Appendix N

Colorado Department of Natural Resources' Colorado Greater Sage-Grouse Conservation Plan: The Colorado Package

STATE OF COLORADO

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Colorado Package: Introduction

Background:

The U.S. Fish and Wildlife Service (FWS) is poised to propose a listing decision for the Greater Sage Grouse under the Endangered Species Act by 2015. Eleven states are host to habitat for the species, and the FWS has indicated its intent to make a single range-wide listing decision, rather than a state-specific determination. Federal, state, local, and private entities have become actively involved in activities to conserve GSG habitat in an effort to avert a listing. In 2008, the (then) Colorado Division of Wildlife (now Colorado Parks and Wildlife) developed a comprehensive *Colorado Greater Sage-Grouse Conservation Plan*. Among the components of that plan is a section entitled ñConservation Strategy,ò which identifies key issues facing GSG conservation. For each issue, objectives are listed that would contribute to mitigation of the issue; for each of these objectives, a number of specific strategies are described. Each strategy, in turn, includes a list of responsible parties with a lead agency identified where possible, an estimated timeline and an approximate cost associated with implementation. This Colorado Conservation Plan is available at:
http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/Birds/Pages/GreaterSageGrouseConsPlan2.aspx

Process:

The Colorado Package was assembled by the Department of Natural Resources (DNR) in conjunction with relevant county, state, federal, and private entities. For each strategy enumerated in the Conservation Plan, described above, DNR compiled information from those stakeholders.

The completed Colorado Package will be sent to the BLM for inclusion in its Northwest Colorado RMP revision, currently underway, as an Appendix, common to all alternatives being considered. Perhaps more importantly, the Package will be submitted to the FWS for its review in developing a listing decision. DNR expects to get preliminary feedback from FWS as to the adequacy of the work being done in Colorado. The state will then have the opportunity to tighten up the Package by providing any information that may be deemed incomplete.

This will be an iterative process. As stakeholders review the compiled material in the Package, they may notice gaps or inaccuracies. Those edits should be sent to Lisa Dale (lisa.dale@state.co.us) for inclusion, and revised versions of the document will be shared with FWS.

Acronym	Meaning
APD	Application for Permit to Drill
APHIS	Animal and Plant Health Inspection Services
ARNF	Arapaho-Roosevelt National Forest
ASAP	As soon as possible
BLM	Bureau of Land Management
BMP	Best Management Practice
CCP	Colorado Conservation Plan
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife *(now Colorado Parks and Wildlife)*
CO	Colorado
COA	Condition of Approval
COGCC	Colorado Oil and Gas Conservation Commission
CPW	Colorado Parks and Wildlife
CRP	Conservation Reserve Program
CSU	Colorado State University
DAU	Data Analysis Unit
DRMS	Division of Reclamation, Mining and Safety
DWM	District Wildlife Manager
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ES&R	Emergency Stabilization & Restoration
FO	Field Office
FSA	Farm Services Agency
FWS	U.S. Fish and Wildlife Service
GIS	Geographic Information Systems
GrSG	Greater Sage Grouse
GSG	Greater Sage Grouse
GuSG	Gunnison Sage Grouse
HAF	Habitat Assessment Framework
HPP	Habitat Protection Program
KFO	Kremmling Field Office
LSFO	Little Snake Field Office
LUP	Land Use Plan
LWG	Local Working Group
MP	Middle Park
MWR	Meeker White River
NAIP	National Agriculture Imagery Program
NEPA	National Environmental Policy Act
NESR	North Eagle/South Routt
NF	National Forest
NGO	Non-Governmental Organization
NP	North Park
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NSO	No Surface Occupancy

Acronym	Meaning
NTT	National Technical Team Report
NWCO	North Western Colorado
NWR	National Wildlife Refuge
O&G	Oil and Gas
OHV	Off-Highway Vehicles
PGH	Preliminary General Habitat
PJ	Pinon-Juniper
PPH	Preliminary Priority Habitat
PPR	Parachute-Piceance-Roan
PT	Part time
PVA	Population Viability Analysis
RMP	Resource Management Plan
ROW	Right of Way
RSO	Restricted Surface Occupancy
SAM	Species Activity Mapping
SCTF	Species Conservation Trust Fund
SLB	State Land Board
SOP	Standard Operating Procedures
SWA	State Wildlife Areas
SWH	Sensitive Wildlife Habitat
UCEPC	Upper Colorado Environmental Plant Center
USFS	United State Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAFWA	Western Association of Fish and Wildlife Agencies
WMP	Wildlife Mitigation Plan
WNV	West Nile Virus
WO	Washington Office
WRFO	White River Field Office
WRNF	White River National Forest
WUI	Wildland-Urban Interface
WY	Wyoming

Chapter 1. Agricultural Conversion					
Issue 1.1	Converted rangelands don't provide adequate GrSG habitat.				
Objective 1.1.1	Develop technologies and share information for establishing native vegetation suitable for GrSG habitat in CRP, cropland, and large monocultural non-native grass plantings. Encourage GrSG habitat restoration on private land.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
1.1.1.1	Evaluate whether past vegetation restoration applications in CRP, cropland, and large monocultural non-native grass plantings serve as suitable GrSG habitat. Produce a report that documents these efforts. **[See Research Strategy 21.1.2.1]**	Multiple Parties	Begin by 2015		
1.1.1.2	Design, plant, evaluate, and report on field trials for establishing desired vegetation to serve as GrSG habitat in CRP, cropland, and large monocultural non-native grass plantings.	Multiple Parties	Begin by 2010	**CPW: General -** This strategy is being achieved at a large scale through multiple partnership and individual agency efforts throughout the state. CPW, NRCS, UCEPC, UP, and energy companies have designed and planted many experimental plots and are currently monitoring plant establishment. CPW has completed construction of a native seed warehouse to encourage the development and to store produced native seed stocks. CPW has also hired two Habitat Coordinators that are active in furthering development of native seed trials on the western slope of Colorado. **MP, NP, NESR, PPR:** Crop land and CRP not issues.	
1.1.1.3	Arrange field trips for land managers to observe the results of different treatment methods in CRP, cropland, and large monocultural non-native grass plantings that may provide GrSG habitat.	NRCS	Begin by 2008	**NRCS:** 1) Meeker NRCS Field Office participated in Conoco Phillips Wildlife Management Plan meeting with other agencies (July 2012) 2) NRCS staff met with Conoco Philliops, CPW and landaowners (August 2012) 3) Districts hosted a tour for state and federal land managers, legislators, NGOS, and landowners to explore impact of wild horses in GSG habitat (July 2012). 4) NRCS range class for new biologist focused on property with summer GSG habitat. 5) District NRCS boards have met with CPW biologists 5 times to discuss GSG issues (June / July 2010, Nov. 2012).	**NRCS:** 1) 20 land managers attended meetings. Outcome = trial of service berry treatement in Piceance Basin. 2) Veg sampling conducted in preparation for juniper and service berry treatment. 3) 48 people attended tour. 4) Trainees prepared to manage for GSG on 2500 acres. 5) More landowner meetings planned for 2013.
1.1.1.4	Purchase and maintain equipment necessary for restoration of GrSG habitat in CRP, cropland, and large monocultural non-native grass plantings.	NRCS	2010 and ongoing		
1.1.1.5	Work with FSA to ensure CRP program policy supports improvement of enrolled land with developed technologies.	Multiple Parties	2008 and ongoing	**CPW: NWCO -** CPW has initiated habitat restoration efforts on CRP properties in partnership with FSA, NRCS, and the Routt County Soil Conservation District. Restoration includes tilling and reseeding CRP fields with GrSG suitable seed mixes. Restoration will allow these properties to compete advantageously for re-enrollment in the CRP program. **MP, NP, NESR, PPR**: Crop land and CRP not issues.	**CPW:** has initiated habitat restoration efforts on 5 CRP properties in Routt County, in partnership with FSA, NRCS, and the Routt County Soil Conservation District.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
1.1.1.6	Help design and fund sagebrush restoration projects (see "Habitat Enhancement" strategy, pg. 349 and CCP Appendix F, "Available Funding Opportunities for GrSG Habitat Conservation").	NRCS	Ongoing	**NRCS:** field office in Meeker implemented 110 acres of restoration. **CPW:** CPW has completed a number of habitat enhancement projects, alone and with partners, and has actively participated in designing and funding a number of additional projects. **See Appendix A: Habitat Treatments** **See Appendix B: Summary of Expenditures on GrSG in Colorado 2006-2012**	**CPW:** has secured approximately $1.4 million of SCTF funds for GrSG habitat enhancement projects. CPW hired a sagebrush steppe habitat coordinator in 2011 who provides additional project coordination, design, and implementation functions for CPW and partners.
ISSUE 1.2	Some CRP lands that are important to GrSG are not eligible for re-enrollment in the program, raising concern that those acres will be lost as GrSG habitat.				
OBJECTIVE 1.2.1	For CRP lands that are important to GrSG, pursue opportunities to keep the habitat intact for GrSG.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
1.2.1.1	CDOW and NRCS will work with FSA to have vacant/unknown, potential, and occupied GrSG habitat in Colorado designated as a priority area in the CRP. This will increase the probability that cropland will remain in CRP and will continue to serve as GrSG habitat.	CPW	2008 and ongoing	**CPW:** General - CPW has worked with FSA and NRCS to include GrSG habitats as a priority area for distribution of Farm Bill habitat funds. MP, NESR, NP, PPR - Crop land and CRP are not issues. **See Appencix C: SAFE Map**	**CPW:** In 2012, NRCS/FSA expanded the enrollment area for the CRP-SAFE program to include nearly all current CRP contracts within GRSG range in the NWCO population in Moffat and Rio Blanco counties.
1.2.1.2	When CRP lands become un-enrolled in the program, cooperating agencies will pool resources to offer monetary incentives to maintain those lands in similar condition as CRP and to provide GrSG habitat.	CPW	2008-2015	**CPW: NWCO** - The CRP enhancement work began in 2010 and will continue until at least 2014. Conducting enhancements increases likelihood of re-enrollment because the re-enrollment evaluation includes "wildlife points" awarded where monocultural or depauperate stands are diversified and seeded with species important for GRSG food and/or cover. **MP, NP, NESR, PPR**: Crop land and CRP not issues.	**CPW:** has cost-shared to enhance approximately 2,385 acres of sodbound CRP.

2. Disease and Parasites

ISSUE 2.1	WNV is lethal to GrSG, has been detected in Colorado, has caused GrSG mortality in Colorado, and thus presents a risk to GrSG.
OBJECTIVE 2.1.1	Minimize the occurrence and impact of WNV if it threatens GrSG populations.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
2.1.1.1	Monitor GrSG and other species (through ongoing projects) for presence of WNV in GrSG counties; coordinate this effort with other research and management activities.	CPW	Ongoing	**CPW:** CPW's Wildlife Health Lab has received <5 carcasses/yr for exam in recent years. **NESR** - CPW collected and processed 17 GrSG mortalities in 2007 to test for WNV. Only 1 tested positive for WNV. CPW also worked with Routt County (2004-2006) to set up mosquito traps in GrSG habitat to test for WNV.	Colorado has not had a problem with WNV.
2.1.1.2	To protect GrSG in localized areas where WNV has been detected, control mosquitoes through applications of appropriate EPA-regulated larvicides and/or adulticides.	Multiple Parties	As needed		
2.1.1.3	Continue to support investigation of GrSG susceptibility to, and inheritance of, immunity to WNV.	Multiple Parties	Ongoing		
2.1.1.4	Determine the impact of wet conditions on mosquito production as it relates to the potential for catastrophic disease in GrSG. Determine the risk factors and potential of catastrophic disease in GrSG populations.	Multiple Parties	Begin by 2010 ongoing		
2.1.1.5	Encourage the design of water development structures to minimize WNV risk to GrSG	Multiple Parties	Now		

ISSUE 2.2	Diseases and/or parasites other than WNV have been shown to be lethal to, or to compromise the health of GrSG.
OBJECTIVE 2.2.1	Minimize the occurrence and impact of diseases and/or parasites (other than WNV) if they threaten GrSG populations.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
2.2.1.1	If GrSG populations are infected with disease or parasites that threaten a population, (1) investigate, isolate, and control the source of disease or parasite; and (2) if possible, treat GrSG.	CPW	As needed	**CPW:** Statewide wildlife health monitoring program is in place for species including sage grouse; no reports of large-scale mortality events in recent years & <5 carcasses/yr submitted, but no systematic surveillance or monitoring is in place.	
2.2.1.2	Investigate the possible need to conduct standard disease screening on all game birds before they are imported into Colorado or moved within GrSG range in Colorado.	CPW	As needed	**CPW:** Existing regulations (0-007) require health certificate & limited disease screening prior to import but no requirements for within-state movement.	
2.2.1.3	Remain vigilant regarding the latest information and research regarding avian influenza and upland game birds.	CPW	On going	**CPW:** Statewide monitoring program is in place for species including sage grouse; problems targeted for monitoring are developed & modified based on published & online professional communications (e.g., on recurring or emerging diseases).	
2.2.1.4	Investigate the need to regulate intra- and inter-state movement of game birds by all parties.	CPW	2008	**CPW:** Current rules prohibit possession of nonnative grouse species (0-008-B-8) but allow release of various other "game birds" on private & some public lands with no permit, health, or monitoring requirements (0-009-B). Some local control of these activities has been recommended or attempted, but not yet adopted.	

