P	Deciduous Oak	<input type="checkbox"/>							
						Utah-Wyoming Rocky Mountains	P	Desert Shrub	<input type="checkbox"/>							
						Wyoming Basin	P	Greasewood Fans and Flats	<input type="checkbox"/>							
						Colorado Plateau	O	Sagebrush	<input type="checkbox"/>							
								Saltbrush Fans and Flats	<input type="checkbox"/>							
								Sand Dune Complex (Grassland)	<input type="checkbox"/>							
								Sand Dunes Complex (Shrubland)	<input type="checkbox"/>							
								Tallgrass Prairie	<input type="checkbox"/>							
								Upland Shrub	<input type="checkbox"/>							
						General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
						Direct Mortality		Illegal take				Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Habitat Conversion		Conversion to cropland				Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		H						
Habitat Conversion		Housing, urban, and ex-urban development				Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		H						
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		H						
Natural Factors		Altered animal community (change in herbivores, predators, pollintors, etc.)				Species Management		Monitor/control competition with black-tailed jackrabbit		M						
White-tailed prairie dog		Population Status		Population Trend		Distribution	Type	Habitat	Primary							
		Medium	X	Stable	X	Colorado Plateau	P	Desert Shrub	<input checked="" type="checkbox"/>							
<i>Cynomys leucurus</i> Tier 1 Mammals						Utah-Wyoming Rocky Mountains	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>							
						Wyoming Basin	P	Sagebrush	<input type="checkbox"/>							
						Southern Rocky Mountains	O									
						Utah High Plateau	O									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority						
Direct Mortality		Poisoning				Education and Communication		Implement landowner outreach/education program		M						
Habitat Conversion		Conversion to cropland				Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		M						
Habitat Conversion		Housing, urban, and ex-urban development				Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		H						
Habitat Degradation		Oil and gas development				Land Protection (Public, Private), Easements, and Resource Rights		Acquire land or conservation easement for habitat protection		M						
Invasive or Exotic Species		Pathogen - sylvatic plague				Invasive Species Control and Prevention		Dust for fleas to prevent plague outbreaks		L						
Resource Extraction		Oil and gas drilling				Voluntary Standards		Implement Best Management Practices for energy development and mining		H						

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Tier 1 Mollusks

Banded Physa		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	X	Unknown	X	Front Range		P	Seeps and Springs		<input checked="" type="checkbox"/>
<i>Physa utahensis</i>		The taxonomy of the North American Physidae both at the generic and specific level needs attention and revision. Validity of this species requires genetic verification.				Utah High Plateau		P	Transition Streams		<input checked="" type="checkbox"/>
Tier 1	Mollusks										
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority
Habitat Degradation		Altered hydrological regime (surface or aquifer)				Land Protection (Public, Private), Easements, and Resource Rights		Establish in-stream flow rights			M
Habitat Degradation		Altered hydrological regime (surface or aquifer)				Maintain or Restore Natural Processes		Maintain linkages and connectivity			M
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control spread of New Zealand mud snail			M
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status			H
Lack of knowledge		Referenced in literature, but current populations are unknown. Colorado surveys conducted from 2001-2004 did not record this species.				Research and Monitoring		Conduct field inventory to refine known distribution			H
Natural Factors		Scarcity (limited distribution)				Species Management		Write and implement management/recovery plan, develop collaborative management agreements			H
Cloche Ancylid		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	X	Declining	X	Front Range		P	Lakes		<input type="checkbox"/>
<i>Ferrissia walkeri</i>		Research is needed to refine our knowledge of the habitats occupied by this mollusk.				Utah High Plateau		P	West Slope Rivers		<input type="checkbox"/>
Tier 1	Mollusks										
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Natural Processes		Remove dams			H
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Natural Processes		Restore natural flow regime in rivers			M
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control spread of New Zealand mud snail			M
Lack of knowledge		Habitat affinities for this species have not been recorded				Research and Monitoring		Research critical habitat components			H
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status			H
Lack of knowledge		Referenced in literature, but current populations are unknown. Colorado surveys conducted from 2001-2004 did not record this species.				Research and Monitoring		Conduct field inventory to refine known distribution			H
Natural Factors		Scarcity (limited distribution)				Species Management		Develop collaborative management agreements			M
Natural Factors		Scarcity (limited distribution)				Species Management		Write and implement management/recovery plan			H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Cockerell	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Declining	X	Southern Rocky Mountains	P	Lakes	<input checked="" type="checkbox"/>	
							Open Water	<input checked="" type="checkbox"/>	
							Mountain Streams	<input type="checkbox"/>	
<i>Promenetus umbilicatellus</i>									
Tier 1	Mollusks								
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)			Maintain or Restore Habitat		Improve erosion and excess sedimentation conditions		M
Habitat Degradation		Natural system modification - wetland filling			Maintain or Restore Habitat		Maintain and Restore natural ponds and small mountain lakes		H
Invasive or Exotic Species		Invasive animals			Invasive Species Control and Prevention		Control spread of New Zealand mud snail		M
Lack of knowledge		Population status unknown			Research and Monitoring		Monitor population status		H
Lack of knowledge		Referenced in literature, but current populations are unknown. Colorado surveys conducted from 2001-2004 did not record this species.			Research and Monitoring		Conduct field inventory to refine known distribution		H
Natural Factors		Scarcity (limited distribution)			Species Management		Develop collaborative management agreements		M
Natural Factors		Scarcity (limited distribution)			Species Management		Reintroduce extirpated native species		M
Cylindrical papershell	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	D	Declining	D	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>	
					Front Range	O	Eastern Plains Streams	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains	O	Lakes	<input checked="" type="checkbox"/>	
<i>Anodontoides ferussacianus</i>									
Tier 1	Mollusks								
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland			Maintain or Restore Habitat		Restore native prairie		M
Habitat Degradation		Decreased water quality (nutrient load from cattle)			Compatible Resource Use		Implement compatible grazing management		M
Habitat Degradation		Altered native vegetation (riparian area)			Maintain or Restore Habitat		Restore riparian vegetation, manage grazing for compatible vegetation height, structure, etc.		H
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals			Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements		H
Invasive or Exotic Species		Invasive animals			Invasive Species Control and Prevention		Control spread of New Zealand mud snail		M
Lack of knowledge		Known from only 2 locations in Colorado. Colorado surveys conducted from 1996-2004 recorded this species at Valmont Lake and the St. Vrain Creek in Boulder County.			Research and Monitoring		Conduct field inventory to refine known distribution		H
Natural Factors		Scarcity (limited distribution; 2 known populations not surveyed since 1997)			Land Protection (Public, Private), Easements, and Resource Rights		Protect populations		H
Natural Factors		Scarcity (limited distribution)			Species Management		Reintroduce extirpated native species		M
Pollution		Nutrient loads (runoff from agricultural activities)			Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat (sod-busting) near streams, rivers, and open water.		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Fragil Ancyliid		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	X	Declining	D	Central Shortgrass Prairie	P	Eastern Plains Rivers		<input checked="" type="checkbox"/>	
						Wyoming Basin	P	Eastern Plains Streams		<input checked="" type="checkbox"/>	
						Front Range	O	Open Water		<input type="checkbox"/>	
Tier 1	Mollusks								West Slope Rivers		<input type="checkbox"/>
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority
Habitat Conversion		Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.			H
Habitat Degradation		Decreased water quality				Compatible Resource Use		Implement compatible grazing management			M
Habitat Degradation		Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)				Maintain or Restore Habitat		Manage grazing for compatible vegetation height, structure, etc.			H
Habitat Degradation		Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)				Maintain or Restore Habitat		Restore riparian vegetation			H
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements			M
Habitat Degradation		Decreased water quality				Maintain or Restore Natural Processes		Improve erosion and excess sedimentation conditions			M
Lack of knowledge		Known from only 3 locations in Colorado. Colorado surveys conducted from 2001-2004 recorded this species at Bear Canyon Creek and Sliver Lake Ditch in Boulder County, and Banner Lake No. 5 in Weld County, Colorado.				Research and Monitoring		Conduct field inventory to refine known distribution			H
Natural Factors		Scarcity (leading to inbreeding depression)				Land Protection (Public, Private), Easements, and Resource Rights		Protect populations			H
Hot Springs Physa		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	X	Unknown	X	Southern Rocky Mountains		P	Open Water		<input checked="" type="checkbox"/>
<i>Physa cupreonitens</i>		The taxonomy of the North American Physidae both at the generic and specific level needs attention and revision. Validity of this species requires genetic verification.									
Tier 1	Mollusks										
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority
Disturbance		Proximal non-recreation disturbance				Education and Communication		Implement landowner outreach/education program (at both commercial and privately owned hot springs)			H
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control New Zealand mud snail			M
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status			M
Natural Factors		Scarcity (limited distribution) physid snails have been reported from only 6 hot springs in Colorado				Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easement for habitat protection			H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Pondhorn	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Declining	D	Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>
							Lakes	<input checked="" type="checkbox"/>
<i>Uniomerus tetralasmus</i>								
Tier 1	Mollusks							
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action	Priority
Habitat Conversion	Conversion to cropland				Maintain or Restore Habitat		Restore native prairie	H
Habitat Degradation	Altered hydrological regime (surface or aquifer)				Land Protection (Public, Private), Easements, and Resource Rights		Acquire water rights	H
Invasive or Exotic Species	Invasive animals				Invasive Species Control and Prevention		Control New Zealand mud snail	M
Lack of knowledge	Complete distribution in Colorado unknown. Colorado surveys conducted from 1996-2002 recorded this species at 1 location, Queens (Neeskah) Reservoir, Kiowa County.				Research and Monitoring		Conduct field inventory to refine known distribution	H
Natural Factors	Scarcity (limited distribution)				Species Management		Reintroduce extirpated native species	H
Pollution	Nutrient loads (runoff from agricultural activities)				Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat (sod-busting)	H
Rocky Mountain capshell	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Unknown	X	Southern Rocky Mountains	P	Lakes	<input checked="" type="checkbox"/>
							Mountain Streams	<input type="checkbox"/>
<i>Acroloxus coloradensis</i>								
Tier 1	Mollusks							
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action	Priority
Invasive or Exotic Species	Invasive animals				Invasive Species Control and Prevention		Control New Zealand mud snail	H
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution	H
Natural Factors	Scarcity (limited distribution)				Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easement for habitat protection (protect known populations)	H
Sharp Sprite	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Declining	X	Southern Rocky Mountains	P	Lakes	<input checked="" type="checkbox"/>
					Wyoming Basin	O	Open Water	<input checked="" type="checkbox"/>
						Mountain Streams	<input type="checkbox"/>	
						West Slope Rivers	<input type="checkbox"/>	
<i>Promenetus exacuus</i>								
Tier 1	Mollusks							
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action	Priority
Habitat Degradation	Natural system modification - wetland filling				Maintain or Restore Habitat		Maintain and Restore natural ponds and small mountain lakes	H
Invasive or Exotic Species	Invasive animals				Invasive Species Control and Prevention		Control New Zealand mud snail	M
Lack of knowledge	Complete distribution in Colorado unknown (reported only from 11 Colorado locations, Colorado surveys conducted from 2001-2004 did not record this species.				Research and Monitoring		Conduct field inventory to refine known distribution	H
Lack of knowledge	Population status unknown				Research and Monitoring		Monitor population status	H
Natural Factors	Scarcity (leading to inbreeding depression)				Species Management		Reintroduce extirpated native species	H

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Table 16 - Continued.

Tier 1 Reptiles

Common garter snake <i>Thamnophis sirtalis</i> Tier 1 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary		
	Medium	X	Declining	X	Front Range	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>		
					Central Shortgrass Prairie	O	Eastern Plains Streams	<input checked="" type="checkbox"/>		
					Southern Rocky Mountains	O	Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>		
							Shrub-dominated Wetlands	<input checked="" type="checkbox"/>		
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority	
Habitat Conversion		Housing, urban, and ex-urban development			Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M	
Lack of knowledge		Lack of population status data			Research and Monitoring		Fill data gaps		M	
Pollution		Herbicide/pesticide spraying or runoff			Compliance and Enforcement		Monitor water quality standards		M	
Massasauga <i>Sistrurus catenatus</i> Tier 1 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary		
	Medium	D	Stable	D	Central Shortgrass Prairie	P	Midgrass Prairie	<input checked="" type="checkbox"/>		
							Shortgrass Prairie	<input checked="" type="checkbox"/>		
	General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
	Direct Mortality		Collision (e.g., auto)			Education and Communication		Implement public outreach/education program		L
Habitat Conversion		Conversion to cropland			Compatible Resource Use		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M	
Texas horned lizard <i>Phrynosoma cornutum</i> Tier 1 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary		
	Medium	D	Stable	X	Central Shortgrass Prairie	P	Midgrass Prairie	<input checked="" type="checkbox"/>		
							Shortgrass Prairie	<input checked="" type="checkbox"/>		
	General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
	Direct Mortality		Illegal take			Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Direct Mortality		Collision (e.g., auto)			Education and Communication		Implement public outreach/education program		L	
Direct Mortality		Poisoning (fire ant insecticides)			Education and Communication		Implement landowner outreach/education program		L	
Habitat Conversion		Conversion to cropland			Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		H	

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Triploid checkered whiptail	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	X	Stable	X	Central Shortgrass Prairie	P	Greasewood Fans and Flats	<input checked="" type="checkbox"/>	
							Playas	<input checked="" type="checkbox"/>	
							Sandy Areas	<input checked="" type="checkbox"/>	
<i>Cnemidophorus neotesselatus</i>							Shortgrass Prairie	<input type="checkbox"/>	
Tier 1	Reptiles								
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland			Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.	M	
Habitat Conversion		Housing, urban, and ex-urban development (note: tolerant of some disturbance such as rural landfills)			Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.	H	

Yellow mud turtle	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Unknown	X	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>	
							Eastern Plains Streams	<input checked="" type="checkbox"/>	
							Open Water	<input checked="" type="checkbox"/>	
<i>Kinosternon flavescens</i>							Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>	
Tier 1	Reptiles								
							Grass/Forb Dominated Wetlands	<input type="checkbox"/>	
							Shortgrass Prairie	<input type="checkbox"/>	
							Shrub-dominated Wetlands	<input type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland			Compatible Resource Use		Avoid plowing of sandhills		M
Lack of knowledge		Population trend unknown			Research and Monitoring		Monitor population status		M
Pollution		Herbicide/pesticide spraying or runoff			Compatible Resource Use		Reduce pesticide use		M

Tier 2 Amphibians

Canyon tree frog <i>Hyla arenicolor</i> Tier 2 Amphibians	Population Status		Population Trend		Distribution		Type	Habitat	Primary
	Medium	X	Stable	X	Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
					Colorado Plateau	P	West Slope Rivers	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains	O	West Slope Streams	<input checked="" type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Disturbance		Non-motorized recreation			Education and Communication		Educate canyon recreators		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Couch's spadefoot	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	X	Stable	X	Central Shortgrass Prairie	P	Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>	
							Shortgrass Prairie	<input checked="" type="checkbox"/>	
Scaphiopus couchii									
Tier 2 Amphibians									
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Climate		Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)			Research and Monitoring		Monitor population status		L
Habitat Conversion		Conversion to cropland			Maintain or Restore Habitat		Maintain native landscape (Exclude cultivation and pesticide use)		M
Habitat Degradation		Altered hydrological regime (surface or aquifer)			Land Protection (Public, Private), Easements, and Resource Rights		Acquire water rights		L
Lack of knowledge		Population status unknown			Research and Monitoring		Fill data gaps		H
Great Plains narrowmouth toad	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Unknown	X	Unknown	X	Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
							Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>	
Gastrophryne olivacea									
Tier 2 Amphibians									
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Climate		Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)			Research and Monitoring		Monitor population status		L
Habitat Conversion		Conversion to cropland			Compatible Resource Use		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Lack of knowledge		Population status unknown			Research and Monitoring		Conduct field inventory to refine known distribution		H
Green toad	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Unknown	X	Unknown	X	Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
							Shortgrass Prairie	<input type="checkbox"/>	
Bufo debilis									
Tier 2 Amphibians									
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland			Maintain or Restore Habitat		Maintain native landscape via zoning, conservation easements, acquisition, etc.		L
Habitat Degradation		Pesticide use			Voluntary Standards		Implement Best Management Practices for agricultural production		
Lack of knowledge		Population status unknown			Research and Monitoring		Monitor population status		L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Northern cricket frog	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	D	Declining	D	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>	
	Possibly extirpated in CO (edge of range)						Eastern Plains Streams	<input checked="" type="checkbox"/>	
							Grass/Forb Dominated Wetlands	<input type="checkbox"/>	
<i>Acris crepitans</i>									
Tier 2	Amphibians								
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Climate		Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)			Research and Monitoring		Monitor population status (Apparent extirpation may be due to normal fluctuations in species' range)		L
Habitat Degradation		Altered hydrological regime (surface or aquifer)			Maintain or Restore Habitat		Implement Best Management Practices for water resource development		L
Invasive or Exotic Species		Invasive animals			Invasive Species Control and Prevention		Control bullfrogs		L
Wood Frog	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	D	Stable	D	Southern Rocky Mountains	P	Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>	
							Mountain Streams	<input checked="" type="checkbox"/>	
							Open Water	<input checked="" type="checkbox"/>	
<i>Rana sylvatica</i>									
Tier 2	Amphibians								
							Shrub-dominated Wetlands	<input checked="" type="checkbox"/>	
							Aspen Forest	<input type="checkbox"/>	
							Lodgepole Pine	<input type="checkbox"/>	
							Mixed Conifer	<input type="checkbox"/>	
							Spruce-Fir	<input type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Climate		Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)			Research and Monitoring		Monitor population status		L
Habitat Conversion		Expansion of residential areas			Planning and Zoning		Promote consideration of biodiversity issues in transportation and land use planning processes		M
Habitat Degradation		Natural system modification			Compatible Resource Use		Implement compatible logging practices		M
Habitat Degradation		Trail and road development and use			Compliance and Enforcement		Enforce 404 wetlands regulations, and regulate off-road recreation		M

Tier 2 Arachnids

A lampshade spider		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Low	X	Unknown	X	Southern Rocky Mountains	P	Exposed Rock	<input checked="" type="checkbox"/>	
<i>Hypochilus bonneti</i>		Occupies caves and canyons of south-central Colorado.								
Tier 2 Arachnids										
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		H
Natural Factors		Scarcity (limited distribution with 2 populations known in Colorado)				Land Protection (Public, Private), Easements, and Resource Rights		Protect populations		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Tier 2 Birds

American dipper <i>Cinclus mexicanus</i> Tier 2 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	D	Unknown	X	Front Range	P	Mountain Streams	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Transition Streams	<input checked="" type="checkbox"/>
					Colorado Plateau	O	West Slope Rivers	<input checked="" type="checkbox"/>
							West Slope Streams	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered hydrological regime		Land Protection (Public, Private), Easements, and Resource Rights		Establish in-stream flow rights		M
Habitat Degradation		Natural system modification (hydrological) - dam construction		Maintain or Restore Natural Processes		Remove dams		L
Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		L
Pollution		Nutrient loads		Compatible Resource Use		Implement compatible logging practices		M
Pollution		Stream pollution		Compliance and Enforcement		Monitor water quality standards		M
American three-toed woodpecker <i>Picoides dorsalis</i> Tier 2 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Unknown	X	Southern Rocky Mountains	P	Aspen Forest	<input checked="" type="checkbox"/>
					Colorado Plateau	O	Douglas Fir	<input checked="" type="checkbox"/>
					Front Range	O	Limber Pine	<input checked="" type="checkbox"/>
							Lodgepole Pine	<input checked="" type="checkbox"/>
							Mixed Conifer	<input checked="" type="checkbox"/>
							Ponderosa Pine	<input checked="" type="checkbox"/>
							Rocky Mtn Bristlecone Pine	<input checked="" type="checkbox"/>
							Spruce-Fir	<input checked="" type="checkbox"/>
							White Fir	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered native vegetation (incompatible logging practices)		Compatible Resource Use		Implement compatible logging practices		L
Habitat Degradation		Altered fire regime (suppression)		Maintain or Restore Natural Processes		Restore natural fire regime		M
Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		L
American white pelican <i>Pelecanus erythrorhynchos</i> Tier 2 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Stable	D	Central Shortgrass Prairie	P	Open Water	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Eastern Plains Rivers	<input type="checkbox"/>
							Playas	<input type="checkbox"/>
							Sandy Areas	<input type="checkbox"/>
							West Slope Rivers	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance		Education and Communication		Implement public and landowner outreach/education program		M
Natural Factors		Nest predation		Research and Monitoring		Monitor breeding status, maintain reservoir levels during nesting (excluding mammalian predators)		L
Pollution		Herbicide/pesticide spraying or runoff		Voluntary Standards		Implement Best Management Practices for agricultural production		M

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Table 16 - Continued.

Barrow's goldeneye		Population Status		Population Trend		Distribution		Type	Habitat		Primary	
		Low	D	Stable	D	Southern Rocky Mountains		P	Grass/Forb Dominated Wetlands		<input checked="" type="checkbox"/>	
		<i>Bucephala islandica</i>								Open Water		<input checked="" type="checkbox"/>
										Mountain Streams		<input type="checkbox"/>
										West Slope Rivers		<input type="checkbox"/>
West Slope Streams										<input type="checkbox"/>		
Tier 2	Birds											
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority	
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness			M	
Habitat Degradation		Altered native vegetation (salvage logging removing cavity trees)				Compatible Resource Use		Implement compatible logging practices			L	
Black rail		Population Status		Population Trend		Distribution		Type	Habitat		Primary	
		Low	D	Unknown	X	Central Shortgrass Prairie		O	Eastern Plains Rivers		<input checked="" type="checkbox"/>	
		<i>Laterallus jamaicensis</i>								Grass/Forb Dominated Wetlands		<input checked="" type="checkbox"/>
Tier 2	Birds											
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority	
Habitat Degradation		Natural system modification - wetland degradation				Compliance and Enforcement		Enforce 404 wetlands regulations			M	
Lack of knowledge		Breeding distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution			M	
Natural Factors		Nest predation				Research and Monitoring		Monitor population status			L	
Pollution		Herbicide/pesticide spraying or runoff				Voluntary Standards		Implement Best Management Practices for agricultural production			L	
Black rosy-finch		Population Status		Population Trend		Distribution		Type	Habitat		Primary	
		Low	D	Unknown	X	Southern Rocky Mountains		O	Exposed Rock		<input checked="" type="checkbox"/>	
		<i>Leucosticte atrata</i>								Meadow Tundra		<input checked="" type="checkbox"/>
										Shrub Tundra		<input checked="" type="checkbox"/>
										Sagebrush		<input type="checkbox"/>
Urban										<input type="checkbox"/>		
Tier 2	Birds											
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action			Priority	
Climate		Habitat shifting and alteration due to climate change				Maintain or Restore Habitat		Reduce CO2 emissions			M	
Habitat Degradation		Mining operations				Voluntary Standards		Implement Best Management Practices for energy development and mining			M	
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status			L	
Natural Factors		Nest predation (increased by Common Ravens drawn above treeline by trash)				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness			L	

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Table 16 - Continued.

Black swift <i>Cypseloides niger</i> Tier 2 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Stable	D	Southern Rocky Mountains	P	Exposed Rock	<input checked="" type="checkbox"/>
							Mountain Streams	<input checked="" type="checkbox"/>
							West Slope Rivers	<input checked="" type="checkbox"/>
							West Slope Streams	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Disturbance		Non-motorized recreation		Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		M

Black-chinned hummingbird <i>Archilochus alexandri</i> Tier 2 Birds		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Medium	X	Unknown	X	Central Shortgrass Prairie	P	Grass/Forb Dominated	<input checked="" type="checkbox"/>	
						Colorado Plateau	p	Wetlands		
						Southern Rocky Mountains	p	Pinyon-Juniper	<input checked="" type="checkbox"/>	
						Utah High Plateau	p	Shrub-dominated Wetlands	<input checked="" type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	p	Urban	<input checked="" type="checkbox"/>	
						Wyoming Basin	P	West Slope Rivers	<input checked="" type="checkbox"/>	
						Wyoming Basin	P	West Slope Streams	<input checked="" type="checkbox"/>	
						Front Range	O			
		General Threat		Specific Threat				General Conservation Action		Specific Conservation Action
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		L

Blue grouse <i>Dendragapus obscurus</i> Tier 2 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	D	Stable	D	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>
	(Dusky grouse)				Front Range	P	Deciduous Oak	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Douglas Fir	<input checked="" type="checkbox"/>
					Utah High Plateau	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>
					Utah-Wyoming Rocky Mountains	P	Limber Pine	<input checked="" type="checkbox"/>
					Wyoming Basin	O	Lodgepole Pine	<input checked="" type="checkbox"/>
							Mixed Conifer	<input checked="" type="checkbox"/>
							Mixed Forest	<input checked="" type="checkbox"/>
							Ponderosa Pine	<input checked="" type="checkbox"/>
							Rocky Mtn Bristlecone Pine	<input checked="" type="checkbox"/>
							Spruce-Fir	<input checked="" type="checkbox"/>
							Upland Shrub	<input checked="" type="checkbox"/>
							White Fir	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, ex-urban development, and conversion to cropland		Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Habitat Degradation		Altered native vegetation (forestry and grazing effects on blue grouse poorly understood)		Research and Monitoring		Research species/habitat response to management		M

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Table 16 - Continued.

Broad-tailed hummingbird		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Abundant	D	Stable	D				
<i>Selasphorus platycercus</i>						Colorado Plateau	P	Aspen Forest	✓
						Front Range	P	Deciduous Oak	✓
						Southern Rocky Mountains	P	Douglas Fir	✓
						Utah High Plateau	P	Foothill/Mountain Grassland	✓
						Utah-Wyoming Rocky Mountains	P	Limber Pine	✓
								Lodgepole Pine	✓
						Central Shortgrass Prairie	O	Mixed Conifer	✓
						Wyoming Basin	O	Mixed Forest	✓
								Mountain Streams	✓
								Pinyon-Juniper	✓
								Ponderosa Pine	✓
								Rocky Mtn Bristlecone Pine	✓
								Sagebrush	✓
								Spruce-Fir	✓
								Upland Shrub	✓
								Urban	✓
								White Fir	✓
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority	
Direct Mortality		Electrocution (electric fence with red insulators)		Voluntary Standards		Implement Best Management Practices for livestock grazing		M	

Cassin's finch		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Medium	D	Declining	D				
<i>Carpodacus cassinii</i>		No known threats				Colorado Plateau	P	Aspen Forest	✓
						Front Range	P	Douglas Fir	✓
						Southern Rocky Mountains	P	Limber Pine	✓
						Utah High Plateau	P	Lodgepole Pine	✓
						Utah-Wyoming Rocky Mountains	P	Mixed Conifer	✓
								Mixed Forest	✓
						Central Shortgrass Prairie	O	Pinyon-Juniper	✓
						Wyoming Basin	O	Ponderosa Pine	✓
								Rocky Mtn Bristlecone Pine	✓
								Spruce-Fir	✓
								Urban	✓
								White Fir	✓

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Chestnut-collared longspur <i>Calcarius ornatus</i> Tier 2 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	D	Unknown	X	Central Shortgrass Prairie	P	Midgrass Prairie	<input checked="" type="checkbox"/>
							Shortgrass Prairie	<input checked="" type="checkbox"/>
							Dryland Crops	<input type="checkbox"/>
							Irrigated Crops	<input type="checkbox"/>
							Tallgrass Prairie	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Climate		Climate variability (prolonged rain events and cold weather can cause nest failure)		Research and Monitoring		Monitor population status		L
Habitat Conversion		Conversion to cropland		Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		H
Habitat Degradation		Altered native vegetation (incompatible grazing)		Compatible Resource Use		Implement compatible grazing management (native range)		M
Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		L
Natural Factors		Predation		Research and Monitoring		Monitor population status		L
Pollution		Herbicide/pesticide spraying or runoff		Voluntary Standards		Implement Best Management Practices for agricultural production		M
Cordilleran flycatcher <i>Empidonax occidentalis</i> Tier 2 Birds	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	D	Stable	X	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>
					Front Range	P	Douglas Fir	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Exposed Rock	<input checked="" type="checkbox"/>
					Central Shortgrass Prairie	O	Limber Pine	<input checked="" type="checkbox"/>
					Utah High Plateau	O	Lodgepole Pine	<input checked="" type="checkbox"/>
					Utah-Wyoming Rocky Mountains	O	Mixed Conifer	<input checked="" type="checkbox"/>
					Wyoming Basin	O	Mixed Forest	<input checked="" type="checkbox"/>
							Mountain Streams	<input checked="" type="checkbox"/>
							Ponderosa Pine	<input checked="" type="checkbox"/>
							Rocky Mtn Bristlecone Pine	<input checked="" type="checkbox"/>
							Spruce-Fir	<input checked="" type="checkbox"/>
							Transition Streams	<input checked="" type="checkbox"/>
							West Slope Rivers	<input checked="" type="checkbox"/>
							West Slope Streams	<input checked="" type="checkbox"/>
							White Fir	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, and ex-urban development		Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		L
Habitat Degradation		Altered native vegetation (timber harvest/grazing)		Compatible Resource Use		Implement compatible logging practices and grazing management		L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Curve-billed thrasher		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Low	D	Unknown	X	Central Shortgrass Prairie		P	Desert Shrub	<input checked="" type="checkbox"/>
Toxostoma curvirostre		Tier 2		Birds					Sand Dunes Complex (Shrubland)	<input checked="" type="checkbox"/>
									Shortgrass Prairie	<input checked="" type="checkbox"/>
									Dryland Crops	<input type="checkbox"/>
									Eastern Plains Rivers	<input type="checkbox"/>
									Eastern Plains Streams	<input type="checkbox"/>
									Irrigated Crops	<input type="checkbox"/>
									Pinyon-Juniper	<input type="checkbox"/>
									General Threat	
Habitat Conversion		Conversion to cropland				Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		L
Dusky flycatcher		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Abundant	D	Stable	X	Colorado Plateau		P	Aspen Forest	<input checked="" type="checkbox"/>
Empidonax oberholseri		Tier 2		Birds					Front Range	<input checked="" type="checkbox"/>
									Southern Rocky Mountains	<input checked="" type="checkbox"/>
									Utah High Plateau	<input checked="" type="checkbox"/>
									Utah-Wyoming Rocky Mountains	<input checked="" type="checkbox"/>
									Lodgepole Pine	<input checked="" type="checkbox"/>
									Mixed Conifer	<input checked="" type="checkbox"/>
									Mixed Forest	<input checked="" type="checkbox"/>
									Pinyon-Juniper	<input checked="" type="checkbox"/>
									Ponderosa Pine	<input checked="" type="checkbox"/>
									Rocky Mtn Bristlecone Pine	<input checked="" type="checkbox"/>
									Shrub Tundra	<input checked="" type="checkbox"/>
									Shrub-dominated Wetlands	<input checked="" type="checkbox"/>
									Spruce-Fir	<input checked="" type="checkbox"/>
									Upland Shrub	<input checked="" type="checkbox"/>
									White Fir	<input checked="" type="checkbox"/>
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Climate		Climate variability (severe late spring storms)				Research and Monitoring		Monitor population status		L
Habitat Conversion		Conversion to cropland or grazing				Maintain or Restore Habitat		Maintain or restore riparian vegetation		M
Habitat Conversion		Housing, urban, ex-urban development, recreation area developments, channelization, and water storage				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime		L

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Table 16 - Continued.

Eared grebe		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Unknown	X	Central Shortgrass Prairie	P	Grass/Forb Dominated	<input checked="" type="checkbox"/>	
						Colorado Plateau	p	Wetlands		
						Front Range	p	Open Water	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	p	Playas	<input type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	P			
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance, and scientific research				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		M
Habitat Degradation		Natural system modification - wetland degradation				Compliance and Enforcement		Enforce 404 wetlands regulations		M
Habitat Degradation		Altered hydrological regime (water level drowning emergent vegetation)				Voluntary Standards		Implement Best Management Practices for water resource development		M
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		L
Evening grosbeak		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Unknown	X	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>	
						Front Range	P	Douglas Fir	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P	Limber Pine	<input checked="" type="checkbox"/>	
						Utah High Plateau	O	Lodgepole Pine	<input checked="" type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	O	Mixed Conifer	<input checked="" type="checkbox"/>	
								Mixed Forest	<input checked="" type="checkbox"/>	
								Ponderosa Pine	<input checked="" type="checkbox"/>	
								Rocky Mtn Bristlecone Pine	<input checked="" type="checkbox"/>	
								Spruce-Fir	<input checked="" type="checkbox"/>	
								White Fir	<input checked="" type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		L
Forster's tern		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Stable	D	Southern Rocky Mountains	P	Grass/Forb Dominated	<input checked="" type="checkbox"/>	
						Central Shortgrass Prairie	O	Wetlands		
								Open Water	<input checked="" type="checkbox"/>	
								Shrub-dominated Wetlands	<input checked="" type="checkbox"/>	
								Eastern Plains Rivers	<input type="checkbox"/>	
								Playas	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance, and scientific research				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		M
Habitat Degradation		Natural system modification - wetland degradation				Compliance and Enforcement		Enforce 404 wetlands regulations		M
Pollution		Water pollution				Compliance and Enforcement		Monitor water quality standards		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Grace's warbler	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	D	Unknown	X	Colorado Plateau	P	Deciduous Oak	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains	O	Ponderosa Pine	<input checked="" type="checkbox"/>	
Dendroica graciae									
Tier 2	Birds								
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, and ex-urban development			Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Habitat Degradation		Altered fire regime (fire suppression leading to high intensity fires)			Maintain or Restore Natural Processes		Restore natural fire regime (frequent low intensity fires)		M
Habitat Degradation		Altered native vegetation (clearcutting)			Voluntary Standards		Implement Best Management Practices for forestry		L
Lack of knowledge		Population trend unknown			Research and Monitoring		Monitor population status		L
Gray flycatcher	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	D	Stable	X	Colorado Plateau	P	Pinyon-Juniper	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains	P	Sagebrush	<input checked="" type="checkbox"/>	
Empidonax wrightii									
Tier 2	Birds								
					Utah High Plateau	P			
					Utah-Wyoming Rocky Mountains	P			
					Wyoming Basin	P			
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered native vegetation (chaining pinon/juniper and sagebrush)			Compatible Resource Use		Implement compatible grazing management		M
Habitat Degradation		Oil and gas development			Voluntary Standards		Implement Best Management Practices for energy development and mining		M
Natural Factors		Habitat loss due to insect damage and fire			Maintain or Restore Habitat		Restore native habitat		L
Harris' sparrow	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	D	Unknown	X	Central Shortgrass Prairie	O	Dryland Crops	<input checked="" type="checkbox"/>	
							Eastern Plains Rivers	<input checked="" type="checkbox"/>	
Zonotrichia querula									
Tier 2	Birds								
							Eastern Plains Streams	<input checked="" type="checkbox"/>	
							Irrigated Crops	<input checked="" type="checkbox"/>	
							Shrub-dominated Wetlands	<input checked="" type="checkbox"/>	

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Table 16 - Continued.

Lazuli bunting <i>Passerina amoena</i> Tier 2 Birds		Population Status		Population Trend		Distribution		Type	Habitat		Primary		
		Medium	D	Declining	D	Central Shortgrass Prairie	P	Deciduous Oak	<input checked="" type="checkbox"/>				
						Colorado Plateau	P	Pinyon-Juniper	<input checked="" type="checkbox"/>				
						Front Range	P	Sagebrush	<input checked="" type="checkbox"/>				
						Southern Rocky Mountains	P	Shrub-dominated Wetlands	<input checked="" type="checkbox"/>				
						Utah High Plateau	P	Upland Shrub	<input checked="" type="checkbox"/>				
						Utah-Wyoming Rocky Mountains	P	Aspen Forest	<input type="checkbox"/>				
						Wyoming Basin	P	Eastern Plains Rivers	<input type="checkbox"/>				
								Eastern Plains Streams	<input type="checkbox"/>				
								Mountain Streams	<input type="checkbox"/>				
								Transition Streams	<input type="checkbox"/>				
								West Slope Rivers	<input type="checkbox"/>				
West Slope Streams	<input type="checkbox"/>												
General Threat		Specific Threat		General Conservation Action				Specific Conservation Action		Priority			
Habitat Degradation		Altered native vegetation		Maintain or Restore Habitat		Plant trees/shrubs		L					
Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		L					
Lesser scaup <i>Aythya affinis</i> Tier 2 Birds		Population Status		Population Trend		Distribution		Type	Habitat		Primary		
		Medium	D	Stable	D	Southern Rocky Mountains	P	Grass/Forb Dominated	<input checked="" type="checkbox"/>				
						Central Shortgrass Prairie	O	Wetlands	<input type="checkbox"/>				
						Colorado Plateau	O	Open Water	<input checked="" type="checkbox"/>				
						Front Range	O	Shrub-dominated Wetlands	<input checked="" type="checkbox"/>				
						Utah-Wyoming Rocky Mountains	O	Eastern Plains Rivers	<input type="checkbox"/>				
								Playas	<input type="checkbox"/>				
								West Slope Rivers	<input type="checkbox"/>				
		General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority	
		Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance		Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		L			
		Habitat Degradation		Natural system modification - wetland degradation		Compliance and Enforcement		Enforce 404 wetlands regulations		M			
Marbled godwit <i>Limosa fedoa</i> Tier 2 Birds		Population Status		Population Trend		Distribution		Type	Habitat		Primary		
		Low	D	Unknown	X	Central Shortgrass Prairie	O	Eastern Plains Rivers	<input checked="" type="checkbox"/>				
								Open Water	<input checked="" type="checkbox"/>				
								Playas	<input checked="" type="checkbox"/>				
		General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority			
		Habitat Conversion		Conversion to cropland		Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easement for habitat protection		L			
		Lack of knowledge		Population trend unknown		Research and Monitoring		Monitor population status		L			
		Pollution		Herbicide/pesticide spraying or runoff		Voluntary Standards		Implement Best Management Practices for agricultural production		L			

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Table 16 - Continued.

Northern harrier		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Medium	D	Stable	D	Central Shortgrass Prairie	P	Dryland Crops	<input checked="" type="checkbox"/>		
Circus cyaneus	Tier 2	Birds					Colorado Plateau	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>	
							Front Range	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
							Southern Rocky Mountains	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>	
							Utah High Plateau	P	Grass/Forb Dominated	<input checked="" type="checkbox"/>	
							Utah-Wyoming Rocky Mountains	P	Wetlands	<input checked="" type="checkbox"/>	
							Wyoming Basin	P	Irrigated Crops	<input checked="" type="checkbox"/>	
									Midgrass Prairie	<input checked="" type="checkbox"/>	
									Playas	<input checked="" type="checkbox"/>	
									Shortgrass Prairie	<input checked="" type="checkbox"/>	
									Tallgrass Prairie	<input checked="" type="checkbox"/>	
									Transition Streams	<input checked="" type="checkbox"/>	
									West Slope Rivers	<input checked="" type="checkbox"/>	
									West Slope Streams	<input checked="" type="checkbox"/>	
									Desert Shrub	<input type="checkbox"/>	
									Greasewood Fans and Flats	<input type="checkbox"/>	
									Sagebrush	<input type="checkbox"/>	
									Saltbrush Fans and Flats	<input type="checkbox"/>	
									Sand Dune Complex (Grassland)	<input type="checkbox"/>	
									Sand Dunes Complex (Shrubland)	<input type="checkbox"/>	
			General Threat		Specific Threat				General Conservation Action		Specific Conservation Action
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Education and Communication		Implement public and landowner outreach/education program		M	
Habitat Conversion		Housing, urban, ex-urban development, and conversion to cropland				Maintain or Restore Habitat		Maintain native landscape via conservation easements, acquisition, farm bill, etc.		M	
Habitat Degradation		Natural system modification - wetland degradation				Compliance and Enforcement		Enforce 404 wetlands regulations		M	
Pollution		Herbicide/pesticide spraying or runoff				Voluntary Standards		Implement Best Management Practices for agricultural production		M	
Northern pintail		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	D	Stable	D	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>		
Anas acuta							Colorado Plateau	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
							Front Range	P	Grass/Forb Dominated	<input checked="" type="checkbox"/>	
Tier 2	Birds					Southern Rocky Mountains	P	Wetlands	<input checked="" type="checkbox"/>		
						Utah-Wyoming Rocky Mountains	P	Open Water	<input checked="" type="checkbox"/>		
						Wyoming Basin	O	Playas	<input checked="" type="checkbox"/>		
								West Slope Rivers	<input checked="" type="checkbox"/>		
								West Slope Streams	<input checked="" type="checkbox"/>		
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority	
Habitat Conversion		Conversion to cropland				Voluntary Standards		Implement Best Management Practices for agricultural production		M	
Habitat Degradation		Natural system modification - wetland degradation				Compliance and Enforcement		Enforce 404 wetlands regulations		M	
Pollution		Herbicide/pesticide spraying or runoff				Voluntary Standards		Implement Best Management Practices for agricultural production		M	

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Table 16 - Continued.

Osprey <i>Pandion haliaetus</i> Tier 2 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Low	D	Increasing	D	Central Shortgrass Prairie	P	Open Water	<input checked="" type="checkbox"/>
						Southern Rocky Mountains	P	Eastern Plains Rivers	<input type="checkbox"/>
						Colorado Plateau	O	Mountain Streams	<input type="checkbox"/>
						Utah-Wyoming Rocky Mountains	O	West Slope Rivers	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation		Altered hydrological regime (surface or aquifer)		Voluntary Standards		Implement Best Management Practices for water resource development		L	
Pollution		Herbicide/pesticide spraying or runoff, mercury		Compliance and Enforcement		Monitor water quality standards		M	
Pygmy nuthatch <i>Sitta pygmaea</i> Tier 2 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Medium	D	Stable	X	Colorado Plateau	P	Ponderosa Pine	<input checked="" type="checkbox"/>
						Front Range	P	Urban	<input checked="" type="checkbox"/>
						Southern Rocky Mountains	P	Aspen Forest	<input type="checkbox"/>
						Utah-Wyoming Rocky Mountains	P	Douglas Fir	<input type="checkbox"/>
						Central Shortgrass Prairie	O	Lodgepole Pine	<input type="checkbox"/>
								Pinyon-Juniper	<input type="checkbox"/>
								Spruce-Fir	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation		Altered native vegetation (intensively managed for timber)		Compatible Resource Use		Implement compatible logging practices		L	
Habitat Degradation		Altered fire regime		Maintain or Restore Natural Processes		Restore natural fire regime		M	
Red crossbill <i>Loxia curvirostra</i> Tier 2 Birds		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Medium	D	Unknown	X	Colorado Plateau	P	Douglas Fir	<input checked="" type="checkbox"/>
						Front Range	P	Limber Pine	<input checked="" type="checkbox"/>
						Southern Rocky Mountains	P	Lodgepole Pine	<input checked="" type="checkbox"/>
						Utah-Wyoming Rocky Mountains	P	Mixed Conifer	<input checked="" type="checkbox"/>
						Utah High Plateau	O	Ponderosa Pine	<input checked="" type="checkbox"/>
								Spruce-Fir	<input checked="" type="checkbox"/>
								White Fir	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation		Altered native vegetation		Voluntary Standards		Implement Best Management Practices for forestry		L	

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Table 16 - Continued.

Rufous hummingbird <i>Selasphorus rufus</i> Tier 2 Birds		Population Status		Population Trend		Distribution	Type	Habitat		Primary
		Medium	D	Unknown	X	Central Shortgrass Prairie	<input type="radio"/>	Deciduous Oak	<input checked="" type="checkbox"/>	
						Colorado Plateau	<input type="radio"/>	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>	
						Front Range	<input type="radio"/>	Meadow Tundra	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	<input type="radio"/>	Shrub Tundra	<input checked="" type="checkbox"/>	
						Utah High Plateau	<input type="radio"/>	Upland Shrub	<input checked="" type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	<input type="radio"/>	Urban	<input checked="" type="checkbox"/>	
						Wyoming Basin	<input type="radio"/>			
		General Threat		Specific Threat			General Conservation Action		Specific Conservation Action	
Lack of knowledge		Population trend unknown			Research and Monitoring		Monitor population status		L	

Snowy egret		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	D	Stable	D	Central Shortgrass Prairie	P	Grass/Forb Dominated	<input checked="" type="checkbox"/>		
Egretta thula		Tier 2		Birds		Front Range	P	Wetlands			
						Southern Rocky Mountains	P	Open Water	<input checked="" type="checkbox"/>		
								Playas	<input checked="" type="checkbox"/>		
								Shrub-dominated Wetlands	<input checked="" type="checkbox"/>		
								Eastern Plains Rivers	<input type="checkbox"/>		
								Eastern Plains Streams	<input type="checkbox"/>		
								Transition Streams	<input type="checkbox"/>		
								West Slope Rivers	<input type="checkbox"/>		
								West Slope Streams	<input type="checkbox"/>		
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation		Natural system modification - wetland degradation				Compliance and Enforcement		Enforce 404 wetlands regulations		M	

Veery		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Low	D	Unknown	X	Southern Rocky Mountains Front Range	P O	Mountain Streams Shrub-dominated Wetlands	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
Catharus fuscescens										
Tier 2		Birds								
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		L

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Table 16 - Continued.

Vesper sparrow		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Medium	D	Stable	D	Central Shortgrass Prairie	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>
Pooecetes gramineus		Tier 2		Birds		Colorado Plateau	P	Sagebrush	<input checked="" type="checkbox"/>
						Front Range	P	Desert Shrub	<input type="checkbox"/>
						Southern Rocky Mountains	P	Greasewood Fans and Flats	<input type="checkbox"/>
						Utah High Plateau	P	Midgrass Prairie	<input type="checkbox"/>
						Utah-Wyoming Rocky Mountains	P	Pinyon-Juniper	<input type="checkbox"/>
						Wyoming Basin	P	Ponderosa Pine	<input type="checkbox"/>
								Sand Dune Complex (Grassland)	<input type="checkbox"/>
								Tallgrass Prairie	<input type="checkbox"/>
						General Threat		Specific Threat	
Habitat Conversion		Conversion to cropland (large scale tillage and chemical use)		Voluntary Standards		Implement Best Management Practices for agricultural production		M	

Virginia's warbler		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Colorado Plateau	P	Deciduous Oak	<input checked="" type="checkbox"/>	
Vermivora virginiae		Tier 2		Birds		Front Range	P	Mixed Forest	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P	Pinyon-Juniper	<input checked="" type="checkbox"/>	
						Utah High Plateau	P	Ponderosa Pine	<input checked="" type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	P	Upland Shrub	<input checked="" type="checkbox"/>	
						Central Shortgrass Prairie	O	Aspen Forest	<input type="checkbox"/>	
						Wyoming Basin	O	Limber Pine	<input type="checkbox"/>	
								Transition Streams	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		M
Natural Factors		Predation				Research and Monitoring		Monitor population status		M

Western grebe		Population Status		Population Trend		Distribution		Type	Habitat		Primary	
		Low	D	Stable	D	Central Shortgrass Prairie Front Range Southern Rocky Mountains			Open Water		<input checked="" type="checkbox"/>	
<i>Aechmophorus occidentalis</i>												
Tier 2		Birds										
General Threat		Specific Threat				General Conservation Action			Specific Conservation Action			Priority
Habitat Degradation		Altered hydrological regime (fluctuating water levels)				Voluntary Standards			Implement Best Management Practices for water resource development			M
Pollution		Water pollution				Compliance and Enforcement			Monitor water quality standards			M

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Table 16 - Continued.

White-faced ibis <i>Plegadis chihi</i> Tier 2 Birds		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Low	D	Increasing	D	Central Shortgrass Prairie		P	Eastern Plains Rivers		<input checked="" type="checkbox"/>
						Colorado Plateau		P	Grass/Forb Dominated		<input checked="" type="checkbox"/>
						Southern Rocky Mountains		P	Wetlands		
						Utah-Wyoming Rocky Mountains		P	Irrigated Crops		<input checked="" type="checkbox"/>
									Open Water		<input checked="" type="checkbox"/>
									Playas		<input checked="" type="checkbox"/>
									Shrub-dominated Wetlands		<input checked="" type="checkbox"/>
							West Slope Rivers		<input checked="" type="checkbox"/>		
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority	
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Education and Communication		Implement public and landowner outreach/education program		M	
Habitat Degradation		Natural system modification - wetland degradation				Compliance and Enforcement		Enforce 404 wetlands regulations		M	
Habitat Degradation		Altered hydrological regime (fluctuating water levels)				Voluntary Standards		Implement Best Management Practices for water resource development		M	
Pollution		Water pollution				Compliance and Enforcement		Monitor water quality standards		M	
White-tailed ptarmigan <i>Lagopus leucurus</i> Tier 2 Birds		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Medium	D	Stable	D	Southern Rocky Mountains		P	Meadow Tundra		<input checked="" type="checkbox"/>
									Shrub Tundra		<input checked="" type="checkbox"/>
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority	
Climate		Habitat shifting and alteration due to climate change				Maintain or Restore Habitat		Reduce CO2 emissions		M	
Disturbance		Motorized and non-motorized recreation, proximal non-recreation disturbance				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		M	
Habitat Degradation		Roads, trails, ski area developments				Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat (e.g., ski area development)		M	
Habitat Degradation		Mining operations				Voluntary Standards		Implement Best Management Practices for energy development and mining		M	
White-throated swift <i>Aeronautes saxatalis</i> Tier 2 Birds		Population Status		Population Trend		Distribution		Type	Habitat		Primary
		Medium	X	Stable	D	Central Shortgrass Prairie		P	Exposed Rock		<input checked="" type="checkbox"/>
						Colorado Plateau		P			
						Front Range		P			
						Southern Rocky Mountains		P			
						Utah High Plateau		P			
						Utah-Wyoming Rocky Mountains		P			
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority	
Disturbance		Non-motorized recreation, proximal non-recreation disturbance (e.g., rock climbing, mining)				Education and Communication		Publish educational material/sponsor educational programs to raise public awareness		M	
Pollution		Herbicide/pesticide spraying or runoff				Voluntary Standards		Implement Best Management Practices for agricultural production		M	

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Table 16 - Continued.

Wilson's phalarope		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Unknown	X	Central Shortgrass Prairie	P	Grass/Forb Dominated	<input checked="" type="checkbox"/>	
Phalaropus tricolor		Tier 2		Birds		Colorado Plateau	P	Wetlands		
						Southern Rocky Mountains	P	Open Water	<input checked="" type="checkbox"/>	
						Utah-Wyoming Rocky Mountains	P	Playas	<input checked="" type="checkbox"/>	
						Front Range	O	Shrub-dominated Wetlands	<input checked="" type="checkbox"/>	
						Utah High Plateau	O			
						Wyoming Basin	O			
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Natural system modification - wetland degradation				Compliance and Enforcement		Enforce 404 wetlands regulations		M
Lack of knowledge		Population trend unknown				Research and Monitoring		Monitor population status		L

Tier 2

Fish

Bluehead sucker		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Unknown	X	Colorado Plateau	P	West Slope Rivers	<input checked="" type="checkbox"/>	
<i>Catostomus discobolus</i>						Southern Rocky Mountains	P	West Slope Streams	<input type="checkbox"/>	
						Utah High Plateau	O			
Tier 2	Fish									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered hydrological regime (surface or aquifer) - dewatering				Maintain or Restore Habitat		Maintain hydrological regime (sufficient flow)		M
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate dam management.		H
Habitat Degradation		Altered hydrological regime (surface or aquifer) - siltation and sedimentation				Maintain or Restore Natural Processes		Improve erosion and excess sedimentation conditions		L
Invasive or Exotic Species		Invasive animals				Invasive Species Control and Prevention		Control non-native fish and crayfish		M

Flannelmouth sucker		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Unknown	X	Southern Rocky Mountains	P	West Slope Rivers	<input checked="" type="checkbox"/>	
						Colorado Plateau	O	Lakes	<input type="checkbox"/>	
								West Slope Streams	<input type="checkbox"/>	
<i>Catostomus latipinnis</i>										
Tier 2		Fish								
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate dam management.		H
Habitat Degradation		Altered hydrological regime (surface or aquifer)				Maintain or Restore Natural Processes		Maintain hydrological and thermal regime		H
Habitat Degradation		Fragmentation				Maintain or Restore Natural Processes		Maintain linkages and connectivity		M
Invasive or Exotic Species		Invasive animals - hybridization with other sucker species				Invasive Species Control and Prevention		Control non-native fish		M

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Table 16 - Continued.

