

COLUMBIAN SHARP-TAILED GROUSE CONSERVATION PLAN

**ROUTT, MOFFAT, AND
RIO BLANCO COUNTIES
NORTHWEST COLORADO**

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EXECUTIVE SUMMARY

Columbian sharp-tailed grouse (CSTG) historically occupied 22 counties in western Colorado, but presently are restricted to three counties in the northwestern portion of the state. The last confirmed sightings from anywhere else within the state are from Mesa County in 1985. Intensive lek surveys conducted in northwestern Colorado since 1997 suggest this population is increasing primarily due to the implementation of the Conservation Reserve Program (CRP) and passage of the Surface Mining Control and Reclamation Act. The current spring breeding population estimate is at 6,100 birds. The Colorado population is contiguous with a smaller population of 500+ birds in south central Wyoming. Together the Colorado and Wyoming birds form one of only three meta-populations of CSTG in North America. The other two meta-populations are found in southeastern Idaho/northern Utah and central British Columbia.

The CSTG population in northwestern Colorado has not experienced the drastic declines documented elsewhere within the subspecies range. However, there is still reason for concern about the long-term stability of this population because of its extensive use of private lands and reliance on artificial habitats. Approximately 71% of the occupied habitat is privately owned. Management opportunities to benefit CSTG are more limited on private than public lands. A population decline can be expected if the Conservation Reserve Program is discontinued or participation in the program declines. Declines also may occur on reclaimed mine lands because there are no assurances these lands will be managed in ways that are beneficial or at least not detrimental to sharptails following bond release. Currently, CRP and reclaimed mine lands account for only 4% of the total land area within the Plan boundary, but support 44% of the 133 known active leks.

The need for this Plan was prompted by the 1995 petition to list the CSTG as threatened in the lower conterminous United States pursuant to the Endangered Species Act. Although the U. S. Fish and Wildlife Service ruled in October 2000 that the petition to list the CSTG was not warranted, the Service retained the option to list discrete populations of CSTG should additional information become available to indicate such an action is appropriate and warranted. Thus, the ruling did not negate the need for this Plan. Completion of this Plan is considered a major step in preventing a future listing of CSTG in Colorado.

This Plan pertains to the area currently occupied by CSTG in Colorado, which encompasses about 1,454,000 acres (588,664 hc) and includes most of Routt County, eastern Moffat County, and north central Rio Blanco County. The Plan also pertains to another 377,000 acres (152,632 hc) of unoccupied habitats and potential dispersal/travel corridors that may only be temporarily occupied at certain times of the year.

Preparation of the Plan was guided by the Northwest Colorado CSTG Work Group, a multi-interested, voluntary partnership of community members, landowners, conservation groups, private industry, local government, and federal and state agencies. The purpose of the Plan is to describe the past and current status of CSTG in northwest Colorado, identify threats to the long-term stability of the CSTG population in northwest Colorado, outline conservation actions to reduce or eliminate these threats, and provide for the opportunity to expand the distribution of CSTG in Colorado and elsewhere throughout its range. In addition, the Plan attempts to identify funding sources, staffing requirements, responsible parties, timing, and evaluation criteria necessary to insure that the Plan will be implemented and that it will be effective in addressing the threats to CSTG in northwest Colorado. The Plan identifies 23 issues and contains 29 objectives, 61 goals, and 248 conservation actions designed to address these issues. The majority of the actions pertain to habitat related issues.

This Plan is intended to be the first step towards a cooperative effort between state and federal agencies and private landowners to conserve CSTG and the habitats that support them in northwest Colorado. Voluntary participation by the private sector is crucial to the successful implementation of the Plan. The Plan is not the final word in CSTG management. It should be viewed as a flexible, dynamic Plan, subject to constant review and periodic revisions as new information becomes available.

COLUMBIAN SHARP-TAILED GROUSE

CONSERVATION PLAN

MISSION STATEMENT: To conserve and enhance Columbian sharp-tailed grouse (*CSTG*, *Tympanuchus phasianellus columbianus*) populations and habitats in northwest Colorado in ways that are compatible with existing and future land uses thereby insuring the opportunity for people to enjoy this wildlife resource in perpetuity.

INTRODUCTION

BACKGROUND: Formation of the Northwest Colorado Columbian Sharp-tailed Grouse Work Group and the preparation of this conservation plan was prompted by the 1995 signing of a Memorandum of Agreement (MOA) between the State of Colorado and Department of Interior concerning Colorado's declining species. This MOA promotes the development of conservation plans for species not yet listed under the Endangered Species Act (ESA) and encourages the voluntary participation by affected stakeholders in the preparation of these plans in an effort to avoid the need to list the species as threatened or endangered. The MOA specifically mentions the need for plans to address declining populations of sage (*Centrocercus* spp.) and Columbian sharp-tailed grouse in Colorado. The MOA expired in December 1999, but an effort is being made to revise and renew the MOA.

The need for this plan was further prompted by the 1995 petition to list the CSTG as threatened in the lower conterminous United States pursuant to the ESA (Carlton 1995), and the October 1999 finding that the petition contained sufficient information to warrant a full assessment of the subspecies status. On 11 October 2000, the United States Fish and Wildlife Service (USFWS) issued its 12 month finding that the petition to list the CSTG as a threatened subspecies throughout its historic range in the contiguous United States was not warranted. In making this finding, the USFWS retained the option to list the CSTG should additional information become available to indicate such an action is appropriate and warranted. They also retained the option of recognizing discrete populations for listing if information becomes available to warrant such action.

THE PROCESS: In December 1998, three public meetings were held in northwest Colorado in the towns of Steamboat Springs, Hayden, and Craig. The purpose of these meetings was to educate the public about the status of CSTG in Colorado and throughout its range, inform them about the petition to list the CSTG, and determine their interest and willingness to form a working group to develop a conservation plan for CSTG in northwest Colorado. The decision was unanimous to proceed with forming the work group and preparing the plan.

Every effort was made to identify and invite all potential stakeholders to participate in the process. This was an ongoing effort. The inaugural meeting of the work group was held in January 1999. From January 1999 to May 2000, meetings were held on the last Tuesday of every month at the Hayden Town Hall. A facilitator was hired to conduct the meetings and to obtain consensus of the group on the material to be included in the plan. This person had no vested interest in the outcome of the plan and was hired to foster trust among the various stakeholders and to insure that all stakeholders had equal input into the plan.

The work group was charged with (1) developing a mission statement and population goal, (2) identifying, defining, and refining the issues that potentially impact CSTG and their habitats in northwest Colorado, and (3) establishing objectives, goals, and conservation actions to address the issues. Once the issues were identified, a time line was prepared and distributed to all the stakeholders so they would know when the issues that pertained to them would be addressed. Stakeholders also were notified by mail and by phone of upcoming meetings and

the issues that would be discussed at those meetings. In addition, meeting notices were placed in the local papers and announced on local television stations. Stakeholders were given the opportunity to develop objectives, goals, and conservation actions for issues that specifically pertained to them. Only one stakeholder group opted for this approach. Otherwise, the work group directed personnel of the Colorado Division of Wildlife (CDOW) to develop the first draft of the objectives, goals, conservation actions, and implementation schedule for each issue, then the work group added, deleted, modified, or accepted this information based on discussions that took place at the meetings.

Approval of the objectives, goals, and conservation actions for each issue involved a 3-step process. First the information was presented to the work group at the designated meeting for the issue(s) in question. Open discussion followed at which time the work group was given the opportunity to ask questions, request further clarification, and to express their opinion about the issue(s) being addressed. Based on the open discussion, the objectives, goals, conservation actions, and implementation schedule were modified according to the group comments and concerns. Second, the revised information was mailed to all stakeholders for their review. At the subsequent meeting, before moving onto the next issue, the third and final step was to obtain consensus of the group to accept the information as presented and revised at the previous meeting. Once the group reached consensus on a particular issue, it agreed not to revisit this issue at the regularly scheduled monthly meetings. If someone wanted to revisit an issue or felt they did not have an opportunity for input, they were asked to schedule another meeting to present their concerns. This only happened once during the entire process.

Time was taken at the beginning of every meeting to inform the work group about ongoing research and management programs on CSTG and to update them on the status of the petition to list the CSTG. Details about the life history and habitat requirements of CSTG were presented to the group at every available opportunity. This enabled the group to better understand the issues and to make sound decisions regarding the conservation actions designed to address these issues.

PURPOSE OF PLAN: Preparation of this plan has been guided by the Northwest Colorado Columbian Sharp-tailed Grouse Working Group, a multi-interested, voluntary, partnership of community members, landowners, conservation groups, private industry, local government, and federal and state agencies. The purpose of this plan is to describe the past and current status of CSTG in northwest Colorado, identify threats to the long-term stability of the CSTG population in northwest Colorado, outline conservation actions to reduce or eliminate these threats, and identify the funding sources, staffing requirements, responsible parties, timing, and evaluation criteria necessary to insure a reasonable level of certainty that the plan will be implemented and that it will be effective in addressing the threats to CSTG in northwest Colorado. Another important purpose of the plan is to provide for the opportunity to expand the distribution of CSTG in Colorado and elsewhere throughout its range. The area to which this plan applies supports the only population of CSTG within the state and one of only a few thriving populations within the entire range of CSTG, making it a critical source of birds for future restoration efforts.

The plan is intended to address conservation measures on public and private lands. The information contained in the plan will be used by state and federal resource management agencies as guidelines to enhance and conserve CSTG and the habitats that support them on public lands. **Implementation of the plan by the private sector is strictly voluntary.** However, because the majority of CSTG occur on private lands, participation by private landowners is essential to the successful implementation of the plan. This is why a tremendous amount of effort went into involving private landowners in the development of the plan and in keeping those unable to participate informed about the decisions being made. The hope is that this community based plan will promote a positive working relationship between the resource management agencies and the private sector in conserving and managing CSTG in northwest Colorado.

This plan is **not** intended to be the final word in CSTG management; nor is it intended to be another document that sits on the bureaucratic shelf. The plan should be subjected to constant review and refinement. It should be viewed as a dynamic plan that allows for some flexibility in how and when it will be implemented. Finally, it should be recognized that the most important work lies ahead in implementing the actions identified in the plan in ways that are least disruptive to the local community and do not impinge upon the rights of private landowners.

FORMAT: Although this plan contains the two basic parts found in most conservation plans, the contents of each part deviates slightly from the general format of most plans. The Conservation Assessment portion of the plan includes a description of the area to which the plan applies along with the distinguishing characteristics, taxonomy, status, distribution, general life history traits, and habitat requirements of CSTG. The problem statement, population objectives, habitat objectives, and identification of the issues are defined in the Conservation Strategy portion of the plan. Each description of the issue is immediately followed by the objectives, goals, conservation actions, and implementation plan for addressing that issue. Any data, such as harvest estimates, lek counts, and agricultural statistics, that helps to clarify the issues are included as part of the issue description. The objectives, goals, conservation actions, and implementation plan are presented in table format (one table for each issue). Each table begins with a brief problem statement. Conservation actions that transcend issues are repeated rather than trying to cross-reference among tables.

CONSERVATION ASSESSMENT

AREA DESCRIPTION

This plan pertains to the area currently occupied by CSTG in Colorado (1,454,000 ac, 588,664 hc), which includes most of Routt County, eastern Moffat County, and north-central Rio Blanco County (Figure 1). The plan also includes about 377,000 ac (152,632 hc) of unoccupied habitats and potential dispersal/travel corridors that may only be temporarily occupied at certain times of year. All total, the plan area encompasses about 1,831,000 ac (741,052 hc) of which 71% is privately owned compared with 21% under federal ownership and 8% in state ownership, including State Trust Lands (Table 1). State Trust Lands are lands granted by the Federal Government to Colorado at statehood to provide income to support public schools. These lands are administered by the State Board of Land Commissioners through the agency known as the State Land Board (SLB). These lands are leased for surface use and mineral extraction, and the lessee controls the access. In 1993, the CDOW entered into an agreement with the SLB to lease trust lands with the best wildlife values for public use. Access to these lands is a privilege and limited to certain properties at specified times of the year (usually 1 September to 28 February).

Approximately 45,000 people live in the area, primarily in and around the towns of Meeker, Craig, Hayden, Steamboat Springs, and Oak Creek. Energy related activity, agriculture, and recreation form the economic base of these communities. The allure of rural living and the boom in recreational opportunities has stimulated rapid growth in parts of this region, especially in Routt County.

Changes in topography and elevation cause considerable variations in local climatic conditions ranging from semi-arid in Moffat County to continental in Routt and Rio Blanco counties. Large diurnal and seasonal temperature changes occur throughout the region. Average annual precipitation ranges from less than 10 in (25.4 cm) at Craig to over 50 in (127 cm) near Steamboat Springs. Most of the precipitation falls as snow from November through March and as rain during April and May. Daily temperatures in summer range from 40 to 80° F (4 - 27° C). Maximum daytime temperatures during winter range from 10 to 40° F (-12 - 4° C). Nighttime temperatures commonly average 20 to 30° F (-7 - 10° C) colder than daytime temperatures. Freezing temperatures and snow are likely from October through April.

Topographically, the area is diverse ranging from 6,200 to 8,500 ft (1,890 - 2,591 m) in elevation and varying from gentle, rolling hills and low mesas at the lower elevations to rugged mountainous terrain at the higher elevations. Numerous higher points above 8,500 ft (2,591 m) up to 10,600 ft (3,232 m) occur within the area but are above the range of CSTG. Vegetation types in the area are equally diverse because of the changing topography, soils, moisture conditions, elevation, and aspect. The natural transition is from big sagebrush (*Artemisia tridentata*) to shrub steppe to mountain shrub to aspen (*Populus tremuloides*) to mixed aspen/conifer to conifer. There is little pinyon-juniper (*Pinus edulis/Juniperus* spp.) present within the conservation plan boundary, except for the area south of Craig to Meeker. It is the extensive deciduous shrub component interspersed with sagebrush, native grasslands, hay meadows, Conservation Reserve Program (CRP) lands, mine reclamation lands, and agricultural lands consisting of wheat and alfalfa that make this region especially suitable for CSTG (Table 2). Serviceberry (*Amelanchier* spp.) is the dominant plant in the deciduous shrub communities and usually grows in association with one or more of the following shrubs: Gambel's oak (*Quercus gambelii*), chokecherry (*Prunus virginiana*), snowberry (*Symphoricarpos* spp.), and sagebrush.

TAXONOMY AND IDENTIFICATION

Columbian sharp-tailed grouse belong to the order Galliformes, family Phasianidae, which includes turkeys, quail, pheasant, partridge, and grouse (including ptarmigan). Grouse and ptarmigan constitute the subfamily Tetraonidae, of which the following 11 species are found in North America: greater sage-grouse (*Centrocercus urophasianus*), Gunnison sage-grouse (*C. minimus*), blue grouse (*Dendragapus obscurus*), greater prairie-chicken (*Tympanuchus cupido*), lesser prairie-chicken (*T. pallidicinctus*), sharp-tailed grouse (*T. phasianellus*), spruce grouse (*D. canadensis*), ruffed grouse (*Bonasa umbellus*), rock ptarmigan (*Lagopus mutus*), willow ptarmigan (*L. lagopus*), and white-tailed ptarmigan (*L. leucurus*). Originally, the scientific name for sharp-tailed grouse was *Pediocetes phasianellus*, but the genus was changed to *Tympanuchus* by the American Ornithologists Union in 1983 to more clearly reflect the relationship between prairie-chickens and sharptails.

There are 6 subspecies of sharp-tailed grouse in North America: northern (*T. p. phasianellus*), northwestern (*T. p. kennicotti*), Alaska (*T. p. caurus*), prairie (*T. p. campestris*), plains (*T. p. jamesi*), and Columbian (*T. p. columbianus*). The Columbian subspecies was first reported by Lewis and Clark, who observed the birds on the sagebrush, bunchgrass (*Agropyron* spp.) plains of the Columbia River, hence the name Columbian sharp-tailed grouse.

Sharptails have a mottled, light brown appearance. Distinguishing features include a short, pointed tail, white spots on the wings, and dark V-shaped markings against a pale background on the upper breast feathers (Johnsgard 1973). Smallest of the 6 subspecies, CSTG grouse weigh 1.3 to 1.8+ lb (600-800 g) depending on sex, age, season of year, and geographic area. Males (1.5-1.8 lb, 700-810 g) weigh more than females (1.3-1.6 lb, 600-725 g), and within sexes, adults weigh more than subadults. Unless the males are displaying and exposing the violet-colored air sacs on each side of the neck, they appear similar in size, shape, and coloration to females. Birds in hand can be sexed by the presence (females) or absence (males) of transverse barring on the central rectrices and crown feathers (Ammann 1944, Henderson et al. 1967).

STATUS AND DISTRIBUTION

Columbian sharp-tailed grouse, once considered the most abundant gallinaceous bird in the intermountain region (Bendire 1892), currently occupies less than 10% of its former range (Bart 2000). The CSTG has the smallest population size and most restricted distribution of the 6 subspecies of sharp-tailed grouse in North America (Miller and Graul 1980). Numerous factors have been implicated in the decline of CSTG. Foremost is the loss and degradation of habitats due to conversion of native rangelands to croplands, excessive grazing by livestock, herbicide treatments, fire suppression, invasion of non-native plants, removal

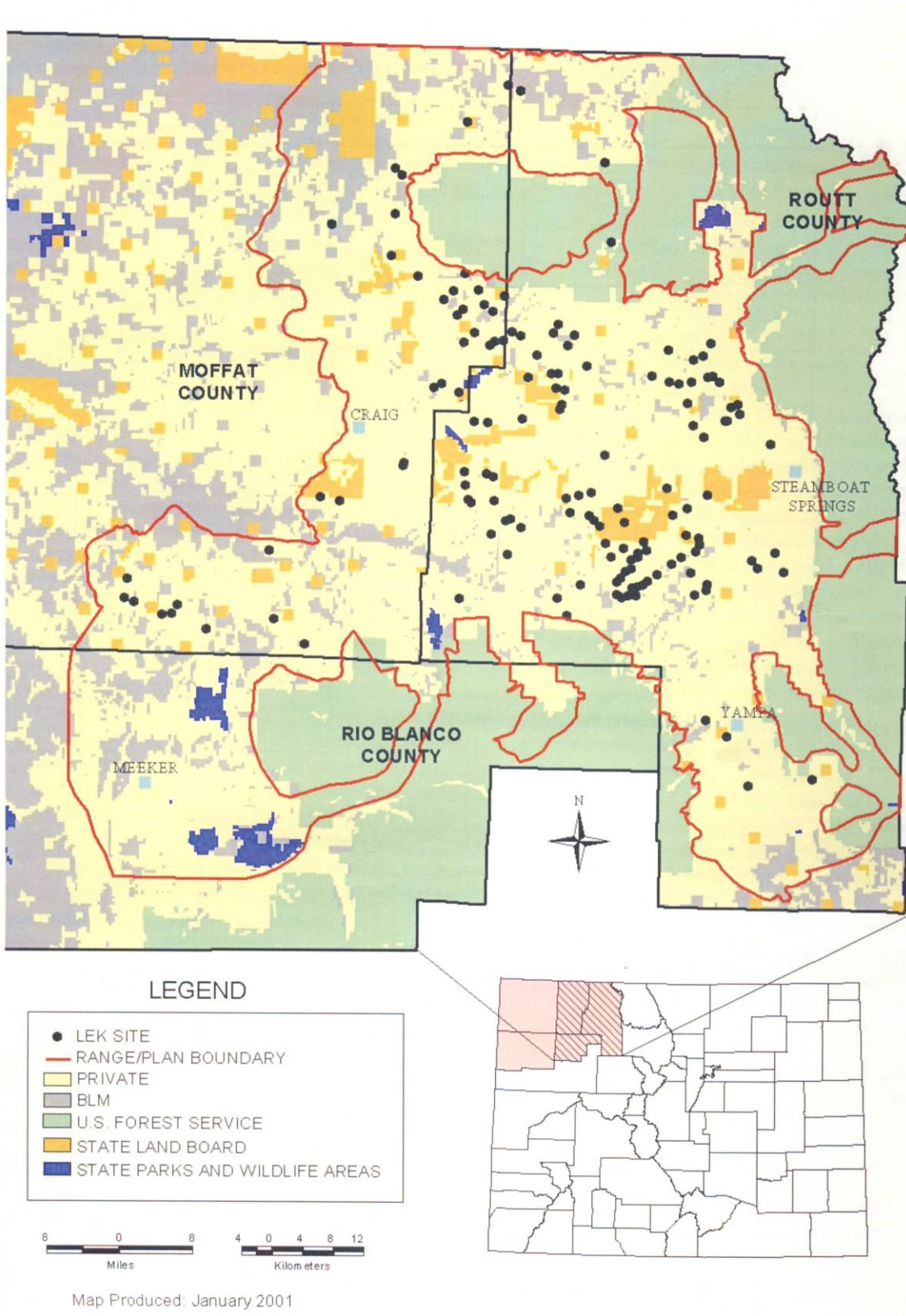


Figure 1: Columbian sharp-tailed grouse distribution in northwestern Colorado

Table 1. Distribution of land ownership within the occupied range of Columbian sharp-tailed grouse in northwest Colorado.

Land Status	Acres	Hectares	Percent
Total Private	1,314,577	531,990	71
Bureau of Land Management	235,023	95,110	13
U.S. Forest Service	148,902	60,258	8
State Wildlife Areas and Parks	25,569	10,347	2
Total Public	409,494	165,715	23
State Land Board (SLB)	106,929	43,371	6
Total Public, Private, and SLB	1,831,000	741,052	100

of trees and shrubs in riparian areas, invasion of conifers, and urban development (Marshall and Jensen 1937, Hart et al. 1950, Yocom 1952, Buss and Dziedzic 1955, Starkey and Schnoes 1976, Zeigler 1979, Oedekoven 1985, Giesen 1987, Klott 1987, 1937, Hart et al. 1950, Yocom 1952, Buss and Dziedzic 1955, Starkey and Schnoes 1976, Zeigler 1979, Oedekoven 1985, Giesen 1987, Klott 1987, Marks and Marks 1987, Ritcey 1995, McDonald and Reese 1998, Schroeder et al. 2000). Much of the habitat that remains has been altered both structurally and floristically. The impacts have been so extensive in some areas that the few remaining unaltered habitats are often too small and widely spaced to support viable grouse populations.

The entire North American breeding population of CSTG is estimated at <35,000 birds (Bart 2000). The historical distribution extends from central British Columbia south across western Montana, Idaho, eastern Washington and Oregon, northeastern California, northern Nevada and Utah, and western Wyoming and Colorado (Aldrich and Duvall 1955, Aldrich 1963, Miller and Graul 1980). Presently, stable or increasing breeding populations (5,000+ birds) can be found in

British Columbia, Idaho, Colorado, and Utah. Within the United States, Idaho contains about 60% of the remaining population. Columbian sharptails have been extirpated from California, Nevada, and Oregon, and only remnant populations (<1,000 birds) remain in Washington, Montana, and Wyoming. Attempts have been made to reintroduce Columbian sharp-tailed grouse into formerly occupied ranges in Oregon, Nevada, and Idaho, and to augment existing populations in eastern Washington (Gardner 1997, Snyder et al. 1999, Crawford and Coggins 2000, Smith 2000; S. Stiver, Nevada Division of Wildlife, pers. com.).

Bailey and Niedrach (1965), citing numerous other sources (Morrison 1888, Gilman 1907, Cary 1909, Cooke 1909, Marsh 1931), present the following account of early records of CSTG in Colorado.

Resident locally to 9500 feet west of the Continental Divide. First noted in present day Colorado in 1839 at the mouth of the Blue River in Grand County. Eight specimens collected in Summit and Grand counties by a man named Carter. Adults and young found near Fort Lewis, La Plata County on high mesas well covered with scrub oak. Rather common near Hahns Peak, Routt County and northeastern Moffat County. In 1907, they were found in the mountains and high mesas of San Miguel and Dolores counties, and in McElmo Canyon, Montezuma County. Noted along the White River Basin in Rio Blanco County.

Referring to their own notes, Bailey and Niedrach (1965) report numerous observations of these grouse in Grand, Routt, and Mesa counties. They specifically mention the open shrub-covered slopes of the

Table 2. Estimated percentage of major vegetation types within the occupied range of Columbian sharp-tailed grouse in northwest Colorado.

Vegetation Type	Percent
Native grass/forb/pasture	26
Mountain shrub/shrub steppe	23
Sagebrush	20
Agricultural ^a	18
CRP	3
Aspen	3
Mine reclamation	1
Other	6

^a Includes wheat, alfalfa, and hay.