3. Energy and Mineral Development					
Issue 3.1	Disturbance to GrSG				
Objective 3.1.1	Current management, all industries except large-scale mining				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.1.1.1	Continue to avoid GrSG breeding and nesting seasons during oil and gas construction and drilling activities and small-scale mining in associated seasonal habitats (for seasonal habitat definitions refer to CCP Appendix B: "GrSG Disturbance Guidelines", or local conservation plans). To protect breeding habitat, negotiate appropriate Conditions of Approval (COAs) on federal estate or use voluntary application on private estates.	USFS, COGCC, BLM	Ongoing	**BLM:** BLM uses the Disturbance Guidelines in Appendix B as default recommendations on APDs and mine applications. **USFS**: Oil and gas leasing has not been an issue on any of the three National Forests (Routt, White River, Arapaho-Roosevelt) in GSG habitat. None of the three NFs has significant GSG habitat. **See Appendix D: COGCC 1200 Series Regulations**	
3.1.1.2	Restrict oil and gas development and production activities and small-scale mining during the GrSG lekking season within a buffer around leks (see CCP Appendix B, "GrSG Disturbance Guidelines"; see also strategies 3.3.3.10 and 3.4.2.1). If this is not possible, limit activities near active sage-grouse leks during the breeding season to portions of the day after 9:00 a.m. and before 4:00 p.m. to avoid times with peak lek attendance (for seasonal definitions refer to CCP Appendix B: "GrSG Disturbance Guidelines", or local conservation plans). Lek data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.	USFS, COGCC, BLM	Ongoing	**BLM:** See above. A .6 mi no surface disturbance buffer around a lek is typically applied to all surface disturbing activities thru Conditions of Approval. Once RMP's are revised or amended a .6 mi NSO stipulation will be available for new leases.	**BLM:** .6 mi represent the average male loafing distance surrounding a lek, and 4 mi represent 80% of the nesting locations expected near a lek (see CCP for references).
3.1.1.3	Gate field and facility service roads or otherwise limit regular public access on field and facility service roads in GrSG range, consistent with landowner wishes and direction.	USFS, Private Landowners, Industry, COGCC, BLM	Ongoing	**Tri-State:** Access is limited to mine employees or contractors only, due to locked gates. Only limited and designated mine employees or other authorized third party personnel are granted periodic access on field and facility service roads in GrSG range. **BLM:** This recommendation has been considered as appropriate on a case by case basis. **COGA**: Yes, 4 of 6 operators surveyed, who hold a total of 69% of the permits in GrSG SWH and operate a total of 24% of the wells in GrSG SWH or RSO	
3.1.1.4	Reduce noise impacts from compressor stations by locating stations at least 2,500 feet away from GrSG leks (or at an alternative distance as indicated by best available science: see CCP Appendix B, "GrSG Disturbance Guidelines"; see also strategies 3.3.3.10 and 3.4.2.1), or by using decibel reduction equipment, on a site-by-site basis.	USFS, Industry, COGCC, BLM	Ongoing	**BLM:** Compressor stations are located outside of the .6 mi buffer around an active GRSG lek. Additional noise reduction BMP's are analyzed and applied on a case by case basis. **COGA**: Yes, 3 of 6 operators surveyed, who hold a total of 3% of the permits in GrSG SWH and operate a total of 2% of the wells in GrSG SWH or RSO	
3.1.1.5	For all geophysical exploration, conservation measures to avoid important GrSG seasonal habitat-use periods should be encouraged on private lands and incorporated on federal lands.	USFS, SLB, Private Landowners, Industry, COGCC, BLM	Ongoing	**SLB:** Proposing to Board the preparation of a SLB GSG Conservation Action Plan to include rapid assessment of state trust lands in GSG habitat, consult with lessees, and make recommendations to the Board for habitat improvement. **BLM:** Timing Limitations are currently applied to geophysical exploration activities. **COGA:** Yes, 3 of 6 operators surveyed, who hold a total of 36% of the permits in GrSG SWH and operate a total of 13% of the wells in GrSG SWH or RSO	**BLM:** 4 mi represent 80% of expected nesting locations.
3.1.1.6	Encourage the use of technologies that reduce road traffic and daily visits to well pads to the extent possible in GrSG habitat (e.g., telemetric well monitoring, multi-phase pipeline gathering systems).	Industry	Ongoing	**COGA:** Yes, 5 of 6 operators surveyed, who hold a total of 69% of the permits in GrSG SWH and operate a total of 24% of the wells in GrSG SWH or RSO	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
Issue 3.2	Effects on GrSG habitat				
Objective 3.2.1	Oil, gas, and small-scale mining of energy and mineral resources				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.2.1.1	Encourage the use of effective BMPs, as identified by BLM or other sources, in order to reduce habitat fragmentation and the long-term footprint of energy and mineral development in GrSG habitat, across all ownership boundaries (see CCP Appendix I, "Suggested Management Practices Applicable for Oil and Gas Development within Lease Rights").	USFS, Industry, COGCC, BLM	Ongoing	**Tri-State:** Surface mining footprint at Colowyo is limited and reclamation activites closely follow mining to further minimize any regional or local impact that could lead to population fragmentation. BMPs are regularly implemented. **BLM:** BMPs are considered and analyzed based on action, location, local population and other factors. Many BMPs in CCP Appendix I had already been incorporated by BLM. **COGA:** Yes, 4 of 6 operators surveyed, who hold a total of 44% of the permits in GrSG SWH and operate a total of 14% of the wells in GrSG SWH or RSO	**BLM:** Individual BMPs are designed to minimize individual actions or potential impacts to SG - see CCP discussion. Limited mineral development has occurred in GRSG core/priority habitat since the CCP was signed. There has not been enough time or on the ground implementation to assess effectiveness of these cumulative actions.
3.2.1.2	In situations with federal lands and federal mineral estates, apply an NSO as a lease stipulation on new leases, or as a COA on drilling permits (see "Energy and Mining Leasing and Development Process", CCP Appendix G) around GrSG leks (see "GrSG Disturbance Guidelines", CCP Appendix B, and strategies 3.3.3.10 and 3.4.2.1). Encourage a similar approach on state and private lands.	USFS, SLB, Private Landowners, Industry, BLM	Ongoing	**USFS**: Leasing stipulations in place for the Routt NF and being developed for the WRNF. Very small portion of ARNF has GSG habitat. **SLB:** Works closely with CPW to identify SLB properties with leks. **BLM:** Leases within 'core' GRSG habitat (now GRSG PPH) have been deferred pending completion of RMP revisions/ now NW CO SG EIS Amend. APDs on existing leases have incorporated a .6 mi no surface disturbance COA around leks or modified pad placements within lease rights to avoid this buffer around leks. **NRCS:** Landowner in Piceance Basin coordinated with industry (2011-2012) to relocate a drilling rig away from a lek.	**SLB:** The board has deferred 11 parcels at the recommendation of CPW because of existing leks. Those parcels have not been leased. **NRCS:** Drilling rig relocated; lek undisturbed.
3.2.1.3	Avoid surface disturbing activities within a buffer of GrSG leks (see CCP Appendix B, "GrSG Disturbance Guidelines"; see also strategies 3.3.3.10 and 3.4.2.1). Locate surface-disturbing activities a minimum of 1,000 feet outside of riparian areas, or as far as practical and necessary to avoid influencing GrSG brood habitat function.	USFS, COGCC, BLM	Ongoing		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.1.4	If an energy or mineral development is planned in sagebrush habitats that are located within a 4-mile radius of a GrSG lek: - within a 1-mile radius of the proposed ground-disturbing activity, any seasonal habitats that may be impacted should be delineated and field-validated in coordination with CDOW, BLM, USFS, or private biologists, prior to project location and design (see “Habitat Monitoring Strategy” [pg. 354] and CCP Appendix C, “Sage-grouse Habitat Monitoring Protocol”). -This is a priority for mapping only. Appropriate strategies should still apply within the 4-mile radius of the lek site. Coordinate responsibility across lease boundaries for mapping purposes and to assess cumulative effects -See “GrSG Disturbance Guidelines” (CCP Appendix B) - Lek data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.	USFS, CPW, BLM	Ongoing	**BLM:** This strategy was intended to help field biologists determine seasonal habitats and associated timing/ other conservation measures in lieu of rangewide seasonal habitat mapping. CPW has since completed a PPH mapping effort that supercedes previous 'core' habitat mapping and encompasses all seasonal habitats. This strategy has only been completed on a very limited basis. **CPW:** General - Site specific seasonal habitats are evaluated by use of GIS information prior to site visit. Case-by-case habitat is not delineated on-the-ground prior to the time of a site visit; however, habitats are visually identified and confirmed at the time of the site visit. CPW Area biologist and Land Use specialists "consult" with BLM and energy operators on energy and mineral developments within Priority Habitat, which largely encompasses suitable habitat within 4 miles of GRSG leks. Seasonal habitat maps from CPW Research Section are available to reference and suitable habitat can largely be delineated from NAIP imagery, so field mapping and/or validation is rarely completed. Consultation with BLM and/or energy operators is done to minimize impacts to GRSG by recommending siting and/or timing criteria. NP - CPW implemented a radio-telemetry project in North Park to refine the seasonal habitat models for North Park. Data are currently being processed and seasonal habitat models for NP should be developed by early 2013. **NESR** - Currently, oil and gas development is not an issue. However there have been several gravel pit permit proposals within GrSG habitat in NESR. CPW provides recommendations to Routt County Planning. Recommendations include ways to avoid, minimize and mitigate impacts to GrSG habitats. The majority of GrSG habitat in Eagle County is BLM. MWR and MP - There is no active energy development. CPW does not expect increased lease sales in MP until after the completion of the BLM Kremmling FO RMP.	**BLM:** Effectiveness of this strategy has not been determined. **CPW:** CPW staff provides large scale habitat suitability data to operators. CPW staff is unaware of cross-lease coordination for mapping and cumulative analysis. DWMs, Land Use Specialists, Biologists and GIS prepare annual updates as information becomes available. **NESR:** Routt County denied a gravel pit proposal partially because of GrSG concerns.
3.2.1.5	Encourage and/or offer to have biologists attend notice of staking on-site visits on private lands, as well as state and federal mineral estates, to locate well pads and roads where they will have the least impact on GrSG habitat.	USFS, CPW, BLM	Ongoing	**CPW:** Land Use and Energy staff attempt to involve biologists at site visits. DWMs and biologists attend as time and workload permit. NWCO - Meeker Land Use position attends many on-site, including federal and private well pad locations. Grand Junction Land Use specialist and NW Energy Liaison attend on-sites, including federal and private well pad locations for most new permits, and all RSO's. CPW biologists are generally attending notice of staking on-site visits on Federal mineral estates. CPW biologists are usually involved with HB 1298 (Colorado OGCC Rules governing wildlife input) site visits. NESR, MWR and MP - There is no active energy development.	**BLM:** Effectiveness of this strategy has not been determined. **CPW:** Land Use Specialists, DWMs, and biologists participate in site visits when work load permits. CPW coordinates with BLM biologists. CPW biologists are generally not asked to attend notice of staking on-site visits on State or private mineral estates.
3.2.1.6	Use directional drilling to minimize the impact to GrSG habitat where biologically significant GrSG habitats are involved, if such techniques are technically feasible and cost-effective.	Industry, COGCC, BLM	Ongoing	**BLM:** Primary BMP considered for all APDs. **COGA:** Yes, 5 of 6 operators surveyed, who hold a total of 69% of the permits in GrSG SWH and operate a total of 24% of the wells in GrSG SWH or RSO	**BLM:** Minimize footprint and %surface disturbance.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.1.7	Minimize pad size and other facilities to the smallest extent practical in GrSG habitat, consistent with safety (note: where directional drilling is used, larger pads are needed for multiple wells).	USFS, Industry, COGCC, BLM	Ongoing	**BLM:** Primary BMP considered for all APDs. **COGA:** Yes, 5 of 6 operators surveyed, who hold a total of 69% of the permits in GrSG SWH and operate a total of 24% of the wells in GrSG SWH or RSO	**BLM:** See Above (3.2.1.6).
3.2.1.8	Limit facility footprint in sage-grouse habitat to that necessary for safe and effective development.	USFS, Industry, COGCC, BLM	Ongoing	**Tri-State:** Colowyo only develops new roads for new pit operations and reclaims existing roads when the intended use is completed. **BLM:** Primary BMP considered for all APDs. **COGA:** Yes, 5 of 6 operators surveyed, who hold a total of 69% of the permits in GrSG SWH and operate a total of 24% of the wells in GrSG SWH or RSO	**BLM:** See Above (3.2.1.6).
3.2.1.9	Plan and construct roads and pipelines to minimize duplication in GrSG habitat. Use existing roads and right-of-ways wherever possible, and design and construct all new roads to a safe and appropriate standard (no higher than necessary), to accommodate their intended use.	USFS, Industry, COGCC, BLM	Ongoing	**Tri-State:** Current roads located on Juniper / Pinyon hillsites to reduce raptor perches. **BLM:** Primary BMP considered for all APDs **COGA:** Yes, 4 of 6 operators surveyed, who hold a total of 34% of the permits in GrSG SWH and operate a total of 13% of the wells in GrSG SWH or RSO	**BLM:** See Above (3.2.1.6).
3.2.1.10	Cooperate with county weed programs to control noxious weed infestations associated with oil and gas development disturbances in GrSG habitat (see also "Weeds" strategy, pg. 425).	USFS, SLB, Private Landowners, LWGs, Industry, CPW, County Governments, BLM	Ongoing	**Moffat**: Co-founded NW Colorado Weed Partnership with BLM (2007). Money from donations, annual expenditures=$35-65,000 on 6000 acres interspersed throughout GSG habitat. Partnerhsip has conducted reseeding projects, hired a PT Coordinator to staff the effort, and worked with CSU in designing annual monitoring. Additional weed partnerships exist and use the Integrated Pest Management principles. Annual site visits assist these partnerships. **Jackson:** Established Noxious Weed Management Program in 1998. Money from county, private, state, and federal partners. Ave. annual expenditures=$51,200. Employs a PT coordinator and applicators, all licensed by the Dept of Ag. Available to assist state agencies at any time. **Tri-State:** Colowyo has a multi-year ongoing noxious weed spray program on reclaimed lands and off-site areas. **SLB:** Over $400K has been spent since 2004 to treat noxious weeds within GSG habitat areas. Newly proposed Conservation Plan will place special emphasis on assessing areas impacted by energy, with goal of 80% native species reclamation following mineral development. **BLM:** All field offices have agreements with county weed programs to assist in control of weed infestations (and would include historic energy development). Weed management specific to current O&G development is incorporated in Surface Use Plan of Operations for all development actions. **CPW:** COGCC 1000 Series Rules require oil and gas operators to manage weeds and comply with State weed Act. PPR - Wildlife Mitigation Plans (WMP's) signed with 4 companies that are developing energy within GrSG habitat include noxious weed management plans. **LWG:** NP LWG - Currently, noxious weeds are not a problem in NP. The Jackson County weed program is active in controlling any weeds that exist. NWCO and PPR LWGs-County officials are active in the LWGs but specific conversations about weed management have been limited. MP and NESR LWGs-do not have oil and gas development issues. **COGA:** 4 of 6 operators surveyed, who hold a total of 61% of the permits in GrSG SWH and operate a total of 22% of the wells in GrSG SWH or RSO.	**Moffat:** 95% control on Halogeton with no impact on sage brush or salt bushes. All treatments since 2008 conducted with new chemical recommendations (1/4 oz / acre of Tellar). **CPW:** CPW makes weed management recommendations. WMPs - CPW reviews progress in meeting weed management plan objectives at least annually.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.1.11	Incorporate BMPs to exclude wildlife from surface impoundments associated with oil and gas development.	USFS, Industry, BLM	2008	**Tri-State:** Surface runoff catch ponds are all fenced. **CPW:** CPW has developed a comprehensive list of BMPs for oil and gas development that are provided to industry and BLM. **BLM**: BLM requires 'practice' to exclude wildlife from surface water impoundments on all oil & gas development. Specific BMP may vary due to location, species, or coordination with CPW or FWS. **COGA:** Yes, 4 of 6 operators surveyed, who hold a total of 69% of the permits in GrSG SWH and operate a total of 24% of the wells in GrSG SWH or RSO	**BLM:** Reduce potential for direct mortality (see CCP). **CPW:** Portions of these BMPs have been included in WMPs and BLM planning documents.
Objective 3.2.2	Large-scale mining of energy and mineral resources				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.2.2.1	Avoid GrSG seasonal habitats when siting large-scale mining operations and oil shale development, where possible (see CCP Appendix B, “GrSG Disturbance Guidelines”).	USFS, Industry, DRMS, BLM	Ongoing	**BLM:** No new large- scale mining operations or oil shale development has been proposed since the CCP. This strategy is being analyzed during the ongoing plan revision process.	
3.2.2.2	Where GrSG habitats cannot be avoided when siting large-scale mining and oil shale development, mitigate impacts through strategies under Objective 3.3.4. See also "Off-site Mitigation of Impacts" discussion, pg. 299.	USFS, Industry, DRMS, BLM	Ongoing	**BLM:** 3.2.2.1. Off -site mitigation related to SG continues to be discussed in an interagency, interdisciplinary forum, specifically what criteria might be developed to identify 'effective' off- site mitigation and where it might be appropriate.	
3.2.2.3	Encourage the use of effective BMPs, as identified by BLM or other sources, in order to reduce habitat fragmentation and the long-term footprint of energy and mineral development in GrSG habitat, across all ownership boundaries (see CCP Appendix I, “Suggested Management Practices Applicable for Oil and Gas Development, within Lease Rights”).	USFS, Industry, DRMS, BLM	Ongoing	**BLM:** See 3.2.1.1. BMPs considered and analyzed based on action, location, local population and other factors. Many BMPs in CCP Appendix I have already been incorporated by BLM. **COGA**: Yes, 4 of 6 operators surveyed, who hold a total of 44% of the permits in GrSG SWH and operate a total of 14% of the wells in GrSG SWH or RSO	**BLM:** See Above (3.2.1.6).

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.2.4	When an energy or mineral development is planned in sagebrush habitats that are located within a 4-mile radius of a GrSG lek: • seasonal habitats that may be impacted within a 1-mile radius of the proposed ground-disturbing activity should be delineated and field-validated in coordination with CDOW, BLM, or private biologists, prior to project location and design (see "Habitat Monitoring Strategy" [pg. 354] and CCP Appendix C, "Sage-grouse Habitat Monitoring Protocol"). This is a priority for mapping only. Appropriate strategies should still apply within the 4 mile radius of the lek site. • coordinate responsibility across lease boundaries for mapping purposes and to assess cumulative effects • see CCP Appendix B, "GrSG Disturbance Guidelines" • Lek and telemetry data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management. When an energy or mineral development is planned in sagebrush habitats that are located within a 4-mile radius of a GrSG lek: • seasonal habitats that may be impacted within a 1-mile radius of the proposed ground-disturbing activity should be delineated and field-validated in coordination with CDOW, BLM, or private biologists, prior to project location and design (see "Habitat Monitoring Strategy" [pg. 354] and CCP Appendix C, "Sage-grouse Habitat Monitoring Protocol"). This is a priority for mapping only. Appropriate strategies should still apply within the 4 mile radius of the lek site. • coordinate responsibility across lease boundaries for mapping purposes and to assess cumulative effects • see CCP Appendix B, "GrSG Disturbance Guidelines" • Lek and telemetry data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.	USFS, Industry, CPW, BLM	Ongoing	**BLM:** Seasonal habitats have not been mapped within the 1 mile radius of proposed surface disturbing actions. CPW has completed a priority habitat model across all ownerships that includes all seasonal habitats and supercedes previously mapped core habitat. CCP Appendix B is currently being applied within the prescribed buffer areas for lek and breeding habitats. Sharing of sensitive Sage-grouse habitat or population data is conducted through a data use agreement with CPW. Location of surface disturbing activities are sited in coordination with CPW thru onsite field visits. **CPW:** General - DRMS involves CPW in review of new mine applications. Site specific seasonal habitats are evaluated by use of GIS information prior to site visit. Case-by-case habitat is not delineated on-the-ground prior to the time of a site visit; however, habitats are visually identified and confirmed at the time of the site visit. CPW Area biologist and Land Use specialists "consult" with BLM and energy operators on energy and mineral developments within Priority Habitat, which largely encompasses suitable habitat within 4 miles of GRSG leks. Seasonal habitat maps from CPW Research Section are available to reference and suitable habitat can largely be delineated from NAIP imagery, so field mapping and/or validation is rarely completed. Consultation with BLM and/or energy operators is done to minimize impacts to GRSG by recommending siting and/or timing criteria. Acquisition of lek and telemetry data requires a non-disclosure form to protect this sensitive data. NP - CPW implemented a radio-telemetry project in North Park to refine the seasonal habitat models for North Park. Data are currently being processed and seasonal habitat models for NP should be developed by early 2013. NESR - CPW provides recommendations to Routt County Planning. Recommendations include ways to avoid, minimize and mitigate impacts to GrSG habitats. Routt County Planning considers GrSG habitats and CPW recommendations in permit authorizations. MWR and MP - There is no active mining. **COGA:** Yes, 2 of 6 operators surveyed, who hold a total of 35% of the permits in GrSG SWH and operate a total of 11% of the wells in GrSG SWH or RSO	**CPW:** CPW staff provides large scale habitat suitability data to operators. Site specific, project level mapping is not occurring by CPW staff. Most mining companies employee private biologists to conduct these site-specific surveys. CPW staff is unaware of cross-lease coordination for mapping and cumulative analysis. DWMs, Land Use Specialists, Biologists and GIS prepare annual updates as information becomes available.
3.2.2.5	For surface mining, above-ground facilities of underground mines, and oil shale development areas, minimize the area impacted and duration of impact on GrSG populations and habitat.	USFS, Industry, DRMS, BLM	Ongoing	**BLM:** No new surface or underground mines have been initiated since 2008. Modification of existing mine plans incorporates BMP's to minimize the footprint and/or duration of an action in Sage-grouse habitat.	
3.2.2.6	Limit facility footprint in sage-grouse habitat to that necessary for safe and effective development.	USFS, Industry, DRMS, BLM	Ongoing	**BLM:** See above (3.2.2.5). **COGA:** Yes, 5 of 6 operators surveyed, who hold a total of 69% of the permits in GrSG SWH and operate a total of 24% of the wells in GrSG SWH or RSO	
3.2.2.7	Cooperate with county weed programs to control noxious weed infestations associated with energy and mineral development disturbances in GrSG habitat.	USFS, SLB, Private Landowners,LWGs, Industry, CPW, County Governments, BLM	Ongoing	**BLM: 3.2.1.10** All field offices have agreements with county weed programs to assist in control of weed infestations. **CPW:** DRMS and federal mining regulations require management of weeds and comply with State Weed Act. CPW makes recommendations to reduce and address noxious weed infestations associated with mineral development. **LWG:** NP LWG - Currently, noxious weeds are not a problem in NP. The Jackson County weed program is active in controlling any weeds that exist. NWCO and PPR LWGs - County officials are active in the LWGs but specific conversations about weed management have been limited. MP and NESR LWGs - do not have current mining issues. **COGA:** Yes, 4 of 6 operators surveyed, who hold a total of 61% of the permits in GrSG SWH and operate a total of 22% of the wells in GrSG SWH or RSO	**BLM:** Many more acres of weeds are treated in coordination with county weed programs than through BLM alone. See CCP for discussion & references.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
Objective 3.2.3	Cumulative impacts of all industries				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.2.3.1	Identify key GrSG areas located within potential energy development areas, to better address cumulative impacts to sage-grouse.	CPW	2008	**SLB:** 80 state trust lands sections have been identified within GSG habitat. Those sections have been leased for grazing and mineral development. Another 115 sections leased for oil and gas development but not yet under development. **CPW:** General - In 2012, CPW updated priority habitat maps that includes lek locations and seasonal habitats. Known leks continue to be monitored while searches for new leks continue in populations, particularly in PPR as part of a research effort by CPW B. Walker. NP - CPW is refining seasonal habitat models for NP. NESR - GrSG habitats are currently mapped as low potential for energy development. At this point, oil and gas development is not an issue in the NESR Population.	**CPW:** CPW updates habitat maps annually or as new information becomes available. Tracking processes/tools to account for cumulative impacts have not been set up or implemented yet.
3.2.3.2	Maintain large blocks of undeveloped sagebrush habitat across the landscape. Locate facilities or design mitigation to maximize the size and continuity of undeveloped sagebrush habitat across the landscape.	USFS, CPW, BLM	Ongoing	**BLM:** Little Snake RMP identified and incorporated strategies to maintain large blocks of undeveloped sagebrush habitat in their 2011 RMP revision. The White River RMP Amendment (Parachute Piceance Roan GRSG population) does not consider a similar alternative due to pre-existing conditions (naturally fragmented landscape, pre-existing leases, large private land ownership). All other plans were analyzing an alternative with similar goals, and this is being carried forward into the NW CO SG EIS Amendment. **CPW:** General - CPW has prioritized maintenance of large blocks of sagebrush habitat in recommendations to BLM for the Little Snake, White River, and Kremmling FO RMP revisions. CPW consults with BLM, energy and mineral operators, and other entities on projects proposed within GRSG habitat. CPW offers analysis, siting suggestions, timing suggestions, and suggests BMPs to avoid, minimize, or mitigate affects to GRSG. CPW recommends use of shared infrastructure (roads, pipelines) at site visits and in consultation negotiations. CPW and BLM coordinate efforts to protect habitat in limited situations Wildlife Mitigation Plans, and Plans of Development. PPR - Some WMPs incorporate phased or clustered development in an attempt to maintain larger blocks of habitat. CPW has commented on the Kremmling Field Office RMP to recommend maintaining large blocks of sagebrush and to minimize fragmentation of the landscape. NESR - Currently, oil and gas development is not an issue. However there have been several gravel pit permit proposals within GrSG habitat in Routt County. CPW provides recommendations to Routt County Planning. Routt County Planning considers GrSG habitats and CPW recommendations in permit authorizations.	**CPW:** Little Snake final RMP incorporates measures that incentivize maintenance of large undeveloped blocks of sagebrush habitat. Draft White River and Kremmling RMPs also include protection of large sagebrush blocks in at least 1 alternative. Also, CPW attempts to maintain large blocks of habitat through the development of WMPs. At least 1 company with a WMP has implemented this strategy. CPW works with BLM when BLM develops Geographic Area Plans (GAPs). Routt County denied a