Flathead chub <i>Platygobio gracilis</i> Tier 2 Fish	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Abundant	D	Stable	D	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>
							Eastern Plains Streams	<input type="checkbox"/>
							Open Water	<input type="checkbox"/>
							Transition Streams	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals		Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate dam management.		H
Habitat Degradation		Altered hydrological regime (surface or aquifer) - dewatering		Maintain or Restore Natural Processes		Maintain hydrological regime (sufficient flow)		H
Pollution		Waste or residual materials (mine tailings, excess sediment loads, etc.)		Compliance and Enforcement		Identify and control point-source and non-point source pollution and monitor water quality		M
Iowa darter <i>Etheostoma exile</i> Tier 2 Fish	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	D	Stable	D	Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>
					Front Range	P	Transition Streams	<input checked="" type="checkbox"/>
							Eastern Plains Rivers	<input type="checkbox"/>
							Open Water	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered hydrological regime (surface or aquifer) - wetland drainage		Maintain or Restore Natural Processes		Maintain hydrological regime		H
Invasive or Exotic Species		Invasive animals		Invasive Species Control and Prevention		Control non-native fish		L
Pollution		Herbicide/pesticide spraying or runoff		Compliance and Enforcement		Identify and control point-source and non-point source pollution		M
Mountain sucker <i>Catostomus platyrhynchus</i> Tier 2 Fish	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Unknown	X	Unknown	X	Southern Rocky Mountains	P	Mountain Streams	<input checked="" type="checkbox"/>
					Utah-Wyoming Rocky Mountains	P	West Slope Streams	<input checked="" type="checkbox"/>
					Wyoming Basin	P	Open Water	<input type="checkbox"/>
					Colorado Plateau	O		
					Utah High Plateau	O		
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals		Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate dam management.		H
Invasive or Exotic Species		Invasive animals - competition, predation, and hybridization		Invasive Species Control and Prevention		Control non-native fish		M
Orangespotted sunfish <i>Lepomis humilis</i> Tier 2 Fish	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	D	Declining	D	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>
					Front Range	O	Eastern Plains Streams	<input checked="" type="checkbox"/>
							Lakes	<input type="checkbox"/>
							Transition Streams	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered hydrological regime (surface or aquifer)		Maintain or Restore Habitat		Maintain hydrological regime		H
Invasive or Exotic Species		Invasive animals		Invasive Species Control and Prevention		Control non-native fish		L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Stonecat		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	D	Unknown	X	Central Shortgrass Prairie Front Range	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
<i>Noturus flavus</i> Tier 2 Fish							P	Eastern Plains Rivers	<input type="checkbox"/>	
								Open Water	<input type="checkbox"/>	
								Transition Streams	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Habitat		Promote maintenance and/or return of rivers to natural flow patterns through protection and appropriate impoundment/diversion management.		H
Habitat Degradation		Altered hydrological regime (surface or aquifer) - siltation				Maintain or Restore Natural Processes		Improve erosion and excess sedimentation conditions		M
Lack of knowledge		Population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution (especially nocturnal surveys)		M

Tier 2 Insects

A Buckmoth		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Unknown	X	Unknown	X	Utah High Plateau Wyoming Basin	P O	Desert Shrub	<input checked="" type="checkbox"/>	
Hemileuca neuvoegeni										
Tier 2		Insects								
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		H
Organizational capacity and management		Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders		M

A sphinx moth		Population Status		Population Trend		Distribution		Type	Habitat	Primary
		Unknown	X	Unknown	X	Central Shortgrass Prairie Colorado Plateau	P P	Unknown	<input type="checkbox"/>	
Sagenosoma elsa										
Tier 2		Insects								
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Habitat affinities for this species are unknown				Research and Monitoring		Research critical life history/habitat components		H
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		H
Organizational capacity and management		Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Arapahoe snowfly	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	D	Unknown	X	Front Range	P	Mountain Streams	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains	P	Transition Streams	<input type="checkbox"/>	
Capnia arapahoe									
Tier 2	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Natural Factors	Scarcity (limited distribution with 2 populations known in Colorado)				Land Protection (Public, Private), Easements, and Resource Rights		Protect populations		H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders		H
Pollution	Waste or residual materials (excess sediment loads, etc.)				Voluntary Standards		Implement Best Management Practices for urban development, landscaping, etc.; Implement Best Management Practices for agricultural production; Implement Best Management Practices for livestock grazing		H
Resource Extraction	Water use, management				Voluntary Standards		Implement Best Management Practices for water resource development		H
Arogos skipper	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Declining	D	Front Range	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains	O	Midgrass Prairie Tallgrass Prairie	<input type="checkbox"/> <input type="checkbox"/>	
Atrytone arogos									
Tier 2	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion	Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		H
Habitat Conversion	Housing, urban, and ex-urban development				Voluntary Standards		Implement Best Management Practices for urban development, landscaping, etc.		H
Habitat Degradation	Altered native vegetation (seral stage imbalance)				Maintain or Restore Habitat		Manage grazing for compatible vegetation height, structure, etc.		H
Habitat Degradation	Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime (fire rotation of 3 years or greater)		H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders		M
Pollution	Herbicide/pesticide spraying or runoff				Compatible Resource Use		Manage pesticide use		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Brimstone clubtail	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	X	Unknown	X	Colorado Plateau	P	West Slope Rivers	<input checked="" type="checkbox"/>
<i>Gomphus intricatus</i>								
Tier 2		Insects						
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action	Priority
Habitat Degradation	Altered native vegetation (riparian area)				Maintain or Restore Habitat		Manage grazing for compatible vegetation height, structure, etc., Restore riparian vegetation	M
Habitat Degradation	Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals				Maintain or Restore Natural Processes		Adjust operation of dam	M
Indirect Mortality	Water use (de-watering of streams)				Land Protection (Public, Private), Easements, and Resource Rights		Establish in-stream flow rights	M
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution	H
Lack of knowledge	Population status unknown				Research and Monitoring		Monitor population status	H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders	M
Pollution	Waste or residual materials (excess sediment loads)				Voluntary Standards		Implement Best Management Practices for agricultural production, Implement Best Management Practices for livestock grazing, Implement Best Management Practices for urban development, landscaping, etc.	M
Colorado blue	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Declining	X	Central Shortgrass Prairie Southern Rocky Mountains	P O	Shortgrass Prairie	<input type="checkbox"/>
<i>Euphilotes rita coloradensis</i>								
Tier 2		Insects						
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action	Priority
Habitat Conversion	Conversion to cropland				Land Protection (Public, Private), Easements, and Resource Rights		Acquire conservation easement for habitat protection, Implement Purchase/Transfer Development Rights program for habitat protection, Purchase habitat for conservation purpose	H
Habitat Conversion	Conversion to cropland				Legislation, Policies and Regulations		Encourage use of Farm Bill programs	M
Habitat Conversion	Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.	M
Habitat Degradation	Altered native vegetation (seral stage imbalance)				Maintain or Restore Habitat		Manage grazing for compatible vegetation height, structure, etc. (Habitats require light to moderate grazing by wildlife or cattle)	H
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution	H
Lack of knowledge	Population status unknown				Research and Monitoring		Monitor population status	H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders	H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Desert buckwheat blue	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Declining	X	Colorado Plateau	P	Desert Shrub	<input checked="" type="checkbox"/>	
					Utah High Plateau	P			
Euphilotes rita emmeli									
Tier 2		Insects							
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized recreation			Compliance and Enforcement		Manage off-road travel		M
Habitat Degradation		Altered fire regime			Maintain or Restore Natural Processes		Restore natural fire regime (mitigate cheatgrass induced increase in frequency and intensity of fire)		M
Invasive or Exotic Species		Invasive plants			Invasive Species Control and Prevention		Manage cheatgrass		M
Lack of knowledge		Complete distribution in Colorado unknown			Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Population status unknown			Research and Monitoring		Monitor population status		H
Early elfin	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	X	Unknown	X	Colorado Plateau		Desert Shrub	<input type="checkbox"/>	
							Pinyon-Juniper	<input type="checkbox"/>	
Incisalia fotis									
Tier 2		Insects							
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered fire regime			Maintain or Restore Natural Processes		Restore natural fire regime (mitigation of the cheatgrass induced increase in frequency and intensity of fire)		L
Invasive or Exotic Species		Invasive plants			Invasive Species Control and Prevention		Manage cheatgrass		L
Lack of knowledge		Complete distribution in Colorado unknown			Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Population status unknown			Research and Monitoring		Monitor population status		H
Organizational capacity and management		Lack of funding			Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Great Basin silverspot butterfly <i>Speyeria nokomis nokomis</i> Tier 2 Insects	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Declining	X	Colorado Plateau		Grass/Forb Dominated	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains		Wetlands	<input checked="" type="checkbox"/>	
					Utah High Plateau		Shrub-dominated Wetlands	<input checked="" type="checkbox"/>	
							West Slope Streams	<input type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, and ex-urban development			Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		H
Habitat Conversion		Housing, urban, and ex-urban development			Voluntary Standards		Implement Best Management Practices for urban development, landscaping, etc.		H
Habitat Degradation		Natural system modification - wetland filling			Legislation, Policies and Regulations		Establish mitigation requirements for developments and other projects that impact species/habitats		M
Lack of knowledge		Complete distribution in Colorado unknown, population status unknown			Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		M
Natural Factors		Scarcity (limited distribution)			Land Protection (Public, Private), Easements, and Resource Rights		Protect populations		H
Pollution		Waste or residual materials (excess sediment loads)			Voluntary Standards		Implement Best Management Practices for agricultural production, Implement Best Management Practices for livestock grazing		M
Resource Extraction		Water use, management			Voluntary Standards		Implement Best Management Practices for water resource development		H
Great Sand Dunes Anthicid beetle <i>Amblyderus weneri</i> Tier 2 Insects	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Unknown	X	Southern Rocky Mountains	P	Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>	
							Sandy Areas	<input checked="" type="checkbox"/>	
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Disturbance		Non-motorized recreation			Protected Area Management		Manage public use to be compatible with biodiversity		M
Indirect Mortality		Water use (de-watering of streams, groundwater pumping, surface water diversions)			Land Protection (Public, Private), Easements, and Resource Rights		Acquire water rights, Establish in-stream flow rights		H
Lack of knowledge		Complete distribution in Colorado unknown, population status unknown			Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Resource Extraction		Water use, management			Voluntary Standards		Implement Best Management Practices for water resource development		L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Hoary skimmer		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
Libellula nodisticta	Tier 2	Insects	Medium	X	Stable	X	Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>
			Habitat includes ponds, small streams and running springs in arid country.				Southern Rocky Mountains	P	Open Water	<input checked="" type="checkbox"/>
							Colorado Plateau	O	West Slope Streams	<input checked="" type="checkbox"/>
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered native vegetation (riparian area deforestation)				Compatible Resource Use		Implement compatible grazing management		M
Habitat Degradation		Natural system modification - wetland filling				Legislation, Policies and Regulations		Encourage use of Farm Bill programs		M
Lack of knowledge		Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Pollution		Herbicide/pesticide spraying or runoff, nutrient loads				Compatible Resource Use		Reduce herbicide and pesticide use, manage agricultural activities near wetlands		M
Pollution		Waste or residual materials (excess sediment loads)				Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements, Improve erosion and excess sedimentation conditions, Manage grazing for compatible vegetation height, structure, etc.		M
Pollution		Nutrient loads				Voluntary Standards		Implement Best Management Practices for agricultural production		M
Pollution		Nutrient loads				Voluntary Standards		Implement Best Management Practices for agricultural production, Implement Best Management Practices for livestock grazing, Implement Best Management Practices for forestry		L
Resource Extraction		Water use, management				Land Protection (Public, Private), Easements, and Resource Rights		Establish in-stream flow rights		M
Resource Extraction		Water use, management				Voluntary Standards		Implement Best Management Practices for water resource development		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Lemon-faced emerald	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Unknown	X	Front Range	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
					Central Shortgrass Prairie	O	Open Water	<input type="checkbox"/>	
Somatochlora ensigera									
Tier 2	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation	Altered native vegetation (riparian area deforestation)				Compatible Resource Use		Implement compatible grazing management		M
Habitat Degradation	Natural system modification - wetland filling				Legislation, Policies and Regulations		Encourage use of Farm Bill programs		M
Indirect Mortality	Water use (e.g., de-watering of streams)				Land Protection (Public, Private), Easements, and Resource Rights		Establish in-stream flow rights		H
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Pollution	Herbicide/pesticide spraying or runoff				Compatible Resource Use		Reduce herbicide and pesticide use		M
Pollution	Waste or residual materials (excess sediment loads)				Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements, Improve erosion and excess sedimentation conditions, Manage grazing for compatible vegetation height, structure, etc.		H
Pollution	Nutrient loads				Voluntary Standards		Implement Best Management Practices for agricultural production		M
Resource Extraction	Water use, management				Voluntary Standards		Implement Best Management Practices for water resource development		H
Lusk's Pinemoth	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Unknown	X	Unknown	X	Front Range		Ponderosa Pine	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains		Lodgepole Pine	<input type="checkbox"/>	
Coloradia luskii									
	Mixed Conifer								<input type="checkbox"/>
Tier 2	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Indirect Mortality	Forest and woodland management				Compatible Resource Use		Implement compatible logging practices		L
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge	Population status unknown				Research and Monitoring		Monitor population status		H
Natural Factors	Disease and parasitism (deforestation due to pine beetle)				Voluntary Standards		Implement Best Management Practices for forestry		M
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Mayfly, spp.	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Unknown	X	Unknown	X	Utah High Plateau Wyoming Basin	P P	West Slope Rivers	<input checked="" type="checkbox"/>
Ametropus albrighti								
Tier 2	Insects							
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action	Priority
Indirect Mortality	Grazing				Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements, Improve erosion and excess sedimentation conditions	M
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status	H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.	H
Pollution	Waste or residual materials (excess sediment loads)				Compatible Resource Use		Implement compatible grazing management, Implement compatible logging practices	M
Pollution	Waste or residual materials (excess sediment loads)				Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements, Improve erosion and excess sedimentation conditions, Manage grazing for compatible vegetation height, structure, etc.	M
Resource Extraction	Water use, management				Voluntary Standards		Implement Best Management Practices for water resource development	M
Moss's elfin	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Declining	X	Front Range	P	Pinyon-Juniper Ponderosa Pine Upland Shrub Transition Streams	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
Callophrys mossii schryveri								
Tier 2	Insects							
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action	Priority
Disturbance	Non-motorized recreation				Protected Area Management		Manage public use to be compatible with biodiversity	M
Habitat Conversion	Housing, urban, and ex-urban development				Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.	H
Habitat Conversion	Recreation area developments				Protected Area Management		Manage public use to be compatible with biodiversity	L
Habitat Conversion	Housing, urban, and ex-urban development				Voluntary Standards		Implement Best Management Practices for urban development, landscaping, etc.	H
Habitat Degradation	Altered native vegetation (seral stage imbalance)				Maintain or Restore Habitat		Manage grazing for compatible vegetation height, structure, etc.	L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Mottled Duskywing	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	X	Declining	X	Front Range	P	Foothill/Mountain Grassland	<input type="checkbox"/>	
					Central Shortgrass Prairie	O	Upland Shrub	<input type="checkbox"/>	
<i>Erynnis martialis</i>									
Tier 2	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation	Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime (fire suppression may result in habitat being eliminated by spreading forests or high shrubbery)		L
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.		H
Nelson’s snowfly	Population Status		Population Trend				Habitat	Primary	
	Unknown	X	Unknown	X			Unknown	<input type="checkbox"/>	
<i>Capnia nelsoni</i>									
Tier 2	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status, Research critical habitat components		H
Natural Factors	Scarcity (leading to inbreeding depression)				Land Protection (Public, Private), Easements, and Resource Rights		Protect populations		H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.		H
Northern hairstreak	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Stable	X	Central Shortgrass Prairie	P	Deciduous Oak	<input checked="" type="checkbox"/>	
							Shortgrass Prairie	<input type="checkbox"/>	
<i>Eurystrymon favonius Ontario</i>									
Tier 2	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.		H

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Table 16 - Continued.

Osler's oakworm moth	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Unknown	X	Unknown	X	Colorado Plateau	P	Deciduous Oak	<input checked="" type="checkbox"/>
<i>Anisota oslari</i>								
Tier 2		Insects						
General Threat	Specific Threat				General Conservation Action	Specific Conservation Action		Priority
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring	Conduct field inventory to refine known distribution, Monitor population status		H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation	Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.		H
Paiute dancer	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Medium	X	Declining	X	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>
							Eastern Plains Streams	<input checked="" type="checkbox"/>
<i>Argia alberta</i>								
Tier 2		Insects						
General Threat	Specific Threat				General Conservation Action	Specific Conservation Action		Priority
Habitat Degradation	Altered native vegetation (riparian area deforestation)				Compatible Resource Use	Implement compatible grazing management		M
Habitat Degradation	Natural system modification - wetland filling				Legislation, Policies and Regulations	Encourage use of Farm Bill programs		M
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring	Conduct field inventory to refine known distribution, Monitor population status		H
Organizational capacity and management	Lack of funding				Capacity Building and Cooperation	Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.		H
Pollution	Herbicide/pesticide spraying or runoff				Compatible Resource Use	Reduce herbicide and pesticide use		M
Pollution	Nutrient loads				Voluntary Standards	Implement Best Management Practices for agricultural production		M
Resource Extraction	Water use, management				Land Protection (Public, Private), Easements, and Resource Rights	Establish in-stream flow rights		H
Resource Extraction	Water use, management				Voluntary Standards	Implement Best Management Practices for water resource development		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Plains snowfly		Population Status		Population Trend		Distribution		Type	Habitat		Primary	
		Unknown	X	Declining	X	Southern Rocky Mountains	P	Transition Streams		<input checked="" type="checkbox"/>		
						Central Shortgrass Prairie	O	Eastern Plains Rivers		<input type="checkbox"/>		
								Eastern Plains Streams		<input type="checkbox"/>		
<i>Mesocapnia frisoni</i>												
Tier 2		Insects										
General Threat		Specific Threat				General Conservation Action			Specific Conservation Action			Priority
Habitat Conversion		Housing, urban, and ex-urban development				Maintain or Restore Natural Processes			Improve erosion and excess sedimentation conditions			H
Habitat Degradation		Altered native vegetation (seral stage imbalance)				Maintain or Restore Habitat			Manage grazing for compatible vegetation height, structure, etc.			M
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring			Conduct field inventory to refine known distribution			H
Lack of knowledge		Population status unknown				Research and Monitoring			Monitor population status			H
Organizational capacity and management		Lack of funding				Capacity Building and Cooperation			Develop partnerships among agencies, NGOs, and stakeholders			H
Resource Extraction		Water use, management				Land Protection (Public, Private), Easements, and Resource Rights			Establish in-stream flow rights			H
Resource Extraction		Water use, management				Voluntary Standards			Implement Best Management Practices for water resource development, Coordinate with related agencies to align goals, policies, measures of success, etc.			H
Red-veined meadowfly		Population Status		Population Trend		Distribution		Type	Habitat		Primary	
		Unknown	X	Unknown	X	Southern Rocky Mountains	P	Grass/Forb Dominated Wetlands		<input checked="" type="checkbox"/>		
						Colorado Plateau		Open Water		<input checked="" type="checkbox"/>		
						Utah High Plateau						
<i>Sympetrum madidum</i>												
Tier 2		Insects										
General Threat		Specific Threat				General Conservation Action			Specific Conservation Action			Priority
Habitat Conversion		Conversion to cropland				Legislation, Policies and Regulations			Encourage use of Farm Bill programs			H
Habitat Conversion		Housing, urban, and ex-urban development				Maintain or Restore Habitat			Avoid destruction of large tracts of native habitat (ephemeral ponds)			H
Habitat Degradation		Natural system modification - wetland filling				Voluntary Standards			Implement Best Management Practices for urban development, landscaping, etc.			M
Lack of knowledge		Population status unknown				Research and Monitoring			Conduct field inventory to refine known distribution, Monitor population status			H
Organizational capacity and management		Lack of funding				Capacity Building and Cooperation			Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.			H
Resource Extraction		Water use, management				Voluntary Standards			Implement Best Management Practices for water resource development			H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Regal fritillary		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Low	X	Declining	X	Central Shortgrass Prairie	P	Foothill/Mountain Grassland	<input type="checkbox"/>
						Front Range	O	Grass/Forb Dominated Wetlands	<input type="checkbox"/>
<i>Speyeria idalia</i>								Tallgrass Prairie	<input type="checkbox"/>
Tier 2 Insects									
General Threat	Specific Threat					General Conservation Action		Specific Conservation Action	Priority
Direct Mortality	Gathering					Compliance and Enforcement		Enforce wildlife and habitat protection laws	L
Habitat Conversion	Conversion to cropland					Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat (sod-busting), Maintain appropriate patch size and habitat mosaic,	H
Habitat Conversion	Housing, urban, and ex-urban development					Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.	M
Habitat Degradation	Altered native vegetation (seral stage imbalance)					Maintain or Restore Habitat		Manage grazing for compatible vegetation height, structure, etc., Restore native prairie	M
Habitat Degradation	Altered fire regime					Maintain or Restore Natural Processes		Restore natural fire regime (fire rotation of <5 years can extirpate a local population)	L
Indirect Mortality	Grazing					Maintain or Restore Habitat		Manage grazing for compatible vegetation height, structure, etc.	M
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown					Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status	H
Natural Factors	Scarcity (limited distribution)					Species Management		Protect populations	H
Pollution	Herbicide/pesticide spraying or runoff					Compatible Resource Use		Reduce use of herbicides and pesticides	L

Rhesus skipper		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Low	X	Declining	X	Central Shortgrass Prairie	P	Midgrass Prairie	<input checked="" type="checkbox"/>
						Front Range	P	Shortgrass Prairie	<input checked="" type="checkbox"/>
<i>Polites rhesus</i>						Colorado Plateau	O	Foothill/Mountain Grassland	<input type="checkbox"/>
Tier 2 Insects						Southern Rocky Mountains	O		
General Threat	Specific Threat					General Conservation Action		Specific Conservation Action	Priority
Habitat Conversion	Conversion to cropland, housing, urban, and ex-urban development					Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat (e.g., ski area development, sod-busting), Maintain appropriate patch size and habitat mosaic	H
Habitat Conversion	Housing, urban, and ex-urban development					Planning and Zoning		Promote consideration of biodiversity issues in transportation and land use planning processes, Promote zoning that concentrates use and protects habitat	H
Indirect Mortality	Grazing					Maintain or Restore Habitat		Manage grazing for compatible vegetation height, structure, etc. (may require moderate grazing by large mammals or livestock)	M
Lack of knowledge	Complete distribution in Colorado unknown, promote zoning that concentrates use and protects habitat					Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status	H
Natural Factors	Scarcity (limited distribution and small local population size)					Land Protection (Public, Private), Easements, and Resource Rights		Protect populations	H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Rocky Mountain Agapema <i>Agapema homogenea</i> Tier 2 Insects	Population Status		Population Trend		Distribution	Type	Habitat	Primary		
	Unknown	X	Unknown	X	Front Range	P	Upland Shrub	<input checked="" type="checkbox"/>		
					Southern Rocky Mountains	O	Douglas Fir	<input type="checkbox"/>		
							Lodgepole Pine	<input type="checkbox"/>		
							Mixed Conifer	<input type="checkbox"/>		
							Mixed Forest	<input type="checkbox"/>		
							Ponderosa Pine	<input type="checkbox"/>		
							White Fir	<input type="checkbox"/>		
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation		Altered native vegetation (riparian area deforestation)			Maintain or Restore Habitat		Manage grazing for compatible vegetation height, structure, etc.		L	
Lack of knowledge		Complete distribution in Colorado unknown, population status unknown			Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H	
Organizational capacity and management		Lack of funding			Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders,Coordinate with related agencies to align goals, policies, measures of success, etc.		H	
San Luis Dunes tiger beetle <i>Cicindela theatina</i> Tier 2 Insects	Population Status		Population Trend		Distribution	Type	Habitat	Primary		
	Low	X	Unknown	X	Southern Rocky Mountains	P	Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>		
	General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
	Disturbance		Non-motorized recreation			Protected Area Management		Manage public use to be compatible with biodiversity, write and implement management plan		M
	Indirect Mortality		Water use (e.g., de-watering of streams)			Land Protection (Public, Private), Easements, and Resource Rights		Acquire water rights, Establish in-stream flow rights		H
	Lack of knowledge		Complete distribution in Colorado unknown, population status unknown			Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
	Resource Extraction		Water use, management			Voluntary Standards		Implement Best Management Practices for water resource development		H
Sandia hairstreak <i>Callophrys mcfarlandi</i> Tier 2 Insects	Population Status		Population Trend		Distribution	Type	Habitat	Primary		
	Low	X	Unknown	X	Central Shortgrass Prairie	P	Shortgrass Prairie	<input checked="" type="checkbox"/>		
	General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
	Habitat Conversion		Conversion to cropland			Maintain or Restore Habitat		Avoid destruction of large tracts of native habitat (sod-busting)		L
	Lack of knowledge		Complete distribution in Colorado unknown, population status unknown			Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
	Natural Factors		Scarcity (limited distribution)			Land Protection (Public, Private), Easements, and Resource Rights		Protect populations		H
	Organizational capacity and management		Lack of funding			Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Spalding's blue	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	X	Unknown	X	Colorado Plateau	P	Pinyon-Juniper	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains	O	Deciduous Oak	<input type="checkbox"/>	
							Ponderosa Pine	<input type="checkbox"/>	
<i>Euphilotes spaldingi</i>									
Tier 2	Insects								
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Indirect Mortality	Grazing				Maintain or Restore Habitat		Manage grazing for compatible structure		L
Invasive or Exotic Species	Invasive plants				Invasive Species Control and Prevention		Control weeds and increased fire risks		L
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Natural Factors	Scarcity (limited local distribution)				Land Protection (Public, Private), Easements, and Resource Rights		Protect populations		H
Stripe-winged baskettail	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Medium	X	Unknown	X	Central Shortgrass Prairie	P	Lakes	<input checked="" type="checkbox"/>	
							Open Water	<input checked="" type="checkbox"/>	
							Eastern Plains Rivers	<input type="checkbox"/>	
<i>Tetragoneuria petechialis</i>									
Tier 2	Insects								
	This species has undergone a taxonomic revision and has been renamed <i>Epitheca costalis</i> (Dunkle 2000).						Eastern Plains Streams		<input type="checkbox"/>
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion	Conversion to cropland				Legislation, Policies and Regulations		Encourage use of Farm Bill programs		H
Habitat Degradation	Altered native vegetation (riparian area deforestation, denuding of wetland vegetation)				Compatible Resource Use		Implement compatible grazing management		H
Habitat Degradation	Natural system modification - wetland filling				Legislation, Policies and Regulations		Encourage use of Farm Bill programs		H
Indirect Mortality	Water use (de-watering of streams)				Land Protection (Public, Private), Easements, and Resource Rights		Establish in-stream flow rights		M
Lack of knowledge	Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Pollution	Herbicide/pesticide spraying or runoff				Compatible Resource Use		Reduce herbicide/pesticide use		M
Pollution	Waste or residual materials (excess sediment loads)				Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements, Improve erosion and excess sedimentation conditions, Manage grazing for compatible vegetation height, structure, etc.		M
Pollution	Nutrient loads				Voluntary Standards		Implement Best Management Practices for agricultural production		M
Resource Extraction	Water use, management				Voluntary Standards		Implement Best Management Practices for water resource development		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Two-spotted skipper	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Unknown	X	Declining	X	Central Shortgrass Prairie	P	Eastern Plains Streams	<input checked="" type="checkbox"/>	
					Front Range		Grass/Forb Dominated Wetlands	<input checked="" type="checkbox"/>	
							Shortgrass Prairie	<input type="checkbox"/>	
Euphyes bimacula									
Tier 2		Insects							
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland			Legislation, Policies and Regulations		Encourage use of Farm Bill programs		H
Habitat Degradation		Altered native vegetation (riparian area deforestation, denuding of wetland vegetation)			Compatible Resource Use		Implement compatible grazing management		H
Habitat Degradation		Natural system modification - wetland filling			Legislation, Policies and Regulations		Encourage use of Farm Bill programs		H
Indirect Mortality		Water use (de-watering of streams)			Land Protection (Public, Private), Easements, and Resource Rights		Establish in-stream flow rights		M
Lack of knowledge		Complete distribution in Colorado unknown, population status unknown			Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Pollution		Herbicide/pesticide spraying or runoff			Compatible Resource Use		Reduce herbicide/pesticide use		M
Pollution		Waste or residual materials (excess sediment loads)			Maintain or Restore Habitat		Implement streambank or in-stream restoration/improvements, Improve erosion and excess sedimentation conditions, Manage grazing for compatible vegetation height, structure, etc.		M
Pollution		Nutrient loads			Voluntary Standards		Implement Best Management Practices for agricultural production		M
Resource Extraction		Water use, management			Voluntary Standards		Implement Best Management Practices for water resource development		H
Wiest's sphinx moth	Population Status		Population Trend		Distribution	Type	Habitat	Primary	
	Low	X	Unknown	X	Central Shortgrass Prairie	P	Sand Dune Complex	<input checked="" type="checkbox"/>	
					Southern Rocky Mountains	O	(Grassland) Shortgrass Prairie	<input type="checkbox"/>	
Euproserpinus wiesti									
Tier 2		Insects							
General Threat		Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered native vegetation (seral stage imbalance)			Compatible Resource Use		Implement compatible grazing management		M
Lack of knowledge		Complete distribution in Colorado unknown, population status unknown			Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Organizational capacity and management		Lack of funding			Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.		H
Pollution		Herbicide/pesticide spraying or runoff			Compatible Resource Use		Reduce herbicide/pesticide use		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Xanthus skipper <i>Pyrgus xanthus</i> Tier 2 Insects		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Low	X	Declining	X	Front Range	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P	Aspen Forest	<input type="checkbox"/>	
						Central Shortgrass Prairie	O	Mixed Conifer	<input type="checkbox"/>	
						Colorado Plateau	O	Mixed Forest	<input type="checkbox"/>	
								Pinyon-Juniper	<input type="checkbox"/>	
						Ponderosa Pine	<input type="checkbox"/>			
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Disturbance		Motorized and non-motorized recreation				Compatible Resource Use		Manage public use to be compatible with biodiversity		L
Habitat Degradation		Altered native vegetation (seral stage imbalance)				Maintain or Restore Habitat		Manage grazing for compatible vegetation structure		L
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime (long-term fire suppression has closed forest openings)		H
Invasive or Exotic Species		Invasive plants				Invasive Species Control and Prevention		Control smooth brome		M
Lack of knowledge		Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Yellow-banded day sphinx <i>Proserpinus flavofasciata</i> Tier 2 Insects		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Unknown	X	Unknown	X	Southern Rocky Mountains	P	Foothill/Mountain Grassland	<input checked="" type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge		Complete distribution in Colorado unknown, population status unknown				Research and Monitoring		Conduct field inventory to refine known distribution, Monitor population status		H
Organizational capacity and management		Lack of funding				Capacity Building and Cooperation		Develop partnerships among agencies, NGOs, and stakeholders, Coordinate with related agencies to align goals, policies, measures of success, etc.		H

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Tier 2 Mammals

Allen's big-eared bat <i>Idionycteris phyllotis</i> Tier 2 Mammals		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Unknown	X	Unknown	X	Colorado Plateau		Deciduous Oak	<input checked="" type="checkbox"/>	
		Not yet documented in Colorado. If found would likely be in the Colorado Plateau Ecoregion.						Pinyon-Juniper	<input checked="" type="checkbox"/>	
								Ponderosa Pine	<input checked="" type="checkbox"/>	
								Exposed Rock	<input type="checkbox"/>	
								Mixed Conifer	<input type="checkbox"/>	
								Sagebrush	<input type="checkbox"/>	
								West Slope Rivers	<input type="checkbox"/>	
								West Slope Streams	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Disturbance		Proximal non-recreation disturbance				Species Management		Manage to limit disturbance, especially to roost sites, maternity colonies, and hibernacula		M
Habitat Degradation		Cave/mine closures				Maintain or Restore Habitat		Manage caves/mines for native bats		H
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		M
Pollution		Herbicide/pesticide spraying or runoff				Compatible Resource Use		Reduce pesticide use		L
Arizona myotis <i>Myotis occultus</i> Tier 2 Mammals		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Unknown	X	Unknown	X	Colorado Plateau	P	Aspen Forest	<input checked="" type="checkbox"/>	
						Southern Rocky Mountains	P	Mixed Conifer	<input checked="" type="checkbox"/>	
						Central Shortgrass Prairie	O	Mixed Forest	<input checked="" type="checkbox"/>	
								Pinyon-Juniper	<input checked="" type="checkbox"/>	
								Ponderosa Pine	<input checked="" type="checkbox"/>	
								Spruce-Fir	<input checked="" type="checkbox"/>	
								Upland Shrub	<input checked="" type="checkbox"/>	
								Deciduous Oak	<input type="checkbox"/>	
								Desert Shrub	<input type="checkbox"/>	
								Eastern Plains Rivers	<input type="checkbox"/>	
								Eastern Plains Streams	<input type="checkbox"/>	
								Foothill/Mountain Grassland	<input type="checkbox"/>	
								Mountain Streams	<input type="checkbox"/>	
								Sagebrush	<input type="checkbox"/>	
								Transition Streams	<input type="checkbox"/>	
								Urban	<input type="checkbox"/>	
								West Slope Rivers	<input type="checkbox"/>	
								West Slope Streams	<input type="checkbox"/>	
		General Threat		Specific Threat				General Conservation Action		Specific Conservation Action
Disturbance		Proximal non-recreation disturbance				Species Management		Manage to limit disturbance, especially to roost sites, maternity colonies, and hibernacula		H
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		M
Lack of knowledge		Population status unknown				Research and Monitoring		Research critical life history/habitat components		M
Pollution		Herbicide/pesticide spraying or runoff				Compatible Resource Use		Reduce pesticied use		L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Bighorn sheep		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Medium	D	Stable	D	Southern Rocky Mountains	P	Exposed Rock	<input checked="" type="checkbox"/>	
<i>Ovis canadensis</i> Tier 2 Mammals						Central Shortgrass Prairie	O	Foothill/Mountain Grassland	<input type="checkbox"/>	
						Colorado Plateau	O	Shrub Tundra	<input type="checkbox"/>	
						Wyoming Basin	O			
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Illegal take				Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Habitat Degradation		Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)				Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic - especially in winter foraging areas		H
Habitat Degradation		Altered fire regime				Maintain or Restore Natural Processes		Restore natural fire regime		M
Invasive or Exotic Species		Invasive animals				Species Management		Reduce competition with domestic livestock		M
Invasive or Exotic Species		Pathogen - lungworm/pneumonia				Species Management		Reduce disease transmission from domestic livestock		H
Natural Factors		Scarcity (leading to inbreeding depression)				Species Management		Maintain genetic connection/integrity within and between populations		M

Bison		Population Status	Population Trend	Habitat	Primary
<i>Bison bison</i>	Tier 2	Mammals	Wild populations extirpated. Classified as domestic species by Wildlife Commission Regulation – Ch. 11, Art. II, Sct 1103 A. This species was identified as a species of greatest conservation need through our expert/stakeholder input process. However, there are currently no wild populations of bison within Colorado; nor are there restoration plans by any agency to establish wild populations in the near future on public lands. As such, there are no threats or conservation actions to be applied to this species at this time.	Midgrass Prairie	<input checked="" type="checkbox"/>
				Shortgrass Prairie	<input checked="" type="checkbox"/>

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Common Hog-nosed skunk		Population Status		Population Trend		Distribution	Type	Habitat	Primary
		Unknown	X	Unknown	X	Central Shortgrass Prairie	P	Pinyon-Juniper	<input checked="" type="checkbox"/>
						Front Range	P	Upland Shrub	<input checked="" type="checkbox"/>
								Deciduous Oak	<input type="checkbox"/>
								Desert Shrub	<input type="checkbox"/>
								Foothill/Mountain Grassland	<input type="checkbox"/>
								Greasewood Fans and Flats	<input type="checkbox"/>
								Saltbrush Fans and Flats	<input type="checkbox"/>
								Sand Dunes Complex (Shrubland)	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority	
Lack of knowledge		Complete distribution in Colorado unknown		Research and Monitoring		Conduct field inventory to refine known distribution		H	
Lack of knowledge		Complete distribution in Colorado unknown		Research and Monitoring		Ground-truth habitat and species distribution model(s)		M	
Lack of knowledge		Population status unknown		Research and Monitoring		Research critical life history/habitat components		H	
Pollution		Herbicide/pesticide spraying or runoff		Compatible Resource Use		Reduce pesticide use		L	
Grizzly bear		Population Status		Population Trend		Habitat		Primary	
						Aspen Forest		<input checked="" type="checkbox"/>	
						Deciduous Oak		<input checked="" type="checkbox"/>	
						Douglas Fir		<input checked="" type="checkbox"/>	
						Foothill/Mountain Grassland		<input checked="" type="checkbox"/>	
						Lodgepole Pine		<input checked="" type="checkbox"/>	
						Meadow Tundra		<input checked="" type="checkbox"/>	
						Mixed Conifer		<input checked="" type="checkbox"/>	
						Mixed Forest		<input checked="" type="checkbox"/>	
						Ponderosa Pine		<input checked="" type="checkbox"/>	
						Shrub Tundra		<input checked="" type="checkbox"/>	
						Spruce-Fir		<input checked="" type="checkbox"/>	
						Upland Shrub		<input checked="" type="checkbox"/>	
						Limber Pine		<input type="checkbox"/>	
						Mountain Streams		<input type="checkbox"/>	
						Rocky Mtn Bristlecone Pine		<input type="checkbox"/>	
						White Fir		<input type="checkbox"/>	
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation		Fragmentation		Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		H	
Habitat Degradation		Fragmentation		Maintain or Restore Habitat		Maintain linkages and connectivity (e.g., wildlife over/under passes, habitat corridors, wildlife-friendly fences)		H	
Lack of knowledge		Population status unknown		Research and Monitoring		Monitor population status		H	

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Table 16 - Continued.

Preble's shrew		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Unknown	X	Unknown	X	Southern Rocky Mountains	P	Deciduous Oak	<input checked="" type="checkbox"/>	
						Colorado Plateau	O	Foothill/Mountain Grassland	<input type="checkbox"/>	
								Sagebrush	<input type="checkbox"/>	
<i>Sorex preblei</i>										
Tier 2	Mammals									
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Ground-truth habitat and species distribution model(s)		M
Lack of knowledge		Population status unknown				Research and Monitoring		Research critical life history/habitat components		M
Wolverine		Population Status		Population Trend		Distribution	Type	Habitat	Primary	
		Unknown	X	Unknown	X	Southern Rocky Mountains	P	Spruce-Fir	<input checked="" type="checkbox"/>	
								Aspen Forest	<input type="checkbox"/>	
								Exposed Rock	<input type="checkbox"/>	
								Limber Pine	<input type="checkbox"/>	
								Lodgepole Pine	<input type="checkbox"/>	
								Meadow Tundra	<input type="checkbox"/>	
								Mixed Conifer	<input type="checkbox"/>	
								Mixed Forest	<input type="checkbox"/>	
								Rocky Mtn Bristlecone Pine	<input type="checkbox"/>	
								Shrub Tundra	<input type="checkbox"/>	
								White Fir	<input type="checkbox"/>	
General Threat		Specific Threat				General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Illegal take				Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Habitat Degradation		Fragmentation				Maintain or Restore Habitat		Maintain appropriate patch size and habitat mosaic		H
Habitat Degradation		Fragmentation				Maintain or Restore Habitat		Maintain linkages and connectivity (e.g., wildlife over/under passes, habitat corridors, wildlife-friendly fences)		H
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution		H
Lack of knowledge		Complete distribution in Colorado unknown				Research and Monitoring		Ground-truth habitat and species distribution model(s)		H
Lack of knowledge		Population status unknown				Research and Monitoring		Monitor population status		H
Natural Factors		Altered animal community (change in herbivores, predators, pollintors, etc.)				Species Management		Maintain healthy ungulate populations		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Tier 2 Reptiles

Blacknecked garter snake <i>Thamnophis cyrtopsis</i> Tier 2 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Unknown	X	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>
					Colorado Plateau	O	Eastern Plains Streams	<input checked="" type="checkbox"/>
							West Slope Rivers	<input checked="" type="checkbox"/>
							West Slope Streams	<input checked="" type="checkbox"/>
							Deciduous Oak	<input type="checkbox"/>
							Desert Shrub	<input type="checkbox"/>
							Pinyon-Juniper	<input type="checkbox"/>
							Shortgrass Prairie	<input type="checkbox"/>
General Threat	Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Direct Mortality	Illegal take			Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Habitat Conversion	Conversion to cropland			Compatible Resource Use		Maintain native landscape via zoning, conservation easements, acquisition, etc.		L
Habitat Conversion	Housing, urban, and ex-urban development			Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		L
Lack of knowledge	Population trend unknown			Research and Monitoring		Monitor population status		L
Natural Factors	Scarcity (leading to inbreeding depression)			Research and Monitoring		Monitor population status		M
Common kingsnake <i>Lampropeltis getula</i> Tier 2 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Unknown	X	Central Shortgrass Prairie	P	Eastern Plains Rivers	<input checked="" type="checkbox"/>
					Colorado Plateau	P	Eastern Plains Streams	<input checked="" type="checkbox"/>
							Irrigated Crops	<input checked="" type="checkbox"/>
							Shortgrass Prairie	<input checked="" type="checkbox"/>
							West Slope Streams	<input checked="" type="checkbox"/>
							Desert Shrub	<input type="checkbox"/>
							Midgrass Prairie	<input type="checkbox"/>
							Playas	<input type="checkbox"/>
General Threat	Specific Threat			General Conservation Action		Specific Conservation Action		Priority
Direct Mortality	Collision (e.g., auto)			Education and Communication		Implement public outreach/education program		L
Lack of knowledge	Population trend unknown			Research and Monitoring		Monitor population status		L

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Longnose leopard lizard <i>Gambelia wislizenii</i> Tier 2 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Stable	X	Colorado Plateau	P	Desert Shrub	<input checked="" type="checkbox"/>
							Greasewood Fans and Flats	<input checked="" type="checkbox"/>
							Pinyon-Juniper	<input checked="" type="checkbox"/>
							Sagebrush	<input checked="" type="checkbox"/>
							Saltbrush Fans and Flats	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland		Compatible Resource Use		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Habitat Conversion		Housing, urban, and ex-urban development		Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		M
Invasive or Exotic Species		Invasive plants- cheatgrass		Invasive Species Control and Prevention		Implement integrated weed/pest management plan		M
Lack of knowledge		Population status unknown		Research and Monitoring		Conduct field inventory to refine known distribution		L
Long-nosed snake <i>Rhinocheilus lecontei</i> Tier 2 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Unknown	X	Central Shortgrass Prairie	P	Sand Dune Complex (Grassland)	<input checked="" type="checkbox"/>
							Shortgrass Prairie	<input checked="" type="checkbox"/>
							Eastern Plains Rivers	<input type="checkbox"/>
							Sagebrush	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Conversion to cropland		Compatible Resource Use		Maintain native landscape via zoning, conservation easements, acquisition, etc.		L
Lack of knowledge		Complete distribution in Colorado unknown		Research and Monitoring		Conduct field inventory to refine known distribution		M
Midget faded rattlesnake <i>Crotalus viridis concolor</i> Tier 2 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Unknown	X	Unknown	X	Colorado Plateau	P	Desert Shrub	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	P	Exposed Rock	<input checked="" type="checkbox"/>
					Utah High Plateau	P	Pinyon-Juniper	<input checked="" type="checkbox"/>
							Greasewood Fans and Flats	<input type="checkbox"/>
							Sagebrush	<input type="checkbox"/>
							Saltbrush Fans and Flats	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Illegal take		Compliance and Enforcement		Enforce hunting, fishing, collecting regulations		L
Habitat Degradation		Off-road and trail development and use		Compliance and Enforcement		Manage off-road travel		M
Lack of knowledge		Population status unknown		Research and Monitoring		Monitor population status		L
Resource Extraction		Oil and gas drilling		Voluntary Standards		Implement Best Management Practices for energy development and mining		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Night snake <i>Hypsiglena torquata</i> Tier 2 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Low	X	Unknown	X	Central Shortgrass Prairie	P	Desert Shrub	<input checked="" type="checkbox"/>
					Colorado Plateau	P	Greasewood Fans and Flats	<input checked="" type="checkbox"/>
					Southern Rocky Mountains		Pinyon-Juniper	<input checked="" type="checkbox"/>
					Utah High Plateau		Eastern Plains Streams	<input type="checkbox"/>
							Sagebrush	<input type="checkbox"/>
							Shortgrass Prairie	<input type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, and ex-urban development (localized, most habitat is not suitable for development)		Planning and Zoning		Maintain native landscape via zoning, conservation easements, acquisition, etc.		L
Lack of knowledge		Complete distribution in Colorado unknown		Research and Monitoring		Conduct field inventory to refine known distribution		M
Roundtail horned lizard <i>Phrynosoma modestum</i> Tier 2 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Unknown	X	Unknown	X	Central Shortgrass Prairie	P	Pinyon-Juniper	<input checked="" type="checkbox"/>
							Shortgrass Prairie	<input checked="" type="checkbox"/>
	General Threat		Specific Threat		General Conservation Action		Specific Conservation Action	
	Direct Mortality		Illegal take		Compliance and Enforcement		Enforce hunting, fishing, collecting regulations	
	Habitat Conversion		Conversion to cropland		Compatible Resource Use		Maintain native landscape via zoning, conservation easements, acquisition, etc.	
Habitat Degradation		Pesticide use		Voluntary Standards		Implement Best Management Practices for agricultural production		M
Lack of knowledge		Population status unknown		Research and Monitoring		Monitor population status		L
Natural Factors		Scarcity (Colorado occurrences known only from two sites apparently disjunct from core range)		Research and Monitoring		Conduct field inventory to refine known distribution		M
Southwestern black-headed snake <i>Tantilla horbartsmithi</i> Tier 2 Reptiles	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Unknown	X	Unknown	X	Colorado Plateau	P	Desert Shrub	<input checked="" type="checkbox"/>
					Southern Rocky Mountains	O	Greasewood Fans and Flats	<input checked="" type="checkbox"/>
							Pinyon-Juniper	<input checked="" type="checkbox"/>
							Sagebrush	<input checked="" type="checkbox"/>
							Saltbrush Fans and Flats	<input checked="" type="checkbox"/>
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Direct Mortality		Collision (e.g., auto)		Education and Communication		Implement public outreach/education program		L
Lack of knowledge		Complete distribution in Colorado unknown		Research and Monitoring		Conduct field inventory to refine known distribution		M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 16 - Continued.

Texas blind snake	Population Status		Population Trend		Distribution	Type	Habitat	Primary
	Unknown	X	Unknown	X	Central Shortgrass Prairie	P	Pinyon-Juniper	<input checked="" type="checkbox"/>
	New Mexico threadsnake (Leptotyphlops dissectus)						Shortgrass Prairie	<input checked="" type="checkbox"/>
							Eastern Plains Streams	<input type="checkbox"/>
Tier 2	Reptiles							
General Threat	Specific Threat				General Conservation Action		Specific Conservation Action	Priority
Lack of knowledge	Complete distribution in Colorado unknown				Research and Monitoring		Conduct field inventory to refine known distribution	M

X = Best professional judgement, D = Science-based decision, P = Primary area of distribution, O = Other areas where species occurs.

Table 17. Key Habitats – Priorities, Threats, and Conservation Actions

Sorted by Priority (High, Medium, Low), Habitat Type, and Habitat Name.

High, Medium, and Low priority habitats are listed in Appendix F.

High Priority				Ponderosa Pine				Forestlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Falco peregrinus anatum	American peregrine falcon	<input type="checkbox"/>	Birds	Picoides dorsalis	American three-toed woodpecker	<input checked="" type="checkbox"/>				
Birds	Patagioenas fasciata	Band-tailed pigeon	<input checked="" type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>				
Birds	Aegolius funereus	Boreal owl	<input type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>				
Birds	Otus flammeolus	Flammulated owl	<input checked="" type="checkbox"/>	Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>				
Birds	Melanerpes lewis	Lewis's woodpecker	<input checked="" type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>				
Birds	Strix occidentalis lucida	Mexican spotted owl	<input checked="" type="checkbox"/>	Birds	Coccothraustes vespertinus	Evening grosbeak	<input checked="" type="checkbox"/>				
Birds	Accipiter gentilis	Northern goshawk	<input checked="" type="checkbox"/>	Birds	Dendroica graciae	Grace's warbler	<input checked="" type="checkbox"/>				
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Birds	Sitta pygmaea	Pygmy nuthatch	<input checked="" type="checkbox"/>				
Birds	Gymnorhinus cyanocephalus	Pinyon jay	<input checked="" type="checkbox"/>	Birds	Loxia curvirostra	Red crossbill	<input checked="" type="checkbox"/>				
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	<input type="checkbox"/>	Birds	Poocetes gramineus	Vesper sparrow	<input type="checkbox"/>				
Birds	Sphyrapicus thyroideus	Williamson's sapsucker	<input checked="" type="checkbox"/>	Birds	Vermivora virginiae	Virginia's warbler	<input checked="" type="checkbox"/>				
Insects	Hesperia leonardus montana	Pawnee montane skipper	<input checked="" type="checkbox"/>	Birds	Coloradia luski	Lusk's Pinemoth	<input checked="" type="checkbox"/>				
Mammals	Sorex nanus	Dwarf shrew	<input checked="" type="checkbox"/>	Insects	Callophrys mossii schryveri	Moss's elfin	<input checked="" type="checkbox"/>				
Mammals	Myotis thysanodes	Fringed myotis	<input type="checkbox"/>	Insects	Agapema homogena	Rocky Mountain Agapema	<input type="checkbox"/>				
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Insects	Euphilotes spaldingi	Spalding's blue	<input type="checkbox"/>				
Mammals	Euderma maculatum	Spotted bat	<input type="checkbox"/>	Insects	Pyrgus xanthus	Xanthus skipper	<input type="checkbox"/>				
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	<input checked="" type="checkbox"/>	Mammals	Idionycteris phyllotis	Allen's big-eared bat	<input checked="" type="checkbox"/>				
				Mammals	Myotis occultus	Arizona myotis	<input checked="" type="checkbox"/>				
				Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>				

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion	Housing, urban, and ex-urban development	Land Protection (Public, Private), Easements, and Resource Rights	Implement Purchase/Transfer Development Rights program for habitat protection	M
Habitat Conversion	Housing, urban, and ex-urban development	Land Protection (Public, Private), Easements, and Resource Rights	Purchase habitat or Acquire conservation easement for conservation purpose	H
Habitat Degradation	Roads or Railroads	Invasive Species Control and Prevention	Implement integrated weed/pest management plan	L
Habitat Degradation	Altered native vegetation (increased tree density)	Maintain or Restore Habitat	Remove trees/shrubs	H
Habitat Degradation	Altered fire regime	Maintain or Restore Natural Processes	Restore natural fire regime	H
Habitat Degradation	Fragmentation	Planning and Zoning	Promote zoning that concentrates use and protects habitat	M

Table 17 - Continued.

High Priority		<u>Sand Dune Complex (Grassland)</u>		Grasslands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Birds	Spizella breweri	Brewer's sparrow	<input type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input type="checkbox"/>
Birds	Aimophila cassinii	Cassin's sparrow	<input checked="" type="checkbox"/>	Birds	Poocetes gramineus	Vesper sparrow	<input type="checkbox"/>
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>	Insects	Amblyderus weneri	Great Sand Dunes Anthicid beetle	<input checked="" type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>		Cicindela theatina	San Luis Dunes tiger beetle	<input checked="" type="checkbox"/>
Birds	Tympanuchus cupido	Greater prairie-chicken	<input checked="" type="checkbox"/>	Insects	Euproserpinus wiesti	Wiest's sphinx moth	<input checked="" type="checkbox"/>
Birds	Tympanuchus pallidicinctus	Lesser prairie-chicken	<input checked="" type="checkbox"/>	Reptiles	Rhinocheilus lecontei	Long-nosed snake	<input checked="" type="checkbox"/>
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>				
Birds	Numenius americanus	Long-billed curlew	<input type="checkbox"/>				
Birds	Tympanuchus phasianellus jamesii	Plains sharp-tailed grouse	<input type="checkbox"/>				
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>				
Birds	Callipepla squamata	Scaled quail	<input checked="" type="checkbox"/>				
Birds	Asio flammeus	Short-eared owl	<input checked="" type="checkbox"/>				
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>				
Birds	Bartramia longicauda	Upland sandpiper	<input type="checkbox"/>				
Mammals	Lepus townsendii	White-tailed jackrabbit	<input type="checkbox"/>				
Reptiles	Kinosternon flavescens	Yellow mud turtle	<input checked="" type="checkbox"/>				

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion	Conversion to cropland	Maintain or Restore Habitat	Re-seed native species	H

Table 17 - Continued.

High Priority				Midgrass Prairie				Grasslands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Haliaeetus leucocephalus	Bald eagle	<input type="checkbox"/>	Birds	Calcarius ornatus	Chestnut-collared longspur	<input checked="" type="checkbox"/>				
Birds	Dolichonyx oryzivorus	Bobolink	<input checked="" type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input checked="" type="checkbox"/>				
Birds	Aimophila cassinii	Cassin's sparrow	<input checked="" type="checkbox"/>	Birds	Poocetes gramineus	Vesper sparrow	<input type="checkbox"/>				
Birds	Buteo regalis	Ferruginous hawk	<input checked="" type="checkbox"/>	Insects	Atrytone arogos	Arogos skipper	<input type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Insects	Polites rhesus	Rhesus skipper	<input checked="" type="checkbox"/>				
Birds	Tympanuchus cupido	Greater prairie-chicken	<input checked="" type="checkbox"/>	Mammals	Bison bison	Bison	<input checked="" type="checkbox"/>				
Birds	Calamospiza melanocorys	Lark bunting	<input checked="" type="checkbox"/>	Reptiles	Lampropeltis getula	Common kingsnake	<input type="checkbox"/>				
Birds	Tympanuchus pallidicinctus	Lesser prairie-chicken	<input checked="" type="checkbox"/>								
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>								
Birds	Numenius americanus	Long-billed curlew	<input type="checkbox"/>								
Birds	Calcarius mccownii	McCown's longspur	<input checked="" type="checkbox"/>								
Birds	Charadrius montanus	Mountain plover	<input type="checkbox"/>								
Birds	Tympanuchus phasianellus jamesii	Plains sharp-tailed grouse	<input checked="" type="checkbox"/>								
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>								
Birds	Callipepla squamata	Scaled quail	<input type="checkbox"/>								
Birds	Asio flammeus	Short-eared owl	<input checked="" type="checkbox"/>								
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>								
Birds	Bartramia longicauda	Upland sandpiper	<input checked="" type="checkbox"/>								
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input checked="" type="checkbox"/>								
Insects	Callophrys comstocki	Comstock's hairstreak	<input type="checkbox"/>								
Insects	Hesperia ottoe	Ottoe skipper	<input checked="" type="checkbox"/>								
Mammals	Mustela nigripes	Black-footed ferret	<input type="checkbox"/>								
Mammals	Cynomys ludovicianus	Black-tailed prairie dog	<input type="checkbox"/>								
Mammals	Thomomys talpoides macrotis	Northern pocket gopher (macrotis ssp)	<input checked="" type="checkbox"/>								
Mammals	Perognathus fasciatus	Olive-backed pocket mouse	<input checked="" type="checkbox"/>								
Mammals	Vulpes velox	Swift fox	<input checked="" type="checkbox"/>								
Mammals	Lepus townsendii	White-tailed jackrabbit	<input checked="" type="checkbox"/>								
Reptiles	Sistrurus catenatus	Massasauga	<input checked="" type="checkbox"/>								
Reptiles	Phrynosoma cornutum	Texas horned lizard	<input checked="" type="checkbox"/>								

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Climate	Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)	Legislation, Policies and Regulations	Reduce CO2 emissions	H
Habitat Conversion	Conversion to cropland	Maintain or Restore Habitat	Restore native prairie	H
Habitat Degradation	Altered native vegetation (seral stage imbalance, etc.)	Compatible Resource Use	Implement compatible grazing management	M

Table 17 - Continued.

High Priority

Tier 1 Species

Group	Species	Common Name	Primary
Birds	Haliaeetus leucocephalus	Bald eagle	<input type="checkbox"/>
Birds	Dolichonyx oryzivorus	Bobolink	<input checked="" type="checkbox"/>
Birds	Aimophila cassinii	Cassin's sparrow	<input type="checkbox"/>
Birds	Buteo regalis	Ferruginous hawk	<input checked="" type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input checked="" type="checkbox"/>
Birds	Tympanuchus cupido	Greater prairie-chicken	<input checked="" type="checkbox"/>
Birds	Calamospiza melanocorys	Lark bunting	<input checked="" type="checkbox"/>
Birds	Tympanuchus pallidicinctus	Lesser prairie-chicken	<input checked="" type="checkbox"/>
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>
Birds	Calcarius mccownii	McCown's longspur	<input type="checkbox"/>
Birds	Tympanuchus phasianellus jamesii	Plains sharp-tailed grouse	<input type="checkbox"/>
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>
Birds	Bartramia longicauda	Upland sandpiper	<input checked="" type="checkbox"/>
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input type="checkbox"/>
Insects	Hesperia ottoe	Ottoe skipper	<input checked="" type="checkbox"/>
Mammals	Lepus townsendii	White-tailed jackrabbit	<input type="checkbox"/>

Tier 2 Species

Group	Species	Common Name	Primary
Birds	Calcarius ornatus	Chestnut-collared longspur	<input type="checkbox"/>
Birds	Circus cyaneus	Northern harrier	<input checked="" type="checkbox"/>
Birds	Poocetes gramineus	Vesper sparrow	<input type="checkbox"/>
Insects	Atrytone arogos	Arogos skipper	<input type="checkbox"/>
Insects	Speyeria idalia	Regal fritillary	<input type="checkbox"/>

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion	Conversion to cropland	Maintain or Restore Habitat	Re-seed native species	M
Habitat Conversion	Housing, urban, and ex-urban development	Maintain or Restore Habitat	Maintain appropriate patch size and habitat mosaic	H
Habitat Degradation	Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)	Compatible Resource Use	Implement compatible grazing management	M
Habitat Degradation	Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)	Maintain or Restore Habitat	Re-seed native species	M

Table 17 - Continued.

High Priority				Shortgrass Prairie				Grasslands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Botaurus lentiginosus	American bittern	<input type="checkbox"/>	Amphibians	Scaphiopus couchii	Couch's spadefoot	<input checked="" type="checkbox"/>				
Birds	Haliaeetus leucocephalus	Bald eagle	<input type="checkbox"/>	Amphibians	Bufo debilis	Green toad	<input type="checkbox"/>				
Birds	Aimophila cassinii	Cassin's sparrow	<input checked="" type="checkbox"/>	Birds	Calcarius ornatus	Chestnut-collared longspur	<input checked="" type="checkbox"/>				
Birds	Buteo regalis	Ferruginous hawk	<input checked="" type="checkbox"/>	Birds	Toxostoma curvirostre	Curve-billed thrasher	<input checked="" type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input checked="" type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input checked="" type="checkbox"/>				
Birds	Tympanuchus cupido	Greater prairie-chicken	<input checked="" type="checkbox"/>	Insects	Euphilotes rita coloradensis	Colorado blue	<input type="checkbox"/>				
Birds	Calamospiza melanocorys	Lark bunting	<input checked="" type="checkbox"/>	Insects	Eurystrymon favonius Ontario	Northern hairstreak	<input type="checkbox"/>				
Birds	Tympanuchus pallidicinctus	Lesser prairie-chicken	<input checked="" type="checkbox"/>	Insects	Polites rhesus	Rhesus skipper	<input checked="" type="checkbox"/>				
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>	Insects	Callophrys mcfarlandi	Sandia hairstreak	<input checked="" type="checkbox"/>				
Birds	Numenius americanus	Long-billed curlew	<input checked="" type="checkbox"/>	Insects	Euphyes bimacula	Two-spotted skipper	<input type="checkbox"/>				
Birds	Calcarius mccownii	McCown's longspur	<input checked="" type="checkbox"/>	Insects	Euproserpinus wiesti	Wiest's sphinx moth	<input type="checkbox"/>				
Birds	Charadrius montanus	Mountain plover	<input checked="" type="checkbox"/>	Mammals	Bison bison	Bison	<input checked="" type="checkbox"/>				
Birds	Tympanuchus phasianellus jamesii	Plains sharp-tailed grouse	<input type="checkbox"/>	Reptiles	Thamnophis cyrtopsis	Blacknecked garter snake	<input type="checkbox"/>				
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>	Reptiles	Lampropeltis getula	Common kingsnake	<input checked="" type="checkbox"/>				
Birds	Callipepla squamata	Scaled quail	<input checked="" type="checkbox"/>	Reptiles	Rhinocheilus lecontei	Long-nosed snake	<input checked="" type="checkbox"/>				
Birds	Asio flammeus	Short-eared owl	<input checked="" type="checkbox"/>	Reptiles	Hypsiglena torquata	Night snake	<input type="checkbox"/>				
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>	Reptiles	Phrynosoma modestum	Roundtail horned lizard	<input checked="" type="checkbox"/>				
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input checked="" type="checkbox"/>	Reptiles	Leptotyphlops dulcis	Texas blind snake	<input checked="" type="checkbox"/>				
Mammals	Mustela nigripes	Black-footed ferret	<input checked="" type="checkbox"/>								
Mammals	Cynomys ludovicianus	Black-tailed prairie dog	<input checked="" type="checkbox"/>								
Mammals	Thomomys talpoides macrotis	Northern pocket gopher (macrotis ssp)	<input checked="" type="checkbox"/>								
Mammals	Perognathus fasciatus	Olive-backed pocket mouse	<input checked="" type="checkbox"/>								
Mammals	Vulpes velox	Swift fox	<input checked="" type="checkbox"/>								
Mammals	Lepus townsendii	White-tailed jackrabbit	<input checked="" type="checkbox"/>								
Reptiles	Sistrurus catenatus	Massasauga	<input checked="" type="checkbox"/>								
Reptiles	Phrynosoma cornutum	Texas horned lizard	<input checked="" type="checkbox"/>								
Reptiles	Cnemidophorus neotesselatus	Triploid checkered whiptail	<input type="checkbox"/>								
Reptiles	Kinosternon flavescens	Yellow mud turtle	<input type="checkbox"/>								

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Climate	Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)	Legislation, Policies and Regulations	Reduce CO2 emissions	H
Habitat Conversion	Housing, urban, and ex-urban development	Land Protection (Public, Private), Easements, and Resource Rights	Purchase habitat or Acquire conservation easement for conservation purpose	H
Habitat Conversion	Conversion to cropland	Maintain or Restore Habitat	Avoid destruction of large tracts of native habitat (e.g., ski area development, sod-busting)	H
Habitat Conversion	Conversion to cropland	Maintain or Restore Habitat	Restore native prairie	L
Habitat Degradation	Altered native vegetation (woody encroachment, seral stage imbalance, etc.)	Compatible Resource Use	Implement compatible grazing management	M

Table 17 - Continued.