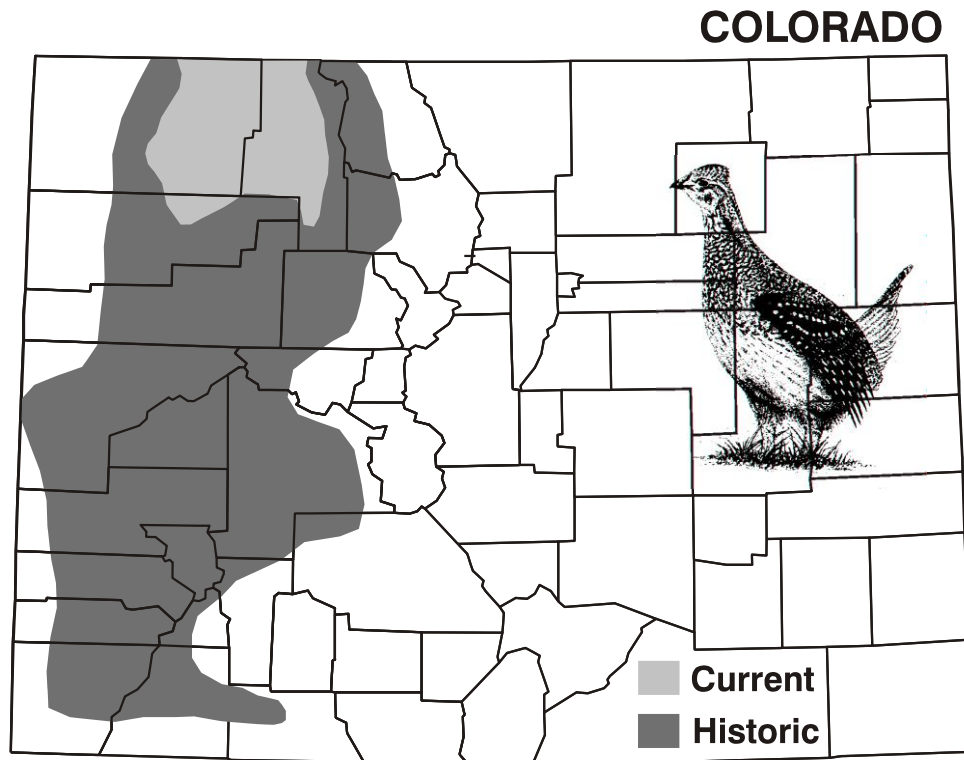


Figure 2. Historic and current distribution of Columbian sharp-tailed grouse in Colorado.

Uncompahgre Plateau as especially favorite places for CSTG. They also make note of 20 skins in the collection from Routt, Moffat, Pitkin, and Grand counties. Roth (1963), citing a statement by Frank Mayer, mentions that sharp-tailed grouse and sage grouse were abundant during early market hunting days on the mesas and in the valleys near the junction of the Grand River (now the Colorado River) and Blue River. This is near the location of the first reported sighting in Colorado (Marsh 1931). Rogers (1969) reported CSTG inhabited the following 8 counties in Colorado in the early 1960s: Dolores, Gunnison, Mesa, Moffat, Montezuma, Montrose, Rio Blanco, and Routt. By the early 1990's, the distribution of the CSTG was restricted to Routt, Moffat, Rio Blanco, and Mesa counties (Giesen and Braun 1993).

Although Giesen and Braun (1993) suggest CSTG grouse may have inhabited 22 counties in western Colorado (Figure 2), it is possible this distribution is exaggerated due to the misidentification of blue grouse and sage grouse for sharptails. Museum specimens and/or documented lek sites of *T. p. columbianus* are only available from Summit, Grand, Moffat, Montrose, Delta, and Routt counties. Valid sightings are reported from Montezuma, Dolores, La Plata, Rio Blanco, Garfield, Gunnison, San Miguel, Ouray, Jackson, and Eagle counties. There are questionable or unconfirmed records of sharptails in Archuleta, Saguache, Mineral, Hinsdale, and Pitkin counties. Giesen and Braun (1993) found 13 specimens of *T. p. columbianus* from Colorado in the Denver and National Museum of Natural History. The specimens were from Routt, Moffat, Grand, and Summit counties. They did not find any specimens from Pitkin County as reported by Bailey and Niedrach (1965).

Currently, Columbian sharp-tailed grouse are known to occur in Routt, Moffat, and Rio Blanco counties. The last confirmed sightings from anywhere else in the state are from Mesa County in 1985 (Giesen 1985). Subsequent efforts to locate sharptails in Mesa County have been unsuccessful. The breeding population of Columbian sharp-tailed grouse in Routt and eastern Moffat counties is contiguous with the smaller population in south-central Wyoming (Oedekoven 1985, Klott 1987), but remains disjunct from populations in Utah (Wilson and Maxfield 2000).

POPULATION ESTIMATE

Moffat and Routt counties support > 90% of the remaining birds in Colorado. Intensive lek surveys conducted from 1997 to 2000 have resulted in the location of 174 lek sites in Moffat (46) and Routt (128) counties of which 133 were classified as active (Appendix A). No active leks have been found in Rio Blanco County or west of Highway 13 north of Craig to the Wyoming border even though sharptails are known to occur in these areas. About 70% of the suitable habitat has been searched. Assuming the unsearched habitat supports proportionally the same number of active leks (i.e., $n = 57$), the minimum breeding population based on a 1:1 sex ratio and 3 year (1998-2000) moving average of 16 males per lek can be estimated as $190 \text{ active leks} \times 16 \text{ males/lek} \times 2 = 6,080 \text{ birds}$.

BIOLOGY

During the spring, males gather on traditional breeding areas called leks or dancing grounds (Connelly et al. 1998). Leks may contain as few as 2 males to as many as 40 or more, but average about 14 males. Here the males go through elaborate courtship displays and vocalizations to attract a female for breeding and to defend their territory on the lek from other males. Established leks may be used for many years, even decades, although the precise location may shift over time. Columbian sharp-tailed grouse are polygynous and have a mating system where relatively few males perform the majority of copulations on the lek (Rippin and Boag 1974). These dominant males occupy territories near the center of the lek. Breeding predominately occurs in late April or early May.

After breeding, females locate and construct a rudimentary nest on the ground and lay 10-12 eggs over an 11-14 day period. Once the clutch is complete, the hen will incubate the eggs for about 24 days. Eggs start hatching in late May, with the peak of hatch occurring in early June. The timing of nesting activities can vary by 2-3 weeks from one year to the next depending on spring weather conditions. Unlike males, hens may attend more than one lek. If the first clutch is destroyed before the eggs hatch, the hen sharptail will often return to the lek for breeding and establish a new nest. Nest success (% of hens that hatch at least 1 egg) can vary from <50% to >70% (Hart et al. 1950, Giesen 1987, Meints 1991, Apa 1998, McDonald 1998, Hoffman 2000). Both adult and yearling hens will attempt to nest, but adults tend to be more successful than yearlings and exhibit a greater tendency to reneest if the first nest is destroyed.

When the chicks first hatch, they are vulnerable to weather, shortages of food, and predation. A cold, wet period during this time can cause the loss of an entire brood, whereas low food abundance and losses to predators usually cause a slow attrition of the brood. An abundant insect supply is very important to chicks during their first two to three weeks of life. After that, the flowering parts and leaves of broad-leaf plants, referred to as forbs, make up a significant portion of their diet. Like nest loss, chick losses up to 65% are not considered detrimental to maintaining populations.

Adults also consume insects in addition to seeds and leaves from a variety of forbs and grasses (Hart et al. 1950, Jones 1966). As summer transitions to fall, the consumption of berries increases and that of insects and herbaceous plants decreases. In Colorado, the fruits of chokecherry, serviceberry, hawthorne (*Crateagus* spp.) and snowberry are used heavily. As the berry crop is depleted and winter snows cover herbaceous plants, sharptails switch to buds of deciduous shrubs and trees, especially chokecherry and serviceberry (Schneider 1994). Sharptails will use cultivated plants, such as alfalfa, wheat, milo, and corn, at certain times of the year if available.

Spring and summer movements of both sexes are usually restricted to within a 1.2 mi (2 km) radius around the lek site (Oedekoven 1985, Marks and Marks 1987, Meints 1991, Giesen 1997, Hoffman 2000). Females tend to venture farther from leks than males, but most females will nest and raise their broods within 1.2 mi (2 km) of the lek where they were bred. The males seldom venture more than 1 mi (1.6 km) from the lek and will often return to the lek site in the fall prior to moving to wintering areas. Movements in excess of 30 km

have been documented between breeding and wintering areas, but usually range from 1 to 4 mi (1.6-6.4 km). Giesen and Connelly (1993) suggested that CSTG move farther to wintering habitats in regions lacking a broad distribution of winter food resources. Recent data collected in northwest Colorado (Hoffman 2000), where winter habitat is abundant and widely distributed, does not support this argument. In this study, birds did not necessarily move to nearest winter habitat, which usually occurred within 1 mi (1.6 km) of the lek sites. Instead, the birds bypassed suitable winter habitat near the leks and dispersed over an area some 25 times as large as the area where they spent the spring and summer.

HABITAT RELATIONSHIPS

General

At the ecosystem level, Columbian sharptails inhabit rangeland communities in the 12 to 20 in (20-51 cm) precipitation zone. They are predominately associated with flat to rolling terrain, although they will use the top and bottom portions of steeper slopes during the winter. Large expanses of healthy rangelands are needed to support a self-sustaining population.

Native CSTG habitat is characterized by bunchgrass and shrub/bunchgrass rangelands in good ecological condition with at least 20% of the landscape in tall, deciduous shrub thickets provided by riparian zones, mountain shrub patches, and aspen stands (Meints et al. 1992, Giesen and Connelly 1993). The rangeland communities provide breeding, nesting, and brood rearing habitat, whereas the riparian zones and mountain shrub thickets are essential for wintering (Giesen and Connelly 1993). Ideal habitats include rangelands dominated by perennial bunchgrasses, such as bluebunch wheatgrass (*Agropyron smithii*) and Idaho fescue (*Festuca idahoensis*), with a shrub layer dominated by big sagebrush, snowberry, and bitterbrush (*Purshia tridentata*). Serviceberry, chokecherry, and hawthorne are particularly valuable mountain shrub species, while birch (*Betula* spp.) and willow (*Salix* spp.) are important riparian species. Aspen also is used during spring and winter.

In certain situations, seeded rangelands and cultivated cropland can provide habitat for sharptails. However, to be useful to sharptails, seeded rangelands must provide important food plants and a similar structure to that of native rangelands. Alfalfa, wheat, and barley fields can provide important food resources, but they must be located near permanent cover that provides nesting, brood-rearing, and winter habitat. Large blocks of cultivated land will not support sharptails.

Leks/Dancing Grounds

Leks are typically located on low knolls, benches, and ridge tops that are slightly higher in elevation than the surrounding terrain. The display area for an average-sized lek of 14 birds occupies an area approximately 100 ft (30 m) in diameter. The vegetation on leks is usually grass, low shrub, or a scattered shrub-grass mixture. The cover is relatively sparse to facilitate visibility and unrestricted movements. Areas of taller, denser shrubs and grasses adjacent to the lek are important for escape cover

Nesting and Brood-Rearing Habitat

Most nest and brood locations are within 1.2 mi (2 km) of the lek where the hen was bred. The birds nest and raise broods in both cultivated fields (e.g., irrigated pasture, alfalfa hay, grain stubble, dryland seedings) and native grassland and grass/shrub plant communities. The birds prefer nest sites with an overhead canopy of vegetation provided by either grasses or shrubs or both. Nest success is usually better on areas that have a relatively dense herbaceous cover of native vegetation (reviewed by Tirhi 1995).

Sharptails show a great degree of flexibility in the proportion of grasses and shrubs that make up suitable nesting and brood-rearing habitat. They use grasslands with only small amounts of shrubs in the composition

as well as shrub/grass ranges with shrub cover up to 40%. The common denominator appears to be the amount of cover provided by the vegetation whether it is herbaceous, shrubs, or a combination of both. In other words, whether it is a grass or a shrub-dominated landscape, a certain height and density of vegetation is required.

The Robel pole (Robel et al. 1970) has become a standard technique to measure sharptail cover. The pole, which is divided into 5-cm (2-in) increments, is placed in the vegetation and the lowest visible increment is recorded from a standard distance and height. Good quality nesting and brood-rearing habitat will have an average visual obstruction reading of 8 to 12 in (20-30 cm). An area that averages less than 6 in (15 cm) visual obstruction is of little or no value to sharptails (Meints et al. 1992).

The growth form of dominant grasses also is an important cover consideration. Bunchgrasses, such as bluebunch wheatgrass and Basin wild rye (*Elymus cincerus*), are much more favorable to sharptails than sod-forming grasses such as smooth brome (*Bromus inermis*). Moreover, bunchgrasses that have a high percentage of leaves to stems, such as bluebunch wheatgrass, provide better cover than bunchgrasses that have a low percentage of leaves to stems, such as crested wheatgrass (*Agropyron cristatum*).

Winter Habitat

When snow covers herbaceous vegetation or agricultural crops, sharptails move to riparian zones and patches of mountain shrubs (Marks and Marks 1988, Schneider 1994, Ulliman 1995, McDonald 1998, Giesen and Connelly 1993). The birds will often move to higher elevations where moister conditions support greater amounts of these types of species. However, if winter conditions are mild, they often stay in the open grassland and shrub/grassland communities that they used for breeding, nesting, and brood-rearing (Ulliman 1995, McDonald 1998).

When the birds are required to use tall deciduous shrubs to survive winter conditions, this type of vegetation should be within 4 mi (6.5 km) of a lek to be useful, although some birds are known to travel over 12 mi (20 km) to find suitable winter habitat (Meints 1991, Hoffman 2000). Winter habitats are characterized by stringers and patches of these tall shrubs that are well distributed over the landscape. Coverage ranging from 5-10% is acceptable, with 20% estimated to be optimum in situations where the birds are using the area for both wintering and nesting/brood-rearing.



Photo by M. Parchman.

CONSERVATION STRATEGY

STATEMENT OF PROBLEM

The CSTG population in northwest Colorado has not experienced the drastic declines documented elsewhere within the subspecies range. However, there is still reason for concern about the long-term stability of this population because of its reliance on artificial habitats and extensive use of private lands. This does not mean private lands are poorly managed, but that management opportunities to benefit CSTG are more limited on private than public lands. Current studies suggest this population has only recently increased due to the implementation of the Conservation Reserve Program and passage of the Surface Mining Control and Reclamation Act (Hoffman 2000). A population decline can be expected if the Conservation Reserve Program is discontinued, if landowners pull out of the program because the guidelines are too restrictive, or if they can generate more income from other uses of the land. Declines also may occur on reclaimed mine lands because there are no assurances reclaimed lands will be managed in ways that are beneficial or at least not detrimental to sharptails following bond release. These lands could be sold or revert back to the original ownership.

POPULATION OBJECTIVE

Considering that the Columbian sharp-tailed grouse population in northwest Colorado is probably greater than it has been in the past 50+ years, a reasonable and prudent goal would be to maintain the population at its current level of approximately 6,100 birds. This would require a minimum of 190 active leks with an average of 16 males per lek. It is reasonable to assume the population can be maintained at this level provided there is no net loss of CRP lands and surface mined lands are reclaimed in an expedient manner. Expansion of the program and/or improving the quality of existing CRP fields will further insure the stability of this population and will most likely contribute to an increase in the population. Under these circumstances, an optimum spring population of 7,500 birds is achievable. This would require an increase in the average number of males per lek and/or the total number of active leks.

HABITAT OBJECTIVES

1. Insure that suitable escape cover occurs within 1,300 ft (400 m) of lek sites. Escape cover can include shrub communities with > 25% canopy coverage and a minimum height of 16 in (41 cm) or grass/forb communities with a cover height of at least 10 in (25 cm). Escape cover can consist of several small patches of 2-3 acres (1 hc) or 1 or 2 larger patches of 8-10 acres (4 hc).
2. Insure that suitable nesting and brood-rearing habitats occur within at least 1.5 mi (2.4 km) and preferably within 0.5 mi (1 km) of all lek sites. Within a 1.5-mile (2.4 -km) radius of the lek, a minimum of 50% of the area should be suitable for nesting and brood rearing. Nesting and brood rearing habitats can include grasslands with little or no shrubs or shrub/grass ranges with up to 40% canopy coverage of shrubs. The important factors are the height and density of the vegetation and not so much the composition. The minimum height for good quality nesting and brood rearing habitat is 8 in (20 cm). The preferred height is 12 in (30 cm). This can be in the form of residual cover or new growth and should be available by mid- to late May.
3. Insure suitable winter habitat occurs within 2.5 mi (4 km) and no more than 4 mi (6.5 km) from lek sites. Winter habitat must include deciduous shrub dominated communities composed of serviceberry, chokecherry, or hawthorne, preferably in close (300-400 ft, 100 m) proximity to aspen, and with canopy coverage >20% and a minimum height of 3-4 ft (1 m). Taller shrubs (6+ ft, 2 m) are better, especially in areas that receive large amounts of snowfall. The birds will roost in the soft snow when not feeding in the shrubs. The snow provides both thermal and hiding cover. Thus, shrub stands in exposed sites where the snow becomes crusted or blown away are less suitable. Within a 4-mile (6.5-km) radius of the lek, at least 10% of the area should consist of suitable winter habitat.

4. Within the plan boundary, insure that 20% of the landscape remains in deciduous shrub dominated communities, 20% in sagebrush dominated communities, 15% in grasslands, 5% in aspen, and 5-10% in CRP and mine reclamation lands. These types should be well distributed across the landscape.
5. At the very minimum, there should be no net loss of CRP within the plan boundary. Every effort should be made to increase the amount of CRP by 5% and to enhance 50% of the existing acreage to benefit sharptails by adding more grasses and legumes. All new CRP should include 5 to 10% (0.05-0.1 lb PLS/acre) big sagebrush in the seed mixture.
6. Identify, maintain, and manage dispersal/travel corridors between blocks of suitable habitat and between occupied and suitable, but unoccupied habitats (e.g., Gore Pass as a link between occupied habitats near Yampa and Toponas and unoccupied, historic habitats in Middle Park).

ISSUE IDENTIFICATION

Issues that potentially impact CSTG and their habitats were identified by the work group. No limitations were placed on what could be an issue. The work group was of the opinion that no one issue was more important than another and that impacts were cumulative across issues. Thus, no attempt was made to prioritize the issues. As the issue identification process evolved, questions arose about the validity of some issues, what was actually meant by certain issues, and whether some issues were pertinent to northwest Colorado. After lengthy discussions, the work group reached consensus on the following list of 23 issues that are addressed in this plan:

- | | |
|-----------------------------------|---|
| ◆ Hunting | ◆ County Land Use Planning/Community Development |
| ◆ Increased Recreational Activity | ◆ Mining and Energy Development |
| ◆ Lek Harassment | ◆ Density and Diversity of Shrubs |
| ◆ Roads | ◆ Grazing by Domestic Ungulates |
| ◆ Power lines | ◆ Grazing by Wild Ungulates |
| ◆ Predation | ◆ Degradation of Wetland Areas |
| ◆ Genetics | ◆ Invasion of Noxious/Exotic Plants |
| ◆ Disease and Parasites | ◆ Ramifications of Listing |
| ◆ Quality of CRP | ◆ Lack of Information Distribution |
| ◆ Loss of CRP | ◆ Poor Historical Information/Inadequate Inventory Data |
| ◆ Range Expansion | ◆ Conversion of Native Habitats due to Cultivation |
| ◆ Fire Management | |

Issues that were discussed but excluded because they were not considered pertinent included pollution, irrigation, insecticides, and fertilization. Habitat fragmentation also was identified as an issue, but rather than present it as a separate issue, it is addressed within the context of the issues that may cause fragmentation.

ISSUE DESCRIPTIONS, CONSERVATION ACTIONS, AND IMPLEMENTATION PLAN

Hunting - Since 1976, season length has ranged from 3 to 34 days with bag limits of 2-3 birds/day and possession limits of 4-9 birds (Table 3). Bag and possession limits for sharp-tailed grouse were in aggregate with sage grouse until 1981. The season opened on the second Saturday in September from 1976 through 1991 and on 1 September thereafter. In 1986, the sharptail season was closed statewide except in portions of Routt and Moffat counties. Until 1995, harvest estimates were obtained using a post-season mail survey of a sample (3-5%) of small game license buyers. From 1995 to 1997, hunters were required to obtain a permit to hunt sharptails. The permits were free and unlimited in number. Both the regular mail survey (5% sample of small game license buyers) and phone survey (100% of permit holders) were conducted during this period. Starting in 1998, small game license buyers were required to register with the Harvest Information Program (HIP). When they call to register, they are asked to provide basic information about their hunting activities, including what species of upland birds they are very likely, somewhat likely, or will not hunt in the upcoming season. A telephone survey is conducted after the season based on the following sampling scheme: 67% of the hunters that indicated they are very likely to hunt sharptails, 27% of those that indicated they are somewhat likely to hunt sharptails, and 4% of those that indicated they would not hunt sharptails.

Due to small sample sizes, high non-response bias (successful hunters more likely to respond than unsuccessful hunters), and misidentification by hunters, mail surveys grossly overestimated the harvest by 6-10 fold compared to the phone surveys (Table 3). Giesen (1999) reported that the annual harvest of sharptails

Table 3. Columbian sharp-tailed grouse season structure and harvest information for western Colorado, 1976-1999.

Year ^a	Season Length (days)	Bag/possession ^b limit	<u>N</u> ^c Hunters	<u>N</u> ^c Harvest
1976	3	2/4	769	1,621
1977	7	3/6	1,067	2,263
1978	9	3/6	786	1,699
1979	9	3/6	914	3,094
1980	9, 16, or 25 ^d	3/6	1,056	2,218
1981	16	3/6	827	1,747
1982	16	3/6	665	924
1983	16	3/6	1,328	2,670
1984	30	3/6	1,482	1,821
1985	23	3/6	1,103	2,116
1986	23	3/6	428	497
1987	23	3/6	1,408	2,368
1988	23	3/6	1,463	2,400
1989	30	3/6	1,862	4,018
1990	30	3/6	1,618	4,639
1991	30	3/6	1,686	2,550
1992	34	3/9	1,267	2,597
1993	33	3/9	1,157	1,761
1994	32	3/9	871	1,404
1995	17	2/4	128 (708)	111 (1096)
1996	22	2/4	255 (900)	227 (1327)
1997	21	2/4	97 (866)	102 (682)
1998	20	2/4	317	433
1999	19	2/4	304	328

^a Hunting restricted to portions of Routt and Moffat counties only from 1986 to present.

^b Bag and possession limit in aggregate with sage grouse from 1976 to 1981.

^c Estimates based on mail surveys only from 1976 to 1994, phone and mail (in parentheses) surveys from 1995 to 1997, and phone surveys only in 1998 and 1999.

^d Season length varied depending on the Game Management Unit.

from 1980 to 1997 averaged 200-300 birds/year and probably did not exceed 500 birds in any one year. Rogers (1969) estimated the average annual harvest to be 588 birds from 1955 to 1965.

Over the past 5 years for which reliable data are available, harvest estimates have ranged from 102 to 433 birds and averaged 240 birds per year (Table 3). Based on a conservative fall population estimate of 12,000 birds (double the spring population to account for production), hunting removes less than 4% of the available birds. At this level, hunting is compensatory to natural mortality. This assertion is supported by data from wing collections. Analysis of wings collected from hunter-harvested birds over the past 24 years indicates juveniles comprise over 55% of the harvest (Table 4). Concerns about over-harvest are further diminished because most of the birds occur on private land with limited access for hunting.

Table 4. Age composition of Columbian sharp-tailed grouse harvested in northwest Colorado based on wing analyses, 1980 - 1999.

Year	Adults ^a		Juveniles		Juveniles/adults	Sample size
	N	%	N	%		
1980	25	40	38	60	1.5	63
1981	83	58	59	42	0.7	142
1982	60	34	117	66	2.0	177
1983	74	33	150	67	2.0	224
1984	29	48	31	52	1.1	60
1985	19	27	50	73	2.6	69
1986	8	30	18	69	2.2	26
1987	56	37	96	63	1.7	152
1988	69	49	72	51	1.0	141
1989	89	56	71	44	0.8	160
1990	44	48	48	52	1.1	92
1991	26	32	54	68	2.1	80
1992	71	53	63	47	0.9	134
1993	33	51	32	49	1.0	65
1994	31	44	40	56	1.3	71
1995	16	34	31	66	1.9	47
1996	17	26	49	74	2.9	66
1997	50	48	55	52	1.1	105
1998	28	44	37	56	1.3	65
1999	28	36	51	64	1.8	79
Totals	856		1162			2018
		42		58	1.4	

^a Includes yearlings. Sex cannot be distinguished based on examination of wing characteristics.

Over-harvest may be an issue on the few areas where sharptails occur on public lands. However, these areas are usually surrounded by private lands that receive little or no hunting pressure. Even if the entire harvest is coming from public lands, it is unlikely the removal of 300 to 400 birds per year has a significant impact on the population occupying public lands. Nonetheless, if sharptails are being over-harvested on some public lands, there should be an adequate source of birds on adjacent private lands to replenish the birds lost on public lands.