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.3.3	Where production phase drilling and development may occur, require a plan that evaluates the impacts to sage-grouse from the entire field development, not just from individual well development. Include the need for additional infrastructure and/or communication towers (e.g., to facilitate remote monitoring) that should be considered during the land-use planning process	USFS, SLB, BLM	Ongoing	**SLB:** All state trust lands are inspected at least once every ten years. New uses require new site inspections. Since 2002, nearly 16K acres (= 16% grazing leases in GSG habitat) were inventoried.	**SLB:** Range inventories often result in improved grazing management practices and treatment for noxious weeds.
3.2.3.4	In GrSG habitat, cluster the development of roads, pipelines, electric lines, and other facilities, and use existing, combined corridors where possible (see “Infrastructure”	USFS, CPW, BLM	Ongoing	**BLM:** Primary BMP considered for all APDs and related actions. Multi-state transmission lines are currently being analyzed and coordinated with CPW. Combined corrdiors are a primary factor in those analyses. **CPW:** General - CPW recommends use of shared infrastructure (roads, pipelines) at site visits and in consultation negotiations. Some Wildlife Mitigation Plans incorporate multiple pipes in a pipeline right-of way. PPR - WMP's (4 signed) with grouse habitat agreed to measures that cluster development where possible. NP and MP - CPW has commented on the Kremmling Field Office RMP to recommend maintaining large blocks of sagebrush and to minimize fragmentation of the landscape. NESR - CPW provides recommendations to Routt County Planning. Routt County Planning considers GrSG habitats and CPW recommendations in permit authorizations. The majority of GrSG habitat in Eagle County is BLM. CPW makes recommendations to BLM to conserve GrSG habitat. MP and MWR - There is no active energy development.	**BLM:** Minimize footprint & % surface disturbance. **CPW:** PPR - Through WMPs, several operators have clustered facilities through the use of centralized fluid collection sites and collocated pipelines.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.3.5	Investigate opportunities and provide incentives for phased energy development in key GrSG habitats.	USFS, CPW, BLM	Ongoing	**BLM:** LSFO incorporated non-monetary incentives in their RMP by rewarding operators who enter into a voluntary SG conservation agreement with an exception on big game timing limitations elsewhere. Focus is on limited % surface disturbance rather than phased development. **CPW:** Individual permitting lacks incentive or ability to protect landscape scale habitats and not all operators are interested in participating in a WMP. CPW has completed 5 WMPs that have incentive based phased or clustered development. CPW also collaborates with BLM on leasing decisions and management actions in Land Use Plans. The draft White River FO RMP includes measures that would incentivize phased development. NP - CPW has brought up the idea of phased development. However, companies claim that oil development in NP is in the "exploratory stage" and companies are not willing to discuss phased energy development at this point. NESR, MWR, and MP - At this point, oil and gas development is not issue.	**CPW:** PPR -Several WMP's have been signed with energy companies providing them with expedited well permits as a benefit of agreeing to implement mitigative measures. Several other WMP's have been started and are in various stages of completion. BLM also uses phased development (to some degree) in GAPs. Phased development is encouraged and used as opportunity and law allows. Four of these 5 operators (EnCana, Williams, Marathon, PDC, and Shell) have sage grouse habitat and have agreed to phased development in a WMP.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.3.6	Identify key sage-grouse areas that are not already leased for energy and mineral development. Investigate and implement alternatives to leasing for energy and minerals in these areas.	USFS, Industry, CPW, BLM	2011 and ongoing	**USFS**: Routt NF RMP revision in progress includes this provision. WRNF oil & gas RMP amendment also underway. **SLB:** 2012 inventory of lands with high conservation values to consider designation for the Stewardship Trust. Inventory covered 16K acres, comprising 4% of SLB-owned GSG habitat. **BLM:** LSFO has incorporated alternatives to maintain large blocks of undeveloped lands in their RMP revision (2010). All new leases have required stipulations that minimize %surface disturbance and fragmentation in the lease area. Three of the four remaining GRSG plans considered an alternative with no new leasing in core SG habitat. The White River RMP is already predominantly leased in the PPR GRSG population area. The NW CO SG EIS Amendment is analyzing an alternative that includes no leasing in GRSG PPH. **CPW:** CPW has identified Priority Habitat for GRSG statewide and has overlaid this with leased acreage to evaluate what areas are currently unleased. CPW has made recommendations to minimize oil and gas leasing in priority areas. CPW has collaborated with BLM to defer leasing until Land Use Plans are complete or until management of GRSG within energy development areas is better understood and managed. BLM is evaluating long-term lease deferrals in several RMP revisions and through their NTT/EIS process. CPW has supported long-term lease deferral alternatives in the White River, Kremmling and Colorado River Valley draft RMPS.	**BLM:** Minimize footprint & % surface disturbance. **CPW:** Alternatives to energy leasing would have to be voluntary pursued on the part of the mineral owner. Current federal practice is that the mineral estate must be leased and developed, with limited exceptions.
3.2.3.7	In areas or populations having intense energy development, encourage LWGs to aggressively pursue additional strategies, using an adaptive management approach, to address population sustainability (e.g., consult PVA analysis in CCP), including, but not limited to, the following options: • options for increasing GrSG female survival • short duration of energy development and expedited reclamation • % habitat disturbance cap, habitat disturbance acreage cap, planned distribution of disturbance areas • innovative area development plans (e.g., refuge approach, mitigation/conservation credit approach; see “Energy and Mineral Development: Avoiding and/or Mitigating Impacts”, pg. 292) • see also all strategies under Issue 3.3, “Habitat Enhancement” strategy section, discussion under “Population Augmentation”	LWGs	ASAP	**LWG:** PPR LWG - originally acted as a spring board for developing actions such as these when writing the local PPR conservation plan. The working group now acts more as an information sharing outlet with such actions being implemented more on an agency-to-landowner/operator basis when possible. NP LWG - Energy development strategies are not included in the Local Plan signed in 2000. However, energy development has been discussed recently by the LWG. Members of the LWG do not agree that proposed oil and gas developments and potential for increased oil and gas development pose a threat to GrSG in NP, thus, the LWG has not developed strategies to address impacts from oil and gas. NWCO LWG - has not addressed this strategy. MP and NESR LWGs - do not have any active energy and mineral development activity.	
Objective 3.2.4	Reclamation, all industries				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.4.1	Use early and effective reclamation techniques, including interim reclamation, to speed the return of disturbed areas to use by sage-grouse (see "Habitat Enhancement" strategy, pg. 349). Develop and implement performance-based reclamation standards.	USFS, Industry, CPW, BLM	Ongoing	**BLM:** All FO's are incorporating early, interim and long term reclamation standards. The WRFO is focusing their RMP Amendment on minimizing the disturbance footprint and maximizing effective reclamation in PPH. Part of those standards include not allowing new development until previously disturbed sites meet established reclamation standards. **CPW:** CPW recommends early interim reclamation, minimal facility disturbance and performance-based reclamation standards. Also, COGCC Series 1000 Rules promote erosion control which may indirectly influence seed mixes that may be better suited for grouse habitat. CPW and BLM coordinate reclamation recommendations as much as possible. CPW comments on reclamation plans in BLM Land Use Plans and for county special use permits where applicable. In addition, reclamation of any energy or infrastructure projects on State Wildlife Areas is dictated and overseen by CPW. **COGA**: Yes, 6 of 6 operators surveyed, who hold a total of 69% of the permits in GrSG SWH and operate a total of 24% of the wells in GrSG SWH or RSO	**CPW:** COGCC regulates and enforces permitting regulations for reclamation. BLM regulates reclamation on federal surface. CPW has required stringent reclamation techniques (use of live plant materials, hydromulching, locally collected seed, etc.) on State Wildlife Areas. CPW has been successful in getting similar requirements applied to some BLM projects. PPR - WMPs incorporate reclamation standards and implementation is verified annually.
3.2.4.2	Practice reclamation techniques that speed the recovery of pre-existing vegetation in GrSG habitat (e.g., brush-beating of sagebrush for site clearance, retention of topsoil with native seed).	USFS, Industry,CPW, BLM	Ongoing	**BLM:** Some BMPs in this area are already being incorporated (retention of topsoil, use of native seed, etc), other BMPs such as use of mats for well pads may not be suitable for all places in CO. **CPW:** CPW does not have regulatory authority over oil and gas permitting or reclamation standards. CPW does recommend minimal facility disturbance and footprint. Recommendations for topsoil management are offered as well. Many techniques such as drilling mats, and minimizing grading, or vegetation mowing are not perceived as viable techniques for construction of a pad site by industry. Operators cite safety as a concern and a reason not to use these techniques. PPR- CPW Researcher, D. Johnston, is studying success of native plant establishment and competition with noxious weeds which may lead to faster reestablishment of native plants. NP - CPW has recommended techniques that speed the recover of sagebrush habitat. For mineral proposals, CPW provides recommendations to Routt County Planning. Recommendations include early and effective reclamation techniques. **COGA:** Yes, 5 of 6 operators surveyed, who hold a total of 62% of the permits in GrSG SWH and operate a total of 23% of the wells in GrSG SWH or RSO	**CPW:**Seed mixes are often not capable of achieving both goals. On private surface, the land owner is the decision maker on seed mix choice and use.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.4.3	Use reclamation seed mixes consisting of native bunchgrasses, forbs, and appropriate subspecies of big sagebrush in GrSG habitat. Avoid aggressive, non-native grasses (e.g., intermediate wheatgrass, pubescent wheatgrass, crested wheatgrass, smooth brome) in reclamation seed mixes (see CCP Appendix D, "Recommendations Regarding Plant Species for Use in GrSG Habitat Management and Restoration", and Monsen 2005).	USFS, Industry, CPW, BLM	Ongoing	**BLM:** Reclamation seed mixes consist largely of native species of grasses and forbs in CO. **CPW:** CPW's oil and gas BMPS include this strategy. These BMPs are provided to industry and regulatory agencies. Also, COGCC Series 1000 Rules promote erosion control which may indirectly influence the use of seed mixes that do not promote quality grouse habitat. CPW and BLM coordinate reclamation recommendations as much as possible. NWCO - CPW comments on reclamation plans in BLM Land Use Plans. In addition, reclamation of any energy or infrastructure projects on State Wildlife Areas is dictated and overseen by CPW. NP - CPW provides recommendations of plant species to use for a variety of different situations specific to GrSG in Appendix D of the State Plan (Recommendations regarding plant species for use in GrSG habitat management and restoration). CPW has recommended the use of native grasses in reclamation. For mineral proposals, CPW provides recommendations to Routt County Planning. **COGA:** Yes, 5 of 6 operators surveyed, who hold a total of 44% of the permits in GrSG SWH and operate a total of 14% of the wells in GrSG SWH or RSO	**CPW:** The BLM and COGCC regulate reclamation at permitting stage. CPW BMPs encourage seed mixes that benefit grouse (e.g., CP-4D mixes). These recommendations are more likely to be adopted at final reclamation rather at the interim reclamation stage. Availability of native plant material continues to be a challenge.
3.2.4.4	Structure reclamation soil profiling and re-vegetation seed mixes to create high quality sage-grouse habitat as quickly post-development as possible see CCP Appendix D, "Recommendations Regarding Plant Species for Use in GrSG Habitat Management and Restoration", and Monsen 2005.	USFS, Industry, DRMS, CPW, BLM	Ongoing	**BLM:** Interim reclamation of O&G development is required within 6 months of ground disturbance. No specific requirements for soil profiling, however ecological sites and associated vegetation types are known, recommended seed mixes can be provided by BLM or other local experts. Through the BLM Native Plant Materials Development Program, native seed mixes specific to re-vegetation in sage-grouse habitat are in use. These native seed mixes will be refined based on the evaluation of the establishment of the species at the site. **CPW:** CPW recommends minimal facility disturbance and footprint. CPW recommendations include topsoil management and seed mixes as well. PPR- CPW Researcher, D. Johnston, is studying a variety of soil management techniques which may lead to faster reestablishment of native plants. NP - CPW has recommended techniques that speed the recover of sagebrush habitat. For mineral proposals, CPW provides recommendations to Routt County Planning. Recommendations include early and effective reclamation techniques. **COGA:** Yes, 5 of 6 operators surveyed, who hold a total of 62% of the permits in GrSG SWH and operate a total of 23% of the wells in GrSG SWH or RSO	**CPW:** The BLM and COGCC require soil management actions in permit COAs. Interim reclamation is not focused on habitat establishment but rather soil stability and erosion control. This type of recommendation - grouse intensive reclamation -would likely occur at final reclamation in about 25 to 35 plus years out. CPW encourages operators to reclaim as much of the facility as possible to the final reclamation standard during interim reclamation.
3.2.4.5	Identify and implement incremental habitat reclamation objectives in GrSG habitat.	USFS, CPW, BLM	Ongoing	**BLM:** Interim and long term reclamation standards are currently being proposed on BLM.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.2.4.6	Develop and implement an evaluation and monitoring process for meeting reclamation objectives in GrSG habitat, using standard monitoring criteria (see "Habitat Monitoring" strategy, pg. 354, and CCP Appendix C, "Habitat Monitoring Protocol").	USFS, CPW, BLM	Ongoing	**BLM:** Current BLM monitoring and evaluation methods are used to determine success in meeting reclamation goals. **CPW:** General - Colorado specific structural habitat guidelines are known and described in the CCP (2008). These provide a potential starting point for development of reclamation monitoring guidelines. CPW comments on reclamation plans in BLM Land Use Plans and other project proposals. Reclamation of any energy or infrastructure projects on State Wildlife Areas is dictated and overseen by CPW. WMPs include agreements on monitoring standards for reclamation.	**BLM:** Not enough time or on the ground implementation has occurred to assess effectiveness of BMPs to date. **CPW:** Reclamation success in WMPs is evaluated annually against the standards specified in the WMP.
3.2.4.7	Discuss options for making state reclamation standards for oil and natural gas development similar to those for mining.	BLM	Begin in 2008	**BLM:** Although no formal attempt has been made to adopt mining reclamation standards for O&G development in BLM CO, WRFO & LSFO have adopted long term reclamation standards that include structural diversity. All O&G development on public land requires a Surface Use Plan of Operations which includes reclamation plans. COAs provide reclamation standards. All offices incorporate forbs into reclamation standards and sagebrush seed is included in current seed mixtures.	
Objective 3.3.1	Land management planning				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.3.1.1	Use the best available and applicable information to expand the extent and to enhance the utility of habitats available for sage-grouse (while continuing to develop additional Colorado-specific research regarding GrSG habitat and habitat-use: see strategies 3.4.3.7 - 3.4.3.10; see also "Habitat Enhancement" strategy, pg. 349 and "Habitat Linkages" strategy, pg. 352).	CPW	Ongoing	**CPW:** Research supports and provides feedback. CPW has worked with private landowners and on BLM-administered lands to conduct habitat enhancements by: 1) conducting pinyon-juniper encroachment projects, 2) seeding burned areas to accelerate recovery, 3) seed private lands to improve CRP stands. These projects have occurred in the general vicinity of energy development, but have not been specifically targeted to mitigate for the impacts of energy development. CPW Research Unit is conducting multiple studies on GrSG and their habitat within the PPR and NWCO populations.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.3.1.2	Evaluate the existence and adequacy of energy and mineral development guidance in federal, state, county, and local work group plans within GrSG habitats, including leasing decisions. Federal policy allows for leasing decisions to be revisited through the land-use planning process when significant new scientific information becomes available (see CCP Appendix G, "Energy and Mining Leasing and Development Background and Process"). Update guidance as needed.	USFS, CPW, BLM	By 2012	**USFS:** Planning revisions underway for Routt NF and White River NF. **BLM:** All new BLM RMP revisions/ amendments include language that allows for incorporation of new scientific information in ongoing federal actions as part of adaptive management processes. **CPW:** All the BLM RMPs have been/are being revised to strengthen protections for GrSG. CPW provides input and recommendation to federal resource management plans, environmental assessments, and geographic area plans. BLM is undergoing a review of adequacy under the GrSG EIS and CPW is a cooperator in all these projects.	**CPW:** The BLM does have the ability to use the best available science to amend lease conditions and stipulation by way of the Yates Decision. The Little Snake RMP incorporates components of the Yates Decision. The use of Working Group recommendations is voluntary and it is a guidance document not a regulatory or prescriptive document. CPW is actively involved in making recommendations for RMP updates and other planning and implementation documents.
3.3.1.4	Evaluate and implement specific mitigation and exception criteria during the land-use planning process in GrSG habitat. Attach the criteria to the lease as stipulations upon issuance.	USFS, BLM	As LUPs are revised	**BLM:** Proposed stipulations for O&G development in SG habitat are being analyzed during the planning process & through the NW CO SG EIS amendment.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.3.1.5	Encourage counties to consider and implement sage-grouse conservation plan recommendations (local and statewide) when planning land-use, and when processing land-use permits.	CPW, County Governments	Ongoing	**Moffat**: Planning & Zoning Commission require weed control plans developed with the consultation of county Weed & Pest Department for ground disturbing projects. Planning Dept may add stipulations to Conditional Use Permits if Commission deems it necessary. County has developed window stickers for vehicles working in on Entrega Interstate Pipeline to verify washed and weed free vehicles entering the county. **Grand**: All land use actions are sent for review to CPW for review. Written feedback recommendations are then incorporated into land use approval granted by the county. All land use actions require noxious weeds to be controlled in compliance with Grand County Noxious Weed program. **Jackson:** Has begun to consider amendments to the county Comprehensive Master Plan that would provide guidance to decision makers on Special Use Permits and other land use authorizations. **Routt:** Zoning regulations 3.6.2 including timing and seasonal limitations, mitigation techniques, and requirement for consultation with CPW. **CPW:** When appropriate CPW - Land Use Specialist, DWM and biologist encourage Counties to implement (state-wide or local working group) sage-grouse plan recommendations. CPW communicates with counties in the NW Colorado population primarily through the Local Working Group. The PPR Conservation Plan, which encourages consideration of numerous strategies that can benefit GrSG, was signed by several counties. There is no active energy development within the MWR Population boundary. CPW references local and statewide conservation plans and their recommendations in CPW comment letters written and provided to the county during planning phases. CPW does make comments or recommendations for local land use plans when local plans are updated. As appropriate, CPW recommends sage-grouse conservation measures in local land-use permitting comments.	**Moffat**: All companies operating in county have completed weed control requirements. 4 large-scale infrastructure projects added weed control stipulations to their permits. Penalties for non-compliance are enforceable by law. **Grand**: former county gravel pit off CR 340 was shifted to seasonal and timing restrictions in response to written request by CPW, to allow for lek activity in the area. **Routt:** County does not have a mechanism to confirm that mitigation stips on permits have been implemented. Field inspections in 2008 revealed 99% compliance rate.
3.3.1.6	Develop a map that reflects ownership of minerals and mineral potential in GrSG habitat in Colorado. Tabulate the acreage and identify blocks of areas with common mineral estate ownership.	USFS, BLM	2008	**BLM:** This has not been done by BLM CO, although the data is available thru COGCC.	
3.3.1.7	Clarify energy development stipulations and where they apply in GrSG habitat.	USFS, BLM	Ongoing	**BLM:** This is an ongoing process. Energy development stipulations are currently being updated, evaluated and applied through the NW CO SG EIS Amendment.	
3.3.1.8	Map energy development infrastructure within GrSG habitat to reflect current and historic development levels, patterns, and conditions (see also “Infrastructure” [pg. 383] and “Roads” [pg. 409] strategy sections.	Industry	Ongoing	**Tri-State:** Colowyo has mapped all infrastructure elements for both current and historic areas of the mine. **COGA:** Yes, 3 of 6 operators surveyed, who hold a total of 32% of the permits in GrSG SWH and operate a total of 11% of the wells in GrSG SWH or RSO	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.3.1.9	Recommend setting bonds sufficient to ensure that appropriate GrSG habitat reclamation is met.	USFS, DRMS, CPW, COGCC, BLM	Ongoing	**BLM:** This has not been done. **CPW:** COGCC and Federal agencies determine bond adequacy in most instances. CPW sets bonds for infrastructure projects affecting State Wildlife Areas. CPW has not recommended bond for projects involving other land management jurisdictions. At site visits, CPW has made comments to both COGCC and BLM that bonds may not be sufficient to cover true on-the-ground reclamation actions.	
3.3.1.10	Write energy development guidelines that take into account a variety of site-specific situations in GrSG habitat. Implementation of these guidelines should be determined on a site-by-site basis within the landscape context.	USFS, CPW, BLM	Ongoing	**BLM:** LSFO wrote performance based GRSG energy guidelines in their approved RMP revision. Similar stipulations or energy development criteria is being evaluated in the NW CO SG EIS Amendment. Any additional overarching energy guidelines will be discussed and/or developed through an interagency team in CO. **CPW:** At a statewide level, CPW has developed BMPs for oil and gas development in coordination with HB 1298 Rules. CPW was engaged in COGCC rule making. CPW provides comments on BLM Resource Management Plans and EAs. CPW, DWMs, Land Use Specialists and biologists make recommendations at site visits and federal Notice of Staking. CPW recommends site specific activities to minimize impacts to habitat. Implementation is up to operator. Companies enrolled in WMP's have implemented guidelines that consider site-specific situations in GrSG habitat. CPW has not written energy development guidelines in NP to date.	**BLM:** Minimize footprint and %surface disturbance.
3.3.1.11	Consider private property owner concerns when developing guidelines for energy and mineral development on split estates in GrSG habitat.	USFS, CPW, BLM	Ongoing	**BLM:** Private property concerns and comments are considered when applying stipulations designed to protect SG on split estate. BLM invites private landowners to attend APD onsites for all federal wells. **CPW:** CPW does make recommendations on private property but they are up to the landowner to accept or not.	
3.3.1.12	Require issue-specific monitoring plans and data reporting processes and standards for energy development projects in GrSG habitat.	USFS, Industry, BLM	Ongoing	**BLM:** This has not been formally done. Although periodic monitoring of noise or container ponds, for example, does occur in conjuction with permit requirements.	
3.3.1.13	Enforce and ensure compliance with conditions, stipulations, and reclamation for leases and permits in GrSG habitat.	USFS, DRMS, COGCC, BLM	Ongoing	**BLM:** Compliance with O&G permit conditions of approval is conducted.	**BLM:** Staffing may not be sufficient to keep up with the need.
Objective 3.3.2	Frameworks for voluntary participation				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.3.2.1	Review the effectiveness of existing industry incentive programs in wildlife habitat in other states (e.g., Pinedale/Jonah field in Wyoming).	BLM	2008	**BLM:** Review of WY incentive programs has been limited to what has been done, not how (or if) it has resulted in effective mitigation relative to impacts to SG.	
3.3.2.2	Develop incentives to encourage industry to implement beneficial development practices for GrSG, including restoration of old sites (energy development sites that have not been sufficiently reclaimed).	BLM	2008 and ongoing	**BLM:** LSFO RMP developed incentives to sign voluntary agreements to limit surface disturbance in priority SG habitat. No other incentives have been developed to date.	
3.3.2.3	Encourage industry to incorporate new and less invasive technologies to develop energy and mineral resources in GrSG habitats (see also strategy 3.2.1.5).	USFS, COGCC, BLM	Ongoing	**BLM:** Conversations with industry relative to innovative technologoies is an ongoing effort. These discussions occur on a case by case basis as opportunities arise.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.3.2.4	Conduct project design, review, and approval through a consultative process with industry, agencies, and others to assure that projects incorporate the most current sage-grouse data and development technology available.	BLM, CPW, COGCC, County Governments, DRMS, Industry, LWGs, SLB	Ongoing		
3.3.2.5	Define the opportunities and/or limitations associated with directional drilling or other energy development technologies in GrSG habitat (e.g., geologic, topographic, cost/benefit).	Industry	2008	**COGA:** Yes, 3 of 6 operators surveyed, who hold a total of 67% of the permits in GrSG SWH and operate a total of 22% of the wells in GrSG SWH or RSO	
3.3.2.6	Encourage operators to provide long-term financial commitments to support reclamation design, compliance, research, and monitoring in GrSG habitat.	COGCC, BLM	Ongoing	**BLM:** Industry has provided financial support for ongoing CPW & BLM efforts on a case by case basis.	
3.3.2.7	Locate site and design oil and gas facilities in cooperation with the operator and landowner to maximize opportunities for interim and long-term GrSG-oriented reclamation.	Private Landowners, LWGs, Industry, CPW, County Governments, COGCC	Ongoing	**Moffat**: County conditions all of its oil and gas facility permits with weed management criteria. County suggests that oil and gas companies consider grouse location sensitive siting. **Jackson:** Defers to the COGCC in regulation, siting and reclamation associated with drilling. **CPW:** CPW offers analysis, siting suggestions, timing suggestions, and suggests BMPs to avoid, minimize, or mitigate affects to GRSG. CPW makes recommendations as extensive as surface owner will allow. CPW does make site specific recommendations when permitting COGCC Form 2A permits, and with BLM at NOS site visits. Recommendations are developed with CPW, surface owner, and energy company representatives. CPW works with BLM, companies, and landowners to minimize overall disturbance. **LWG:** PPR LWG originally acted as a spring board for developing actions such as these when writing the local PPR conservation plan. The LWG now acts more as an information sharing outlet with such actions being implemented more on an agency-to-landowner basis when possible. NP and NWCO LWGs - CPW and BLM are involved with site design and interim and long-term reclamation; the LWG is not involved. **COGA:** Yes, 2 of 6 operators surveyed, who hold a total of 35% of the permits in GrSG SWH and operate a total of 11% of the wells in GrSG SWH or RSO	**Moffat**: At least two operators have moved a well from a lek location based on a county request.
3.3.2.8	Encourage operators to provide long-term financial commitments to support reclamation design, compliance, research, and monitoring in GrSG habitat.	USFS	Ongoing		
Objective 3.3.3	Adaptive management approach				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.3.3.1	Develop and implement a valid monitoring plan to assess the impacts of energy and mineral development on sage-grouse.	USFS, BLM	2010 and Ongoing	**BLM:** Ongoing monitoring of SG movement and habitat use is conducted in several populations of SG by CPW, and continues to inform proposed development. BLM has adopted or proposed adaptive management processes for oil and gas development in the Little Snake final RMP and the White River draft RMP. CPW has been a cooperator.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.3.3.2	Develop and implement a valid monitoring plan for reclamation activities in GrSG habitat (see “Habitat Monitoring” strategy, pg. 354 and CCP Appendix C, “Habitat Monitoring Protocol”).	USFS, CPW, BLM	2010 and Ongoing	**BLM:** BLM uses approved monitoring methodology to determine effectivenss of reclamation activities. **CPW:** BLM has adopted or proposed adaptive management processes for oil and gas development in the Little Snake final RMP and the White River draft RMP. CPW has been a cooperator. PPR - WMPs require monitoring of reclamation activities.	**CPW:** CPW reviews reclamation progress in WMPs annually.
3.3.3.3	Develop and implement a valid monitoring plan to assess GrSG habitat restoration and to measure success with respect to GrSG.	USFS, CPW, BLM	2010 and Ongoing	**BLM:** BLM uses approved monitoring methodology to determine effectivenss of reclamation activities. **CPW:** CPW has hired a habitat coordinator who is developing monitoring plans for tracking restoration of GrSG habitat.	**BLM:** Not enough time or on the ground implementation has occurred to assess effectiveness of BMPs to date.
3.3.3.4	Use and refine existing vegetation and other map data to develop a better understanding of piñon-juniper/mountain shrub, industrial, agricultural, and urban encroachment on GrSG habitat.	USFS, NRCS, CPW, BLM	2010	**BLM:** BLM is using the revised SG habitat maps that CPW developed in the analysis within the ongoing NW CO SG EIS Amendment. **CPW:** CPW has hired a habitat coordinator who is developing monitoring plans for tracking restoration of GrSG habitat. CPW Researcher, B. Walker, is studying habitat improvement through the removal of pinyon-juniper and has generated suitable habitat maps using models guided by telemetry locations. NP - CPW is digitizing disturbed habitats and refining mapping data for use in the NP seasonal habitat model. CPW is also developing an anthropogenic disturbance layer for use in GrSG modeling in NP.	**CPW:** Research results are preliminary; however, they indicate some use of treated areas by grouse.
3.3.3.5	Use remote sensing and other techniques to determine the current state of fragmentation in GrSG habitat.	USFS, CPW, BLM	2010	**BLM:** BLM has not implemented this to date. BLM is coordinating with CPW on ongoing remote sensing efforts. **CPW:** CPWs 2012 priority habitat map provides a measure of natural fragmentation at a landscape scale as unsuitable habitats are not priority habitat.	
3.3.3.6	Evaluate the adequacy and effectiveness of GrSG stipulations and BMPs related to mineral and energy development.	USFS, CPW, BLM	2015		
3.3.3.7	Assess the compliance, consistency, implementation, and cost of stipulations and/or COAs with respect to GrSG management, and report results.	DRMS, CPW, COGCC, BLM	Biennially	**CPW:** Since 2010, CPW has been tracking implementation of stipulations, COAs, and BMPs through the Form 2A permits. WMPs stipulations or BMPs are applied. **See Appendix E: Summary of Oil and Gas Permits in GrSG Habitats**	**CPW:** The application of stipulations or BMPs in WMPs is assessed annually by CPW, in some cases through formal audits.
3.3.3.8	Continue to update and adjust BMPs to reflect monitoring and research results in GrSG habitats. Promote use of updated BMPs across land ownership boundaries.	USFS, BLM	Ongoing	**BLM:** Minimal monitoring or research has been completed to indicate necessary changes to BMPs.	
3.3.3.9	Develop a mechanism to modify regulations or stipulations on federal mineral estates over time, based on monitoring and/or research results in GrSG habitat.	USFS, BLM	2008 and ongoing	**BLM:** Language is currently being incorporated into all RMP revisions to specifically acknowledge & authorize use of updated conservation measures or restrictions as needed and based on new science thru the adaptive management process. No other mechanism for changes in management has been identified.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.3.3.10	Evaluate alternatives to a radial buffer approach in GrSG habitat, such as incorporating local topographic conditions or habitat communities for defining geometry (see CCP Appendix B, "GrSG Disturbance Guidelines").	USFS, CPW, BLM	2008	**BLM:** CPW has refined the core habitat approach & updated priority habitat using some topographic & habitat data. The buffer approach is still used as a starting point to implement appropriate conservation measures. **CPW:** CPW recommends use of topography as one variable that can adjust radial buffers. NWCO and PPR - New seasonal habitat maps take into account habitat attributes in addition to lek buffers for defining seasonally important areas and Priority Habitat. CPW Researcher, B. Walker, has generated models that incorporate roughness of topology. CPW is refining the seasonal habitat models based on locations from a telemetry study. CPW will evaluate the refined seasonal habitat models compared to the lek buffer approach.	**CPW:** CPW- DWMs, Land Use Specialists, biologists and BLM often use topography to offset impacts or to improve buffering of development locations.
Objective 3.3.4	Mitigation, both current and future				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.3.4.1	Define what constitutes meaningful mitigation to meet site- and/or issue-specific GrSG population and/or habitat objectives.	CPW	2010	**CPW:**CPW and operators have agreed on mitigation when both parties develop a WMP.	**CPW:** Consultation - site visit - recommendations often reflect compromise of mitigation actions based on input from operators, CPW staff, and/or landowner.
3.3.4.2	Wherever possible, incorporate site-specific COAs (on-site mitigation measures) on proposed operations in GrSG habitat, consistent with lease rights, or as negotiated with operators.	USFS, BLM	Ongoing	**BLM:** This is consistently done during the APD process on a case by case basis with input from CPW.	
3.3.4.3	Evaluate the need for near-site and/or off-site mitigation to maintain sage-grouse populations during oil and gas development and production and energy and mineral development through mining.	CPW	Ongoing	**CPW:** CPW includes mitigation in WMPs and is in the preliminary stage of development on a Colorado Habitat Exchange for credit trading and mitigation banking. BLM has similar opportunity when GAP is proposed or required in mineral development plans.	**CPW:** Mitigation implementation in WMPs is evaluated by CPW annually against the standards specified in the WMP. Specifically, credit trading and mitigation banking have been utilized. CPW Researcher, B. Walker, is conducting research for possibilities for off site mitigation (pj removal).
3.3.4.4	Determine whether sage-grouse will move to mitigation areas as mine and energy development sites develop in active habitat. **[See Research Strategy 21.3.1.1]**	Universities, CPW	Begin by 2010	**CPW:** CPW Researcher, B. Walker, is conducting research on pj removal and subsequent use by GrSG.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.3.4.5	Identify potential locations where there may be opportunities for off-site mitigation for GrSG. Identify suitable mitigation practices within those areas (see also Strategy 3.3.4.9).	CPW	2010	**CPW:** CPW has identified some potential areas for mitigation at both the landscape and local scales. WMPs attempt to conserve large blocks of habitat suitable for mitigation efforts and include phased development as mitigation. Colorado Habitat Exchange will develop potential locations for off-site mitigation. Landscape scale priority habitat mapping identifies suitable habitat. Finer scale mapping for PPR and Hiawatha portion of NWCO provides locations to consider for off-site mitigation. CPW participated with the Nature Conservancy to identify areas suitable for mitigation in NWCO through Energy by Design modeling. NESR - CPW has made on- and off-site mitigation recommendations for gravel pit proposals. CPW continues to identify suitable mitigation practices for particular sites (e.g. conservation easements or pinyon juniper habitat enhancement projects). CPW research and monitoring data informs these decisions.	
3.3.4.6	Consider site capability and the timeline necessary to restore areas to suitable GrSG habitat, when determining which mitigation practices should be implemented on a site-by-site basis.	USFS, CPW, BLM	Ongoing	**BLM:** This is consistently done during the APD process on a case by case basis with input from CPW. **CPW:** CPW is working with industry to make recommendations based on current knowledge and best available information and site specific factors. CPW recommends habitat enhancement or restoration activities taking into account soil type, precipitation regime, land ownership, management practices, etc.	**CPW:** CPW- DWMs, Land Use Specialists, biologists incorporate these factors when making mitigation recommendations.
3.3.4.7	Conduct effective GrSG habitat enhancements (on- and off-site mitigation) in areas adjacent to or nearby energy development, in order to maintain sage-grouse population numbers (see “Habitat Enhancement” strategy, pg. 349).	USFS, CPW, BLM	Ongoing	**BLM:** Limited energy development, and thus site-mitigation, has occurred in GRSG priority habitat since the CCP. **CPW:** CPW is not able to do off site mitigation on individual 2A permits unless a surface owner volunteers to do so. CPW is able to do some off site mitigation in WMP documents. CPW has worked with private landowners and on BLM-administered lands to conduct habitat enhancements by: 1) conducting pinyon-juniper encroachment projects, 2) seeding burned areas to accelerate recovery, 3) seed private lands to improve CRP stands. These projects have occurred in the general vicinity of energy development, but have not been specifically targeted to mitigate for the impacts of energy development. CPW Research Unit is conducting multiple studies on GrSG and their habitat within the PPR and NWCO populations. The Colorado Habitat Exchange will indentify additional areas where oil and gas mitigation can occur.	**CPW:** Mitigation implementation in WMPs is evaluated by CPW annually against the standards specified in the WMP.
3.3.4.8	Encourage completion of mitigation measures prior to mine site development or expansion, or energy field development, where possible, to minimize sage-grouse population disruption.	USFS, Industry, BLM	Ongoing	**BLM:** No new mine sites or energy fields have been developed since the CCP.	
3.3.4.9	Investigate, evaluate, and implement mitigation trust/banking opportunities where appropriate in GrSG habitat. Develop incentives to ensure that mitigation areas remain undeveloped until original habitats are fully recovered and populations are re-established.	USFS, CPW, BLM	Ongoing	**CPW:** Colorado Habitat Exchange - CPW, CO Cattleman's Assoc. and the Envir. Defense Fund are currently developing a credit trading program and expect it to be completed by late 2013. Mitigation banking and credit trading have been utilized by a few operators to a small degree.	
Objective 3.4.1	Existing research				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.4.1.1	Evaluate existing research on energy and mining development impacts on GrSG regarding (1) its applicability to local situations; and (2) whether or not it has been peer-reviewed.	CPW	Dec. 2008	**CPW:** CPW has a strong research unit that conducts peer-reviewed research in CO relevant to GrSG and grouse habitats. CPW uses best available science to inform oil and gas recommendations. CPW researchers routinely meet with LWGs to ensure that research projects address local needs. CPW also conducts research in local populations e.g., telemetry project in NP in 2010. One objective was to gather information on GrSG demographics in NP prior to more extensive oil and gas development.	**CPW:** CPW staff are regularly up-dated on new and existing research (Biological In-Service and research reviews, etc.).
Objective 3.4.2	Determine effectiveness of existing stipulations and mitigation				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.4.2.1	Through research, determine the effectiveness of energy and mining mitigation actions, stipulations, and BMPs in maintaining GrSG populations and/or habitat across the landscape. **[See Research Strategy 21.3.1.1]**	Universities, CPW	Begin by 2010	**CPW:** CPW has started evaluations of mitigation actions but not BMP or stipulation effectiveness at the population level.	**CPW:** CPW researchers are conducting evaluations of some mitigation actions (e.g., PJ removal and plant establishment techniques).
Objective 3.4.3	Other needed research				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.4.3.1	Develop a timeline for implementation of research strategies (e.g., strategies 3.4.3.3 - 3.4.3.5; 3.4.3.7 - 3.4.3.10). **[See Research Strategy 21.2.1.3]**	USFWS, Industry, CPW, BLM	Begin by 2020		
3.4.3.2	Increase funding to conduct needed research on mining, energy development, and GrSG in Colorado. **[See Research Strategy 21.2.1.3]**	USFWS, Industry, CPW, BLM	Begin by 2020	**Tri-State:** Colowyo has funded numerous studies including Masters and Doctoral research. **BLM:** BLM continues to provide funding for ongoing research in CO for SG. **COGA:** Yes, 3 of 6 operators surveyed, who hold a total of 67% of the permits in GrSG SWH and operate a total of 22% of the wells in GrSG SWH or RSO	
3.4.3.3	Investigate the specific factors affecting GrSG population parameters (e.g., causes of female and chick mortality, effects of noise on sage-grouse habitat use or avoidance, wind direction, and topography influence on noise impacts), and how they are influenced by energy development. [See Research Strategy 21.2.1.3]	USFWS, Industry, CPW, BLM	Begin by 2020	**Tri-State**: Colowyo has been the site for GSG investigations, including the Collom Wildlife Monitoring Report (2006, 2007, 2008) and the Collom Raptor / Grouse Report (2011). **BLM:** BLM regularly reviews and shares ongoing research from other states, such as recent research in WY relative to impacts of noise on SG. **COGA**: Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	
3.4.3.4	Design and implement a research program (regarding energy/mining and GrSG) so that the duration of data is sufficient to answer GrSG management questions. Recognize the need and timeline necessary to integrate research data and results into planning cycles. [See Research Strategy 21.2.1.3]	USFWS, Industry,CPW, BLM	Begin by 2020		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.4.3.5	Study, monitor, and attempt to quantify impacts to sage-grouse from oil and gas development and mining operations (e.g., intensity, duration, and timing elements of PVA). **[See Research Strategy 21.2.1.3]**	USFWS, Industry, CPW, BLM	Begin by 2020	**COGA**: Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	
3.4.3.6	Incorporate stakeholder concerns into current and future research designs for GrSG studies. **[See Research Strategy 21.2.1.3]**	USFWS, Industry, CPW, BLM	Begin by 2020	**CPW:** Current research has evolved out of needs identified by the state and local Conservation Plans developed by a consortium of stakeholders. CPW researchers routinely meet with LWGs to ensure that research projects address local needs.	
3.4.3.7	Quantify habitat fragmentation effects on GrSG. **[See Research Strategy 21.1.1.1]**	BLM, CDA, CPW, Industry, LWGs, NGOs, NRCS, Other Research Institutions, Private Landowners, SLB, Universities, USFS, USFWS, USGS, WAFWA	Begin by 2010	**See 21.1.1.1**	
3.4.3.8	Determine habitat loss thresholds for GrSG populations using spatially explicit landscape models (i.e., how much habitat is needed to sustain a population). **[See Research Strategy 21.1.1.1]**	BLM, CDA, CPW, Industry, LWGs, NGOs, NRCS, Other Research Institutions, Private Landowners, SLB, Universities, USFS, USFWS, USGS, WAFWA	Begin by 2010	**See 21.1.1.1**	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.4.3.9	Identify the appropriate mix of sagebrush habitats and seral stages necessary for sustainable GrSG populations, consistent with site capabilities. **[See Research Strategies 21.1.1.1 and 21.1.1.3]**	BLM, CDA, CPW, Industry, LWGs, NGOs, NRCS, Other Research Institutions, Private Landowners, SLB, Universities, USFS, USFWS	Begin by 2010/2012	**See 21.1.1.1**	
3.4.3.10	Determine the sufficient minimum habitat patch size for GrSG, as it relates to habitat fragmentation. **[See Research Strategy 21.1.1.1]**	BLM, CDA, CPW, Industry, LWGs, NGOs, NRCS, Other Research Institutions, Private Landowners, SLB, Universities, USFS, USFWS, USGS, WAFWA	Begin by 2010	**See 21.1.1.1**	
Issue 3.5	Communication				
Objective 3.5.1	Improve communication				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
3.5.1.1	Develop a communication process to assist the energy industry to work with CDOW and LWGs in planning energy activity on non-federal surface-owned leases. **[See also Information, Communication, and Education Strategy 12.3.2.1]**	DNR, County Governments	2008	**Moffat**: monthly meetings with Shell Oil and "as needed" meetings with other operators.	
3.5.1.2	Present information and data about energy, mining, and GrSG so that it is readily understandable and accepted by stakeholders and the general public. **[See also Information, Communication, and Education Strategy 12.2.1.3]**	USFS, Industry, CPW, BLM	Ongoing	**BLM:** BLM presents current data in ongoing NEPA analysis and planning efforts that bridge GRSG habitat and threats discussion with proposed management actions. **CPW:** CPW researchers present research findings at LWG meetings and at CPW's semi-annual seminars for industry. All research projects have annual reports that are posted to the CPW public website. MP LWG has hosted 2 public presentation workshops over the last 4 years to update and educate landowners on current research and CPW activities concerning GrSG. **COGA:** Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.5.1.3	Share GrSG data among agencies, and with counties and industry to allow for better planning of mining and energy development, to minimize impacts to the species. Provide GrSG data to COGCC and DRMS to identify opportunities for coordination. Lek and telemetry data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management. [See also Information, Communication, and Education Strategy 12.3.2.2]	CPW	Ongoing	**BLM:** The public has opportunities to review and provide comments to all proposed energy & mineral leasing, development and conservation measures within RMP revisions (planning) during the BLM NEPA process. **CPW:** CPW routinely shares data with agencies, counties, and private entities. Lek and telemetry data are provided for development projects but are limited to the project area and require a non-disclosure agreement. CPW - DWMs, Land Use Specialists, biologists, Energy Liaison, research, and GIS coordinate efforts and data sharing. Annual LWG meetings update interested stakeholders with the most recent population counts, research findings, and GrSG related efforts on the ground. CPW has also provided information to COGCC in the HB 1298 rules that assist companies with oil and gas development planning.	
3.5.1.4	Share energy development plans with agencies ASAP to facilitate improved planning, analysis, and management of GrSG within sagebrush habitats, recognizing confidentiality sensitivities. Lek and telemetry data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management. [See also Information, Communication, and Education Strategy 12.3.2.2]	Industry	Ongoing	**COGA:** Yes, 3 of 6 operators surveyed, who hold a total of 35% of the permits in GrSG SWH and operate a total of 11% of the wells in GrSG SWH or RSO	
3.5.1.5	Encourage counties, LWGs, conservation and sportsmen's groups, and private landowners to be involved in COGCC meetings in order to comment on well pad spacing densities, reclamation standards, and comprehensive planning within GrSG habitats. [See also Information, Communication, and Education Strategies 12.2.2.1 and 12.3.2.3]	LWGs, CPW	Ongoing	**CPW:** CPW has no formal process for notification. CPW provides its own comments based on staff recommendations. CPW does not actively promote participation in these activities but does inform stakeholders when such activities are up-coming or directly related to their operational interests. **LWG: PPR LWG -** Discussions encouraging stakeholders to attend COGCC meetings have not been held. **NP and NWCO LWGs** - At this point, not involved. **NESR and MP LWGs** - Currently, oil and gas development is not issue.	
3.5.1.6	Encourage open communication among companies to entertain opportunities to reduce impacts and/or maximize benefits to GrSG, at the local and landscape levels. **[See also Information, Communication, and Education Strategy 12.3.2.3]**	Industry	Ongoing	**COGA:** Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	
3.5.1.7	Encourage oil, gas, and mining companies to participate on local GrSG work groups. **[See Information, Communication, and Education Strategy 12.3.2.1]**	CPW	2008 and ongoing	**CPW:** LWG meetings are open to all interested parties and oil, gas, and mining companies are encouraged to participate and some company staff are involved in LWGs. NP LWG - EOG was added to the North Park LWG mailing list and invited them to be involved. NESR LWG - Gravel companies have been involved. PPR LWG - a number of oil and gas companies are active in the LWG (EnCana, Williams, Barrett, and others).	**CPW:** A variety of companies' staff participate in LWGs.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.5.1.8	Promote regular communication and continual coordination among agencies, industry, LWGs, and counties to improve energy and mineral-related planning and management of GrSG. **[See Information, Communication, and Education Strategy 12.3.2.3]**	Industry	2008	**CPW:** CPW conducts semi-annual seminars for industry to foster communications between entities. Additional formal and informal communications occur at annual meetings and site visits. CPW engages with oil and gas operators in long-range planning efforts by way of WMPs and long-range planning meetings. Annual LWG meetings are used to update interested stakeholders with the most recent population counts, research findings, and GrSG related efforts on the ground. CPW has coordinated with the NESR LWG and Routt County on issues relating to gravel pit proposals. **COGA:** Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	**CPW:** CPW is actively communicating and coordinating with industry (EnCana, Williams, Marathon, Shell, etc) regarding use of BMPs, and operational planning across their leases.
3.5.1.9	Promote and provide regular opportunities for public involvement to improve energy and mineral planning as it relates to management of GrSG and GrSG habitat. **[See also Information, Communication, and Education Strategy 12.2.2.1]**	LWGs, Industry, County Governments, BLM	Ongoing	**Moffat**: monthly Land Use Board meetings, monthly Planning Commission meetings, weekly County Commissioner meetings, all open to the public. **Jackson:** Active participation in North Park Sage Grouse Working Group, also open to the public. County representatives also hear from the public at a range of stakeholder meetings where GSG issues are discussed. **CPW:** CPW is active in public presentations on GrSG conservation efforts and energy development. LWGs provide opportunities for the public to be involved with mineral and energy development. LWG: NWCO LWG meets 2 to 3 times per year to share information and typically has guests present information on large scale issues (e.g.. BLM RMPs, transmission line EIS, etc), providing opportunity for stakeholders to be involved in GrSG conservation. PPR LWG - is open to public involvement and encourages public input. NESR LWG - Members of the NESR LWG participated in Routt County Commissioners meetings to discuss a proposed gravel pit in GrSG habitat. **COGA**: Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	**Moffat**: Members of the public attend every Land Use Board meeting when energy and sage grouse issues are considered. **CPW:** CPW invites industry and other stakeholders to participate in LWG meetings. CPW provides outreach to NGOs.
3.5.1.10	Communicate to affected publics the need to balance energy and mineral production with GrSG habitat and population requirements.	All Stakeholders	Ongoing	**CPW:** CPW conducts semi-annual seminars for industry to foster communications between entities. Additional formal and informal communications occur at annual meetings and site visits. The need to balance energy and mineral development with GrSG conservation is routine part of CPW interactions with stakeholders.	
3.5.1.11	Promptly and frequently update information related to energy and mineral development and GrSG to foster a better understanding of impacts to the species. **[See also Information, Communication, and Education Strategy 12.3.2.2]**	Industry, BLM	Ongoing	**BLM:** BLM regularly reviews and shares ongoing research from other states, such as recent research in WY relative to impacts of noise on SG. **CPW:** CPW routinely communicates and coordinates with the public regularly via the LWGs. CPW - DWMs, biologists, researchers and GIS update lek data as it becomes available. CPW research up-dates are routinely posted on CPW's public website. CPW includes recent research findings into BMP requests at on sites. MP LWG has hosted 2 public presentation workshops over the last 4 years to update and educate landowners on current research and CPW activities concerning GrSG. These presentations have included updates from research being conducted concerning interactions between GrSG and energy development. **COGA:** Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	**CPW:** CPW staff update grouse information annually, specifically lek maps.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
3.5.1.12	Improve the understanding, sharing, and acceptance of research and modeling efforts regarding GrSG and mining/energy development. Ensure that current management, reclamation techniques, and appropriate BMPs are shared with contractors and consultants to improve on-the-ground implementation. [See also Information, Communication, and Education Strategies 12.3.1.1 and 12.3.2.2]	CPW	Ongoing	**CPW:** CPW conducts semi-annual research up-date seminars for industry where current findings. CPW meets at least annually with each energy company involved in a WMP to review progress, incorporate recent research findings, and develop future plans. CPW updates lek data annually. CPW routinely consults with contractors, consultants, and energy operators to promote the implementation of the most up-to-date management and reclamation techniques. MP LWG has hosted 2 public presentation workshops over the last 4 years to update and educate landowners on current research and CPW activities concerning GrSG. These presentations have included updates from research being conducted concerning interactions between GrSG and energy development.	