Habitat Degradation	Altered animal community (loss of herbivores, esp. BTPD complexes, predators, pollinators, etc.)	Education and Communication	Implement landowner outreach/education program	H
Habitat Degradation	Natural system modification (terrestrial) - windbreaks, agricultural methods such as tilling, pitting	Maintain or Restore Habitat	Discourage planting windbreaks	L
Habitat Degradation	Overhead utility lines and towers	Planning and Zoning	Promote consideration of biodiversity issues in transportation and land use planning processes	L
Habitat Degradation	Roads or Railroads (super slab)	Research and Monitoring	Research habitat response to management	H
Indirect Consumptive Use	Grazing	Maintain or Restore Habitat	Maintain appropriate patch size and habitat mosaic	H
Invasive or Exotic Species	Invasive plants	Invasive Species Control and Prevention	Implement integrated weed/pest management plan	L

Table 17 - Continued.

High Priority				West Slope Streams				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Amphibians	<i>Rana pipiens</i>	Northern leopard Frog	<input checked="" type="checkbox"/>	Amphibians	<i>Hyla arenicolor</i>	Canyon tree frog	<input checked="" type="checkbox"/>				
Birds	<i>Falco peregrinus anatum</i>	American peregrine falcon	<input type="checkbox"/>	Birds	<i>Cinclus mexicanus</i>	American dipper	<input checked="" type="checkbox"/>				
Birds	<i>Haliaeetus leucocephalus</i>	Bald eagle	<input checked="" type="checkbox"/>	Birds	<i>Bucephala islandica</i>	Barrow's goldeneye	<input type="checkbox"/>				
Birds	<i>Aquila chrysaetos</i>	Golden eagle	<input type="checkbox"/>	Birds	<i>Cypseloides niger</i>	Black swift	<input checked="" type="checkbox"/>				
Birds	<i>Centrocercus urophasianus</i>	Greater sage-grouse	<input type="checkbox"/>	Birds	<i>Archilochus alexandri</i>	Black-chinned hummingbird	<input checked="" type="checkbox"/>				
Birds	<i>Centrocercus minimus</i>	Gunnison sage-grouse	<input checked="" type="checkbox"/>	Birds	<i>Empidonax occidentalis</i>	Cordilleran flycatcher	<input checked="" type="checkbox"/>				
Birds	<i>Melanerpes lewis</i>	Lewis's woodpecker	<input checked="" type="checkbox"/>	Birds	<i>Passerina amoena</i>	Lazuli bunting	<input type="checkbox"/>				
Birds	<i>Falco mexicanus</i>	Prairie falcon	<input type="checkbox"/>	Birds	<i>Circus cyaneus</i>	Northern harrier	<input checked="" type="checkbox"/>				
Birds	<i>Sphyrapicus nuchalis</i>	Red-naped sapsucker	<input type="checkbox"/>	Birds	<i>Anas acuta</i>	Northern pintail	<input checked="" type="checkbox"/>				
Birds	<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	<input checked="" type="checkbox"/>	Birds	<i>Egretta thula</i>	Snowy egret	<input type="checkbox"/>				
Birds	<i>Buteo swainsoni</i>	Swainson's hawk	<input checked="" type="checkbox"/>	Fish	<i>Catostomus discobolus</i>	Bluehead sucker	<input type="checkbox"/>				
Birds	<i>Coccyzus americanus</i>	Western yellow-billed cuckoo	<input checked="" type="checkbox"/>	Fish	<i>Catostomus latipinnis</i>	Flannelmouth sucker	<input type="checkbox"/>				
Fish	<i>Oncorhynchus clarki pleuriticus</i>	Colorado River Cutthroat Trout	<input type="checkbox"/>	Fish	<i>Catostomus playtrhynchus</i>	Mountain sucker	<input checked="" type="checkbox"/>				
Fish	<i>Gila robusta</i>	Roundtail chub	<input type="checkbox"/>	Insects	<i>Speyeria nokomis nokomis</i>	Great Basin silverspot butterfly	<input type="checkbox"/>				
Mammals	<i>Myotis thysanodes</i>	Fringed myotis	<input type="checkbox"/>	Insects	<i>Libellula nodisticta</i>	Hoary skimmer	<input checked="" type="checkbox"/>				
Mammals	<i>Lontra canadensis</i>	River otter	<input type="checkbox"/>	Mammals	<i>Idionycteris phyllotis</i>	Allen's big-eared bat	<input type="checkbox"/>				
Mammals	<i>Euderma maculatum</i>	Spotted bat	<input type="checkbox"/>	Mammals	<i>Myotis occultus</i>	Arizona myotis	<input type="checkbox"/>				
Mammals	<i>Plecotus (Chorynorhinus) townsendii pallescens</i>	Townsend's big-eared bat ssp.	<input type="checkbox"/>	Reptiles	<i>Thamnophis cyrtopsis</i>	Blacknecked garter snake	<input checked="" type="checkbox"/>				
				Reptiles	<i>Lampropeltis getula</i>	Common kingsnake	<input checked="" type="checkbox"/>				

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion	Housing, urban, and ex-urban development	Land Protection (Public, Private), Easements, and Resource Rights	Purchase habitat or Acquire conservation easement for conservation purpose	H
Habitat Conversion	Recreation area developments	Land Protection (Public, Private), Easements, and Resource Rights	Implement Purchase/Transfer Development Rights program for habitat protection	M
Habitat Conversion	Conversion to cropland	Maintain or Restore Habitat	Restore riparian vegetation	H
Habitat Conversion	Housing, urban, and ex-urban development	Maintain or Restore Habitat	Restore riparian vegetation	M
Habitat Degradation	Decreased water quality	Maintain or Restore Habitat	Improve erosion and excess sedimentation conditions	M
Habitat Degradation	Trail development	Maintain or Restore Habitat	Coordinate on ecologically sensitive design of recreational facilities	M
Habitat Degradation	Altered hydrological regime (surface or aquifer)	Maintain or Restore Natural Processes	Adjust operation of dam	H
Invasive or Exotic Species	Invasive animals	Invasive Species Control and Prevention	Control non-native fish	H
Invasive or Exotic Species	Invasive plants - tamarisk	Invasive Species Control and Prevention	Implement integrated weed/pest management plan	M

Table 17 - Continued.

High Priority				West Slope Rivers				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Amphibians	Rana pipiens	Northern leopard Frog	☑	Amphibians	Hyla arenicolor	Canyon tree frog	☑				
Birds	Falco peregrinus anatum	American peregrine falcon	☐	Birds	Cinclus mexicanus	American dipper	☑				
Birds	Haliaeetus leucocephalus	Bald eagle	☑	Birds	Pelecanus erythrorhynchos	American white pelican	☐				
Birds	Aquila chrysaetos	Golden eagle	☐	Birds	Bucephala islandica	Barrow's goldeneye	☐				
Birds	Grus canadensis tabida	Greater sandhill crane	☐	Birds	Cypseloides niger	Black swift	☑				
Birds	Melanerpes lewis	Lewis's woodpecker	☑	Birds	Archilochus alexandri	Black-chinned hummingbird	☑				
Birds	Falco mexicanus	Prairie falcon	☐	Birds	Empidonax occidentalis	Cordilleran flycatcher	☑				
Birds	Empidonax traillii extimus	Southwestern willow flycatcher	☑	Birds	Passerina amoena	Lazuli bunting	☐				
Birds	Buteo swainsoni	Swainson's hawk	☑	Birds	Aythya affinis	Lesser scaup	☐				
Birds	Progne subis hesperia	Western purple Martin	☐	Birds	Circus cyaneus	Northern harrier	☑				
Birds	Coccyzus americanus	Western yellow-billed cuckoo	☑	Birds	Anas acuta	Northern pintail	☑				
Fish	Gila elegans	Bonytail chub	☑	Birds	Pandion haliaetus	Osprey	☐				
Fish	Ptychocheilus lucius	Colorado Pikeminnow	☑	Birds	Egretta thula	Snowy egret	☐				
Fish	Gila cypha	Humpback chub	☑	Birds	Plegadis chihi	White-faced ibis	☑				
Fish	Xyrauchen texanus	Razorback Sucker	☑	Fish	Catostomus discobolus	Bluehead sucker	☑				
Fish	Gila robusta	Roundtail chub	☑	Fish	Catostomus latipinnis	Flannelmouth sucker	☑				
Mammals	Myotis thysanodes	Fringed myotis	☐	Insects	Gomphus intricatus	Brimstone clubtail	☑				
Mammals	Lontra canadensis	River otter	☑	Insects	Ametropus albrighti	Mayfly, spp.	☑				
Mammals	Euderma maculatum	Spotted bat	☐	Mammals	Idionycteris phyllotis	Allen's big-eared bat	☐				
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	☐	Mammals	Myotis occultus	Arizona myotis	☐				
Mollusks	Ferrissia walkeri	Cloche Ancylid	☐	Reptiles	Thamnophis cyrtopsis	Blacknecked garter snake	☑				
Mollusks	Ferrissia fragilis	Fragil Ancylid	☐								
Mollusks	Promenetus exacuus	Sharp Sprite	☐								

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion	Housing, urban, and ex-urban development	Land Protection (Public, Private), Easements, and Resource Rights	Purchase habitat or Acquire conservation easement for conservation purpose	H
Habitat Conversion	Recreation area developments	Land Protection (Public, Private), Easements, and Resource Rights	Implement Purchase/Transfer Development Rights program for habitat protection	M
Habitat Conversion	Conversion to cropland	Maintain or Restore Habitat	Restore riparian vegetation	H
Habitat Conversion	Housing, urban, and ex-urban development	Maintain or Restore Habitat	Restore riparian vegetation	M
Habitat Degradation	Decreased water quality	Maintain or Restore Habitat	Improve erosion and excess sedimentation conditions	M
Habitat Degradation	Trail development	Maintain or Restore Habitat	Coordinate on ecologically sensitive design of recreational facilities	M
Habitat Degradation	Altered hydrological regime (surface or aquifer)	Maintain or Restore Natural Processes	Adjust operation of dam	H
Invasive or Exotic Species	Invasive animals	Invasive Species Control and Prevention	Control non-native fish	H
Invasive or Exotic Species	Invasive plants - tamarisk	Invasive Species Control and Prevention	Implement integrated weed/pest management plan	M

Table 17 - Continued.

High Priority				<u>Playas</u>				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Falco peregrinus anatum	American peregrine falcon	<input type="checkbox"/>	Birds	Pelecanus erythrorhynchos	American white pelican	<input type="checkbox"/>				
Birds	Haliaeetus leucocephalus	Bald eagle	<input type="checkbox"/>	Birds	Podiceps nigricollis	Eared grebe	<input type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Sterna forsteri	Forster's tern	<input type="checkbox"/>				
Birds	Calamospiza melanocorys	Lark bunting	<input type="checkbox"/>	Birds	Aythya affinis	Lesser scaup	<input type="checkbox"/>				
Birds	Sterna antillarum	Least tern	<input checked="" type="checkbox"/>	Birds	Limosa fedoa	Marbled godwit	<input checked="" type="checkbox"/>				
Birds	Numenius americanus	Long-billed curlew	<input checked="" type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input checked="" type="checkbox"/>				
Birds	Calcarius mccownii	McCown's longspur	<input type="checkbox"/>	Birds	Anas acuta	Northern pintail	<input checked="" type="checkbox"/>				
Birds	Charadrius melodus	Piping plover	<input checked="" type="checkbox"/>	Birds	Egretta thula	Snowy egret	<input checked="" type="checkbox"/>				
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>	Birds	Plegadis chihi	White-faced ibis	<input checked="" type="checkbox"/>				
Birds	Callipepla squamata	Scaled quail	<input type="checkbox"/>	Birds	Phalaropus tricolor	Wilson's phalarope	<input checked="" type="checkbox"/>				
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>	Reptiles	Lampropeltis getula	Common kingsnake	<input type="checkbox"/>				
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input type="checkbox"/>								
Birds	Charadrius alexandrinus nivosus	Western snowy plover	<input checked="" type="checkbox"/>								
Reptiles	Cnemidophorus neotesselatus	Triploid checkered whiptail	<input checked="" type="checkbox"/>								
General Threat		Specific Threat	General Conservation Action		Specific Conservation Action		Priority				
Habitat Conversion		Conversion to cropland	Maintain or Restore Habitat		Restore native prairie		H				
Habitat Degradation		Replace ephemeral playa with longer-term water catchment	Maintain or Restore Habitat		Restore playa		M				
Lack of knowledge		Complete distribution in Colorado unknown	Research and Monitoring		Conduct field inventory to refine known distribution		H				

Table 17 - Continued.

High Priority				<u>Shrub-dominated Wetlands</u>				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Amphibians	Bufo boreas boreas	Boreal toad (Southern Rocky Mountain Population)	✓	Amphibians	Rana sylvatica	Wood Frog	✓				
Amphibians	Rana pipiens	Northern leopard Frog	✓	Birds	Archilochus alexandri	Black-chinned hummingbird	✓				
Amphibians	Rana blairi	Plains leopard Frog	✓	Birds	Empidonax oberholseri	Dusky flycatcher	✓				
Birds	Falco peregrinus anatum	American peregrine falcon	☐	Birds	Sterna forsteri	Forster's tern	✓				
Birds	Haliaeetus leucocephalus	Bald eagle	☐	Birds	Zonotrichia querula	Harris' sparrow	✓				
Birds	Aquila chrysaetos	Golden eagle	☐	Birds	Passerina amoena	Lazuli bunting	✓				
Birds	Centrocercus urophasianus	Greater sage-grouse	☐	Birds	Aythya affinis	Lesser scaup	✓				
Birds	Grus canadensis tabida	Greater sandhill crane	☐	Birds	Egretta thula	Snowy egret	✓				
Birds	Centrocercus minimus	Gunnison sage-grouse	✓	Birds	Catharus fuscescens	Veery	✓				
Birds	Falco mexicanus	Prairie falcon	☐	Birds	Plegadis chihi	White-faced ibis	✓				
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	✓	Birds	Phalaropus tricolor	Wilson's phalarope	✓				
Birds	Empidonax traillii extimus	Southwestern willow flycatcher	✓	Insects	Speyeria nokomis nokomis	Great Basin silverspot butterfly	✓				
Insects	Boloria improba acrochema	Uncompahgre fritillary	☐								
Mammals	Zapus hudsonius	Meadow jumping mouse (both subspecies)	✓								
Mammals	Lontra canadensis	River otter	☐								
Reptiles	Thamnophis sirtalis	Common garter snake	✓								
Reptiles	Kinosternon flavescens	Yellow mud turtle	☐								

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Degradation	Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)	Maintain or Restore Habitat	Manage grazing for compatible vegetation height, structure, etc.	H
Habitat Degradation	Altered hydrological regime (surface or aquifer)	Maintain or Restore Natural Processes	Adjust operation of dam and ditches	
Invasive or Exotic Species	Invasive plants	Invasive Species Control and Prevention	Implement integrated weed/pest management plan	M
Invasive or Exotic Species	Invasive plants - tamarisk	Invasive Species Control and Prevention	Implement integrated weed/pest management plan	H

Table 17 - Continued.

High Priority				Eastern Plains Rivers				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Amphibians	<i>Rana pipiens</i>	Northern leopard Frog	✓	Amphibians	<i>Acris crepitans</i>	Northern cricket frog	✓				
Amphibians	<i>Rana blairi</i>	Plains leopard Frog	✓	Birds	<i>Pelecanus erythrorhynchos</i>	American white pelican					
Birds	<i>Falco peregrinus anatum</i>	American peregrine falcon		Birds	<i>Laterallus jamaicensis</i>	Black rail	✓				
Birds	<i>Haliaeetus leucocephalus</i>	Bald eagle	✓	Birds	<i>Toxostoma curvirostre</i>	Curve-billed thrasher					
Birds	<i>Aquila chrysaetos</i>	Golden eagle		Birds	<i>Sterna forsteri</i>	Forster's tern					
Birds	<i>Sterna antillarum</i>	Least tern	✓	Birds	<i>Zonotrichia querula</i>	Harris' sparrow	✓				
Birds	<i>Melanerpes lewis</i>	Lewis's woodpecker	✓	Birds	<i>Passerina amoena</i>	Lazuli bunting					
Birds	<i>Numenius americanus</i>	Long-billed curlew		Birds	<i>Aythya affinis</i>	Lesser scaup					
Birds	<i>Charadrius melodus</i>	Piping plover	✓	Birds	<i>Limosa fedoa</i>	Marbled godwit	✓				
Birds	<i>Falco mexicanus</i>	Prairie falcon		Birds	<i>Circus cyaneus</i>	Northern harrier	✓				
Birds	<i>Buteo swainsoni</i>	Swainson's hawk	✓	Birds	<i>Anas acuta</i>	Northern pintail	✓				
Birds	<i>Coccyzus americanus</i>	Western yellow-billed cuckoo	✓	Birds	<i>Pandion haliaetus</i>	Osprey					
Fish	<i>Etheostoma cragini</i>	Arkansas darter		Birds	<i>Egretta thula</i>	Snowy egret					
Fish	<i>Hybognathus hankinsoni</i>	Brassy minnow		Birds	<i>Plegadis chihi</i>	White-faced ibis	✓				
Fish	<i>Hybognathus placitus</i>	Plains minnow	✓	Fish	<i>Platygobio gracilus</i>	Flathead chub	✓				
Fish	<i>Etheostoma spectabile</i>	Plains orangethroat darter		Fish	<i>Etheostoma exile</i>	Iowa darter					
Fish	<i>Phenacobius mirabilis</i>	Suckermouth minnow	✓	Fish	<i>Lepomis humilis</i>	Orangespotted sunfish	✓				
Mammals	<i>Zapus hudsonius</i>	Meadow jumping mouse (both subspecies)		Fish	<i>Noturus flavus</i>	Stonecat					
Mammals	<i>Lontra canadensis</i>	River otter	✓	Insects	<i>Argia alberta</i>	Paiute dancer	✓				
Mollusks	<i>Anodontoidea ferussacianus</i>	Cylindrical papershell	✓	Insects	<i>Mesocapnia frisoni</i>	Plains snowfly					
Mollusks	<i>Ferissia fragilis</i>	Fragil Ancyloid	✓	Insects	<i>Tetragoneuria petechialis</i>	Stripe-winged baskettail					
Reptiles	<i>Thamnophis sirtalis</i>	Common garter snake	✓	Mammals	<i>Myotis occultus</i>	Arizona myotis					
Reptiles	<i>Kinosternon flavescens</i>	Yellow mud turtle	✓	Reptiles	<i>Thamnophis cyrtopsis</i>	Blacknecked garter snake	✓				
				Reptiles	<i>Lampropeltis getula</i>	Common kingsnake	✓				
				Reptiles	<i>Rhinocheilus lecontei</i>	Long-nosed snake					
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority			
Habitat Degradation		Altered hydrological regime (aquifer)		Maintain or Restore Natural Processes		Reduce ground-water pumping		M			
Habitat Degradation		Altered hydrological regime (surface)		Maintain or Restore Natural Processes		Adjust operation of dam		H			
Habitat Degradation		Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals		Maintain or Restore Natural Processes		Remove levees		M			
Invasive or Exotic Species		Invasive plants - tamarisk and Russian Olive		Invasive Species Control and Prevention		Implement integrated weed/pest management plan		M			

Table 17 - Continued.

High Priority				Eastern Plains Streams				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Amphibians	<i>Rana pipiens</i>	Northern leopard Frog	✓	Amphibians	<i>Hyla arenicolor</i>	Canyon tree frog	✓				
Amphibians	<i>Rana blairi</i>	Plains leopard Frog	✓	Amphibians	<i>Gastrophryne olivacea</i>	Great Plains narrowmouth toad	✓				
Birds	<i>Falco peregrinus anatum</i>	American peregrine falcon	□	Amphibians	<i>Bufo debilis</i>	Green toad	✓				
Birds	<i>Haliaeetus leucocephalus</i>	Bald eagle	✓	Amphibians	<i>Acris crepitans</i>	Northern cricket frog	✓				
Birds	<i>Aquila chrysaetos</i>	Golden eagle	□	Birds	<i>Toxostoma curvirostre</i>	Curve-billed thrasher	□				
Birds	<i>Melanerpes lewis</i>	Lewis's woodpecker	✓	Birds	<i>Zonotrichia querula</i>	Harris' sparrow	✓				
Birds	<i>Numenius americanus</i>	Long-billed curlew	□	Birds	<i>Passerina amoena</i>	Lazuli bunting	□				
Birds	<i>Falco mexicanus</i>	Prairie falcon	□	Birds	<i>Circus cyaneus</i>	Northern harrier	✓				
Birds	<i>Buteo swainsoni</i>	Swainson's hawk	✓	Birds	<i>Anas acuta</i>	Northern pintail	✓				
Birds	<i>Coccyzus americanus</i>	Western yellow-billed cuckoo	✓	Birds	<i>Egretta thula</i>	Snowy egret	□				
Fish	<i>Etheostoma cragini</i>	Arkansas darter	✓	Fish	<i>Platygobio gracilus</i>	Flathead chub	□				
Fish	<i>Hybognathus hankinsoni</i>	Brassy minnow	✓	Fish	<i>Etheostoma exile</i>	Iowa darter	✓				
Fish	<i>Hybognathus placitus</i>	Plains minnow	□	Fish	<i>Lepomis humilis</i>	Orangespotted sunfish	✓				
Fish	<i>Etheostoma spectabile</i>	Plains orangethroat darter	✓	Fish	<i>Noturus flavus</i>	Stonecat	✓				
Fish	<i>Phoxinus erythrogaster</i>	Southern Redbelly Dace	□	Insects	<i>Libellula nodisticta</i>	Hoary skimmer	✓				
Fish	<i>Phenacobius mirabilis</i>	Suckermouth minnow	✓	Insects	<i>Somatochlora ensigera</i>	Lemon-faced emerald	✓				
Mammals	<i>Zapus hudsonius</i>	Meadow jumping mouse (both subspecies)	✓	Insects	<i>Argia alberta</i>	Paiute dancer	✓				
Mammals	<i>Lontra canadensis</i>	River otter	□	Insects	<i>Mesocapnia frisoni</i>	Plains snowfly	□				
Mollusks	<i>Anodontoidea ferussacianus</i>	Cylindrical papershell	✓	Insects	<i>Tetragoneuria petechialis</i>	Stripe-winged baskettail	□				
Mollusks	<i>Ferissia fragilis</i>	Fragil Ancyloid	✓	Insects	<i>Euphyes bimacula</i>	Two-spotted skipper	✓				
Mollusks	<i>Unio merus tetralasmus</i>	Pondhorn	✓	Mammals	<i>Myotis occultus</i>	Arizona myotis	□				
Reptiles	<i>Thamnophis sirtalis</i>	Common garter snake	✓	Reptiles	<i>Thamnophis cyrtopsis</i>	Blacknecked garter snake	✓				
Reptiles	<i>Kinosternon flavescens</i>	Yellow mud turtle	✓	Reptiles	<i>Lampropeltis getula</i>	Common kingsnake	✓				
				Reptiles	<i>Hypsiglena torquata</i>	Night snake	□				
				Reptiles	<i>Leptotyphlops dulcis</i>	Texas blind snake	□				

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Degradation	Altered hydrological regime (aquifer)	Maintain or Restore Natural Processes	Reduce ground-water pumping	H
Habitat Degradation	Altered hydrological regime (surface)	Maintain or Restore Natural Processes	Adjust operation of dam	
Habitat Degradation	Decreased water quality	Maintain or Restore Natural Processes	Improve erosion and excess sedimentation conditions	M
Invasive or Exotic Species	Invasive plants - tamarisk and Russian Olive	Invasive Species Control and Prevention	Implement integrated weed/pest management plan	M
Pollution	Herbicide/pesticide spraying or runoff	Voluntary Standards	Implement Best Management Practices for agricultural production	M
Pollution	Nutrient loads	Voluntary Standards	Implement Best Management Practices for agricultural production	M

Table 17 - Continued.

High Priority				Sagebrush				Shrublands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Dendroica nigrescens	Black-throated gray warbler	<input type="checkbox"/>	Birds	Leucosticte atrata	Black rosy-finch	<input type="checkbox"/>				
Birds	Spizella breweri	Brewer's sparrow	<input checked="" type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>				
Birds	Leucosticte australis	Brown-capped rosy-finch	<input type="checkbox"/>	Birds	Empidonax wrightii	Gray flycatcher	<input checked="" type="checkbox"/>				
Birds	Aimophila cassinii	Cassin's sparrow	<input type="checkbox"/>	Birds	Passerina amoena	Lazuli bunting	<input checked="" type="checkbox"/>				
Birds	Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse	<input checked="" type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input type="checkbox"/>				
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>	Birds	Poocetes gramineus	Vesper sparrow	<input checked="" type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input checked="" type="checkbox"/>	Mammals	Idionycteris phyllotis	Allen's big-eared bat	<input type="checkbox"/>				
Birds	Centrocercus urophasianus	Greater sage-grouse	<input checked="" type="checkbox"/>	Mammals	Myotis occultus	Arizona myotis	<input type="checkbox"/>				
Birds	Centrocercus minimus	Gunnison sage-grouse	<input checked="" type="checkbox"/>	Mammals	Sorex preblei	Preble's shrew	<input type="checkbox"/>				
Birds	Calamospiza melanocorys	Lark bunting	<input type="checkbox"/>	Reptiles	Gambelia wislizenii	Longnose leopard lizard	<input checked="" type="checkbox"/>				
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>	Reptiles	Rhinocheilus lecontei	Long-nosed snake	<input type="checkbox"/>				
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>	Reptiles	Crotalus viridis concolor	Midget faded rattlesnake	<input type="checkbox"/>				
Birds	Amphispiza belli	Sage sparrow	<input checked="" type="checkbox"/>	Reptiles	Hypsiglena torquata	Night snake	<input type="checkbox"/>				
Birds	Callipepla squamata	Scaled quail	<input checked="" type="checkbox"/>	Reptiles	Tantilla horbartsmithi	Southwestern black-headed snake	<input checked="" type="checkbox"/>				
Birds	Asio flammeus	Short-eared owl	<input checked="" type="checkbox"/>								
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>								
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input type="checkbox"/>								
Insects	Callophrys comstocki	Comstock's hairstreak	<input type="checkbox"/>								
Mammals	Mustela nigripes	Black-footed ferret	<input type="checkbox"/>								
Mammals	Myotis thysanodes	Fringed myotis	<input type="checkbox"/>								
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input type="checkbox"/>								
Mammals	Cynomys gunnisoni	Gunnison's prairie dog	<input type="checkbox"/>								
Mammals	Vulpes macrotis	Kit fox	<input checked="" type="checkbox"/>								
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	<input type="checkbox"/>								
Mammals	Lepus townsendii	White-tailed jackrabbit	<input type="checkbox"/>								
Mammals	Cynomys leucurus	White-tailed prairie dog	<input type="checkbox"/>								

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion	Housing, urban, and ex-urban development	Land Protection (Public, Private), Easements, and Resource Rights	Purchase habitat or Acquire conservation easement for conservation purpose	M
Habitat Degradation	Altered native vegetation (low forb and grass diversity)	Restore Habitat	Re-seed native species	H
Habitat Degradation	Altered native vegetation (low forb and grass diversity)	Compatible Resource Use	Implement compatible grazing management	H
Habitat Degradation	Altered native vegetation (juniper encroachment)	Maintain or Restore Habitat	Remove trees/shrubs	M
Habitat Degradation	Altered fire regime	Maintain or Restore Natural Processes	Restore natural fire regime	M
Habitat Degradation	Oil and gas pipelines	Planning and Zoning	Promote consideration of biodiversity issues in transportation and land use planning processes	H
Habitat Degradation	Fragmentation	Voluntary Standards	Implement Best Management Practices for energy development and mining (reduce footprint and/or extend implementation timeline)	H

Table 17 - Continued.

Habitat Degradation	Overhead utility lines and towers	Voluntary Standards	Implement Best Management Practices for energy development and mining (bury or consolidate lines)	M
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High Priority		<u>Sand Dunes Complex (Shrubland)</u>		Shrublands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Birds	Aimophila cassinii	Cassin's sparrow	<input checked="" type="checkbox"/>	Birds	Toxostoma curvirostre	Curve-billed thrasher	<input checked="" type="checkbox"/>
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Mammals	Conepatus leuconotus	Common Hog-nosed skunk	<input type="checkbox"/>
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>				
Birds	Callipepla squamata	Scaled quail	<input checked="" type="checkbox"/>				
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>				
Mammals	Cynomys ludovicianus	Black-tailed prairie dog	<input type="checkbox"/>				
Mammals	Lepus townsendii	White-tailed jackrabbit	<input type="checkbox"/>				

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion	Conversion to cropland	Maintain or Restore Habitat	Re-seed native species	H

Table 17 - Continued.

Medium Priority		Aspen Forest		Forestlands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Amphibians	Bufo boreas boreas	Boreal toad (Southern Rocky Mountain Population)	<input type="checkbox"/>	Amphibians	Rana sylvatica	Wood Frog	<input type="checkbox"/>
Birds	Patagioenas fasciata	Band-tailed pigeon	<input type="checkbox"/>	Birds	Picoides dorsalis	American three-toed woodpecker	<input checked="" type="checkbox"/>
Birds	Aegolius funereus	Boreal owl	<input type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>
Birds	Otus flammeolus	Flammulated owl	<input checked="" type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Carpodacus cassinii	Cassin’s finch	<input checked="" type="checkbox"/>
Birds	Accipiter gentilis	Northern goshawk	<input checked="" type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	<input checked="" type="checkbox"/>	Birds	Coccothraustes vespertinus	Evening grosbeak	<input checked="" type="checkbox"/>
Birds	Progne subis hesperia	Western purple Martin	<input checked="" type="checkbox"/>	Birds	Passerina amoena	Lazuli bunting	<input type="checkbox"/>
Birds	Sphyrapicus thyroideus	Williamson’s sapsucker	<input checked="" type="checkbox"/>	Birds	Sitta pygmaea	Pygmy nuthatch	<input type="checkbox"/>
Mammals	Sorex nanus	Dwarf shrew	<input checked="" type="checkbox"/>	Birds	Vermivora virginiae	Virginia’s warbler	<input type="checkbox"/>
Mammals	Myotis thysanodes	Fringed myotis	<input type="checkbox"/>	Insects	Pyrgus xanthus	Xanthus skipper	<input type="checkbox"/>
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Mammals	Myotis occultus	Arizona myotis	<input checked="" type="checkbox"/>
Mammals	Euderma maculatum	Spotted bat	<input type="checkbox"/>	Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend’s big-eared bat ssp.	<input type="checkbox"/>	Mammals	Gulo gulo	Wolverine	<input type="checkbox"/>

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Degradation	Altered fire regime	Maintain or Restore Natural Processes		

Table 17 - Continued.

Medium Priority				<u>Mixed Forest</u>				Forestlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Patagioenas fasciata	Band-tailed pigeon	☑	Birds	Dendragapus obscurus	Blue grouse	☑				
Birds	Otus flammeolus	Flammulated owl	☐	Birds	Selasphorus platycercus	Broad-tailed hummingbird	☑				
Birds	Aquila chrysaetos	Golden eagle	☐	Birds	Carpodacus cassinii	Cassin's finch	☑				
Birds	Accipiter gentilis	Northern goshawk	☑	Birds	Empidonax occidentalis	Cordilleran flycatcher	☑				
Birds	Contopus cooperi	Olive-sided flycatcher	☑	Birds	Empidonax oberholseri	Dusky flycatcher	☑				
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	☐	Birds	Coccothraustes vespertinus	Evening grosbeak	☑				
Birds	Sphyrapicus thyroideus	Williamson's sapsucker	☑	Birds	Vermivora virginiae	Virginia's warbler	☑				
Mammals	Sorex nanus	Dwarf shrew	☑	Insects	Agapema homogena	Rocky Mountain Agapema	☐				
Mammals	Myotis thysanodes	Fringed myotis	☐	Insects	Pyrgus xanthus	Xanthus skipper	☐				
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	☑	Mammals	Myotis occultus	Arizona myotis	☑				
Mammals	Euderma maculatum	Spotted bat	☐	Mammals	Ursus arctos	Grizzly bear	☑				
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	☑	Mammals	Gulo gulo	Wolverine	☐				

General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Not particularly threatened								

Table 17 - Continued.

Medium Priority				Foothill/Mountain Grassland				Grasslands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Haliaeetus leucocephalus	Bald eagle	<input type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>				
Birds	Dolichonyx oryzivorus	Bobolink	<input checked="" type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>				
Birds	Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse	<input type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input checked="" type="checkbox"/>				
Birds	Buteo regalis	Ferruginous hawk	<input checked="" type="checkbox"/>	Birds	Selasphorus rufus	Rufous hummingbird	<input checked="" type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input checked="" type="checkbox"/>	Birds	Poocetes gramineus	Vesper sparrow	<input checked="" type="checkbox"/>				
Birds	Grus canadensis tabida	Greater sandhill crane	<input type="checkbox"/>	Insects	Atrytone arogos	Arogos skipper	<input checked="" type="checkbox"/>				
Birds	Calamospiza melanocorys	Lark bunting	<input type="checkbox"/>	Insects	Erynnis martialis	Mottled Duskywing	<input type="checkbox"/>				
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>	Insects	Speyeria idalia	Regal fritillary	<input type="checkbox"/>				
Birds	Charadrius montanus	Mountain plover	<input type="checkbox"/>	Insects	Polites rhesus	Rhesus skipper	<input type="checkbox"/>				
Birds	Tympanuchus phasianellus jamesii	Plains sharp-tailed grouse	<input checked="" type="checkbox"/>	Insects	Pyrgus xanthus	Xanthus skipper	<input checked="" type="checkbox"/>				
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>	Insects	Proserpinus flavofasciata	Yellow-banded day sphinx	<input checked="" type="checkbox"/>				
Birds	Asio flammeus	Short-eared owl	<input checked="" type="checkbox"/>	Mammals	Myotis occultus	Arizona myotis	<input type="checkbox"/>				
Birds	Buteo swainsoni	Swainson’s hawk	<input checked="" type="checkbox"/>	Mammals	Ovis canadensis	Bighorn sheep	<input type="checkbox"/>				
Insects	Hesperia leonardus montana	Pawnee montane skipper	<input type="checkbox"/>	Mammals	Conepatus leuconotus	Common Hog-nosed skunk	<input type="checkbox"/>				
Mammals	Mustela nigripes	Black-footed ferret	<input type="checkbox"/>	Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>				
Mammals	Thomomys bottae rubidus	Botta’s pocket gopher (rubidus ssp)	<input checked="" type="checkbox"/>	Mammals	Sorex preblei	Preble’s shrew	<input type="checkbox"/>				
Mammals	Myotis thysanodes	Fringed myotis	<input type="checkbox"/>								
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input type="checkbox"/>								
Mammals	Cynomys gunnisoni	Gunnison’s prairie dog	<input checked="" type="checkbox"/>								
Mammals	Thomomys talpoides macrotis	Northern pocket gopher (macrotis ssp)	<input checked="" type="checkbox"/>								
Mammals	Perognathus fasciatus	Olive-backed pocket mouse	<input checked="" type="checkbox"/>								
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend’s big-eared bat ssp.	<input type="checkbox"/>								
Mammals	Lepus townsendii	White-tailed jackrabbit	<input checked="" type="checkbox"/>								
Mammals	Cynomys leucurus	White-tailed prairie dog	<input checked="" type="checkbox"/>								

General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority	
Habitat Degradation				Compatible Resource Use					

Table 17 - Continued.

Medium Priority				Grass/Forb Dominated Wetlands				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Amphibians	Bufo boreas boreas	Boreal toad (Southern Rocky Mountain Population)	✓	Amphibians	Scaphiopus couchii	Couch's spadefoot	✓				
Amphibians	Rana pipiens	Northern leopard Frog	✓	Amphibians	Gastrophryne olivacea	Great Plains narrowmouth toad	✓				
Amphibians	Rana blairi	Plains leopard Frog	✓	Amphibians	Acris crepitans	Northern cricket frog					
Birds	Botaurus lentiginosus	American bittern	✓	Amphibians	Rana sylvatica	Wood Frog	✓				
Birds	Falco peregrinus anatum	American peregrine falcon		Birds	Bucephala islandica	Barrow's goldeneye	✓				
Birds	Haliaeetus leucocephalus	Bald eagle		Birds	Laterallus jamaicensis	Black rail	✓				
Birds	Aquila chrysaetos	Golden eagle		Birds	Archilochus alexandri	Black-chinned hummingbird	✓				
Birds	Centrocercus urophasianus	Greater sage-grouse		Birds	Podiceps nigricollis	Eared grebe	✓				
Birds	Grus canadensis tabida	Greater sandhill crane	✓	Birds	Sterna forsteri	Forster's tern	✓				
Birds	Centrocercus minimus	Gunnison sage-grouse		Birds	Aythya affinis	Lesser scaup	✓				
Birds	Numenius americanus	Long-billed curlew		Birds	Circus cyaneus	Northern harrier	✓				
Birds	Charadrius melodus	Piping plover		Birds	Anas acuta	Northern pintail	✓				
Birds	Falco mexicanus	Prairie falcon		Birds	Egretta thula	Snowy egret	✓				
Birds	Asio flammeus	Short-eared owl	✓	Birds	Plegadis chihi	White-faced ibis	✓				
Birds	Grus americana	Whooping crane	✓	Birds	Phalaropus tricolor	Wilson's phalarope	✓				
Mammals	Lontra canadensis	River otter		Insects	Speyeria nokomis nokomis	Great Basin silverspot butterfly	✓				
Reptiles	Thamnophis sirtalis	Common garter snake	✓	Insects	Sympetrum madidum	Red-veined meadowfly	✓				
Reptiles	Kinosternon flavescens	Yellow mud turtle		Insects	Speyeria idalia	Regal fritillary					
				Insects	Euphyes bimacula	Two-spotted skipper	✓				
General Threat		Specific Threat	General Conservation Action		Specific Conservation Action		Priority				
Invasive or Exotic Species		Invasive plants	Invasive Species Control and Prevention		Implement integrated weed/pest management plan		H				

Table 17 - Continued.

Medium Priority		Transition Streams		Riparian/Wetlands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Amphibians	Rana pipiens	Northern leopard Frog	✓	Birds	Cinclus mexicanus	American dipper	✓
Birds	Falco peregrinus anatum	American peregrine falcon		Birds	Empidonax occidentalis	Cordilleran flycatcher	✓
Birds	Haliaeetus leucocephalus	Bald eagle	✓	Birds	Passerina amoena	Lazuli bunting	
Birds	Aquila chrysaetos	Golden eagle		Birds	Circus cyaneus	Northern harrier	✓
Birds	Melanerpes lewis	Lewis's woodpecker	✓	Birds	Egretta thula	Snowy egret	
Birds	Strix occidentalis lucida	Mexican spotted owl	✓	Birds	Vermivora virginiae	Virginia's warbler	
Birds	Falco mexicanus	Prairie falcon		Fish	Platygobio gracilus	Flathead chub	
Birds	Sphyrapicus nuchalis	Red-naped sapsucker		Fish	Etheostoma exile	Iowa darter	✓
Fish	Etheostoma cragini	Arkansas darter		Fish	Lepomis humilis	Orangespotted sunfish	
Fish	Hybognathus hankinsoni	Brassy minnow		Fish	Noturus flavus	Stonecat	
Fish	Luxilus cornutus	Common shiner	✓	Insects	Capnia arapahoe	Arapahoe snowfly	
Fish	Phoxinus eos	Northern Redbelly Dace	✓	Insects	Callophrys mossii schryveri	Moss's elfin	
Fish	Etheostoma spectabile	Plains orangethroat darter		Insects	Mesocapnia frisoni	Plains snowfly	✓
Fish	Gila pandora	Rio Grande chub	✓	Mammals	Myotis occultus	Arizona myotis	
Fish	Phoxinus erythrogaster	Southern Redbelly Dace	✓				
Fish	Phenacobius mirabilis	Suckermouth minnow					
Insects	Celastrina humulus	Hops feeding azure	✓				
Mammals	Myotis thysanodes	Fringed myotis					
Mammals	Zapus hudsonius	Meadow jumping mouse (both subspecies)					
Mammals	Lontra canadensis	River otter					
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.					
Mollusks	Physa utahensis	Banded Physa	✓				
Mollusks	Anodontoides ferussacianus	Cylindrical papershell					

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion		Land Protection (Public, Private), Easements, and Resource Rights		

Table 17 - Continued.

Medium Priority				Upland Shrub				Shrublands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Patagioenas fasciata	Band-tailed pigeon	<input type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>				
Birds	Aimophila cassinii	Cassin's sparrow	<input type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>				
Birds	Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse	<input type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>				
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>	Birds	Passerina amoena	Lazuli bunting	<input checked="" type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Selasphorus rufus	Rufous hummingbird	<input checked="" type="checkbox"/>				
Birds	Asio flammeus	Short-eared owl	<input checked="" type="checkbox"/>	Birds	Vermivora virginiae	Virginia's warbler	<input checked="" type="checkbox"/>				
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>	Insects	Callophrys mossii schryveri	Moss's elfin	<input checked="" type="checkbox"/>				
Mammals	Myotis thysanodes	Fringed myotis	<input type="checkbox"/>	Insects	Erynnis martialis	Mottled Duskywing	<input type="checkbox"/>				
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Insects	Agapema homogenea	Rocky Mountain Agapema	<input checked="" type="checkbox"/>				
Mammals	Euderma maculatum	Spotted bat	<input type="checkbox"/>	Mammals	Myotis occultus	Arizona myotis	<input checked="" type="checkbox"/>				
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	<input type="checkbox"/>	Mammals	Conepatus leuconotus	Common Hog-nosed skunk	<input checked="" type="checkbox"/>				
Mammals	Lepus townsendii	White-tailed jackrabbit	<input type="checkbox"/>	Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>				
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority			
Habitat Conversion				Land Protection (Public, Private), Easements, and Resource Rights							
Habitat Degradation		Altered fire regime		Maintain or Restore Natural Processes							

Table 17 - Continued.

Low Priority		<u>Rocky Mtn Bristlecone Pine</u>				Forestlands		
Tier 1 Species				Tier 2 Species				
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary	
Birds	Aegolius funereus	Boreal owl	<input type="checkbox"/>	Birds	Picoides dorsalis	American three-toed woodpecker	<input checked="" type="checkbox"/>	
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>	
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>	
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	<input type="checkbox"/>	Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>	
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>	
				Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>	
				Birds	Coccothraustes vespertinus	Evening grosbeak	<input checked="" type="checkbox"/>	
				Mammals	Ursus arctos	Grizzly bear	<input type="checkbox"/>	
				Mammals	Gulo gulo	Wolverine	<input type="checkbox"/>	
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Climate		Habitat shifting and alteration due to climate change		Legislation, Policies and Regulations		Reduce CO2 emissions		

Low Priority		<u>Limber Pine</u>		Forestlands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Birds	Patagioenas fasciata	Band-tailed pigeon	<input type="checkbox"/>	Birds	Picoides dorsalis	American three-toed woodpecker	<input checked="" type="checkbox"/>
Birds	Otus flammeolus	Flammulated owl	<input type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>
Birds	Gymnorhinus cyanocephalus	Pinyon jay	<input checked="" type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	<input type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>
Birds	Sphyrapicus thyroideus	Williamson's sapsucker	<input checked="" type="checkbox"/>	Birds	Coccothraustes vespertinus	Evening grosbeak	<input checked="" type="checkbox"/>
Mammals	Sorex nanus	Dwarf shrew	<input type="checkbox"/>	Birds	Loxia curvirostra	Red crossbill	<input checked="" type="checkbox"/>
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input type="checkbox"/>	Birds	Vermivora virginiae	Virginia's warbler	<input type="checkbox"/>
				Mammals	Ursus arctos	Grizzly bear	<input type="checkbox"/>
				Mammals	Gulo gulo	Wolverine	<input type="checkbox"/>

General Threat		Specific Threat	General Conservation Action		Specific Conservation Action	Priority
Climate		Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)	Legislation, Policies and Regulations		Reduce CO2 emissions	

Table 17 - Continued.

Low Priority		Spruce-Fir		Forestlands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Amphibians	Bufo boreas boreas	Boreal toad (Southern Rocky Mountain Population)	<input type="checkbox"/>	Amphibians	Rana sylvatica	Wood Frog	<input type="checkbox"/>
Birds	Patagioenas fasciata	Band-tailed pigeon	<input type="checkbox"/>	Birds	Picoides dorsalis	American three-toed woodpecker	<input checked="" type="checkbox"/>
Birds	Aegolius funereus	Boreal owl	<input checked="" type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>
Birds	Otus flammeolus	Flammulated owl	<input type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	<input type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>
Birds	Sphyrapicus thyroideus	Williamson's sapsucker	<input checked="" type="checkbox"/>	Birds	Coccothraustes vespertinus	Evening grosbeak	<input checked="" type="checkbox"/>
Mammals	Sorex nanus	Dwarf shrew	<input checked="" type="checkbox"/>	Birds	Sitta pygmaea	Pygmy nuthatch	<input type="checkbox"/>
Mammals	Myotis thysanodes	Fringed myotis	<input type="checkbox"/>	Birds	Loxia curvirostra	Red crossbill	<input checked="" type="checkbox"/>
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Mammals	Myotis occultus	Arizona myotis	<input checked="" type="checkbox"/>
Mammals	Lynx canadensis	Lynx	<input checked="" type="checkbox"/>	Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	<input type="checkbox"/>	Mammals	Gulo gulo	Wolverine	<input checked="" type="checkbox"/>
General Threat		Specific Threat	General Conservation Action		Specific Conservation Action		Priority
Climate		Habitat shifting and alteration due to climate change	Legislation, Policies and Regulations		Reduce CO2 emissions		

Table 17 - Continued.

Low Priority		Pinyon-Juniper		Forestlands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Birds	Falco peregrinus anatum	American peregrine falcon	<input type="checkbox"/>	Birds	Archilochus alexandri	Black-chinned hummingbird	<input checked="" type="checkbox"/>
Birds	Patagioenas fasciata	Band-tailed pigeon	<input checked="" type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>
Birds	Dendroica nigrescens	Black-throated gray warbler	<input checked="" type="checkbox"/>	Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>
Birds	Aegolius funereus	Boreal owl	<input type="checkbox"/>	Birds	Toxostoma curvirostre	Curve-billed thrasher	<input type="checkbox"/>
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Empidonax wrightii	Gray flycatcher	<input checked="" type="checkbox"/>
Birds	Vireo vicinior	Gray vireo	<input checked="" type="checkbox"/>	Birds	Passerina amoena	Lazuli bunting	<input checked="" type="checkbox"/>
Birds	Baeolophus ridgwayi	Juniper titmouse	<input checked="" type="checkbox"/>	Birds	Sitta pygmaea	Pygmy nuthatch	<input type="checkbox"/>
Birds	Melanerpes lewis	Lewis's woodpecker	<input checked="" type="checkbox"/>	Birds	Pooecetes gramineus	Vesper sparrow	<input type="checkbox"/>
Birds	Strix occidentalis lucida	Mexican spotted owl	<input checked="" type="checkbox"/>	Birds	Vermivora virginiae	Virginia's warbler	<input checked="" type="checkbox"/>
Birds	Accipiter gentilis	Northern goshawk	<input checked="" type="checkbox"/>	Insects	Incisalia fotis	Early elfin	<input type="checkbox"/>
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Insects	Callophrys mossii schryveri	Moss's elfin	<input checked="" type="checkbox"/>
Birds	Gymnorhinus cyanocephalus	Pinyon jay	<input checked="" type="checkbox"/>	Insects	Euphilotes spaldingi	Spalding's blue	<input checked="" type="checkbox"/>
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>	Insects	Pyrgus xanthus	Xanthus skipper	<input type="checkbox"/>
Birds	Callipepla squamata	Scaled quail	<input checked="" type="checkbox"/>	Mammals	Idionycteris phyllotis	Allen's big-eared bat	<input checked="" type="checkbox"/>
Insects	Callophrys comstocki	Comstock's hairstreak	<input checked="" type="checkbox"/>	Mammals	Myotis occultus	Arizona myotis	<input checked="" type="checkbox"/>
Mammals	Thomomys bottae rubidus	Botta's pocket gopher (rubidus ssp)	<input type="checkbox"/>	Mammals	Conepatus leuconotus	Common Hog-nosed skunk	<input checked="" type="checkbox"/>
Mammals	Sorex nanus	Dwarf shrew	<input type="checkbox"/>	Reptiles	Thamnophis cyrtopsis	Blacknecked garter snake	<input type="checkbox"/>
Mammals	Myotis thysanodes	Fringed myotis	<input checked="" type="checkbox"/>	Reptiles	Gambelia wislizenii	Longnose leopard lizard	<input checked="" type="checkbox"/>
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Reptiles	Crotalus viridis concolor	Midget faded rattlesnake	<input checked="" type="checkbox"/>
Mammals	Euderma maculatum	Spotted bat	<input type="checkbox"/>	Reptiles	Hypsiglena torquata	Night snake	<input checked="" type="checkbox"/>
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	<input checked="" type="checkbox"/>	Reptiles	Phrynosoma modestum	Roundtail horned lizard	<input checked="" type="checkbox"/>
				Reptiles	Tantilla horbartsmithi	Southwestern black-headed snake	<input checked="" type="checkbox"/>
				Reptiles	Leptotyphlops dulcis	Texas blind snake	<input checked="" type="checkbox"/>

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion	Housing, urban, and ex-urban development	Planning and Zoning	Promote zoning that concentrates use and protects habitat	
Habitat Degradation	Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)	Compatible Resource Use	Implement compatible grazing management	
Habitat Degradation	Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)	Maintain or Restore Natural Processes		

Table 17 - Continued.

Low Priority				<u>Mixed Conifer</u>				Forestlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Amphibians	Bufo boreas boreas	Boreal toad (Southern Rocky Mountain Population)	<input type="checkbox"/>	Amphibians	Rana sylvatica	Wood Frog	<input type="checkbox"/>				
Amphibians	Rana pipiens	Northern leopard Frog	<input type="checkbox"/>	Birds	Picoides dorsalis	American three-toed woodpecker	<input checked="" type="checkbox"/>				
Birds	Patagioenas fasciata	Band-tailed pigeon	<input checked="" type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>				
Birds	Otus flammeolus	Flammulated owl	<input type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>				
Birds	Strix occidentalis lucida	Mexican spotted owl	<input checked="" type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>				
Birds	Accipiter gentilis	Northern goshawk	<input checked="" type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>				
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Birds	Coccothraustes vespertinus	Evening grosbeak	<input checked="" type="checkbox"/>				
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	<input type="checkbox"/>	Birds	Loxia curvirostra	Red crossbill	<input checked="" type="checkbox"/>				
Birds	Sphyrapicus thyroideus	Williamson's sapsucker	<input checked="" type="checkbox"/>	Insects	Coloradia luskii	Lusk's Pinemoth	<input type="checkbox"/>				
Mammals	Sorex nanus	Dwarf shrew	<input checked="" type="checkbox"/>	Insects	Agapema homogena	Rocky Mountain Agapema	<input type="checkbox"/>				
Mammals	Myotis thysanodes	Fringed myotis	<input checked="" type="checkbox"/>	Insects	Pyrgus xanthus	Xanthus skipper	<input type="checkbox"/>				
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Mammals	Idionycteris phyllotis	Allen's big-eared bat	<input type="checkbox"/>				
Mammals	Lynx canadensis	Lynx	<input checked="" type="checkbox"/>	Mammals	Myotis occultus	Arizona myotis	<input checked="" type="checkbox"/>				
Mammals	Euderma maculatum	Spotted bat	<input type="checkbox"/>	Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>				
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	<input checked="" type="checkbox"/>	Mammals	Gulo gulo	Wolverine	<input type="checkbox"/>				

General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Not particularly threatened								

Table 17 - Continued.

Low Priority				<u>Douglas Fir</u>				Forestlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Patagioenas fasciata	Band-tailed pigeon	<input type="checkbox"/>	Birds	Picoides dorsalis	American three-toed woodpecker	<input checked="" type="checkbox"/>				
Birds	Otus flammeolus	Flammulated owl	<input type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>				
Birds	Strix occidentalis lucida	Mexican spotted owl	<input checked="" type="checkbox"/>	Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>				
Birds	Accipiter gentilis	Northern goshawk	<input checked="" type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>				
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>				
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	<input type="checkbox"/>	Birds	Coccothraustes vespertinus	Evening grosbeak	<input checked="" type="checkbox"/>				
Birds	Sphyrapicus thyroideus	Williamson's sapsucker	<input checked="" type="checkbox"/>	Birds	Sitta pygmaea	Pygmy nuthatch	<input type="checkbox"/>				
Mammals	Sorex nanus	Dwarf shrew	<input checked="" type="checkbox"/>	Birds	Loxia curvirostra	Red crossbill	<input checked="" type="checkbox"/>				
Mammals	Myotis thysanodes	Fringed myotis	<input type="checkbox"/>	Insects	Agapema homogena	Rocky Mountain Agapema	<input type="checkbox"/>				
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>				
Mammals	Lynx canadensis	Lynx	<input checked="" type="checkbox"/>								
Mammals	Euderma maculatum	Spotted bat	<input type="checkbox"/>								
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	<input type="checkbox"/>								
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority			
Habitat Conversion		Housing, urban, and ex-urban development		Land Protection (Public, Private), Easements, and Resource Rights							
Habitat Degradation		Altered fire regime		Maintain or Restore Natural Processes							

Table 17 - Continued.

Low Priority		<u>Lodgepole Pine</u>		Forestlands				
Tier 1 Species				Tier 2 Species				
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary	
Amphibians	Bufo boreas boreas	Boreal toad (Southern Rocky Mountain Population)	<input type="checkbox"/>	Amphibians	Rana sylvatica	Wood Frog	<input type="checkbox"/>	
Birds	Patagioenas fasciata	Band-tailed pigeon	<input type="checkbox"/>	Birds	Picoides dorsalis	American three-toed woodpecker	<input checked="" type="checkbox"/>	
Birds	Aegolius funereus	Boreal owl	<input checked="" type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>	
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>	
Birds	Accipiter gentilis	Northern goshawk	<input checked="" type="checkbox"/>	Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>	
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>	
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	<input type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>	
Birds	Sphyrapicus thyroideus	Williamson's sapsucker	<input checked="" type="checkbox"/>	Birds	Coccothraustes vespertinus	Evening grosbeak	<input checked="" type="checkbox"/>	
Mammals	Sorex nanus	Dwarf shrew	<input checked="" type="checkbox"/>	Birds	Sitta pygmaea	Pygmy nuthatch	<input type="checkbox"/>	
Mammals	Myotis thysanodes	Fringed myotis	<input type="checkbox"/>	Birds	Loxia curvirostra	Red crossbill	<input checked="" type="checkbox"/>	
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Insects	Coloradia luskii	Lusk's Pinemoth	<input type="checkbox"/>	
Mammals	Lynx canadensis	Lynx	<input checked="" type="checkbox"/>	Insects	Agapema homogena	Rocky Mountain Agapema	<input type="checkbox"/>	
				Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>	
				Mammals	Gulo gulo	Wolverine	<input type="checkbox"/>	
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Habitat Degradation		Altered fire regime		Maintain or Restore Natural Processes		Restore natural fire regime		

Table 17 - Continued.