Hunting is an issue because few agree about the merits of hunting. Historically, unrestricted harvest in the early 19th century was believed to be one of the major contributing factors leading to the decline of Columbian sharp-tailed grouse (Hart et al. 1950). Presently, where secure populations exist, regulated harvest is believed to have little effect on long term population viability. However, some biologists argue that hunting

is additive to over-winter mortality and may negatively impact populations (Bergerud 1988). Marks and Marks (1987) suggest that sharptails are more vulnerable to over-harvest than other grouse because of their tendency to concentrate around leks during the fall hunting season. Others believe that up to a certain level (15-20% of the fall population) hunting is compensatory and has no impact on the subsequent spring breeding population (Hickey 1955). Still others question if it is ethical to hunt any species that has been petitioned for listing regardless of whether hunting is additive or compensatory. In Colorado, biologists believe hunting of sharptails is self-regulatory because 95% of the birds occur on private land where there is little or no access (Braun et al. 1994). This fact in itself represents an issue, because there is demand, but limited opportunity for hunting sharptails by the public.

Issue **Hunting**: How can the CDOW continue to provide hunting opportunity for CSTG without negatively impacting long-term population viability?

Objectives	Goals	Actions	Who	When
A. Provide a level of hunting recreation that does not adversely affect viability of CSTG populations in northwest Colorado.	<p>1. Maintain the current hunting season in Routt and Moffat counties (19-24 days starting 1 September, 2/4 bag and possession limit).</p> <p>2. Modify harvest regulations (season length, bag and possession limits, timing) depending on population trends and harvest estimates using a 3 year moving average.</p>	a. Continue monitoring hunter activity and harvest using check stations, wing barrels, and telephone surveys.	CDOW	Ongoing
		b. Evaluate the reliability of HIP in identifying CSTG hunters.	CDOW	Starting in 2001 ongoing
		c. Sample 100% of the hunters registering with HIP that say they are very likely to hunt CSTG.	CDOW	Starting in 2001 ongoing
		d. Explore new ways to increase the precision of harvest surveys, especially identification of sampling universes (e.g., issue an upland bird habitat stamp or separate upland bird license).	CDOW	Starting in 2001 ongoing
		e. Treat lek locations as sensitive information.	CDOW	Ongoing
		f. Avoid seasons that coincide with the period of fall lek attendance (late Sept to mid-Oct).	CDOW	Starting in 2001 ongoing
		g. Publish reminders in the small game hunting brochure encouraging hunters to participate in harvest surveys and wing collection programs.	CDOW	Starting in 2001 ongoing
		h. Educate hunters on grouse identification to reduce illegal kill.	CDOW	Starting in 2001 ongoing
		i. Provide sufficient manpower and funding to conduct annual lek surveys in accordance with established protocols.	CDOW	Starting in 2001 ongoing
		j. Implement more conservative regulations if harvest levels are >20% of the estimated fall population over 3 consecutive years	CDOW	Starting in 2003 ongoing
		k. Consider more liberal regulations if harvest levels are <10% of the estimated fall population over 3 consecutive years.	CDOW	Starting in 2003 ongoing

Increased Human Recreational Activities - This issue initially centered around concerns about the unrestricted, expanding use of off road vehicles and the subsequent impacts on sharp-tailed grouse behavior and habitat use. However, the work group considered this a site-specific problem that was less pronounced on private lands, where most grouse presently occur. The work group decided that use of off road vehicles was indicative of a larger issue, which was identified as increased human recreational activities. This larger issue takes into consideration the cumulative impacts of numerous recreational activities including ATV's, motorcycles, 4-wheel drive vehicles, snowmobiles, mountain bikes, hikers, and skiers. Effects of recreational activities on sharp-tailed grouse have not been well documented, although some observations have been reported. Baydack and Hein (1987) found that during spring, male sharptails were temporarily displaced from leks subjected to disturbances, but continued to attempt to regain their position on the lek and returned once the disturbance factor was removed. During fall, displaced males seldom returned to leks that were disturbed. Females avoided disturbed leks at all times and made no effort to return until the disturbances were removed. Based on this observation, Baydack and Hein (1987) concluded that leks subjected to continual disturbance may become reproductively inactive due to absence of females.

Issue **Increased Human Recreational Activity**: How can the impacts of more people recreating in areas occupied by CSTG be minimized/better managed?

Objectives	Goals	Actions	Who	When
A. Provide for a level of recreation that does not jeopardize the stability of CSTG populations.	1. Minimize the negative impacts of recreational activities on CSTG.	a. Manage recreational activities on public land during breeding and nesting periods where conflicts have been identified.	CDOW, USFS, BLM, State Parks	Starting in 2001 as identified
	2. Quantify the level of recreational activity within areas occupied by CSTG and identify potential conflicts.	b. Encourage landowners to minimize human activities on their land during the breeding and nesting seasons.	CDOW	Starting in 2001 as needed
		c. Avoid excessive or unnecessary recreational activities within 0.6 mi (1 km) of known lek sites where conflicts have been identified.	CDOW, USFS, BLM, landowners, State Parks	Starting in 2001 as identified
	3. Educate recreationists about the potential impacts of their activity on CSTG, including recommendations to minimize disturbance.	d. Advocate better/increased enforcement of existing regulations where conflicts have been identified.	CDOW, USFS, BLM, State Parks	Starting in 2001 as needed
		e. Identify and map areas of high recreational use within a 1 mi (1.6 km) radius of known lek sites.	CDOW	Starting in 2001
		f. Initiate research to evaluate the cumulative impacts of recreational activities on CSTG.	CDOW	Starting in 2004
		g. Manage snowmobile use near critical winter habitats (mountain shrub and riparian areas) where conflicts have been identified.	CDOW, BLM, USFS, State Parks	Starting in 2001 as identified
	h. Prepare and distribute educational materials about CSTG to recreational groups, tourists, pet owners, and private landowners.	CDOW, USFS, BLM, State Parks	Starting in 2001	

Issue **Increased Human Recreational Activity**: continued.

Objectives	Goals	Actions	Who	When
		i. Work with recreational groups and private landowners to develop mutually acceptable guidelines/restrictions to minimize disturbance of CSTG and damage to CSTG habitats.	CDOW, USFS, BLM, State Parks	Starting in 2001
		j. Post signs describing access restrictions in critical areas where conflicts have been identified.	CDOW, BLM, USFS, State Parks	Starting in 2001 as needed
		k. Plan/permit organized recreational activities to avoid critical times and areas important to CSTG.	CDOW, USFS, BLM, State Parks	Starting in 2001
		l. Avoid/manage disturbance which impairs the “acoustic component” (i.e., continuous noise sources) of the breeding display.	CDOW, USFS, BLM, State Parks	Starting in 2001 as identified

Lek Harassment - This issue can be divided into two categories - scientific (research/management activities) and recreational (wildlife viewing) harassment. The work group did not regard wildlife viewing as a serious issue because (1) 124 of 133 active leks are located on private lands with little or no public access, and (2) most of the leks on public lands are inaccessible during the breeding season due to road closures or snow conditions. However, concern was expressed about future demands for public viewing and the need to develop viewing protocols to manage human activities near leks. Concern also was expressed about possible trespass problems for easily accessible leks located on State Trust and private lands.

Protocols for guided and self-guided viewing tours for sage grouse leks were developed and implemented in North Park, Colorado in the mid-1980s (Profera 1986). Braun (1987) suggested that as long as protocols are understood and followed no reduction in lek attendance or disruption of breeding activities should occur. The first guided tours for sharp-tailed grouse in northwest Colorado were conducted in spring 2000 following the guidelines developed for the North Park tours. Male sharptails seem to be more tolerant of disturbance at the lek than sage grouse. Male sharptails can be viewed at a closer distance and generally return within 10 to 15 minutes if accidentally flushed. Female sharptails are less tolerant of disturbance (Baydack and Hein 1987). Thus, if protocols are not followed, attendance of female sharptails may be adversely affected resulting in reduced reproductive activity.

Research and management activities for sharptails require frequent visits to lek sites for inventory, monitoring, capture, and marking. Because the birds are often obscured by vegetation or topographic features when on the lek, monitoring and inventory frequently require that the birds must be flushed to obtain a complete count. Repeated visits to the lek may impact lek attendance patterns and cause the birds to become more wary. Efforts to capture birds using walk-in traps (Schroeder and Braun 1991) may compound these impacts. In addition, some mortality can be directly attributed to trapping and handling of birds for research purposes. Currently, the Colorado Division of Wildlife traps about 150 birds per year as part of their research program with an estimated trap mortality of 3%.

Issue **Lek Harassment**: How can lek harassment be minimized while also allowing for public viewing and research/management activities?

Objectives	Goals	Actions	Who	When
A. Minimize disturbance at leks due to public viewing, research, and management activities.	1. Prevent negative impacts from unethical viewing practices and poorly designed research and management projects. 2. Allow public viewing recreation of CSTG. 3. Evaluate impacts of public viewing, research, and management activities on lek attendance patterns.	a. Treat lek locations as sensitive information.	CDOW, BLM, USFS	Starting in 2000
		b. Develop protocols for lek viewing.	CDOW	Starting in 2000
		c. Educate public about ethical viewing practices.	CDOW	Starting in 2001
		d. Select appropriate leks for viewing (not to exceed 10% of known active leks) and obtain landowner approval to designate as viewing leks.	CDOW	Starting in 2001
		e. Screen research/management proposals to insure ethical capture, handling, and monitoring protocols are incorporated into the project.	CDOW	Starting in 2000 ongoing
		f. Develop watchable wildlife program for CSTG in conjunction with the local community and interested landowners.	CDOW	Starting in 2000
		g. Identify benefits and economic incentives to landowners that allow lek viewing.	CDOW	Starting in 2001
		h. Evaluate research methodologies and modify when feasible to reduce negative impacts to CSTG.	CDOW	Starting in 2000 ongoing
		i. Monitor and quantify effects of viewing on lek attendance patterns, especially for females.	CDOW	Starting in 2001

Roads - Roads may impact sharptails by causing acoustic disturbances, loss of habitat, degradation of habitat, fragmentation of habitat, and/or direct mortality. The degree of impact will depend on the type of road, density of roads, and proximity to key habitat use areas. There are no Interstate Highways, one U.S. Highway (US 40), and only three major State Highways (Colo 131, 134 and 13) within the area to which this plan applies (Table 5). The majority of roads in the area are paved or gravel county roads (Table 5). Whereas few sharptail leks have been located within 0.6 mi (1 km) of the state or federal highways, most leks are within 1 km of a county road (Table 6) and can be accessed within 0.25 mi (400 m) by two-track, utility, or service roads. The concerns about roads primarily relate to construction of new roads and improvement of existing roads. New and improved roads generally are accompanied by an increase in human activities. Construction of new roads may cause abandonment of nearby leks as documented for lesser prairie-chickens (Crawford and Bolen 1976) and sage grouse (Braun 1985, Remington and Braun 1991). Birds that traditionally used areas prior to road establishment or improvement may be more susceptible to disturbance and at greater risk of death from moving vehicles. Also, it is likely that there is some threshold density of roads above which sharptails avoid or reduce their use of adjacent suitable habitats.

Table 5. Amount of federal, state, and county roads within the plan boundary.

Road Type	Miles	Kilometers
Federal Highway	62	100
State Highway	167	270
County Road	3617	5821

Table 6. Distance [miles (km)] of active leks from roads within the plan boundary.

Road Type	Mean	Range
Federal Highway	9.1 (14.6)	0.6 - 29.6 (1.0 - 47.7)
State Highway	7.3 (12.1)	0.4 - 18.4 (0.6 - 29.6)
County Road	0.7 (1.1)	0.02 - 3.5 (0.03 - 5.6)

Issue **Roads**: How can existing and future roads be managed to minimize road-related disturbance, fragmentation, loss of habitat, degradation of habitat, and mortality of CSTG?

Objectives	Goals	Actions	Who	When	
A. Provide for a level of road types and density that does not further impact CSTG populations and their habitats.	1. Avoid further fragmentation/loss of critical habitats due to roads.	a. Identify, map, quantify, and evaluate impacts of existing roads in relation to known lek locations and other critical CSTG habitats.	CDOW	Starting in 2001	
	2. Where possible, reduce road densities in CSTG habitat.	b. Consider the impacts to CSTG when designing new roads and modifying existing roads.	USFS, BLM, State, County, landowners	Starting in 2001	
	3. Assess the impacts of roads on CSTG population dynamics and habitat use.		c. Consider management options such as seasonal use restrictions, closure, removal, realignment, or other mutually acceptable actions when possible to avoid disturbance of CSTG and damage to the habitat.	USFS, BLM, State, County, landowners	Starting in 2001 as identified
			d. Revegetate roads that are closed with plant species beneficial to CSTG.	USFS, County, BLM, landowners	Starting in 2001 as identified
			e. Develop standards and provide recommendations on future road construction to USFS, BLM, County, State, etc.	CDOW	Starting in 2001 ongoing
			f. Educate travel management planning groups and the general public about the impacts of roads on CSTG.	CDOW	Starting in 2001 ongoing

Power lines - Rigorous data concerning the impacts of power lines on sharp-tailed grouse are lacking. Therefore, concerns are based on the little information that is available about the response of sage grouse to power lines. Until recently, even this information was circumstantial and based more on opinion than quantitative data. However, recent information collected in Montana (Gunderson, P., unpublished data, Montana Fish, Wildlife, and Parks) and California (Hall, F., unpublished data, California Department of Fish and Game) shows that sage grouse abandoned lek sites following the construction of new power lines. Power line poles serve as perches for raptors (reviewed by Avian Power Line Interaction Committee 1996), which may increase predation rates on grouse or deter use of the immediate area by grouse. Mortality rates also may increase due to grouse colliding with power lines (reviewed by Avian Power Line Interaction Committee 1994). Even without the presence of raptors, there is evidence from studies of radio-marked sharptails that suggests they avoid otherwise suitable habitats under or immediately adjacent to power lines. The impacts of power lines may be less pronounced on sharptails than sage grouse. Active sharptail leks have been located < 0.25 mi (400 m) from power lines (Table 7). Some of these leks have been in existence for 10+ years. Rogers (1969) reported finding several leks near fences and under power and telephone lines, but did not specify how many.

Table 7. Classification of active Columbian sharp-tailed grouse lek sites in northwest Colorado according to the distance from overhead utility lines.

Distance (m)	N	Percent
< 100	2	2
100 - 300	9	8
300 - 500	5	4
500 - 1000	31	28
> 1000	64	58

No representatives from the utility industry were present at the meetings when the work group developed and approved the conservation actions to address the power line issue. This was not the fault of the utility industry. They were inadvertently missed in the stakeholder identification process that preceded the formation of the work group. In an effort to correct this mistake and address concerns expressed by the utility companies about the conservation actions that were developed in their absence, a special meeting was held on 31 January 2000 with representatives from the Colorado Rural Electric Association, Yampa Valley Rural Electric, and White River Rural Electric. One outcome of this meeting was that the Rural Electric Associations were to review, revise, and modify the conservation actions for minimizing impacts of power lines on grouse as necessary to reflect their concerns. In essence, they were asked to develop their own set of conservation actions for review and approval by the work group. This was the same approach taken with the mining industry and offered to any other stakeholder that disagreed with the conservation actions developed by the work group. As of this writing, the Rural Electric Associations have chosen not to participate in the public conservation planning process and instead to pursue legislative solutions. Thus, the following conservation actions are those developed by the work group without input or approval by the Rural Electric Associations.

Issue **Power lines**: How can existing power lines be maintained and new power lines constructed while minimizing impacts to CSTG populations and their habitats?

Objectives	Goals	Actions	Who	When
A. Provide for a level of power line densities that does not further impact CSTG populations and their habitats.	1. Assess impacts of power lines on CSTG population dynamics and habitat use. 2. Avoid further fragmentation and loss of habitat due to power lines. 3. Reduce power line densities in CSTG habitat where feasible.	a. Identify, map, quantify, and evaluate impacts of existing power lines in relation to lek sites and other critical habitats.	CDOW	Starting in 2000
		b. When feasible, place power lines underground.	Utility Companies	Starting in 2001
		c. Encourage utility companies to develop a consistent process to send development or utility line corridor proposals to CDOW for comment.	CDOW	Starting in 2001
		d. Concentrate utilities in existing corridors rather than creating new ones.	Utility Companies	Starting in 2001
		e. Modify power lines near leks and other critical habitats to minimize collisions and discourage use by raptors.	Utility Companies	Starting in 2001 as identified
		f. Remove unused overhead utility lines where feasible.	Utility Companies	Starting in 2001
		g. Educate utility companies and general public about the potential impacts of power lines on CSTG.	CDOW	Starting in 2001

County Land Use Planning and Community Development - Although no research is available that directly addresses the effects of land development on sharp-tailed grouse, some of the effects are obvious. Development not only displaces lek sites, nesting and brood rearing areas, and winter habitat, but also is accompanied by numerous other factors that may impact sharp-tailed grouse such as roads, power lines, increased human activity, and increased density of cats and dogs. The greatest threats from development are in Routt County within a 20 mi (32 km) radius of Steamboat Springs. Another important element of this issue is private property rights, which involves balancing the need to conserve habitats for sharp-tailed grouse with the rights of private property owners to develop their land. Addressing the concerns landowners have with respect to this sensitive subject is absolutely critical to the management of sharp-tailed grouse in northwest Colorado because 71% of the occupied habitat occurs on private land. Feasible measures that avoid, minimize, rectify, or compensate for the impacts of development on sharptail populations and their habitats must be implemented without placing an unreasonable burden on affected landowners.

Issue **County Land Use Planning and Community Development**: How can the loss, degradation, and fragmentation of CSTG habitats due to development be minimized, mitigated, or avoided?

Objectives	Goals	Actions	Who	When
A. Provide for a level of development that does not adversely affect the stability of CSTG populations in northwest Colorado.	1. Minimize the loss of critical CSTG habitats due to development. 2. Minimize fragmentation of CSTG habitats due to development. 3. Minimize impacts to CSTG habitats through the County Land Use Planning Process.	a. Work with planners and County Commissioners on development and modification of land use and zoning plans to protect critical sharptail habitats.	CDOW, County	Starting in 2001
		b. Provide testimony at County Commission and planning meetings to avoid, minimize, rectify, or mitigate impacts of development on CSTG.	CDOW	Starting in 2001 ongoing
		c. Educate planners, county commissioners, and developers about CSTG habitat requirements.	CDOW	Starting in 2001
		d. Create and periodically update distribution maps to be used by planners to determine if development activities are occurring in critical sharptail habitats.	CDOW	Starting in 2001 ongoing
		e. Map and monitor leks in jeopardy due to development.	CDOW	Starting in 2001
		f. Identify and map areas where development could potentially fragment existing populations.	CDOW	Starting in 2001
		g. Encourage counties to offer incentives to developers who protect/enhance CSTG habitats.	CDOW	Starting in 2001 ongoing
		h. Encourage clustering, density credits, development rights transfers, conservation easements, land exchanges, and other mechanisms to minimize the loss of sharptail habitat.	CDOW, County	Starting in 2001 ongoing
		i. Find new ways to raise money for open space and to mitigate impacts from development.	CDOW, County	Starting in 2001 ongoing
		j. Encourage counties to develop a consistent process for sending development proposals, including roads, to CDOW for comment.	CDOW	Starting in 2001 ongoing
		k. Encourage counties to develop a step-down process to address wildlife issues as outlined in the Rio Blanco County Master Plan.	CDOW	Starting in 2001

Predation - Like hunting, predation is an issue because there are different perceptions about the impacts of predation on sharp-tailed grouse populations. Predation has been a major force shaping the dynamics of grouse populations (Bergerud 1988). It is a known fact that losses of sharptail nests, young, and adults to predation are high, and this is considered normal under natural conditions. It also is well known that the primary strategy sharptails have evolved to compensate for high predation rates is correspondingly high reproductive rates. That is, they have large clutches and high nesting rates, both adult and yearling hens attempt to nest, and adults frequently re-nest if the first clutch is destroyed (Connelly et al. 1998).

The contention of most biologists is that predation is not a limiting factor in sharptail grouse populations provided adequate cover is available. However, these same biologists would concede that the rules of nature change when the balance between predators and prey is disrupted. In pristine times, grouse lived in habitats largely untouched by man. The impact of predators on grouse in these pristine habitats represented a balance that evolved over a long period of time. Man's activities in the last century have upset this balance and altered the landscape in ways that appear to favor certain predators. For example, raccoons (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and red fox (*Vulpes vulpes*) now have more diverse food supplies (grain, garbage, carrion) and places to over-winter and rear their young (abandoned buildings, barns, haystacks). Common crows (*Corvus brachyrhynchos*), common ravens (*C. corax*), great-horned owls (*Bubo virginianus*), and golden eagles (*Aquila chrysaetos*) have more places to nest and perch in the form of trees planted by man and artificial structures built by man. Together these factors have contributed to an increase in predator populations and allowed certain predators to expand their range into previously unoccupied areas.

Herein lies the controversy. Some believe the solution is predator control. Others believe it is habitat restoration. Still others believe it is a combination of both. The general consensus among biologists and wildlife managers is that predator control over broad geographic areas is impractical, and without habitat improvement, will be ineffective. Predator control to increase production and recruitment in bird populations has only been effective on small, intensively managed areas (Balsler et al. 1968, Chesness et al. 1968, Duebbert and Lokemoen 1980). Even then, the control program must be ongoing and target a suite of predators, otherwise, the benefits will be minimal and last only a short time. Certain predators cannot be controlled because they are protected by law, whereas some predators are more easily controlled than others. The end result may be predator exchange (i.e., removing one predator may increase densities and predation rates of another predator) with no net decrease in predation rates (Parker 1984, Greenwood 1986). For instance, removing coyotes (*Canis latrans*), which do not have a strong reliance on birds or eggs as a diet item (Hoffman 1979, Andelt et al. 1987, Johnson et al. 1989), may result in an increase in red fox, which are major predators of birds and bird nests (Voigt 1987, Johnson et al. 1989, Sovada et al. 1995). By controlling both coyotes and red fox, ground squirrel (*Spermophilus* spp.) populations will likely increase. Ground squirrels are major nest predators of ground nesting birds, including grouse. Controlling all mammalian predators may only accentuate predation rates by avian predators, most of which cannot be controlled because they are protected by law.

The entire predator issue is further compounded because predator/prey relationships are extremely complex and difficult to study. Any attempt to evaluate the impacts of predator control will be fraught with design problems. The data will likely be inconclusive, open to broad interpretation, and will have limited application because predation patterns in one portion of the range seldom mimic patterns in another portion of the range.

Issue **Predation**: How can predation be minimized to enhance production, recruitment, and survival of CSTG?

Objectives	Goals	Actions	Who	When
A. Minimize predation of CSTG and their nests to enhance production, recruitment, and survival.	1. Reduce or modify factors that facilitate predation. 2. Identify periods and causes of mortality.	a. Remove or reposition power lines where feasible.	Utility companies	Starting in 2001
		b. Remove or replace wooden fence posts with steel posts where feasible.	CDOW, USFS, BLM, landowners	Starting in 2001 as identified
		c. Eliminate natural and man-made perches near leks where feasible.	CDOW, USFS, BLM, landowners	Starting in 2001 as identified
		d. Where feasible, eliminate abandoned man-made structures that may serve as denning or nesting sites for predators.	CDOW, USFS, BLM, landowners	Starting in 2001 as identified
		e. Promote vegetative diversity (burning, reseeding, fertilization, brush beating, fencing) within 1.2 mi (2 km) of lek sites to minimize movements from leks and to enhance nesting, brood rearing, and escape cover.	CDOW, USFS, BLM, NRCS, landowners	Starting in 2000
		f. Increase vegetative diversity within CRP fields to enhance nesting, brood rearing, and escape cover.	NRCS, landowners, CDOW	Starting in 2000
		g. Implement appropriate site and species-specific predator practices where deemed necessary and feasible in accordance with CDOW predator management plans and policies.	Wildlife Services, CDOW	Starting in 2001 as identified
		h. Implement study to better understand predator/prey relationships.	CDOW, University	Starting in 2001



Photo by R. B. Gill.

Genetics - Although the Columbian sharp-tailed grouse is recognized as a separate subspecies, the distinction is based on morphology, geographic distribution, behavior, and habitats occupied. Nothing is known about genetic diversity among the six subspecies or the degree of hybridization in areas where the ranges come together. Ritcey (1995) argues that the genetic attributes or distinctiveness of the Columbian subspecies needs to be investigated because this information is basic to formulating management strategies. If indeed the Columbian sharp-tailed grouse is an identifiable source of genetic diversity, every effort should be made to maintain and protect the race. If not, transplant programs could be done with birds from the nearest or most economical source, regardless of the subspecies, provided the genetics data shows the Columbian subspecies is not distinct.