4. Fire and Fuels Management					
Issue 4.1	Fire and fuel treatments may impact GrSG				
Objective 4.1.1	Wildfire – impacts to habitat				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
4.1.1.1	Plan fire suppression response to potential wildfires in important GrSG habitat. Schedule annual coordination meetings and share fire response and GrSG seasonal habitat information with county, fire district, and federal fire fighting officials to plan and implement appropriate response to wildfires in these areas. Lek and telemetry data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.	BLM	Annually		
4.1.1.2	Train and use resource advisors to assist with considering sage-grouse conservation in prioritizing response to fire during multiple ignition episodes. Distribute sage-grouse information updates to fire dispatchers for initial attack planning. [See also Information, Communication, and Education Strategy 12.3.1.1]	BLM	Training: annually; Updates: as needed	**BLM:** BLM provides annual training to local resource advisors, and emphasizes SG conservation thru IM WO-2011-138. Resource advisors have access to the most current local SG data available.	
4.1.1.3	Burn-out/backfiring operations, dozer line construction, and other suppression activities in GrSG habitat should be conducted in a manner, and if possible in a location, that minimizes the loss of sagebrush, while still providing for public and fire crew safety.	BLM	As needed	**BLM:** SG occupied habitat is considered when identifying techniques and location for fire fighting efforts.	
4.1.1.4	Where practical, locate fire camps, staging areas, and helibases at least 2 miles away from GrSG leks, and preferably outside of GrSG habitat.	BLM	Annual discussion with FMOs	**BLM:** SG occupied habitat is considered when identifying high traffic areas for fire fighting efforts.	
4.1.1.5	Fire specialists and wildlife biologists should review and update area Wild Fire Management Plans in GrSG habitat every 5 years, or as necessary due to increased fire activity or risk.	BLM	Every 5 years	**BLM:** These fire plans are reviewed annually and signed by Field Office Managers following a review checklist. If SG issues are brought forward, additional review may occur.	
4.1.1.6	Manage habitat mosaics and fuel loads in and adjacent to GrSG habitats to minimize the possibility of catastrophic wildfires, while maintaining sage-grouse habitat quality (see CCP Appendix A, “GrSG Structural Habitat Guidelines”.	BLM	Annually as crews available	**BLM:** Fuel projects under WUI (Wildland Urban Interface) or those proposed for SG habitat improvement consider SG habitat objectives in their design and implementation.	
4.1.1.7	Map all wildfire, prescribed burns, and fuel treatments in GrSG habitat within one year of occurrence, and develop a GIS layer of “vegetation modification” history (see “Habitat Monitoring” strategy, pg. 354; see also strategy 4.1.2.9). Track cumulative historic wildfire events under the umbrella of local fire management plans.	BLM	Annually	**BLM:** In January 2013, a national fire perimeter data call will be conducted bringing our fire map data (historic and current fires, > 10 ac) in line with national data standards. It will be updated on an annual basis after this.	
4.1.1.8	Conduct post-fire operation reviews/evaluations in areas where fires were large enough or intense enough to cause long-term degradation of GrSG habitat. The intent is to improve fire fighting priority setting, tactics, or resource availability in preparation for potential fires in sage-grouse habitat. The urgency of the review depends on when in the fire season the fire occurred, how typical or significant it was, and if there are clearly opportunities to identify and fix problems resulting from individual fires, and to learn important lessons.	BLM	Only as needed or warranted	**BLM:** One major fire has occurred on BLM in GRSG habitat since 2008. No issues were identified relative to fire fighting operations & procedures.	
4.1.1.9	At the wildland-urban interface bordering sagebrush habitats, increase public education and implement fuel reduction projects to reduce the risk of human-caused fires escaping into GrSG habitats (examples include pamphlets, news releases). [See also Information, Communication, and Education Strategy 12.2.1.3]	BLM	Annually and as needed during fire season	**BLM:** If issues are brought forward in the wildland - urban interface near SB habitat, a project is submitted under the WUI program.	
4.1.1.10	During annual training for fire fighting personnel, increase awareness of issues and potential impacts of fire and suppression activities in GrSG habitats. **[See also Information, Communication, and Education Strategy 12.3.1.1]**	BLM	Annually	**BLM:** Emphasis on SG management is part of the annual fire fighting training.	