Low Priority		White Fir		Forestlands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Birds	Patagioenas fasciata	Band-tailed pigeon	<input type="checkbox"/>	Birds	Picoides dorsalis	American three-toed woodpecker	<input checked="" type="checkbox"/>
Birds	Otus flammeolus	Flammulated owl	<input type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>
Birds	Contopus cooperi	Olive-sided flycatcher	<input checked="" type="checkbox"/>	Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	<input type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>
Birds	Sphyrapicus thyroideus	Williamson's sapsucker	<input checked="" type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>
Mammals	Sorex nanus	Dwarf shrew	<input type="checkbox"/>	Birds	Coccothraustes vespertinus	Evening grosbeak	<input checked="" type="checkbox"/>
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input type="checkbox"/>	Birds	Loxia curvirostra	Red crossbill	<input checked="" type="checkbox"/>
Mammals	Lynx canadensis	Lynx	<input type="checkbox"/>	Insects	Agapema homogena	Rocky Mountain Agapema	<input type="checkbox"/>
				Mammals	Ursus arctos	Grizzly bear	<input type="checkbox"/>
				Mammals	Gulo gulo	Wolverine	<input type="checkbox"/>

Table 17 - Continued.

Low Priority				Lakes				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Fish	Oncorhynchus clarki pleuriticus	Colorado River Cutthroat Trout	<input checked="" type="checkbox"/>	Fish	Catostomus latipinnis	Flannelmouth sucker	<input type="checkbox"/>				
Fish	Oncorhynchus clarki stomias	Greenback Cutthroat Trout	<input type="checkbox"/>	Fish	Lepomis humilis	Orangespotted sunfish	<input type="checkbox"/>				
Fish	Couesius plumbeus	Lake chub	<input checked="" type="checkbox"/>	Insects	Tetragoneuria petechialis	Stripe-winged baskettail	<input checked="" type="checkbox"/>				
Fish	Phoxinus eos	Northern Redbelly Dace	<input type="checkbox"/>								
Fish	Gila pandora	Rio Grande chub	<input type="checkbox"/>								
Fish	Oncorhynchus clarki virginalis	Rio Grande Cutthroat Trout	<input type="checkbox"/>								
Fish	Phoxinus erythrogaster	Southern Redbelly Dace	<input type="checkbox"/>								
Mollusks	Ferrissia walkeri	Cloche Ancyloid	<input type="checkbox"/>								
Mollusks	Promenetus umbilicatellus	Cockerell	<input checked="" type="checkbox"/>								
Mollusks	Anodontoides ferussacianus	Cylindrical papershell	<input checked="" type="checkbox"/>								
Mollusks	Uniomerus tetralasmus	Pondhorn	<input checked="" type="checkbox"/>								
Mollusks	Acroloxus coloradensis	Rocky Mountain capshell	<input checked="" type="checkbox"/>								
Mollusks	Promenetus exacuus	Sharp Sprite	<input checked="" type="checkbox"/>								

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Pollution	Herbicide/pesticide spraying or runoff	Voluntary Standards	Implement Best Management Practices for urban development, agriculture, etc.	
Pollution	Nutrient loads	Voluntary Standards	Implement Best Management Practices for agricultural production	

Table 17 - Continued.

Low Priority				Open Water				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Amphibians	Bufo boreas boreas	Boreal toad (Southern Rocky Mountain Population)	☑	Amphibians	Gastrophryne olivacea	Great Plains narrowmouth toad	☐				
Amphibians	Rana pipiens	Northern leopard Frog	☑	Amphibians	Rana sylvatica	Wood Frog	☑				
Amphibians	Rana blairi	Plains leopard Frog	☐	Birds	Pelecanus erythrorhynchos	American white pelican	☑				
Birds	Falco peregrinus anatum	American peregrine falcon	☐	Birds	Bucephala islandica	Barrow's goldeneye	☑				
Birds	Haliaeetus leucocephalus	Bald eagle	☑	Birds	Podiceps nigricollis	Eared grebe	☑				
Birds	Aquila chrysaetos	Golden eagle	☐	Birds	Sterna forsteri	Forster's tern	☑				
Birds	Grus canadensis tabida	Greater sandhill crane	☐	Birds	Aythya affinis	Lesser scaup	☑				
Birds	Sterna antillarum	Least tern	☑	Birds	Limosa fedoa	Marbled godwit	☑				
Birds	Numenius americanus	Long-billed curlew	☑	Birds	Anas acuta	Northern pintail	☑				
Birds	Charadrius melodus	Piping plover	☑	Birds	Pandion haliaetus	Osprey	☑				
Birds	Falco mexicanus	Prairie falcon	☐	Birds	Egretta thula	Snowy egret	☑				
Fish	Etheostoma cragini	Arkansas darter	☐	Birds	Aechmophorus occidentalis	Western grebe	☑				
Fish	Hybognathus hankinsoni	Brassy minnow	☐	Birds	Plegadis chihi	White-faced ibis	☑				
Fish	Ptychocheilus lucius	Colorado Pikeminnow	☐	Birds	Phalaropus tricolor	Wilson's phalarope	☑				
Fish	Luxilus cornutus	Common shiner	☐	Fish	Platygbio gracilus	Flathead chub	☐				
Fish	Gila cypha	Humpback chub	☐	Fish	Etheostoma exile	Iowa darter	☐				
Fish	Hybognathus placitus	Plains minnow	☐	Fish	Catostomus playtrhynchus	Mountain sucker	☐				
Fish	Etheostoma spectabile	Plains orangethroat darter	☐	Fish	Noturus flavus	Stonecat	☐				
Fish	Xyrauchen texanus	Razorback Sucker	☐	Insects	Libellula nodisticta	Hoary skimmer	☑				
Fish	Catostomus plebeius	Rio Grande sucker	☐	Insects	Somatochlora ensigera	Lemon-faced emerald	☐				
Fish	Gila robusta	Roundtail chub	☐	Insects	Sympetrum madidum	Red-veined meadowfly	☑				
Fish	Phenacobius mirabilis	Suckermouth minnow	☐	Insects	Tetragoneuria petechialis	Stripe-winged baskettail	☑				
Mammals	Lontra canadensis	River otter	☐								
Mollusks	Promenetus umbillicatellus	Cockerell	☑								
Mollusks	Anodontoides ferussacianus	Cylindrical papershell	☐								
Mollusks	Ferrissia fragilis	Fragil Ancylid	☐								
Mollusks	Physa cupreonitens	Hot Springs Physa	☑								
Mollusks	Promenetus exacuus	Sharp Sprite	☑								
Reptiles	Kinosternon flavescens	Yellow mud turtle	☑								

Table 17 - Continued.

Low Priority				Mountain Streams				Riparian/Wetlands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Amphibians	Bufo boreas boreas	Boreal toad (Southern Rocky Mountain Population)	☑	Amphibians	Rana sylvatica	Wood Frog	☑				
Amphibians	Rana pipiens	Northern leopard Frog	☑	Birds	Cinclus mexicanus	American dipper	☑				
Birds	Falco peregrinus anatum	American peregrine falcon	☐	Birds	Bucephala islandica	Barrow's goldeneye	☐				
Birds	Haliaeetus leucocephalus	Bald eagle	☐	Birds	Cypseloides niger	Black swift	☑				
Birds	Aquila chrysaetos	Golden eagle	☐	Birds	Selasphorus platycercus	Broad-tailed hummingbird	☑				
Birds	Grus canadensis tabida	Greater sandhill crane	☐	Birds	Empidonax occidentalis	Cordilleran flycatcher	☑				
Birds	Strix occidentalis lucida	Mexican spotted owl	☑	Birds	Passerina amoena	Lazuli bunting	☐				
Birds	Falco mexicanus	Prairie falcon	☐	Birds	Pandion haliaetus	Osprey	☐				
Birds	Sphyrapicus nuchalis	Red-naped sapsucker	☐	Birds	Catharus fusceceus	Veery	☑				
Birds	Progne subis hesperia	Western purple Martin	☐	Fish	Catostomus platyrhynchus	Mountain sucker	☑				
Fish	Oncorhynchus clarki pleuriticus	Colorado River Cutthroat Trout	☑	Insects	Capnia arapahoe	Arapahoe snowfly	☑				
Fish	Oncorhynchus clarki stomias	Greenback Cutthroat Trout	☑	Mammals	Myotis occultus	Arizona myotis	☐				
Fish	Gila pandora	Rio Grande chub	☐	Mammals	Ursus arctos	Grizzly bear	☐				
Fish	Oncorhynchus clarki virginalis	Rio Grande Cutthroat Trout	☑								
Fish	Catostomus plebeius	Rio Grande sucker	☑								
Mammals	Sorex nanus	Dwarf shrew	☑								
Mammals	Myotis thysanodes	Fringed myotis	☐								
Mammals	Zapus hudsonius	Meadow jumping mouse (both subspecies)	☑								
Mammals	Lontra canadensis	River otter	☑								
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	☐								
Mollusks	Promenetus umbillicatellus	Cockerell	☐								
Mollusks	Acroloxus coloradensis	Rocky Mountain capshell	☐								
Mollusks	Promenetus exacuus	Sharp Sprite	☐								

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Degradation	Altered hydrological regime (surface or aquifer)	Maintain or Restore Natural Processes	Adjust operation of dam and ditches	
Invasive or Exotic Species	Invasive animals	Invasive Species Control and Prevention	Control non-native fish	
Invasive or Exotic Species	Invasive plants	Invasive Species Control and Prevention	Implement integrated weed/pest management plan	

Table 17 - Continued.

Low Priority		<u>Greasewood Fans and Flats</u>		Shrublands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Birds	Spizella breweri	Brewer's sparrow	<input type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input type="checkbox"/>
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>	Birds	Poecetes gramineus	Vesper sparrow	<input type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Mammals	Conepatus leuconotus	Common Hog-nosed skunk	<input type="checkbox"/>
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>				
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>	Reptiles	Gambelia wislizenii	Longnose leopard lizard	<input checked="" type="checkbox"/>
Birds	Amphispiza belli	Sage sparrow	<input checked="" type="checkbox"/>	Reptiles	Crotalus viridis concolor	Midget faded rattlesnake	<input type="checkbox"/>
Birds	Callipepla squamata	Scaled quail	<input type="checkbox"/>	Reptiles	Hypsiglena torquata	Night snake	<input checked="" type="checkbox"/>
Mammals	Cynomys gunnisoni	Gunnison's prairie dog	<input type="checkbox"/>	Reptiles	Tantilla horbartsmithi	Southwestern black-headed snake	<input checked="" type="checkbox"/>
Mammals	Vulpes macrotis	Kit fox	<input checked="" type="checkbox"/>				
Mammals	Lepus townsendii	White-tailed jackrabbit	<input type="checkbox"/>				
Reptiles	Cnemidophorus neotesselatus	Triploid checkered whiptail	<input checked="" type="checkbox"/>				

General Threat		Specific Threat	General Conservation Action		Specific Conservation Action	Priority
Habitat Degradation		Altered hydrological regime (aquifer)	Maintain or Restore Natural Processes		Reduce ground-water pumping	

Low Priority		<u>Saltbrush Fans and Flats</u>		Shrublands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Birds	Spizella breweri	Brewer's sparrow	<input type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input type="checkbox"/>
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>	Mammals	Conepatus leuconotus	Common Hog-nosed skunk	<input type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Reptiles	Gambelia wislizenii	Longnose leopard lizard	<input checked="" type="checkbox"/>
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>	Reptiles	Crotalus viridis concolor	Midget faded rattlesnake	<input type="checkbox"/>
Birds	Charadrius montanus	Mountain plover	<input type="checkbox"/>	Reptiles	Tantilla horbartsmithi	Southwestern black-headed snake	<input checked="" type="checkbox"/>
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>				
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>				
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input type="checkbox"/>				
Mammals	Vulpes macrotis	Kit fox	<input checked="" type="checkbox"/>				
Mammals	Lepus townsendii	White-tailed jackrabbit	<input type="checkbox"/>				
General Threat		Specific Threat	General Conservation Action		Specific Conservation Action		Priority
Habitat Conversion		Housing, urban, and ex-urban development	Land Protection (Public, Private), Easements, and Resource Rights		Purchase habitat or Acquire conservation easement for conservation purpose		

Table 17 - Continued.

Low Priority				<u>Desert Shrub</u>				Shrublands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Spizella breweri	Brewer's sparrow	<input type="checkbox"/>	Birds	Toxostoma curvirostre	Curve-billed thrasher	<input checked="" type="checkbox"/>				
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Poocetes gramineus	Vesper sparrow	<input type="checkbox"/>				
Birds	Calamospiza melanocorys	Lark bunting	<input checked="" type="checkbox"/>	Insects	Hemileuca neuvoeigeni	A Buckmoth	<input checked="" type="checkbox"/>				
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>	Insects	Euphilotes rita emmeli	Desert buckwheat blue	<input checked="" type="checkbox"/>				
Birds	Charadrius montanus	Mountain plover	<input type="checkbox"/>	Insects	Incisalia fotis	Early elfin	<input type="checkbox"/>				
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>	Mammals	Myotis occultus	Arizona myotis	<input type="checkbox"/>				
Birds	Callipepla squamata	Scaled quail	<input checked="" type="checkbox"/>	Mammals	Conepatus leuconotus	Common Hog-nosed skunk	<input type="checkbox"/>				
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>	Reptiles	Thamnophis cyrtopsis	Blacknecked garter snake	<input type="checkbox"/>				
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input checked="" type="checkbox"/>	Reptiles	Lampropeltis getula	Common kingsnake	<input type="checkbox"/>				
Insects	Callophrys comstocki	Comstock's hairstreak	<input checked="" type="checkbox"/>	Reptiles	Gambelia wislizenii	Longnose leopard lizard	<input checked="" type="checkbox"/>				
Mammals	Mustela nigripes	Black-footed ferret	<input type="checkbox"/>	Reptiles	Crotalus viridis concolor	Midget faded rattlesnake	<input checked="" type="checkbox"/>				
Mammals	Myotis thysanodes	Fringed myotis	<input type="checkbox"/>	Reptiles	Hypsiglena torquata	Night snake	<input checked="" type="checkbox"/>				
Mammals	Cynomys gunnisoni	Gunnison's prairie dog	<input type="checkbox"/>	Reptiles	Tantilla horbartsmithi	Southwestern black-headed snake	<input checked="" type="checkbox"/>				
Mammals	Vulpes macrotis	Kit fox	<input checked="" type="checkbox"/>								
Mammals	Euderma maculatum	Spotted bat	<input type="checkbox"/>								
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	<input type="checkbox"/>								
Mammals	Lepus townsendii	White-tailed jackrabbit	<input type="checkbox"/>								
Mammals	Cynomys leucurus	White-tailed prairie dog	<input checked="" type="checkbox"/>								

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Conversion	Housing, urban, and ex-urban development	Land Protection (Public, Private), Easements, and Resource Rights	Purchase habitat or Acquire conservation easement for conservation purpose	

Table 17 - Continued.

Low Priority		Deciduous Oak		Shrublands			
Tier 1 Species				Tier 2 Species			
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary
Birds	Patagioenas fasciata	Band-tailed pigeon	<input checked="" type="checkbox"/>	Birds	Dendragapus obscurus	Blue grouse	<input checked="" type="checkbox"/>
Birds	Dendroica nigrescens	Black-throated gray warbler	<input type="checkbox"/>	Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>
Birds	Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse	<input type="checkbox"/>	Birds	Empidonax oberholseri	Dusky flycatcher	<input checked="" type="checkbox"/>
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Dendroica graciae	Grace's warbler	<input checked="" type="checkbox"/>
Birds	Tympanuchus phasianellus jamesii	Plains sharp-tailed grouse	<input checked="" type="checkbox"/>	Birds	Passerina amoena	Lazuli bunting	<input checked="" type="checkbox"/>
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>	Birds	Selasphorus rufus	Rufous hummingbird	<input checked="" type="checkbox"/>
Insects	Hesperia ottoe	Ottoe skipper	<input type="checkbox"/>	Birds	Vermivora virginiae	Virginia's warbler	<input checked="" type="checkbox"/>
Mammals	Myotis thysanodes	Fringed myotis	<input checked="" type="checkbox"/>	Insects	Eurystrymon favonius Ontario	Northern hairstreak	<input checked="" type="checkbox"/>
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Insects	Anisota oslari	Oslar's oakworm moth	<input checked="" type="checkbox"/>
Mammals	Cynomys gunnisoni	Gunnison's prairie dog	<input type="checkbox"/>	Insects	Euphilotes spaldingi	Spalding's blue	<input type="checkbox"/>
Mammals	Plecotus (Chorynorhinus) townsendii pallescens	Townsend's big-eared bat ssp.	<input type="checkbox"/>	Mammals	Idionycteris phyllotis	Allen's big-eared bat	<input checked="" type="checkbox"/>
Mammals	Lepus townsendii	White-tailed jackrabbit	<input type="checkbox"/>	Mammals	Myotis occultus	Arizona myotis	<input type="checkbox"/>
				Mammals	Conepatus leuconotus	Common Hog-nosed skunk	<input type="checkbox"/>
				Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>
				Mammals	Sorex preblei	Preble's shrew	<input checked="" type="checkbox"/>
				Reptiles	Thamnophis cyrtopsis	Blacknecked garter snake	<input type="checkbox"/>

General Threat	Specific Threat	General Conservation Action	Specific Conservation Action	Priority
Habitat Degradation		Maintain or Restore Natural Processes		

Table 17 - Continued.

Low Priority		<u>Meadow Tundra</u>		Tundra				
Tier 1 Species				Tier 2 Species				
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary	
Birds	Leucosticte australis	Brown-capped rosy-finch	<input checked="" type="checkbox"/>	Birds	Leucosticte atrata	Black rosy-finch	<input checked="" type="checkbox"/>	
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Selasphorus rufus	Rufous hummingbird	<input checked="" type="checkbox"/>	
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>	Birds	Lagopus leucurus	White-tailed ptarmigan	<input checked="" type="checkbox"/>	
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	<input checked="" type="checkbox"/>	Mammals	Ursus arctos	Grizzly bear	<input checked="" type="checkbox"/>	
				Mammals	Gulo gulo	Wolverine	<input type="checkbox"/>	
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Climate				Legislation, Policies and Regulations		Reduce CO2 emissions		
Habitat Degradation				Recreation Management				

Low Priority		<u>Shrub Tundra</u>		Tundra				
Tier 1 Species				Tier 2 Species				
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary	
Birds	Leucosticte australis	Brown-capped rosy-finch	☑	Birds	Leucosticte atrata	Black rosy-finch	☑	
Birds	Aquila chrysaetos	Golden eagle	☐	Birds	Empidonax oberholseri	Dusky flycatcher	☑	
Birds	Falco mexicanus	Prairie falcon	☐	Birds	Selasphorus rufus	Rufous hummingbird	☑	
Insects	Boloria improba acrochema	Uncompahgre fritillary	☑	Birds	Lagopus leucurus	White-tailed ptarmigan	☑	
Mammals	Canis lupus	Gray wolf - two subspecies (Northern and Mexican)	☑	Mammals	Ovis canadensis	Bighorn sheep	☐	
				Mammals	Ursus arctos	Grizzly bear	☑	
				Mammals	Gulo gulo	Wolverine	☐	
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Climate		Habitat shifting and alteration due to climate change		Legislation, Policies and Regulations		Reduce CO2 emissions		

Table 17 - Continued.

Low Priority				<u>Exposed Rock</u>				Unvegetated			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Falco peregrinus anatum	American peregrine falcon	<input checked="" type="checkbox"/>	Arachnids	Hypochilus bonneti	A lampshade spider	<input checked="" type="checkbox"/>				
Birds	Leucosticte australis	Brown-capped rosy-finch	<input checked="" type="checkbox"/>	Birds	Leucosticte atrata	Black rosy-finch	<input checked="" type="checkbox"/>				
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>	Birds	Cypseloides niger	Black swift	<input checked="" type="checkbox"/>				
Birds	Aquila chrysaetos	Golden eagle	<input checked="" type="checkbox"/>	Birds	Empidonax occidentalis	Cordilleran flycatcher	<input checked="" type="checkbox"/>				
Birds	Strix occidentalis lucida	Mexican spotted owl	<input checked="" type="checkbox"/>	Birds	Aeronautes saxatalis	White-throated swift	<input checked="" type="checkbox"/>				
Birds	Falco mexicanus	Prairie falcon	<input checked="" type="checkbox"/>	Mammals	Idionycteris phyllotis	Allen's big-eared bat	<input type="checkbox"/>				
Mammals	Myotis thysanodes	Fringed myotis	<input checked="" type="checkbox"/>	Mammals	Ovis canadensis	Bighorn sheep	<input checked="" type="checkbox"/>				
Mammals	Euderma maculatum	Spotted bat	<input checked="" type="checkbox"/>	Mammals	Gulo gulo	Wolverine	<input type="checkbox"/>				
				Reptiles	Crotalus viridis concolor	Midget faded rattlesnake	<input checked="" type="checkbox"/>				
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority			
Habitat Degradation		Cave/mine closures		Compliance and Enforcement		Manage recreation and/or permitted activities (e.g., rock climbing, grazing leases)					
Non-consumptive Disturbance		Non-motorized recreation (caving and climbing)		Compliance and Enforcement		Manage recreation and/or permitted activities (e.g., rock climbing, grazing leases)					

Low Priority				<u>Sandy Areas</u>				Unvegetated			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Aquila chrysaetos	Golden eagle	<input type="checkbox"/>	Birds	Pelecanus erythrorhynchos	American white pelican	<input type="checkbox"/>				
Birds	Sterna antillarum	Least tern	<input checked="" type="checkbox"/>	Insects	Amblyderus weneri	Great Sand Dunes Anthicid beetle	<input checked="" type="checkbox"/>				
Birds	Charadrius melodus	Piping plover	<input checked="" type="checkbox"/>								
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>								
Birds	Charadrius alexandrinus nivosus	Western snowy plover	<input checked="" type="checkbox"/>								
Reptiles	Cnemidophorus neotesselatus	Triploid checkered whiptail	<input checked="" type="checkbox"/>								
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority			
Not particularly threatened											

Table 17 - Continued.

Low Priority				Irrigated Crops				Urban and Croplands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Botaurus lentiginosus	American bittern	<input type="checkbox"/>	Birds	Calcarius ornatus	Chestnut-collared longspur	<input type="checkbox"/>				
Birds	Haliaeetus leucocephalus	Bald eagle	<input type="checkbox"/>	Birds	Toxostoma curvirostre	Curve-billed thrasher	<input type="checkbox"/>				
Birds	Patagioenas fasciata	Band-tailed pigeon	<input type="checkbox"/>	Birds	Zonotrichia querula	Harris' sparrow	<input checked="" type="checkbox"/>				
Birds	Dolichonyx oryzivorus	Bobolink	<input checked="" type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input checked="" type="checkbox"/>				
Birds	Spizella breweri	Brewer's sparrow	<input type="checkbox"/>	Birds	Plegadis chihi	White-faced ibis	<input checked="" type="checkbox"/>				
Birds	Aimophila cassinii	Cassin's sparrow	<input type="checkbox"/>	Reptiles	Lampropeltis getula	Common kingsnake	<input checked="" type="checkbox"/>				
Birds	Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse	<input type="checkbox"/>								
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>								
Birds	Aquila chrysaetos	Golden eagle	<input checked="" type="checkbox"/>								
Birds	Tympanuchus cupido	Greater prairie-chicken	<input checked="" type="checkbox"/>								
Birds	Centrocercus urophasianus	Greater sage-grouse	<input type="checkbox"/>								
Birds	Grus canadensis tabida	Greater sandhill crane	<input checked="" type="checkbox"/>								
Birds	Centrocercus minimus	Gunnison sage-grouse	<input type="checkbox"/>								
Birds	Calamospiza melanocorys	Lark bunting	<input checked="" type="checkbox"/>								
Birds	Tympanuchus pallidicinctus	Lesser prairie-chicken	<input type="checkbox"/>								
Birds	Melanerpes lewis	Lewis's woodpecker	<input type="checkbox"/>								
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>								
Birds	Numenius americanus	Long-billed curlew	<input type="checkbox"/>								
Birds	Calcarius mccownii	McCown's longspur	<input type="checkbox"/>								
Birds	Charadrius montanus	Mountain plover	<input checked="" type="checkbox"/>								
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>								
Birds	Callipepla squamata	Scaled quail	<input type="checkbox"/>								
Birds	Asio flammeus	Short-eared owl	<input type="checkbox"/>								
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>								
Birds	Bartramia longicauda	Upland sandpiper	<input type="checkbox"/>								
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input type="checkbox"/>								
Birds	Grus americana	Whooping crane	<input checked="" type="checkbox"/>								
General Threat		Specific Threat		General Conservation Action		Specific Conservation Action	Priority				
Not particularly threatened											

Table 17 - Continued.

Low Priority				Dryland Crops				Urban and Croplands			
Tier 1 Species				Tier 2 Species							
Group	Species	Common Name	Primary	Group	Species	Common Name	Primary				
Birds	Botaurus lentiginosus	American bittern	<input type="checkbox"/>	Birds	Calcarius ornatus	Chestnut-collared longspur	<input type="checkbox"/>				
Birds	Haliaeetus leucocephalus	Bald eagle	<input type="checkbox"/>	Birds	Toxostoma curvirostre	Curve-billed thrasher	<input type="checkbox"/>				
Birds	Spizella breweri	Brewer's sparrow	<input type="checkbox"/>	Birds	Zonotrichia querula	Harris' sparrow	<input checked="" type="checkbox"/>				
Birds	Aimophila cassinii	Cassin's sparrow	<input type="checkbox"/>	Birds	Circus cyaneus	Northern harrier	<input checked="" type="checkbox"/>				
Birds	Buteo regalis	Ferruginous hawk	<input type="checkbox"/>								
Birds	Aquila chrysaetos	Golden eagle	<input checked="" type="checkbox"/>								
Birds	Tympanuchus cupido	Greater prairie-chicken	<input checked="" type="checkbox"/>								
Birds	Centrocercus urophasianus	Greater sage-grouse	<input type="checkbox"/>								
Birds	Grus canadensis tabida	Greater sandhill crane	<input type="checkbox"/>								
Birds	Calamospiza melanocorys	Lark bunting	<input checked="" type="checkbox"/>								
Birds	Tympanuchus pallidicinctus	Lesser prairie-chicken	<input type="checkbox"/>								
Birds	Lanius ludovicianus	Loggerhead shrike	<input checked="" type="checkbox"/>								
Birds	Numenius americanus	Long-billed curlew	<input type="checkbox"/>								
Birds	Calcarius mccownii	McCown's longspur	<input type="checkbox"/>								
Birds	Charadrius montanus	Mountain plover	<input checked="" type="checkbox"/>								
Birds	Falco mexicanus	Prairie falcon	<input type="checkbox"/>								
Birds	Callipepla squamata	Scaled quail	<input type="checkbox"/>								
Birds	Asio flammeus	Short-eared owl	<input type="checkbox"/>								
Birds	Buteo swainsoni	Swainson's hawk	<input checked="" type="checkbox"/>								
Birds	Bartramia longicauda	Upland sandpiper	<input type="checkbox"/>								
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input type="checkbox"/>								
Birds	Grus americana	Whooping crane	<input checked="" type="checkbox"/>								
Mammals	Vulpes velox	Swift fox	<input checked="" type="checkbox"/>								

General Threat		Specific Threat		General Conservation Action		Specific Conservation Action		Priority
Not particularly threatened								

Table 17 - Continued.

Low Priority

Tier 1 Species

Group	Species	Common Name	Primary
Birds	Falco peregrinus anatum	American peregrine falcon	<input type="checkbox"/>
Birds	Patagioenas fasciata	Band-tailed pigeon	<input type="checkbox"/>
Birds	Leucosticte australis	Brown-capped rosy-finch	<input type="checkbox"/>
Birds	Melanerpes lewis	Lewis's woodpecker	<input type="checkbox"/>
Birds	Gymnorhinus cyanocephalus	Pinyon jay	<input checked="" type="checkbox"/>
Birds	Callipepla squamata	Scaled quail	<input type="checkbox"/>
Birds	Buteo swainsoni	Swainson's hawk	<input type="checkbox"/>
Birds	Athene cunicularia hypugaea	Western burrowing owl	<input type="checkbox"/>
Mammals	Cynomys ludovicianus	Black-tailed prairie dog	<input type="checkbox"/>

Urban

Tier 2 Species

Group	Species	Common Name	Primary
Birds	Leucosticte atrata	Black rosy-finch	<input type="checkbox"/>
Birds	Archilochus alexandri	Black-chinned hummingbird	<input checked="" type="checkbox"/>
Birds	Selasphorus platycercus	Broad-tailed hummingbird	<input checked="" type="checkbox"/>
Birds	Carpodacus cassinii	Cassin's finch	<input checked="" type="checkbox"/>
Birds	Sitta pygmaea	Pygmy nuthatch	<input checked="" type="checkbox"/>
Birds	Selasphorus rufus	Rufous hummingbird	<input checked="" type="checkbox"/>
Mammals	Myotis occultus	Arizona myotis	<input type="checkbox"/>

Urban and Croplands

General Threat

Specific Threat

General Conservation Action

Specific Conservation Action

Priority

Not particularly threatened

PART 4 – COORDINATION, REVIEW, AND REVISION OF THE PLAN

4.1 Coordination of Conservation Actions with Relevant Partners

Two strategies will ensure continued coordination with relevant partners. First is to maintain the ‘transparent’ process used to develop this CWCS. Potential partners were notified by letter of the strategy development almost as soon as it began and invited to participate. Nearly 1,000 initial letters began the process of communication and coordination. Numerous potential partnerships are identified in the Science Forum dealing with individual habitats, issues, conservation actions and monitoring strategies and this list was expanded as a result of the stakeholder process. Other mechanisms used for communication and coordination and involving relevant partners in preparing this CWCS are listed in Section 1.2. Communication can be characterized as diverse and widespread and will continue throughout the implementation of this CWCS. It is the State of Colorado’s intent to maintain this transparent and participatory approach to coordinate with current partners and to recruit additional ones.

The second strategy is to integrate the priorities identified in this CWCS into the substantial wildlife management infrastructure that already exists in Colorado. This is to begin with integration of the efforts reflected in Table 18 with the CWCS priorities, the opportunities it presents for partnerships, and potential benefits of synergistic projects. In order to facilitate this integration the Division of Wildlife has initiated a central location on its web site to provide access to all conservation, recovery, or other action plans for Colorado’s wildlife (<http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/>)

Table 18. A sample of existing species-specific and multi-species conservation, recovery, and other action plans and agreements for Colorado wildlife. These and other plans that are in electronic format may be accessed *via* the CDOW website, <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/>

Species	Species Plans and/or Agreements	Multi-Species Plans
Gunnison Sage-grouse	<ul style="list-style-type: none">• Gunnison Sage-grouse Rangewide Steering Committee (2005);• Conservation Plan/Agreement with Assurance;• WAFWA MOU National Sage Grouse Habitat Conservation Strategy;• Local work group plans (6)	<ul style="list-style-type: none">• Rich et al. (2004) ;• Intermountain West Joint Venture;• Neely et al. (2001);• Tuhy et al. (2002)• Colorado Important Bird Areas Program;
Greater Sandhill Crane	<ul style="list-style-type: none">• State Recovery Plan	<ul style="list-style-type: none">• Colorado Important Bird Areas Program;• Neely et al. (2001)
Greenback Cutthroat Trout	<ul style="list-style-type: none">• U.S. Fish and Wildlife Service (1998b)	<ul style="list-style-type: none">• Neely et al. (2001)
Greater Sage Grouse	<ul style="list-style-type: none">• WAFWA MOU National Sage Grouse Habitat Conservation Strategy;• Local working group plans (4)	<ul style="list-style-type: none">• Rich et al. (2004);• Intermountain West Joint Venture;• Neely et al. (2001)

Table 18. A sample of existing species-specific and multi-species conservation, recovery, and other action plans and agreements for Colorado wildlife. These and other plans that are in electronic format may be accessed *via* the CDOW website, <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/>

Species	Species Plans and/or Agreements	Multi-Species Plans
Roundtail Chub		<ul style="list-style-type: none"> • State Conservation Plan (3-Species Plan) (WY, CO, UT, NM, AZ, NV)
Colo. River Cutthroat Trout	<ul style="list-style-type: none"> • Multi-agency Tri-State CACS (CO, UT, WY) 	<ul style="list-style-type: none"> • Neely et al. (2001)
Colorado Pikeminnow	<ul style="list-style-type: none"> • Fed Recovery Plan 	<ul style="list-style-type: none"> • Neely et al. (2001)
Rio Grande Cutthroat Trout	<ul style="list-style-type: none"> • Multi-agency CO-NM CACS, • Colorado Conservation Plan 	<ul style="list-style-type: none"> • Neely et al. (2001)
River Otter	<ul style="list-style-type: none"> • CDOW (2003b) 	
Black-footed Ferret	<ul style="list-style-type: none"> • U.S. Fish and Wildlife Service (1988); • Wolf Creek and Coyote Basin Cooperative Mgmt. Plan; • Little Snake Cooperative Management Plan 	
Bonytail Chub	<ul style="list-style-type: none"> • Federal Recovery Plan 	
Mountain Plover		<ul style="list-style-type: none"> • Playa Lakes Joint Venture (<i>in prep.</i>); • Intermountain West Joint Venture; • CDOW (2003a); • The Nature Conservancy Central Shortgrass Prairie Ecoregional Assessment; • Brown et al. (2001); • Central Plains/Playa Lakes Shorebird Conservation Plan; • Colorado Important Bird Areas Program; • Neely et al. (2001)
Razorback Sucker	<ul style="list-style-type: none"> • U.S. Fish and Wildlife Service (1998c) 	
Lesser Prairie-Chicken	<ul style="list-style-type: none"> • W. Governor's Association Interstate Working Group; • State Recovery Plan; • Lesser Prairie-chicken Conservation Initiative. 	<ul style="list-style-type: none"> • Playa Lakes Joint Venture (<i>in prep.</i>); • The Nature Conservancy Central Shortgrass Prairie Ecoregional Assessment; • Rich et al. (2004); • N. Am. Grouse Mgt Plan (draft only) ; • Colorado Important Bird Areas Program; • Neely et al. (2001)
Bald Eagle	<ul style="list-style-type: none"> • Federal Recovery Plan 	
Humpback Chub	<ul style="list-style-type: none"> • Federal Recovery Plan 	
Black-tailed Prairie Dog	<ul style="list-style-type: none"> • Multi-agency MOU; • Multi-State Conservation Plan for BTPD in the United States 	<ul style="list-style-type: none"> • CDOW (2003a); • The Nature Conservancy Central Shortgrass Prairie Ecoregional Assessment; • Neely et al. (2001)

Table 18. A sample of existing species-specific and multi-species conservation, recovery, and other action plans and agreements for Colorado wildlife. These and other plans that are in electronic format may be accessed *via* the CDOW website, <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/>

Species	Species Plans and/or Agreements	Multi-Species Plans
American Peregrine Falcon	<ul style="list-style-type: none"> Federal Recovery Plan (resulted in a monitoring plan for this de-listed species) 	<ul style="list-style-type: none"> Rich et al. (2004)
Common Shiner	<ul style="list-style-type: none"> State Recovery Plan 	<ul style="list-style-type: none"> So. Platte Native Fish Conservation Plan; Neely et al. (2001)
Boreal toad	<ul style="list-style-type: none"> The Boreal Toad Recovery Team and Technical Advisory Group (2001); Conservation Agreement w/Assurances 	<ul style="list-style-type: none"> Neely et al. (2001)
Burrowing Owl	<ul style="list-style-type: none"> Klute et al. (2003) 	<ul style="list-style-type: none"> CDOW (2003); Rich et al. (2004); The Nature Conservancy Central Shortgrass Prairie Ecoregional Assessment; Playa Lakes Joint Venture (<i>in prep.</i>); Intermountain West Joint Venture;
Plains Minnow	<ul style="list-style-type: none"> State Recovery Plan 	<ul style="list-style-type: none"> South Platte Native Fish Conservation Plan; Arkansas River Native Fish Conservation Plan
Suckermouth Minnow	<ul style="list-style-type: none"> State Recovery Plan 	<ul style="list-style-type: none"> South Platte Native Fish Conservation Plan; Arkansas River Native Fish Conservation Plan; Neely et al. (2001)
Northern Redbelly Dace	<ul style="list-style-type: none"> State Recovery Plan 	<ul style="list-style-type: none"> South Platte Native Fish Conservation Plan
Columbian Sharp-tailed Grouse	<ul style="list-style-type: none"> Multi-agency Conservation Plan and Agreement 	<ul style="list-style-type: none"> Hoffman (2001); Neely et al. (2001)
Swift Fox	<ul style="list-style-type: none"> Kahn et al. (1997) 	<ul style="list-style-type: none"> CDOW (2003); The Nature Conservancy Central Shortgrass Prairie Ecoregional Assessment; Neely et al. (2001)
Gunnison's Prairie Dog		<ul style="list-style-type: none"> Neely et al. (2001)
Brassy Minnow	<ul style="list-style-type: none"> State Recovery Plan 	<ul style="list-style-type: none"> South Platte Native Fish Conservation Plan; Neely et al. (2001)
Whooping Crane	<ul style="list-style-type: none"> Federal Recovery Plan 	<ul style="list-style-type: none"> Kushlan et al. (2002)
Kit Fox		<ul style="list-style-type: none"> Boyle and Reeder (2005)
SW Willow Flycatcher	<ul style="list-style-type: none"> Federal Recovery Plan 	<ul style="list-style-type: none"> Inter-mountain West Joint Venture; Tuhy et al. (2002); Neely et al. (2001)
Rio Grande Sucker	<ul style="list-style-type: none"> State Recovery Plan 	<ul style="list-style-type: none"> Neely et al. (2001)
Rio Grande Chub	<ul style="list-style-type: none"> State Recovery Plan 	<ul style="list-style-type: none"> Neely et al. (2001)

Table 18. A sample of existing species-specific and multi-species conservation, recovery, and other action plans and agreements for Colorado wildlife. These and other plans that are in electronic format may be accessed *via* the CDOW website, <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/>

Species	Species Plans and/or Agreements	Multi-Species Plans
Long-billed Curlew		<ul style="list-style-type: none"> • Playa Lakes Joint Venture (<i>in prep.</i>); • Brown et al (2001); • Central Plains/Playa Lakes Shorebird Conservation Plan; • The Nature Conservancy Central Shortgrass Prairie Ecoregional Assessment
Ferruginous Hawk		<ul style="list-style-type: none"> • CDOW (2003); • Rich et al. (2004); • The Nature Conservancy Central Shortgrass Prairie Ecoregional Assessment; • Playa Lakes Joint Venture (<i>in prep.</i>); • Intermountain West Joint Venture;
Plains Sharp-tailed Grouse	• State Recovery Plan	• Rich et al. (2004)
Arkansas Darter	• State Recovery Plan	• Neely et al. (2001)
Lake Chub		
White-tailed Prairie Dog	• Seglund et al. (<i>in prep.</i>)	• Neely et al. (2001)
Southern Redbelly Dace	• State Recovery Plan	• Arkansas River Native Fish Conservation Plan
Piping Plover	• Federal Recovery Plan	<ul style="list-style-type: none"> • Brown et al. (2001); • Central Plains/Playa Lakes Shorebird Conservation Plan; • State of Colorado Piping Plover and Interior Least Tern Recovery Plan (1994) ; • Colorado Important Bird Areas Program
Western Snowy Plover		<ul style="list-style-type: none"> • Brown et al (2001); • Central Plains/Playa Lakes Regional Shorebird Conservation Plan; • Colorado Important Bird Areas Program
Mexican Spotted Owl	• Federal Recovery Plan	<ul style="list-style-type: none"> • Rich et al. (2004); • Colorado Important Bird Areas Program; • Neely et al. (2001)
Lynx	• Multi-agency Conservation Plan and Agreement	<ul style="list-style-type: none"> • Neely et al. (2001); • CDOW (2002)
Preble's Meadow Jumping Mouse	• U.S. Fish and Wildlife Service (2003)	• Neely et al. (2001)
Least Tern	• Federal Recovery Plan	<ul style="list-style-type: none"> • Playa Lakes Joint Venture (<i>in prep.</i>); • Kushlan et al. (2002);

Table 18. A sample of existing species-specific and multi-species conservation, recovery, and other action plans and agreements for Colorado wildlife. These and other plans that are in electronic format may be accessed *via* the CDOW website, <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/>

Species	Species Plans and/or Agreements	Multi-Species Plans
		<ul style="list-style-type: none"> • State of Colorado Piping Plover and Interior Least Tern Recovery Plan (1994) ; • Colorado Important Bird Areas Program
Wolf	<ul style="list-style-type: none"> • Federal Recovery Plan; • Colorado wolf management working group (2004). 	<ul style="list-style-type: none"> • Neely et al. (2001)

4.2 Incorporating New Information into the CWCS

As new information becomes available it will be incorporated into the CWCS. Colorado frequently employs adaptive management approaches using management interventions as experiments and monitors the effects of management treatments to adjust future plans. Colorado Division of Wildlife species conservation plans provide quantified management objectives and security benchmarks that are reflected in its “Work Package” planning system (Figure 3). These work packages will continue to be developed for CWCS-eligible projects so progress against those objectives can be measured both within the specific plans and the CWCS. Due to the costliness of measuring the outcomes of some management interventions, not all will be measured with the same rigor. Nevertheless, the CWCS will require periodic review and revision and Colorado will routinely continue to accumulate information on performance using such variables as status and trends of species of greatest conservation need and trends in habitat condition along with assessment of specific project outcomes.

4.3 Review and Updates to the CWCS

In the near term, CWCS review and incorporation of new information will be performed in traditional fashion using similar procedures to this initial effort, at an interval of not less than 5 years, and no more than 10. This timeframe will allow the effects of the Strategy and the operational or action plans and activities that flow from it to be adequately expressed and evaluated before extensive modification. As described elsewhere, a future vision of adopting a more aggressive adaptive management strategy, with the CWCS residing on a database platform (vs. a fixed text document), allowing ongoing updates to reflect changes in species and habitat status, conservation accomplishments as they occur (i.e., a “living” strategy). This will facilitate ongoing communication and coordination among conservation partners and the incorporation of information they gain through their normal operations. Thus, updates and review of the CWCS would be a continuous, rather than a punctuated process. Oversight and maintenance of such a systems approach would be accomplished *via* pooled resources of collaborating entities, including an oversight committee of those collaborators. Given current fiscal, logistical, and technological constraints, contributors to the CWCS who recommended this approach typically acknowledged it as a longer-term vision rather than necessarily an initiative to be undertaken in the immediate future.

Work Package

0841 Least Tern Recovery

Work Package Description:

The purpose of this work package is to maintain viable, self-sustaining populations of least tern. Colorado management objectives and recovery benchmarks are to upgrade from Endangered to Threatened when > 25 breeding pairs @ > 0.7 young fledged/breeding pr is sustained for > 5 consecutive yrs.

Delist from Threatened when an avg. of > 50 breeding pairs @ > 0.7 young fledged/breeding pr. is sustained for > 5 consecutive years over 2 separate and distinct breeding areas with > 3 breeding prs. @ 0.7 young fledged/breeding pair.

Activities include monitoring nesting population and productivity, nest relocation, and habitat enhancement at John Martin, Adobe Creek, Verhoeff, and Great Plains reservoirs in southeastern Colorado.

Out Come Measurement

Number of breeding pairs @ 0.7 young fledged

Number of separate and distinct breeding areas w/ > 3 breeding pairs @ > 0.7 young fledged

Species secure, not on state or federal T&E list

Figure 3. Example of Colorado Division of Wildlife Work Package, demonstrating management objectives and security benchmarks

PART 5 – LITERATURE CITED

Bailey, R.G., P.E. Avers, T. King, and W.H. McNab. 1994. Ecoregions and subregions of the United States (map). USDA Forest Service, Washington, D.C.

The Boreal Toad Recovery Team and Technical Advisory Group. 2001. Conservation plan and agreement for the management and recovery of the southern Rocky Mountain population of the boreal toad (*Bufo boreas boreas*). 77 pp. plus Appendices.
<http://wildlife.state.co.us/aquatic/boreal/BorealToadRecovery.pdf>

Boyle, S. A. and D. R. Reeder. 2005. Colorado sagebrush: a conservation assessment and strategy. Version 1, June 2005. Colorado Division of Wildlife, Denver, Colorado, USA.

Brown, S., C. Hickey, B. Harrington, and R. Gill, eds. 2001. The U. S. shorebird conservation plan, 2nd ed. Manomet Center for Conservation Sciences, Manomet, MA.
<http://www.fws.gov/shorebirdplan/USShorebird/downloads/USShorebirdPlan2Ed.pdf>

Colorado Conservation Trust. 2005. Colorado conservation at a crossroads. Colorado Conservation Trust, Boulder, Colorado, USA. (36 pp).
<http://www.coloradoconservationtrust.org/goingon/cccfullreportsmall.pdf>

Colorado Division of Wildlife. 2002. Conservation plan for Canada lynx in Colorado. Colorado Division of Wildlife, Denver, Colorado, USA. 10 pp.
<http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/>

Colorado Division of Wildlife. 2003a. Conservation Plan for Grassland Species in Colorado. Colorado Division of Wildlife, Denver, CO. 210 pp.
http://wildlife.state.co.us/species_cons/Grasslands/conservationplan.asp

Colorado Division of Wildlife. 2003b. State of Colorado river otter recovery plan. Colorado Division of Wildlife, Denver, Colorado. 51 pp. <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/>

Colorado Wildlife Commission. 2002. Colorado Division of Wildlife Strategic Plan. Colorado Division of Wildlife. Denver, CO. 42 pp. http://wildlife.state.co.us/about/strategicplan/Final_Adoption.pdf

Colorado Wolf Management Working Group. 2004. Findings and recommendations for managing wolves that migrate into Colorado. Colorado Division of Wildlife, Denver, Colorado, USA. 67 pp. http://wildlife.state.co.us/species_cons/GrayWolf/workinggroup/recomendations.pdf

Fish and Wildlife Service. 1994. Uncompahgre fritillary butterfly recovery plan. Denver, CO. 20pp.
http://www.xerces.org/Pollinator_Red_List/Recovery_Plans/Uncompahgre_Fritillary_Recovery_Plan_1994.pdf

Gunnison Sage-grouse Rangewide Steering Committee. 2005. Gunnison sage-grouse rangewide conservation plan. Colorado Division of Wildlife, Denver, Colorado, USA. 359 pp. plus Appendices. http://wildlife.state.co.us/species_cons/Gunnison_sage_grouse/index.asp

Hoffman, R.W. (Technical editor). 2001. Columbian sharp-tailed grouse conservation plan. Northwest Colorado Columbian Sharp-tailed Grouse Work Group and Colorado Division of Wildlife, Fort Collins, Colorado, USA. 80pp.

Illahee. 2005. Habitat Monitoring: an approach for reporting status and trends for state Comprehensive Wildlife Conservation Strategies. Prepared by: Peter Schoonmaker and Wayne Luscombe for The Defenders of Wildlife, West Linn, Oregon 97068

Kahn, R., P. Fox, P. Horner, B. Giddings, and C. Roy. 1997. Conservation assessment and conservation strategy for swift fox in the United States. (Colorado Division of Wildlife, Denver, Colorado, USA). 54 pp.

Klute, D.S., L.W. Ayers, M.T. Green, W.H. Howe, S.L. Jones, J.A. Schaffer, S.R. Sheffield, and T.S. Zimmerman. 2003. Status assessment and conservation plan for the western burrowing owl in the United States. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C. 108 pp. <http://mountain-prairie.fws.gov/birds/WBO/Western%20Burrowing%20Owlrev73003a.pdf>

Kushlan, J. A., M.J. Steinkamp, K.C. Parsons, J. Capp, M. Acosta-Cruz, M. Coulter, I. Davidson, L. Dickson, N. Edelson, R. Elliot, R. M. Erin, S. Hatch, S. Kress, R. Milko, S. Miller, K. Mills, R. Paul, R. Phillips, J. E. Saliva, B. Sydeman, J. Trapp, J. Wheeler, and K. Wohl. 2002. Waterbird Conservation for the Americas: The North American Waterbird Conservation Plan. Version 1. Waterbird Conservation for the Americas, Washington, D.C., USA. 78 pp. <http://www.waterbirdconservation.org/pubs/complete.pdf>

Melcher, C. P., Gross, J. E., M. B. Dillon, T. P. Nesler, and G. Skiba. 2001. Colorado Vertebrate Ranking System (COVERS, v. 3): Identifying Species at Risk and Setting Priorities for Conservation of Vertebrates in Colorado. Unpublished report to Colorado Division of Wildlife, Denver, CO. Prepared by Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO.

Nature Conservancy. 2004. Community based conservation. <http://nature.org/wherework/northamerica/states/newyork/eastern/about/art5708.html>.

Neely, B., P. Comer, C. Moritz, M. Lammert, R. Rondeau, C. Pague, G. Bell, H. Copeland, J. Humke, S. Spackman, T. Schulz, D. Theobald, and L. Valutis. 2001. Southern Rocky Mountains: An Ecoregional Assessment and Conservation Blueprint. Prepared by The Nature Conservancy with support of the U.S. Forest Service, Rocky Mountain Region, Colorado Division of Wildlife, and Bureau of Land Management. 86pp. plus Appendices. <http://conserveonline.org/docs/2002/02/SRMreport.pdf>

Neely, B., S. Kettler, J. Horsman, C. Pague, R. Rondeau, P. Comer, L. Grunau, G. Belew, F. Pusateri, B. Rosenlund, D. Runner, J. Sovell, D. Anderson, T. Jackson, and M. Klavetter. 2006. Central Shortgrass Prairie Ecoregional Assessment and Partnership Initiative. Prepared by The Nature Conservancy with funding by Department of Defense Legacy Resource Management Program and Colorado Division of Wildlife. 136pp + Appendices.

Playa Lakes Joint Venture. *in prep.*. Area Implementation Plan for the Bird Conservation Region 18 (Shortgrass Prairie) portion of Colorado. Playa Lakes Joint Venture, Lafayette, Colorado, USA. 4 pp.

Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Iñigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, T. C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, NY. Partners in Flight website. http://www.partnersinflight.org/cont_plan/ (VERSION: March 2005).

Schrupp, D.L., W.A. Reiners, T.G. Thompson, L.E. O'Brien, J.A. Kindler, M.B. Wunder, J.F. Lowsky, J.C. Buoy, L. Satcowitz, A.L. Cade, J.D. Stark, K.L. Driese, T.W. Owens, S.J. Russo, and F. D'Erchia. 2000. Colorado Gap Analysis Program: A Geographic Approach to Planning for Biological Diversity - Final Report, USGS Biological Resources Division, Gap Analysis Program and Colorado Division of Wildlife, Denver, CO.

Seglund, A.E., A.E. Ernst, M. Grenier, B. Luce, A. Puchniak, and P. Schnurr. *In prep.* White-tailed Prairie Dog Conservation Assessment. Western Association of Fish and Wildlife Agencies. Laramie, Wyoming. Unpublished Report. 138 pp.

Shutkin, W. A. 2000. The land that could be: environmentalism and democracy in the twenty-first century. MIT Press, Massachusetts, USA.

Southern Rockies Ecosystem Project. 2003. The Denver Zoological Foundation and The Wildlands Project 2003. Southern Rockies Wildlands Network Vision. Colorado Mountain Club: Golden, Colorado. www.RestoreTheRockies.org

Southern Rockies Ecosystem Project, 2004. The State of the Southern Rockies Ecoregion. Colorado Mountain Club: Golden, Colorado. www.RestoreTheRockies.org.

Southern Rockies Ecosystem Project. March 2005. Linking Colorado's Landscapes: A Statewide Assessment of Wildlife Linkages, Phase I Report. In collaboration with the Federal Highway Administration, Colorado Department of Transportation, Colorado State University, and The Nature Conservancy. www.RestoreTheRockies.org.

The Nature Conservancy. 1998. Ecoregion-based Conservation in the Central Shortgrass Prairie. The Nature Conservancy, Boulder, CO. 91pp + appendices.

Theobald, D., N. Peterson, and G. Wilcox. 2005. CoMAP v4 Mapping the status and trends of Colorado's protected areas. Colorado State University Natural Resources Ecology Laboratory Technical Report, Fort Collins, Colorado, USA. 16 pp.

http://www.nrel.colostate.edu/projects/comap/download_documents/COMaP%20v4%20Technical%20Report.pdf

Tuhy, J. S., P. Comer, D. Dorfman, M. Lammert, J. Humke, B. Cholvín, G. Bell, B. Neely, S. Silbert, L. Whitham, and B. Baker. 2002. A conservation assessment of the Colorado Plateau Ecoregion. The Nature Conservancy, Moab, UT. 110 p. + appendices.

<http://www.redrockforests.org/issuestatement.html>

U.S. Fish and Wildlife Service. 1988. Black-footed ferret recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado, USA. 154 pp. http://ecos.fws.gov/docs/recovery_plans/1988/880808.pdf

U.S. Fish and Wildlife Service. 1998a. Pawnee montane skipper butterfly (*Hesperia leonardus montana*) recovery plan. Denver, CO 16 pp.

http://www.xerces.org/Pollinator_Red_List/Recovery_Plans/Pawnee_Montane_Skipper_Recovery_Plan_1998.pdf

U.S. Fish and Wildlife Service. 1998b. Greenback cutthroat trout recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado, USA. 62 pp.

http://ecos.fws.gov/docs/recovery_plans/1998/980301.pdf

U.S. Fish and Wildlife Service. 1998c. Razorback sucker (*Xyrauchen texanus*) recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado, USA. 81 pp.

<http://ifw2es.fws.gov/Documents/R2ES/RazorbackSucker.pdf>

U.S. Fish and Wildlife Service. 2003. Draft Preble's meadow jumping mouse recovery plan, Colorado. Region 6, U.S. Fish and Wildlife Service, Lakewood, Colorado, USA.

<http://www.r6.fws.gov/preble/RECOVERY/RECOVERYindex.htm>

Zeller, M. 1999. Stewardship of land, an investigation into the state of the art, Fund, Menlo Park, California; <ftp://cnlm.org/pub/stewardship.pdf>

Appendix A

Application of the Criteria Used To Select the Species of Greatest Conservation Need

The specific criteria used to include or exclude species in the list of species of greatest conservation need are:

Inclusion Criteria	<i>Meeting any of the Following</i>
	Listed as federal candidate (C), threatened (T) or endangered (E) species under the ESA.
	Classified as state endangered (E), threatened (T), or species of special concern (SC).
	Global ranking scores of G1, G2 or G3 by the Colorado Natural Heritage Program ⁷ .
	Identified as conservation priorities through a range-wide status assessment or assessment of large taxonomic divisions.
Exclusion Criteria	Assigned state ranking scores of S1 or S2 AND a global ranking score of G4 by the Colorado Natural Heritage Program ⁸ .
	<i>Species meeting the inclusion criteria were eliminated from the Species of Greatest Conservation Need listing if they met any of the following:</i>
	Occurs peripherally in Colorado but is common elsewhere AND for which management actions in Colorado are likely to have no population-level effect.
	Very common but were placed on lists due to economic considerations (e.g., Mallard).

⁷ G1 is critically imperiled globally because of rarity (5 or fewer occurrences in the world; or very few remaining individuals), or because some factor of its biology makes it especially vulnerable to extinction. G2 is imperiled globally because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range. G3 is vulnerable throughout its range or found locally in a restricted range (21 to 100 occurrences). From: Colorado Natural Heritage Program, <http://www.cnhp.colostate.edu>.

⁸ S1 is critically imperiled in state because of rarity (5 or fewer occurrences in the state; or very few remaining individuals), or because some factor of its biology makes it especially vulnerable to extinction. S2 is imperiled in state because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range. G4 is apparently secure in state, though it might be quite rare in parts of its range, especially at the periphery. From: Colorado Natural Heritage Program, <http://www.cnhp.colostate.edu>.

Table A1 - Mollusks - Species of greatest conservation concern (Science Forum Results).