Nothing also is known about genetic diversity within and among existing populations of Columbian sharptails. This is of concern because there is no exchange of genetic material among the 10 remaining populations of Columbian sharp-tailed grouse in the western United States, with the possible exception of two populations in Washington. Some of these populations contain < 100 individuals, and thus, may be experiencing inbreeding depression. The population of sharp-tailed grouse in northwest Colorado is contiguous with the population in south-central Wyoming. No barriers to movements occur within or between these two populations and for management purposes they should be considered as one population. The nearest other population is located approximately 175 mi (280 km) west in north-central Utah and southeast Idaho. Although no interchange occurs between these populations today, historically, the populations were likely connected along the base of the Uinta Mountains through extreme southwest Wyoming (south of Evanston), northeast Utah (north of Vernal), and northwest Colorado (north of Dinosaur). It is unlikely this was one continuous population. Instead, there were probably pockets of birds connected by corridors of suitable habitat that allowed for dispersal. Exactly how long the Colorado/Wyoming population has been isolated from the Idaho/Utah population is uncertain. Best estimates would be from 75 to 100 years. Genetic isolation and possible inbreeding are not of immediate concern within the Colorado/Wyoming population because sufficient individuals remain in the population. However, this does not negate the need to collect genetics data and to consider moving birds among populations to enhance genetic diversity.

Issue Genetics: How can genetic relationships be incorporated into CSTG management programs?

Objectives	Goals	Actions	Who	When
A. Understand genetic relationships among the 6 subspecies of sharp-tailed grouse and among the existing populations of CSTG.	1. Identify and compare genetic attributes of CSTG throughout their range.	a. Implement cooperative study with other states to collect and analyze blood/tissue samples from all the subspecies of sharp-tailed grouse.	CDOW, other State Wildlife Agencies, selected Universities	Implement by 2001
	2. Identify and compare genetic attributes of CSTG with the other 5 subspecies.	b. Implement cooperative study with other states to collect and analyze blood/tissue samples from all the remaining populations of CSTG.	CDOW, other State Wildlife Agencies, selected Universities	Implement by 2001
		c. Consider supplemental releases of CSTG into existing populations to enhance genetic diversity.	State Wildlife Agencies	Implement by 2002

Disease and Parasites - Little is known about the diseases and parasites that afflict sharp-tailed grouse. Disease outbreaks in wild grouse are rarely documented because of their low densities, secretive habits, and difficulty in finding the remains of dead birds before they are scavenged by insects and other animals. Consistent and heavy parasite loads have been reported in sharp-tailed grouse (Boddicker 1967, 1972; Hillman and Jackson 1973), including ticks, chiggers, lice, gravid tapeworms, round worms, hippoboscids, and mites (reviewed by Tirhi 1995). Diseases and parasites probably do not limit sharp-tailed grouse populations but may impair reproductive performance or increase the vulnerability of infected birds to mortality from other sources. These impacts are likely more pronounced when populations are stressed due to poor habitat or prolonged adverse weather conditions. Diseases and parasites may become an issue if wild sharptails come in contact with domestic fowl, which is becoming increasingly likely as more people move into areas occupied by sharptails. Another factor that may increase the likelihood of disease and parasite infestations in sharptails is the release of game farm strains of ring-necked pheasants (*Phasianus colchicus*), Gambel's quail (*Callipepla gambelii*), northern bobwhite (*Colinus virginianus*), chukar (*Alectoris chukar*), and gray partridge (*Perdix perdix*) on privately owned lands for personal use or for the purpose of charging customers to hunt. There are 5 licensed Commercial Game Bird Parks within or near the Plan boundary, 2 in Moffat County and 3 in Rio Blanco County. In addition, Country General in Craig is licensed to sell ring-necked pheasants, chukar, gray partridge, northern bobwhite, Gambel's quail, and scaled quail (*C. squamata*). Colorado law allows anyone to purchase up to 25 birds of any of the forementioned species and release them on their land without a commercial parks license. There is currently no way to track how many birds are released in this manner.

Issue **Disease and Parasites**: How can health monitoring protocols be incorporated into CSTG management programs?

Objectives	Goals	Actions	Who	When
A. Understand the role of parasites and disease in population dynamics of CSTG.	1. Monitor health of CSTG captured in conjunction with other studies.	a. Collect blood and tissue samples and submit to diagnostic labs for general disease testing.	CDOW, Diagnostic labs, Sportsmen	Starting in 2001 ongoing
		b. Submit carcasses of birds that die from unknown causes for necropsy.	CDOW	Starting in 2001 ongoing
		c. Collect and examine birds that appear sick, show clinical signs of disease, or exhibit unusual behavior.	CDOW	Starting in 2001 ongoing
		d. Enact stricter regulations regarding the release of game farm (captive-reared) upland birds into the wild. Discourage the release of game farm pheasants, quail, chukars, and gray partridge into areas occupied by CSTG.	CDOW	Starting in 2001
		e. Encourage landowners to keep domestic fowl in pens and not allow the birds to roam freely.	CDOW	Starting in 2001

Mining and Energy Development - Reclamation and revegetation activities on surface mined lands have improved dramatically in the past two decades due to the passage of the Surface Mining Control and Reclamation Act (SMCRA) of 1977 and increased environmental awareness by the mining industry. Lek surveys and studies conducted in northwest Colorado suggest that sharptails are actively using post-act mine reclamation lands for breeding, nesting, and brood rearing (Hoffman 2000). Reclaimed mine lands account for only 1% (11,118 of 1,831,000 acres; Table 8) of the area within the conservation plan boundary, but support about 18% (24 of 133; Table 9) of the active leks. At least one lek has been found on every piece of mine reclamation ground within the boundaries of this plan. This computes to a density of about one lek for every 427 ac (170 hc) of reclaimed land. The average number of males per lek on reclaimed lands in 2000 was 22 compared to the overall average of 19 males per lek. Conversely, only one lek has been located on lands mined prior to passage of SMCRA. Studies of radio-marked grouse indicate the birds avoid sites that have not been reclaimed or were reclaimed prior to passage of SMCRA.

Table 8. Approximate area [expressed as acres (hectares)] of disturbed and reclaimed lands for surface mines in northwest Colorado, 1980-2000.

Mine	Facilities	Active Mine Area	Reclaimed Area	County
Trapper	394 (158)	244 (97)	2,807 (1,123)	Moffat
Colowyo	632 (253)	1,549 (620)	1,232 (493)	Moffat
Edna	76 (30)	0	1,162 (465)	Routt
Hayden Gulch	4 (2)	0	364 (147)	Routt
Seneca II	82 (33)	34 (14)	1,839 (736)	Routt
Seneca IIW	215 (86)	253 (101)	207 (83)	Routt
Yoast	128 (51)	237 (95)	63 (25)	Routt
Eckman Park	0	0	2,940 (1,176)	Routt
Energy Mine 3	3 (1)	0	370 (148)	Routt
Meadows 1	0	0	131 (52)	Routt
Totals	1,534 (614)	2,317 (927)	11,115 (4,446)	

Mining and the activities associated with mining alter habitat conditions and may displace sharptails in the short-term. The primary impact is the conversion of native shrub dominated communities to a combination of native and non-native grass/forb dominated communities. This has been viewed as negative for wildlife due to the loss of shrubs and the challenge to reclaim these lands so the former shrub densities are achieved. This view may not be warranted for sharptails. Available evidence indicates the long-term benefits

may outweigh the short-term losses. In some cases, the lands being mined are marginal for sharptails or not used

at all, whereas the habitat created after reclamation is suitable for sharptails. In other cases, suitable habitat is mined but the habitat created after reclamation is even better.

Activities associated with mining, such as road building, increased development, and power lines, also may displace sharptails, degrade their habitat, or contribute to increased mortality. Many of these factors are not limited to mining and, therefore, are addressed as separate issues in this document.

Sharptail leks have been located on reclaimed lands within 0.5 mi (0.8 km) of active mining operations and within 0.25 mi (400 m) of major haul roads. Thus, activity alone may not deter use of suitable habitats.

The greatest concern with respect to mine reclamation lands is what will happen to these lands after bond release. Regardless of whether the mines retain ownership or these lands are sold or revert back to the original owners, there are no assurances the reclaimed lands will be managed in ways that are beneficial or at least not detrimental to sharptails.

Table 9. Distribution of leks by habitat type in northwest Colorado

Habitat Type	Percent
Sagebrush	28%
CRP	26%
Mine reclamation	18%
Hay/pasture	17%
Native grass/forb	6%
Alfalfa	3%
Wheat	1%
Mountain shrub	1%

Issue **Mining and Energy Development**: How can a viable mining and energy industry be maintained in Moffat, Routt, and Rio Blanco counties while minimizing impacts to CSTG populations and their habitats?

Objectives	Goals	Actions	Who	When
<p>A. Provide for a level of energy development that does not adversely effect the long-term stability of CSTG populations and habitats in northwest Colorado.</p> <p>B. Capitalize on existing opportunities to establish CSTG habitats and enhance CSTG populations on reclaimed mine lands while maintaining the viability and flexibility of the northwest Colorado energy industry.</p>	1. Establish post-mining landscapes that are beneficial to CSTG.	a. Continue to utilize seed mixtures for reclamation that provide cover and forage favorable to CSTG.	Mining industry	Starting in 2001 ongoing
		b. Where appropriate, continue to utilize shrub establishment techniques (strip seeding, shrub clumps, area seeding) to enhance escape and nesting cover on reclaimed mine lands.	Mining industry	Starting in 2001 ongoing
	3. Enhance practices to establish additional CSTG habitats on mine reclamation lands.	c. Continue to re-establish approximate original contours on reclaimed lands and establish where appropriate topographic features (knolls) favorable to CSTG.	Mining industry	Starting in 2001 ongoing
		d. Continue to establish water sources (ponds) on reclaimed lands to enhance diversity and distribute utilization over the landscape.	Mining industry	Starting in 2001 ongoing
		e. Control and limit access, to the extent practical, to leks and nesting areas and manage access in accordance with CDOW recommendations.	Mining industry, CDOW	Starting in 2001 ongoing
		f. Develop long-term management strategies for reclaimed lands that incorporate CSTG conservation practices.	Mining industry, CDOW	Starting in 2001
		g. Encourage access and support for agencies studying CSTG population dynamics and habitat relationships.	Mining industry	Starting in 2001 ongoing
		h. Participate in technology transfer efforts to enhance diversity on CRP land.	Mining industry, CDOW, NRCS	Starting in 2001 ongoing
		i. Where appropriate, implement management practices (burning, fencing, clearing) on lands adjacent to reclaimed lands to enhance vegetative diversity.	Mining industry, CDOW	Starting in 2001 ongoing
		j. In developing reclamation plans and management strategies, recognize that changes in vegetative community types resulting from reclamation operations have proven beneficial to CSTG by increasing habitat diversity.	Mining industry, CDOW	Starting in 2001 ongoing
k. Pursue the use of AML (Abandon Mine Lands) funds for establishment of CSTG habitat.	CDOW	Starting in 2001 ongoing		

Loss of CRP - Federal farm land retirement programs have been part of American agriculture since the 1930s (Berner 1984). These programs have had mixed benefits for wildlife with the greatest benefits derived from programs that required establishment of cover crops on the retired lands (reviewed by Sirotnak et al. 1991). The most recent program of this type is the Conservation Reserve Program (CRP) enacted with the passage of the 1985 Farm Bill. The Conservation Reserve Program retires lands for 10-15 years, requires that perennial cover crops be maintained on the idled lands, and prohibits harvest (grazing or haying) of the cover crop except in emergency situations.

Since the Conservation Reserve Program started, sharptail grouse populations have experienced large increases in Idaho, Utah, and Colorado (Bart 2000). The extensive undisturbed grasslands that develop on CRP have provided breeding, nesting, and brood rearing habitat for sharptail grouse (Sirotnak et al. 1991, Apa 1998, McDonald 1998, Wachob 1997), especially where alfalfa was included in the seed mixture. In Idaho, 138 (80%) of 172 new leks found from 1995 to 1998 were located in CRP fields (Mallet 2000). In northwest Colorado, 28 (28%) of 99 new leks found from 1997 to 2000 were located in CRP fields. More revealing is that within this area CRP accounts for only 3% (52,866 ac) of the land acreage but supports 26% (Table 9) of all known active leks. This indicates that birds on known leks often shifted locations when CRP was planted near existing leks. Removing lands from the program and returning them to crop production will cause a drastic reduction in the abundance of sharptails. If CRP lands are removed from the program and used for pasture, the impacts to sharptails will vary depending on the type of grazing management implemented. Proper grazing may actually enhance these lands for sharptails.

Moffat, Routt, and Rio Blanco counties are included within the state conservation priority areas for sage and sharp-tailed grouse. Routt and Moffat counties are slightly above the maximum allotment of CRP, which is based on 25% of the total cropland in the county (Table 10). In Rio Blanco County, the current acreage of CRP falls well below the 25% cap (Table 10). All three counties are eligible to apply for a waiver to increase the cap up to 35%.

Table 10. Allowable and current acreage [expressed as acres (hectares)] of CRP in Moffat, Routt, and Rio Blanco counties, northwest Colorado.

CRP Base Determination	Moffat County	Routt County	Rio Blanco County
Total Cropland	125,453 (50,181)	59,252 (23,989)	51,064 (20,426)
25% CRP Allotment	31,363 (12,545)	14,813 (5,997)	12,766 (5,106)
Current CRP Allotment	34,008 (13,603)	16,230 (6,492)	2,628 (1,051)
Percent of Cropland	27	27	5



Issue **Loss of CRP**: How can the existing acreage of CRP be maintained (i.e., no net loss) in northwest Colorado?

Objectives	Goals	Actions	Who	When
A. Maintain or if possible increase the acreage of CRP within CSTG habitats in northwest Colorado	1. No net loss of CRP in Moffat, Routt, and Rio Blanco counties. 2. Achieve the maximum allowable CRP acres by county in northwest Colorado.	a. Encourage county committees, county commissioners, and agricultural businesses to support and approve waivers to increase CRP acreage within their counties.	CDOW, STGWG	Starting in 2001
		b. Educate the county committees, county commissioners, and agricultural business owners about the needs of CSTG and benefits of CRP to CSTG.	CDOW	Starting in 2001
		c. Increase payments based on benefits to CSTG.	FSA	2002 Farm Bill
		d. Increase the amount of CRP in Rio Blanco County.	CDOW, FSA	Starting in 2001
		e. Maintain CRP in large (100+ ac), clumped patches.	FSA	Starting immediately
		f. Investigate additional funding sources to encourage participation and to improve existing CRP for CSTG.	CDOW	Starting in 2001
		g. Provide assistance to landowners in dealing with CRP issues.	CDOW, NRCS, FSA	Starting in 2001 ongoing
		h. Support creation of an upland bird habitat stamp as an additional funding base for improving CRP.	STGWG, public	Starting in 2001
		i. Give more points to applicants with CSTG on their land or with land that might attract CSTG if this land is enrolled in the program.	FSA	2002 Farm Bill
		j. Allow landowners more flexibility for alternative uses of CRP as an alternative to increased payments.	FSA	2002 Farm Bill
		k. Provide CSTG distribution maps and information brochures to NRCS and FSA offices.	CDOW	Starting in 2001
		l. Consider the potential to manage for CSTG on former CRP ground that is now enrolled in AMTA (Agriculture Marketing Transition Act).	CDOW, STGWG, FSA	Starting in 2001 ongoing
		m. Inform political leaders about the benefits of CRP and encourage their support of this program.	CDOW, STGWG	Starting in 2001 ongoing

Quality of CRP - Marks and Marks (1987) reported that Columbian sharp-tailed grouse in Idaho avoided intermediate wheatgrass (*A. intermedium*) during summer. In another Idaho study, Sirotnak et al. (1991) found that some CRP fields were never used by sharptails, whereas others were consistently used. McDonald (1998) concluded that CRP fields in Washington may be acting as ecological traps for nesting sharptails. In Colorado, sharptails extensively used CRP for lekking purposes, but the hens visiting these leks tended to nest in habitat types other than CRP (Hoffman 2000). These studies suggest that some CRP fields may provide little or no benefits to sharptails and may in fact contribute to higher predation rates and lower nesting success due to the lack of spatial, structural, and vegetative diversity. Adding legumes and bunchgrasses and reducing sod-forming grasses within these fields should enhance the suitability for sharptails.

Seed mixes for CSTG should include at least 4 grasses and 2 forbs, of which 2 of the grasses should be bunchgrasses and 1 of the forbs should be alfalfa. Ideally, sagebrush should be included in the mixture, but broadcasted rather than drilled with the other seeds. The sagebrush seed should not be uniformly distributed across the field. Instead, it should be broadcasted in selected areas such as draws, north slopes and benches. It is best to lightly drag the surface after broadcasting the sagebrush seed. Furthermore, to increase the likelihood that sagebrush will become established, it is best not to plant the other seeds in the area where the sagebrush seed is distributed. If this is not an option, drill less of the grass/forb mixture in the area where the sagebrush is planted. Following is a list of recommended grasses and forbs to plant for sharptails. The mixture should include about 20% alfalfa, 65% grasses, 10% forbs, and 5% sagebrush. The list includes native and non-native plants and provides enough choices to insure an economical mixture can be formulated.

Grasses

Big Bluegrass (*Poa ampla*)
Idaho Fescue (*Festuca idahoensis*)
Bluebunch Wheatgrass (*Agropyron spicatum*)
Basin Wild Rye (*Elymus cinereus*)
Mountain Brome (*Bromus marginatus*)
Western Wheatgrass (*Agropyron smithii*)
Slender Wheatgrass (*Agropyron trachycaulum*)
Tall Wheatgrass (*Agropyron elongatum*)
Orchardgrass (*Dactylis glomerata*)

Forbs

Alfalfa (*Medicago sativa*)
Cicer Milkvetch (*Astragalus cicer*)
American Vetch (*Vicia americana*)
Sulphur Flower (*Eriogonum umbellatum*)
Blue Flax (*Linum lewisii*)
Red or White Clover (*Trifolium spp.*)
Yellow Salsify (*Tragopogon dubius*)
Peavine (*Lathyrus spp*)
Wild Lettuce (*Lactuca serriola*)



Issue **Quality of CRP**: How can the structure and composition of new and existing CRP fields be improved to benefit CSTG?

Objectives	Goals	Actions	Who	When
A. Improve the overall quality of CRP fields in northwest Colorado.	<p>1. Manage CRP fields to benefit CSTG.</p> <p>2. Insure new CRP fields meet the minimum CP-4D requirements for CSTG.</p> <p>3. Enhance existing CRP fields.</p>	a. Develop seed mixes that best meet the needs of CSTG and at the same time provide some flexibility for the producer.	CDOW, NRCS	Starting in 2000
		b. Develop seed mixes that are economical.	CDOW, NRCS	Starting in 2000
		c. Quality seed mixes should contain a minimum of 6 species including 4 grasses and 2 legumes.	Landowners, NRCS	Starting in 2001 ongoing
		d. Legumes should comprise 20-30% of the mix.	Landowners, NRCS	Ongoing
		e. Grasses should comprise 60-70% of the mix of which 40-50% should be bunchgrasses; i.e., if the mix contains 60% grasses then 24-30% should be bunchgrasses where these grasses commonly exist.	Landowners, NRCS	Starting in 2001 ongoing
		f. Encourage producers to include sagebrush as 5-10% of the mixture. The shrub seed should be distributed in patches around the field rather than spread evenly throughout the field; i.e., plant shrub seed in draws and bottoms, on benches, and along the lower portions of slopes.	CDOW, NRCS	Starting in 2000 ongoing
		g. Establish deciduous shrub thickets within CRP fields.	CDOW, NRCS	Starting in 2001
		h. Existing fields with no legumes or a monoculture of grasses should be given preference for enhancement. This should include former CRP ground that has not been broken out and is now enrolled in AMTA.	CDOW	Starting in 2000 ongoing
		i. Where landowners must re-seed 51% of re-enrolled fields, consider providing incentives to enhance all or portions of the remaining 49%.	CDOW	Starting in 2000 ongoing
		j. Experiment with ways to encourage greater forb production in CRP and to set CRP patches back to an earlier successional stage.	NRCS, CDOW, landowners	Starting in 2001 ongoing
		k. Develop incentives for landowners to plant enhanced seed mixtures that benefit CSTG.	CDOW	Starting in 2000 ongoing
		l. Identify alternative funding sources to enhance existing CRP, such as HPP funds.	CDOW	Starting in 2000
		m. Gather data on how CSTG use CRP and respond to enhancement.	CDOW	Starting in 2000

Fire Management, Density and Diversity of Shrubs, and Oakbrush/Pinyon-Juniper Invasion - Too much, as well as too little, fire can have negative impacts on sharptail habitat. Likewise, too many of the same shrubs, or too few of the important shrubs needed for food and cover, affects habitat quality for sharptails. These are all issues in northwest Colorado that are closely related and, thus, need to be addressed in the context of each other.

The impacts of fire on sharptail habitats vary and are influenced by the vegetation type, timing, intensity, frequency, and size of burn. Additionally, the effects of fire are regional and site specific. Therefore, managers must exercise caution in the use of fire as a management tool. Many species of deciduous shrubs and trees, such as serviceberry, chokecherry, Gambel's oak, and aspen, resprout following fire. Other shrubs, such as sagebrush, may be eliminated by intense or frequent fires. Repeated burning may favor certain shrubs (serviceberry) over others (oakbrush), which may benefit sharptails where oakbrush has become too dense. Fire also may open dense stands of sagebrush, creating a mosaic of grasses, forbs, and shrubs. Fires that create a mosaic of burned and unburned habitats are preferred to fires that burn large, contiguous patches. Fire suppression allows fuel loads to increase resulting in larger, more intense fires, which can have negative consequences to sharptails. Fire suppression also allows pinyon and juniper to invade sagebrush/grassland habitats to the detriment of sharptails. Fires may increase the frequency of some forbs used for food, while simultaneously decreasing the abundance of insects utilized by young grouse.

Lack of deciduous shrubs, which is a major limiting factor for CSTG throughout much of their range (reviewed by Giesen and Connelly 1993), is not an issue in northwest Colorado. Mountain shrub communities are widely distributed and comprise about 23% (Table 2) of the landscape within the current range of CSTG in Colorado. However, the health of many of these communities is of concern. Extensive stands of dense, over-mature shrub communities are common. Such stands have limited value as sharptail habitat, except where they border more open habitat types. Only 1 active lek has been located within the mountain shrub type (Table 9). Although the mountain shrub type provides critical winter habitat, the areas selected by sharptails tend to be in the more open stands dominated by serviceberry and interspersed with aspen. Management efforts to reduce the density within some mountain shrub communities will benefit sharptails, but these efforts should take into consideration the importance of the denser shrub communities as habitat for other species of wildlife.

The lack of shrubs in northwest Colorado is most pronounced on lands converted for agricultural use, on mine reclamation lands, and on sagebrush rangelands that have been sprayed to increase grass/forb production for livestock. Although large tracts of agricultural lands have been enrolled in CRP, these lands still lack a shrub component. Efforts to re-establish shrubs on mine reclamation lands have met with limited success because of intensive grazing pressure by wild ungulates. The presence of some shrub cover (10-20%), especially sagebrush, on CRP and mine reclamation lands would benefit sharptails, but is not critical if these areas support healthy grass/forb stands within 1 mi (1.6 km) of shrub dominated communities.

Spraying of herbicides to eliminate or reduce the shrub component and increase grass production is a form of habitat conversion. The impacts to sharptails depends on the amount of acreage treated and the degree of kill. The larger the area treated and the greater the kill the more detrimental it will be to sharptails. The effects of herbicide spraying are complex and the outcome is difficult to predict because of the combination of site conditions, chemicals applied, application rates, timing of application, and the interval between applications. In addition, loss of non-target species, especially forbs and deciduous shrubs, is of serious concern. Another negative side effect is the reduction in insect populations that utilize the forbs and shrubs that are killed by the herbicide. For these reasons, other types of treatment (fire, brush beating, dixie harrow) are preferred over spraying of herbicides to reduce the canopy coverage of sagebrush. The additional grass produced as a result of spraying can be of benefit to sharptails provided the treated areas are allowed to recover (rested if necessary) and only lightly to moderately grazed thereafter.

Pinyon and juniper invasion of sagebrush and mountain shrub communities occurs as a result of fire suppression. This is not a major issue within the plan boundary, except in localized areas north and south of Craig in Moffat County and in Rio Blanco County. However, pinyon/juniper invasion is a problem in areas bordering the plan boundary in Eagle, Rio Blanco, and Moffat counties, and may be one reason why sharptails have not expanded their range in northwest Colorado. Pinyon and juniper trees provide perches for raptors and better hiding cover for other predators. The expansion and dominance of oakbrush also are issues locally and in surrounding areas (especially Rio Blanco County). Areas dominated by oakbrush tend to lack diversity and are extremely dense. Except for the edges, sharptails avoid large, continuous patches of oakbrush. Sharptails will eat acorns, but the buds and berries of serviceberry or chokecherry are far more important to sharptails than acorns.

Issue **Fire Management**: How can prescribed fire be incorporated into CSTG habitat management programs?