4. Fire and Fuels Management					
Objective 4.1.2	Prescribed burns and fuel treatments – impacts to habitat				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
4.1.2.1	Use prescribed burning and mechanical fuels treatments at an appropriate scale (i.e., smaller is better) to maintain or improve the quality and quantity of GrSG habitats. Consider fire scale, seasonality, and moisture regime from a GrSG habitat management perspective (as well as air quality issues, as guided by state regulations) in planning prescribed burns (see "Habitat Enhancement Strategy" [pg. 349] and Monsen 2005).	BLM	During project planning	**BLM:** All habitat and fuels projects conducted by BLM consider SG habitat objectives & site capability in their design, analysis and implementation.	
4.1.2.2	All prescribed burns or mechanical fuel treatments within sagebrush areas should have identified GrSG habitat objectives, and should consider existing sagebrush communities, site conditions, and site potential in treatment design (see "Habitat Enhancement Strategy" [pg. 349] and Monsen 2005).	BLM	Project - dependent	**BLM:** All habitat and fuels projects conducted by BLM consider SG habitat objectives & site capability in their design, analysis and implementation.	
4.1.2.3	In xeric (dry) occupied and potential GrSG habitat, design prescribed burns that are small, irregular in shape, and that encourage natural reestablishment of the native plant community. For burns that are larger than 5 acres in xeric sites in occupied or potential GrSG habitat, encourage sagebrush rehabilitation with appropriate seed mixture (see "Habitat Enhancement" strategy, pg. 349, and CCP Appendix D, "Recommendations Regarding Plant Species for Use in GrSG Habitat Management and Restoration").	BLM	As needed	**BLM:** All habitat and fuels projects conducted by BLM consider SG habitat objectives & site capability in their design, analysis and implementation.	
4.1.2.4	Avoid fire or mechanical fuel reduction treatments within GrSG habitat in areas susceptible to invasion by cheatgrass or other invasive plant species, except where they are part of a well-defined and aggressive restoration program (see "Habitat Enhancement" strategy, pg. 349).	BLM	As needed	**BLM:** All habitat and fuels projects conducted by BLM consider SG habitat objectives & site capability in their design, analysis and implementation.	
4.1.2.5	In areas where sagebrush is limited on the landscape, avoid the use of prescribed fire and other sagebrush reduction projects in areas that currently meet GrSG breeding or winter habitat requirements (see "Habitat Enhancement" strategy, pg. 349 and CCP Appendix B, "GrSG Disturbance Guidelines").	BLM	During project planning	**BLM:** All habitat and fuels projects conducted by BLM consider SG habitat objectives & site capability in their design, analysis and implementation.	
4.1.2.6	Protect sagebrush adjacent to riparian zones, meadows, lakebeds, and croplands that include important GrSG summer habitat.	BLM	During project planning	**BLM:** SG habitat objectives are considered before planning any treatment project in SG habitat. Therefore, important existing SB habitat adjacent to riparian areas that may provide brood rearing or summer habitat will be maintained.	
4.1.2.7	To avoid introduction of noxious weeds in GrSG habitat, wash vehicles and heavy equipment for fires and mechanical fuel reduction treatments prior to arrival at a new location (see "Weeds" strategy, pg. 425).	BLM	As needed	**BLM:** This is a BMP that is applied when appropriate through NEPA on projects in SG habitat.	
4.1.2.8	Consider recent drought events and their effects on GrSG habitat (e.g., understory vigor) when planning/implementing fire or fuel reduction treatment projects (see "Weather" strategy, pg. 423).	BLM	During project planning	**BLM:** All habitat and fuels projects conducted by BLM consider SG habitat objectives & site capability in their design, analysis and implementation.	
4.1.2.9	Map all burns and fuel treatments in GrSG habitat within one year of occurrence, and develop a GIS layer of "vegetation modification" history (see "Habitat Monitoring" strategy, pg. 354; see also strategy 4.1.1.7).	BLM	Annually	**BLM:** All Burns & fuel treatments will be mapped per National BLM data standards early in 2013.	
Objective 4.1.3	All fire and fuel treatments – direct impacts to GrSG				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