	Scientific Name	Common Name	Criteria for inclusion or exclusion.				
			Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
	<i>Acroloxus coloradensis</i>	Rocky Mountain Capshell		SC	G3	S1	
	<i>Anodontoides ferussacianus</i>	Cylindrical papershell		SC	G5	S2	
	<i>Ferrissia fragilis</i>				G5	S1	
	<i>Ferrissia walkeri</i>				G4G5	S3	
	<i>Physa cupreonitens</i>	Hot Springs Physa			G2	S2	
	<i>Physa utahensis</i>	Banded Physa			G2	S1	
	<i>Promenetus exacuouus</i>				G5	S2	
	<i>Promenetus umbilicatellus</i>				G4	S3	
	<i>Uniomereus tetralasmus</i>	Pondhorn			G5	S1	

Table A2 - Insects - Species of greatest conservation concern (Science Forum Results).						
Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
Stoneflies (Plecoptera)						
<i>Capnia arapahoe</i>	Arapahoe Snowfly			G1	S1	<u>1/</u>
<i>Capnia nelsoni</i>	Nelson's snowfly					<u>1/</u>
<i>Mesocapnia frisoni</i>	Plains Snowfly			G5	S1	<u>1/</u>
Mayflies (Ephemeroptera)						
<i>Ametropus albrighti</i>	Mayfly, spp.					<u>1/</u>
Dragonflies and Damselflies (Odonata)						
<i>Argia alberta</i>	Paiute Dancer			G4	S1S2	
<i>Gomphus intricatus</i>	Brimstone Clubtail			G4	S2	
<i>Libellula nodisticta</i> ^{1/}	Hoary Skimmer			G4	S1	
<i>Somatochlora ensigera</i>	Lemon-faced Emerald			G4	S1	
<i>Sympetrum madidum</i>	Red-veined Meadowfly			G4	S1	
<i>Tetragoneuria petechialis</i>	Stripe-winged Baskettail			G4	S2	
Beetles (Coleoptera)						
<i>Amblyderus wernerii</i>	Great Sand Dunes Anthicid Beetle			G1?	S1	
<i>Cicindela theatina</i>	San Luis Dunes Tiger Beetle			G1	S1	
Butterflies and Moths (Lepidoptera)						
<i>Atrytone arogos</i>	Arogos Skipper			G3	S2	
<i>Euphyes bimacula</i>	Two-spotted Skipper			G4	S2	
<i>Hesperia leonardus Montana</i> ⁺⁺	Pawnee Montane Skipper	T		G4T1	S1	
<i>Hesperia ottoe</i>	Ottoe Skipper			G3G4	S2	
<i>Polites rhesus</i>	Rhesus Skipper			G4	S2S3	
<i>Pyrgus xanthus</i>	Xanthus Skipper			G3G4	S3	
<i>Erynnis martialis</i>	Mottled Duskywing			G3G4	S2S3	
Gossamer-winged Butterflies						
<i>Callophrys comstocki</i>	Comstock's Hairstreak			G2G3	S1	
<i>Callophrys mcfarlandi</i>	Sandia Hairstreak			G4	S1	
<i>Callophrys mossii schryveri</i>	Moss's Elfin			G4T3	S2S3	
<i>Celastrina humulus</i>	Hops Feeding Azure			G2G3	S2	
<i>Euphilotes rita coloradensis</i>	Colorado Blue			G3G4T2T3	S2	
<i>Euphilotes rita emmeli</i>	Desert Buckwheat Blue			G3G4T2	S1	
<i>Euphilotes spaldingi</i>	Spalding's Blue			G3G4	S2S3	
<i>Eurystrymon favonius ontario</i>	Northern Hairstreak			G4T4	S1	
<i>Incisalia fotis</i>	Early Elfin			G3G4	S2S3	
Brush-footed Butterflies						

Table A2 - Insects - Species of greatest conservation concern (Science Forum Results).

Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
<i>Boloria improba acrochema</i> ⁺⁺⁺	Uncompahgre fritillary	E				
<i>Speyeria idalia</i>	Regal fritillary			G3	S1	
<i>Speyeria nokomis nokomis</i>	Great Basin Silverspot Butterfly			G3T1	S1	
Satyrids						
<i>Agapema homogena</i>	Rocky Mountain Agapema			G4	S2	
<i>Anisota oslari</i>	Oslar's Oakworm Moth			G2G4	S1	
<i>Coloradia luskii</i>	Lusk's Pinemoth			G4	S1?	
<i>Hemileuca neumoegeni</i>	A Buckmoth			G4	S1	
Sphinx Moths						
<i>Euproserpinus wiesti</i>	Wiest's Sphinx Moth			G3G4	S2	
<i>Proserpinus flavofasciata</i>	Yellow-banded Day Sphinx			G4	S1	
<i>Sagenosoma elsa</i>	A Sphinx Moth			G4	S1?	
^{1/} Added in the Science forum (Source: Dr. Boris Kondratieff, Colorado State University. ⁺⁺ U.S. Fish and Wildlife Service. 1998. Pawnee montane skipper butterfly (<i>Hesperia leonardus Montana</i>) recovery plan. Denver, CO 16 pp. ⁺⁺⁺ Fish and Wildlife Service. 1994. Uncompahgre fritillary butterfly recovery plan. Denver, CO. 20pp.						

Table A3 - Arachnids - Species of greatest conservation concern (Science Forum Results).						
Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
<i>Hypochilus bonneti</i>	A lampshade spider					<u>1/</u>
<u>1/</u> Added as a result of review by the scientists participating in the Questionnaire and Science Forum.						

Table A4 - Reptiles - Species of greatest conservation concern (Science Forum Results).						
Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
Turtles						
<i>Kinosternon flavescens</i>	Yellow mud turtle		SC	G5	S1	
Lizards						
<i>Gambelia wislizenii</i>	Longnose leopard lizard		SC	G5	S1	
<i>Phrynosoma cornutum</i>	Texas horned lizard		SC	G4G5	S3	
<i>Phrynosoma modestum</i>	Roundtail horned lizard		SC	G5	S1	
<i>Cnemidophorus neotesselatus</i>	Triploid checkered whiptail		SC	Not Tracked	S2	
Snakes						
<i>Leptotyphlops dulcis</i>	Texas blind snake		SC	Not Tracked	Not Tracked	
<i>Hypsiglena torquata</i>	Night snake		SC	Not Tracked	Not Tracked	
<i>Lampropeltis getula</i>	Common kingsnake		SC	G5	S1	
<i>Rhinocheilus lecontei</i>	Long-nosed snake					<u>1/</u>
<i>Tantilla horbartsmithi</i>	Southwestern black-headed snake					<u>1/</u>
<i>Thamnophis cyrtopsi</i>	Blacknecked garter snake					<u>1/</u>
<i>Thamnophis sirtalis</i>	Common garter snake		SC	Not Tracked	Not Tracked	
<i>Crotalus viridis concolor</i>	Midget faded rattlesnake		SC	G5T4	S3?	
<i>Sistrurus catenatus</i>	Massasauga		SC	G3G4	S2	
Classification scheme from: Hammerson, G. 2000. Amphibians and reptiles of Colorado. 2 nd ed. University Press of Colorado, Boulder, CO.						
1/ Added as a result of review by the scientists participating in the Questionnaire and Science Forum.						

Table A5 - Amphibians - Species of greatest conservation concern (Science Forum Results).						
Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
Toads						
<i>Scaphiopus couchii</i>	Couch's Spadefoot		SC	G5	S1	
<i>Bufo boreas boreas</i>	Boreal Toad (Southern Rocky Mountain Population)		E	G4T1Q	S1	
<i>Bufo debilis</i>	Green toad			G5	S2	<u>1/</u>
Frogs						
<i>Acris crepitans</i>	Northern cricket frog		SC	G5	SH	
<i>Hyla arenicolor</i>	Canyon tree frog					<u>1/</u>
<i>Gastrophryne olivacea</i>	Great Plains Narrowmouth Toad		SC	G5	S1	
<i>Rana blairi</i>	Plains Leopard Frog		SC	G5	S3	
<i>Rana pipiens</i>	Northern Leopard Frog		SC	G5	S3	
<i>Rana sylvatica</i>	Wood Frog		SC	G5	S3	
Classification scheme from: Hammerson, G. 2000. Amphibians and reptiles of Colorado. 2 nd ed. University Press of Colorado, Boulder, CO.						
<u>1/</u> Added as a result of review by the scientists participating in the Questionnaire and Science Forum.						

Table A6 - Fish - Species of greatest conservation concern (Science Forum Results).

Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
Sunfishes						
<i>Lepomis humilis</i>	Orangespotted sunfish					<u>1</u> /
Catfishes						
<i>Noturus flavus</i>	Stonecat		SC	Not Tracked	Not Tracked	
Perch-like Fishes						
<i>Etheostoma cragini</i>	Arkansas Darter		T	G3G4	S2	
<i>Etheostoma exile</i>	Iowa darter		SC	Not Tracked	Not Tracked	
<i>Etheostoma spectabile</i>	Plains orangethroat darter		SC	Not Tracked	Not Tracked	
Suckers						
<i>Catostomus discobolus</i>	Bluehead Sucker					X
<i>Catostomus latipinnis</i>	Flannelmouth Sucker					X
<i>Catostomus platyrhynchus</i>	Mountain sucker		SC	Not Tracked	Not Tracked	
<i>Catostomus plebeius</i>	Rio Grande Sucker		E	G3G4	S1	
<i>Xyrauchen texanus</i>	Razorback Sucker	E	E	G1	S1	X
Minnows						
<i>Couesius plumbeus</i>	Lake Chub		E	Not Tracked	Not Tracked	
<i>Gila cypha</i>	Humpback Chub	E	T	G1	S1	X
<i>Gila elegans</i>	Bonytail	E	E	G1	S1	X
<i>Gila pandora</i>	Rio Grande Chub		SC	G3	S1?	
<i>Gila robusta</i>	Roundtail Chub		SC	G3	S2	
<i>Hybognathus hankinsoni</i>	Brassy minnow		T	Not Tracked	Not Tracked	
<i>Hybognathus placitus</i>	Plains minnow		E	Not Tracked	Not Tracked	NatureServe G4
<i>Luxilus cornutus</i>	Common shiner		T	Not Tracked	Not Tracked	
<i>Phenacobius mirabilis</i>	Suckermouth minnow		E	Not Tracked	Not Tracked	
<i>Phoxinus eos</i>	Northern Redbelly Dace		E	G5	S1	
<i>Phoxinus erythrogaster</i>	Southern Redbelly Dace		E	G5	S1	
<i>Platygobio gracilis</i>	Flathead chub			Not Tracked	Not Tracked	<u>1</u> /
<i>Ptychocheilus lucius</i>	Colorado Pikeminnow	E	T	G1	S1	X
Trouts						
<i>Oncorhynchus clarki pleuriticus</i>	Colorado River Cutthroat Trout		SC	G4T3	S3	X

Table A6 - Fish - Species of greatest conservation concern (Science Forum Results).						
Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
<i>Oncorhynchus clarki stomias</i>	Greenback Cutthroat Trout	T	T	G4T2T3	S2	X
<i>Oncorhynchus clarki virginalis</i>	Rio Grande Cutthroat Trout		SC	G4T3	S3	X
1/ Added as a result of review by the scientists participating in the Questionnaire and Science Forum.						

Table A7 - Birds - Species of greatest conservation concern (Science Forum Results).

Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
Grebes						
<i>Podiceps nigricollis</i>	Eared Grebe					1/
<i>Aechmophorus occidentalis</i>	Western Grebe					1/
Pelicans						
<i>Pelecanus erythrorhynchos</i>	American White Pelican			G3	S1B	X
Hérons						
<i>Botaurus lentiginosus</i>	American Bittern			Not Tracked	Not Tracked	X
<i>Egretta thula</i>	Snowy Egret			G5	S2B	X
<i>Plegadis chihi</i>	White-faced Ibis			G5	S2B	X
Swans, Geese, and Ducks						
<i>Aythya affinis</i>	Lesser Scaup			Not Tracked	Not Tracked	X
<i>Anas acuta</i>	Northern Pintail			Not Tracked	Not Tracked	X
<i>Bucephala islandica</i>	Barrow's Goldeneye					1/
Kites, Eagles, and Hawks						
<i>Pandion haliaetus</i>	Osprey			Not Tracked	Not Tracked	X
<i>Haliaeetus leucocephalus</i>	Bald Eagle	X	T	G4	S1B,S3N	
<i>Circus cyaneus</i>	Northern Harrier			Not Tracked	Not Tracked	X
<i>Accipiter gentilis</i>	Northern Goshawk			G5	S3B	X
<i>Buteo swainsoni</i>	Swainson's Hawk			Not Tracked	Not Tracked	X
<i>Buteo regalis</i>	Ferruginous Hawk		SC	G4	S3B,S4N	
<i>Aquila chrysaetos</i>	Golden Eagle			Not Tracked	Not Tracked	X
Falcons						
<i>Falco peregrinus anatum</i>	American Peregrine Falcon		SC	G4T3	S2B	
<i>Falco mexicanus</i>	Prairie Falcon			Not Tracked	Not Tracked	X NatureServe G5
Partridges, Grouse, Turkeys, and Quail						
<i>Centrocercus urophasianus</i>	Greater Sage-Grouse		SC	Not Tracked	Not Tracked	NatureServe G4
<i>Centrocercus minimus</i>	Gunnison Sage Grouse		SC	G1	S1	
<i>Lagopus leucurus</i>	White-tailed Ptarmigan					1/
<i>Tympanuchus cupido</i>	Greater Prairie Chicken			Not Tracked	Not Tracked	X

Table A7 - Birds - Species of greatest conservation concern (Science Forum Results).

Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
<i>Dendragapus obscurus</i>	Blue Grouse			Not Tracked	Not Tracked	X
<i>Tympanuchus phasianellus columbianus</i>	Columbian Sharp-tailed Grouse		SC	G4T3	S2	
<i>Tympanuchus phasianellus jamesii</i>	Plains Sharp-tailed Grouse		E	G4T4	S1	
<i>Tympanuchus pallidicinctus</i>	Lesser Prairie-chicken		T	G3	S2	
<i>Callipepla squamata</i>	Scaled Quail			Not Tracked	Not Tracked	X
Rails, Gallinules, and Coots						
<i>Laterallus jamaicensis</i>	Black Rail					<u>1/</u>
Cranes						
<i>Grus canadensis tabida</i>	Greater Sandhill Crane		SC	G5T4	S2B, S4N	
<i>Grus americana</i>	Whooping Crane	E	E	G1	SNA	
Plovers						
<i>Charadrius alexandrinus nivosus</i>	Western Snowy Plover		SC	G4T3	S1B	
<i>Charadrius melodus</i>	Piping Plover	T	T	G3	S1B	
<i>Charadrius montanus</i>	Mountain Plover		SC	G2	S2B	
Sandpipers and Phalaropes						
<i>Bartramia longicauda</i>	Upland Sandpiper			Not Tracked	Not Tracked	X
<i>Numenius americanus</i>	Long-billed Curlew		SC	G5	S2B	X
<i>Limosa fedoa</i>	Marbled Godwit					X
<i>Phalaropus tricolor</i>	Wilson's Phalarope			Not Tracked	Not Tracked	X
Jaegers, Gulls, and Terns						
<i>Sterna forsteri</i>	Forster's Tern					<u>1/</u>
<i>Sterna antillarum</i>	Least Tern	E	E	G4	S1B	
Pigeons and Doves						
<i>Patagioenas fasciata</i>	Band-tailed Pigeon			Not Tracked	Not Tracked	X
Cuckoos, Roadrunners, and Anis						
<i>Coccyzus americanus</i>	Western Yellow-billed Cuckoo		SC	Not Tracked	Not Tracked	
Owls						
<i>Athene cunicularia hypugaea</i>	Western Burrowing Owl		T	Not Tracked	Not Tracked	X
<i>Otus flammeolus</i>	Flammulated			Not Tracked	Not Tracked	X

Table A7 - Birds - Species of greatest conservation concern (Science Forum Results).

Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
	Owl					
<i>Strix occidentalis lucida</i>	Mexican Spotted Owl	T	T	G3T3	S1B,SUN	
<i>Asio flammeus</i>	Short-eared Owl			G5	S2B	X
<i>Aegolius funereus</i>	Boreal Owl					1/
Swifts						
<i>Cypseloides niger</i>	Black Swift			G4	S3B	X
<i>Aeronautes saxatalis</i>	White-throated Swift			Not Tracked	Not Tracked	X
Hummingbirds						
<i>Archilochus alexandri</i>	Black-chinned Hummingbird			Not Tracked	Not Tracked	X
<i>Selasphorus platycercus</i>	Broad-tailed Hummingbird			Not Tracked	Not Tracked	X
<i>Selasphorus rufus</i>	Rufous Hummingbird			Not Tracked	Not Tracked	X
Woodpeckers						
<i>Melanerpes lewis</i>	Lewis's Woodpecker			Not Tracked	Not Tracked	X
<i>Sphyrapicus thyroideus</i>	Williamson's Sapsucker			Not Tracked	Not Tracked	X
<i>Sphyrapicus nuchalis</i>	Red-naped Sapsucker			Not Tracked	Not Tracked	X
<i>Picoides dorsalis</i>	American Three-toed Woodpecker					1/
Flycatchers						
<i>Contopus cooperi</i>	Olive-sided Flycatcher			Not Tracked	Not Tracked	X
<i>Empidonax traillii eximius</i>	Southwestern Willow Flycatcher	E	E	Not Tracked	Not Tracked	
<i>Empidonax wrightii</i>	Gray Flycatcher			Not Tracked	Not Tracked	X
<i>Empidonax oberholseri</i>	Dusky Flycatcher			Not Tracked	Not Tracked	X
<i>Empidonax occidentalis</i>	Cordilleran Flycatcher			Not Tracked	Not Tracked	X
Shrikes						
<i>Lanius ludovicianus</i>	Loggerhead Shrike					1/
Vireos						
<i>Vireo vicinior</i>	Gray Vireo			G4	S2B	X
Jays, Magpies, and Crows						
<i>Gymnorhinus cyanocephalus</i>	Pinyon Jay			Not Tracked	Not Tracked	X
Swallows						

Table A7 - Birds - Species of greatest conservation concern (Science Forum Results).

Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
<i>Progne subis hesperia</i>	Western Purple Martin					1/
Chickadees and Titmice						
<i>Baeolophus ridgwayi</i>	Juniper Titmouse			Not Tracked	Not Tracked	X
Nuthatches						
<i>Sitta pygmaea</i>	Pygmy Nuthatch			Not Tracked	Not Tracked	X
Dippers						
<i>Cinclus mexicanus</i>	American Dipper			Not Tracked	Not Tracked	X
Kinglets, Gnatcatchers, and Thrushes						
<i>Catharus fuscescens</i>	Veery					1/
<i>Toxostoma curvirostre</i>	Curve-billed Thrasher					X
Wood-Warblers						
<i>Vermivora virginiae</i>	Virginia's Warbler			Not Tracked	Not Tracked	X
<i>Dendroica nigrescens</i>	Black-throated Gray Warbler			Not Tracked	Not Tracked	X
<i>Dendroica graciae</i>	Grace's Warbler			G5	S3B	X
New World Sparrows						
<i>Aimophila cassinii</i>	Cassin's Sparrow			Not Tracked	Not Tracked	X
<i>Spizella breweri</i>	Brewer's Sparrow			Not Tracked	Not Tracked	X
<i>Amphispiza belli</i>	Sage Sparrow			G5	S3B	X
<i>Calamospiza melanocorys</i>	Lark Bunting			Not Tracked	Not Tracked	X
<i>Poocetes gramineus</i>	Vesper Sparrow					1/
<i>Zonotrichia querula</i>	Harris' Sparrow					X
<i>Calcarius mccownii</i>	McCown's Longspur			G5	S2B	X
<i>Calcarius ornatus</i>	Chestnut-collared Longspur			G5	S1B	X
Grosbeaks and Buntings						
<i>Passerina amoena</i>	Lazuli Bunting			Not Tracked	Not Tracked	X
Blackbirds and Orioles						
<i>Dolichonyx oryzivorus</i>	Bobolink			G5	S3B	X
Finches						
<i>Leucosticte atrata</i>	Black Rosy-Finch			Not Tracked	Not Tracked	X
<i>Leucosticte australis</i>	Brown-capped Rosy-Finch			G4	S3B, S4N	X
<i>Coccothraustes vespertinus</i>	Evening Grosbeak					1/

Table A7 - Birds - Species of greatest conservation concern (Science Forum Results).						
Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
<i>Carpodacus cassinii</i>	Cassin's Finch			Not Tracked	Not Tracked	X
<i>Loxia curvirostra</i>	Red Crossbill					X
1/ Added as a result of review by the scientists participating in the Questionnaire and Science Forum.						

Table A8 - Mammals - Species of greatest conservation concern (Science Forum Results).

Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
Shrews						
<i>Sorex nanus</i>	Dwarf Shrew			G4	S2	
<i>Sorex preblei</i>	Preble's Shrew			G4	S1	
Bats						
<i>Euderma maculatum</i>	Spotted Bat			G4	S2	
<i>Idionycteris phyllotis</i>	Allen's big-eared bat	C		G3/G4 NMHP	S2	
<i>Myotis occultus</i>	Arizona myotis			G5/T3/T4	Not Tracked	X
<i>Myotis thysanodes</i>	Fringed myotis	C		G4G5	S3	X
<i>Plecotus</i> (<i>Chorynorhinus</i>) <i>townsendii pallescens</i>	Townsend's Big-eared Bat Subsp		SC	G4T4	S2	
Rabbits and Hares						
<i>Lepus townsendii</i>	White-tailed Jackrabbit			Not Tracked	Not Tracked	X
Squirrels						
<i>Cynomys gunnisoni</i>	Gunnison prairie dog					<u>1/</u>
<i>Cynomys leucurus</i>	White-tailed prairie dog					<u>1/</u>
<i>Cynomys ludovicianus</i>	Black-tailed prairie dog		SC	G3	S3	NatureServe G3
Pocket Gophers						
<i>Thomomys bottae rubidus</i>	Botta's Pocket Gopher (rubidus ssp)		SC	G5T1	S1	
<i>Thomomys talpoides macrotis</i>	Northern pocket gopher (macrotis ssp)		SC	G5T1	S1	
<i>Perognathus fasciatus</i>	Olive-backed pocket mouse					<u>1/</u>
Jumping Mice						
<i>Zapus hudsonius</i>	Meadow Jumping Mouse (both subspecies)	T	T	G5T2	S1	
Dogs and Allies						
<i>Canis lupus</i>	Gray Wolf - two subspecies (Northern and Mexican)	E	E	Not Tracked	Not Tracked	
<i>Vulpes macrotis</i>	Kit Fox		E	G4	S1	
<i>Vulpes velox</i>	Swift Fox		SC	G3	S3	
Bears						
<i>Ursus arctos</i>	Grizzly bear	T	T3/T4X	G4	Not	

Table A8 - Mammals - Species of greatest conservation concern (Science Forum Results).

Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T/E/C	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
					Tracked	
Weasels and Allies						
<i>Conepatus leuconotus</i>	Common Hog-nosed Skunk			G4	S1	
<i>Gulo gulo</i>	Wolverine		E	G4	S1	
<i>Lontra canadensis</i>	River Otter		T	Not Tracked	Not Tracked	
<i>Mustela nigripes</i>	Black-footed Ferret	E	E	G1	S1	
Cattle and Allies						
<i>Bison bison</i>	Bison			G1 or G2 (pending)		
<i>Ovis canadensis</i>	Bighorn sheep					<u>2/</u>
Cats						
<i>Lynx canadensis</i>	Lynx	T	E	G5	S1	
<u>1/</u> Added as a result of review by the scientists participating in the Questionnaire and Science Forum. <u>2/</u> Added by CDOW to ensure consideration in federal land management planning and decisions.						

Table A9 – Additional species recommended for addition to the list of species of greatest conservation concern during review of the draft plan (all recommended because they appear on other lists of species of concern, management indicator species, etc). They did not meet the inclusion criteria, and are not included in the 2005 CWCS.

OWSS:

Scientific Name	Common Name	Criteria for inclusion or exclusion.				
		Fed T or E	State T/E/SC	CNHP G1, G2 or G3	S1 or S2 AND G4	Rangewide assessment
Insects						
<i>Somatochlora hudsonica</i> ^{1/}	Hudsonian emerald					U.S. For. Svc. Region 2 Sensitive
Reptiles						
<i>Lampropeltis triangulum taylori</i> ^{2/}	milk snake					CO Bur. Land Mgt. Sensitive
<i>Sceloporus magister</i> ^{2/}	spiny lizard					CO Bur. Land Mgt. Sensitive
Amphibians						
<i>Spea intermontana</i> ^{2/}	Great Basin spadefoot					CO Bur. Land Mgt. Sensitive
Fish						
<i>Fundulus sciadicus</i> ^{2/}	Plains topminnow					CO Bur. Land Mgt. Sensitive
<i>Hybopsis gracilis</i> ^{2/}	Flathead chub					CO Bur. Land Mgt. Sensitive
<i>Nocomis biguttatus</i> ^{1/}	hornyhead chub					CO Bur. Land Mgt. Sensitive
<i>Notropis blennius</i> ^{2/}	river shiner					CO Bur. Land Mgt. Sensitive
Birds						
<i>Ammodramus savannarum</i> ^{1/}	grasshopper sparrow					U.S. For. Svc. Region 2 Sensitive
<i>Chlidonias niger</i> ^{1/2/}	black tern					U.S. For. Svc. Region 2 Sensitive
<i>Cygnus buccinator</i> ^{1/}	trumpeter swan					U.S. For. Svc. Region 2 Sensitive
<i>Histrionicus histrionicus</i> ^{1/}	harlequin duck					U.S. For. Svc. Region 2 Sensitive
Mammals						
<i>Martes Americana</i> ^{1/}	American marten					U.S. For. Svc. Region 2 Sensitive
<i>Myotis yumanensis</i> ^{2/}	Yuma myotis					CO Bur. Land Mgt. Sensitive
<i>Nyctinomops macrotis</i> ^{2/}	free-tailed bat					CO Bur. Land Mgt. Sensitive
<i>Sorex hoyi</i> ^{1/}	pygmy shrew					U.S. For. Svc. Region 2 Sensitive
^{1/} USDA Forest Service Region 2 – Sensitive ^{2/} Colorado Bureau of Land Management - Sensitive						

Appendix B

Land Cover Descriptions and Distribution Maps of Habitat Types

The 41 land cover types used for this CWCS are based on the Colorado GAP Analysis (Schrupp et al. 2000), with the exception of the “lakes” category which was added at the request of Science Forum participants. The Colorado Gap Analysis project was a proactive effort by Colorado Division of Wildlife to identify potential habitat for wildlife species, as well as areas of the state where many species may find suitable habitat (i.e., biodiversity “hot spots”) (Thompson et al. 1996). As part of the National GAP Program, habitat classifications identified for Colorado are consistent with the classifications of surrounding states. Refer to Thompson et al. 1996 for additional detail on mapping methods and development of the land cover types used in this CWCS.

In the opinion of the experts in the technical questionnaire and Science Forum, the list of land cover types from the Colorado GAP Analysis was helpful but not universally applicable. For example, for fish the participants at the Science Forum felt a more detailed stratification delineating different kinds of “open water” habitats would be helpful, specifically adding lakes as a land cover type, and there were some verbal expressions of interest in more detailed stratifications of grass lands. Table B1 provides a cross-reference of the final list of wildlife habitats identified by experts at the Science Forum and the original Colorado GAP vegetation classification upon which those habitats were based. The land cover accounts that follow are taken from Thompson et al. 1996.

Literature Cited:

- Schrupp, D.L., W.A. Reiners, T.G. Thompson, L.E. O'Brien, J.A. Kindler, M.B. Wunder, J.F. Lowsky, J.C. Buoy, L. Satcowitz, A.L. Cade, J.D. Stark, K.L. Driese, T.W. Owens, S.J. Russo, and F. D'Erchia. 2000. Colorado Gap Analysis Program: A Geographic Approach to Planning for Biological Diversity - Final Report, USGS Biological Resources Division, Gap Analysis Program and Colorado Division of Wildlife, Denver, CO.
- Thompson, T., P. Gillard, K. Driese, W.A. Reiners, R. Thurston, and D. Schrupp. 1996. Manual to accompany the GAP analysis land cover map of Colorado. University of Wyoming, Larimie, WY, and Colorado Division of Wildlife, Denver, CO.

Table B1. CO Gap Analysis - Land Cover Classification Crosswalk to Comprehensive Wildlife Strategy Habitat Types			
CWCS General Land Cover	CWCS Land Cover Type	Gap First Order Land Cover Type	GAP Second Order Land Cover Type
Urban and Cropland	Urban	Urban and Minelands	Urban/Build up.
Urban and Cropland	Irrigated Crops	Agricultural Lands	Irrigated Crop Type
Urban and Cropland	Dryland Crops	Agricultural Lands	Dryland Crop Type
Riparian/Wetlands	Shrub Dominated Wetlands	Nonforested Wetlands	Shrub Dominated Wetlands
Riparian/Wetlands	Grass Dominated Wetlands	Herbaceous Rangeland	Grass/Forb Dominated Wetland/Riparian
Riparian/Wetlands	Playas	Barren Lands	Unvegetated Playas
Riparian/Wetlands	Open Water	Open Water	Open Water
Riparian/Wetlands	Lakes	Not Included in GAP Land Cover Types	Not Included in GAP Land Cover Types
Riparian/Wetlands	Eastern Plains Rivers	Not Included in GAP Land Cover Types	Forest Dominated Wetland/Riparian
Riparian/Wetlands	Eastern Plains Streams	Not Included in GAP Land Cover Types	Forest Dominated Wetland/Riparian
Riparian/Wetlands	Transition Streams	Not Included in GAP Land Cover Types	Forest Dominated Wetland/Riparian
Riparian/Wetlands	Mountain Streams	Not Included in GAP Land Cover Types	Forest Dominated Wetland/Riparian
Riparian/Wetlands	West Slope Rivers	Not Included in GAP Land Cover Types	Forest Dominated Wetland/Riparian
Riparian/Wetlands	West Slope Streams	Not Included in GAP Land Cover Types	Forest Dominated Wetland/Riparian
Grasslands	Tallgrass Prairie	Herbaceous Rangeland	Tall Grass Prairie
Grasslands	Midgrass Prairie	Herbaceous Rangeland	Mid Grass Prairie
Grasslands	Shortgrass Prairie	Herbaceous Rangeland	Short Grass Prairie
Grasslands	Foothill/Mountain Grassland	Herbaceous Rangeland	Foothill and Mountain Grassland
Grasslands	Sand Dune Complex (Grassland)	Herbaceous Rangeland	Sand Dune Complex
Shrublands	Upland Shrub	Shrub and Brush Rangeland	Xeric Upland Shrubland
Shrublands			Mesic Upland Shrubland
Shrublands	Deciduous Oak	Shrub and Brush Rangeland	Deciduous Oak
Shrublands	Sagebrush	Shrub and Brush Rangeland	Mountain Big Sagebrush
Shrublands			Wyoming Big Sagebrush Steppe
Shrublands			Black Sagebrush Steppe
Shrublands			Big Sagebrush Shrubland
Shrublands	Desert Shrub	Shrub and Brush Rangeland	Desert Shrub
Shrublands	Saltbrush Fans and Flats	Shrub and Brush Rangeland	Saltbrush Fans and Flats
Shrublands	Greasewood Fans and Flats	Shrub and Brush Rangeland	Greasewood Fans and Flats
Shrublands	Sand Dune Complex (Shrubland)	Shrub and Brush Rangeland	Sand Dune Complex
Forestlands	Aspen	Deciduous Forest Land	Aspen
Forestlands	Spruce-Fir	Evergreen Forest Land	Spruce Fir
Forestlands	Douglas Fir	Evergreen Forest Land	Douglas Fir
Forestlands	Lodgepole Pine	Evergreen Forest Land	Lodgepole Pine
Forestlands	Limber Pine	Evergreen Forest Land	Limber Pine
Forestlands	Ponderosa Pine	Evergreen Forest Land	Ponderosa Pine
Forestlands	White Fir	Evergreen Forest Land	White Fir
Forestlands	Pinyon/Juniper	Evergreen Forest Land	Juniper Woodland
Forestlands			Pinyon Woodland
Forestlands	Rocky Mountain Bristlecone Pine	Evergreen Forest Land	Rocky Mtn. Bristlecone Pine
Forestlands	Mixed Conifer	Evergreen Forest Land	Mixed Conifer
Forestlands	Mixed Forest	Deciduous Forest Land	Mixed Forest
Tundra	Shrub Tundra	Shrub and Brush Tundra	Prostrate Shrub Tundra
Tundra	Meadow Tundra	Herbaceous Tundra	Meadow Tundra
Unvegetated	Sandy Areas	Barren Lands	Sandy Areas
Unvegetated	Exposed Rock	Exposed Rock	Exposed Rock

MAPPING UNIT ATTRIBUTE CODE: 11001

MAPPING UNIT NAME: Urban or Built-up land.

DOMINANT SPECIES: Not applicable



DESCRIPTION: This category is comprised of areas of intensive use with much of the land covered by structures. Included in this category are cities, towns, villages, strip developments along highways, transportation, power, and communications facilities, and areas such as those occupied by mills, shopping centers, industrial and commercial complexes, and institutions that may, in some instances, be isolated from urban areas (Anderson, et al. 1976).

DISTRIBUTION: Throughout the state of Colorado.

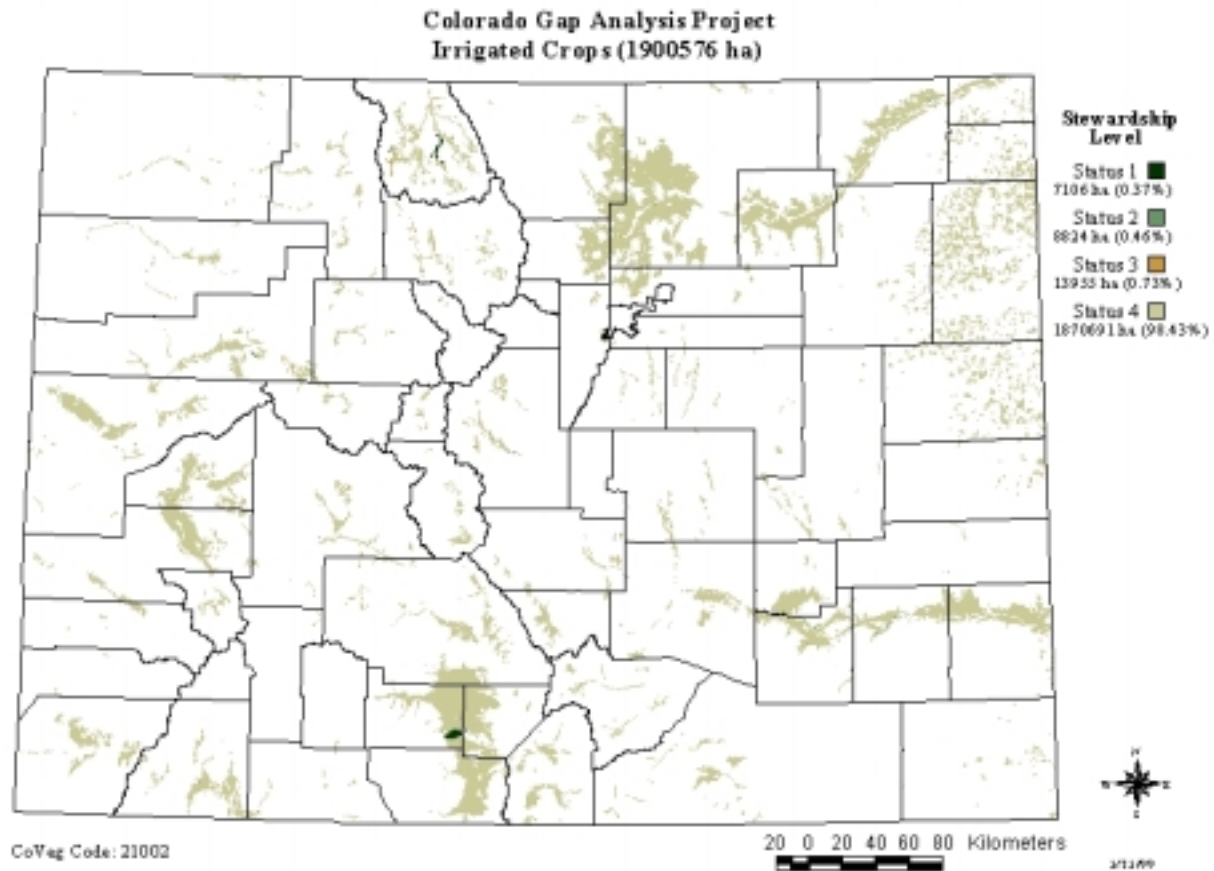
ELEVATION RANGE:

DIAGNOSTIC SPECIES: Not applicable

MAPPING UNIT ATTRIBUTE CODE: 21002

MAPPING UNIT NAME: Irrigated crop type.

DOMINANT SPECIES: (see DIAGNOSTIC SPECIES)



DESCRIPTION: Any irrigated agricultural area. Includes most row crops, irrigated pastureland and hay fields and associated farm or ranch facilities.

DISTRIBUTION: Throughout the state of Colorado.

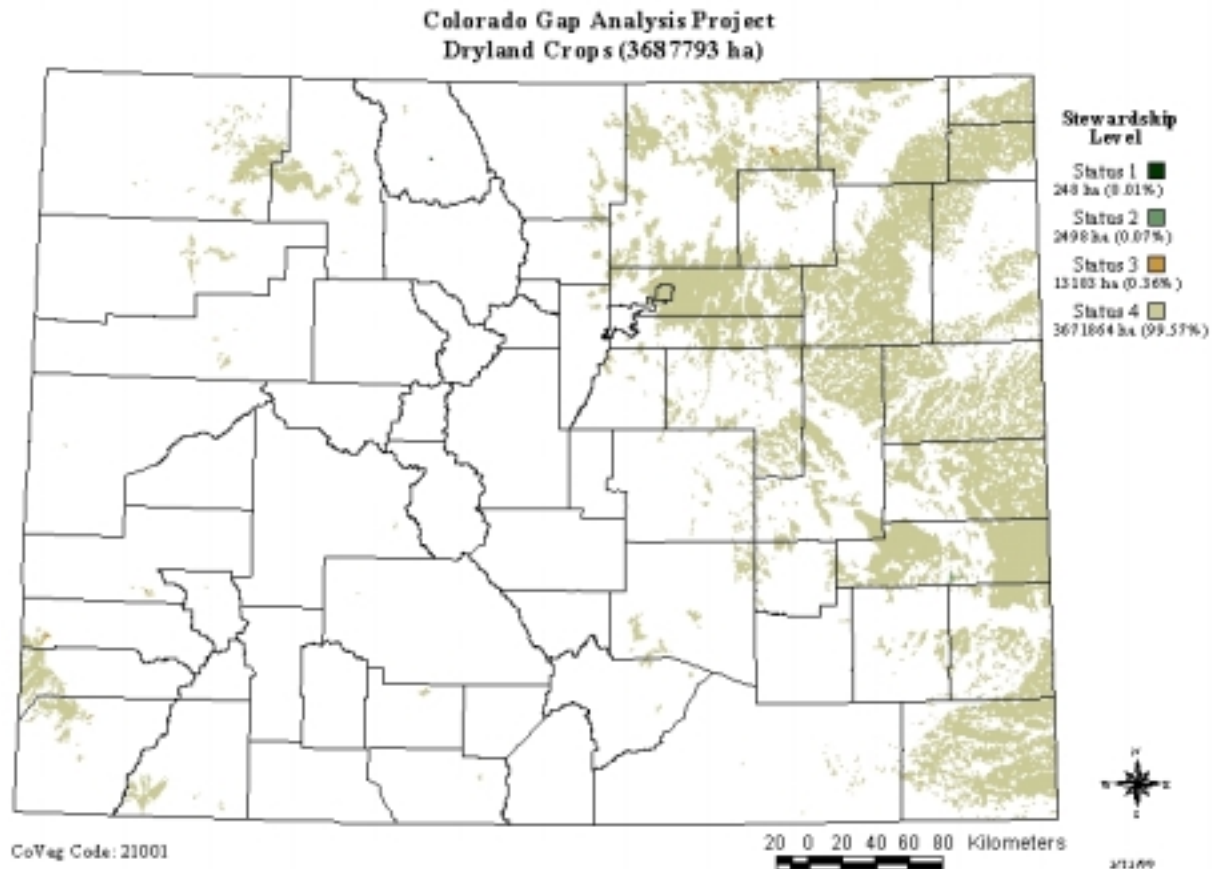
ELEVATION RANGE:

DIAGNOSTIC SPECIES: Row crops, corn, beans, irrigated hayfields and pastures.

MAPPING UNIT ATTRIBUTE CODE: 21001

MAPPING UNIT NAME: Dry land crops type.

DOMINANT SPECIES: (see DIAGNOSTIC SPECIES)



DESCRIPTION: This type includes non irrigated cropland, dryland improved pastures, fallow lands, rural development, ranch and farm facilities and shelter belts.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE:

DIAGNOSTIC SPECIES: Small grains, wheat, barley, rye, any non-irrigated crop.

MAPPING UNIT ATTRIBUTE CODE: 62001

MAPPING UNIT NAME: Shrub dominated wetland/riparian type.

DOMINANT SPECIES: Any shrub dominated riparian area.



DESCRIPTION: Riparian or wetland areas where shrubs comprise more than 25% of the vegetative cover and trees comprise less than 25%. Shrubs often include various willow species but other shrubs (hawthorn, wild plum, birch, alder, greasewood or sagebrush) may be present or dominant. Includes willow dominated subalpine riparian zones.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE: 950-3650m (3100-12000')

DIAGNOSTIC SPECIES: *Salix* sp., *Betula* sp., *Alnus* sp.

NOTES: This type occurs at elevations above 2200m and extending to 2800m on very wet, usually saturated soils and includes *A. incana* ssp. *tenuifolia*, *B. occidentalis*, and various *Salix* species. It occurs on sites that are beyond the mesic limit of mixed wet forest (Peet, 1981). New Mexican locust thickets frequently occupy the zone between *P. angustifolia* and upland *Pinus* forests in the Spanish Peaks area (Peet, 1978).

MAPPING UNIT ATTRIBUTE CODE: 62002

MAPPING UNIT NAME: Graminoid and forb dominated wetland/riparian type.

DOMINANT SPECIES: Varied



DESCRIPTION: This type includes wetland and riparian areas with vegetation dominated by grasses or forbs. Includes communities such as wet and moist meadow grasslands, marsh and swamp wetlands, cattail, bulrush and sedge dominated wetlands, inland salt meadows and salt flats as well as riparian areas. Must not have more than 25% shrub or tree cover.

DISTRIBUTION:

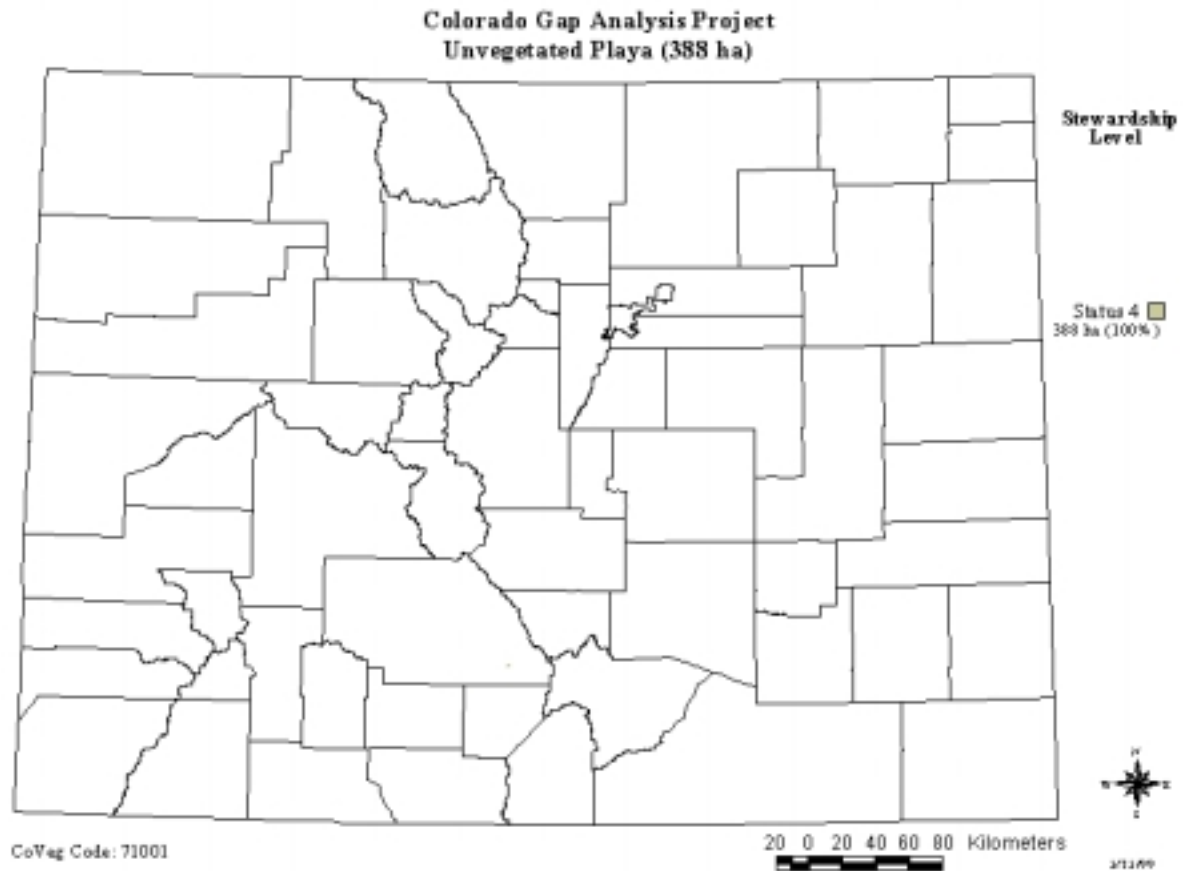
ELEVATION RANGE:

DIAGNOSTIC SPECIES:

MAPPING UNIT ATTRIBUTE CODE: 71001

MAPPING UNIT NAME: Unvegetated playa type.

DOMINANT SPECIES: None



DESCRIPTION: This type includes bare saline playa areas, mud flats, shorelines, sand beaches and gravel bars. Very sparse, salt tolerant vegetation such as *Salicornia rubra* may be present around the margins.

DISTRIBUTION: Mainly flat-floored bottoms of interior desert basins which do not qualify as wetlands

ELEVATION RANGE:

DIAGNOSTIC SPECIES: *Salicornia rubra*

MAPPING UNIT ATTRIBUTE CODE: 52001

MAPPING UNIT NAME: Open water type.

DOMINANT SPECIES: Not applicable



DESCRIPTION: Any area of open water with area greater than 40 ha. Includes lakes and reservoirs, but not rivers or streams.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE: 920-3820m (3000-12500')

DIAGNOSTIC SPECIES: Not applicable

MAPPING UNIT ATTRIBUTE CODE: 61001

MAPPING UNIT NAME: Forest dominated wetland/riparian type.

DOMINANT SPECIES: Plains cottonwood (*Populus deltoides*), Narrowleaf cottonwood (*Populus angustifolia*), Aspen, Boxelder (*Acer negundo*), Willows (*Salix* sp.), conifer species.



DESCRIPTION: Riparian and wetland areas in which tree species dominate the vegetation. These are generally cottonwood species at low to middle elevations, but grade into aspen, boxelder, alder, willows and a variety of conifer species at mid to high elevations. Trees must occupy more than 25% of the vegetative cover within the riparian zone.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE: 1070-2900m (3500-9500')

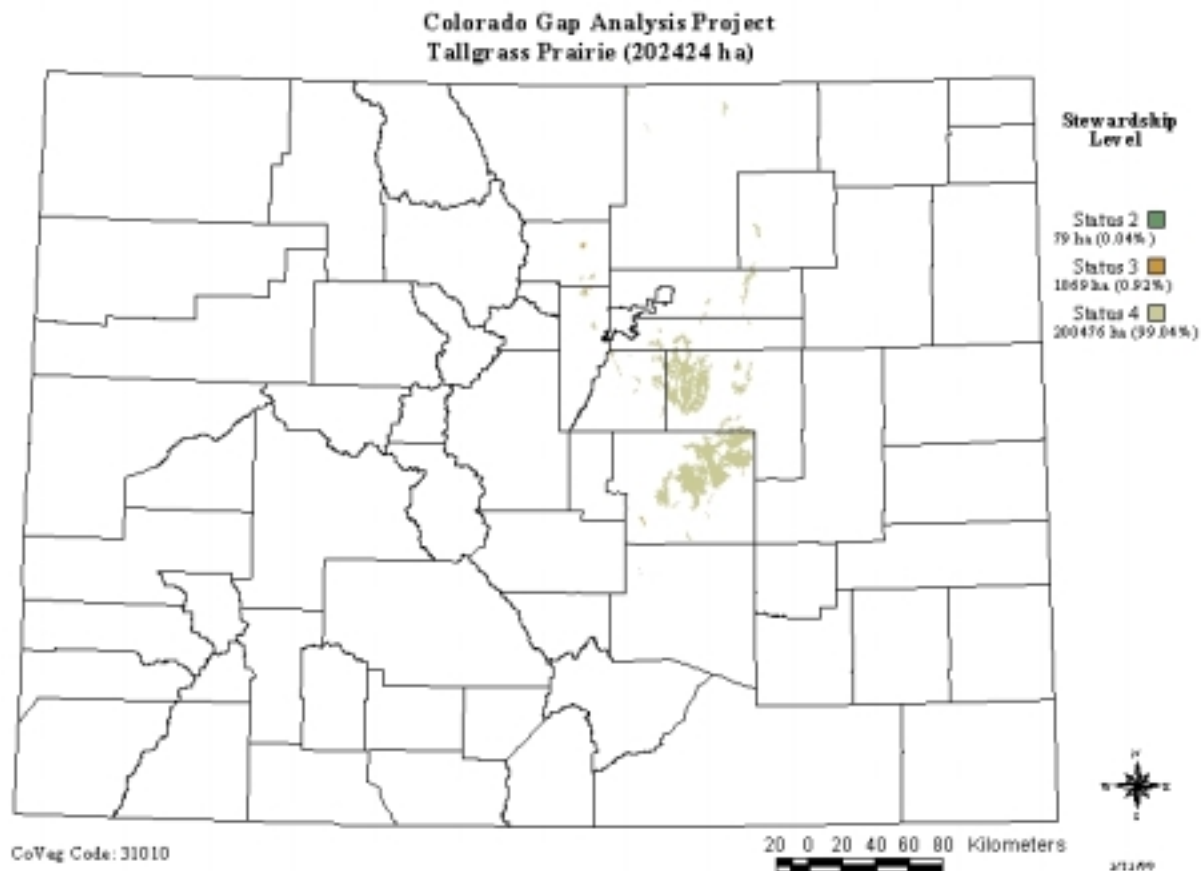
DIAGNOSTIC SPECIES: *Populus deltoides*, *Populus angustifolia*, *Populus tremuloides*, *Acer negundo*, *Salix* sp., conifer species.

NOTES: Riparian communities, in general, exhibit elevational variation. Broadleaved deciduous species, mostly cottonwoods and willows line major streams of foothills and adjacent semi arid lowlands. This results in fingers of mesophytic forest in an otherwise semi arid landscape of low grass or desert shrub (Peet, 1988). *P. deltoides* is dominant below 1950m in the Estes Park region (Peet, 1981). At the upper limit, the riparian zone is dominated by *P. engelmannii*, and *A. lasiocarpa*, usually mixed with *P. menziesii* (Peet, 1981). At middle elevations, *P. pungens*, *A. concolor*, and *P. angustifolia* are important species in this type.

MAPPING UNIT ATTRIBUTE CODE: 31010

MAPPING UNIT NAME: Tallgrass prairie type.

DOMINANT SPECIES: Big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), indian grass (*Sorghastrum nutans*)



DESCRIPTION: (see NOTES)

DISTRIBUTION: Eastern Colorado

ELEVATION RANGE:

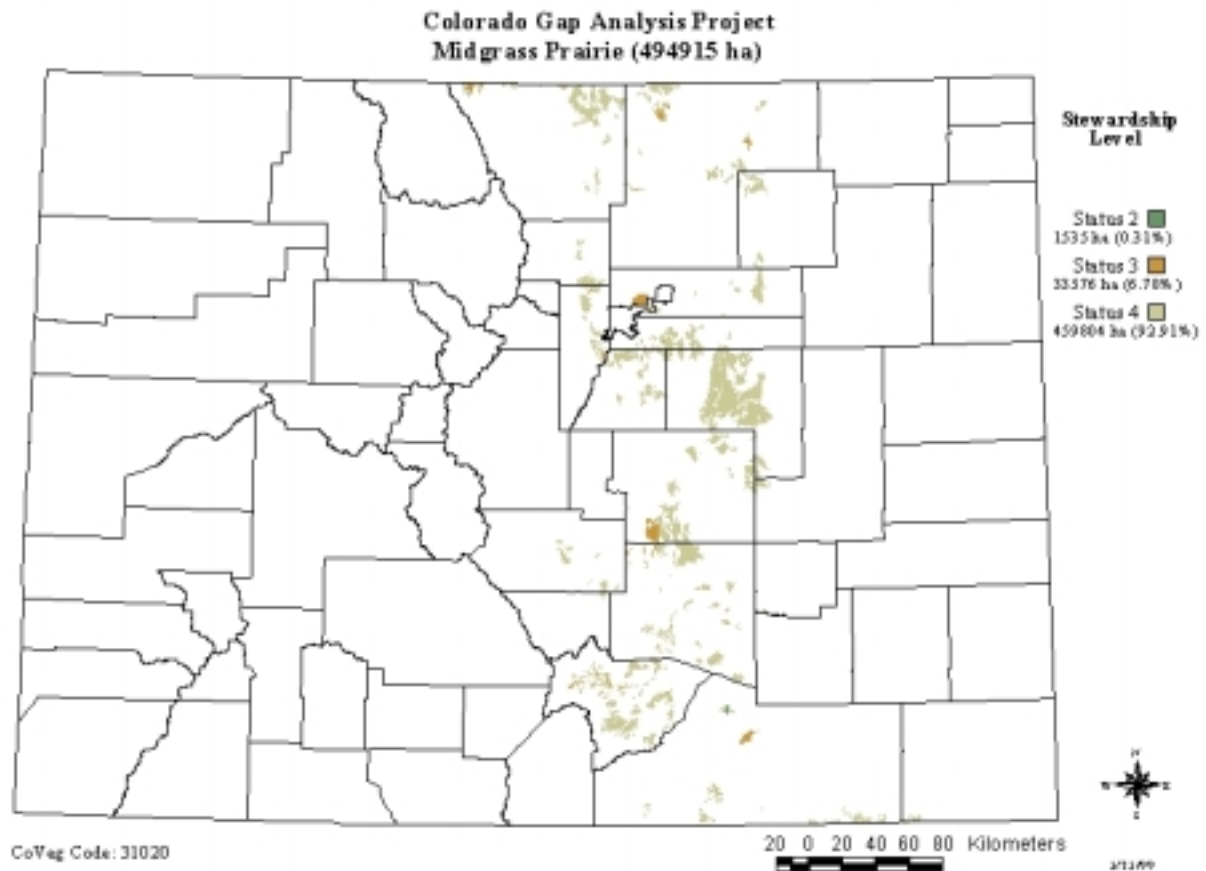
DIAGNOSTIC SPECIES: *Andropogon gerardii*, *Schizachyrium scoparium*, *Sorghastrum nutans*

NOTES: The type is the most mesic of the central plains regional grasslands, gets more rainfall, and has the greatest north to south diversity and largest number of dominant species. The vegetation is primarily long lived perennials, bunch grasses and sod forming grasses. *A. gerardii* is prevalent on low lands and wetter sites. *S. scoparium* dominates uplands, especially on shallow slopes. Most of the tallgrass prairie is now in cultivation, the remnants are on sites unfavorable to cultivation due to topography or rockiness (Sims, 1988).

MAPPING UNIT ATTRIBUTE CODE: 31020

MAPPING UNIT NAME: Mid grass prairie type.

DOMINANT SPECIES: Sideoats grama (*Bouteloua curtipendula*), Galleta (*Hilaria jamesii*), Foxtail barley (*Hordeum jubatum*), Western wheatgrass (*Pascopyrum smithii*), Bluebunch wheatgrass (*Pseudoroegneria spicata*), Little bluestem (*Schizachyrium scoparium*), New Mexico feathergrass (*Stipa neomexicana*), Green needlegrass (*Stipa viridula*).