Objectives	Goals	Actions	Who	When
<p>A. Provide for a level of prescribed fires that mimic natural fire patterns and frequencies.</p> <p>B. Provide the opportunity for wildfires to burn in areas where there is no threat to human life or property.</p>	<p>1. Use fire as a management tool to create new habitat and enhance existing habitat for CSTG.</p> <p>2. Evaluate the response of CSTG to the intensity, frequency, pattern, magnitude, and timing of prescribed fires.</p> <p>3. Improve upon existing recommendations for conducting prescribed burns in or near CSTG habitats.</p>	<p>a. Because the response of various plant communities to fire is highly variable, always exercise caution when using fire as a management tool to enhance habitat.</p>	Agencies, Counties, landowners	Ongoing
		<p>b. Adhere to the burning techniques applicable to the conditions and vegetation types involved. In the case of CSTG, burn prescriptions will differ among grassland, sagebrush, and mountain shrub types.</p>	Agencies, Counties, landowners	Ongoing
		<p>c. Coordinate with existing fire management plans prepared by the BLM, USFS, and Counties and modify as needed to benefit CSTG.</p>	CDOW, BLM, USFS, Counties	2001 - ongoing
		<p>d. Encourage voluntary, prescribed burns on private lands to benefit CSTG in accordance with the following conservation actions.</p>	Agencies, Counties, landowners	2001 - ongoing
		<p>e. Use extreme caution when burning in low (<12 in, 30 cm) precipitation zones.</p>	Agencies, Counties, landowners	Ongoing
		<p>f. Early spring, late fall, and winter burns will produce the best results with the least impacts.</p>	Agencies, Counties, landowners	Ongoing
		<p>g. Avoid burns during the nesting and brood rearing seasons (mid May to mid-August).</p>	Agencies, Counties, landowners	Ongoing
		<p>h. Several, small (<100 ac, 40 hc), irregularly shaped burns that result in a mosaic pattern of habitat types are preferred over large, contiguous block burns.</p>	Agencies, Counties, landowners	Ongoing
		<p>i. Never treat more than 20% of the available habitat in a given area in any one year.</p>	Agencies, Counties, landowners	2001 - ongoing
		<p>j. When burning within the sagebrush type, follow guidelines (Connelly et al. 2000) that benefit or do not negatively impact sage grouse.</p>	Agencies, Counties, landowners	2001 - ongoing

Issue **Fire Management:** continued.

Objectives	Goals	Actions	Who	When
		<p>k. Use repeated fires (5-10 years) within the oakbrush type to suppress oak, create openings, and encourage growth of serviceberry.</p> <p>l. Use fire to control pinyon and juniper invasion in sagebrush communities.</p> <p>m. Consider fire as a management tool to restore vigor and enhance diversity in CRP.</p> <p>n. Suppress wildfires that threaten human life or property or that threaten to burn large contiguous blocks of habitat, especially sagebrush. Otherwise, allow wildfires to burn.</p> <p>o. Manage burned areas for at least 2 years post-burn to allow for establishment of grasses and forbs.</p> <p>p. Monitor and evaluate the effects of fire on CSTG habitat use and population dynamics.</p>	<p>Agencies, Counties, landowners</p> <p>Agencies, Counties, landowners</p> <p>NRCS, landowners</p> <p>Agencies, Counties, landowners</p> <p>Agencies, Counties, Landowners</p> <p>CDOW</p>	<p>Starting in 2001 as identified</p> <p>Starting in 2001 as identified</p> <p>Starting in 2002 as identified</p> <p>Starting in 2001 as identified</p> <p>Starting in 2001 as needed</p> <p>Starting in 2001 as opportunities exist</p>



Issue **Density and Diversity of Shrubs**: How can shrub density, diversity, and structure be optimized to enhance CSTG habitat?

Objectives	Goals	Actions	Who	When
A. Provide for a density and diversity of shrubs within northwest Colorado that meets the seasonal needs of CSTG.	<p>1. Manage shrub habitats for species beneficial to CSTG.</p> <p>2. Strive to maintain 20-30% of the landscape in deciduous shrub dominated habitats preferably in a mosaic pattern with canopy coverage within these habitats varying from 5-50% and averaging 20-25%.</p>	a. Identify the preferred shrubs.	CDOW	Starting in 2000
		b. Conduct prescribed burns to meet desired density, structure, and composition of shrubs.	CDOW, BLM, USFS, Landowners	Starting in 2001 as needed
		c. Consider the use of mechanical manipulation, fertilization, and chemical control to achieve desired shrub density and structure.	CDOW, BLM, USFS, Landowners	Starting in 2001 as needed
		d. Promote shrub plantings on CRP, AMTA, and mine reclamation lands.	CDOW, NRCS, mining industry	Starting in 2001
		e. Protect/fence riparian areas to encourage re-establishment of shrubs.	CDOW, BLM, USFS, Landowners	Starting in 2001 as needed
		f. Coordinate the management of shrub habitats, especially sagebrush, as not to negatively impact and preferably to benefit other wildlife species such as sage grouse (Connelly et al. 2000).	CDOW, BLM, SLB, USFS, NRCS	Starting in 2001 ongoing
		g. Encourage landowners to maintain shrub habitats within intensively farmed and grazed areas.	CDOW, NRCS	Starting in 2001 as identified
		h. Implement grazing management practices to achieve and maintain desired shrub densities, structure, and composition.	CDOW, BLM, SLB, USFS, Landowners	Starting in 2001 ongoing
		i. Design sagebrush treatments to benefit CSTG. Treat no more than 100 ac per 1000 ac within a 5 year period. Treat in patches of 15-25 ac rather than one contiguous block. Only treat areas where the sagebrush canopy exceeds 35%. Treat areas prior to the emergence of forbs to reduce kill of non-target species. These guidelines will improve forage production for livestock.	CDOW, NRCS, BLM, SLB, Landowners	Starting in 2001 ongoing as needed
		j. Consider other alternatives besides herbicide treatment to manage sagebrush rangelands.	CDOW, BLM, Landowners, SLB	Starting in 2001 ongoing
		k. Implement big game population regulation measures to achieve and maintain desired shrub densities, structure, and composition.	CDOW	Starting in 2001
l. Provide funding to assist landowners with implementing shrub management practices that benefit CSTG.	CDOW, NRCS	Starting in 2001 ongoing		

Grazing by Domestic Ungulates - Livestock grazing is one of the dominant land uses on public and private lands in northwest Colorado. Available data suggests a recent decline in sheep numbers and a corresponding increase in cattle (Table 11). Long-term (40+ years), both sheep and cattle numbers have declined in this region of the state. Private lands provide the majority (71%) of CSTG habitat in the region. Healthy and productive rangelands are the foundation of a profitable and sustainable ranching industry and abundant wildlife. Therefore, emphasis should be placed on maintaining these lands as viable economic units in order to preserve large areas of habitat and open space. The alternative (evident in Routt County) is habitat fragmentation and increased human impacts when agricultural lands are sold for development.

Table 11. Cattle and sheep inventory for Routt, Moffat, and Rio Blanco Counties for 1992 and 1997 based on data obtained from the National Agricultural Statistics Service.

County	Sheep 92	Sheep 97	Cows 92	Cows 97
Moffat	90,515	72,715	25,504	41,829
Routt	20,820	9,936	37,042	45,178
Rio Blanco	30,662	35,959	35,740	33,910
Total	142,000	118,610	98,286	120,917

Sound grazing management promotes the use of forage resources while having a neutral or positive impact on plant vigor. Proper livestock grazing management can maintain and/or enhance desirable plant communities by preventing the invasion of noxious weeds, improving vegetation palatability, and promoting residual cover. Proper livestock grazing can also increase plant diversity and improve riparian areas. However, excessive or improper grazing disrupts native plant communities by promoting the invasion of noxious or exotic weeds, spread of less desirable (often unpalatable) vegetation, and removal of residual cover. Other impacts include degradation of riparian zones and reduced plant diversity. Improper grazing management has been and continues to be a serious problem on some areas within the CSTG range. Livestock grazing has the potential to influence the availability of food and cover for CSTG by affecting the composition and structure of grasses, forbs, and shrubs.

Proper grazing management on rangelands is based on controlling the intensity, timing, frequency, selectivity and distribution of grazing animals (Montana Watershed Coordination Council's Grazing Practices Work Group 1999). Range monitoring to measure frequency, intensity and timing of grazing is an important management tool for private and public land managers. Utilization levels are only one management tool to assist in livestock grazing management. In order to insure areas achieve or continue to meet habitat objectives for CSTG, additional monitoring data are needed, such as trends in vegetation health, actual use (what is actually being used and height of residual vegetation), and climatic conditions.

The best management practices and recommended rotational systems included in the conservation actions are believed to be beneficial long-term options for managing grazing to benefit CSTG. Specific grazing guidelines must be adapted to fit the needs of the livestock operator, the specific area, and the current condition of the plant community. The goal of specific grazing guidelines is to provide suitable habitat for CSTG without requiring reduction in either domestic or wild ungulates. However, if the data indicate plant community composition or vigor are lacking, then the suggested utilization levels, intensity, timing, distribution, and/or duration of grazing should be adjusted to encourage the desired plant response.

Part of good range stewardship is being aware of and providing for the habitat needs of wildlife, including CSTG. If the ranching community will do this, the effort will return many dividends to the industry.

Issue **Grazing by Domestic Ungulates**: How can a viable livestock industry be maintained in Moffat, Routt, and Rio Blanco counties while minimizing impacts to CSTG populations and their habitats?

Objectives	Goals	Actions	Who	When
A. Provide for a level of grazing that maintains and improves the long-term stability of CSTG populations and habitats in northwest Colorado.	<p>1. Maintain grazing management practices that achieve and maintain desired ecological conditions throughout the range.</p> <p>2. Strive to maintain grazing management practices that allow for flexibility and adaptability to habitat conditions.</p> <p>3. Evaluate effects of different grazing systems on CSTG productivity, survival, and habitat use.</p>	a. Wildlife professionals and livestock producers must become more tolerant, understanding, and respectful of each others perspective, and focus on areas of mutual interest.	State and Federal agencies and livestock producers	Starting immediately
		b. Best Management Practices (Montana Grazing Practices Work Group 1999) should be applied to grazing areas to achieve critical residues.	Land mgmt agencies, producers	Starting immediately
		c. Where appropriate, implement grazing systems that provide for areas and times of deferment. Examples in order of preference are: Rest Rotation where the range unit is rested for an entire year. Deferred Rotation where the range unit is rested for part of the year.	Land mgmt agencies, producers	Starting in 2001 as identified
		d. If continuous or seasonal grazing every year is the only alternative, then intensity should be light to moderate based on the capabilities of the area.	Land mgmt agencies, producers	Starting in 2001 as identified
		e. Under rest rotational grazing, the rested unit should not be grazed until after the nesting season the following year and then at light to moderate intensity.	Land mgmt agencies, producers	Starting in 2001
		f. Under deferred rotational grazing, a unit should be grazed only once within the year at light to moderate intensity.	Land mgmt agencies, producers	Starting in 2001
		g. Avoid excessive utilization of grazed pastures to compensate for rested pastures (a year of rest cannot compensate for a year of excessive use).	Land mgmt agencies, producers	Starting in 2001
		h. Where appropriate, consider short duration, high intensity grazing as another alternative to continuous grazing.	Land mgmt agencies, producers	Starting in 2001
		i. Avoid over-utilization around water sources, in bottoms and draws, and along benches, and divert more utilization to slopes and ridge tops.	Land mgmt agencies, producers	Starting in 2001
		j. The intensity and duration of grazing should be reduced during drought years.	Land mgmt agencies, producers	Starting in 2001
		k. When possible, adhere to grazing management plan.	Land mgmt agencies, producers	Starting in 2001
l. Initiate research to evaluate whether domestic ungulates constitute a physical disturbance to CSTG and/or impact CSTG habitats.	CDO	By 2002		

Invasion of Noxious/Exotic Plants - There is no evidence that invasion of noxious/exotic plants have affected sharptail grouse in northwest Colorado. However, degradation of habitats due to the invasion of noxious/exotic plants could have significant impacts in the future if left uncontrolled. The weeds of immediate concern in northwest Colorado include leafy spurge (*Euphorbia esula*), dalmatian (*Linaria dalmatica*) and yellow (*L. vulgaris*) toadflax, and whitetop (*Cardaria pubescens*). Cheatgrass (*B. tectorum*) is another undesirable plant that needs to be monitored and controlled, especially in semi-arid sagebrush rangelands. It is fire adapted and perpetuates itself by increasing the fire frequency. Cheatgrass invasions in other states have increased the fire frequency in sagebrush communities to the point that sagebrush stands have been completely eradicated and/or the understory converted almost entirely to cheatgrass. Noxious weeds compete with and displace native plants that provide food and cover for sharptails. Sharp-tailed grouse do not eat noxious weeds, however, the chemicals used to control weeds also harm native forbs that are consumed by grouse. Noxious weeds have little or no cover value for sharptails.

Moffat, Routt, and Rio Blanco counties have weed management programs. In addition, the Colorado Division of Wildlife attempts to control weeds on state properties. The mining industry also has an aggressive program to control weeds on reclaimed lands and the NRCS assists private landowners in efforts to control weeds. The consensus among these groups is that they are not succeeding in effectively controlling weed infestations in northwest Colorado due to the lack of resources to combat the problem.

Issue **Invasion of Noxious/Exotic Plants**: How can current integrated weed management be incorporated into CSTG management programs?

Objectives	Goals	Actions	Who	When
A. Preserve and establish desired and natural communities that benefit CSTG.	1. Manage, and if possible, control existing noxious/exotic weeds within CSTG habitats.	a. Identify and map the distribution of noxious/exotic weeds within the range of CSTG in coordination with the County Weed Department, BLM, and USFS.	CDOW, County, BLM, USFS	Starting in 2001 - ongoing
	2. Manage, and if possible, prevent the further spread of noxious/exotic weeds within CSTG habitats.	b. Solicit additional funding for weed management where invasions affect the quality of CSTG habitats.	County, CDOW	Starting in 2001 - ongoing
		c. Support the use of integrated weed management practices (Sheley et al. 1998) for planning, inventory, treatment, monitoring, and reporting noxious/exotic weeds within areas occupied by CSTG.	CDOW, County, BLM, USFS, NRCS, SLB, landowners	Starting in 2001 - ongoing
	3. Manage, and if possible, prevent the establishment and spread of potential new invaders in CSTG habitats.	d. Set priorities for management and control of weeds based on their potential impacts to CSTG habitats.	CDOW	Starting in 2001 - ongoing
		e. Maintain and improve the health of existing plant communities so they can withstand future weed invasions.	Landowners, BLM, USFS, CDOW, SLB	Starting in 2001 - ongoing
	4. Assess the impacts of noxious/exotic weeds on CSTG habitat use patterns and habitat quality.	f. Focus on the causes of weed infestations and discourage activities and land uses that promote weed growth and propagation.	County, CDOW, BLM, USFS, SLB, landowners	Starting in 2001 - ongoing
		g. Promote educational programs for the general public about the identification of undesirable plants and management strategies for controlling them.	CDOW, County	Starting in 2001 - ongoing

Grazing by Wild Ungulates - Elk (*Cervus elephus*), mule deer (*Odocoileus hemionus*), and pronghorn (*Antilocarpa americana*) are the principal wild ungulates in northwest Colorado that occur within the occupied range of sharptails. At issue is whether excessive grazing and browsing, currently by elk, and in the past by deer, have not allowed for sufficient regrowth and recovery of certain shrubs, grasses, and forbs used by sharptails for food and covered. Excessive browsing by an over-abundant deer herd during the 50s, 60s and 70s may have greatly impacted the quality and quantity of deciduous shrubs of importance to sharptails. Although the deer herds have declined over the past two decades, the elk herds have increased and expanded into areas that received little use in the past. As a result, the grazing pressure has shifted from the shrub communities to the herbaceous communities. Elk may be competing directly with sharptails for food. Of greater concern is that elk may be reducing the amount of residual cover available for nesting. The impact may be most pronounced on the transitional range where elk congregate in spring and fall on their way from and to the winter range. The transitional range of elk corresponds to the breeding, nesting, and brood rearing range of sharptails. In mild winters, the elk remain on the transitional range longer. Mild winters have been the norm rather than the exception over the past 10 years. This likely has compounded the impact of elk on the herbaceous community within the breeding and nesting range of sharptails. Elk also are impacting the establishment of shrubs on mine reclamation lands and would probably severely impede any attempt to establish shrubs, other than sagebrush, in CRP without the use of fencing.

Despite the apparent negative impacts of elk on local plant communities, sharptail populations are increasing in conjunction with increasing elk populations. This suggests that whatever factors are contributing to the increasing elk population are also favorable for sharptails.

The current range of the CSTG falls within the Bear’s Ears and White River Data Analysis Units (DAU) for elk. Elk populations have increased significantly in both units. Post-season population estimates for these units have consistently been above the population objectives (Table 12). This is due to the inability to obtain an adequate harvest of cow elk. Once the season starts, many animals move on to private lands where access is restricted and where most of the hunting pressure is focused on bulls. Mild weather conditions during the past several seasons also have contributed to the poor harvest.

Table 12. Elk population and harvest estimates for northwest Colorado.

Period	Bear’s Ears DAU Population Objective = 12,200			White River DAU Population Objective = 28,500		
	Hunters	Harvest	Population	Hunters	Harvest	Population
1950s	1,122	335	3,286	5,375	1,476	8,572
1960s	2,771	738	5,660	9,575	2,760	15,320
1970s	7,407	1,536	9,984	18,418	4,746	28,465
1980s	9,737	2,014	14,416	24,322	5,542	35,228
1990s	15,429	3,820	13,716	31,081	7,828	31,638

Issue **Grazing by Wild Ungulates**: How can healthy, diverse wild ungulate populations be maintained in Moffat, Routt, and Rio Blanco counties while minimizing impacts to CSTG populations and their habitats?

Objectives	Goals	Actions	Who	When
A. Provide for a level of grazing by wild ungulates that maintains and improves the long-term stability of CSTG populations and habitats in northwest Colorado.	<p>1. Manage for healthy wild ungulate populations capable of supporting both significant harvests and nonconsumptive uses while maintaining desired ecological conditions throughout the range.</p> <p>2. Strive to maintain herd management practices that allow for flexibility and adaptability to habitat conditions.</p> <p>3. Evaluate effects of wild ungulates on CSTG lek attendance patterns, food availability, and habitat use.</p>	a. Address the inability to maintain wild ungulate populations in accordance with the DAU plans for the area.	CDOW	Starting in 2001
		b. Initiate research to evaluate whether wild ungulates constitute a physical disturbance to CSTG and/or impact CSTG habitats.	CDOW	By 2002
		c. Identify potential big game/CSTG conflict areas	CDOW	Starting in 2001
		d. Review the big game herd objectives and modify as necessary to improve conditions for CSTG.	CDOW	By 2002
		e. If necessary, implement special seasons to meet harvest objectives.	CDOW	Starting in 2001
		f. Incorporate CSTG habitat management guidelines into management plans for wild ungulates.	CDOW	Starting in 2001
		g. Develop partnerships with the local HPP committees to identify projects mutually beneficial to CSTG, wild ungulates, and domestic livestock.	CDOW, HPP committees	Starting in 2001-ongoing
		h. Aggressively seek joint ventures with private conservation groups to acquire and improve habitats especially winter and transitional ranges for deer because good management of deer habitat will benefit CSTG.	CDOW	Starting in 2001 - ongoing
		i. Improve accuracy and precision of census procedures and harvest estimates for wild ungulates within northwest Colorado.	CDOW	Starting in 2001 - as methods are developed
		j. Encourage coordination of DAU plans for all ungulates.	CDOW	Starting in 2001

Conversion of Native Habitats due to Cultivation - Within the plan boundary, suitable habitats for CSTG are mostly contiguous or separated by only narrow strips of unsuitable habitat. Sharptails within the area have been documented to move in excess of 18 mi (30 km) between seasonal ranges. There are no significant barriers to impede movements within the currently occupied range. The primary cause of what fragmentation has occurred in this area is conversion of native habitats due to cultivation (i.e., dryland wheat). However, this problem has been partially and temporarily alleviated by the conversion of much of the wheat acreage to CRP. Although sharptails can adapt to agriculture, large scale conversions or alteration of native habitats can be detrimental (McDonald and Reese 1998, Schroeder et al. 2000). Clean farming practices in conjunction with habitat conversions can compound the problem. In addition, grouse that adapt to using agricultural lands are exposed to other factors associated with agriculture that may increase mortality or decrease production, such as haying, mowing, and spraying of pesticides and herbicides. Habitat conversion for agricultural has been identified as the primary reason for the rangewide decline of CSTG (Miller and Graul 1980, Giesen and Connelly 1993, Bart 2000). Fortunately, in northwest Colorado, large scale habitat conversions have not occurred at the magnitude that has taken place elsewhere within the range of the CSTG. Topographic constraints in northwest Colorado limit the amount of land that can be converted to croplands. This is why CSTG still inhabit the area. Preventing any future conversion or detrimental alteration of existing native habitats is the key to maintaining this population.

Issue **Conversion of Native Habitats Due to Cultivation**: How can a viable agricultural industry be maintained in Moffat, Routt, and Rio Blanco counties while minimizing the impacts to CSTG populations and their habitats?

Objectives	Goals	Actions	Who	When
<p>A. Provide for a level of agriculture that does not adversely effect the long-term stability of CSTG populations and habitats in northwest Colorado.</p> <p>B. Capitalize on positive benefits that certain agricultural practices may serve in enhancing habitats for CSTG.</p>	<p>1. To reduce and if possible reverse the conversion of habitats due to agricultural activities.</p> <p>2. Maintain cultivated lands at 15-20% of the total land area within the plan boundary.</p>	a. Avoid conversion of native habitats into large, contiguous blocks of agricultural lands.	Landowners	Starting in 2001 - ongoing
		b. Identify areas where agricultural activities have eliminated large tracts of suitable habitat and seek to work with the landowners to improve habitat conditions in these areas.	CDOW	Starting in 2001
		c. Develop farm plans that encourage buffers, corridors, shrub plantings, protection of remaining native habitats, and water developments.	NRCS, FSA, Landowners	Starting in 2001 - ongoing
		d. Utilize Farm Bill programs (CRP, WHIP, EQIP) for habitat improvements on private lands.	CDOW, NRCS, Landowners	Ongoing
		e. Develop Candidate Conservation Agreements with Assurances (CCAA) with private landowners to implement conservation measures for CSTG.	CDOW, USFWS	Starting in 2001 - ongoing
		f. Restore abandoned or unused farm ground.	CDOW	Starting in 2001
		g. Consider potential for growing non-traditional crops (i.e., native grass seed) that will provide income to landowners and benefit sharptails.	CDOW, NRCS, FSA, landowners	Starting in 2001
		h. Establish demonstration areas that integrate traditional and non-traditional farming practices, habitat restoration, and sound grazing management.	CDOW	By 2005
		i. Develop incentives for private landowners to maintain and restore native habitats.	NRCS, FSA CDOW	By 2002

Range Expansion - There is one self-sustaining population of CSTG in Colorado. This population resides primarily in Moffat and Routt counties. Although this population is doing well, it will be necessary for conservation planning purposes, to establish at least two other self-sustaining populations within the state. Potential reintroduction sites already have been identified in Grand, Mesa, Dolores, and Montezuma counties. Also, since northwest Colorado supports one of the three largest remaining populations of CSTG in the United States, birds from this area will be needed to assist other states (Wyoming, Oregon, Nevada, and Washington) with their reintroduction efforts. Private lands in Moffat and Routt counties will ultimately be the source of birds for supplemental and reintroduction programs. The issue is whether landowners will grant permission to remove birds and whether the community will support any transplants outside their area.

Following are questions that have been raised by the work group about transplants:

1. What impact will transplants have on the source population?
2. If birds are removed from northwest Colorado, will this increase the chances they will be listed there?
3. How will the local community benefit by allowing birds to be transplanted elsewhere?

Reintroduction attempts have been made in Oregon, Idaho, and Nevada with some success. Too date, no efforts have been made to reintroduce CSTG into formerly occupied ranges in Colorado. However, planning has been initiated for a potential transplant in 2001 to private lands in Grand County along the Blue River. In addition, a supplemental release is being considered in Rio Blanco County in an area where birds may still occur in low numbers. Birds for this transplant will need to come from another source outside the state. If birds from Routt or Moffat County are used for this release, it is possible they may return to where they were trapped. Before CSTG are reintroduced anywhere into historical habitats, the factors which caused their extirpation from that area must be identified and remedied (Griffith et al. 1989).

Issue **Range Expansion**: How can CSTG be reintroduced into unoccupied, historic habitats without impacting the existing population?