4. Fire and Fuels Management					
4.1.3.1	Schedule prescribed burns and/or fuel treatment projects in sagebrush habitat to avoid, when possible, the GrSG seasonal use period for that area (e.g., breeding, winter; see also CCP Appendix B "GrSG Disturbance Guidelines").	BLM	During project planning	**BLM:** Timing limitations are placed on proposed habitat or fuels reduction projects in SG habitat to protect birds during the appropriate seasonal use period.	**BLM:** Limit disturbance to the bird. See CCP, disturbance guidelines for discussion & references.
4.1.3.2	When treating sagebrush areas to reduce fuels within 0.6 miles of a GrSG lek, maintain adequate canopy cover for sage-grouse (see "Breeding Habitat" in "GrSG Habitat Structural Guidelines", CCP Appendix A). Lek data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.	BLM	During project planning	**BLM:** Fuels treatments avoid the .6 mi area around a lek to protect the integrity and use of the lek site.	
Objective 4.1.4	Post-burn and -treatment habitat restoration				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
4.1.4.1	Monitor all wildfires or prescribed burns in the first 3 growing seasons post-fire, and then every 5-10 years for noxious or invasive weeds. Treat accordingly.	BLM	As needed per fire event	**BLM:** One major fire has occurred on BLM in GRSG habitat since 2008. It was treated (restoration seeding) thru the ES&R program which includes a minimum of 3 years subsequent monitoring. Additional monitoring is encouraged, and schedules are based on objectives & funding. Monitoring of smaller fires is typically conducted to determine if project objectives have been met. Schedules depend on objectives (short & long-term), staffing and funding.	
4.1.4.2	All wildfires or prescribed burns greater than 10 acres in size that are subject to cheatgrass invasion will be seeded with an appropriate seed mixture (i.e., avoid undesirable grass species; see CCP Appendix D, "Recommendations Regarding Plant Species for Use in GrSG Habitat Management and Restoration" and Monsen 2005), to reduce the probability of cheatgrass establishment (see also "Habitat Enhancement" strategy, pg. 349).	BLM	As needed per fire event	**BLM:** All fires are evaluated to determine if reseeding is a desirable or necessary management tool.	
4.1.4.3	Annually evaluate all recent wildfires and prescribed burns (greater than 10 acres), and reseed if necessary to achieve GrSG habitat objectives (see "Habitat Enhancement" strategy, pg. 349).	BLM	Annually	**BLM:** All fires are evaluated to determine if reseeding is a desirable or necessary management tool.	
4.1.4.4	Ensure that GrSG habitat considerations are incorporated into restoration and burn rehabilitation plans. Use BMPs and grazing management alternatives (see CCP Appendix E, "Grazing Management Options for GrSG") for land management practices following wild and prescribed fire events (see also Monsen 2005, "Habitat Enhancement" [pg. 349], "Recreational Activities" [pg. 407] and "Grazing" [pg. 342] strategies).	BLM	During project planning	**BLM:** One major fire has occurred on BLM in GRSG habitat since 2008. It was treated (restoration seeding) thru the ES&R program with an emphasis on restoring SG habitat.	
4.1.4.5	Evaluate the response of GrSG habitat (see "Habitat Monitoring" strategy, pg. 354) to all burns and mechanical fuel reduction treatments (be certain to consider the need for weed control in the area).	BLM	Annually	**BLM:** Habitat projects on BLM are typically monitored to determine effectiveness in meeting the project objective. The schedule of monitoring is dependant on the objective (short & long term), staffing and funding.	

4. Fire and Fuels Management					
4.1.4.6	Incorporate ecologically appropriate sagebrush seed into fire rehabilitation seed mixtures as often as possible in GrSG habitat (see CCP Appendix D, “Recommendations Regarding Plant Species for Use in GrSG Habitat Management and Restoration”) and Monsen 2005.	BLM	During re-seeding plan	**BLM:** All ES&R plans, as well as, other reseeding projects in SG habitat incorporate the use of SB seed when appropriate.	
4.1.4.7	Encourage and strongly support the development of production and storage facilities for native seed in Colorado, including native seed banks, for use in reclamation efforts (see “Habitat Enhancement” strategy 7.1.1.5). Emphasize the use of native plants following burns/treatments in GrSG habitat whenever possible.	BLM	Annually	**BLM:** Although BLM has strongly supported and funded local native plant efforts thru the Uncompahgre Plateau Partnership and Meeker Plant Center over the last decade, we are not funding or developing a local storage facility. BLM is developing a new seed storage warehouse in Ely, Nevada. BLM has access to native seeds (including storage) at multiple national seed warehouse sites.	
4.1.4.8	When reseeding an area in GrSG habitat, use certified "weed-free" seeds (see “Habitat Enhancement” strategy 7.1.1.6 and “Weeds” strategy section, pg. 425).	BLM	During re-seeding plan	**BLM:** BLM policy requires the use of certified weed-free seed on all public lands managed by the BLM. Straws or mulches applied as part of seeding, stabilization, or restoration projects on public lands must be certified to be weed seed-free as part of this policy.	
4.1.4.9	Rehabilitate firelines or trails caused by equipment use during fire fighting activities in GrSG habitat (see “Habitat Enhancement” strategy, pg. 349).	BLM	Post-fire	**BLM:** Large scale fires are reclaimed using the ES&R program (Emergency Stabilization & Restoration). Small scale fires are reclaimed thru site specific NEPA on a cases by case basis. GRSG habitat needs are considered in both these actions where appropriate.	
4.1.4.10	Identify and secure funding to support post-fire restoration efforts in GrSG habitat.	BLM	Annually	**BLM:** BLM prioritizes restoration needs and ES&R funding on a National and State level. Important SG habitat is a priority for such efforts.	

5. Genetics

ISSUE 5.1	Research has found that the genetic and geographic distances segregate Colorado greater sage-grouse populations into at least 2 clusters (Oyler-McCance et al. 2005), which should be considered in any potential transplant.
OBJECTIVE 5.1.1	Prevent the translocation of greater sage-grouse from the eastern part of the statewide distribution to the western part of the statewide distribution (or vice versa), to preserve unique genetic clusters.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
5.1.1.1	Conduct additional genetic sampling and analysis in GrSG populations that have not had genetic samples collected (PPR, MWR, NWCO - Zone 4B), or increase samples in appropriate populations.	CPW	5 years	**CPW:** Researcher, B. Walker, collected feather samples in the PPR and the Hiawatha portion of NWCO from 2007-2012. CPW is also collaborating with Exxon and CSU on a project to use non-invasive genetic mark-recapture data from genetic samples (feathers and pellets) in the PPR. Collection efforts are ongoing. Genetic analysis have not yet been conducted. CPW is part of the WAFWA Rangewide Connectivity Study and will be submitting samples after the 2013 lek season. Sample collection will be directed to specific areas. Previously, tissue (feather, blood, and/or fecal) samples have been collected opportunistically throughout the populations. A 2005 study by Oyler-McCance looked at genetic variation across the GrSG range.	**Thompson, T.R. 2012.** Dispersal ecology of greater sage-grouse in northwestern Colorado; evidence from demographic and genetic data. Ph.D. Dissertation, University of Idaho, Moscow, Idaho, USA. **Walker, B. L. 2012d.** Evaluation of Alternative Population Monitoring Strategies for Greater Sage-Grouse in the Parachute-Piceance-Roan Population of Northwestern Colorado. Colorado Parks and Wildlife annual progress report. **Apa, A.D. 2010.** Seasonal habitat use, movements, genetics, and vital rates in the Parachute/Piceance/Roan population of greater sage-grouse. Colorado Parks and Wildlife Final Report. Fort Collins, Colorado, USA. **CPW:** Birds from the PPR population do not appear to differ greatly from other GrSG sampled in CO.
5.1.1.2	If additional genetic testing indicates a genetic line of demarcation (north to south) between Colorado GrSG populations, all translocations should be north-south, and not east-west.	CPW	Ongoing		

ISSUE 5.2	Small isolated populations of greater sage-grouse may have low genetic diversity, which may facilitate inbreeding depression.
OBJECTIVE 5.2.1	Monitor genetic diversity within the smaller isolated populations of greater sage-grouse in Colorado.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
5.2.1.1	To monitor the genetic diversity and isolation of GrSG populations, obtain blood and other tissue samples as GrSG are captured for other purposes, and submit for DNA testing (see also strategy 8.2.1.4).	CPW	By 2008 and ongoing	See 5.1.1.1.	
5.2.1.2	Continue to develop and refine, if it proves feasible, techniques to obtain DNA from sage-grouse fecal droppings so that genetic testing can be accomplished without capturing birds. **[See Research Strategy 21.7.1.1]**	CPW, Universities	Ongoing		

OBJECTIVE 5.2.2	Maintain genetic diversity present within individual Colorado populations of GrSG so that each small population contains 70% of the overall genetic diversity within Colorado (see also Issue 8.2, Objective 8.2.1).

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
5.2.2.1	Increase genetic diversity (if found to be low) within small GrSG populations through augmentation with eggs, chicks, and/or adults.	CPW	5 years		
5.2.2.2	Develop and implement a genetic diversity monitoring plan and schedule for GrSG populations.	CPW, Denver University, USGS	2010		