DESCRIPTION: (see NOTES)

DISTRIBUTION: Eastern Colorado

ELEVATION RANGE:

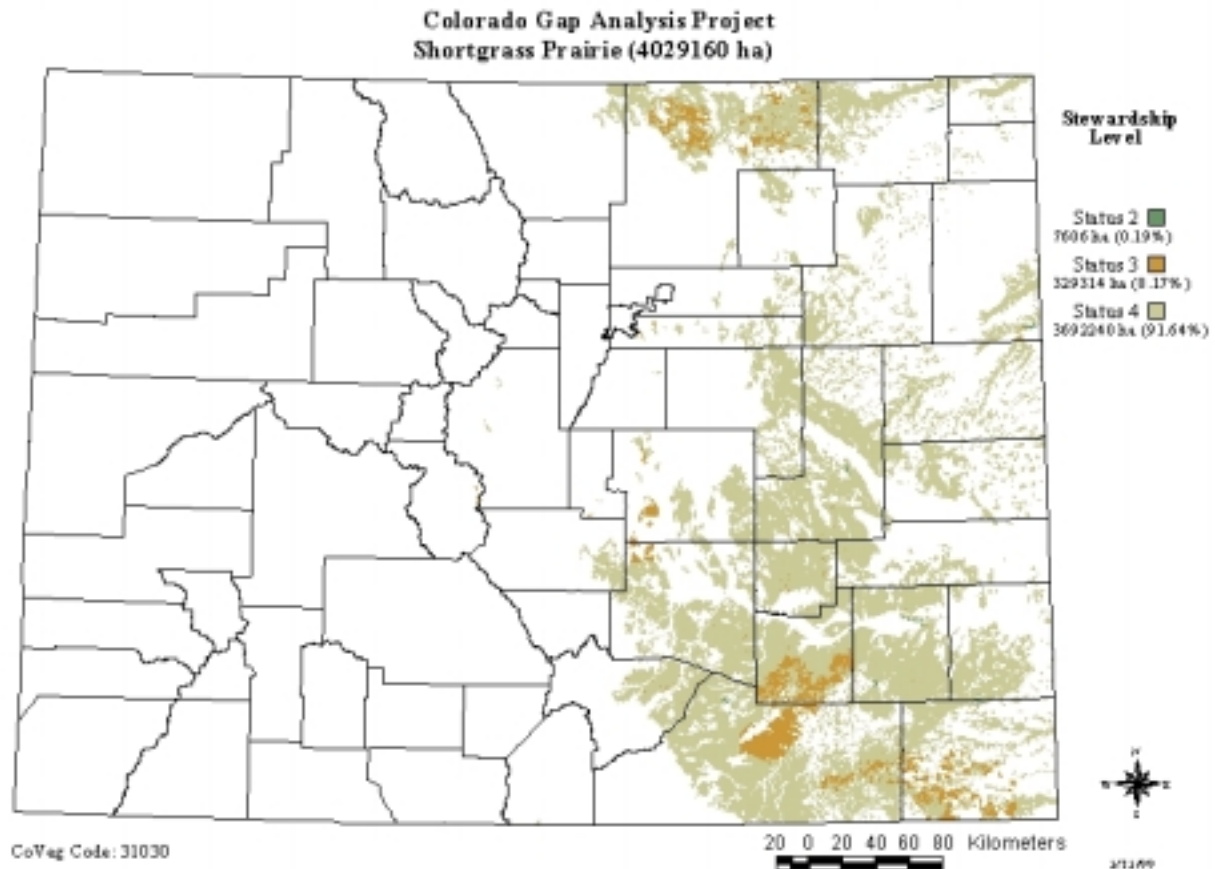
DIAGNOSTIC SPECIES: Sideoats grama (*Bouteloua curtipendula*), Galleta (*Hilaria jamesii*), Foxtail barley (*Hordeum jubatum*), Western wheatgrass (*Pascopyrum smithii*), Bluebunch wheatgrass (*Pseudoroegneria spicata*), Little bluestem (*Schizachyrium scoparium*), New Mexico feathergrass (*Stipa neomexicana*), Green needlegrass (*Stipa viridula*), Needle and thread (*Stipa comata*).

NOTES: Mid grass, or mixed grass, prairie is a blend of the vegetation of the tallgrass and shortgrass prairies. It has the richest floristic complexity of all the central plains region grasslands. This type is mixed with tall grasses in wetter areas and with shorter grasses in drier sites (Sims, 1988).

MAPPING UNIT ATTRIBUTE CODE: 31030

MAPPING UNIT NAME: Short grass prairie type.

DOMINANT SPECIES: Buffalograss (*Buchloe dactyloides*), blue grama (*Bouteloua gracilis*)



DESCRIPTION: This graminoid type is dominated by short grass prairie species and buffalograss is considered as an indicator. Buffalograss must be present for a grassland to be mapped as this type. This type usually consists of a shortgrass understory of buffalograss and blue grama and an overstory of western wheatgrass, needle and thread grass, or other mixed grass species.

DISTRIBUTION: Eastern Colorado

ELEVATION RANGE:

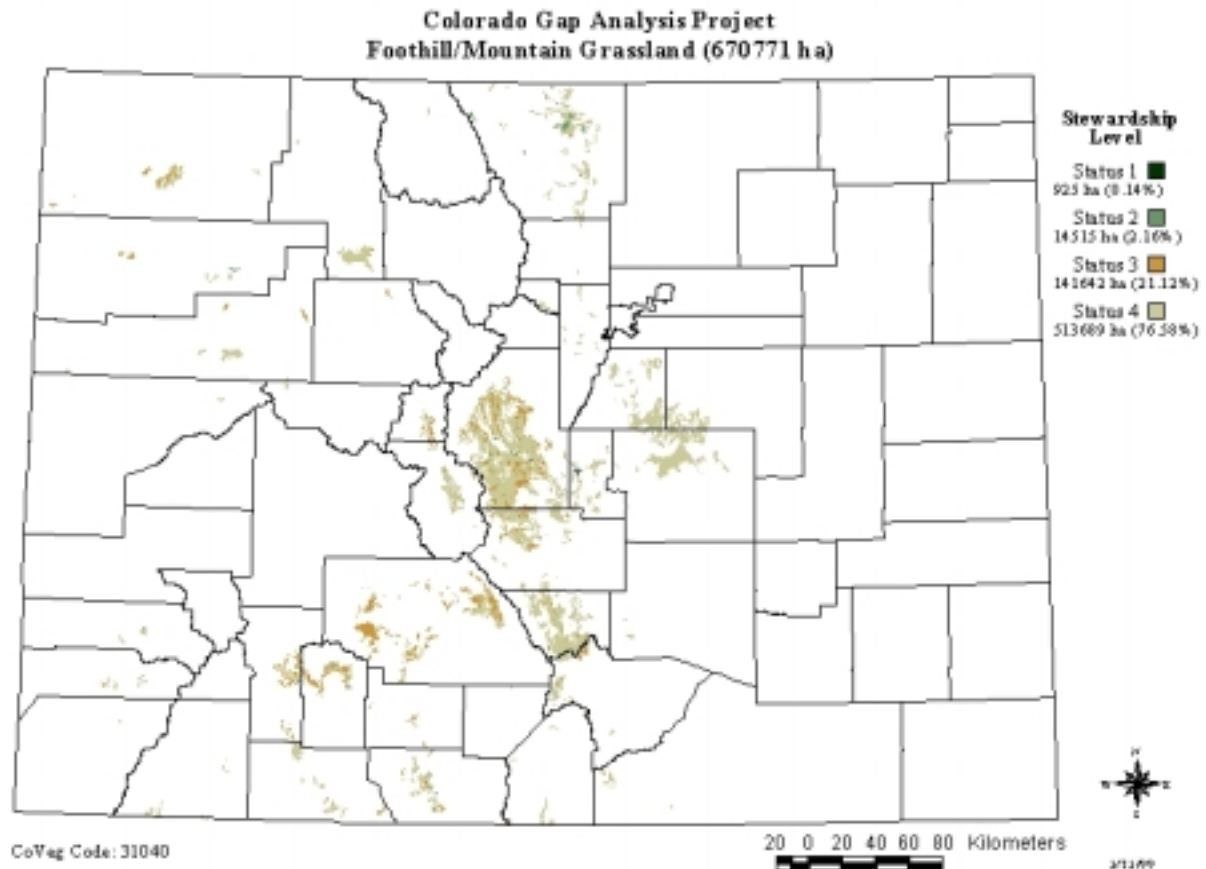
DIAGNOSTIC SPECIES: *Buchloe dactyloides*, *Bouteloua gracilis*

NOTES: In eastern Colorado, *Artemisia frigida*, *Carex filifolia*, and *Koeleria cristata* are important species in the shortgrass prairie community (Sims, 1988).

MAPPING UNIT ATTRIBUTE CODE: 31040

MAPPING UNIT NAME: Foothills and mountain grassland type.

DOMINANT SPECIES: *Festuca* spp., *Muhlenbergia* spp.



DESCRIPTION: (see NOTES)

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE:

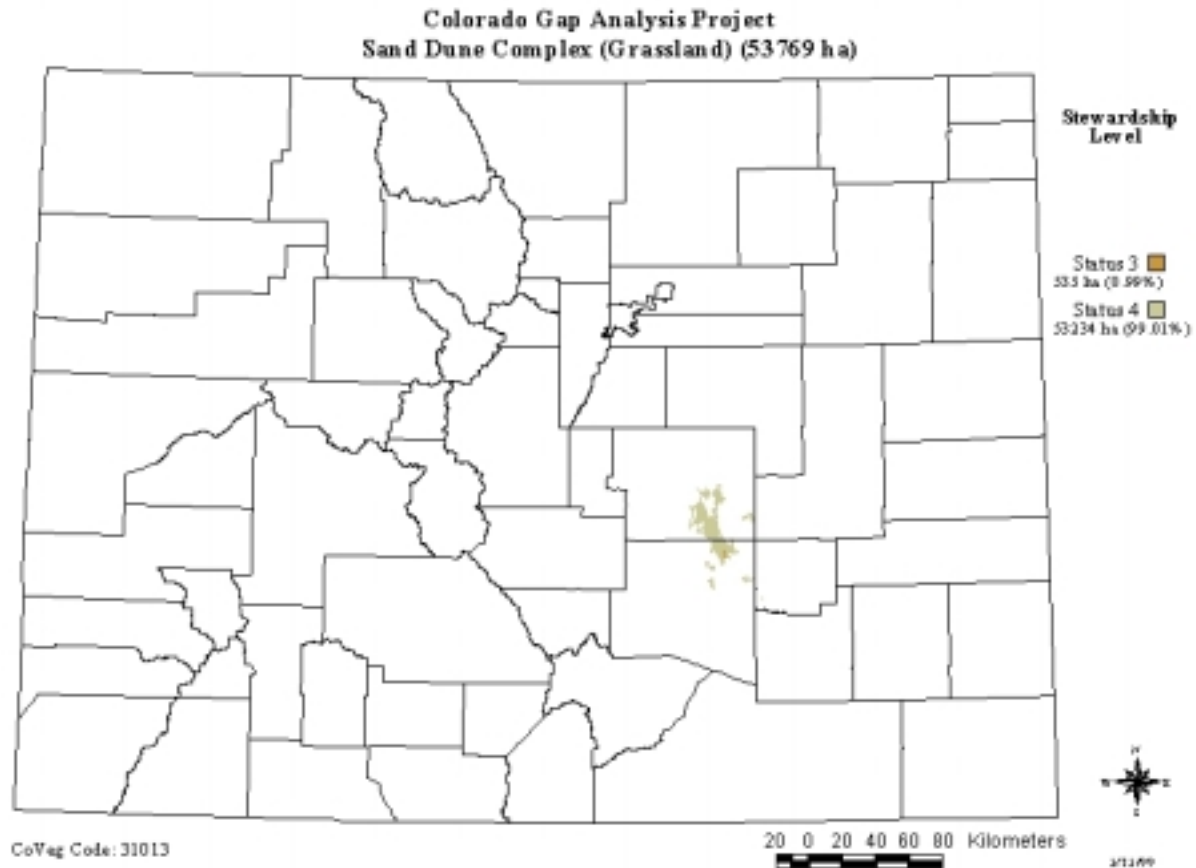
DIAGNOSTIC SPECIES: *Festuca arizonica*, *Festuca thurberi*, *Festuca idahoensis*, *Muhlenbergia montana*, *Muhlenbergia filiculmis*, *Danthonia parryi*, *Pseudoroegneria spicata*, *Stipa comata*

NOTES: Steep south facing slopes in the ponderosa pine and lower Douglas fir zones of the Front Range, particularly where soil is thin, with little water holding capacity, frequently support open park like vegetation dominated by *M. montana* or other graminoids (Peet, 1988).

MAPPING UNIT ATTRIBUTE CODE: 31013

MAPPING UNIT NAME: Sand dune grassland complex type.

DOMINANT SPECIES: Prairie sandreed (*Calamovilfa longifolia*), Sand bluestem (*Andropogon hallii*), Common Reed (*Phragmites australis*), Blowoutgrass (*Redfieldia flexuosa*), Lemon scurfpea (*Psoralea lanceolata*).



DESCRIPTION: This type includes active and stabilized grass dominated sand dune communities. Distinct from shrub sand dune complex type in being dominated by grass species, although shrub species are likely to be present also.

DISTRIBUTION: Northeastern Colorado

ELEVATION RANGE:

DIAGNOSTIC SPECIES: Prairie sandreed (*Calamovilfa longifolia*), Sand bluestem (*Andropogon hallii*), Common Reed (*Phragmites australis*), Blowoutgrass (*Redfieldia flexuosa*), Lemon scurfpea (*Psoralea lanceolata*).

MAPPING UNIT ATTRIBUTE CODE: 32002

MAPPING UNIT NAME: Xeric upland shrub type.

DOMINANT SPECIES: Mountain mahogany (*Cercocarpus* sp.)



DESCRIPTION: A shrub community with vegetative cover dominated by species of mountain mahogany. Mountain mahogany must comprise more than 25% of the total vegetative cover.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE: 1740-2855m (5700-9360')

DIAGNOSTIC SPECIES: *Cercocarpus montanus*, *Cercocarpus ledifolius*

NOTES: This type often forms a transition zone from montane coniferous forest to treeless plains. It may be found above, or intermingled with, the pinyon juniper type in the Great Basin. It is often associated with a variety of other shrubs including *Quercus* sp., *Artemisia* sp., *Purshia tridentata*, *Rhus trilobata*, *Rhamnus* sp., *Fallugia paradoxa*, *Cowania mexicana*, *Amelanchier* sp., *Symphoricarpos* sp., *Berberis* sp., *Arctostaphylos* sp., and *Ceanothus* sp. Taller shrubs rarely exhibit continuous cover, but occur as dense clumps separated by grassland or low shrub steppe. The height of the shrub cover is 1-5m, depending on species, site, and fire history. Many of these shrubs re-sprout readily after burning and have seed germination stimulated by fire (West, 1988).

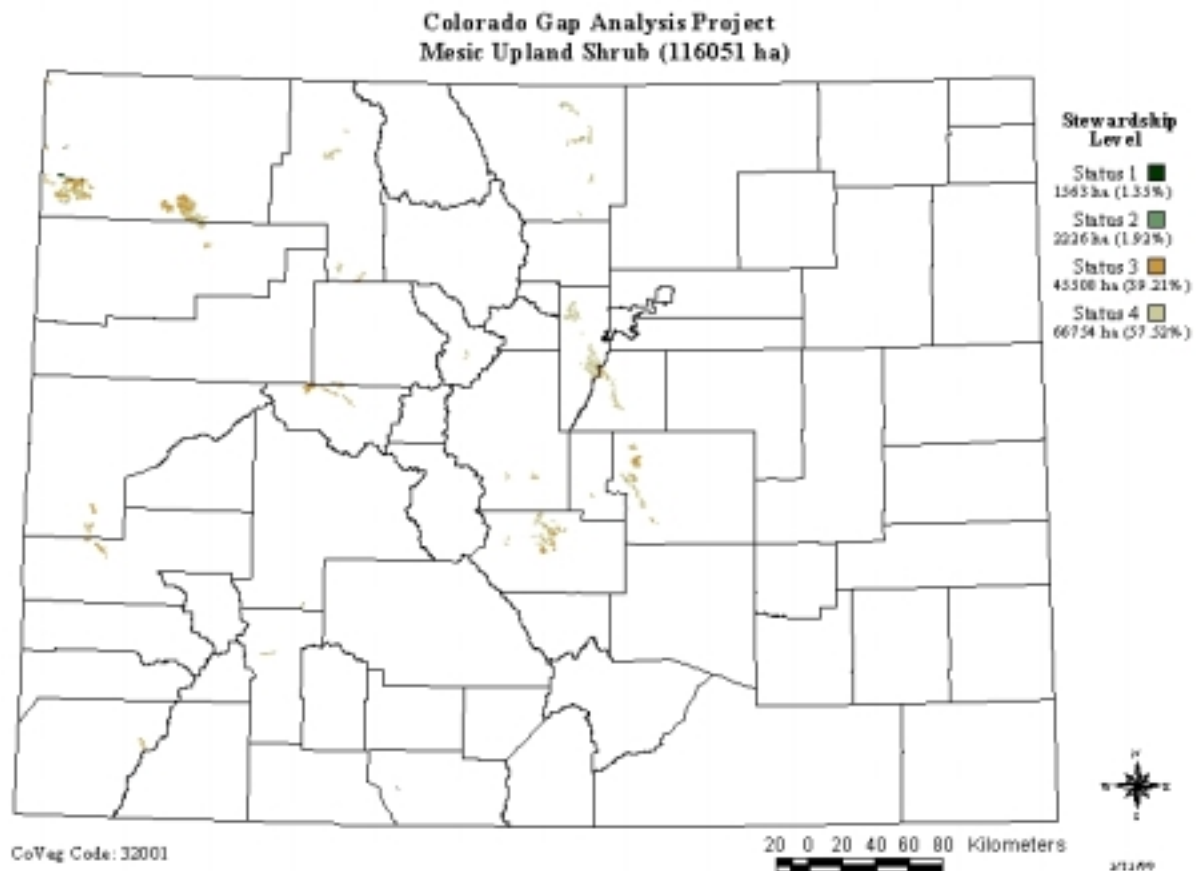
Johnston describes several plant associations of the *C. montanus* series in Colorado. In one association, it is co dominant with *R. trilobata* with *Andropogon gerardii* as the grass associate. Other associations include *Elytrigia dasystachya*, *Muhlenbergia montana*, *Stipa comata*, and *Stipa lettermanii*.

Rhus trilobata is found in a plant association with *Muhlenbergia montana* on steep rock ledges and screes.

MAPPING UNIT ATTRIBUTE CODE: 32001

MAPPING UNIT NAME: Mesic upland shrub type.

DOMINANT SPECIES: Varied (see DIAGNOSTIC SPECIES)



DESCRIPTION: This is a 'catch all' type which includes a variety of shrub communities that grow in relatively mesic sites. Most often, Rocky Mountain maple, serviceberry, and/or chokecherry are dominant or co-dominant, but other shrub species may be present. Mountain mahogany can not be dominant. Mesic shrubs must comprise more than 25% of the total vegetative cover.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE: 1560-3760m (5100-12325')

DIAGNOSTIC SPECIES: *Acer glabrum*, *Amelanchier* sp., *Symphoricarpos* sp., *Prunus* sp.

NOTES: *Amelanchier alnifolia* is associated with *Agropyron spicatum* and *Carex* sp., as habitat type in Middle Park (Tiedeman et al., 1987).

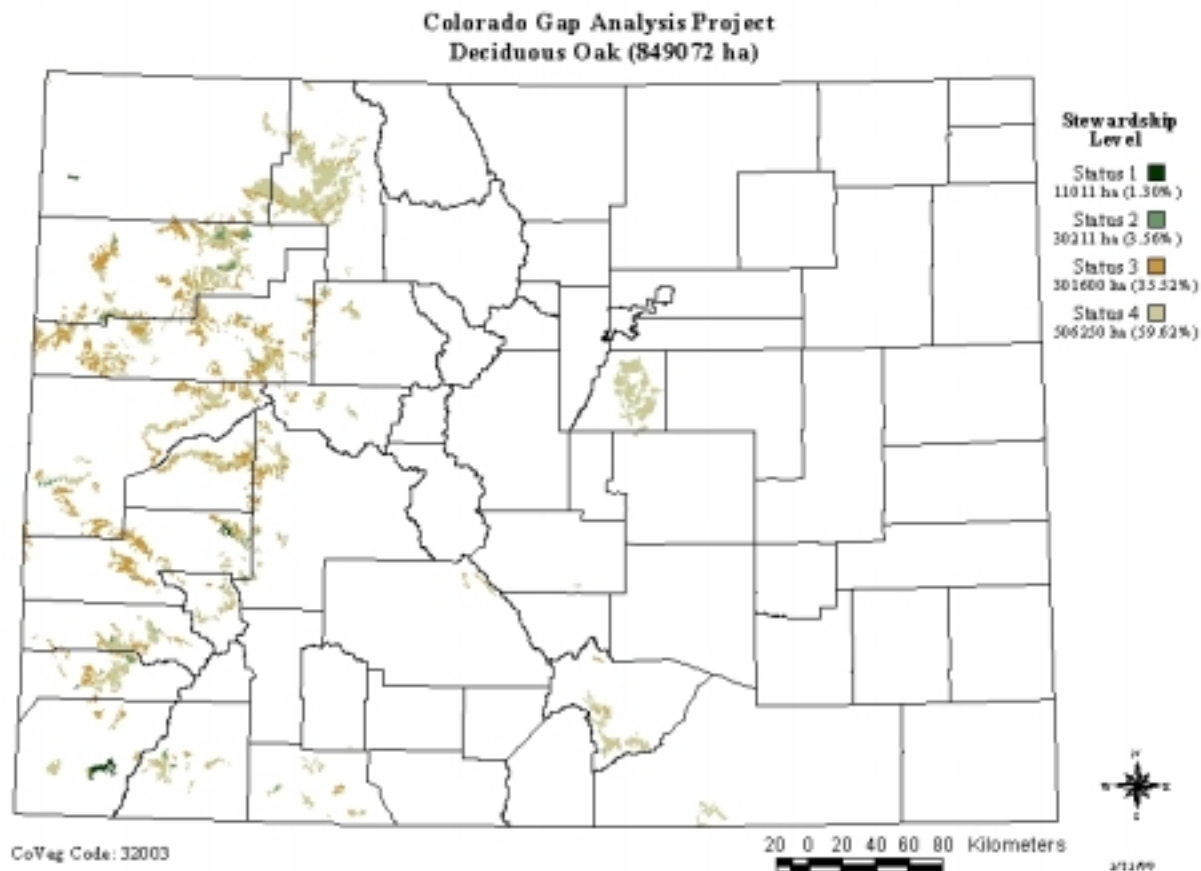
Plant associations for the species in this type include, for *A. glabrum*, association with *Swida sericea*. For *Amelanchier* sp. series includes *Carex geyeri* (with *A. alnifolia* dominant in Middle Park and the Front Range and *A. utahensis* dominant in northwestern Colorado), *Symphoricarpos oreophilus* and *Artemisia tridentata*, and co dominant with *P. tridentata*, having *Roegneria spicata* as a grass associate. *A. alnifolia* is co-dominant with *Prunus virginiana* with *Vicia americana* as a grass associate. *P. virginiana* is co-dominant with *S. occidentalis* having *Elymus smithii* as a grass associate and co dominant with *S. oreophilus* having *Elymus trachycaulus* grass understory.

S. oreophilus is associated with *Festuca thurberi*. *Vaccinium cespitosum* is associated with *Blepharoneuron tricoleps* and *V. scoparium* or *V. cespitosum* is found associated with *Lidia biflora*.

MAPPING UNIT ATTRIBUTE CODE: 32003

MAPPING UNIT NAME: Deciduous oak type.

DOMINANT SPECIES: Gambel oak (*Quercus gambelii*)



DESCRIPTION: Scrub oak community where Gambel oak comprises more than 25% of the total vegetative cover and is the dominant shrub.

DISTRIBUTION: This species does not occur on the east slope of the Front Range north of the Denver area. However, the range of this species extends into Wyoming on the west slope.

ELEVATION RANGE: 1830-2940m (6000-9630')

DIAGNOSTIC SPECIES: *Quercus gambelii*

NOTES: The northern limit of this species seems to occur where the lower elevation limit set by drought intersects the upper elevation limit set by cold temperature (Peet, 1988). This species often forms a well developed understory in ponderosa pine forests, especially in southern Colorado. Along with *Rhus trilobata*, it forms much of the transition to grassland in the Pike's Peak area (Peet, 1978).

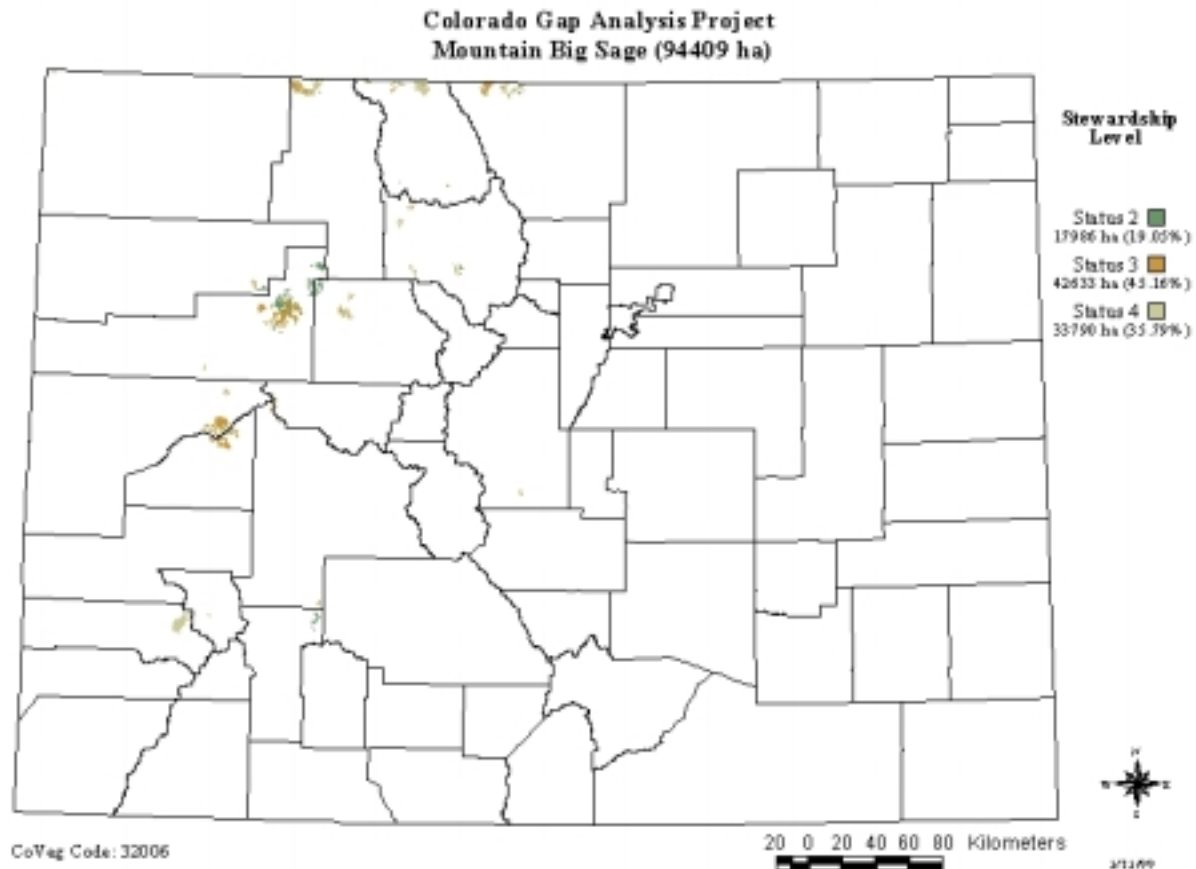
Habitat and community types of the *Quercus gambelii* series include, on warm, dry sites *Amelanchier alnifolia*, *Pachystima myrsinites*, *Prunus virginiana*, and *Symphoricarpos oreophilus*. All of these types are associated with *P. tremuloides*.

Plant associations of the *Q. gambelii* series described by Johnston (1987) include *A. alnifolia*, *A. utahensis*, *Carex heliophila*, *Cercocarpus montanus*, *Symphoricarpos oreophilus*, and *Padus* (*Prunus*) *virginiana* with *Festuca thurberi* and with *Pachystima myrsinites*.

MAPPING UNIT ATTRIBUTE CODE: 32006

MAPPING UNIT NAME: Mountain big sagebrush type.

DOMINANT SPECIES: Mountain big sagebrush (*Artemisia tridentata* ssp., *vaseyana*)



DESCRIPTION: This type is dominated by mountain big sagebrush, which must be 25% or greater of the total vegetative cover. Often this type occurs with mixed grasses. Sometimes occurs as patches of dense sagebrush with patches of mixed grasses. In this case, sagebrush patches must be more than 50% of the land area.

DISTRIBUTION: (see NOTES)

ELEVATION RANGE: 1525-2900m (5000-9500')

DIAGNOSTIC SPECIES: *Artemisia tridentata* ssp. *vaseyana*

NOTES: This species occurs at higher elevations than the other *A. tridentata* subspecies. It occupies cool, moist sites with a lower pH and lower CaCO₃ values than the other subspecies, although the soil texture may vary. In the Piceance Basin, it is associated with *Lupinus* sp., *Chrysothamnus viscidiflorus*, *Erigeron umbellatum*, *Stipa lettermanii* and *Symphoricarpos oreophilus* (Cottrell and Bonham, 1992).

This species is associated with *Festuca idahoensis* and *Festuca thurberi* as habitat types in Middle Park (Tiedeman et al., 1987).

MAPPING UNIT ATTRIBUTE CODE: 32007

MAPPING UNIT NAME: Wyoming big sagebrush type.

DOMINANT SPECIES: Wyoming big sagebrush (*Artemisia tridentata* ssp., *wyomingensis*)



DESCRIPTION: This type is dominated by Wyoming big sagebrush, comprising more than 25% of the total vegetative cover. This type is variable and includes areas of dense homogenous Wyoming big sagebrush, to sparsely vegetated, arid areas where Wyoming big sagebrush is the dominant shrub. Often, patches of Wyoming big sagebrush are found with patches of mixed grasses. In these cases, the area is classified as Wyoming big sagebrush if the sagebrush patches occupy more than 50% of the total ground cover.

DISTRIBUTION:

ELEVATION RANGE: 1030-3410m (3300-11200')

DIAGNOSTIC SPECIES: *Artemisia tridentata* ssp., *wyomingensis*

NOTES: In the Piceance Basin, the distribution of *A.t. wyomingensis* overlaps that of *A.t. tridentata* but is more common on shallow, silty soil where soil moisture stress is greater. It is generally found away from streams (Cottrell and Bonham, 1992).

Barker and McKell (1983) report that *A.t. wyomingensis* occurs on dry shallow rocky soils on the foothill and valley sites between 1520m and 2150m. Whenever it occurs with *A.t. tridentata*, *A.t. wyomingensis* is always on drier, poorer, shallower soils.

Shumar and Anderson (1986) describe *A.t. wyomingensis* sites to be on moderate to shallow soils, with medium textures that often limit water penetration. It is often found on immature or slightly saline soil on the lower slopes of major drainages or on hilltops and flats.

This species has been associated with *Agropyron smithii*, *Agropyron spicatum*, and *Stipa columbiana* as habitat types in Middle Park (Tiedeman et al., 1987).

MAPPING UNIT ATTRIBUTE CODE: 32008

MAPPING UNIT NAME: Black sagebrush type.

DOMINANT SPECIES: Black sagebrush (*Artemisia nova*)

DESCRIPTION: Areas where black sagebrush comprises more than 25% of the total vegetative cover and is the dominant shrub type. Often found with mixed grasses and Wyoming big sagebrush.

DISTRIBUTION: Found in western Colorado.

ELEVATION RANGE: 2290-2500m (7500-8200')

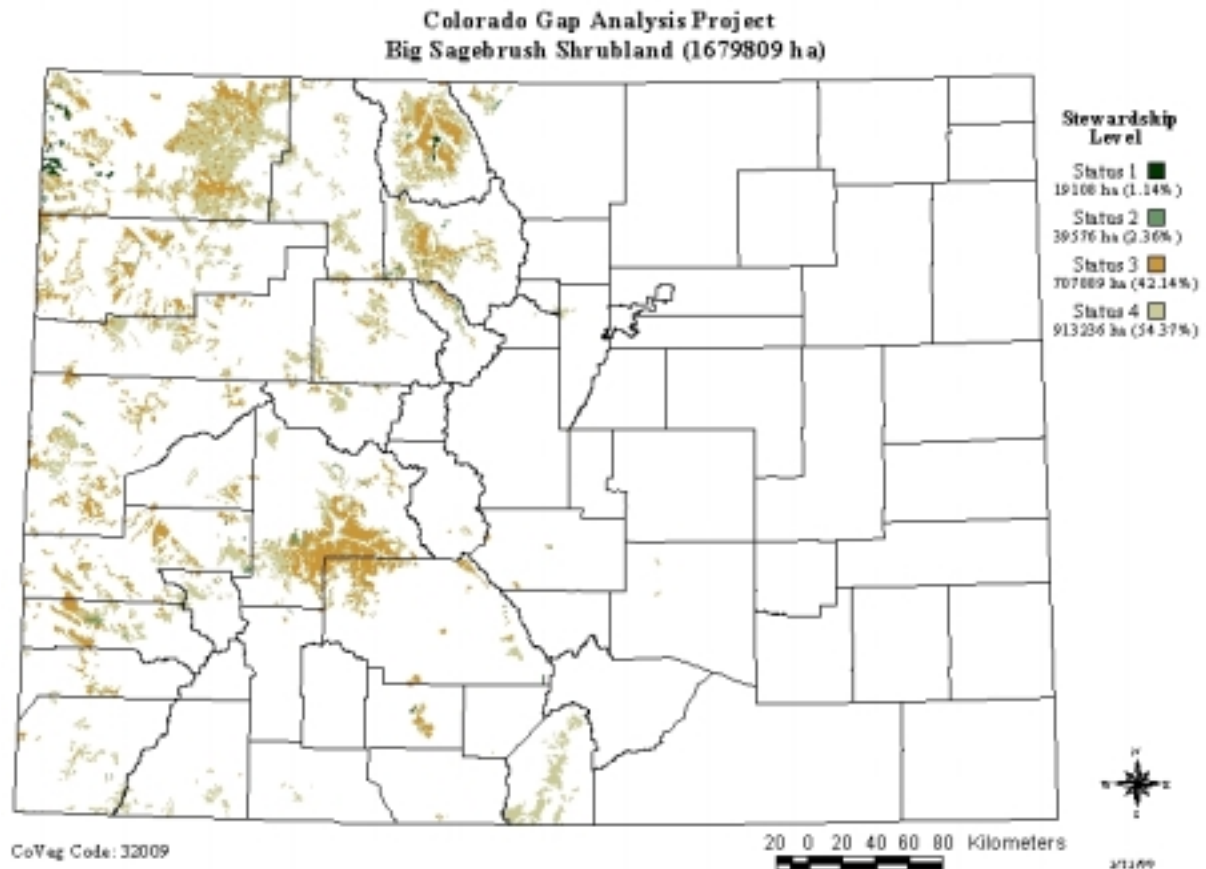
DIAGNOSTIC SPECIES: *Artemisia nova*

NOTES: Johnston (1987) describes only one plant association in the *A. nova* series from Colorado. The association is with *Balsamorhiza sagittata* on level to gently sloping (2-23%), exposed windswept benches and terraces, northwest - west - south facing exposures, very deep, well drained slowly permeable calcareous soils with a very dense subsurface of clay. Precipitation is generally from 17-18 in/yr.

MAPPING UNIT ATTRIBUTE CODE: 32009

MAPPING UNIT NAME: Big sagebrush type.

DOMINANT SPECIES: Big sagebrush (*Artemisia tridentata* ssp., *tridentata*)



DESCRIPTION: Shrubland with basin big sagebrush dominating the shrub cover and comprising more than 25% of the total vegetative cover. Often occurs mixed with grasses. When found in riparian areas, primary vegetation is classified as shrub riparian and secondary type as big sagebrush shrubland.

DISTRIBUTION: (see NOTES)

ELEVATION RANGE: 1200-2150m (4000-7000')

DIAGNOSTIC SPECIES: *Artemisia tridentata* ssp. *tridentata*

NOTES: In the Piceance Basin, *A.t. tridentata* is found on deeper, sandier soils than other *A. tridentata* subspecies. It is found in valley bottoms and grows to heights greater than 2m. It is often associated with *Chenopodium pratense* and *Lepidium latifolium* (Cottrell and Bonham, 1992).

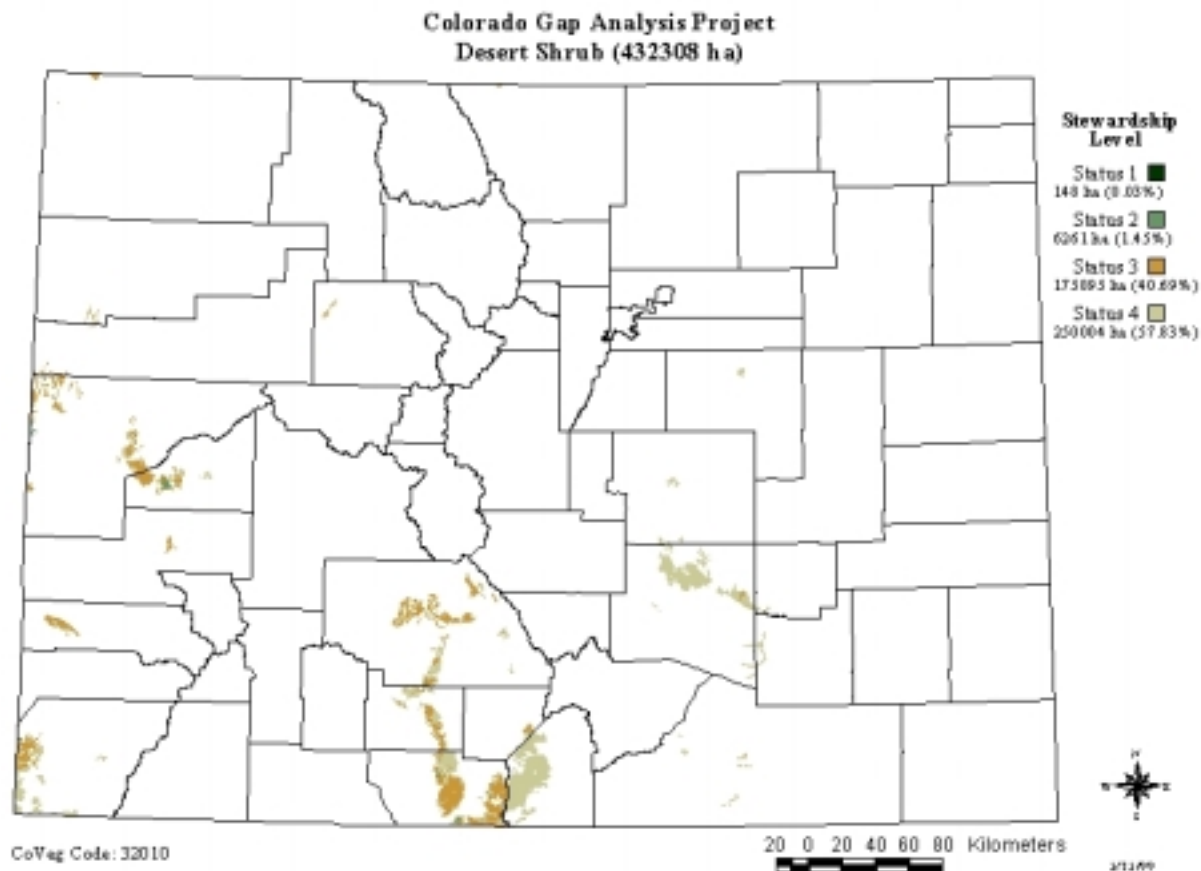
Barker and McKell (1983) report that *A.t. tridentata* occurs on deep, seasonally dry, well drained, fertile soils on plains, valleys and foothills between 610m and 2140m. It grows in more mesic, fertile habitats than does *A.t. wyomingensis*.

Shumar and Anderson (1986) describe *A.t. tridentata* as occurring on deep, well drained, often sandy soil in valley bottoms, on foothills or along drainages. Its distribution coincides with a high water table or deep moisture accumulations. This species has been associated with *Agropyron smithii* as a habitat type in Middle Park (Tiedeman, et al., 1987).

MAPPING UNIT ATTRIBUTE CODE: 32010

MAPPING UNIT NAME: Desert shrub type.

DOMINANT SPECIES: Four wing saltbush (*Atriplex canescens*), Shadscale (*Atriplex confertifolia*)



DESCRIPTION: This type is a mixture of shrubs occurring in dry, salty habitats. Shrub cover is often dominated by shadscale, but can be a mixture of shrub species.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE: 1220-2440m (4000-8000')

DIAGNOSTIC SPECIES: *Atriplex canescens*, *Atriplex confertifolia*, *Coleogyne ramosissima*

NOTES: This type is generally associated with halomorphic soils. It is usually on more upland sites, with the water table well below 1m from the surface (West, 1988).

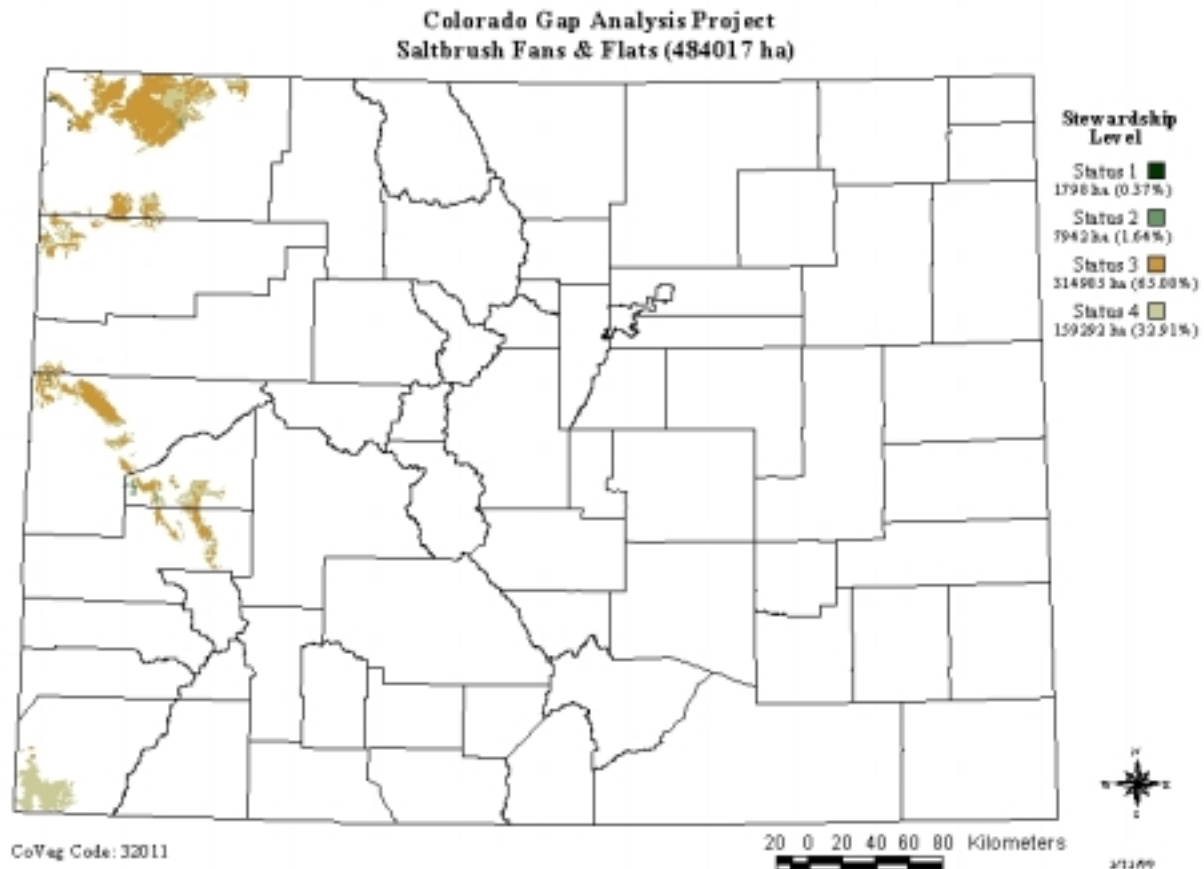
Johnston (1987) describes several plant associations in the *Atriplex* sp. series. *A. canescens* is associated with *Bouteloua gracilis* on low slopes with deep slightly alkaline (pH 8.2-8.7) soils, in areas of average precipitation of 12 in/yr. Another association is with *Elytrigia smithii* and *B. gracilis* on bottom floodplains with alluvial fine textured soils. *A. canescens* occurs with *Stipa comata* on upper slopes and sides of mesas, foothills, southerly and relatively steep slopes. *A. confertifolia* and *A. canescens* are co dominant and *Sporobolus airoides* is the understory associate on alluvial flats with a low slope angle, deep highly alkaline (pH 8.6-9.0) soils in areas of 12in/yr. annual precipitation.

A. confertifolia and *Artemisia tridentata* are co-dominant with *Roegneria spicata* as the grass associate on heavier textured soils of badlands (clay or clay loams), on moderately steep to steep (30-100%) slopes and southeast to southwest exposures. In northwestern Colorado it occurs from 6070-6810 ft.

MAPPING UNIT ATTRIBUTE CODE: 32011

MAPPING UNIT NAME: Saltbush fans and flats type.

DOMINANT SPECIES: Saltbush (*Atriplex* sp.)



DESCRIPTION: Areas where Gardner's saltbush comprises more than 25% of the total vegetative cover. These are usually relatively pure saltbush stands, often sparsely vegetated with bare soil constituting most of the land surface. Can be mixed with some grasses or shrubs if these comprise less than 50% of the total cover.

DISTRIBUTION: Found in western Colorado.

ELEVATION RANGE: 1400-1830m (4500-6000')

DIAGNOSTIC SPECIES: *Atriplex nuttallii*, *Atriplex corrugata*, *Atriplex cuneata*

NOTES: This type is also generally associated with halomorphic soils (West, 1988).

MAPPING UNIT ATTRIBUTE CODE: 32012

MAPPING UNIT NAME: Greasewood fans and flats type.

DOMINANT SPECIES: Greasewood (*Sarcobatus vermiculatus*)



DESCRIPTION: Areas where greasewood comprises more than 75% of the total shrub cover and more than 25% of the total vegetative cover. Often found mixed with grasses. Greasewood is frequently found in riparian areas and classified as shrub riparian, with greasewood classified as secondary vegetation type within the polygon.

DISTRIBUTION: (see NOTES)

ELEVATION RANGE: 1400-2600m (4500-8500')

DIAGNOSTIC SPECIES: *Sarcobatus vermiculatus*

NOTES: This type is associated with halomorphic soils. It is generally in lowland situations, with the free water table at least occasionally present at the surface and usually remaining within 1 meter of the surface. This species has been associated with *Artemisia tridentata* ssp. *tridentata* and *Agropyron smithii* as a habitat type in Middle Park (Tiedeman et al., 1987).

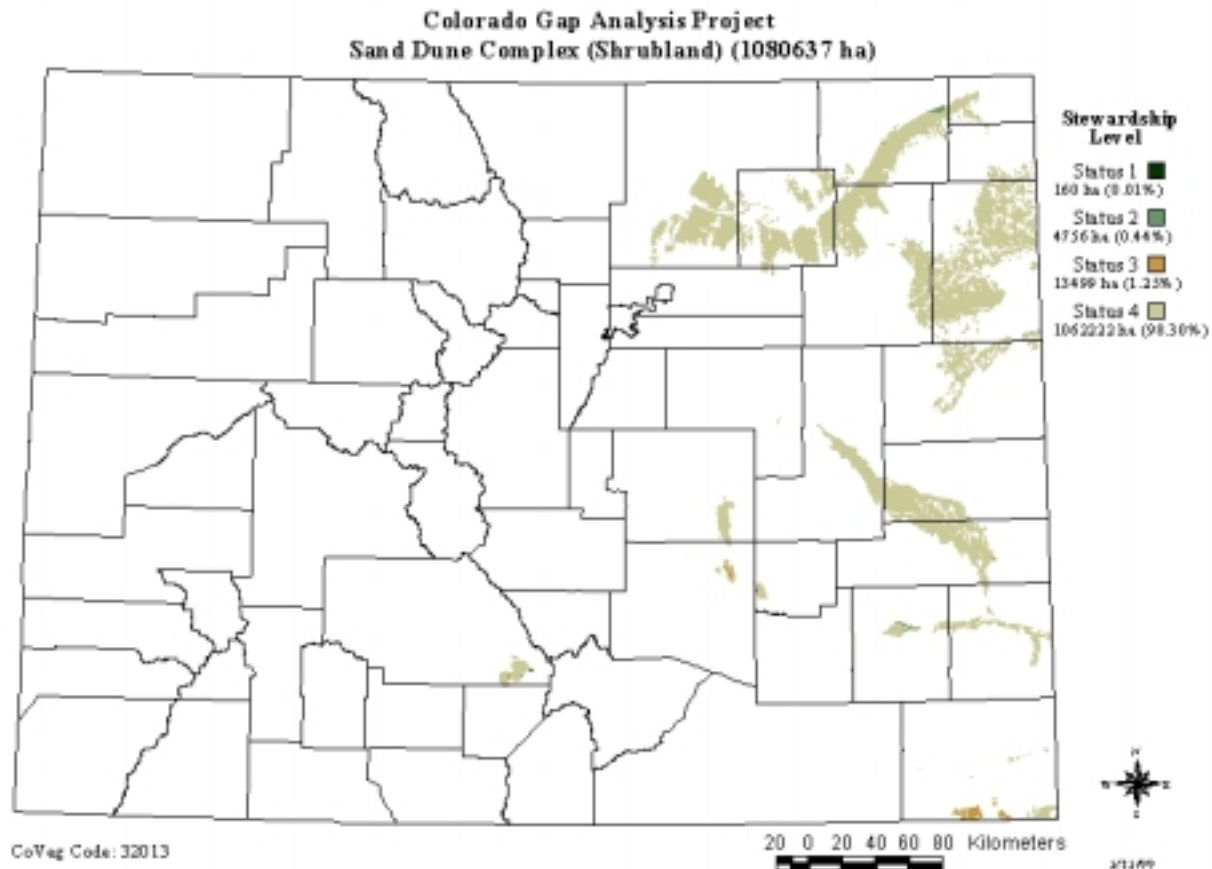
Johnston (1987) describes several plant associations dominated by *S. vermiculatus*. One is co-dominant with *Atriplex confertifolia* with a *Elymus trachycaulus* understory. This association occurs on steep upland slopes with no CaCO₂ accumulation and low organic content. In northwestern Colorado it is found from 6000-6800 ft. and in northcentral Colorado from 7220-7710 ft.

Another association is with *Leymus cinereus* where it occurs at low elevations in a narrow band along floodplains of rivers and streams from 3000-7000 ft. In northwestern Colorado it occurs from 6000-7000 ft. Another association is with *Sporobolus airoides* on highly alkaline (pH 8.4), clay loam soils on floodplains. The grass understory of this association vary with soil texture. In south central Colorado, it occurs from 7000-7800 ft.

MAPPING UNIT ATTRIBUTE CODE: 32013

MAPPING UNIT NAME: Sand dune shrub complex type.

DOMINANT SPECIES: Sand sagebrush (*Artemisia filifolia*), Rabbitbrush (*Chrysothamnus* sp.), Spiny hopsage (*Grayia spinosa*)



DESCRIPTION: This type includes active and stabilized shrub dominated sand dune communities. On active dunes most of the land surface is comprised of bare, shifting sands though some dune stabilizing species such as Indian ricegrass, *Psoralea* spp., and rabbitbrush may be present, especially around the margins. Stabilized dunes are vegetated and may include a combination of the above as well as *Artemisia* species.

DISTRIBUTION: Northeastern Colorado, Comanche National Grassland, San Luis Valley

ELEVATION RANGE: 1070-1700m (3500-5500')

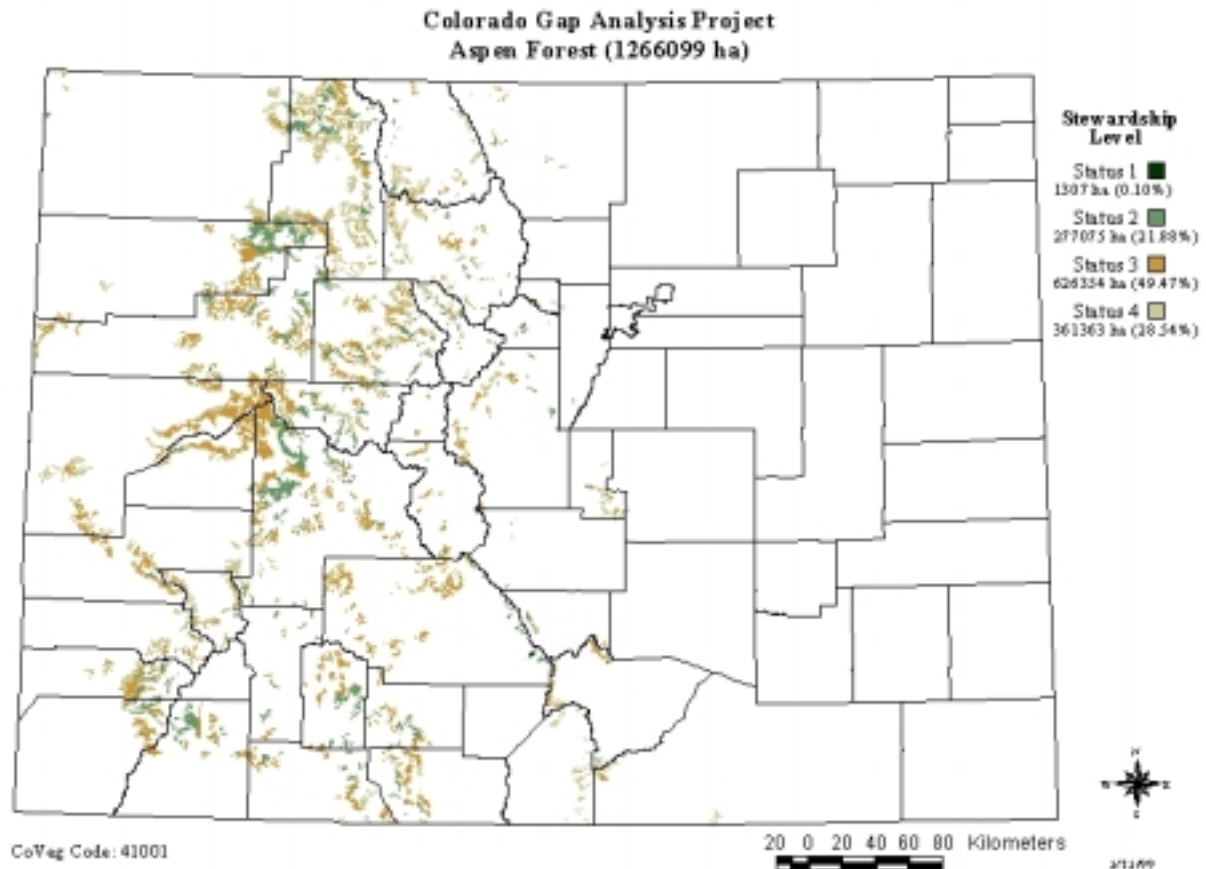
DIAGNOSTIC SPECIES: *Artemisia filifolia*, *Chrysothamnus* sp., *Psoralea* spp., *Oryzopsis hymenoides*, bare sand

NOTES: Johnston (1987) describes two plant associations of the *A. filifolia* series in Colorado. One association is with *Andropogon hallii* which occurs in deep dune type sands, principally on the leeward side of major drainageways in the Comanche and Cimarron National Grasslands. The other association is *Sporobolus cryptandrus* *Bouteloua gracilis* which is found on sandy loams and fine sandy loams, rolling hills, with an average precipitation of 23 in/yr. in the Comanche National Grasslands and northeastern Colorado.

MAPPING UNIT ATTRIBUTE CODE: 41001

MAPPING UNIT NAME: Aspen type.

DOMINANT SPECIES: Rocky Mountain aspen (*Populus tremuloides*)



DESCRIPTION: Forest in which aspen dominates the canopy. Includes pure aspen forest and mixed conifer aspen forest where aspens make up over 50% of the total canopy. Total canopy coverage of trees must be greater than 25%.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE: 1830-3050m (6000-10000')

DIAGNOSTIC SPECIES: *Populus tremuloides*

NOTES: This species can form steady state forests under certain conditions, but is more important as a post fire invader. It regenerates almost totally from root sprouts instead of by seeds. Stands may burn frequently, but extremely hot fires can damage or destroy roots. It is typically found on finer, more calcareous soils than lodgepole pine and appears to have a broader range of environmental tolerances than does lodgepole pine (Peet, 1988). In southern Colorado and northern New Mexico where lodgepole pine is absent, *P. tremuloides* is the ecological analogue of lodgepole pine, but with a more herbaceous understory (Peet, 1978).