Objectives	Goals	Actions	Who	When
<p>A. Reintroduce CSTG into formerly occupied habitats in Colorado through trapping and transplanting.</p> <p>B. Assist other states with their CSTG restoration efforts as appropriate.</p>	<p>1. Establish at least two other self-sustaining populations of CSTG within formerly occupied ranges in Colorado.</p> <p>2. Provide transplant stock to other states if local population goals are met.</p> <p>3. Evaluate and improve upon guidelines for transplanting CSTG.</p>	a. Identify and prioritize potential reintroduction sites in Colorado	CDOW	Starting in 2001
		b. Identify landowners currently willing to voluntarily participate in a reintroduction program.	CDOW	Starting in 2001
		c. Conduct public meetings within proposed reintroduction areas.	CDOW	Starting in 2001
		d. Develop CCAAs with landowners within the proposed release areas.	USFWS, CDOW	Starting in 2001
		e. Pursue experimental population designations for releases into unoccupied habitats.	CDOW, USFWS	Starting in 2001
		f. Obtain support/approval from the work group within the occupied range to trap and move birds to unoccupied areas.	CDOW	Starting in 2001
		g. Transplant birds into suitable unoccupied habitats.	CDOW	Starting in 2001

Issue **Range Expansion:** continued

Objectives	Goals	Actions	Who	When
		i. Consider supplemental releases into the periphery of the existing population in south Routt County, eastern Moffat County, and north-central Rio Blanco County. j. Work with the States of Wyoming, Oregon, Utah, Washington and Idaho to establish new populations and reconnect existing population of CSTG within the Rocky Mountain Region.	CDOW State Wildlife agencies	Starting in 2002 Starting in 2002

Ramifications of Listing - Although the USFWS recently ruled that the petition to list the CSTG as threatened was not warranted, this ruling does not negate the need for this plan and the importance of implementing the conservation actions identified in the plan to prevent a future listing. Of concern is that listing will hinder rather than promote conservation efforts for CSTG currently underway in northwest Colorado. Landowner support and cooperation are critical to the success of these efforts. So far, landowners have been extremely cooperative in sharing information, participating in habitat improvement programs, and granting access for conducting surveys and research studies. They have been major contributors in the preparation of this plan. Some are willing to participate in reintroduction programs by allowing access to their land for trapping. Others are open to allowing the state to release birds on their lands where suitable but unoccupied habitats exist. All this could change if the CSTG is listed. Landowners will be reluctant to do anything on their land that may attract grouse. For example, listing could jeopardize landowner participation in the CRP program because they know CRP will attract grouse to their land. It is the opinion of this work group that promoting trust and cooperation among the federal agencies, state agencies, local governments, and private sector will go further in achieving the mission and goals of this plan than invoking the protection of the ESA.

In order to better work with landowners on conservation of species that are not yet listed, the Candidate Conservation Agreement with Assurances (CCAA) Policy was developed by the Fish and Wildlife Service and National Marine Fisheries Service. The intent of the CCAA Policy is to preclude or remove the need for Federal listing of proposed, candidate, and declining species that occur on private, State, Tribal, and other non-Federal lands by providing regulatory assurances to the landowners. Landowners that enter into CCAs will be assured that no additional conservation measures, outside of those specified in their CCAA, will be placed on them in the event that the species covered under a CCAA is federally listed. Many candidate and declining species also occur on federally owned lands, however, Federal agencies cannot receive assurances.

For CSTG, conservation measures incorporated into CCAs with landowners in northwest Colorado would follow habitat management guidelines included in this Conservation Plan.

An Enhancement of Survival Permit that allows incidental take of a species is issued with the CCAA under section 10 of the ESA. If the subject species is listed, the permit allows the landowner to remove individuals or habitat of the species back down to an agreed upon level without violating “take” prohibitions under section 9 of the ESA. The term “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct with respect to a threatened or endangered species. The term “harm” includes destruction or modification of a species habitat such that it cannot use the habitat for breeding, feeding, shelter, or other activities essential to its survival. When all necessary landowners enter into CCAs and implement conservation measures therein, the Service can make a determination that the species does not need to be federally listed.

Even if a species is federally listed, landowners who wish to develop their land in some way can enter into Habitat Conservation Plans (HCP) and/or Safe Harbor Agreements (SHA) to allow them to “take” some individuals of the subject species. The HCP can contain an SHA that provides assurances similar to the CCAA Policy, or the landowner can enter into a separate SHA. A landowner under an SHA is assured that if the subject species increases in number, they can take individuals of the species or its habitat back down to the level the species or habitat was at when they entered into the Safe Harbor Agreement. An “Incidental Take Permit” under section 10 of the ESA is issued to allow the landowner to take the species or its habitat. The Habitat Conservation Plans and Safe Harbor Agreements specify what actions the landowner will take to conserve the species while allowing for all or some proposed development on the land.

Issue **Ramifications of Listing:** How can the population of CSTG in Colorado be conserved, enhanced, and expanded without invoking the constraints of the Endangered Species Act?

Objectives	Goals	Actions	Who	When
<p>A. Manage CSTG under the existing MOA between the State of Colorado and Department of Interior.</p> <p>B. Capitalize on the positive changes in the status of CSTG in Colorado to expand conservation efforts and implement reintroduction programs without the protection of the ESA.</p>	<p>1. Maintain state control of the management and conservation of CSTG in Colorado.</p>	<p>a. Renew the MOA between the State of Colorado and Department of Interior.</p>	<p>State of CO, Dept. of Interior</p>	<p>Complete in 2001</p>
		<p>b. Develop conservation plan in conjunction with the local community.</p>	<p>Agencies, local community</p>	<p>Complete by 2001</p>
		<p>c. Establish an interagency/interstate CSTG conservation team.</p>	<p>Agencies</p>	<p>Starting in 2001</p>
	<p>2. Provide for flexibility in efforts to maintain and enhance existing populations and habitats of CSTG.</p>	<p>d. Develop and make available range wide habitat management guidelines for CSTG.</p>	<p>CDOW</p>	<p>Starting 2001, complete 2002</p>
		<p>e. When and where appropriate, encourage letter writing campaign by stakeholders emphasizing their support and commitment to the conservation of CSTG.</p>	<p>CDOW</p>	<p>Ongoing</p>
		<p>f. Develop statewide or individual CCAA's.</p>	<p>USFWS, CDOW, landowners</p>	<p>Starting in 2001</p>
	<p>3. Provide for flexibility in efforts to expand the distribution of CSTG where ecologically and economically feasible.</p>	<p>g. Promote the understanding that management efforts to maintain, enhance, and expand populations of CSTG need to address the cumulative impacts of numerous activities and therefore will require cooperation among all the stakeholders.</p>	<p>CDOW</p>	<p>Starting in 2001</p>
		<p>h. Develop MOA with other states to reintroduce CSTG into areas that have the highest potential for success and for re-establishing connections between existing populations.</p>	<p>CDOW, other State Wildlife Agencies</p>	<p>Starting in 2001</p>
		<p>i. Continue to monitor and evaluate CSTG populations in relation to the 5 listing criteria considered by the USFWS in evaluating possible action under the ESA (Appendix B).</p>	<p>CDOW</p>	<p>Starting in 2001 - ongoing</p>

Lack of Information Distribution - Published guidelines for management of CSTG habitats (Giesen and Connelly 1993) are generic in nature and of little use to public and private land managers. In addition, most of the information currently available on CSTG is contained within technical manuscripts, master's theses, Ph. D. dissertations, and agency reports that are not readily available or easily interpreted by landowners wanting to improve habitats on their land for sharptails. This information needs to be compiled into a user-friendly format and widely distributed. Whatever format is used, it needs to include a list of all known management practices that benefit sharptails and detailed guidelines on how, when, and where to apply these practices.

Issue Lack of Information Distribution: How can educational efforts be expanded to include information about CSTG conservation?

Objectives	Goals	Actions	Who	When
A. Provide information, education, and technical assistance on CSTG conservation.	<p>1. Identify and prioritize the appropriate target audiences then develop and distribute educational materials to these audiences that will help improve CSTG conservation.</p> <p>2. Develop and implement projects that will demonstrate what constitutes good CSTG management practices.</p> <p>3. Identify economic benefits of CSTG to the local community.</p>	a. Develop an informational brochure that targets the general public and includes a description of the bird and its habitat and a list of beneficial and detrimental management practices.	CDOW, BLM, USFS, NRCS, CSUCE	Starting in 2001
		b. Develop technical guidelines that target the public and private land managers. These brochures should contain detailed, technical descriptions of population and habitat management practices that benefit CSTG and how to integrate these practices into existing land uses.	CDOW, BLM, USFS, NRCS, CSUCE	Starting in 2001
		c. Develop educational materials that can be incorporated into school curricula.	CDOW	Starting in 2001
		d. Create a video on CSTG biology and habitat requirements.	CDOW	Starting in 2001
		e. Establish a database that contains historical and current data on lek counts and surveys.	CDOW	Starting in 2000 ongoing
		f. Establish a web page of CSTG information.	CDOW	Starting in 2001
		g. Identify existing and potential educational, recreational, scientific, and economic benefits of CSTG.	CDOW, CSUCE	Starting in 2001 ongoing
		h. Promote projects and events that increase public awareness of CSTG.	CDOW, Chamber of Commerce, NGO	Starting in 2000
		i. Increase knowledge about CSTG through research.	CDOW, Universities	Ongoing
		j. Use information gained from research to improve CSTG management and to revise this conservation plan as needed.	CDOW, NRCS, USFS, BLM, CSUCE	Ongoing
		k. Coordinate education with other wildlife programs, especially for deer and sage grouse.	CDOW, CSUCE, CDOW, NRCS, BLM, USFS	Ongoing
		l. Establish demonstration areas to educate land managers on what is good CSTG habitat and how to create and maintain it.	CSUCE, NGO, CDOW, landowners	Starting in 2001
		m. Establish a special award to recognize landowners that implement programs to benefit CSTG.	CDOW, NRCS, CSUCE	Starting in 2001

Poor Historical Information/Inadequate Inventory Data - Until recently, CSTG have received little attention in Colorado. Lack of information, poor record keeping, inconsistent efforts among years, and failure to follow standard protocols for conducting lek surveys have made it difficult to track the status and distribution of CSTG in Colorado. What little is known about this grouse in Colorado has resulted from studies in the northwest portion of the state (Dargan et al. 1942, Rogers 1969, Giesen 1987). Giesen (1987) and Giesen and Hoffman (1981) present some data on lek surveys for northwest Colorado, but their information is limited to only a few leks and is not useful in ascertaining the status and distribution of the population at the time they conducted their surveys. Rogers (1969) conducted the only investigation to determine the statewide distribution of CSTG based on lek surveys. Although he conducted lek surveys throughout the state, including northwest

Colorado, much of his information is based on second-hand

reports from sources that may not have been reliable. He acknowledges that the use of common names and misidentification of blue grouse and sage grouse for sharptails made it difficult for him to determine precisely the distribution of sharptails in Colorado. In the past 20+ years, local conservation officers and biologists have conducted lek surveys. However, for the same reasons already mentioned, these data are of limited value in tracking the status and distribution of CSTG in northwest Colorado.

Traditionally, lek counts were designed to provide information on average number of males per lek and average number of birds per lek. However, Kobriger (1975) concluded that lek counts have limited value in measuring population size or documenting population trends because of inconsistent lek attendance patterns within and among years. Beck and Braun (1980) likewise concluded that high variation in lek attendance patterns by males at leks seriously limits the utility of lek counts as a population index for sage grouse. Cannon and Knopf (1981) recommended replacing lek counts with lek surveys (i.e., number of active leks) as an index to prairie grouse populations. Their recommendation was based on the observation that when populations increase, males respond by forming more leks instead of increasing the average number of males on each lek. These findings suggest that lek surveys should include surveys of known leks to ascertain status (active or inactive) and systematic searches for new leks. This does not preclude conducting lek counts, but the results should be interpreted with caution.

The earliest known effort to conduct lek counts for CSTG in Colorado was in 1959 (Table 13). Inconsistent and poorly documented efforts were made to count leks from 1964 to 1996. Since 1997, more intensive efforts have been made to conduct lek surveys and lek counts in northwest Colorado and to document the results (Appendix A). It is imperative that these efforts continue because this information will serve as the basis for measuring whether the conservation actions outlined in this plan are meeting the population goal.

Table 13. Columbian sharp-tailed grouse lek counts in Moffat and Routt Counties from 1959 to 2000.

Year	N Active Leks Counted	Total Birds Counted	Birds/ Lek
1959	5	76	15.2
1964	6	35	5.8
1965	15	91	6.1
1966-76	no data	no data	no data
1977	2	16	8.0
1978	8	65	8.1
1979	15	123	8.2
1980	5	36	7.2
1981	24	335	14.0
1982	26	317	12.2
1983	24	311	13.0
1984	12	107	8.9
1985	7	73	10.4
1986	no data	no data	no data
1987	6	92	15.3
1988	10	146	14.6
1989	19	311	16.4
1990	22	326	14.8
1991	7	90	12.9
1992	7	77	11.0
1993	16	148	9.2
1994	4	39	9.7
1995	13	158	12.1
1996	14	160	11.4
1997	44	524	11.9
1998	86	1107	12.9
1999	103	1646	16.0
2000	127	2454	19.3

Issue **Poor Historic Information/Inadequate Inventory Data**: How can current management efforts compensate for the lack of historic information on the status of CSTG in Colorado?

Objectives	Goals	Actions	Who	When
<p>A. Clarify the historic status of CSTG in Colorado.</p> <p>B. Provide for the long-term monitoring of CSTG in Colorado.</p>	<p>1. Reflect as accurately as possible the historic distribution and status of CSTG in Colorado.</p> <p>2. Establish protocols for future population monitoring and record keeping, including mechanisms to insure consistent implementation.</p>	a. Delineate the known historic distribution of CSTG in Colorado based on museum specimens, confirmed sightings, and lek locations.	CDOW	By 2001
		b. Delineate the suspected historic distribution of CSTG in Colorado based on confirmed and unconfirmed records.	CDOW	By 2001
		c. Delineate the present distribution of CSTG in Colorado based on recent lek surveys.	CDOW	By 2001
		d. Develop a standardized form for recording lek counts and lek survey information. The form should be completed for every visit to a lek site regardless of whether birds are observed or not.	CDOW	By 2001
		e. Consider using volunteers, including private landowners, to conduct lek surveys and to search for new leks.	CDOW	Starting in 2001
		f. Prepare an annual report summarizing the results of the lek surveys and lek counts.	CDOW	Starting in 2000 ongoing
		g. Establish a primary database that includes information on the location and status of all known leks.	CDOW	By 2000 - ongoing
		h. Conduct surveys of all known leks each year to determine if the site is active or inactive. Surveys can start in late March and continue through late May or early June. Any lek not checked the previous year should be given priority the current year.	CDOW, USFS, BLM	Starting in 2000 ongoing
		i. Classify leks with no birds for 3 consecutive years as inactive. Remove these leks from the primary database. Maintain information about inactive leks in a separate database in case the sites become active again in the future.	CDOW	Starting in 2000 ongoing
		j. Leks checked late in the morning, late in the season, or during inclement weather may be mistakenly classified as inactive. Revisit these leks again and also check the site for signs of activity (droppings, feathers, tracks, or matted vegetation).	CDOW, USFS, BLM	Starting in 2000 ongoing
		k. Intensify lek searches within 1 km radius of inactive leks to insure the lek has not relocated to a new site. If another lek is found within 0.5 km of the inactive site, it should not be classified as a new lek.	CDOW, USFS, BLM	Starting in 2000 ongoing

Issue **Poor Historic Information/Inadequate Inventory Data:** continued.

Objectives	Goals	Actions	Who	When
		<p>l. Classify any lek found within 0.5 km of an active lek as a satellite lek if it contains < 4 males and as a new lek if it contains > 4 males.</p> <p>m. Obtain counts (total birds present) on the same 40 leks each year. The count leks should be randomly selected from the most current list of active leks. If a count lek becomes inactive, it should be replaced with another lek randomly selected from the list of active lek.</p> <p>n. Conduct lek counts between 20 April and 15 May during the period ½ hour before sunrise to 2 hours after sunrise. Attempt to count on mornings with no precipitation and wind speeds <15 mph.</p> <p>o. If there is no vantage point from which to count all the birds on the lek, then flush the birds off the lek and count birds flying away. Walk through the lek to insure all the birds were flushed. It is not necessary, and often not possible, to distinguish males from females. Promptly leave the lek after conducting the count.</p> <p>p. Conduct searches for new leks.</p> <p>q. Insure all lek locations are incorporated into the Wildlife Resource Information System (WRIS) for mapping purposes.</p>	<p>CDOW, USFS, BLM</p> <p>CDOW</p> <p>CDOW, USFS, BLM</p> <p>CDOW, USFS, BLM</p> <p>CDOW, USFS, BLM</p> <p>CDOW</p>	<p>Starting in 2000 ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>As identified</p> <p>Ongoing</p> <p>Ongoing</p>



Degradation of Wetland Areas - For purposes of this plan, wetland areas are defined as springs, seeps, marshes, lakes, ponds, creeks, and streams and the lands bordering these bodies of water. The terms wetland and riparian areas may be used interchangeably. In Colorado and other western states, wetland areas stand out in marked contrast to the adjacent, more arid uplands. Many species of wildlife, including grouse, are naturally drawn to wetland areas because of the presence of water and succulent vegetation. Wetland areas generally support a greater diversity and higher density of plants and insects, which in combination with the succulent vegetation, makes them extremely attractive as brood rearing sites. The problem is that the same factors that attract wildlife to wetland areas also attract livestock. Wetland values are easily lost through intensive use by domestic livestock. Domestic ungulates spend a disproportionate amount of time in wetland areas unless they are excluded from these areas with fencing or herded away on a daily basis. Thus, grazing, browsing, and trampling in wetland areas by domestic livestock may occur in a manner and to a degree that impairs wetland function and does not allow the wetland system time to recover. When the vegetation is removed, the amplitudes of peak runoff are increased. This in turn increases gully formation and the loss of surface water. Consequently, the water table is lowered, the wetland vegetation disappears or shrinks in size, and adjacent upland vegetation or worse, noxious plant species, encroach on the site.

The effects of improper management in wetland areas are evident throughout Moffat, Routt, and Rio Blanco counties. Many smaller drainages within the plan boundary no longer carry water or dry up during the summer. Others have little or no wetland vegetation associated with the site. Still others have been lost due to the conversion of the adjacent lands to agriculture. It is uncertain how the loss and degradation of these sites have impacted the grouse population. However, it is likely the birds would be more widely distributed in some areas if it was not for the loss of quality wetland areas.

Issue **Degradation of Wetland Areas**: How can healthy wetland plant communities be maintained, or degraded wetlands improved, to benefit CSTG?

Objectives	Goals	Actions	Who	When
A. Provide for a level of management that conserves, maintains, and if possible, improves upon the quality of wetland plant communities within CSTG habitats in northwest Colorado.	1. Promote the establishment, health, and vigor of wetland plant communities known to be of benefit to CSTG.	a. Seek funding through the CDOW Wetlands Program to create, conserve, enhance, and restore wetlands in CSTG habitats, including riparian areas, springs, seeps, wet meadows, and marshes.	Landowners, BLM, USFS, NRCS, CDOW	Starting in 2001 ongoing
		b. Identify and map high priority and critical wetland areas in CSTG habitats.	CDOW	Starting in 2001
	2. Insure no net loss of wetland habitats within the breeding/nesting range of CSTG.	c. Identify, map, and prioritize wetland restoration and enhancement projects in CSTG habitats.	CDOW	Starting in 2001
		d. Where appropriate, discourage further construction of roads, power lines, or housing developments in or near wetlands.	CDOW, BLM, USFS, County	Starting in 2001 ongoing
	3. Manage for healthy wetland plant communities capable of supporting livestock use while still maintaining adequate herbaceous and woody plant cover for CSTG.	e. Where appropriate, remove and realign roads and power lines in wetlands.	CDOW, BLM, USFS, County	Starting in 2001 where feasible
		f. Create new incentives for landowners and developers to protect and/or restore wetlands.	CDOW	Starting in 2001
		g. Where feasible, conserve, create, enhance, and restore small ephemeral wet areas within CSTG nesting and brood rearing areas.	BLM, USFS, CDOW, NRCS	Starting in 2001 ongoing

Issue **Degradation of Wetland Areas**: continued.

Objectives	Goals	Actions	Who	When
		h. Where damage or loss of wetlands is unavoidable, mitigate negative effects by enhancing other wetlands whenever possible.	Landowners, agencies, counties	Starting in 2001 - ongoing
		i. Whenever possible, avoid altering the height, density, or canopy coverage of deciduous shrubs within 300 + ft (100 m) of streams, including seasonally dry and intermittent streams.	Landowners, land mgmt agencies	Starting in 2001 - ongoing
		j. Where possible herd livestock to upland areas.	Landowners	Ongoing
		k. Where possible, place mineral blocks in upland areas.	Landowners	Ongoing
		l. Where possible, develop alternate water sources away from wetland areas.	Landowners, NRCS, land mgmt agencies	Starting in 2001 - ongoing
		m. Where feasible, use fencing to protect or allow only limited access to wetland areas.	Landowners, NRCS, land mgmt agencies	Starting in 2001 - ongoing
		n. Where feasible, create riparian pastures and incorporate into a deferred or rest rotation grazing system.	Landowners, NRCS, land mgmt agencies	Starting in 2001 - ongoing
		o. Where feasible, place rocks, brush piles, or tree branches along stream banks to limit livestock access.	Landowners, NRCS, land mgmt agencies	Starting in 2001 as needed
		p. Where appropriate, renovate and seed uplands with preferred forage species to attract livestock away from wetlands.	Landowners, NRCS, land mgmt agencies	Starting in 2001 as needed
		q. Where appropriate, protect springs and seeps and pipe water to troughs for livestock.	Landowners, NRCS, land mgmt agencies	Starting in 2001 as needed
		r. Where possible, pipe overflow from troughs to protected areas to create wet areas.	Landowners, NRCS, land mgmt agencies	Starting in 2001 where possible
		s. Where possible, rest severely degraded wetlands for at least 2 years to allow for vegetation recovery then implement rest or deferred rotation grazing system.	Landowners, land mgmt agencies	Starting in 2001 as identified
		t. Where possible, utilization in wetland areas should not exceed 40% of the preferred forage.	Landowners, land mgmt agencies	Starting in 2001 - ongoing
		u. Where possible, alter season of use of wetland areas from year to year.	Landowners, land mgmt agencies	Starting in 2001 - ongoing

Issue **Degradation of Wetland Areas**: continued

Objectives	Goals	Actions	Who	When
		v. Where possible, avoid winter feeding of livestock in or near wetland areas.	Landowners	Starting in 2001 ongoing
		w. Where possible, closely monitor livestock use in wetland areas to avoid over utilization.	Landowners, land mgmt agencies	Starting in 2001 ongoing
		x. Where possible, allow for flexibility in deciding when livestock should be moved in or out of pastures with wetlands to accommodate for yearly variations in precipitation and vegetation growth.	Landowners, BLM, USFS, CDOW, NRCS	Starting in 2001 ongoing

MONITORING AND EVALUATION

This plan contains 248 conservation actions designed to address the 23 issues that may potentially impact CSTG in northwest Colorado. The majority of actions pertain to habitat related issues. Some of the actions presented in the plan are already being implemented, monitored, and evaluated.

Because the CSTG population in this area is believed to be at an all time high, the goals and objectives of this plan are directed at maintaining existing population and habitat conditions. Towards this end, current habitat conditions will be assessed and future habitat conditions will be monitored to detect any changes that may positively or negatively impact the population. Management efforts will focus on protection, restoration, enhancement, and maintenance of CSTG habitats. The primary population data that will be collected includes total number of active and inactive leks, average number of males per lek, number of new leks located annually, total harvest, and juveniles/adults in the fall harvest based on wing analyses. These data will be incorporated into annual progress reports and distributed to the stakeholders. Annual meetings will be held to review and discuss the population and habitat data, determine whether progress is occurring, and to identify adjustments if progress is not occurring.

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APPENDIX A. COLUMBIAN SHARP-TAILED GROUSE LEK SURVEYS AND COUNTS.