6. Grazing					
Issue 6.1	Lack of understanding of relationships among herbivory, GrSG populations, GrSG habitat				
Objective 6.1.1	Research - herbivore direct effects on GrSG				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
6.1.1.1	Conduct a literature review of herbivores and their effects on sage-grouse. **[See Research Strategy 21.2.1.1;** see also http://sagemap.wr.usgs.gov/ for a recently completed literature review**]**	BLM, CPW, Universities	Begin by 2020	**CPW:** Beck and Mitchell, 2000. Influences of livestock grazing on sage-grouse habitat. Wildlife Society Bulletin 28:993-1001. Cagney et al. 2010. Grazing Influence, Objective Development, and Management in Wyoming's Greater Sage-Grouse Habitat. BLM report.	
6.1.1.2	Evaluate the effects of herbivores on GrSG (e.g., nest trampling, changes in GrSG behavior, also positive effects). **[See Research Strategy 21.2.1.1]**	BLM, CPW, Universities	Begin by 2020		
Objective 6.1.2	Research - herbivory effects on GrSG habitat				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
6.1.2.1	Conduct a literature review of grazing systems and their effects on the vegetation parameters important to sage-grouse. **[See Research Strategy 21.1.2.2]**	BLM, CPW, CSU Extension, LWGs, NAGP, NRCS, Universities, USFS, WAFWA	Begin by 2015	**CPW:** Beck and Mitchell 2000. Influences of livestock grazing on sage-grouse habitat. Wildlife Society Bulletin 28:993-1001. Cagney et al. 2010. Grazing Influence, Objective Development, and Management in Wyoming's Greater Sage-Grouse Habitat. BLM report.	
6.1.2.2	Evaluate the effect of herbivores on the quality of sagebrush habitat (e.g., grass and forb abundance, diversity, and vegetative structure). **[See Research Strategy 21.1.2.2]**	BLM, CPW, CSU Extension, LWGs, NAGP, NRCS, Universities, USFS, WAFWA	Begin by 2015		
6.1.2.3	Provide incentives to private landowners to participate in research (e.g., strategy 6.1.1.2, 6.1.2.2) and monitoring actions (e.g., if a rancher is requested to rest a pasture for a research project). Develop grazing banks or help find other pasture to graze. Provide financial compensation such as fencing and water developments; however, water developments should be designed to minimize WNV risk to GrSG). [See Research Strategy 21.1.2.2]	BLM, CPW, CSU Extension, LWGs, NAGP, NRCS, Universities, USFS, WAFWA	Begin by 2015		
6.1.2.4	As results become available on research on herbivory and GrSG (e.g., strategy 6.1.1.2, 6.1.2.2), distribute them to local work groups. **[See also Information, Communication, and Education Strategy 12.3.2.1 and Research Strategy 21.1.2.2]**	BLM, CPW, CSU Extension, NRCS, USFS	Ongoing	**See 12.3.2.1**	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
Objective 6.1.3	Research - effects of GrSG habitat parameters on GrSG populations				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
6.1.3.1	Conduct a literature review of how GrSG populations respond to different habitat parameters. **[See Research Strategy 21.1.1.1]**	BLM, CDA, CPW, Industry, LWGs, NGOs, NRCS, Other Research Institutions, Private Landowners, SLB, Universities, USFS, USFWS, USGS, WAFWA	Begin by 2010	**See 21.1.1.1**	
6.1.3.2	Determine the relationship of GrSG habitat parameters to sage-grouse productivity, demographics, and population viability. **[See Research Strategies 21.1.1.1 and 21.1.1.3]**	BLM, CDA, CPW, Industry, LWGs, NGOs, NRCS, Other Research Institutions, Private Landowners, SLB, Universities, USFS, USFWS, USGS, WAFWA	Bein by 2010/2012	**See 21.1.1.1**	
Issue 6.2	Sagebrush - management of herbivores while considering GrSG habitat needs				
Objective 6.2.1	Domestic herbivore management				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
6.2.1.1	Identify GrSG seasonal habitat objectives for individual sites (dependent on site potential and environmental conditions; see CCP Appendix A, "GrSG Structural Habitat Guidelines").	BLM, CPW, LWGs, NPS, NRCS, Private Landowners, SLB, USFS, USFWS	Ongoing	**CPW:** NP - CPW, with support from the NP LWG, conducted habitat measurements at GrSG use and non-use sites across NP. The USFWS helped with funding technicians to conduct the habitat measurement. Local habitat measurement will be compared to seasonal habitat objectives. Data have been collected and currently being analyzed. A report will be provided to NP LWG. NWCO and NESR - CPW conducted habitat measurements at GrSG locations in various ecological sites. These data were compared to other GrSG structural guidelines and then used in the development of the Colorado GrSG Structural Habitat Guidelines. PPR - Partial - seasonal maps have been developed. MP - no mapping	
6.2.1.2	In cooperation with the local work groups, identify a specific menu of grazing management options (for examples, see Appendix E, "Grazing Management Options") that supports the local work group sage-grouse habitat objectives and will provide the flexibility needed for local site conditions; options should be compatible with the BLM's "Standards for Public Land Health" and "Guidelines for Livestock Grazing Management" (http://www.blm.gov/co/st/en/BLM_Programs/grazing/rm_stds_guidelines.html), as well as the "GrSG Structural Habitat Guidelines" (Appendix A). Encourage application of grazing management options for GrSG on a landscape scale, across ownership boundaries.	BLM, CSU Extension, LWGs, NRCS, SLB, USFS	Within next 2 years		
6.2.1.3	Use livestock grazing management options on private lands, where possible, and on public lands, as developed by land management agencies or LWGs, that are consistent with achieving GrSG habitat objectives. Explore the use of vacant federal allotments through the land-use planning process and CRP, to provide flexibility in grazing options recommended to achieve GrSG habitat objectives.	BLM	Ongoing	**BLM:** Grazing mangement practices on BLM are evaluated with respect to compatibility with achieving SG habitat objectives when grazing permits come up for renewal. No vacant federal allotments have been identified that could provide flexibility in grazing in SG habitat to date.	
6.2.1.4	Monitor the effectiveness of grazing management options. All stakeholders should be involved in the development of monitoring plans (see "Habitat Monitoring" strategy, pg. 354, and CCP Appendix C, "Habitat Monitoring Protocol").	BLM, CDOW, LWGs	Start within 5 years		
6.2.1.5	Use monitoring results (strategy 6.2.1.4) to adjust grazing management options (see "Adaptive Management", pg. 10).	BLM, CDOW, FSA, LWGs, NPS, NRCS, Private Landowners, SLB, USFS, USFWS	ASAP following monitoring results		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
6.2.1.6	Use results from research on grazing impacts on GrSG habitat and populations (strategies 6.1.1.2 and 6.1.2.2) to update and adjust grazing management options (see “Adaptive Management”, pg. 10).	BLM	Ongoing	**BLM:** As research relative to impacts on SG or their habitat become available, that information is shared among agency biologists for use and consideration.	
6.2.1.7	Monitor (throughout the year as needed) GrSG habitat and total utilization (e.g., cattle, sheep, wild ungulates, wild horses, insects), and/or vegetation structure available during the important grouse use period, and adjust grazing management plans as necessary to achieve desired vegetation structure for GrSG. Monitoring protocol should provide data useful for determining if GrSG habitat and grazing objectives are being met (see CCP Appendix C, “Habitat Monitoring Protocol”).	BLM, CPW, LWGs, NRCS, Private Landowners, USFS	Ongoing		
6.2.1.8	Evaluate the effectiveness of grazing management options in achieving GrSG habitat objectives used at the local level. Use monitoring results to adjust management options (see “Adaptive Management”, pg. 10). It is critical for all stakeholders to be involved in the design of the monitoring plan.	BLM, CSU Extension, LWGs, NRCS, SLB, USFS	Within 5 years		
6.2.1.9	Evaluate the effects of grazing management changes made for GrSG on maintaining sustainable agriculture.	BLM, CPW, CSU Extension, LWGs, NRCS, Private Landowners,	Ongoing		
Objective 6.2.2	Wild herbivore management				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
6.2.2.1	Encourage the consideration of specific sage-grouse habitat objectives when revising DAU plans for deer, elk and pronghorn, particularly in revisions of big game population objectives.	BLM, CPW, LWGs, USFS	Ongoing	**CPW:** CPW staff encourage local ranchers and BLM through verbal communication to consider GrSG habitat. BLM considers GrSG habitat when analyzing grazing allotments. Several herd management areas have developed forage availability models that reserve 50% of net annual production for landscape health and wildlife habitat needs including GrSG. For example, NWCO - A combined model addresses mule deer, elk, pronghorn, and wild horses in 4 herd units that included the majority of the NWCO, NESR, and MWR populations. This model was used to set and validate big game population objectives in these herds. [Wockner et al. 2005. The Habitat Assessment Model: A tool to improve wildlife habitat management. CPW Report.] Similar forage availability/allocation models have been completed for all other portions of the range except the southwestern corner of NWCO (Blue Mountain) and southern portions of PPR. **See Appendix F: Big Game Populations in GrSG Habitat**	**CPW:** Elk populations have been reduced to or below population objectives in most portions of the NWCO, NESR, and MWR areas. For instance, elk populations in NWCO have been reduced by nearly half (from 108,959 in 2000 to 56,853 at the end of 2011-see attached table). Efforts to bring elk populations to objective continue in other areas. Populations of deer and pronghorn are generally below long-term objectives due to other environmental conditions. Forage availability/allocation models that facilitate consideration of GrSG habitat objectives when planning deer, elk and pronghorn population objectives have been completed for all portions of GrSG habitat in Colorado, with the exception of the southwestern corner of NWCO and southern portions of PPR.
6.2.2.2 (a)	Encourage the consideration of specific sage-grouse habitat objectives when revising BLM Wild Horse Herd Management Plans, where applicable.	BLM	Ongoing	**BLM:** The Sand Wash Wild Horse Herd Management Plan has not been revised since the CCP was completed. As wild horse issues are identified, SG habitat objectives will be considered when recommending appropriate management changes.	**BLM:** See CCP for discussion and references.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
6.2.2.2b				**CPW:** CPW harvest strategies are designed to meet DAU-specific population objectives for big game. The DAU planning process is open for public comment and is aimed to manage big game populations at sustainable levels and considers the total number of wild and domestic ungulates on the landscape. MP - No specific guidelines have been developed associated with GrSG habitat objectives and wild ungulate distribution and utilization. However, DAU plans (D-9) address deer management objectives for Middle Park. In theory, a healthy deer herd at or below objective should produce a healthy rangeland which would positively benefit GrSG habitat. PPR, NESR, NP - CPW has not developed specific GrSG habitat objectives with respect to wild ungulate distribution and Big Game DAU plans do not specifically address GrSG habitat objectives when determining appropriate herd population objectives.	
6.2.2.2	Develop guidelines to influence wild ungulate distribution and utilization levels in order to achieve GrSG habitat objectives.	CPW	2009		
6.2.2.3	Implement guidelines (where possible) to influence wild ungulate distribution and utilization levels in order to achieve GrSG habitat objectives.	CPW	2011 and ongoing	**CPW:** CPW revises herd management objectives on an approximate 10 year schedule. Many big game populations in sage-grouse habitat peaked in the early 2000's. CPW has aggressively reduced elk populations throughout GrSG range to bring these herds to desired objective levels.	**CPW:** Elk populations have been reduced to or below population objectives in most portions of the NWCO, NESR, and MWR areas. For instance, elk populations in NWCO have been reduced by nearly half (from 108,959 in 2000 to 56,853 at the end of 2011-see attached table). Efforts to bring elk populations to objective continue in other areas. Populations of deer and pronghorn are generally below long-term objectives due to other environmental conditions.
Issue 6.3	Funding and socioeconomic issues				
Objective 6.3.1	Identify funding, prioritize projects				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
6.3.1.1	Identify potential funding sources for GrSG habitat conservation (see CCP Appendix F, "Available Funding Opportunities for GrSG Habitat Conservation").	CCP SC	2008	**CPW:** The constituent agencies that make up the CCPSC have pursued new funding sources through their individual budget processes.	**CPW:** BLM has brought additional project money to CO. NRCS has designated funds specifically for habitat enhancement and conservation in CO. There are 3 jointly-funded private lands biologist that have been hired to administer these projects. CPW has secured $2.1 million of Species Conservation Trust Fund monies for GrSG habitat projects.
6.3.1.2	Assist local work groups in developing a process to evaluate management options and set priorities for funding habitat improvement projects.	CPW	As needed	**CPW:** General - CPW, BLM, NRCS, and private lands biologists meet routinely to plan and implement projects. Some LWGs are more involved in this process than others. CPW sagebrush habitat coordinator, hired 2011, will be developing landscape management plans and local implementation plans that will prioritize where to treat and what treatments will be most effective in our sagebrush ecosystem. MP and PPR -- CPW meets annually with LWGs where projects are proposed, discussed and reviewed. Funding is available for work on private land through NRCS programs; however many private lands tend to be in valley bottoms not used by grouse or are industry owned. The PPR LWG has not developed a process to annually review and implement habitat projects. NP and NESR - CPW meets bi-annually and annually (respectively) with the LWG and has requested habitat implementation project ideas. The BLM and CPW have initiated GrSG improvement projects. CPW and BLM consider GrSG habitat needs when deciding whether to implement a project for big game. The NP LWG has not developed a process to annually review and implement habitat projects. NESR - An influential LWG member initiated a habitat enhancement project on his private land. The LWG toured this project to get additional project ideas.	**CPW:** Communication between agencies and with the LWGs is frequent and available whenever the LWG wants.
Objective 6.3.2	Address indirect costs of responsible GrSG management				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
6.3.2.1	Assist local work groups in developing procedures to conduct cost-benefit analyses of the economic impact of different grazing management options that benefit GrSG.	BLM, CPW, CSU Extension, LWGs, NRCS, Universities, USFS, USFWS	Ongoing		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
6.3.2.2	Identify opportunities to compensate landowners for the cost of implementation of management options and facilitating practices to benefit GrSG (e.g., grazing banks, conservation easements and other options).	BLM, CPW, Land Trusts, NGOs, USFS, USFWS,	2008 and ongoing	**CPW:** Both traditional NRCS programs and the expanded Sage Grouse Initiative (SGI) funds are available to assist with the cost of implementing grazing systems. FWS's Partners for Fish and Wildlife also funds projects in GrSG habitat.	**CPW:** This process occurs annually.
6.3.2.3	Provide funding to private landowners and land managers to implement grazing management options developed in strategy 6.2.1.2.	BLM, CPW, Industry, NRCS, SLB, USFS, USFWS	Ongoing	**CPW:** General - Both traditional NRCS programs and the expanded Sage Grouse Initiative (SGI) funds are available to assist with the cost of implementing grazing systems. FWS's Partners for Fish and Wildlife also funds projects in GrSG habitat. NP - CPW, BLM, NRCS, USFS and USFWS work with Owl Mountain Partnership to implement grazing management improvements on private and public lands.	**CPW:** This process occurs annually.
6.3.2.4	Conduct a cost-benefit analysis of the economic impact on local communities when planning for the management of the wild ungulates.	CPW	As needed	**CPW:** Cost-benefit analysis for wild ungulates in relation to local communities has been conducted at large scales but not for PPR specifically. NP and NESR - The big game DAU plans for NP consider the economic costs and benefits with respect to wild ungulate management.	
6.3.2.5	Continue support for HPP and game damage programs that address wild ungulate herbivory on private land.	CPW	Ongoing	**CPW:** General - CPW continues its support and oversight of the Habitat Protection Program. HPP committees receive 5% of the big game license fees collected in their area to use for damage mitigation and habitat improvement. CPW monitors HPP projects to ensure that they do not impact GrSG populations. NWCO, MWR, MP, NP, PPR and NESR - All GrSG habitat has an active HPP committee.	
Issue 6.4	Lack of cooperation, communication, and respect among stakeholders				
Objective 6.4.1	Foster information sharing				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
6.4.1.1	Ensure that private land managers, permittees, conservation groups, and other interested publics are encouraged to be involved in land management planning (e.g., AMP planning, DAU plans) that involve sage-grouse habitats.	BLM, CPW, USFS	Ongoing	**BLM:** BLM conducts public scoping meetings and provides opportunites for public input during our planning process. During local project planning, all affected parties are involved in development of proposed management actions. The public is notified of proposed action and the BLM receives comments during the NEPA process. **CPW:** General - CPW harvest strategies are designed to meet DAU-specific population objectives for big game. The DAU planning process is open for public comment and is aimed to manage big game populations at sustainable levels and considers the total number of wild and domestic ungulates on the landscape. Public meetings are announced and held for the majority of CPW plans and proposed research projects. CPW is pursuing additional opportunities for input including web based surveys and to review documents on-line. CPW encourages participation from multiple parties on the LWGs. Various parties are represented on the LWG and are involved with GrSG habitats and planning.	
6.4.1.2	Develop a public outreach/education program about domestic and wild grazing and GrSG needs (e.g., create a traveling display to be used at schools, county fairs). Be certain that part of the educational material identifies the contribution of landowners to sage-grouse conservation. [See Information, Communication, and Education Strategies 12.2.1.1, 12.2.1.2, 12.2.1.3, and 12.2.1.4]	CPW	2009	**CPW:** Has not been done specific to grazing.	
6.4.1.3	Develop an internet website through which local work groups can share information. Include a link from the CDOW website. **[See Information, Communication, and Education Strategy 12.3.2.1]**	CPW	2008 and ongoing	**CPW:** CPW has all conservation plans, research, and basic information about GrSG posted on its website.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
6.4.1.4	Establish controlled or regulated tours to impart an understanding of the various aspects of GrSG habitat. Be certain that part of the educational material identifies the contribution of landowners and public lands to sage-grouse conservation. Have a training and/or education program for the people who lead lek-viewing tours. [See Information, Communication, and Education Strategies 12.2.1.1, 12.2.1.2, 12.2.1.3, and 12.2.1.4]	CPW	2009	**CPW:** NWCO - CPW has coordinated, helped coordinate, or participate in several private lands habitat tours over the past 4 years to look at land management practices in GRSG habitat, most recently as part of the WAFWA Sage and Columbian Sharp-tailed Grouse Workshop in summer 2012. Lek viewing tours in NWCO are conducted and regulated. MP - The Middle Park LWG has hosted several public habitat tours over the last decade, many of which highlighted habitat treatments that were conducted to improve GrSG habitat and livestock grazing. PPR - Several field trips to the PPR that discuss GrSG habitat, sagebrush, and mitigation have been conducted over the past 5 years. Lek tours are not given in the PPR population as most leks are too difficult to access. NP - Owl Mountain Partnership and NP HPP have led several tours (usually at least one per year) to discuss habitat improvement projects across public and private ownership boundaries. These tours generally discuss GrSG habitats as well as the importance of the mix of public and private land for conserving GrSG habitats. CPW has developed a watchable wildlife brochure for lek viewing in NP. NESR - CPW organized a LWG tour to review and discuss habitat improvement projects in NESR. Tour focused on private land and the importance of private land for the NESR GrSG population. CPW is not aware of lek viewing tours in NESR. The majority of leks are located on private land and landowners do not allow public access.	**CPW:** During these tours proper grazing is touted as a valuable contribution to GrSG conservation.
6.4.1.5	Develop elementary, middle, and high school curricula that include grazing and grouse management, to fit Colorado educational standards. **[See Information, Communication, and Education Strategies 12.2.1.2 and 12.2.1.4]**	CPW	2009	**CPW:** MP - During the summer of 2012 CPW and NRCS participated in the first NW Future Farmers of America school program to combine the principles of livestock grazing and natural resource management. Students were introduced to science principles practiced in grazing and wildlife management, specifically GrSG, in a field setting. Students were from high schools in Grand, Jackson and Moffat counties. This plans to be continued in future years.	