This type typically has a well developed understory of mesophytic forbs and grasses. It is often replaced by stands of more shade tolerant species such as *A. lasiocarpa*, *P. engelmannii*, or *P. menziesii*. This type often forms the transition from steppe or shrubland to forest on western slopes in the southern Rockies (Peet, 1988). This type plays a successional role on a range of sites between 2100m and 3350m, especially on the wettest sites and rocky or xeric sites in the Rocky Mountain National Park area.

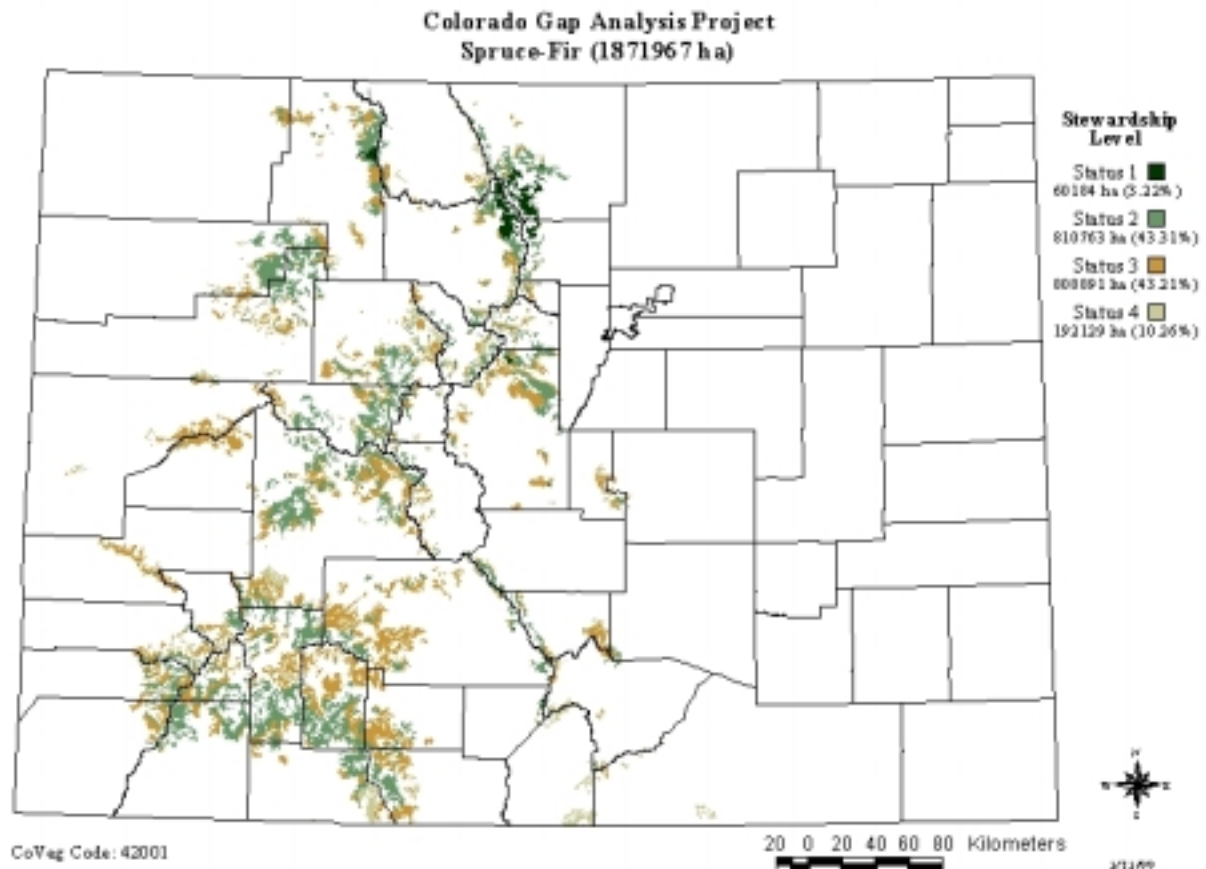
Because of the wide environmental tolerances of this species and its role as a post fire invader, it is found in association with a great number of shrubs and grasses on a variety of different sites. Common tree associates also include most of the montane forest species, including *A. lasiocarpa*, *P. contorta*, *P. ponderosa*, *P. flexilis*, *P. menziesii*, *P. engelmannii*, *A. concolor*, *P. pungens*, and *J. scopulorum* (Alexander, 1987).

DETAILED DESCRIPTION OF TYPES FOUND ON THE COLORADO LAND COVER MAP

MAPPING UNIT ATTRIBUTE CODE: 42001

MAPPING UNIT NAME: Spruce - fir type.

DOMINANT SPECIES: Engelmann Spruce (*Picea engelmannii*) and Subalpine fir (*Abies lasiocarpa*).



DESCRIPTION: Spruce fir forest not significantly affected by logging. Engelmann spruce and/or subalpine fir must be dominant or co-dominant in the canopy. This type will also include spruce fir krummholz communities. Total canopy coverage by all tree species must be greater than 25%.

DISTRIBUTION: *Abies lasiocarpa* and *Picea engelmannii* are found in the subalpine zone throughout the state of Colorado. The subspecies *A.l. arizonica* begins to replace the subspecies *A.l. lasiocarpa* in the southern part of the state. *Abies* is absent from the relatively dry subalpine zone of Pike's Peak.

ELEVATION RANGE: 2590-3659m (8500 - 12000')

DIAGNOSTIC SPECIES: *Picea engelmannii*, *Abies lasiocarpa*

NOTES: Spruce fir forest characterizes the subalpine portion of the Rocky Mountains. This type is usually the highest forested zone on the mountain, the next lower zones being lodgepole pine and/or Douglas fir types. The spruce fir zone extends to lower elevations in wet valley bottoms, cool ravines and sheltered northern slopes (Peet, 1988). *Picea* usually dominates the upper slopes of the subalpine zone and especially in the southern part of Colorado and appears to be more tolerant of extreme conditions. In Front Range forests, *Picea* is dominant on very wet or boggy sites, and *Abies* is more numerically dominant on more mesic sites (Peet, 1988).

Abies is absent from timberline forests in northern New Mexico, shares dominance with *Picea* in the lower portion of the subalpine zone in the Sangre de Cristos and is co-dominant with *Picea* at timberline in Rocky Mountain National Park (Allen and Peet, 1989).

Krummholz forms are infrequent in northern New Mexico, but become more common as latitude increases. Treeline decreases from 3800m in northern New Mexico to 3400m in the Medicine Bow (Allen and Peet, 1989).

There are several habitat and community types for the *Picea engelmannii* series recognized by the Forest Service (Alexander, 1987). It is associated with *Salix pseudolapponum*, *Heracleum sphondylium* (a riparian type) and *Trifolium dasyphyllum*. On drier sites associates are *Vaccinium myrtillus*, *Polemonium pulcherrimum*, and *Saxifraga bronchialis*. Common tree associates are *A. lasiocarpa*, *P. contorta*, *P. flexilis*, *P. tremuloides*, and *P. aristata*.

Habitat and community types identified for the *Abies lasiocarpa* series include, on warmer sites, *Pachystima myrsinites*, *Pedicularis racemosa* and *Rubus parviflorus*. On cooler sites, associates include *Juniperus communis*, *Vaccinium scoparium*, *Carex geyeri*, *Arnica cordifolia*, *Polemonium pulcherrimum*, *Saxifraga bronchialis* (associated with scree environments), various mosses, *Vaccinium myrtillus*, *Erigeron eximus*, *Salix glauca*, *Calamagrostis canadensis*, *Mertensia ciliata*, and *Senecio triangularis*. Common tree associates are *P. engelmannii*, *P. menziesii*, *P. tremuloides*, *P. contorta*, *P. aristata*, and *A. concolor*.

MAPPING UNIT ATTRIBUTE CODE: 42003

MAPPING UNIT NAME: Douglas fir type.

DOMINANT SPECIES: Douglas fir (*Pseudotsuga menziesii*)



DESCRIPTION: Forests dominated by Douglas fir. This type includes both intact Douglas fir forests and those affected by logging (when contiguous logged areas are smaller than 100 ha.).

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE: 1650-2800m (5400-9000') (Peet, 1988)

DIAGNOSTIC SPECIES: *Pseudotsuga menziesii*

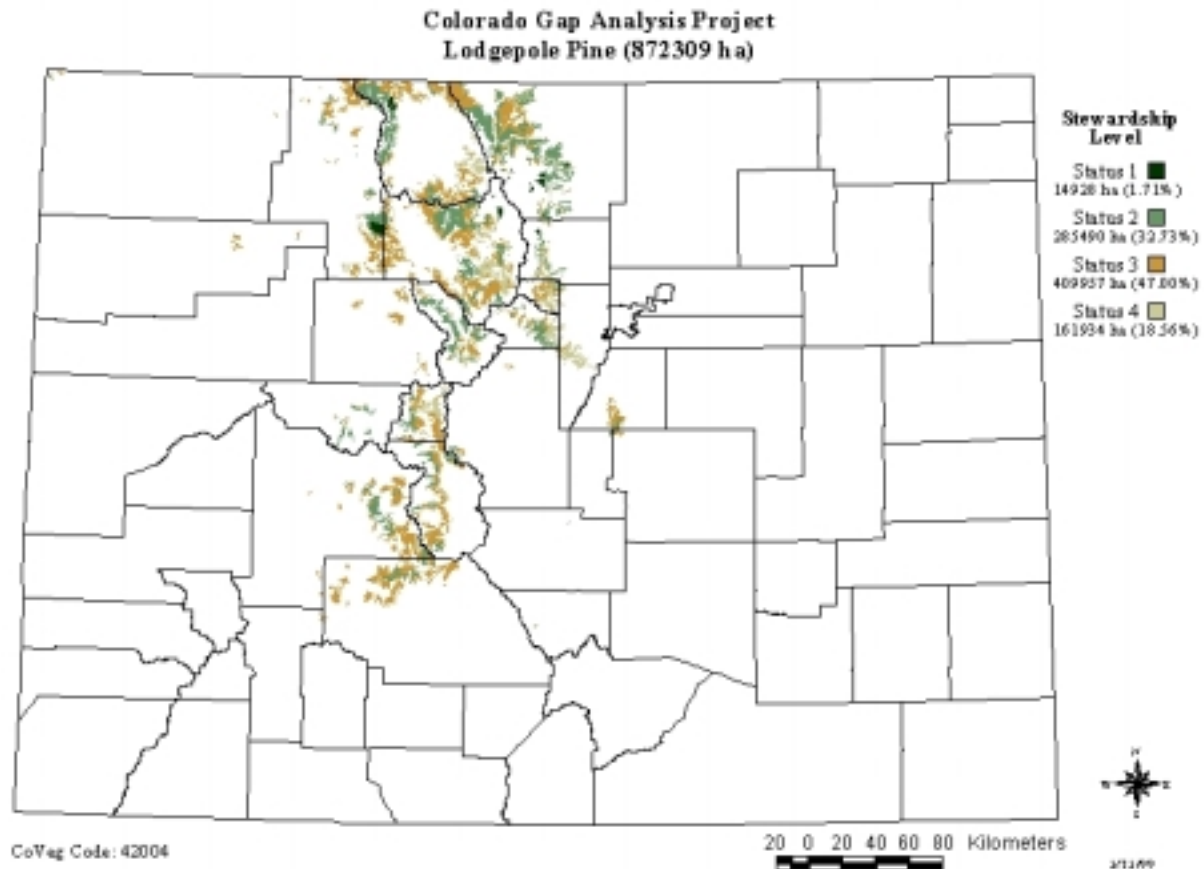
NOTES: Douglas fir is often the dominant tree species of north facing slopes and steep ravines from 1650-2700m and of open slopes from 2300-2800m. On mesic slopes it is often co dominant with or successional to *A. concolor*. In moist canyon bottoms, it is often co dominant with *P. pungens*. The Douglas fir type is usually found between the lodgepole pine and ponderosa pine types in elevation (Peet, 1988). The average frost free season is 80-120 days and the average annual precipitation is 20-30 in. in this type (Garrison, 1977).

There are several habitat and community types identified for the *P. menziesii* series (Alexander, 1987). On warm dry sites, it is associated with *Berberis repens*, *Holodiscus dumosus* (in scree habitats), *Pachystima myrsinites*, *Purshia tridentata*, *Quercus gambelii*, *Symphoricarpos oreophilus*, *Festuca arizonica*, and *Festuca idahoensis*. On warm moist sites, associates are *Clematis pseudoalpina*, *Jamesia americana*, and *Physocarpus monogynus*. On cool dry sites, it is associated with *Carex geyeri*. Common tree associates are *P. tremuloides*, *A. concolor*, *P. flexilis*, *P. contorta*, *P. engelmannii*, *Juniperus scopulorum*, and *P. edulis*.

MAPPING UNIT ATTRIBUTE CODE: 42004

MAPPING UNIT NAME: Lodgepole pine type.

DOMINANT SPECIES: Lodgepole pine (*Pinus contorta*)



DESCRIPTION: Forest which is dominated by lodgepole pine and not significantly affected by logging. Engelmann spruce and subalpine fir may be mixed with the canopy trees or important in the understory, but not as dominants.

DISTRIBUTION: Lodgepole pine is absent from the Pike's Peak area and reaches it's southern limit of distribution in southern Colorado. The species is also absent from the west slope of the Rockies in southern Colorado.

ELEVATION RANGE: 1830-3354m (6000-11000') especially above 2440m

DIAGNOSTIC SPECIES: *Pinus contorta*

NOTES: Lodgepole pine forests are generally found in between the spruce fir and the Douglas fir types in elevation. Lodgepole pine is a widespread species that can form steady state forests under certain conditions, but usually occurs as a post fire invader. In fact, it is viewed as an archetypal post fire species (Peet, 1988). Typically, stands of lodgepole pine are replaced by more shade tolerant species such as subalpine fir and Engelmann spruce at higher elevations and by Douglas fir at lower elevations. This type also generally has a very sparse herb or shrub understory (Peet, 1988). Lodgepole pine is found on sites where the frost free season is 80 120 days, but appears to be tolerant of frost at any time. This type also occurs in a wide range of precipitation zones (Garrison, 1977).

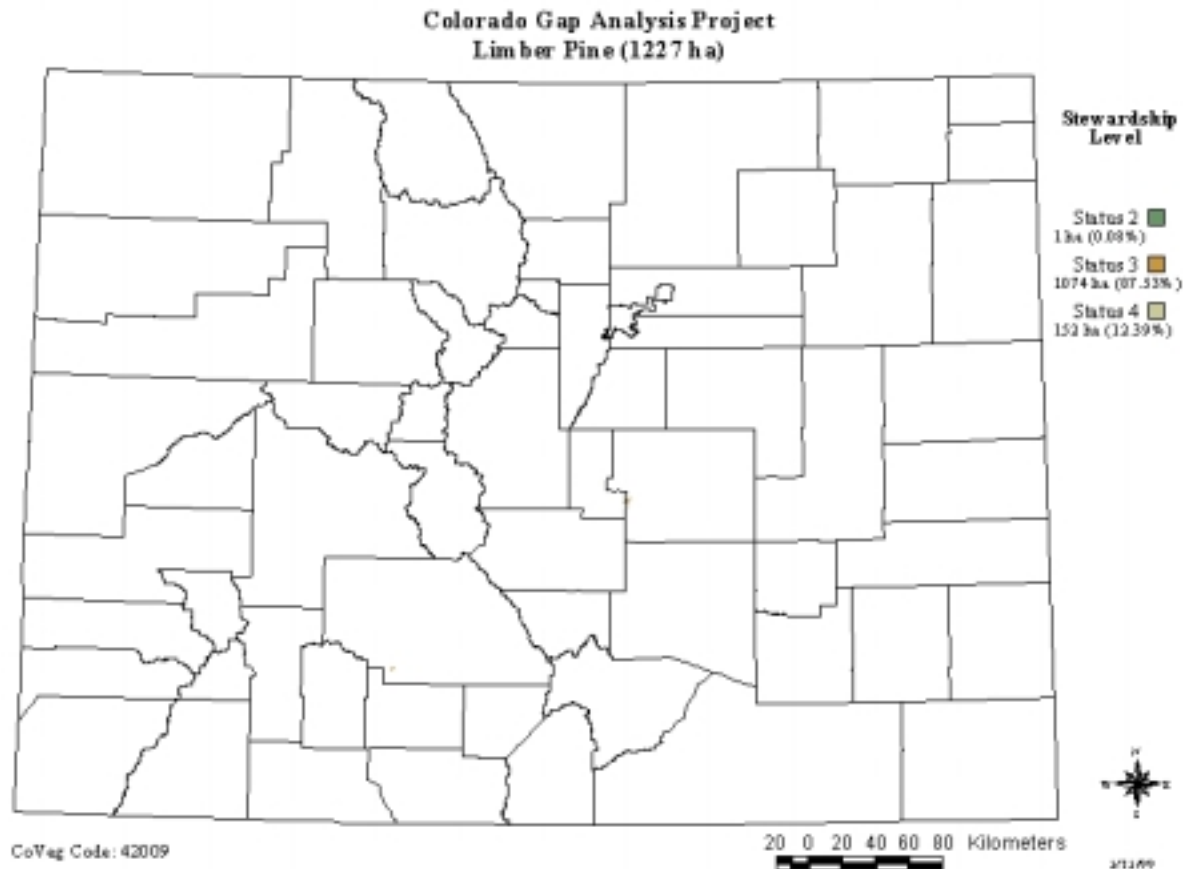
Moir (1969) suggests that lodgepole pine is seral to Douglas fir in montane forest below about 2500m and that the type is best represented on north facing slopes. It is also seral above about 2835m on deep soils to spruce fir forests. Moir then refers to the zone between 2500 and 2835m on deep soils with upland exposures as the lodgepole pine zone on the eastern slope of the Front Range. Most lodgepole pine stands are one storied, even aged, and uniform in stem and crown geometry.

Habitat and community types identified by the Forest Service for the *P. contorta* series include, on warm dry sites, association with *Carex foenea*. On cool dry sites, it is associated with *Juniperus communis*, *Vaccinium myrtillus*, *Vaccinium scoparium*, and *Carex geyeri*. On both type of sites it can be found with *Shepherdia canadensis*. Tree associates are *P. menziesii*, *P. engelmannii*, *A. lasiocarpa*, and *P. tremuloides* (Alexander, 1987).

MAPPING UNIT ATTRIBUTE CODE: 42009

MAPPING UNIT NAME: Limber pine type.

DOMINANT SPECIES: Limber pine (*Pinus flexilis*)



DESCRIPTION: Areas dominated by limber pine. This type includes closed canopy forest dominated by limber pine to more open limber pine woodland where limber pine consists of more than 25% of the total vegetative cover. Often co-occurs with juniper woodland and with shrubs or grasses in the understory.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE: 1524-3354m (5000-11000')

DIAGNOSTIC SPECIES: *Pinus flexilis*

NOTES: This type is found on xeric sites from montane forests to treeline when it is the only white pine species present. If *P. aristata* or *P. albicaulis* is present, it is restricted to the low elevation portion of its potential habitat and to situations of rocky substrate (Peet, 1978). In Front Range areas where *P. aristata* is absent, *P. flexilis* appears to show competitive release and can be found dominating exposed ridges near treeline (Peet, 1988).

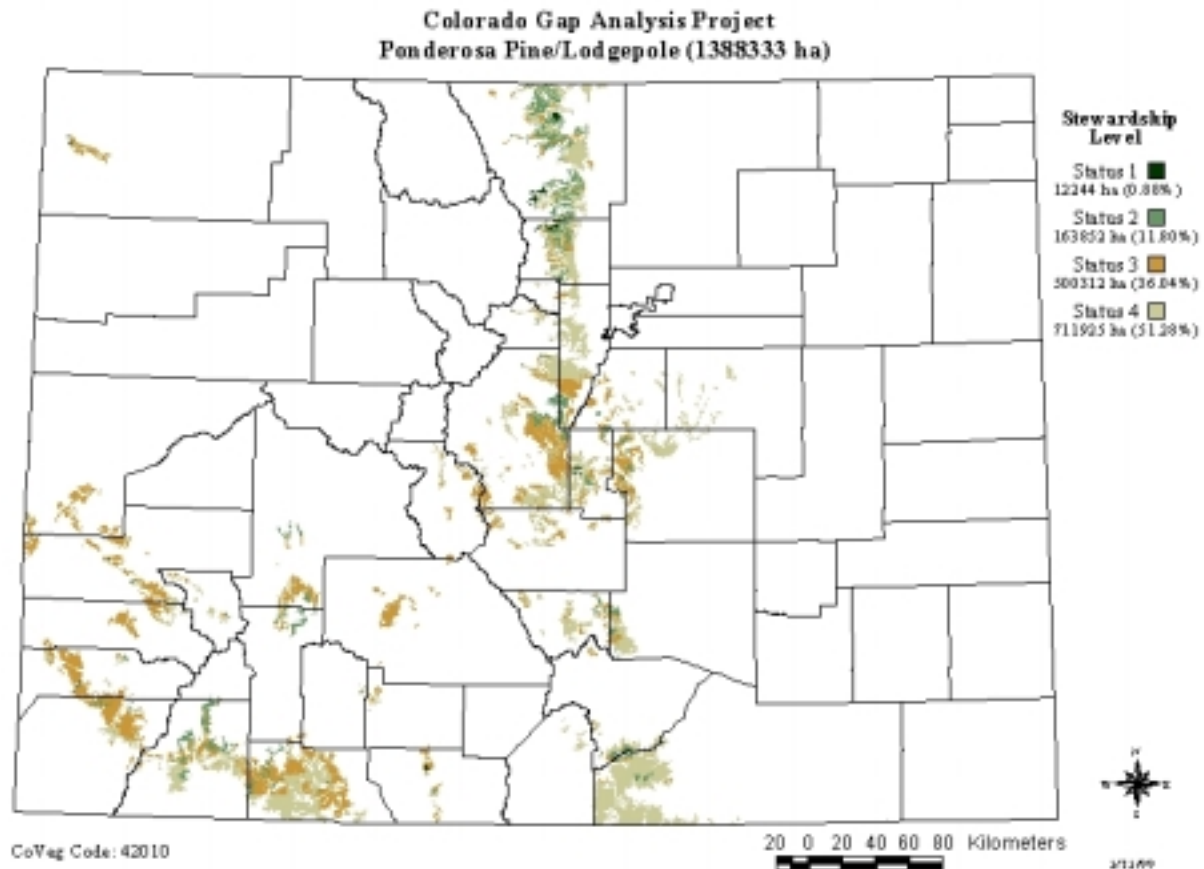
P. flexilis also appears to substitute for *P. contorta* or *P. ponderosa* when either species is absent. For example, on Pike's Peak *P. flexilis* has expanded its niche to fill successional role of *P. contorta* and to have preempted *P. tremuloides* from many potential sites. This species can also be an important post fire seral species, replacing *P. contorta* in this role on drier sites in the southern Rockies (Peet, 1988). *P. flexilis* forests typically have poorly developed understory vegetation.

Habitat and community types for *Pinus flexilis* on warm dry sites include *Arctostaphylos uva ursi*, *Juniperus communis*, *Calamagrostis purpurascens*, and *Saxifraga bronchialis*. Common tree associates are *P. menziesii*, *P. engelmannii*, and *P. contorta* (Alexander, 1987).

MAPPING UNIT ATTRIBUTE CODE: 42010

MAPPING UNIT NAME: Ponderosa pine type.

DOMINANT SPECIES: Ponderosa pine (*Pinus ponderosa*)



DESCRIPTION: Ponderosa pine dominated forest or woodland that is not significantly affected by logging. Canopy closure may vary from 26-100%.

DISTRIBUTION: Found throughout the state of Colorado. East of the continental divide from the Colorado - Wyoming border northward, the low elevation habitat of ponderosa pine occurs only along the far eastern fringe of the Rocky Mountain region (Black Hills, Bighorn Mountains, Laramie Range and rocky outcrops in between).

ELEVATION RANGE: 1524-2744m (5000-9000')

DIAGNOSTIC SPECIES: *Pinus ponderosa*

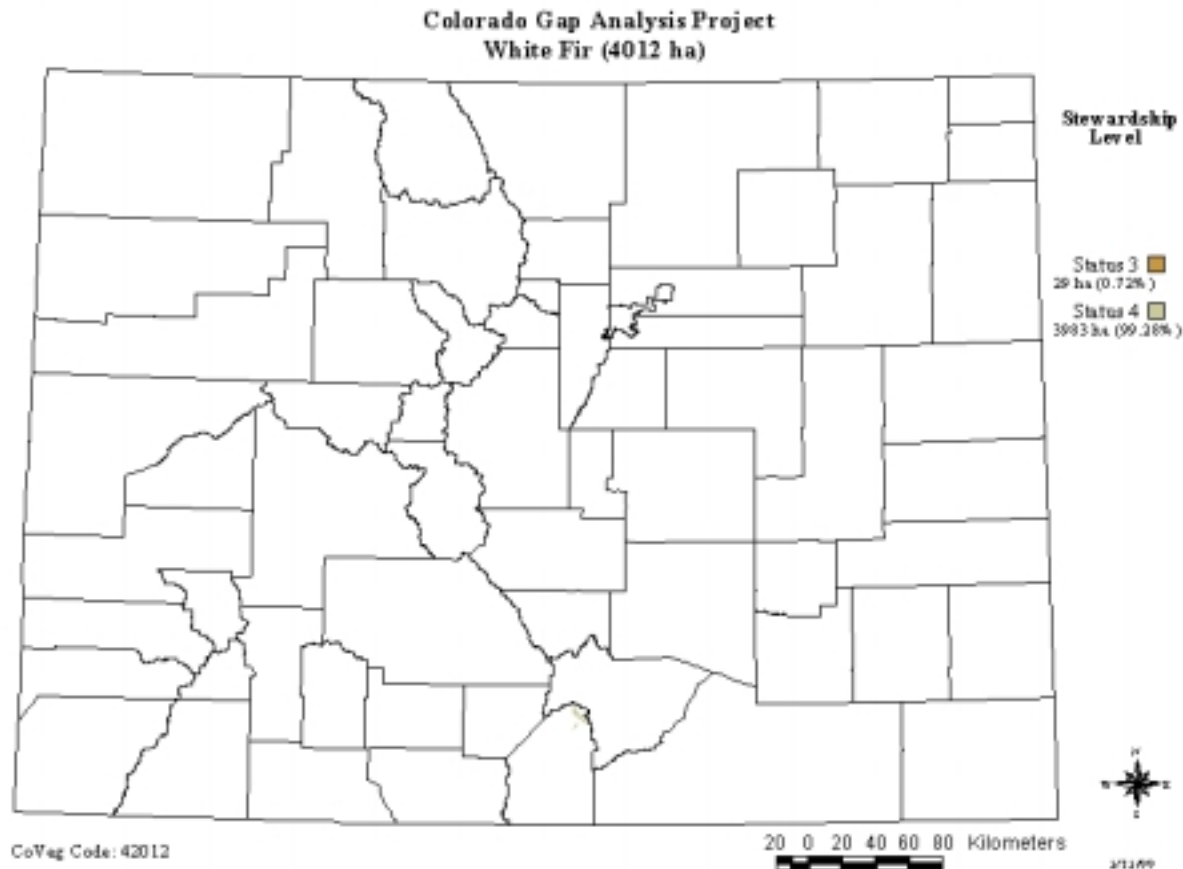
NOTES: Near the upper elevation limit, *P. ponderosa* increases in density to form well developed forests, and may be successional to Douglas fir. At the lower elevation limits, this type grades into pinyon juniper woodland or encinal (oak shrub), and where pinyon - juniper is absent, the type becomes progressively more open until only scattered individuals remain in the most rocky areas (Peet, 1988). The grass understory is usually highly flammable, leading to many fires in this type, and probably has the highest fire frequency of any Rocky Mountain forest type. Along the Front Range, this type may have a well developed *Quercus gambelii* or other shrub understory in southern Colorado, but further north, shrubs are much reduced and the understory is more grassy (Peet, 1978).

Habitat and community types identified for *Pinus ponderosa* include, on warm very dry sites, *Cercocarpus montanus*, and *Oryzopsis hymenoides* (on sand hills). On warm to hot, dry sites it is associated with *Festuca arizonica*. On warm dry sites, *P. ponderosa* can be associated with *Arctostaphylos uva ursi*, *Artemisia tridentata*, *Purshia tridentata*, *Quercus gambelii*, *Ribes inerme* (in scree situations), *Muhlenbergia montana*, and *Carex rossii*. On cool to warm moist sites, it is found with *Poa pratensis* (often riparian situations). Common tree associates are *J. monosperma*, *P. edulis*, *P. menziesii*, *J. scopulorum*, *P. flexilis*, *P. angustifolia*, *A. negundo*, and *A. tenuifolia* (Alexander, 1987).

MAPPING UNIT ATTRIBUTE CODE: 42012

MAPPING UNIT NAME: White fir type.

DOMINANT SPECIES: White fir (*Abies concolor*)



DESCRIPTION: Forested areas where white fir is more than 25% of the total canopy cover. White fir habitat and community types are described by the Forest Service only from forests of south central Colorado. This species is typically found in mixed stands and/or riparian areas and therefore may not often occur as a primary vegetation type.

DISTRIBUTION: This species reaches it's northern limit on the east slope of the Front Range by Denver. This type is more common in the forests in New Mexico, Arizona, and Utah.

ELEVATION RANGE: 2290-3050m (7500-10000')

DIAGNOSTIC SPECIES: *Abies concolor*

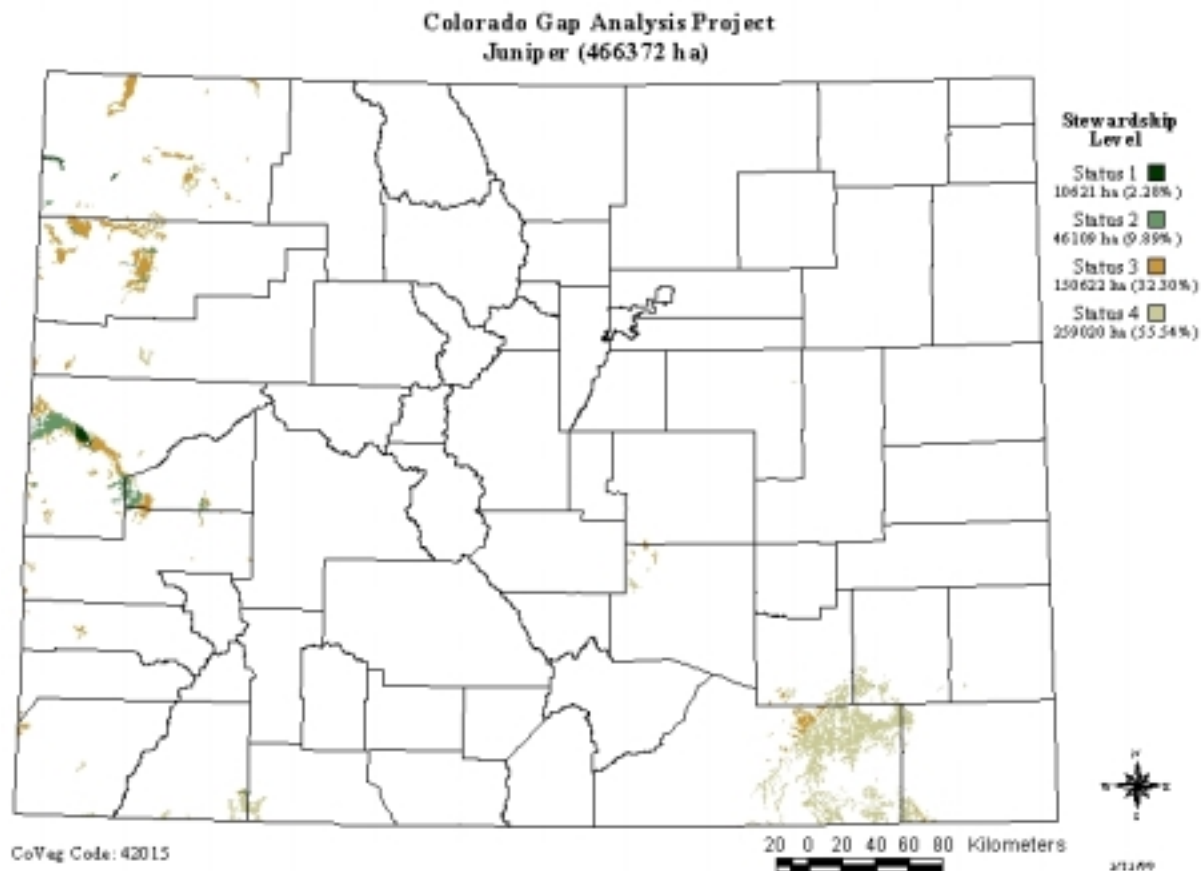
NOTES: This species may occur where middle elevation streams pass through sheltered valleys or canyons. On mesic slopes, it may co dominate with or succeed *P. menziesii* (Peet, 1988). It is generally found on more fertile soil than *P. menziesii* (Allen and Peet, 1989).

Habitat and community types for *Abies concolor* include, on warm dry sites, *Arctostaphylos uva ursi*, *Quercus gambelii*, and a sparse understory type. On cool dry sites, it is associated with *Holodiscus dumosus* (in scree situations), and *Vaccinium myrtillus*. On cool moist sites, the types are *Acer glabrum*, *Erigeron eximius* and *Galium triflorum* (in riparian situations). Common tree associates are *P. ponderosa*, *P. menziesii*, *P. flexilis*, *P. tremuloides*, *P. pungens*, *J. scopulorum*, *P. engelmannii*, *A. lasiocarpa*, and *P. angustifolia* (Alexander, 1987).

MAPPING UNIT ATTRIBUTE CODE: 42015

MAPPING UNIT NAME: Juniper woodland type.

DOMINANT SPECIES: Juniper (*Juniperus monosperma*, *Juniperus osteosperma*, *Juniperus scopulorum*)



DESCRIPTION: Woodland dominated by species of Juniper. Junipers must comprise more than 25% of the total vegetative cover. Often occurs with mountain mahogany, sagebrush and limber pine.

DISTRIBUTION: Foothills and rocky outcrops throughout Colorado.

ELEVATION RANGE: 1525-2130m (5000-7000')

DIAGNOSTIC SPECIES: *Juniperus monosperma*, *Juniperus osteosperma*, *Juniperus scopulorum*

NOTES: This type tends to be associated with relatively low elevation rocky sites.

Habitat and community types identified for the *Juniperus osteosperma* series are *Cercocarpus montanus* on warm dry sites and *Symphoricarpos oreophilus* on warm, very dry sites. Tree associates include *P. edulis* and *P. tremuloides*.

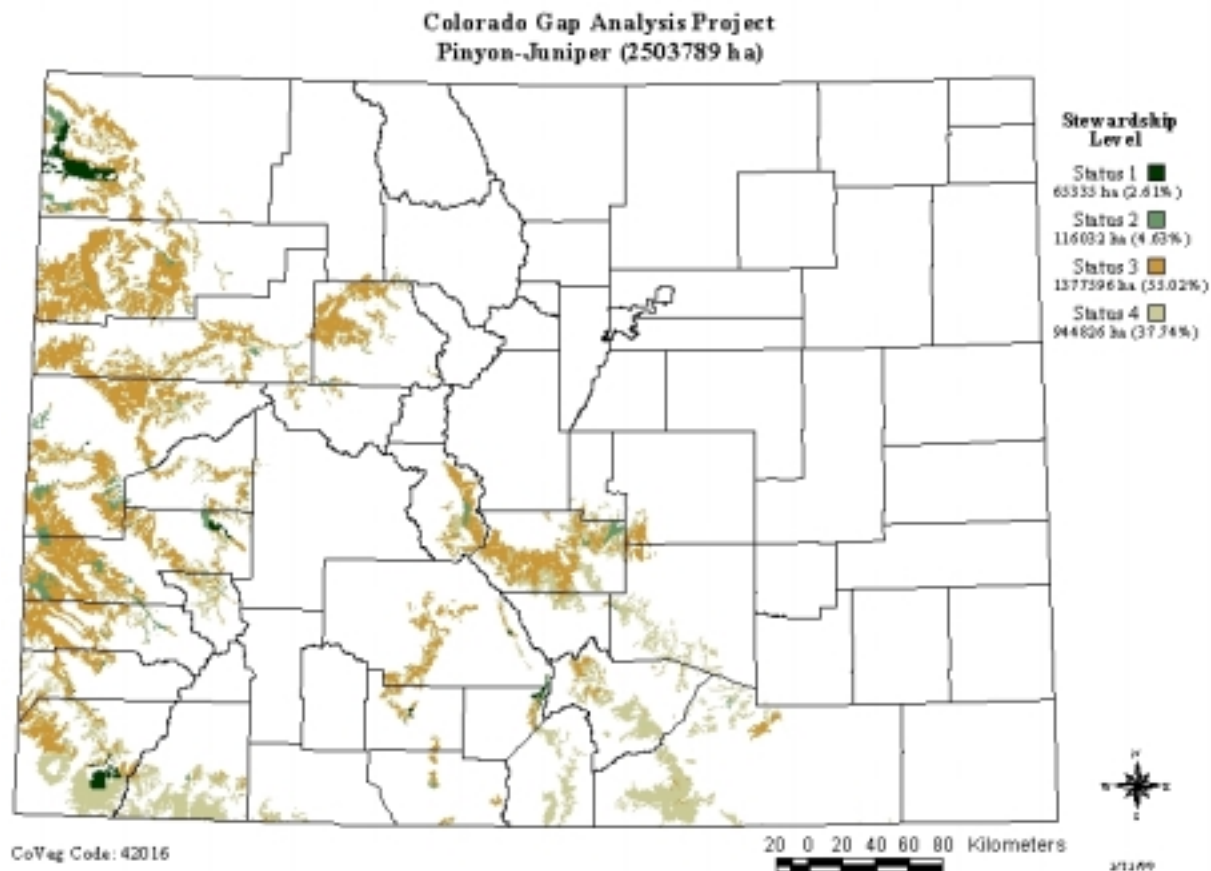
Habitat and community types identified for *Juniperus scopulorum* includes *Cercocarpus montanus* on warm very dry sites. On warm dry sites, it is associated with *Artemisia tridentata*, *Purshia tridentata*, and *Agropyron spicatum*. Common tree associates are *P. ponderosa* and *P. menziesii* (Alexander, 1987).

The *Juniperus scopulorum* *Agropyron spicatum* habitat type can be found in Middle Park (Tiedeman et al., 1987).

MAPPING UNIT ATTRIBUTE CODE: 42016

MAPPING UNIT NAME: Pinyon - Juniper type.

DOMINANT SPECIES: Pinyon pine (*Pinus edulis*) and Juniper (*Juniperus monosperma*, *Juniperus osteosperma*, *Juniperus scopulorum*)



DESCRIPTION: Forested areas dominated by a mixture of pinyon pine and one or more species of juniper. Lower elevation sites where pinyon pine is absent or rare should be classified as juniper woodland. This type rarely forms closed canopy forests and is more typically found in a woodland situation.

DISTRIBUTION: Both *Juniperus monosperma* and *Pinus edulis* are absent from the east slope of the Front Range of north central Colorado (from about the latitude of Denver north). However, this type continues to the Wyoming border on the west slope.

ELEVATION RANGE: 1220-2750m (4000-9000')

DIAGNOSTIC SPECIES: *Pinus edulis*, *Juniperus monosperma*, *Juniperus osteosperma*, *Juniperus scopulorum*

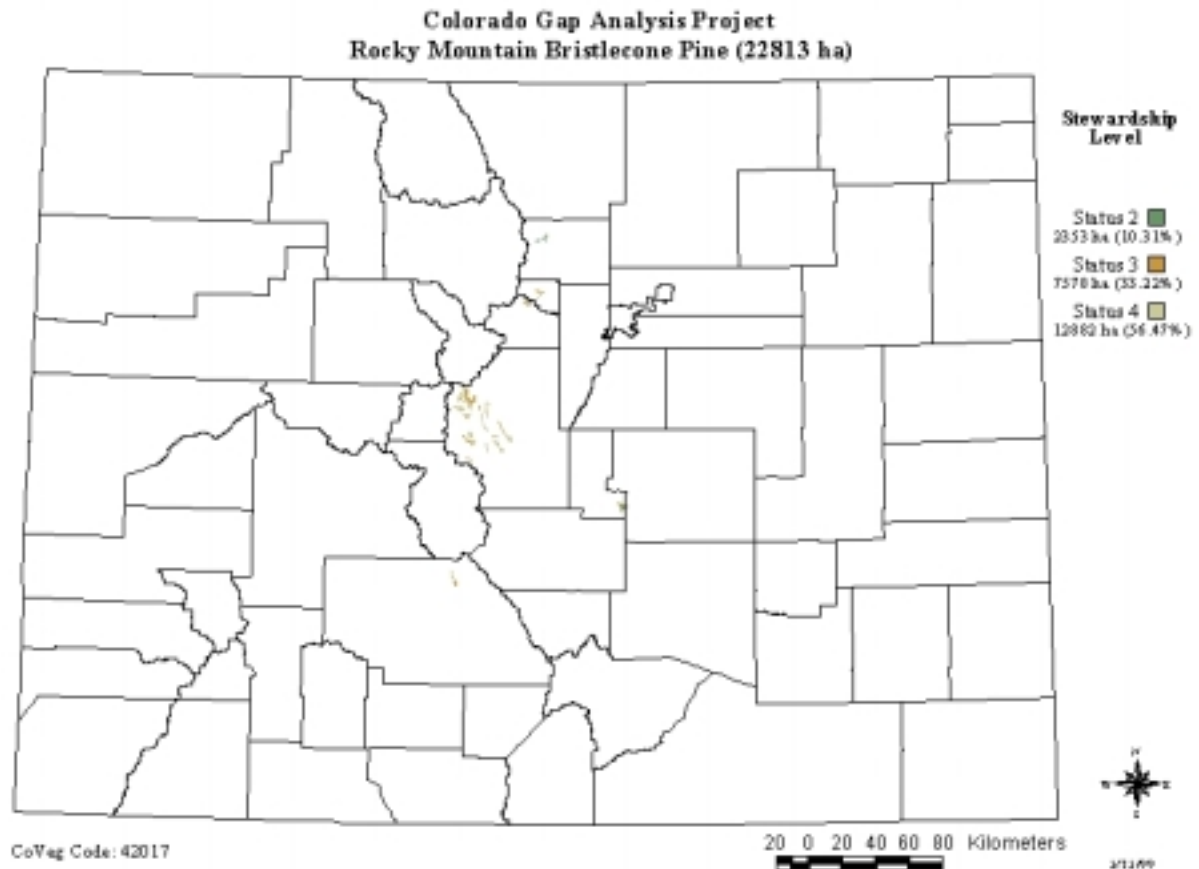
NOTES: This type forms the transition from grassland to montane conifer forests, usually ponderosa pine. In general lower, drier sites are occupied by junipers, with pinyon assuming dominance at higher elevations (Peet, 1988). Both junipers and pinyon are 10-15m in height when mature. The understory vegetation in this type varies greatly. Tree height and density increase with site favorableness, usually tied to elevation. The elevation range of this type seems to be expanding both upslope and downslope due to human impacts and perhaps climate change (West, 1988).

Habitat and community types for the *Pinus edulis* series include *Juniperus* sp. and *Cercocarpus montanus* on warm very dry sites and *Quercus gambelii* on warm dry sites. Common tree associates are the three juniper species listed above and *P. menziesii* (Alexander, 1987).

MAPPING UNIT ATTRIBUTE CODE: 42017

MAPPING UNIT NAME: Rocky Mountain bristlecone pine type.

DOMINANT SPECIES: Rocky Mountain bristlecone pine (*Pinus aristata*)



DESCRIPTION: Forested areas dominated by Rocky Mountain bristlecone pine. This type rarely forms closed canopy forests.

DISTRIBUTION: It is found primarily on the east slope of the continental divide, but does not occur as far north as Rocky Mountain National Park.

ELEVATION RANGE: 2130-3960m (7000-13000')

DIAGNOSTIC SPECIES: *Pinus aristata*

NOTES: This species is found on dry ridges and exposed southern slopes of the subalpine zone (Peet, 1988). It may regenerate primarily after fires and does not appear to be a climax type (Baker, 1992). It can co dominate with *P. engelmannii* in older stands. It is a long lived species and it's growth is inversely correlated with temperature (Baker, 1992). In Baker's study area, *P. aristata* was characteristically found on south facing slopes, from 2700 to 3700m on rather steep slopes (20 35 degrees), with litter depths less than 2cm, small rocks, less than 50% rock cover, soil depth less than 10cm and most often in the middle of the slope (Baker, 1992).

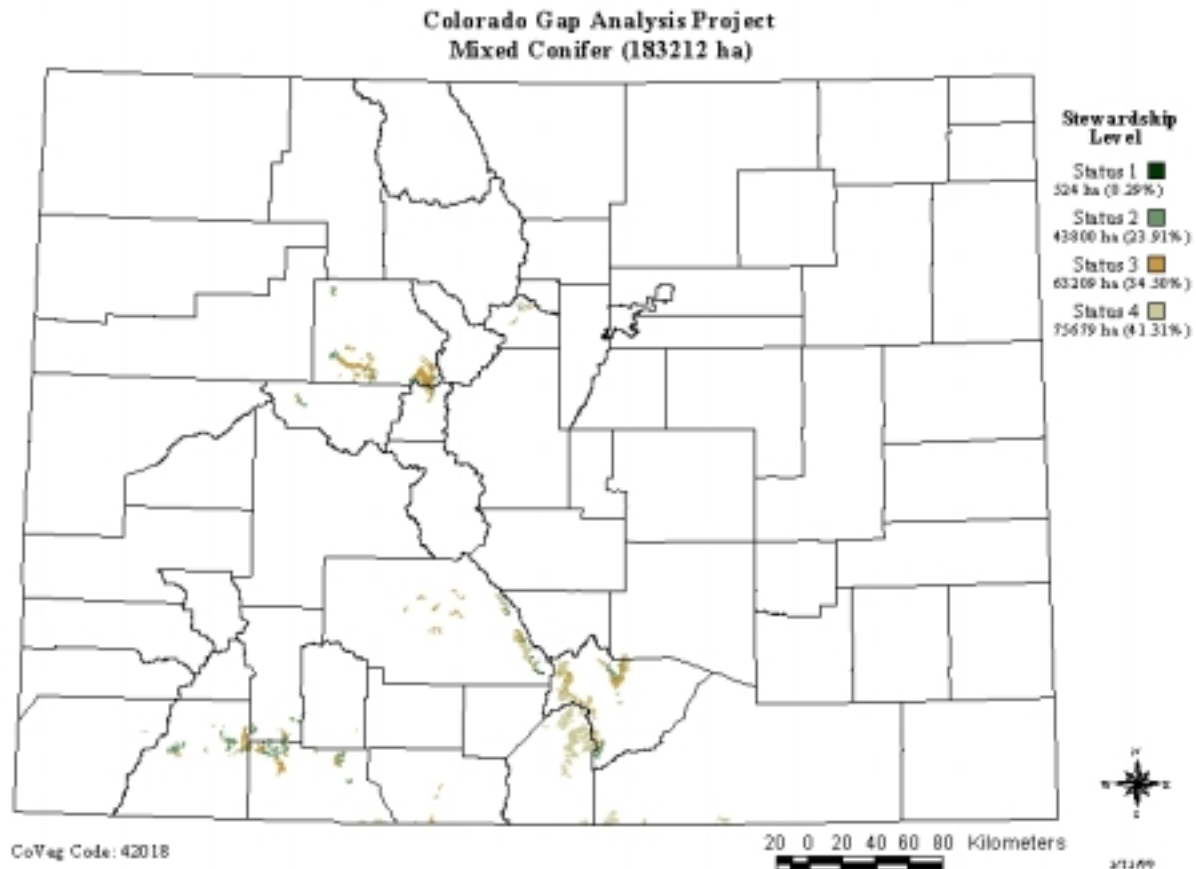
Where *P. aristata* is extensively distributed, it may competitively restrict the habitat of *P. flexilis* (Allen, Peet, and Baker, 1991). In the mountains above Santa Fe, *P. aristata* occurs only on xeric sites above 3100m and is uncommon. To the north, it increases in importance and in the Spanish Peaks area can be found from treeline to the *P. ponderosa Quercus gambelii* woodlands. Continuing northward, it decreases gradually in importance both in absolute abundance and relatively to *P. flexilis*, and does not occur on the east slope as far north as Rocky Mountain National Park.

Habitat and community type of the *Pinus aristata* series include, on cool dry sites, *Juniperus communis*, *Ribes montigeum* (in scree situations), *Festuca arizonica*, *Festuca thurberi*, and *Trifolium dasyphyllum* (Alexander, 1987).

MAPPING UNIT ATTRIBUTE CODE: 42018

MAPPING UNIT NAME: Mixed conifer type.

DOMINANT SPECIES: (see DESCRIPTION)



DESCRIPTION: Includes areas that are dominated by conifers, but can not be assigned to one of the conifer cover types because of the mixture of conifer types present. Includes several common conifer mixtures including White Fir-Douglas Fir, Lodgepole Pine-Douglas Fir, Spruce-Fir-Douglas Fir, Blue Spruce-Douglas Fir, and Limber Pine-Douglas Fir. Combinations of Ponderosa Pine and Douglas Fir are generally typed as Ponderosa Pine, if Ponderosa Pine seemed more common, and as Douglas Fir if Douglas Fir seemed more common. Areas where Bristlecone Pine or Limber Pine occurred with other conifer species fell into this category as well. Areas found on the SCS Natural Plant Community maps that were mapped as Mixed Conifer fell into this category as well, but the conifer types are not known.

DISTRIBUTION: Mixed Conifer stands found in the Front Range, and in Southern Colorado.

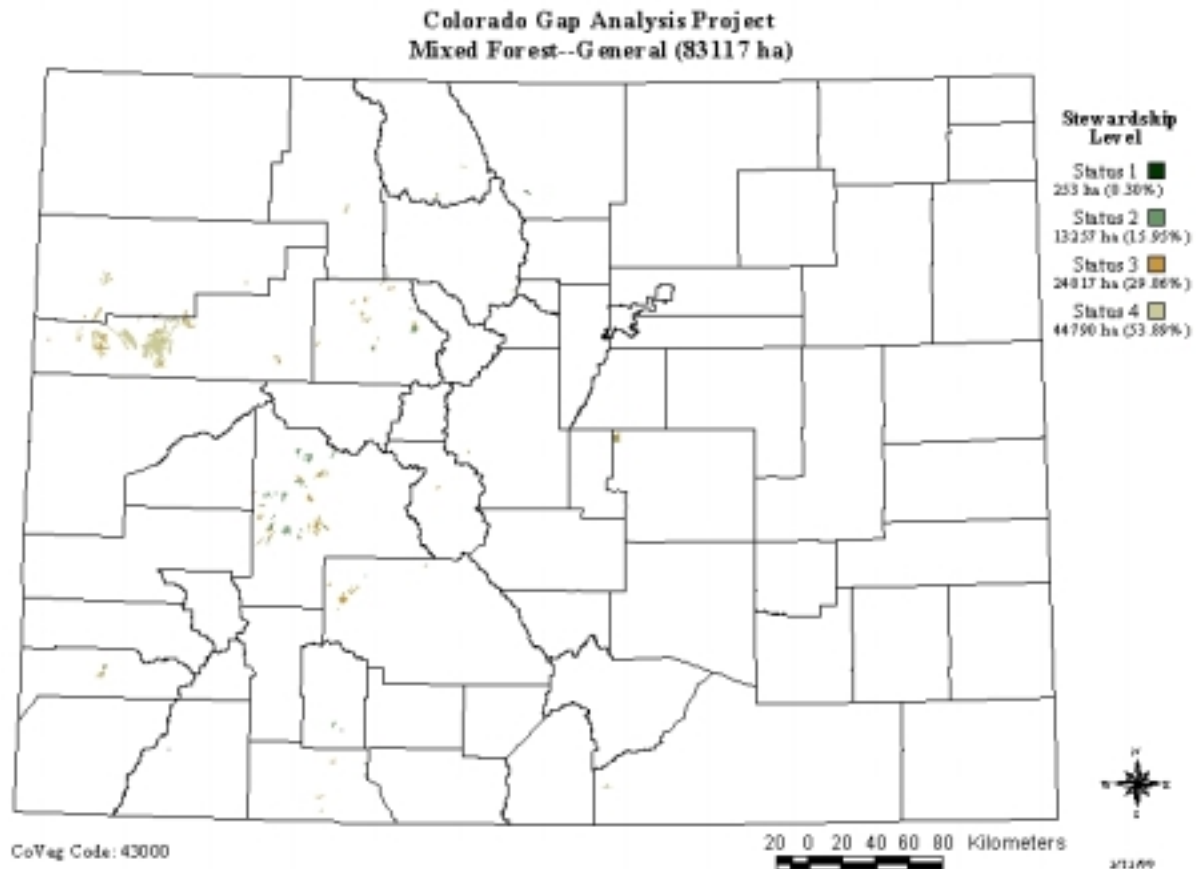
ELEVATION RANGE:

DIAGNOSTIC SPECIES: (see DESCRIPTION)

MAPPING UNIT ATTRIBUTE CODE: 43000

MAPPING UNIT NAME: Mixed forest land type.

DOMINANT SPECIES: Varied



DESCRIPTION: This type includes all forested areas where both evergreen and deciduous trees are growing and neither predominates. When more than one-third intermixture of either evergreen or deciduous species occurs in a specific area, it is classified as mixed forest land. Where the intermixed land use total less than one-third of the specified area, the category appropriate to the dominant type of forest land applied, whether deciduous or evergreen (Anderson, et al. 1976). In practice, the Land Use/ Land Cover map used by Colorado Gap seemed to include the following vegetation cover combinations in the class "Mixed Forest": pinyon-juniper-Gambel oak, Ponderosa pine-Gambel oak, Ponderosa pine-Aspen, Spruce-fir-Aspen, Mixed conifer-Aspen.

DISTRIBUTION: Throughout western Colorado.

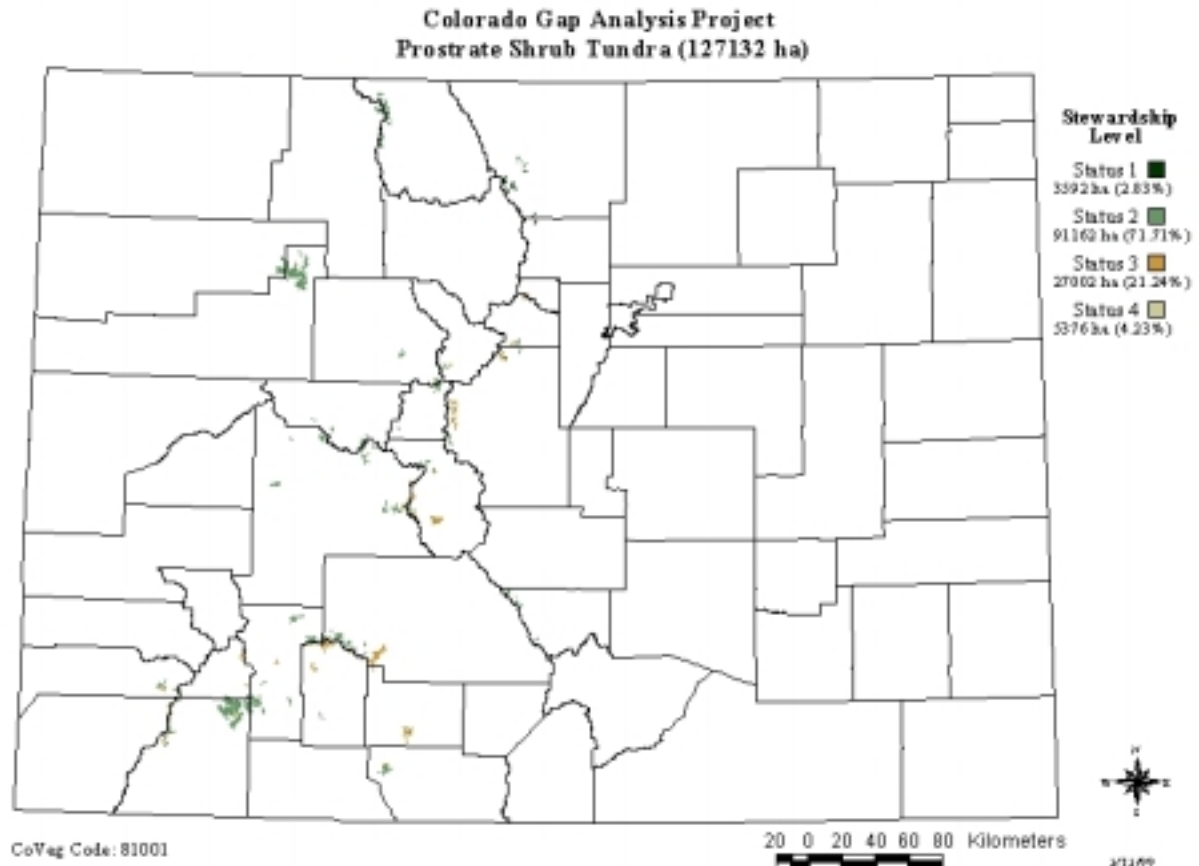
ELEVATION RANGE:

DIAGNOSTIC SPECIES: (see DESCRIPTION)

MAPPING UNIT ATTRIBUTE CODE: 81001

MAPPING UNIT NAME: Prostrate shrub and tundra type.