Lek Name	County	Type ¹	Status ²				Status 2000	Count 1997	Count 1998	Count 1999	Count 2000	Habitat Type	Land Status ³
			1997	1998	1999	2000							
80 Road	Routt	K	A	A	A	A		8	12	16	Hay/pasture	private	
Annan's Twenty Mile 1	Routt	H	A	A	A	A		18	10	14	CRP	private	
Annan's Twenty Mile 2	Routt	H	A	A	A	A	16	22	38	26	Sagebrush	private	
Annan's Twenty Mile 3	Routt	K	A	A	A	A		14	23	14	CRP	private	
Baker's Peak	Moffat	K	NC	I	I	I					unknown	SLB	
Barnes	Routt	K	A	I	I	I					CRP	private	
Big Elk 1	Routt	N		A*	A	A		18	26	30	CRP	private	
Big Elk 2	Routt	N		A*	A	A		8	5	27	CRP	private	
Bloomquist	Routt	N	A*	A	A	A	9	11	7	20	Hay/pasture	private	
Buck Mountain 1	Moffat	K	A	A	A	A		14	15	33	Sagebrush	SLB	
Buck Mountain 2	Moffat	N	A*	A	A	A		8	25	11	Sagebrush	private	
Buck Mountain 3	Moffat	N	A*	A	A	A		3	18	22	Sagebrush	private	
Burn	Moffat	N	A*	A	A	A		19	52	54	Native grass/forb	private	
Calf Creek	Routt	N	A*	NC	A	A	12		16	18	Sagebrush	private	
California Park 1	Routt	K	NC	A	I	I		2			Sagebrush	public (USFS)	
California Park 2	Routt	N		A*	A	A		10	11	8	Sagebrush	SLB	
California Park 3	Routt	N		A*	A	I		4	5		Sagebrush	public (USFS)	
California Park Road 1	Routt	H	NC	NC	NC	NC					unknown	private	
California Park Road 2	Routt	K	NC	NC	NC	A				12	Sagebrush	private	
California Park Road 3	Routt	N			A*	A			12	18	Sagebrush	private	
Cedar Hill Gulch	Moffat	K	NC	I	I	A					Native grass/forb	private	
Cole Gulch 1	Moffat	N		A*	A	I		4			CRP	private	
Cole Gulch 2	Moffat	N		A*	A	A		13	21	33	CRP	private	
Colowyo Reclamation	Moffat	N				A*				6	Mine reclamation	private	
County Airport	Routt	K	I	I	I	I					Native grass/forb	private	
Cull Reservoir	Moffat	N		A*	A	A		18	22	16	Hay/pasture	private	
Davis	Moffat	N			A*	A			12	13	CRP	private	
Davis 2	Moffat	N				A*				4	CRP	private	
Deadman	Routt	N				A*				24	Sagebrush	private	
Deep Creek	Routt	N	A*	A	A	A	6			10	Sagebrush	private	
Dinwiddie	Routt	K	NC	I	A	A				13	Alfalfa	private	
Dresher Reservoir	Moffat	N		A*	A	I		2			CRP (retired)	private	
Dry Creek	Routt	N	A*	A	A	A	9	17	14	35	Hay/pasture	private	
Dry Elkhead Ridge	Routt	H	A	NC	A	A	4	8	8	16	CRP	private	
Dry Fork Elkhead	Routt	H	A	A	A	A		30	29	35	Hay/pasture	private	
Dry Fork Elkhead 2	Routt	N				A*				23	Sagebrush	SLB	
Dry Fork Elkhead 3	Routt	N				A*				9	Sagebrush	private	
Dry Gulch 2	Routt	H	I	I	I	NC					Sagebrush	private	
Dry Gulch 3	Routt	K	I	I	I	NC					Alfalfa	SLB	

APPENDIX A. Continued.

Lek Name	County	Type ¹	Status ²			Status			Count			Habitat Type	Land Status ³
			1997	1998	1999	2000	1997	1998	1999	2000			
Dunckley Park	Routt	N				A*						Hay/pasture	private
Earle	Routt	N		A*	A	A				12	18	CRP	private
Eckman Park 1	Routt	N	A*	A	A	A		17	19	29	30	Mine reclamation	private
Eckman Park 2	Routt	N	A*	A	A	A		18	17	51	59	Mine reclamation	private
Eckman Park 2A	Routt	N			A*	A				4	11	Mine reclamation	private
Eckman Park 3	Routt	N	A*	A	A	A		17	11	13	6	Mine reclamation	private
Eckman Park 4	Routt	N	A*	A	A	A		10	8	11	8	Mine reclamation	private
Eckman Park 5	Routt	N	A*	NC	A	A		10		19	16	Mine reclamation	private
Eckman Park 6	Routt	N	A*	A	A	A		11	13	18	21	Mine reclamation	private
Eckman Park 7	Routt	N			A*	A				29	40	Mine reclamation	private
Eckman Park 8	Routt	N				A*					30	Mine reclamation	private
Edna Mine 1	Routt	N		A*	A	A			9	14	24	Mine reclamation	private
Edna Mine 2	Routt	N			A*	A				5	2	Mine reclamation	private
Edna Mine 3	Routt	N			A*	A				18	22	Mine reclamation	private
Elk Creek 1	Routt	N	A*	A	A	A		12	9	9	13	Mine spoil	private
Elkhead	Routt	N	A*	NC	A	A		10			7	Native grass/forb	private
Elkhead Road 1	Moffat	H	I	I	I	I						wheat	private
Elkhead Road 2	Moffat	H	I	I	I	I						wheat	private
Elkhead Road 3A	Routt	H	A	A	A	A		8		10	14	CRP	private
Elkhead Road 3B	Routt	N			A*	A				7	5	CRP	private
Elkhead Road 4	Moffat	K	I	NC	I	I						Sagebrush	private
Elk Mountain 1	Routt	H	I	NC	A	A				2	16	Hay/pasture	private
Elk Mountain 2	Routt	H	A	A	A	A		6	16	15	22	Hay/pasture	private
Elk Mountain 3	Routt	H	A	A	A	A		35	31		39	Hay/pasture	private
Elk River Cemetery	Routt	H	I	I	I	I						Native grass/forb	private
Energy Fuels	Routt	K	NC	NC	A	A				4		Sagebrush	private
Finger Rock	Routt	N	A*	NC	I	I		3				Native grass/forb	private
Fish Creek	Routt	N		A*	A	A			15	8	8	Sagebrush	private
Five Pines Mesa	Routt	K	NC	I	I	I						Sagebrush	private
Fly Creek	Moffat	K	NC	A	A	A			12	10		Sagebrush	private
Foidel Creek	Routt	H	A	NC	I	I		11				CRP (retired)	private
Fortification Rocks	Moffat	K	NC	I	NC	I						Sagebrush	public (BLM)
George's Gulch	Routt	H	A	A	A	A		24	22	18	14	CRP	private
Gillilands	Routt	H	I	I	I	NC						unknown	private
Gnat Hill	Routt	N	A*	I	I	I						CRP	private
Green Acres	Routt	K	I	I	I	I						Sagebrush	private
Hayden Divide	Routt	H	A	A	A	A			25	28	26	Mine reclamation	private
Heidel	Routt	K	A	A	A	A			17	14	17	CRP	private
Hicks	Routt	K	NC	NC	NC	A					7	Sagebrush	private

APPENDIX A. Continued.

Lek Name	County	Type ¹	Status ²		Status	Status	Status	Count	Count	Count	Count	Count	Habitat Type	Land Status ³
			1997	1998										
Hightail	Routt	N	A*	A	A	A	13	8	8	9	9	CRP (retired)	private	
Hillberry	Routt	N	A*	A	A	A	10	22	20	31	31	Sagebrush	private	
Hinkle	Routt	K	A	A	A	A	5	6	7	8	8	CRP (retired)	private	
Hocket	Routt	K	A	A	A	A		8	18	22	22	Hay/pasture	private	
Hoffman	Routt	N	A*	A	A	A	11	18	26	12	12	Hay/pasture	private	
Homestead	Routt	N	A*	A	A	A	6		14	12	12	CRP (retired)	private	
Homestead Ditch	Routt	N	A*	A	A	A	7	7	5	2	2	Mine reclamation	private	
Horton Knoll 1	Routt	K	A	A	A	A		11		25	25	Sagebrush	private	
Iles Dome	Moffat	H	NC	A	A	A		3	10	18	18	CRP	private	
Iles Mountain	Moffat	N								25	25	Sagebrush	private	
Jacks	Routt	N			A*	A			5	17	17	Wheat	private	
Jubb	Moffat	N			A*	A			9	9	9	Native grass/forb	private	
Little Buck 1	Moffat	K	A	A	A	A		15	19	7	7	Sagebrush	private	
Little Buck 2	Moffat	K	A	A	A	A		7	17	13	13	Sagebrush	private	
Little Hunter	Routt	N	A*	NC	I	I						Sagebrush	private	
Long Gulch	Moffat	K	A	A	A	A		2	11	16	16	Hay/pasture	private	
Maneotis	Routt	K	A	A	I	A	15	7				Hay/pasture	private	
McInturf Mesa	Moffat	K	NC	I	I	I						Sagebrush	public (BLM)	
McKinney Ranch	Routt	H	A	A	A	A	7		6	6	6	Hay/pasture	private	
MCR 18	Moffat	N		A*	A	A		4	5	8	8	CRP	private	
Middle Creek	Routt	N	A*	A	A	A			7	36	36	Mine reclamation	private	
Miller	Routt	N			A*	A			3			Sagebrush	private	
Milner	Routt	K	I	I	NC	I						unknown	private	
Morapas Gas Field	Moffat	H	NC	A	A	A		21	37	33	33	CRP	private	
Morgan	Moffat	N	A*	A	A	A		44	49	53	53	Native grass/forb	private	
Morgan Creek Reservoir	Routt	K	A	A	A	A		30	35	40	40	Sagebrush	private	
Morning Crow	Routt	N	A*	I	A	A			4	6	6	CRP	private	
Mud Springs	Routt	H	A	A	A	A		20		33	33	CRP	private	
Nolands	Moffat	K	NC	A	A	A		7	6	4	4	CRP	private	
Nolands 2	Moffat	N			A*	A				7	7	Hay/pasture	private	
North Giant	Routt	N	A*	A	A	A	19	17	13	31	31	CRP	private	
Pelleys	Moffat	H	NC	I	I	I						Hay/pasture	private	
Pilot Knob	Routt	N			A*	A				22	22	Hay/pasture	private	
Pinnacle Mountain 1	Moffat	N	A*	A	A	A		9	13	18	18	Sagebrush	private	
Pinnacle Mountain 2	Moffat	N	A*	NC	I	I		9				unknown	private	
Pinnacle Mountain 3	Moffat	N	A*	A	A	A		4	16	13	13	Alfalfa	private	
Pondella Ranch	Moffat	N	A*	A	A	A		10	17	37	37	Hay/pasture	private	
Postovit	Routt	N	A*	A	A	A		10	10	16	16	CRP	private	
RCR 33b	Routt	N	A*	A	A	A	44	38	48	51	51	CRP	private	

APPENDIX A. Continued.

Lek Name	County	Type ¹	Status ²			Status	Status	Status	2000	Count	1998	Count	1999	Count	2000	Habitat Type	Land Status ³
			1997	1998	1999												
Rick's	Routt	N	A*	A	A	A	A	10	10	10	13	14	CRP (retired)	private			
Robinson	Routt	K	I	I	NC	I	I						Alfalfa	private			
Rock Creek 1	Routt	H	NC	I	NC	I	I						unknown	private			
Rock Creek 2	Routt	K	A	A	A	A	A	12	12	12		21	Sagebrush	private			
Rogers	Routt	N	A*	I	A	A	A	15	15	15	9	15	CRP (retired)	private			
Saddle Mountain 1	Routt	N	A*	NC	I	I	I	5					Hay/pasture	private			
Sage Creek	Routt	H	A	I	I	I	NC						unknown	SLB			
Salt Creek	Routt	N					A*					20	Mountain shrub	private			
Schneiders	Moffat	H	NC	I	I	I	NC						Hay/pasture	private			
Seneca Mine 1	Routt	K	A	A	A	A	A	15	15	15	18	20	Mine reclamation	SLB			
Seneca Mine 2	Routt	N	A*	A	A	A	A	12	12	12	21	21	Mine reclamation	SLB			
Sherrrod-Sadelin	Routt	K	I	I	I	I	NC						unknown	private			
Shivers	Routt	N	A*	I	I	I	I	6					CRP	private			
Six Plus	Routt	N					A*					14	Sagebrush	private			
Slater Park 1	Routt	K	NC	A	A	A	A	7	7	7	7	7	Sagebrush	public (USFS)			
Smiths	Routt	H	A	A	A	A	A	11	11	11	35	29	Hay/pasture	private			
Smuin Gulch Gravel Pit	Routt	N	A*	A	A	A	A	14	15	15	12	16	CRP	private			
Smuin Gulch Oil Well 1	Routt	N	A*	A	A	A	A	10	10	10	15	23	CRP	private			
Smuin Gulch Oil Well 2	Routt	N	A*	A	A	A	A		10	10	5	16	CRP	private			
Soash	Routt	K	A	A	A	A	A	6	6	6	7	9	Hay/pasture	private			
Stokes Gulch 1	Routt	N	A*	A	A	A	A	21	21	21	27	18	CRP	private			
Stokes Gulch 2	Routt	N		A*	A	A	A	25	25	25	19	19	CRP	private			
Straight Gulch	Moffat	N	A*	A	A	A	A	14	14	14	9	23	Sagebrush	private			
Taylor's	Moffat	H	NC	I	NC	I	NC						unknown	private			
Trapper	Routt	N			A*	A	A				6	5	Sagebrush	private			
Trapper Mine 1	Moffat	H	NC	A	A	A	A	23	23	23	27	31	Mine reclamation	SLB			
Trapper Mine 2	Moffat	N		A*	A	A	A	6	6	6	6	8	Mine reclamation	private			
Turner Creek	Routt	N	A*	A	A	A	A	14	15	15	10	30	Sagebrush	private			
Twentymile 1	Routt	K	A	A	A	A	A				9	7	Hay/pasture	private			
Twentymile 2	Routt	N			A*	A	A				12	12	Hay/pasture	private			
Twentymile 3	Routt	N			A*	A	A				14	7	Hay/pasture	private			
Twentymile 4	Routt	N			A*	A	A				17	24	Hay/pasture	SLB			
Twentymile 5	Routt	N					A*					25	Sagebrush	private			
Twentymile Cliffs 1	Routt	N	A*	I	I	I	I	3					Mine reclamation	private			
Twentymile Cliffs 2	Routt	N	A*	A	A	A	A	10	24	24	26	43	Mine reclamation	private			
Twentymile Cliffs 3	Routt	N	A*	A	I	A	A	4	3	3		7	Mine reclamation	private			
Twentymile Cliffs 4	Routt	K	A	A	A	A	A	8	9	9	19	34	Mine reclamation	private			
Twentymile Cliffs 5	Routt	N	A*	A	A	A	A	20	14	14			Mine reclamation	private			
Twentymile Cliffs 6	Routt	N					A*					26	Mine reclamation	private			

APPENDIX A. Continued.

Lek Name	County	Type ¹	Status ²			Status			Count	Count	Count	Habitat Type	Land Status ³
			1997	1998	1999	2000	1997	1998					
Villards	Moffat	K	A	I	I	I					Hay/pasture	private	
Villards 2	Moffat	N				A*				12	Hay/pasture	private	
Warrick Pasture	Routt	N	A*	A	NC	A					Sagebrush	private	
Wilderness Ranch	Moffat	K	A	A	A	A		5	12	10	Sagebrush	SLB	
William's Park	Routt	N	A	A*	A	A		7	27	50	Sagebrush	private	
Wilson	Moffat	K	A	A	A	A		24	21	27	Native grass/forb	private	
Wilson 2	Moffat	N				A*				9	Native grass/forb	private	
Windemere	Routt	N		A*	A	A		3	3	3	CRP	private	
Wiseman's 1	Moffat	H	NC	I	I	NC					unknown	private	
Wolf Mountain Ranch	Routt	N	A*	NC	A	A			10	18	Sagebrush	private	
Woods	Routt	K	A	A	A	A		6	20	19	Hay/pasture	private	
Wymans 1	Routt	K	NC	A	A	A			26	28	CRP	private	
Wymans 2	Routt	N				A*				7	CRP	private	
Yampa	Routt	N			A*	A		5	5		Sagebrush	private	
Yellowjacket Road	Routt	H	A	A	A	A		3	4		Native grass/forb	private	
Yellowjacket 1	Routt	H	I	I	I	I					Hay/pasture	private	
Yellowjacket 2	Routt	K	A	NC	A	A				8	Native grass/forb	private	
Yeast Mine Road	Routt	N				A*				10	Alfalfa	private	

Summary	1997	1998	1999	2000
Total Established Leks	75	114	141	156
New Leks Located	39	27	15	18
Total Leks	114	141	156	174
Total Leks Surveyed	91	125	146	165
Total Active Leks	77	94	114	133
Total Leks Counted	44	86	103	127
Total Males Counted	524	1107	1646	2454
Average males/lek	11.9	12.9	16	19.3

1 K = known lek found prior to 1997; H = historic lek reported in Rogers, G.E. 1969. The sharp-tailed grouse in Colorado. Colo. Div. Game Fish, and Parks
 N = new lek found since 1997.
 2 A = active (* denotes the year the lek was first located for new leks); I = inactive; NC = not checked.
 3 SLB = State land Board; USFS = United States Forest Service; BLM = Bureau of Land Management.

APPENDIX B

The U.S. Fish and Wildlife Service uses five factors to determine whether any species is threatened or endangered. The factors and the corresponding response regarding Columbian sharp-tailed grouse in northwest Colorado are as follows:

1. Present or threatened destruction, modification, or curtailment of its habitat or range.

Columbian sharp-tailed grouse once were more widely distributed in northwest Colorado than they are today, but the exact distribution is unknown. The 8 counties that comprise northwest Colorado include Moffat, Routt, Jackson, Grand, Summit, Eagle, Garfield, and Rio Blanco. Historical records indicate Columbian sharptails inhabited portions of all 8 counties. However, the distribution was probably not continuous and densities likely varied greatly throughout the area. Museum specimens and/or documented lek sites of Columbian sharptails are available from Summit, Grand, Moffat, and Routt counties, whereas valid sightings are reported from Rio Blanco, Garfield, Jackson, and Eagle counties. Currently, Columbian sharp-tailed grouse are known to occur in Routt, Moffat, and Rio Blanco counties. The last confirmed sightings elsewhere in northwest Colorado date back to the early 1960s.

Moffat and Routt counties support 95% of the remaining birds in Colorado. Two factors suggest sharptail populations in northwest Colorado are increasing. First and foremost is the increase in the total number of leks and second is the increase in the average number of males per lek. Prior to 1997, the CDOW knew the location of 75 sharptail grouse lek sites in Routt (54) and Moffat (21) counties. Intensive lek surveys conducted from 1997 to 2000 have resulted in the location of 99 new leks. During this period, the average number of males per lek has steadily increased from 11.9 to 19.3. The number of known lek sites now totals 174 (Moffat = 46, Routt = 128) of which 133 are active. About 70% of the suitable habitat has been searched. Assuming the unsearched habitat supports proportionally the same number of active leks (i.e., $n = 57$), the minimum breeding population based on a 1:1 sex ratio and 3 year (1998-2000) moving average of 16 males per lek can be estimated as $190 \text{ active leks} \times 16 \text{ males/lek} \times 2 = 6,080 \text{ birds}$.

Information on lek counts dates back to the late 1950s. However, this information must be interpreted with caution because of incomplete reporting of the results, inconsistent effort among years, and poor record keeping. Past lek surveys, other than the efforts by Rogers (1969), were limited in scope and did not include systematic searches for new leks. In addition, none of the past surveys, including the surveys by Rogers (1969), were nearly as intensive as the surveys conducted since 1997.

The first study of CSTG in Colorado did not include lek surveys (Dargan et al. 1942). Instead, this study focused on food habits, flock size, and habitat use. The earliest known lek counts were conducted by the advanced biology class at Moffat County High School in 1959. They counted 76 birds on 5 different leks in Moffat County. Rogers (1969) conducted the first rangewide survey of CSTG in Colorado. He reported finding 36 leks in 4 counties from 1963 to 1965. Most (31) of the leks he found were in Routt (21) and Moffat (10) counties. The remaining 5 leks were in Mesa (4) and Montrose (1) counties. He reports counting a maximum of 357 males on 36 grounds in 1963 (9.9 males/lek), but presents no summary of the counts by lek site or county. However, he does present data for counts conducted in 1964 and 1965. No lek count data are available for the 11 year period from 1966 to 1976. Local Conservation Officers and researchers conducted most of the counts since 1977 (Giesen and Hoffman 1981, Giesen 1987, Hoffman 2000).

Despite the limitations of the data presented by Rogers (1969), it is apparent that the core of the CSTG population in Colorado resided in Routt and Moffat counties in the mid 1960s as it still does today and that the birds were gone or existed in low numbers elsewhere in the state. Although not conclusive, it also is reasonable to surmise from the data that the density of birds in Routt and Moffat counties 35+ years ago was significantly less than it is today. If CSTG were ever abundant in other regions of the state, there should be

APPENDIX B (Continued)

more recorded sightings, more known lek site locations, more museum specimens, and more harvest records for areas outside of Routt and Moffat counties.

Reasons for the recent increase in sharptail populations are twofold: (1) implementation of the Conservation Reserve Program, and (2) passage of the Surface Mining Control and Reclamation Act. CRP and reclaimed mine lands account for only 4% of the land area within the plan boundary but support 44% of the known lek sites. The extensive, relatively undisturbed grasslands that have developed on CRP and mine reclamation lands in combination with the abundant and widely distributed mountain shrub communities have provided secure breeding, nesting, brood rearing, and winter habitat for sharptails in northwest Colorado.

Removing lands from the Conservation Reserve Program and returning them to crop production or using them as pasture will cause a reduction in the abundance of CSTG as will over-grazing or development of reclaimed mine lands following bond release. However, CSTG persisted in northwest Colorado before CRP and before passage of the mine reclamation act; therefore, the loss of CRP or improper management of reclaimed lands alone will not result in the extinction of this population.

Large scale habitat conversions in northwest Colorado have not occurred at the magnitude that has taken place elsewhere within the range of the CSTG. Most of the ground suitable for farming already has been converted and even during the peak of wheat production in this region sharptails managed to survive. The remaining native habitats in northwest Colorado are secure from future conversion to croplands because these lands are topographically unsuitable for farming.

The greatest concern for sharptails in northwest Colorado is their dependence on private lands; 71% of the occupied range is privately owned. There is the constant threat that these lands could be lost or fragmented due to development, especially in Routt County. Of secondary concern is the limited opportunity to manage grazing on private lands to benefit sharptails. Sound livestock management practices are not detrimental to sharptails and, in many situations, can be used as a management tool to enhance habitat suitability for sharptails. Excessive or improper grazing, however, disrupts native plant communities by promoting invasion of noxious or exotic plants, spread of less desirable vegetation, loss of vegetative diversity, degradation of riparian areas, and removal of residual cover required for nesting.

2. Over-utilization for commercial, recreational, scientific, or educational purposes.

No over-utilization of Columbian sharp-tailed grouse in northwest Colorado is apparent. Commercial and educational uses are limited to viewing tours conducted by private companies and nonprofit organizations to observe sharptails on leks in spring. This activity involves fewer than 10 leks and imposes minimal disturbance.

Recreational use occurs through hunting within 9 game management units in northwest Colorado. The season opens 1 September and extends through the third weekend of the month, varying in length from 16-22 days depending on which day of the week the season opens. Bag and possession limits are 2 and 4 birds, respectively, which was reduced by the Wildlife Commission in 1995 from 3 and 9. In an effort to obtain more reliable harvest information, the CDOW required permits to hunt sharptails from 1995-97. Permits were free and no restrictions were placed on the number issued. Attempts were made to contact all the permit holders by phone following the season. The results indicated that past mail surveys grossly inflated the harvest estimates by 6-10 fold. Subsequent surveys have been conducted by phone, with potential sharptail grouse hunters identified through the Harvest Information Program.

Over the past 5 years for which reliable data are available, harvest estimates have ranged from 102-433 birds and averaged 240 birds per year. Hunter participation is low. Estimates indicate on average only 220

APPENDIX B (Continued)

hunters pursue sharptails each year (range for past 5 years = 97 - 317). Based on a conservative fall population estimate of 12,000 birds (double the spring population to account for production), hunting removes less than 4% of the available birds. At this level, hunting is compensatory to natural mortality. This assertion is supported by data from wing collections. Analysis of wings collected from hunter-harvested birds over the past 24 years indicates juveniles comprise over 55% of the harvest. Concerns about over-harvest are further diminished because most of the birds occur on private land with limited access for hunting.

Over-harvest may be an issue on the few areas where sharptails occur on public lands. However, these areas are usually surrounded by private lands that receive little or no hunting pressure. Even if the entire harvest is coming from public lands, it is unlikely the removal of 300 to 400 birds per year has a significant impact on the population occupying public lands. Nonetheless, if sharptails are being over-harvested on some public lands, there should be an adequate source of birds on adjacent private lands to replenish the birds lost on public lands.

Scientific study affects about 150 birds per year. These birds are captured, banded, and radio-marked (60-70 birds) to study population dynamics and habitat relationships. Mortality resulting from the direct interference of captured birds is less than 5%.

3. Disease or predation.

No disease/parasite problems have been identified in Columbian sharp-tailed grouse populations in Colorado or elsewhere within the subspecies range. This does not imply sharptails are disease-free. Consistent and sometimes heavy parasite loads are common in grouse, but seldom cause direct mortality. However, heavy parasite loads may limit growth, reduce productivity, or increase vulnerability to predation if the birds are stressed.

Predation is a natural event that removes about 50% of the population each year. Sharptails compensate for high predation with high reproductive rates. They lay large clutches (average = 10 eggs), both adult and yearling hens attempt to nest, and hens will frequently renest if the first nest is destroyed. Avian induced mortality tends to exceed mortality caused by mammals, except for nest predation. Mammals, such as skunks, badgers (*Taxidea taxus*), ground squirrels, raccoons, and foxes are major nest predators along with ravens, crows, black-billed magpies (*Pica pica*), and bullsnakes (*Pituophis melanoleucus*). Avian predators of sharp-tailed grouse include golden eagles, prairie falcons (*Falco mexicanus*), northern harriers (*Circus cyaneus*), northern goshawks (*Accipiter gentilis*), red-tailed hawks (*Buteo jamaicensis*), Swainson's hawks (*B. swainsoni*), great-horned owls, and ravens. Smaller avian predators, such as Cooper's hawks (*A. cooperii*) and sharp-shinned hawks (*A. striatus*), will take young grouse. Major mammalian predators include coyotes, foxes, and weasels (*Mustela* sp.).