DOMINANT SPECIES: Willows (*Salix* sp.), Mountain avens (*Dryas octopetala*), Alpine prickly currant (*Ribes montigeum*), Wild red raspberry (*Rubus idaeus* ssp. *sachalinensis*), Shrubby cinquefoil (*Potentilla fruticosa*).



DESCRIPTION: Alpine tundra areas, above treeline, where the vegetation is dominated by low willows and other prostrate shrubs. Willow species must comprise more than 25% of the total vegetative cover.

DISTRIBUTION: Above timberline throughout the state of Colorado.

ELEVATION RANGE: Above timberline.

DIAGNOSTIC SPECIES: *Salix* sp., *Dryas octopetala*, *Ribes montigeum*, *Rubus idaeus* ssp. *sachalinensis*, *Potentilla fruticosa*.

MAPPING UNIT ATTRIBUTE CODE: 82001

MAPPING UNIT NAME: Meadow tundra type.

DOMINANT SPECIES: Dominance various



DESCRIPTION: This type includes graminoid and forb dominated vegetation that occurs above upper treeline in the alpine zone. Common species include various sedges (*Carex* sp.), low growing willows (*Salix* sp.), grasses and forbs.

DISTRIBUTION: Above timberline throughout the state of Colorado.

ELEVATION RANGE: Above timberline

DIAGNOSTIC SPECIES: *Carex* sp., *Salix* sp.

NOTES: Alpine ecosystems occupy those mountain areas above timberline that are characterized by short, cool growing seasons and long, cold winters. The vegetation is characteristically dominated by low growing (20 cm. or less) perennial, herbaceous and shrubby vascular plants, extensive mats of cryptograms (mosses, lichens, etc.) and the almost complete absence of trees. Topographic site, degree and duration of winter snow cover and exposure to the wind are major influences (Thilenius, 1975).

MAPPING UNIT ATTRIBUTE CODE: 74001

MAPPING UNIT NAME: Exposed rock type.

DOMINANT SPECIES: Not applicable



DESCRIPTION: This type includes naturally occurring areas of bare rock such as cliffs, spires, rock outcrops and talus fields as well as steep scarps of soft rock with total vegetative cover less than 5%.

DISTRIBUTION: Throughout the state of Colorado.

ELEVATION RANGE:

DIAGNOSTIC SPECIES: Not applicable

MAPPING UNIT ATTRIBUTE CODE: 70000

MAPPING UNIT NAME: Barren Lands

DOMINANT SPECIES: Not Applicable



DESCRIPTION: Areas dominated by bare ground in which less than one-third of the area has vegetation or other cover. In general, it is an area of thin soil, sand, or rock.

DISTRIBUTION: Can be found throughout Colorado.

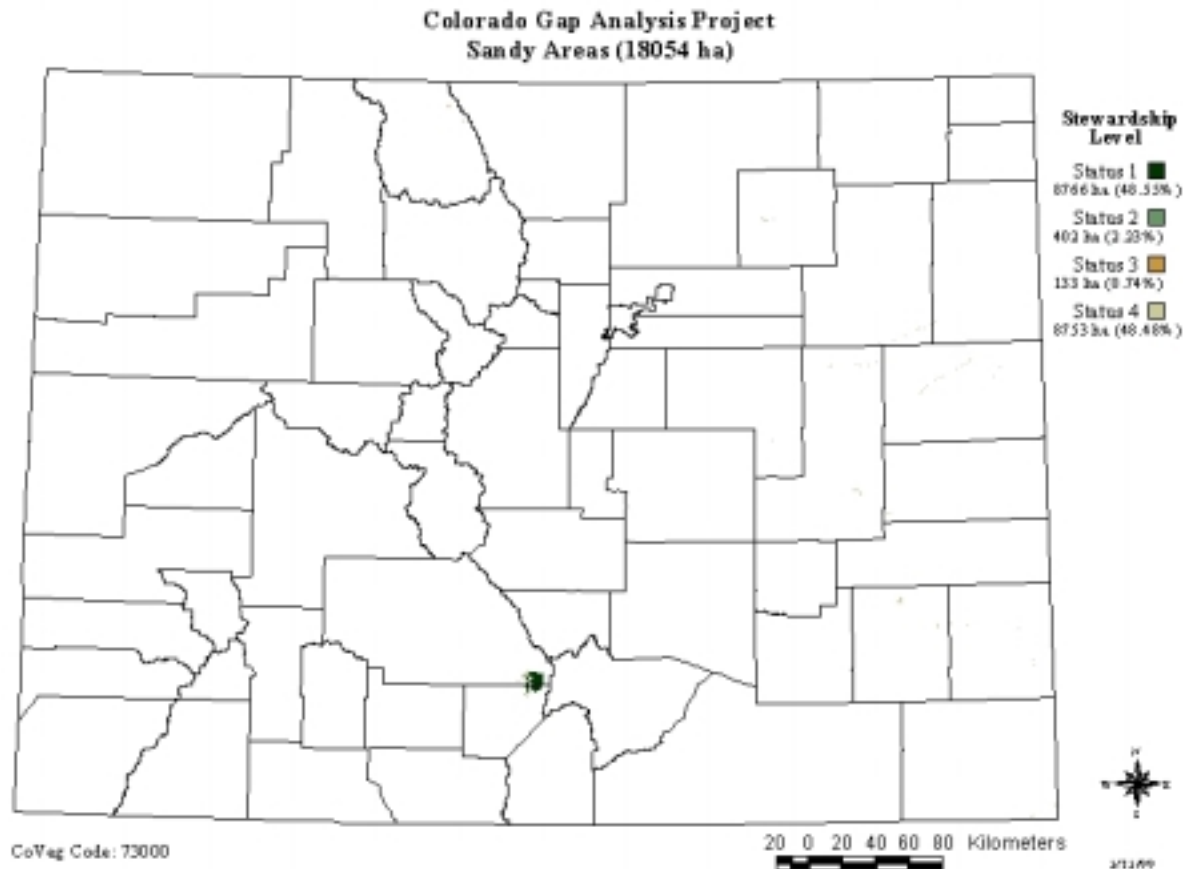
ELEVATION RANGE:

DIAGNOSTIC SPECIES:

MAPPING UNIT ATTRIBUTE CODE: 73000

MAPPING UNIT NAME: Sandy areas other than beaches.

DOMINANT SPECIES: Not applicable



DESCRIPTION: This type is composed primarily of dunes, accumulations of sand transported by wind (Anderson, et al. 1976).

DISTRIBUTION: This type is found primarily in eastern Colorado, North Park, and the Great Sand Dunes National Monument in the San Luis Valley.

ELEVATION RANGE:

DIAGNOSTIC SPECIES: Not applicable

Appendix C

Relative Condition of Key Habitats in Colorado by Taxonomic Group

Table C1 - Mollusks - Relative Condition of Key Habitats in Colorado (Science Forum Results).

Habitat Category	Land Cover Type		Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
Urban and Croplands	Urban									
	Dryland Crops									
	Irrigated Crops									
Riparian / Wetlands	Open Water			X				X		
	Shrub-dominated Wetlands			X			X			
	Grass/Forb Dominated Wetlands					X	X			
	Eastern Plains Rivers		X				X			
	Eastern Plains Streams		X				X			
	Transition Streams		X				X			
	Mountain Streams			X				X		
	West Slope Rivers			X			X			
	West Slope Streams			X			X			
	Playas									
Grasslands	Tallgrass Prairie									
	Midgrass Prairie									
	Shortgrass Prairie									
	Foothill / Mountain Grassland									
	Sand Dune Complex (Grassland)									
Shrublands	Upland Shrub									
	Deciduous Oak									
	Sagebrush									
	Desert Shrub									
	Saltbrush Fans & Flats									
	Greasewood Fans & Flats									
	Sand Dune Complex (Shrubland)									
Forestlands	Aspen Forest									
	Spruce-Fir									
	Douglas Fir									
	Lodgepole Pine									

Table C1 - Mollusks - Relative Condition of Key Habitats in Colorado (Science Forum Results).

Habitat Category	Land Cover Type		Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
	Limber Pine									
	Ponderosa Pine									
	White Fir									
	Pinyon-Juniper									
	Rocky Mountain Bristlecone Pine									
	Mixed Conifer									
	Mixed Forest									
Tundra	Shrub Tundra									
	Meadow Tundra									
Unvegetated	Sandy Areas									
	Exposed Rock									
Lakes	Added at Science Forum			X				X		

Table C2 - Insects - Relative Condition of Key Habitats in Colorado (Science Forum Results).

Habitat Category	Land Cover Type		Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
Urban and Croplands	Urban					X			X	
	Dryland Crops					X				X
	Irrigated Crops					X				X
Riparian / Wetlands	Open Water			X				X		
	Shrub-dominated Wetlands			X			X			
	Grass/Forb Dominated Wetlands			X			X			
	Eastern Plains Rivers		X				X			
	Eastern Plains Streams		X				X			
	Transition Streams			X			X			
	Mountain Streams			X				X		
	West Slope Rivers			X			X			
	West Slope Streams			X			X			
	Playas					X	X			
Grasslands	Tallgrass Prairie		X				X			
	Midgrass Prairie					X				X
	Shortgrass Prairie			X			X			
	Foothill / Mountain Grassland			X			X			
	Sand Dune Complex (Grassland)					X				X
Shrublands	Upland Shrub					X				X
	Deciduous Oak			X				X		
	Sagebrush		X					X		
	Desert Shrub			X						X
	Saltbrush Fans & Flats			X				X		
	Greasewood Fans & Flats		X					X		
	Sand Dune Complex (Shrubland)					X				X
Forestlands	Aspen Forest			X						X
	Spruce-Fir					X		X		
	Douglas Fir			X				X		
	Lodgepole Pine					X				X
	Limber Pine					X				X
	Ponderosa Pine			X				X		
	White Fir					X				X
	Pinyon-Juniper		X				X			

Table C2 - Insects - Relative Condition of Key Habitats in Colorado (Science Forum Results).

Habitat Category	Land Cover Type		Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
	Rocky Mountain Bristlecone Pine					X				X
	Mixed Conifer					X		X		
	Mixed Forest					X				X
Tundra	Shrub Tundra					X				X
	Meadow Tundra					X				X
Unvegetated	Sandy Areas					X				X
	Exposed Rock					X				X

* This group at the Science Forum ranked habitat types instead of just voting for them

Table C3 - Amphibians and Reptiles - Relative Condition of Key Habitats in Colorado (Science Forum Results).

Habitat Category	Land Cover Type	Vote	Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
Urban and Croplands	Urban									
	Dryland Crops									
	Irrigated Crops	*								
Riparian / Wetlands	Open Water	*		X			X			
	Shrub-dominated Wetlands	*		X			X			
	Grass/Forb Dominated Wetlands	*		X			X			
	Eastern Plains Rivers	*	X				X			
	Eastern Plains Streams	*		X			X			
	Transition Streams	*		X			X			
	Mountain Streams	*		X				X		
	West Slope Rivers	*				X				X
	West Slope Streams	*				X				X
	Playas	*		X				X		
Grasslands	Tallgrass Prairie									
	Midgrass Prairie	*	X				X			
	Shortgrass Prairie	*		X			X			
	Foothill / Mountain Grassland									
	Sand Dune Complex (Grassland)									
Shrublands	Upland Shrub									
	Deciduous Oak									
	Sagebrush	*	X				X			
	Desert Shrub	*		X						X
	Saltbrush Fans & Flats	*		X				X		
	Greasewood Fans & Flats	*				X				X
	Sand Dune Complex (Shrubland)									
Forestlands	Aspen Forest	*		X			X			
	Spruce-Fir	*				X				X
	Douglas Fir									
	Lodgepole Pine	*				X				X

Table C3 - Amphibians and Reptiles - Relative Condition of Key Habitats in Colorado (Science Forum Results).

Habitat Category	Land Cover Type	Vote	Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
	Limber Pine									
	Ponderosa Pine									
	White Fir									
	Pinyon-Juniper									
	Rocky Mountain Bristlecone Pine									
	Mixed Conifer	*				X				X
	Mixed Forest									
Tundra	Shrub Tundra									
	Meadow Tundra									
Unvegetated	Sandy Areas	*		X				X		
	Exposed Rock									

* This group at the Science Forum highlighted the most important land cover types and did not record actual votes.

Table C4 - Fish - Relative Condition of Key Habitats in Colorado (Science Forum Results).

The "vote" column represents the outcome of multi-voting by the experts at the Science Forum (in this case using the number of items on their list divided by three). Multi-voting is a way for groups to express their collective judgment about the habitats that are most important for the species of greatest conservation concern in this species group. Members of the species workgroup, after listing all the habitats of importance, were given multiple votes (number of species divided by three) and asked to allocate their votes as a personal assessment of importance. The sum of all votes was then used to capture the collective assessment of the group. After this voting was complete, an opportunity for discussion of the results was provided. The larger the number the larger the importance.

Habitat Category	Land Cover Type	Vote	Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
Urban and Croplands	Urban									
	Dryland Crops									
	Irrigated Crops									
Riparian / Wetlands	Open Water			X				X		
	Shrub-dominated Wetlands			X			X			
	Grass/Forb Dominated Wetlands					X	X			
	Eastern Plains Rivers	1	X				X			
	Eastern Plains Streams	1	X				X			
	Transition Streams			X			X			
	Mountain Streams			X				X		
	West Slope Rivers			X			X			
	West Slope Streams	1		X			X			
	Playas									
Grasslands	Tallgrass Prairie									
	Midgrass Prairie									
	Shortgrass Prairie									
	Foothill / Mountain Grassland									
	Sand Dune Complex (Grassland)									
Shrublands	Upland Shrub									
	Deciduous Oak									
	Sagebrush									
	Desert Shrub									
	Saltbrush Fans & Flats									
	Greasewood Fans & Flats									
	Sand Dune Complex (Shrubland)									
Forestlands	Aspen Forest									
	Spruce-Fir									
	Douglas Fir									
	Lodgepole Pine									
	Limber Pine									
	Ponderosa Pine									
	White Fir									
	Pinyon-Juniper									

Table C4 - Fish - Relative Condition of Key Habitats in Colorado (Science Forum Results).

The "vote" column represents the outcome of multi-voting by the experts at the Science Forum (in this case using the number of items on their list divided by three). Multi-voting is a way for groups to express their collective judgment about the habitats that are most important for the species of greatest conservation concern in this species group. Members of the species workgroup, after listing all the habitats of importance, were given multiple votes (number of species divided by three) and asked to allocate their votes as a personal assessment of importance. The sum of all votes was then used to capture the collective assessment of the group. After this voting was complete, an opportunity for discussion of the results was provided. The larger the number the larger the importance.

Habitat Category	Land Cover Type	Vote	Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
	Rocky Mountain Bristlecone Pine									
	Mixed Conifer									
	Mixed Forest									
Tundra	Shrub Tundra									
	Meadow Tundra									
Unvegetated	Sandy Areas									
	Exposed Rock									
Lakes	Added at Science Forum		X				X			

Table C5 - Birds - Relative Condition of Key Habitats in Colorado (Science Forum Results).

The "vote" column represents the outcome of multi-voting by the experts at the Science Forum (in this case using the number of items on their list divided by three). Multi-voting is a way for groups to express their collective judgment about the habitats that are most important for the species of greatest conservation concern in this species group. Members of the species workgroup, after listing all the habitats of importance, were given multiple votes (number of species divided by three) and asked to allocate their votes as a personal assessment of importance. The sum of all votes was then used to capture the collective assessment of the group. After this voting was complete, an opportunity for discussion of the results was provided. The larger the number the larger the importance.

Habitat Category	Land Cover Type	Vote	Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
Urban and Croplands	Urban			X					X	
	Dryland Crops			X				X		
	Irrigated Crops			X				X		
Riparian / Wetlands	Open Water			X				X		
	Shrub-dominated Wetlands	2				X	X			
	Grass/Forb Dominated Wetlands	5		X			X			
	Eastern Plains Rivers	6	X				X			
	Eastern Plains Streams	4	X				X			
	Transition Streams	1	X				X			
	Mountain Streams			X				X		
	West Slope Rivers	5	X				X			
	West Slope Streams	4	X				X			
	Playas	6	X				X			
Grasslands	Tallgrass Prairie		X				X			
	Midgrass Prairie	5	X				X			
	Shortgrass Prairie	6		X			X			
	Foothill / Mountain Grassland	3		X			X			
	Sand Dune Complex (Grassland)			X						X
Shrublands	Upland Shrub			X			X			
	Deciduous Oak			X				X		
	Sagebrush	6	X				X			
	Desert Shrub			X			X			
	Saltbrush Fans & Flats			X			X			
	Greasewood Fans & Flats			X			X			
	Sand Dune Complex (Shrubland)					X				X
Forestlands	Aspen Forest	5		X			X			
	Spruce-Fir			X				X		
	Douglas Fir	4		X			X			
	Lodgepole Pine				X			X		
	Limber Pine			X				X		
	Ponderosa Pine	5	X				X			
	White Fir			X					X	
	Pinyon-Juniper	6	X				X			

Table C5 - Birds - Relative Condition of Key Habitats in Colorado (Science Forum Results).

The "vote" column represents the outcome of multi-voting by the experts at the Science Forum (in this case using the number of items on their list divided by three). Multi-voting is a way for groups to express their collective judgment about the habitats that are most important for the species of greatest conservation concern in this species group. Members of the species workgroup, after listing all the habitats of importance, were given multiple votes (number of species divided by three) and asked to allocate their votes as a personal assessment of importance. The sum of all votes was then used to capture the collective assessment of the group. After this voting was complete, an opportunity for discussion of the results was provided. The larger the number the larger the importance.

Habitat Category	Land Cover Type	Vote	Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
	Rocky Mountain Bristlecone Pine			X				X		
	Mixed Conifer	2		X				X		
	Mixed Forest					X				X
Tundra	Shrub Tundra			X				X		
	Meadow Tundra			X				X		
Unvegetated	Sandy Areas					X				X
	Exposed Rock				X			X		

Table C6 - Mammals - Relative Condition of Key Habitats in Colorado (Science Forum Results).

The "vote" column represents the outcome of multi-voting by the experts at the Science Forum (in this case using the number of items on their list divided by three). Multi-voting is a way for groups to express their collective judgment about the habitats that are most important for the species of greatest conservation concern in this species group. Members of the species workgroup, after listing all the habitats of importance, were given multiple votes (number of species divided by three) and asked to allocate their votes as a personal assessment of importance. The sum of all votes was then used to capture the collective assessment of the group. After this voting was complete, an opportunity for discussion of the results was provided. The larger the number the larger the importance.

Habitat Category	Land Cover Type	Vote	Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
Urban and Croplands	Urban		X						X	
	Dryland Crops					X		X		
	Irrigated Crops					X	X			
Riparian / Wetlands	Open Water			X				X		
	Shrub-dominated Wetlands	2		X			X			
	Grass/Forb Dominated Wetlands			X			X			
	Eastern Plains Rivers		X				X			
	Eastern Plains Streams	1	X				X			
	Transition Streams	1		X				X		
	Mountain Streams	3		X				X		
	West Slope Rivers	2		X			X			
	West Slope Streams	2		X				X		
Grasslands	Playas					X	X			
	Tallgrass Prairie			X			X			
	Midgrass Prairie	3		X			X			
	Shortgrass Prairie	6		X			X			
	Foothill / Mountain Grassland	3		X			X			
Shrublands	Sand Dune Complex (Grassland)		X				X			
	Upland Shrub	1		X			X			
	Deciduous Oak	1		X			X			
	Sagebrush	3		X			X			
	Desert Shrub	1		X				X		
	Saltbrush Fans & Flats			X				X		
	Greasewood Fans & Flats			X				X		
Forestlands	Sand Dune Complex (Shrubland)	2		X			X			
	Aspen Forest	1		X				X		
	Spruce-Fir	1		X			X			
	Douglas Fir	1		X				X		
	Lodgepole Pine			X				X		
	Limber Pine				X			X		
	Ponderosa Pine	3	X				X			
	White Fir			X				X		
Pinyon-Juniper	Pinyon-Juniper	5		X				X		

Table C6 - Mammals - Relative Condition of Key Habitats in Colorado (Science Forum Results).

The "vote" column represents the outcome of multi-voting by the experts at the Science Forum (in this case using the number of items on their list divided by three). Multi-voting is a way for groups to express their collective judgment about the habitats that are most important for the species of greatest conservation concern in this species group. Members of the species workgroup, after listing all the habitats of importance, were given multiple votes (number of species divided by three) and asked to allocate their votes as a personal assessment of importance. The sum of all votes was then used to capture the collective assessment of the group. After this voting was complete, an opportunity for discussion of the results was provided. The larger the number the larger the importance.

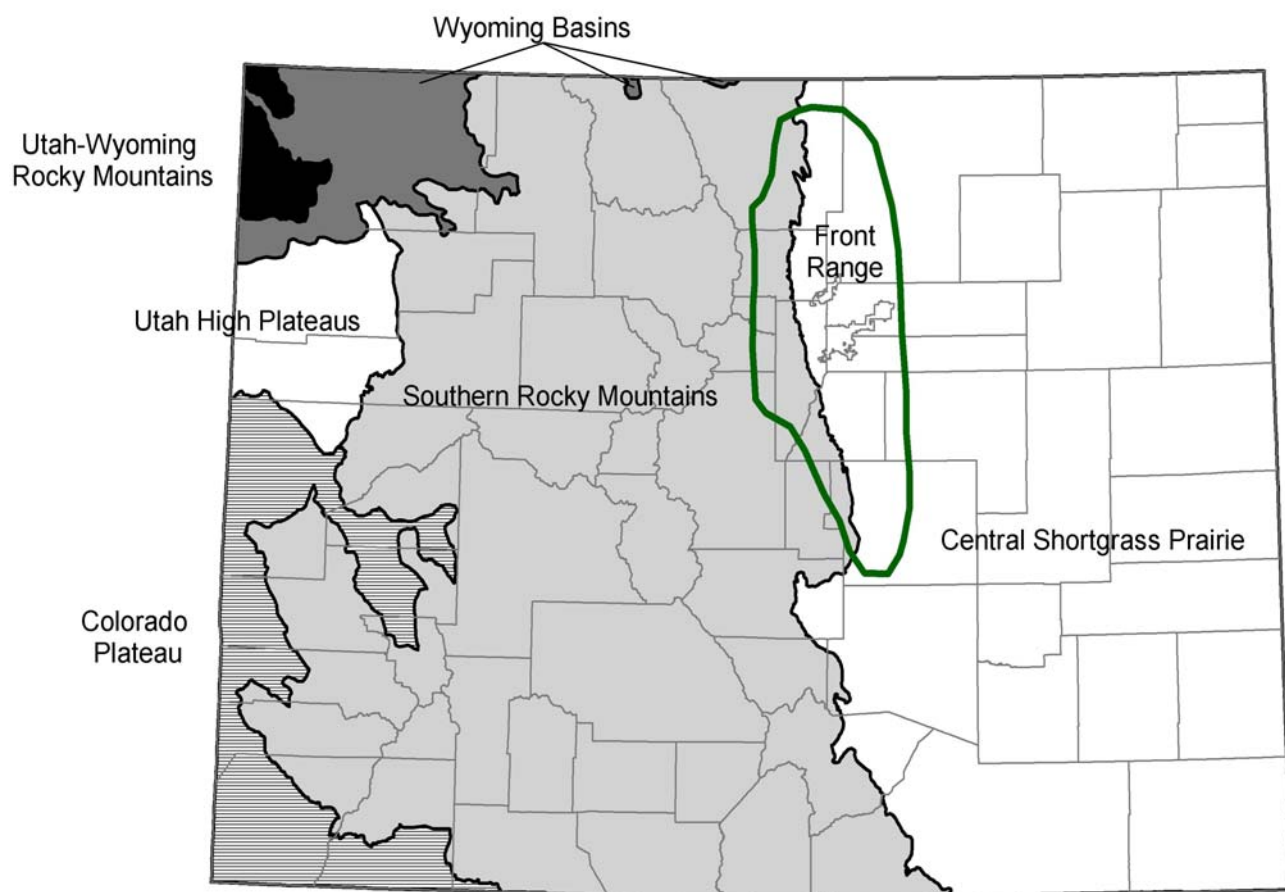
Habitat Category	Land Cover Type	Vote	Habitat Condition Status				Habitat Condition Trend			
			What is it now?				Is it changing?			
			Poor	Good	Excellent	Unknown	Declining	Stable	Increasing	Unknown
	Rocky Mountain Bristlecone Pine			X				X		
	Mixed Conifer	3		X				X		
	Mixed Forest					X				X
Tundra	Shrub Tundra			X				X		
	Meadow Tundra			X					X	
Unvegetated	Sandy Areas				X			X		
	Exposed Rock			X				X		

Appendix D

Key to Species Distributions Used in Table 16

Species distributions in Table 16 are categorized by ecoregion. Ecoregions were adapted from Bailey et al. (1994), and modified for Colorado by The Nature Conservancy (TNC 1998; Neely et al. 2006). For the purposes of this CWCS, a “Front Range” distribution category was added to distinguish the suite of species that occur in distributions that overlap the two largest Colorado ecoregions (Central Shortgrass Prairie and Southern Rocky Mountains).

Figure D1. Key to species distributions used in Table 16.



Appendix E

Species of Greatest Conservation Need – Tier 1 and Tier 2

Table E1. Tier 1 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Amphibians	Boreal toad (Southern Rocky Mountain Population)	<i>Bufo boreas boreas</i>
	Northern leopard Frog	<i>Rana pipiens</i>
	Plains leopard Frog	<i>Rana blairi</i>
Birds	American bittern	<i>Botaurus lentiginosus</i>
	American peregrine falcon	<i>Falco peregrinus anatum</i>
	Bald eagle	<i>Haliaeetus leucocephalus</i>
	Band-tailed pigeon	<i>Patagioenas fasciata</i>
	Black-throated gray warbler	<i>Dendroica nigrescens</i>
	Bobolink	<i>Dolichonyx oryzivorus</i>
	Boreal owl	<i>Aegolius funereus</i>
	Brewer's sparrow	<i>Spizella breweri</i>
	Brown-capped rosy-finch	<i>Leucosticte australis</i>
	Cassin's sparrow	<i>Aimophila cassinii</i>
	Columbian sharp-tailed grouse	<i>Tympanuchus phasianellus columbianus</i>
	Ferruginous hawk	<i>Buteo regalis</i>
	Flammulated owl	<i>Otus flammeolus</i>
	Golden eagle	<i>Aquila chrysaetos</i>
	Gray vireo	<i>Vireo vicinior</i>
	Greater prairie-chicken	<i>Tympanuchus cupido</i>

Table E1. Tier 1 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Birds, cont.	Greater sage-grouse	<i>Centrocercus urophasianus</i>
	Greater sandhill crane	<i>Grus canadensis tabida</i>
	Gunnison sage-grouse	<i>Centrocercus minimus</i>
	Juniper titmouse	<i>Baeolophus ridgwayi</i>
	Lark bunting	<i>Calamospiza melanocorys</i>
	Least tern	<i>Sterna antillarum</i>
	Lesser prairie-chicken	<i>Tympanuchus pallidicinctus</i>
	Lewis's woodpecker	<i>Melanerpes lewis</i>
	Loggerhead shrike	<i>Lanius ludovicianus</i>
	Long-billed curlew	<i>Numenius americanus</i>
	McCown's longspur	<i>Calcarius mccownii</i>
	Mexican spotted owl	<i>Strix occidentalis lucida</i>
	Mountain plover	<i>Charadrius montanus</i>
	Northern goshawk	<i>Accipiter gentilis</i>
	Olive-sided flycatcher	<i>Contopus cooperi</i>
	Pinyon jay	<i>Gymnorhinus cyanocephalus</i>
	Piping plover	<i>Charadrius melodus</i>
	Plains sharp-tailed grouse	<i>Tympanuchus phasianellus jamesii</i>
	Prairie falcon	<i>Falco mexicanus</i>
	Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>
	Sage sparrow	<i>Amphispiza belli</i>
	Scaled quail	<i>Callipepla squamata</i>

Table E1. Tier 1 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Birds, cont.	Short-eared owl	<i>Asio flammeus</i>
	Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>
	Swainson's hawk	<i>Buteo swainsoni</i>
	Upland sandpiper	<i>Bartramia longicauda</i>
	Western burrowing owl	<i>Athene cunicularia hypugaea</i>
	Western purple Martin	<i>Progne subis hesperia</i>
	Western snowy plover	<i>Charadrius alexandrinus nivosus</i>
	Western yellow-billed cuckoo	<i>Coccyzus americanus</i>
	Whooping crane	<i>Grus americana</i>
	Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>
Fish	Arkansas darter	<i>Etheostoma cragini</i>
	Bonytail chub	<i>Gila elegans</i>
	Brassy minnow	<i>Hybognathus hankinsoni</i>
	Colorado Pikeminnow	<i>Ptychocheilus lucius</i>
	Colorado River Cutthroat Trout	<i>Oncorhynchus clarki pleuriticus</i>
	Common shiner	<i>Luxilus cornutus</i>
	Greenback Cutthroat Trout	<i>Oncorhynchus clarki stomias</i>
	Humpback chub	<i>Gila cypha</i>
	Lake chub	<i>Couesius plumbeus</i>
	Northern Redbelly Dace	<i>Phoxinus eos</i>
	Plains minnow	<i>Hybognathus placitus</i>
	Plains orangethroat darter	<i>Etheostoma spectabile</i>

Table E1. Tier 1 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Fish, cont.	Razorback Sucker	<i>Xyrauchen texanus</i>
	Rio Grande chub	<i>Gila pandora</i>
	Rio Grande Cutthroat Trout	<i>Oncorhynchus clarki virginalis</i>
	Rio Grande sucker	<i>Catostomus plebeius</i>
	Roundtail chub	<i>Gila robusta</i>
	Southern Redbelly Dace	<i>Phoxinus erythrogaster</i>
	Suckermouth minnow	<i>Phenacobius mirabilis</i>
Insects	Comstock's hairstreak	<i>Callophrys comstocki</i>
	Hops feeding azure	<i>Celastrina humulus</i>
	Ottoo skipper	<i>Hesperia ottoe</i>
	Pawnee montane skipper	<i>Hesperia leonardus montana</i>
	Uncompahgre fritillary	<i>Boloria improba acrochema</i>
Mammals	Black-footed ferret	<i>Mustela nigripes</i>
	Black-tailed prairie dog	<i>Cynomys ludovicianus</i>
	Botta's pocket gopher (rubidus ssp)	<i>Thomomys bottae rubidus</i>
	Dwarf shrew	<i>Sorex nanus</i>
	Fringed myotis	<i>Myotis thysanodes</i>
	Gray wolf - two subspecies (Northern and Mexican)	<i>Canis lupus</i>
	Gunnison's prairie dog	<i>Cynomys gunnisoni</i>
	Kit fox	<i>Vulpes macrotis</i>
	Lynx	<i>Lynx canadensis</i>
	Meadow jumping mouse (both subspecies)	<i>Zapus hudsonius</i>

Table E1. Tier 1 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Mammals, cont.	Northern pocket gopher (macrotis ssp)	<i>Thomomys talpoides macrotis</i>
	Olive-backed pocket mouse	<i>Perognathus fasciatus</i>
	River otter	<i>Lontra canadensis</i>
	Spotted bat	<i>Euderma maculatum</i>
	Swift fox	<i>Vulpes velox</i>
	Townsend's big-eared bat ssp.	<i>Plecotus (Chorynorhinus) townsendii pallescens</i>
	White-tailed jackrabbit	<i>Lepus townsendii</i>
	White-tailed prairie dog	<i>Cynomys leucurus</i>
Mollusks	Banded Physa	<i>Physa utahensis</i>
	Cloche Ancyloid	<i>Ferrissia walkeri</i>
	Cockerell	<i>Promenetus umbilicatellus</i>
	Cylindrical papershell	<i>Anodontoides ferussacianus</i>
	Fragil Ancyloid	<i>Ferrissia fragilis</i>
	Hot Springs Physa	<i>Physa cupreonitens</i>
	Pondhorn	<i>Unio merus tetralasmus</i>
	Rocky Mountain capshell	<i>Acroloxus coloradensis</i>
	Sharp Sprite	<i>Promenetus exacuus</i>
Reptiles	Common garter snake	<i>Thamnophis sirtalis</i>
	Massasauga	<i>Sistrurus catenatus</i>
	Texas horned lizard	<i>Phrynosoma cornutum</i>
	Triploid checkered whiptail	<i>Cnemidophorus neotesselatus</i>
	Yellow mud turtle	<i>Kinosternon flavescens</i>

Table E2. Tier 2 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Amphibians	Canyon tree frog	<i>Hyla arenicolor</i>
	Couch's spadefoot	<i>Scaphiopus couchii</i>
	Great Plains narrowmouth toad	<i>Gastrophryne olivacea</i>
	Green toad	<i>Bufo debilis</i>
	Northern cricket frog	<i>Acris crepitans</i>
	Wood Frog	<i>Rana sylvatica</i>
Arachnids	A lampshade spider	<i>Hypochilus bonneti</i>
Birds	American dipper	<i>Cinclus mexicanus</i>
	American three-toed woodpecker	<i>Picoides dorsalis</i>
	American white pelican	<i>Pelecanus erythrorhynchos</i>
	Barrow's goldeneye	<i>Bucephala islandica</i>
	Black rail	<i>Laterallus jamaicensis</i>
	Black rosy-finch	<i>Leucosticte atrata</i>
	Black swift	<i>Cypseloides niger</i>
	Black-chinned hummingbird	<i>Archilochus alexandri</i>
	Blue grouse	<i>Dendragapus obscurus</i>
	Broad-tailed hummingbird	<i>Selasphorus platycercus</i>
	Cassin's finch	<i>Carpodacus cassinii</i>
	Chestnut-collared longspur	<i>Calcarius ornatus</i>
	Cordilleran flycatcher	<i>Empidonax occidentalis</i>
	Curve-billed thrasher	<i>Toxostoma curvirostre</i>
	Dusky flycatcher	<i>Empidonax oberholseri</i>

Table E2. Tier 2 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Birds, cont.	Eared grebe	<i>Podiceps nigricollis</i>
	Evening grosbeak	<i>Coccothraustes vespertinus</i>
	Forster's tern	<i>Sterna forsteri</i>
	Grace's warbler	<i>Dendroica graciae</i>
	Gray flycatcher	<i>Empidonax wrightii</i>
	Harris' sparrow	<i>Zonotrichia querula</i>
	Lazuli bunting	<i>Passerina amoena</i>
	Lesser scaup	<i>Aythya affinis</i>
	Marbled godwit	<i>Limosa fedoa</i>
	Northern harrier	<i>Circus cyaneus</i>
	Northern pintail	<i>Anas acuta</i>
	Osprey	<i>Pandion haliaetus</i>
	Pygmy nuthatch	<i>Sitta pygmaea</i>
	Red crossbill	<i>Loxia curvirostra</i>
	Rufous hummingbird	<i>Selasphorus rufus</i>
	Snowy egret	<i>Egretta thula</i>
	Veery	<i>Catharus fuscescens</i>
	Vesper sparrow	<i>Pooecetes gramineus</i>
	Virginia's warbler	<i>Vermivora virginiae</i>
	Western grebe	<i>Aechmophorus occidentalis</i>
	White-faced ibis	<i>Plegadis chihi</i>
	White-tailed ptarmigan	<i>Lagopus leucurus</i>
	White-throated swift	<i>Aeronautes saxatalis</i>

Table E2. Tier 2 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Birds, cont.	Wilson's phalarope	<i>Phalaropus tricolor</i>
Fish	Bluehead sucker	<i>Catostomus discobolus</i>
	Flannelmouth sucker	<i>Catostomus latipinnis</i>
	Flathead chub	<i>Platygobio gracilus</i>
	Iowa darter	<i>Etheostoma exile</i>
	Mountain sucker	<i>Catostomus platyrhynchus</i>
	Orangespotted sunfish	<i>Lepomis humilis</i>
	Stonecat	<i>Noturus flavus</i>
Insects	A Buckmoth	<i>Hemileuca neumoegeni</i>
	A sphinx moth	<i>Sagenosoma elsa</i>
	Arapahoe snowfly	<i>Capnia arapahoe</i>
	Arogos skipper	<i>Atrytone arogos</i>
	Brimstone clubtail	<i>Gomphus intricatus</i>
	Colorado blue	<i>Euphilotes rita coloradensis</i>
	Desert buckwheat blue	<i>Euphilotes rita emmeli</i>
	Early elfin	<i>Incisalia fotis</i>
	Great Basin silverspot butterfly	<i>Speyeria nokomis nokomis</i>
	Great Sand Dunes Anthicid beetle	<i>Amblyderus weneri</i>
	Hoary skimmer	<i>Libellula nodisticta</i>
	Lemon-faced emerald	<i>Somatochlora ensigera</i>
	Lusk's Pinemoth	<i>Coloradia luskii</i>
	Mayfly, spp.	<i>Ametropus albrighti</i>
	Moss's elfin	<i>Callophrys mossii schryveri</i>

Table E2. Tier 2 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Insects, cont.	Mottled Duskywing	<i>Erynnis martialis</i>
	Nelson's snowfly	<i>Capnia nelsoni</i>
	Northern hairstreak	<i>Eurystrymon favonius</i> Ontario
	Oslar's oakworm moth	<i>Anisota oslari</i>
	Paiute dancer	<i>Argia alberta</i>
	Plains snowfly	<i>Mesocapnia frisoni</i>
	Red-veined meadowfly	<i>Sympetrum madidum</i>
	Regal fritillary	<i>Speyeria idalia</i>
	Rhesus skipper	<i>Polites rhesus</i>
	Rocky Mountain Agapema	<i>Agapema homogena</i>
	San Luis Dunes tiger beetle	<i>Cicindela theatina</i>
	Sandia hairstreak	<i>Callophrys mcfarlandi</i>
	Spalding's blue	<i>Euphilotes spaldingi</i>
	Stripe-winged baskettail	<i>Tetragoneuria petechialis</i>
	Two-spotted skipper	<i>Euphyes bimacula</i>
	Wiest's sphinx moth	<i>Euproserpinus wiesti</i>
	Xanthus skipper	<i>Pyrgus xanthus</i>
	Yellow-banded day sphinx	<i>Proserpinus flavofasciata</i>
Mammals	Allen's big-eared bat	<i>Idionycteris phyllotis</i>
	Arizona myotis	<i>Myotis occultus</i>
	Bighorn sheep	<i>Ovis canadensis</i>
	Bison	<i>Bison bison</i>
	Common Hog-nosed skunk	<i>Conepatus leuconotus</i>

Table E2. Tier 2 Species of Greatest Conservation Need		
Taxonomic Group	Common Name	Scientific Name
Mammals, cont.	Grizzly bear	<i>Ursus arctos</i>
	Preble's shrew	<i>Sorex preblei</i>
	Wolverine	<i>Gulo gulo</i>
Reptiles	Blacknecked garter snake	<i>Thamnophis cyrtopsis</i>
	Common kingsnake	<i>Lampropeltis getula</i>
	Longnose leopard lizard	<i>Gambelia wislizenii</i>
	Long-nosed snake	<i>Rhinocheilus lecontei</i>
	Midget faded rattlesnake	<i>Crotalus viridis concolor</i>
	Night snake	<i>Hypsiglena torquata</i>
	Roundtail horned lizard	<i>Phrynosoma modestum</i>
	Southwestern black-headed snake	<i>Tantilla horbartsmithi</i>
	Texas blind snake	<i>Leptotyphlops dulcis</i>

Appendix F

Key Habitat Priorities

Table F1. High Priority Habitats	
Habitat Type	Habitat
Forestlands	Ponderosa Pine
Grasslands	Midgrass Prairie
	Sand Dune Complex (Grassland)
	Shortgrass Prairie
	Tallgrass Prairie
Riparian/Wetlands	Eastern Plains Rivers
	Eastern Plains Streams
	Playas
	Shrub-dominated Wetlands
	West Slope Rivers
	West Slope Streams
Shrublands	Sagebrush
	Sand Dunes Complex (Shrubland)

Table F2. Medium Priority Habitats.	
Habitat Type	Habitat
Forestlands	Aspen Forest
	Mixed Forest
Grasslands	Foothill/Mountain Grassland
Riparian/Wetlands	Grass/Forb Dominated Wetlands
	Transition Streams
Shrublands	Upland Shrub

Table F3. Low Priority Habitats.	
Habitat Type	Habitat
Forestlands	Douglas Fir
	Limber Pine
	Lodgepole Pine
	Mixed Conifer
	Pinyon-Juniper
	Rocky Mtn Bristlecone Pine
	Spruce-Fir
	White Fir
Riparian/Wetlands	Lakes
	Mountain Streams
	Open Water

Table F3. Low Priority Habitats.	
Habitat Type	Habitat
Shrublands	Deciduous Oak
	Desert Shrub
	Greasewood Fans and Flats
	Saltbrush Fans and Flats
Tundra	Meadow Tundra
	Shrub Tundra
Unvegetated	Exposed Rock
	Sandy Areas
Urban and Croplands	Dryland Crops
	Irrigated Crops
	Urban

Appendix G

Threats Taxonomies for Species and Habitats

Table G1 – Taxonomy of Threats for Species.

Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.

General Threats	Specific Threats
Climate	Habitat shifting and alteration due to climate change
	Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)
Direct Mortality	Hunting, trapping, fishing
	Poisoning
	Collecting
	Scientific research
	Collision (e.g., auto, turbine, aircraft)
	Electrocution
	Illegal Take
	Mortality at stock tanks from drowning
Disturbance	Motorized recreation
	Non-motorized recreation
	Proximal non-recreation disturbance
	Scientific research
	Flight paths
Habitat Conversion	Housing, urban, and ex-urban development
	Conversion to cropland
	Recreation area developments
	Water storage
	Commerical and industrial development
	Channelization
	Road or power right of way
	Commercial hog farm or feedlot
Habitat Degradation	Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals
	Natural system modification (terrestrial) - windbreaks, agricultural methods such as tilling, pitting
	Natural system modification - wetland filling
	Altered fire regime
	Altered hydrological regime (surface or aquifer)
	Decreased water quality or quantity
	Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)
	Fragmentation
	Altered animal community (loss of herbivores, predators, pollintors, etc.)

Table G1 – Taxonomy of Threats for Species.

Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.

General Threats	Specific Threats
	Trail development
	Roads or Railroads
	Overhead utility lines and towers
	Oil and gas pipelines
	Cave/mine closures
	Intensive agricultural operations
	Mining operations
	Range improvement operations
	Off-road trail development and use
	Ski area development
Indirect Mortality	Forest and woodland management
	Grazing
	Water use (e.g., de-watering of streams)
Invasive or Exotic Species	Invasive plants
	Invasive plants - tamarisk
	Invasive animals
	Pathogen - chytrid fungus
	Pathogen - sylvatic plague
	Introduced genetic material
	Problematic native species (species originally found in ecosystem but out of balance or released due to humans)
Organizational capacity and management	Lack of coordination
	Lack of funding
	Lack of common goals
	Confused or gaps in authorities
	Legislation/policy changes
Lack of knowledge	Complete distribution in Colorado unknown
	Critical life history/habitat components unknown
	Genetic relationship with other subspecies unknown
	Population status unknown
	Population trend unknown
	Breeding distribution in Colorado unknown
Natural Factors	Scarcity (leading to inbreeding depression)
	Herbivory (e.g., resource competition, changes in habitat structure)
	Altered animal community (change in herbivores, predators, pollinators, etc.)
	Disease and parasitism
	Habitat loss due to insect damage
	Low annual recruitment
	Low reproductive rate
	Nest predation
	Competition
	Parasites
Pollution	Chemicals and toxins

Table G1 – Taxonomy of Threats for Species.

Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.

General Threats	Specific Threats
	Nonpoint source pollution
	Water pollution
	Herbicide/pesticide spraying or runoff
	Nutrient loads
	Solid waste
	Waste or residual materials (mine tailings, excess sediment loads, etc.)
	Air pollution
	Radioactive materials
	Salt
	Light pollution
	Septic system failures
Resource Extraction	Oil and gas drilling
	Mining (coal, sand/gravel, etc.)
	Water use, management
	Wind energy

Table G2 – Taxonomy of Threats for Habitats.

Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.

General Threats	Specific Threats
Climate	Habitat shifting and alteration due to climate change
	Climate variability (intensification or alteration of normal weather patterns, e.g., droughts, tornados, etc.)
Habitat Conversion	Housing, urban, and ex-urban development
	Conversion to cropland
	Recreation area developments
	Water storage
	Commerical and industrial development
	Commercial hog farm or feedlot
Habitat Degradation	Natural system modification (hydrological) - dam construction, riprap, levees, bank stabilization, channelization, irrigation canals
	Natural system modification (terrestrial) - windbreaks, agricultural methods such as tilling, pitting
	Natural system modification - wetland filling
	Altered fire regime
	Altered hydrological regime (surface or aquifer)
	Decreased water quality
	Altered native vegetation (riparian area deforestation, woody encroachment, chaining sagebrush, seral stage imbalance, etc.)
	Fragmentation
	Altered animal community (loss of herbivores, predators, pollintors, etc.)
	Trail development
	Roads or Railroads
	Overhead utility lines and towers
	Oil and gas pipelines
	Cave/mine closures
Indirect Consumptive Use	Forest and woodland management
	Grazing
	Water use (e.g., de-watering of streams)
Invasive or Exotic Species	Invasive plants
	Invasive plants - tamarisk
	Invasive animals
	Introduced genetic material
	Problematic native species (species originally found in ecosystem but out of balance or released due to humans)
Lack of knowledge	Complete distribution in Colorado unknown
	Status unknown
Natural Factors	Scarcity
	Herbivory (e.g., resource competition, changes in habitat structure)

Table G2 – Taxonomy of Threats for Habitats.

Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.

	Altered animal community (change in herbivores, predators, pollinators, etc.)
Non-consumptive Disturbance	Motor-powered recreation
	Non-motorized recreation
	Proximal non-recreation disturbance
Organizational capacity and management	Lack of coordination
	Lack of funding
	Lack of common goals
	Legislation/policy changes
Pollution	Chemicals and toxins
	Herbicide/pesticide spraying or runoff
	Nutrient loads
	Solid waste
	Waste or residual materials (mine tailings, excess sediment loads, etc.)
	Air pollution
	Radioactive materials
	Salt
	Septic system failures
Resource Extraction	Oil and gas drilling
	Mining (coal, sand/gravel, etc.)
	Water use, management
	Wind energy

Appendix H

Taxonomies of Conservation Actions for Species and Habitats

Table H1 – Taxonomy of Conservation Actions for Species.	
Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.	
General Conservation Actions	Specific Conservation Actions
Maintain or Restore Habitat	Restore native prairie
	Restore riparian vegetation
	Plant trees/shrubs
	Remove infrastructure (e.g., roads, dams)
	Restore sagebrush
	Re-seed native species
	Manage grazing for compatible vegetation height, structure, etc.
	Implement streambank or in-stream restoration/improvements
	Remove trees/shrubs
	Improve erosion and excess sedimentation conditions
	Discourage introduction of non-native ornamental species
	Maintain linkages and connectivity (e.g., wildlife over/under passes, habitat corridors, wildlife-friendly fences)
	Maintain appropriate patch size and habitat mosaic
	Manage caves/mines for native bats
	Avoid destruction of large tracts of native habitat (e.g., ski area development, sod-busting)
Maintain or Restore Natural Processes	Coordinate on ecologically sensitive design of recreational facilities
	Reduce CO2 emissions
	Restore natural fire regime
	Remove dam
	Adjust operation of dam
Compatible Resource Use	Remove road(s)
	Manage for predator/prey balance
	Manage natural herbivory
	Improve erosion and excess sedimentation conditions
	Maintain linkages and connectivity
Protected Area Management	Implement compatible logging practices
	Implement compatible grazing management
Legislation, Policies and Regulations	Write and implement management plan
	Manage public use to be compatible with biodiversity
	Alter management of park, preserve, wildlife area
	Regulate lethal control methods

Table H1 – Taxonomy of Conservation Actions for Species.

Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.

General Conservation Actions	Specific Conservation Actions
	Establish mitigation requirements for developments and other projects that impact species/habitats
	Encourage use of Farm Bill programs
Species Management	Reintroduce extirpated native species
	Provide artificial nesting boxes/platforms
	Maintain genetic connection/integrity within and between populations
	Maintain comprehensive species database
	Develop collaborative management agreements
	Write and implement management/recovery plan
	Manage caves/mines for native bats
	Develop proactive conservation program to prevent species from becoming a concern in the future
	Implement existing management/recovery plan
Voluntary Standards	Implement Best Management Practices for transportation projects
	Implement Best Management Practices for energy development and mining
	Implement Best Management Practices for water resource development
	Implement Best Management Practices for livestock grazing
	Implement Best Management Practices for forestry
	Implement Best Management Practices for agricultural production
	Implement Best Management Practices for urban development, landscaping, etc.
Land Protection (Public, Private), Easements, and Resource Rights	Create protected park, preserve, wildlife area
	Expand existing protected park, preserve, wildlife area
	Purchase habitat for conservation purpose
	Acquire conservation easement for habitat protection
	Establish legal designation to protect habitat (e.g., wilderness, Research Natural Area)
	Implement Purchase/Transfer Development Rights program for habitat protection
	Establish in-stream flow rights
	Acquire water rights
	Mitigate species/habitat loss (e.g., grass banking, mitigation banking, credits for off-site habitat protection)
Invasive Species Control and Prevention	Map weed infestations and sensitive no spray/no mow zones
	Implement integrated weed/pest management plan
	Control bullfrogs
	Control non-native fish
	Avoid transfer of chytrid fungus

Table H1 – Taxonomy of Conservation Actions for Species.

Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.

General Conservation Actions	Specific Conservation Actions
	Dust for fleas to prevent plague outbreaks
Ex-situ Conservation	Create captive breeding program
	Create gene-banking program
Planning and Zoning	Write management plan for species or habitat
	Promote zoning that concentrates use and protects habitat
	Promote consideration of biodiversity issues in transportation and land use planning processes
Compliance and Enforcement	Monitor water quality standards
	Enforce wildlife and habitat protection laws
	Enforce hunting, fishing, collecting regulations
	Enforce 404 wetlands regulations
	Enforce state/federal/local pollution standards
	Identify and control point-source and non-point source pollution
	Manage recreation and/or permitted activities (e.g., rock climbing, grazing leases)
	Manage off-road travel
Research and Monitoring	Follow established protocols for species research (e.g., to avoid spread of chytrid fungus)
	Conduct field inventory to refine known distribution
	Research critical life history/habitat components
	Fill data gaps
	Ground-truth habitat and species distribution model(s)
	Research species/habitat response to management
	Monitor population status
Education and Communication	Publish educational material/sponsor educational programs to raise public awareness
	Improve knowledge of species, habitats, problems, via professional meetings and other venues
	Improve communication among researchers and policy/decision-makers
	Implement landowner outreach/education program
	Educate development industries about avoiding and/or mitigating wildlife impacts
Economic Incentives	Promote ecotourism
	Promote green building, development, and lifestyle
	Increase efficiency of water use
	Provide economic assistance for private land habitat improvements and/or species conservation
Capacity Building and Cooperation	Develop partnerships among agencies, NGOs, and stakeholders
	Coordinate with related agencies to align goals, policies, measures of success, etc.
	Engage in collaborative, proactive planning and conservation programs
	Develop collaborative management agreements

Table H2 – Taxonomy of Conservation Actions for Habitats.

Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.

General Action	Specific Action
Capacity Building and Cooperation	Develop partnerships among agencies, NGOs, and stakeholders
	Coordinate with related agencies to align goals, policies, measures of success, etc.
	Engage in collaborative, proactive planning and conservation programs
	Develop collaborative management agreements
Compatible Resource Use	Implement compatible logging practices
	Implement compatible grazing management
Compliance and Enforcement	Monitor water quality standards
	Enforce wildlife and habitat protection laws
	Enforce 404 wetlands regulations
	Enforce state/federal/local pollution standards
	Identify and control point-source and non-point source pollution
	Manage recreation and/or permitted activities (e.g., rock climbing, grazing leases)
	Manage off-road travel
Economic Incentives	Promote ecotourism
	Promote green building, development, and lifestyle
	Increase efficiency of water use
	Provide economic assistance for private land habitat improvements and/or species conservation
	Reduce ground-water pumping
Education and Communication	Publish educational material/sponsor educational programs to raise public awareness
	Improve knowledge of habitats, problems, via professional meetings and other venues
	Improve communication among researchers and policy/decision-makers
	Implement landowner outreach/education program
	Educate development industries about avoiding and/or mitigating habitat impacts
Invasive Species Control and Prevention	Map weed infestations and sensitive no spray/no mow zones
	Implement integrated weed/pest management plan
	Control bullfrogs
	Control non-native fish
	Avoid transfer of chytrid fungus
	Dust for fleas to prevent plague outbreaks
Land Protection (Public, Private), Easements, and Resource Rights	Create protected park, preserve, wildlife area
	Expand existing protected park, preserve, wildlife area
	Purchase habitat or Acquire conservation easement for conservation purpose

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	Establish legal designation to protect habitat (e.g., wilderness, Research Natural Area)
	Implement Purchase/Transfer Development Rights program for habitat protection
	Establish in-stream flow rights
	Acquire water rights
	Mitigate species/habitat loss (e.g., grass banking, mitigation banking, credits for off-site habitat protection)
Legislation, Policies and Regulations	Regulate lethal control methods
	Establish mitigation requirements for developments and other projects that impact species/habitats
	Encourage use of Farm Bill programs
	Reduce CO2 emissions
Maintain or Restore Habitat	Restore native prairie
	Restore riparian vegetation
	Plant trees/shrubs
	Remove infrastructure (e.g., roads, dams)
	Restore sagebrush
	Re-seed native species
	Manage grazing for compatible vegetation height, structure, etc.
	Implement streambank or in-stream restoration/improvements
	Remove trees/shrubs
	Improve erosion and excess sedimentation conditions
	Discourage introduction of non-native ornamental species
	Maintain linkages and connectivity (e.g., wildlife over/under passes, habitat corridors, wildlife-friendly fences)
	Maintain appropriate patch size and habitat mosaic
	Manage caves/mines for native bats
	Avoid destruction of large tracts of native habitat (e.g., ski area development, sod-busting)
	Coordinate on ecologically sensitive design of recreational facilities
	Reduce CO2 emissions
Maintain or Restore Natural Processes	Restore natural fire regime
	Remove dam
	Adjust operation of dam
	Remove road(s)
	Manage for predator/prey balance
	Manage natural herbivory
	Improve erosion and excess sedimentation conditions
	Maintain linkages and connectivity
	Reduce ground-water pumping

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Adapted from Neely et al. 2006, and modified to encompass input gathered during this planning process from state experts and stakeholders, as well as formatting provided by the Arizona Game and Fish Department from their CWCS.

Planning and Zoning	Write management plan for species or habitat
	Promote zoning that concentrates use and protects habitat
	Promote consideration of biodiversity issues in transportation and land use planning processes
Protected Area Management	Write and implement management plan
	Manage public use to be compatible with biodiversity
	Alter management of park, preserve, wildlife area
Research and Monitoring	Conduct field inventory to refine known distribution
	Research critical life history/habitat components
	Fill data gaps
	Ground-truth habitat and species distribution model(s)
	Research habitat response to management
	Monitor habitat status
Species Management	Reintroduce extirpated native species
	Provide artificial nesting boxes/platforms
	Maintain genetic connection/integrity within and between populations
	Maintain comprehensive species database
	Develop collaborative management agreements
	Write and implement management/recovery plan
	Manage caves/mines for native bats
	Develop proactive conservation program to prevent species from becoming a concern in the future
	Implement existing management/recovery plan
Voluntary Standards	Implement Best Management Practices for transportation projects
	Implement Best Management Practices for energy development and mining
	Implement Best Management Practices for water resource development
	Implement Best Management Practices for livestock grazing
	Implement Best Management Practices for forestry
	Implement Best Management Practices for agricultural production
	Implement Best Management Practices for urban development, landscaping, etc.