The impact of predators on grouse in native habitats represents a balance that has evolved over a long period of time. There is some concern that man's activities have upset this balance and altered the landscape in ways that appear to favor certain predators. For example, raccoons, skunks, and red fox now have more diverse food supplies (grain, garbage, carrion) and places to over-winter and rear their young (abandoned buildings, barns, haystacks). Crows, ravens, great-horned owls, and golden eagles have more places to nest and perch in the form of trees planted by man and artificial structures built by man. Together these factors have contributed to an increase in predator populations and allowed certain predators to expand their range into previously unoccupied areas. The impacts of these changes in predator/prey relationships have not been adequately evaluated.

APPENDIX B (Continued)

4. Inadequacy of existing regulatory mechanisms.

Members of the Northwest Colorado Columbian sharp-tailed working group are committed to improving conditions for sharptails in Routt, Moffat, and Rio Blanco counties. Members of this group include representatives from the energy industry, agricultural community, conservation/sportsman's organizations, county government, BLM, USFS, NRCS, and CDOW. There is broad support for the goals, objectives, and conservation actions identified in this plan. The group believes existing regulatory mechanisms are adequate to maintain the sharptail population in northwest Colorado at its current level, which is probably greater than historic levels. The group further believes existing mechanisms are adequate to expand the range of sharptails into formerly occupied habitats in Colorado.

The Colorado Division of Wildlife has responsibility for managing the sharptail resource in Colorado. Towards this end, the Division has improved the reliability of its harvest surveys, conducted annual surveys to assess population status, implemented studies to better understand the population dynamics and habitat relationships of this grouse, developed programs to enhance the habitat, worked cooperatively with NRCS and FSA to develop seed mixtures for CRP that benefit sharptails, established viewing tours in conjunction with the local communities, evaluated potential reintroduction sites, coordinated the formation of the Northwest Colorado Work Group, and actively participates as a member of this group.

The County Board of Commissioners of Routt, Moffat, and Rio Blanco counties has the authority to regulate land use, land planning, and protect the environment within their respective counties. The counties have regulations in place to review and approve or deny proposed activities and uses of the land. The counties recognize the importance of sharptails in northwest Colorado and have helped to develop conservation actions that consider sharptails in the County Land Use Planning Process.

The mining industry must comply with strict regulations for reclaiming surface mines. These regulations, although not drafted with sharptails in mind, have nonetheless created habitats beneficial to sharptails. The mining industry in northwest Colorado, through their involvement in the working group, has expressed an interest and willingness to cooperatively develop reclamation plans and long-term management strategies for existing reclaimed lands to benefit sharptails.

The USFS and BLM have authority for the conservation of Columbian sharp-tailed grouse on public forest and rangelands through numerous federal laws and regulations. The USFS has formed the California Park Ecosystem Management Team to develop and prepare an integrated management plan for the California Park area. The Forest Service designated California Park as a special interest management area partially because of the diversity of threatened, endangered, and sensitive plant and wildlife species in the area. The intent is to actively manage for these species. Columbian sharp-tailed grouse are one of the featured species. The significance of California Park is that it is one of only a few areas where sharptails occur on public land.

The NRCS and FSA have authority for Columbian sharp-tailed grouse through various federal laws that impact private lands. The most important program administered by these agencies is the Conservation Reserve Program. This program has benefited sharptails immensely in northwest Colorado. Efforts to enhance existing CRP and improve new CRP are underway. Other programs administered by the NRCS also have benefited sharptails including the Wildlife Habitat Improvement Program (WHIP) and Environmental Quality Incentive Program (EQIP).

In 1995, the State of Colorado and the U. S. Department of Interior entered into a Memorandum of Agreement, which committed agencies in the Department of Interior and the State to collaborate and cooperate in management and conservation of declining populations of fish and wildlife and their habitat.

APPENDIX B (Continued)

This agreement, which expired in December 1999, had two important tasks: (1) the State and Department agreed to develop and implement programs to determine and monitor the status of species at risk, and (2) the State and Department agreed to encourage partners and stakeholders to take a leadership role in working with the State and Department to develop and implement conservation actions through Conservation and Recovery Agreements. A list of species was identified for which the Department and State would initially focus on development of conservation actions. The Columbian sharp-tailed grouse was on the list and this plan was one outcome of the MOA. It is important that this MOA be revised and renewed in an effort to show continued support for the development and implementation of conservation plans.

5. Other natural or man-made factors affecting its continued existence.

Fire suppression has resulted in significant changes in the mountain shrub and sagebrush communities to the detriment of sharptails. These changes have included increased densities of oakbrush and decadent stands of sagebrush, reduced densities and increased age of preferred species (aspen, serviceberry, chokecherry, hawthorn, bitterbrush), decreased reproduction by preferred species, decreased nutrient content of preferred species, reduction of herbaceous understories, fewer openings with the shrub canopy, and invasion of pinyon-juniper.

Spraying of herbicides to eliminate or reduce the shrub component (specifically sagebrush) and increase grass production is a form of habitat conversion that may negatively impact sharptails. The magnitude of the impact depends on the amount of acreage treated and the degree of kill. The larger the area treated and the greater the kill the more detrimental it will be to sharptails. The effects of herbicide spraying are complex and the outcome is difficult to predict because of the combination of site conditions, chemicals applied, application rates, and timing of application. In addition, damage to non-target species, especially forbs and deciduous shrubs, is of serious concern. Another negative side effect is the reduction in insect populations that utilize the forbs and shrubs that are killed by the herbicide. For these reasons, other types of treatment (fire, brush beating, dixie harrow) are preferred over spraying of herbicides to reduce the canopy coverage of sagebrush.

APPENDIX C

LIST OF WORK GROUP PARTICIPANTS (individuals that attended one or more meetings)

<u>Name</u>	<u>Affiliation</u>
Mike Alpe	Bureau of Land Management
Michael Altavilla	Seneca Coal
Thane Anderson	Landowner
Steve Andrew	Landowner
Patti Halbert Barney	Natural Resource Conservation Service
Kari Bartosiak	U.S. Forest Service
Jennifer Boisvert	University of Idaho Graduate Student
Don Bruchez	Landowner
Robert Bruchez	Landowner
Ed Camilletti	Landowner, Routt County Cattleman's Association
Barry Castaganasso	Routt County Extension Service/Weed Control
Nick Charchalis	Landowner
Neil Cinquemani	Landowner
Kurt Clayton	Thunderbird Wildlife Consulting
Jeff Comstock	Moffat County Natural Resources Department
Don Cook	Landowner
Curtis and Debbie Cook	Landowner
Dan Craig	Colorado Farm Bureau
Gerald Culverwell	Landowner
Pat Davey	Natural Resource Conservation Service
Ann Davidson	The Nature Conservancy
Al Deeds	Colorado Trappers Association
Dan Ellison	Routt County Commissioner
Philip Erikson	Landowner
Harry and Catherine Duncan	Landowners
Roxanne Falise	Bureau of Land Management
Neil Forsyth	Timberline Trail Riders
Allen Fox	Interested Citizen
Ann Franklin	Moffat County Extension Service
Kurt Frentress	Landowner
Forrest Frentress	Landowner
Vance Fulton	Natural Resource Conservation Service
Charles Fulton	Landowner
Juan Garcia	Colowyo Coal Company L.P.
Dean and Audrey Gent	Landowner
David Gilmer	Yampa Valley Electric Association
Bill Grindle	Landowner
Jim Haskins	Colorado Division of Wildlife
Jim Hicks	Colorado Division of Wildlife
Duane Hockett	Landowner
Rick Hoffman	Colorado Division of Wildlife
Calderon Howe	Landowner
John Husband	Bureau of Land Management
Terry Ireland	U.S. Fish and Wildlife Service
Jenny Johnson	Interested Citizen
Roy Karo	Seneca Coal

LIST OF PARTICIPANTS (continued)

<u>Name</u>	<u>Affiliation</u>
Jim Kiger	Colowyo Coal Company L.P.
Karl Koehler	Trapper Mining Inc.
Jim Komatinsky	Rio Blanco County Planning Department
Michelle Lassige	Colorado State University Graduate Student
Tom and Linda Litteral	Interested Citizens
Jim Lorenz	Landowner
Forrest Luke	Trapper Mining Inc.
Ron McLeod	Landowner
Wes McStay	Landowner
John and Nancy Merrill	Interested Citizens
Libbie Miller	Colorado Division of Wildlife
Rick Mills	Twentymile Coal Company
John Monarch	Monarch and Associates
Larry Monger	Landowner
C. J. Mucklow	Routt County Extension Service
Kevin Murphy	Landowner
Sharon Nereson	Landowner
Rod Neumiller	Interested Citizen
Billy Nicholson	Trapper Mining Inc.
Lane Osborn	State Land Board
Brad Petch	Colorado Division of Wildlife
Steve Raftopoulos	Landowner
Jim Remick	Landowner
Duane Rogers	Landowner
Roy Rozell	Landowner
Gary Salazar	Steamboat Today
Mike Sanders	Interested Citizen
Clee Sealing	Sierra Club, North American Grouse Partnership
David Seely	Landowner
Robin Sell	Bureau of Land Management
John Shaw	Landowner
Dennis Shumaker	Colorado Bowhunter's Association
Robert Skorkowsky	U.S. Forest Service
David Smith	Landowner
Jo Stanko	Routt County Cattlewoman's Association
Bud Stanley	Yampa Valley Electric
John Stegeman	Hayden Valley Press
Dale Thompson	Landowner
Al Tuck	Colorado Bowhunters Association
Lee Upham	Bureau of Land Management
Lisa VanAmburg	Colowyo Coal Company L.P.
Boone Vaughn	Landowner
Dean Visintaniner	Landowner
Mark Voloshin	Landowner, Moffat County Cattleman's Association
Louis Wyman	Landowner
Colleen Young	Colorado Division of Wildlife

APPENDIX D


This appendix contains copies of the signed agreements of the state and federal agencies that have assisted in the preparation of this plan and committed to participate in its implementation. Agreements will be added, deleted, and edited as appropriate and when needed. This appendix also contains copies of the signature page for members of the private sector who participated in the development of the plan and support the mission of the plan.

CONSERVATION AGREEMENT

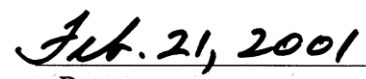
The **Colorado Division of Wildlife** hereby states its intent and commitment to assist with and participate in the implementation of the *Northwest Colorado Columbian Sharp-tailed Grouse Conservation Plan* as prepared by the Northwest Colorado Columbian Sharp-tailed Grouse Work Group. Specific commitments made hereby are as follows:

1. To provide one staff person to coordinate the implementation of this plan and represent the Division on the Northwest Colorado Columbian Sharp-tailed Grouse Work Group, which consists of representatives from state and federal agencies, local government, conservation organizations, landowners, private industry, and interested members of the local community.
2. To assume lead responsibility for the inventory and monitoring (including harvest) of Columbian sharp-tailed grouse in northwest Colorado, and to annually compile and report inventory and monitoring information.
3. To assume lead responsibility for the reintroduction of Columbian sharp-tailed grouse into formerly occupied habitats in Colorado.
4. To implement and enforce specific State statutes and Wildlife Commission Regulations (Colorado Revised Statutes, Title 33, Articles 3 and 6, and Colorado Wildlife Commission Regulations Chapter 3) that control the taking and possession of Columbian sharp-tailed grouse in Colorado.
5. To make recommendations to, and cooperate with, other state and federal agencies, local governments, private landowners, and land developers to avoid, minimize, or mitigate negative impacts of development and other land uses on Columbian sharp-tailed grouse populations and their habitats in northwest Colorado.
6. To make recommendations to, provide some funding for, and cooperate with, other state and federal agencies, local governments, private landowners, and conservation organizations to conserve and enhance Columbian sharp-tailed grouse habitats in northwest Colorado.
7. To continue to support and conduct research on the population dynamics and habitat relationships of Columbian sharp-tailed grouse in Colorado.

Performance of the commitments described above is contingent on adequate funding being made available and allocated to the signatory agency. This agreement shall not prohibit the signatory agency from engaging in management actions regarding Columbian sharp-tailed grouse beyond those described in this agreement and in the Conservation Plan. This agreement shall become effective on the date of signing by the participating party and shall remain in effect until the signatory party chooses to terminate the agreement.



Russell George
Director, Colorado Division of Wildlife



Date

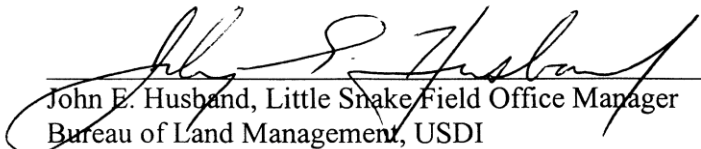
CONSERVATION AGREEMENT

The **U.S. Bureau of Land Management (Little Snake Field Office)** hereby states its intent and commitment to assist with and participate in the implementation of the *Northwest Colorado Columbian Sharp-tailed Grouse Conservation Plan*. This plan was prepared by a work group of affected stakeholders and is designed to conserve and enhance populations and habitats of Columbian sharp-tailed grouse, a BLM sensitive species. This plan is in no way meant to be construed as a Resource Management Plan Decision. All projects or management actions implemented through these guidelines will be subject to site specific environmental analysis required under the National Environmental Policy Act. Specific commitments made hereby are as follows:

1. All proposed projects or actions funded, implemented or authorized by the BLM will be analyzed with respect to impacts on sharptail grouse and their habitats in accordance with the guidelines set forth in this plan.
2. To implement the guidelines, conservation actions, and intent set forth in this plan within the constraints of existing laws, policies, regulations and management plans, and while considering the needs or implications to other species and multiple uses.
3. To work with private landowners, companies, organizations and other state or federal agencies to implement necessary conservation actions to enhance sharptail habitat as outlined in this plan.
4. To protect or mitigate any sharptail grouse populations and suitable habitat which may be located on BLM lands from negative impacts which may be caused by other land use activities. Authority for the protection of the Columbian sharp-tailed grouse and its habitat is pursuant to provisions in the BLM Policy Manual and the Federal Land Policy and Management Act.

Performance of all activities described above is contingent on adequate staff and funding being allocated to the signatory agency. This agreement shall not prohibit the signatory agency from engaging in management actions regarding Columbian sharp-tailed grouse conservation beyond those described in this agreement and in the Conservation Plan. Such management actions should be coordinated with the Northwest Colorado Columbian sharp-tailed grouse work group.

This agreement shall become effective on the date of signature by the participating party, and shall remain in effect until the signatory party chooses to terminate the agreement, or the agreement is terminated by consent of the Northwest Colorado Columbian sharp-tailed grouse work group. This agreement may be terminated by providing 90 days written notification to the Northwest Colorado Columbian sharp-tailed grouse work group.


John E. Husband, Little Snake Field Office Manager
Bureau of Land Management, USDI

01/30/01
Date

CONSERVATION AGREEMENT

The U.S. Forest Service, Medicine Bow-Routt National Forest, hereby states its intent and commitment to assist with and participate in the implementation of the *Northwest Colorado Columbian Sharp-tailed Grouse Conservation Plan* as prepared by the Northwest Colorado Columbian Sharp-tailed Grouse Work Group. Specific commitments made hereby are as follows:

1. To manage, as outlined in the Conservation Plan, historic and currently occupied Columbian sharp-tailed grouse habitats in the California Park Special Interest Area as a desirable objective of land management activities within this Routt National Forest Plan identified Special Interest Area.
2. To implement conservation measures identified in the Northwest Colorado Columbian Sharp-tailed Grouse Conservation Plan on sharp-tailed grouse habitat on the Medicine Bow-Routt National Forest.
3. To exercise authority for maintenance of biological diversity on the Medicine Bow-Routt National Forest and for the conservation and management of Regional Forester's identified sensitive species, which includes Columbian sharp-tailed grouse.
4. To consider and address, if applicable, the issues identified in the Northwest Colorado Columbian Sharp-tailed Grouse Conservation Plan in NEPA planning documents for activities proposed within Columbian sharp-tailed grouse habitat on the Medicine Bow-Routt National Forest.

Performance of all activities described above is contingent on adequate funds being made available and allocated to the signatory agency. This agreement shall not prohibit the signatory agency from engaging in management actions regarding Columbian sharp-tailed grouse conservation beyond those described in this Conservation Plan. Such management actions should be coordinated with the Colorado Division of Wildlife.

This agreement shall become effective on the date of signature by the participating party, and shall remain in effect until the signatory party chooses to terminate the agreement, or the agreement is terminated by consent of the Working Group. Either the signatory party or the working group may terminate the agreement by providing 90 days written notification to the other party.

_____

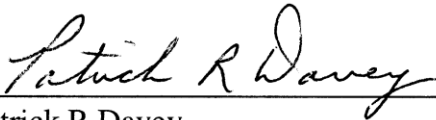
Mary Peterson
Forest Supervisor - Medicine Bow-Routt National Forests

3-5-01
Date

CONSERVATION AGREEMENT

The USDA/Natural Resources Conservation Service hereby states its intent to assist with and participate in the implementation of the Northwest Colorado Columbian Sharp-tailed Grouse Conservation Plan, as prepared by the Northwest Colorado Columbian Sharp-tailed Grouse Work Group.

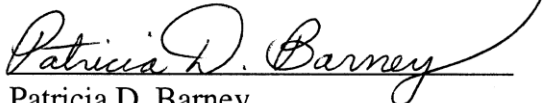
Performance of all activities described in the PLAN pertaining to the NRCS is contingent on adequate funds and staff being made available and allocated to the agency. This agreement shall become effective on the date of signature by the participating parties, and shall remain in effect until the parties choose to terminate the agreement, or the agreement is terminated by consent with the Northwest Colorado Columbian Sharp-tailed Grouse Work Group.



Patrick R Davey
District Conservationist, NRCS
Routt County

1-30-01

Date



Patricia D. Barney
District Conservationist, NRCS
Moffat County

1-30-01

Date

CONSERVATION AGREEMENT

The **U.S. Fish and Wildlife Service** hereby states its intent and commitment to assist with and participate in the implementation of the *Northwest Colorado Columbian Sharp-tailed Grouse Conservation Plan* as prepared by the Northwest Colorado Columbian Sharp-tailed Grouse Working Group. Specific commitments made hereby are as follows:

1. To provide funding through the ESA section 6 process to the State of Colorado for implementation of the Conservation Plan.
2. To provide a representative to the Working Group meetings.
3. To use our authorities to review Federal projects and recommend measures to avoid or minimize impacts to the Columbian sharp-tailed grouse and its habitat.
4. To develop Statewide or individual Candidate Conservation Agreement with Assurances in accordance with the Conservation Plan, which can be entered voluntarily by landowners.

Performance of all activities described above is contingent on adequate funds and staff being made available and allocated to the signatory agency. This agreement shall not prohibit the signatory agency from engaging in management actions regarding Columbian sharp-tailed grouse conservation beyond those described in this agreement and in the Conservation Plan. However, such management actions should be coordinated with the Working Group.

This agreement shall become effective on the date of signature by the participating party, and shall remain in effect until the signatory party chooses to terminate the agreement, or the agreement is terminated by consent of the Working Group. Either the signatory party or the Working Group may terminate the agreement by providing 90 days written notification to the other party.

Terry Ireland
for Allan R. Pfister
Assistant Colorado Field Supervisor

January 30, 2001
Date

PRIVATE SECTOR SIGNATURE PAGE

Signatories to this plan have participated in the plan development. They support the mission of the plan to conserve and enhance Columbian sharp-tailed grouse populations and habitats in northwest Colorado in ways that are compatible with existing and future land uses thereby insuring the opportunity for people to enjoy this wildlife resource in perpetuity. Any actions undertaken by the signatories are strictly voluntary. Signing this plan shall in no way be construed to reduce or deprive the signatories of any rights or privileges they enjoy.

<u>Name</u>	<u>Affiliation</u>
<u>W. Gordon Peters</u>	<u>TRAPPER MINE INC.</u>
<u>Dan Miller</u>	<u>ROUTT COUNTY</u>
<u>Ed P. Camillotto</u>	<u>LANDOWNER</u>
<u>Cl. Muckler</u>	<u>ROUTT COUNTY Extension, CSCE</u>
<u>Jim Jony</u>	<u>LANDOWNER</u>
<u>Richard Mills</u>	<u>Twenty mile Coal Company</u>
<u>Ron McLeod</u>	<u>LANDOWNER - ROUTT COUNTY</u>
<u>Forest Luntress</u>	<u>Landowner Routt</u>
<u>Stephen C. Ancker</u>	<u>Landowner Moffat County</u>
<u>Severly Lane</u>	<u>Colorado State Land Board</u>
<u>Walter Gent</u>	<u>LANDOWNER MOFFAT COUNTY</u>
<u>James A. Kiger</u>	<u>Participant - Colowyo Mine</u>

PRIVATE SECTOR SIGNATURE PAGE (continued)

Name

Affiliation

James Menge (we put best stewardship SKBUSD)

Moffat County Farm Bureau

Genie Polashin (landowner)

Moffat Co. Farm Bureau

Ray Jallington (Land Owner)

Moffat Co. Farm Bureau

Erik Norman (Land Owner)

Moffat Co. Farm Bureau

Mark A. Voloz PRESIDENT

MOFFAT CO. CATTLEMEN

Kurt Pauly Landowner

Moffat Co. Cattlemen

Leon Fedunec (landowner)

General Manager
Cross Mountain Ranch
(landowner)

Moffat Co. Cattlemen

Tom Peabys

Moffat Co. Cattlemen

Darin Seeb

moffat co cattle assoc.

Daryl L. Steck

Moffat Co cattle assn.

Sam McToby

Moffat Co. Cattle assn

David Hulka

Moffat C. C. A.

~~Signature~~

Wagon A Co. Inc

Mark E. ...

PRIVATE SECTOR SIGNATURE PAGE (continued)

Name

Affiliation

Mal A. Valeri

LANDOWNER MOFFAT COUNTY

Harold L. Culverwell

Landowner Moffat + Routt

Kurt Frestness

Landowner Routt

Cal Howell

LAND OWNER ROUTT

Ann Franklin

Moffat County Extension, CSUCC

Wes McStay

Landowner - Moffat

~~Supriya~~

Wildlife Biologist

Clu Seabing

Sierra Club

Les Hampton

Moffat County Cattleman

Marianna Ryzopoulos

Moffat County Commissioner

Michael Setheault

The Nature Conservancy

Russell Mays

The Hervey Ranch

~~Will~~

~~WATERCLOUD RANCH / CATTLEMAN~~

Jan W. Stank

STANKO RANCH

Doug Carlson

President, Routt County Cattleman's Assn.

Doug Carlson

Sand Mountain Cattle Co

Peter Cook

Ranch

APPENDIX E

POTENTIAL FUNDING SOURCES FOR COLUMBIAN SHARP-TAILED GROUSE CONSERVATION PROGRAMS

FEDERAL PROGRAMS

1. USDA, Farm Services Agency and Natural Resource Conservation Service: Wildlife Habitat Incentives Program (WHIP), Conservation Reserve Program (CRP), Environmental Quality Program (EQIP), and Wetland Reserve Program (WRP).
2. United States Fish and Wildlife Service: Endangered Species Act Section 6 Funds, Partners for Fish and Wildlife Program, Pittman-Robertson Funds.
3. Bureau of Land Management cost sharing through cooperative agreements, Grazing Advisory Council.
4. U. S. Forest Service - cost sharing through cooperative agreements.
5. National Fish and Wildlife Challenge Cost Share Grants.

STATE PROGRAMS

1. Colorado Division of Wildlife Wetlands Program.
2. Colorado Division of Wildlife Grouse Habitat Improvement Program.
3. Colorado Division of Wildlife Habitat Partnership Program.
4. Colorado Natural Heritage Program.
5. Colorado Game Cash Funds.
6. Great Outdoors Colorado

PRIVATE PROGRAMS

1. North American Grouse Partnership
2. Pheasants Forever
3. Quail Unlimited

APPENDIX F

LIST OF ACRONYMS

AML	Abandon Mine Lands
AMTA	Agriculture Marketing Transition Act
ATV	All Terrain Vehicle
BLM	Bureau of Land Management
CCAA	Candidate Conservation Agreement with Assurances
CDOW	Colorado Division of Wildlife
CRP	Conservation Reserve Program
CSTG	Columbian Sharp-tailed Grouse
CSUCE	Colorado State University County Extension
DAU	Data Analysis Unit
EQIP	Environment Quality Incentive Program
ESA	Endangered Species Act
FSA	Farm Service Agency
HCP	Habitat Conservation Plans
HIP	Harvest Information Program
HPP	Habitat Partnership Program
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NGO	Non-government Organization
NRCS	Natural Resource Conservation Service
SHA	Safe Harbor Agreement
SLB	State Land Board
SMCRA	Surface Mining Control and Reclamation Act
STGWW	Sharp-tailed Grouse Work Group
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WHIP	Wildlife Habitat Incentives Program
WRIS	Wildlife Resource Inventory System