7. Habitat Enhancement					
ISSUE 7.1	Improper design or implementation of vegetation enhancement treatments may not meet habitat objectives and may lead to degraded GrSG habitats.				
OBJECTIVE 7.1.1	Conduct proper planning for sagebrush, riparian, and wet meadow restoration and improvement projects that provide the structural habitat requirements in breeding, summer-fall, and winter sage-grouse habitats.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
7.1.1.1	Identify the sage-grouse habitat treatment objective(s) in a given population, sub-population, or population zone area, and review annually (see CCP Appendix A, "GrSG Structural Habitat Guidelines").	BLM, CPW, LWGs, NRCS, Private Landowners, SLB, USFS, USFWS	When project is proposed	**CPW: General -** Population scale habitat treatment objectives are in an early state, but project level identification of these objectives occurs routinely. CPW has hired a sagebrush steppe habitat coordinator who is beginning work to identify these population-wide objectives, starting in portions of the **NWCO** population. **NP** - CPW, BLM, NRCS, USFS and USFWS work with Owl Mountain Partnership and NP HPP to implement habitat improvement projects on private and public lands in NP. GrSG habitat requirements are considered when planning habitat improvement projects in NP.	The multiple parties listed here are reconsidering the effectiveness of sagebrush treatment projects as a GrSG habitat enhancement project in NP.
7.1.1.2	Identify the ecological site characteristics and sagebrush species associated with the project area in GrSG habitat.	BLM, CPW, LWGs, NRCS, Private Landowners, SLB, USFS, USFWS	When project is proposed	**CPW: General -** CPW and BLM identify the ecological site characteristics associated with projects in GrSG habitat. CPW and BLM attempt to identify the sagebrush species for projects in GrSG.	Strategy complicated due to the presence of sagebrush hybrids throughout much of Colorado GrSG habitat.
7.1.1.3	Consult Monsen (2005), and select appropriate treatment options suitable for the site characteristics and treatment objectives in GrSG habitat.	BLM, CPW, LWGs, NRCS, Private Landowners, SLB, USFS, USFWS	During project planning	**CPW: General -** Monsen (2005) and/or other valid treatment references are consulted by CPW biologists during treatment planning to determine appropriate treatment methods. CPW landscape scale treatment planning (Sagebrush Biome Habitat Coordinator) will also include assessments of the most appropriate treatment methodologies for areas of GrSG habitat.	
7.1.1.4	Conduct pre-project planning for treatment areas in GrSG habitat (e.g., project design, necessary archaeological clearances, EAs).	BLM, CPW, LWGs, NRCS, Private Landowners, SLB, USFS, USFWS	During project planning	**CPW: General -** Project pre-planning is a routine part of project level planning in GrSG habitat. **Portions of NWCO and PPR** have accomplished programmatic NEPA clearances for GrSG habitat activities (e.g., PJ removal), expediting project level planning. **NWCO** - Project planning and necessary clearances have been conducted for numerous PJ removal projects in Management Zones 5, 6, and 7. **MP** - Project planning was conducted prior to the PJ removal project completed summer 2012 on private lands. CPW, NRCS and FWS worked to identify the project boundaries, develop contract, and flag work areas. **PPR** - This is done by BLM to clear BLM lands for PJ treatments as a joint effort with CPW. **NP -** CPW, BLM, NRCS, USFS and USFWS work with Owl Mountain Partnership and NP HPP to implement habitat improvement projects on private and public lands in NP. The project proponents conduct the pre-project planning for treatment areas. **NESR** - CPW, BLM, NRCS, USFS and USFWS implement habitat improvement projects on private and public lands in NESR. The project proponents conduct the pre-project planning for treatment areas.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
7.1.1.5	Encourage and strongly support development of production and storage of native seed in Colorado, including native seed banks, for use in reclamation efforts in GrSG habitat (see also “Fire and Fuels Management” strategy 4.1.4.7.) Work cooperatively with the Uncompahgre Project (UP), Upper Colorado Environmental Plant Center (UCEPC), and other entities in the development and storage of native seed for restoration purposes.	BLM, CPW, LWGs, NRCS, SCDs, SLB, UCEPC, UP, USFS, USFWS	Ongoing	**Upper CO Environmental Plant Center** has conducted 8 Replicated Field Evaluation Plantings in CO since 2004. Intended to identify which native plants are most easily established. Some have been subsequently released as formal products to the commercial seed industry for reclamation. **CPW:** CPW completed the Seed Warehouse in Delta in 2012 as a storage repository for native seed to be used on habitat enhancement/restoration projects in western Colorado (e.g., rehabilitation of the 2012 Pine Ridge Fire on the SW side of PPR. Through multiple partners, a variety of native collections are being developed and the propagation of native species by commercial growers is continuing.	
7.1.1.6	When reseeding an area in GrSG habitat, use certified "weed-free" seeds (see “Fire and Fuels Management” strategy 4.1.4.8 and “Weeds” strategy section, pg. 425).	BLM, CPW, LWGs, NRCS, SCDs, SLB, UCEPC, UP, USFS, USFWS	Ongoing	**Upper CO Environmental Plant Center** develops, produces, sells and promotes the use of certified seed. Available since 1975. **CPW**: CPW recommends and uses certified weed free seed when possible. The CPW native seed storage facility should help with this action by providing storage for appropriate seed stocks. BLM, USFS, and NRCS require certified "weed-free" seeds on many projects.	
OBJECTIVE 7.1.2	Conduct and monitor restoration for improvement of the vegetation structural habitat requirements necessary for productive breeding, summer-fall, and winter sage-grouse habitats.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
7.1.2.1	Conduct pre-restoration monitoring using a recognized technique appropriate to measure the treatment objective(s) in GrSG habitat (see “Habitat Monitoring” strategy, pg. 354 and CCP Appendix C, “Habitat Monitoring Protocol”).	BLM, CPW, LWGs, NRCS, Private Landowners, SLB, USFS, USFWS	During project planning	**CPW: General -** Standardized monitoring of GrSG habitat enhancement projects is still in development, but is being increasingly implemented for individual projects. CPW's Sagebrush Steppe Habitat Coordinator will assist with developing standardized monitoring protocols for CPW projects. **MP** - Conducted presence/absence surveys prior to the PJ removal treatment completed in 2012. **PPR** - BLM and CPW conducted veg transects in GrSG habitat before a prescribed burn was implemented. **NP -** CPW, BLM, NRCS, USFS and USFWS work with Owl Mountain Partnership and NP HPP to implement habitat improvement projects on private and public lands in NP. Pre-treatment monitoring transects have been conducted at the majority of sagebrush habitat enhancement projects in NP. **NESR -** Pre-treatment habitat measurement data are available for a small portion of the vegetation enhancement projects in NESR. However, only before photos are available for most of the PJ projects.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
7.1.2.2	Implement the appropriate treatment/restoration action(s) in GrSG habitat (Monsen 2005).	BLM, CPW, LWGs, NPS, NRCS, Private Landowners, SLB, USFS, USFWS	Project specific	**NRCS**: completed 8 conservation plans in GSG habitat that meet criteria of NRCS Conference Report. Completed through EQIP. **CPW:** General - Numerous treatment projects have been completed in GrSG habitat since 2004, including control of PJ encroachment, restoration of agricultural lands to suitable habitat, development of wet meadow sites, wildfire restoration/seeding, and understory restoration (reference number and acreage of treatments from table). NWCO - PJ removal projects have been completed in management zones 5, 6, and 7. MP - A GrSG habitat site with encroaching PJ at stage 1 and 2 was treated to remove PJ in the summer of 2012. NP - CPW, BLM, NRCS, USFS and USFWS work with Owl Mountain Partnership and NP HPP to implement habitat improvement projects on private and public lands in NP. GrSG habitat requirements are considered when planning habitat improvement projects in NP. The multiple parties listed above are reconsidering the effectiveness of sagebrush treatment projects as a GrSG habitat enhancement project in NP. NESR - CPW, BLM, NRCS, USFS and USFWS implement habitat improvement projects on private and public lands in NESR. GrSG habitat requirements are considered when planning habitat improvement projects in NESR. **See Appendix A: Habitat Treatments** **See Appendix B: Summary of Expenditures on GrSG in Colorado 2006-2012**	**NRCS:** 3,000 acres of private land in GSG habitat now in compliance with NRCS / USFWS Conference Report.
7.1.2.3	Monitor vegetation response to treatments in GrSG habitat using appropriate monitoring technique and timing for the treatment type (see “Habitat Monitoring” strategy, pg. 354 and CCP Appendix C, “Habitat Monitoring Protocol”).	BLM, CPW, LWGs, NPS, NRCS, Private Landowners, SLB, USFS, USFWS	Post-treatment + every 5 years	**CPW: General -** Standardized monitoring of GrSG habitat enhancement projects is still in development, but is being increasingly implemented for individual projects. CPW's Sagebrush Steppe Habitat Coordinator will assist with developing standardized monitoring protocols for CPW projects. **NP -** CPW, BLM, NRCS, USFS and USFWS work with Owl Mountain Partnership and NP HPP to implement habitat improvement projects on private and public lands in NP. Post-treatment monitoring transects have been conducted at several of the sagebrush habitat enhancement projects in NP. **NESR -** Post-treatment photos are available for the PJ projects in NESR. Post-treatment vegetation measurements are generally not available. **MP -** not completed.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
7.1.2.4	Evaluate the effectiveness of vegetation enhancement treatments on GrSG. **[See Research Strategy 21.1.2.1]**	BLM, CDA, CPW, LWGs, NRCS, Private Landowners, UCEPC, USFS, USFWS, USGS	Begin by 2015	**CPW: General -** Project level effectiveness in achieving vegetative goals can be determined by project monitoring. Systematic assessment of vegetation enhancement treatments, particularly their effect on GrSG populations will require a research project designed and funded to assess specific vegetation and/or GrSG objectives and exceeds the capability of local field studies. **PPR -** CPW/BLM PJ removal research by CPW Researcher B. Walker is using pellet transects to determine change in GrSG occupancy after treatment to assess effectiveness. **NP -** CPW, BLM, NRCS, USFS and USFWS work with Owl Mountain Partnership and NP HPP to implement habitat improvement projects on private and public lands in NP. GrSG habitat requirements are considered when planning habitat improvement projects in NP.	The multiple parties listed here are reconsidering the effectiveness of sagebrush treatment projects as a GrSG habitat enhancement project in NP. CPW is currently determining whether NP GrSG telemetry data can be used to evaluate the effectivemess of vegetaion treatements on GrSG in NP.

8. Habitat Linkages					
ISSUE 8.1	Movement of GrSG is becoming increasingly limited by a reduction of suitable and available habitat linkages *within populations* .				
OBJECTIVE 8.1.1	Maintain or reestablish linkages within populations where fragmentation and isolation of occupied habitats has occurred (e.g., NESR, NWCO populations).				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
8.1.1.1	Within GrSG population areas, prioritize and refine mapped intra-population linkages that are most important to GrSG movements and dispersal.	CPW	2008	**CPW:** CPW Researchers T. Apa and B. Walker have demonstrated several intra-population linkages in NWCO with radio telemetered GrSG. Specifically, GrSG linkages exist between Management Zones 1 and 2, 2 and 3a, 3a and 5, and 5 and 6 in the NWCO population. Management Zone 3a has been identified as a key linkage that maintains the opportunity for gene flow through much of the NWCO population.	**CPW:** GrSG linkages exist between Management Zones 1 and 2, 2 and 3a, 3a and 5, and 5 and 6 in the NWCO population. Management Zone 3a has been identified as a key linkage that maintains the opportunity for gene flow through much of the NWCO population.
8.1.1.2	In high priority GrSG intra-population linkages (see strategy 8.1.1.1), pursue opportunities to protect areas from permanent loss (e.g., management plans, easements, land exchanges, acquisitions).	BLM, CPW, Land Trusts, Counties, Private Landowners, SLB, USFS	2009 and ongoing	**CPW:** CPW is continually looking for opportunities to protect key intra-population linkages. CPW is pursuing several conservation easements in the NWCO intra-population linkage areas identified above. CPW also includes the need to protect these areas in land use comments to BLM and other entities. **PPR -** Maintenance of intra-population linkages is one of several management strategies employed in WMPs.	**CPW:** CPW closed a 15,156 acre conservation easement in the NWCO intra-population linkage between Management Zone 5 and 6 in 2012.
8.1.1.3	In high priority GrSG intra-population linkages (see strategy 8.1.1.1), pursue opportunities for improving GrSG habitat (e.g., piñon-juniper removal, protection/enhancement of existing sagebrush communities; see "Habitat Enhancement" [pg. 349] and "Piñon – Juniper Encroachment" [pg. 396] strategies).	BLM, CPW, LWGs, NRCS. Private Landowners, SLB, USFS	2009 and ongoing	**CPW:** CPW has conducted a number of PJ removal projects to maintain intra-population linkages. A number of additional areas would still benefit from vegetation treatment.	**CPW: NWCO -** PJ removal in the Peck Mesa portion of Management Zone 5 maintains linkage to MZ 2. **PPR -** PJ removal has occurred in North PPR to reconnect isolated areas of habitat.
ISSUE 8.2	Genetic interchange and movement of GrSG *between populations* may become increasingly limited by the lack of suitable linkages (see also Issue 5.2).				
OBJECTIVE 8.2.1	Pursue opportunities to develop and maintain linkages between GrSG populations.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
8.2.1.1	In linkage areas between GrSG populations, prioritize and refine mapped inter-population linkages that could offer GrSG movement opportunities and potential for genetic interchange. Address issues of isolated populations during the prioritization process.	CPW	2008	**CPW: General -** In 2012, CPW refined the habitat linkage areas between GrSG populations across the range in CO. These were originally developed in the CCP. It is assumed these linkages will allow for movements between populations and will decrease the probability of extinction. The linkage data is updated as information is available and during SAM mapping updates every 4 years.	**CPW:** These linkages are being considered "general" habitat in the BLM Sage-grouse EIS and will have the same level of protection as general habitat on BLM and Forest Service lands. Recent radio telemetry has demonstrated that GrSG use the linkage area between NP and MP.
8.2.1.2	In high priority GrSG inter-population linkage areas (see strategy 8.2.1.1) that are on public lands, work to protect and improve habitat characteristics for GrSG (see "Habitat Enhancement" strategy, pg. 349).	BLM	2009 and ongoing	**BLM:** No specific actions have been implemented to to improve habitat in linkage areas. Any management activities proposed in linkages do consider the potential implications to SG movement within and between populations.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
8.2.1.3	In high priority GrSG inter-population linkage areas (see strategy 8.2.1.1) that are on private lands, work with willing landowners to protect and enhance habitat characteristics for GrSG (e.g., management plans, conservation easements).	Counties, CPW, Land trusts, LWGs, NRCS, Private Landowners	2010 and ongoing	**CPW:** These linkages are being considered "general" habitat in the BLM Sage-grouse EIS and will have the same level of protection as general habitat on BLM and Forest Service lands. CPW is pursuing conservation easements in linkage areas between NWCO and MWR, between MWR and PPR, and between MP and NESR.	**CPW:** CPW has secured a conservation easement in the Yellow Jacket Pass area, a linkage between **NWCO and MWR**. **MP -** A 1,115 acre conservation easement was completed in the linkage between MP and NESR in 2008.
8.2.1.4	Using results of population genetic testing (see Strategy 5.2.1.1), review prioritization of inter-population linkages.	CPW	2008 and ongoing	**CPW:** Preliminary genetic evaluations presented in the CCP indicate some genetic separation of NP, NESR, and MP from the remaining populations. Additional, genetic work in relation to linkages has not yet been conducted, however, CPW will be participating with a multi-state genetic study beginning in 2013. These results will be used to inform linkage evaluations and potential future transplants of GrSG.	

9. Habitat Monitoring					
ISSUE 9.1	Information on the location and condition of current seasonal habitats for GrSG in Colorado may not be adequate to effectively manage, maintain, and/or improve those habitats.				
OBJECTIVE 9.1.1	On a statewide basis, identify and delineate current GrSG habitat and track future changes in habitat.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
9.1.1.1	Develop inventory technique(s) (in conjunction with similar efforts for GuSG) for searching "vacant/unknown" habitat areas for sage-grouse use. Techniques should: (1) determine grouse presence and/or use; and (2) assist in delineating and distinguishing between "suitable vacant" areas and "suitable unknown" areas (using GIS mapping).	CPW	2008	**CPW: General -** CPW updates range maps for GrSG once every 4 years. Occupied range for GrSG was updated statewide in 2012 in conjunction with development of Priority Habitat maps. Vacant/unknown habitat polygons were also updated during this process, with some areas becoming occupied range and others being removed as unsuitable. **PPR** - Pellet transects were used to search for presence of GrSG on the Sunnyside area North and West of the Battlements. This area was vacant/unknown at the time but has now been changed to occupied (at least during extreme winters). CPW Researcher B. Walker has also used pellet transects to look at detection probability and occupancy. **NP and MP-** Inventory of vacant and unknown habitats is not an issue for NP or MP. The entirety of North Park and vast majority of Middle Park is GrSG habitat.	
9.1.1.2	In conjunction with efforts for GuSG, develop technique(s) to use in searching for new or previously unknown GrSG leks.	CPW	2008	**CPW Research:** CPW (Brett Walker) has been deploying solar GPS satellite transmitters on GRSG in the Hiawatha field (2010-2012) and in the PPR (2012) as part of a project evaluating lek-based monitoring and management strategies (Walker 2012a, Walker 2012b). Tracking morning locations of GPS males during the breeding season allows identification, confirmation, and counting of new GRSG leks. In addition, dual-frame sampling from helicopter has been conducted in four population zones in Colorado (North Park in 2009, Great Divide in 2010, and PPR in 2012). Dual-frame sampling includes surveying for GRSG leks within a spatially balanced random sample of 1 x 1 km cells (Walker 2012d). CPW Research: (1) Walker, B. L. 2012a. Using GPS Satellite Transmitters to Estimate Survival, Detectability on Leks, Lek Attendance, Inter-lek Movements, and Breeding-Season Habitat Use of Male Greater Sage-Grouse in Northwestern Colorado. Colorado Parks and Wildlife annual progress report. (2) Walker, B. L. 2012b. Evaluating Lek-Based Monitoring and Management Strategies for Greater Sage-Grouse in the Parachute-Piceance-Roan Population in Northwestern Colorado. Colorado Parks and Wildlife annual progress report. (3) Walker, B. L. 2012d. Evaluation of Alternative Population Monitoring Strategies for Greater Sage-Grouse in the Parachute-Piceance-Roan Population of Northwestern Colorado. Colorado Parks and Wildlife annual progress report. **CPW:** CPW staff note new leks found during lek counts each spring and lek data is updated annually. Ad hoc searches for new lek sites occur annual as time and conditions permit. Researcher B. Walker is currently using helicopter flights and dual-frame sampling techniques to discover new lek locations in PPR. Dual frame sampling has already been applied to NP and portions of NWCO.	**CPW Research:** Tracking males with GPS transmitters resulted in the discovery and confirmation of 5 new leks in the Hiawatha area in spring 2011 and 2012 (Walker 2012a). Dual-frame sampling from helicopter resulted in the discovery of 7 new GRSG leks in the PPR in spring 2012 (Walker 2012d).

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
9.1.1.3	Survey and search vacant/unknown habitat for GrSG use and leks.	CPW	2009 and ongoing	**CPW Research:** See 9.1.1.2 above. **CPW:** NWCO - There is only a small amount of mapped "vacant/unknown" habitat in the NW Colorado GRSG population area and it has not been searched. Survey work and searches have been conducted in mapped occupied range to fill in gaps in known lek distribution, resulting in the location of several new leks over the past 4 years. Dual Frame Sampling has been conducted in north-central and northwest portions of NWCO. MWR - Some areas with no known leks have been searched. No additional leks (beyond the one currently active lek) were found, but additional areas are yet to be searched. MP - Portions of the vacant/unknown habitat will be searched for leks in Spring 2013. Landowners were contacted in fall 2012. PPR - Dual Frame Sampling techniques currently being conducted in occupied range may be extrapolated to vacant/unknown areas if it proves to work well in occupied range. NP - CPW conducted Dual Frame sampling in NP to locate new leks, but did not locate any additional leks. CPW continually searches for new leks from the ground when conducting lek counts. NESR - In 2010, CPW conducted helicopter flights in historic habitat to search for new leks. CPW has not organized a robust survey of the suitable vacant/unknown habitat in NESR. CPW does follow-up on anecdotal sightings in vacant or unknown habitat.	
9.1.1.4	Update the CDOW habitat map using new GrSG habitat categories: “Suitable Occupied”, “Suitable Unknown”, “Suitable Vacant”, and “Potentially Suitable Habitat” *. Within the “Potentially Suitable Habitat” category, consider the relative restoration priority of each habitat area.	CPW	2008	**CPW:** These mapping definitions have been applied to CPW GrSG habitat mapping. CPW has produced several landscape scale habitat maps utilizing a variety of mapping and modeling techniques, as well as the 2012 priority habitat map. CPW GrSG maps were up-dated in 2012 to more accurately reflect areas currently occupied. In addition, these maps are revisited every 4 years and updates are made where needed. CPW has a working sense of the relative restoration priority of habitat areas. This will be more systematically defined as the Sagebrush Steppe Habitat Coordinator completes landscape habitat planning in GrSG habitat.	**CPW:** CPW GrSG maps now include these mapping definitions.
9.1.1.5	Review and update statewide GrSG habitat-related mapping efforts.	BLM, CPW	Every 10 years, or as necessary	**CPW:** CPW conducted a comprehensive review of GrSG overall range and seasonal habitat maps in 2012. CPW revised and updated the overall range map to accurately reflect vegetation conditions and recent telemetry results. Rangewide seasonal habitat maps for breeding, summer, and winter seasons were developed and used to formulate Priority Habitat polygons. In addition, fine scale seasonal habitat models are being developed in areas of high energy development potential (PPR and the Hiawatha portion of NWCO).	**CPW:** CPW conducted a comprehensive review of GrSG overall range and seasonal habitat maps in 2012.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
9.1.1.6	In conjunction with GuSG efforts, delineate sagebrush communities by species and/or groups of species using GIS modeling techniques.	CPW	2009	**CPW:** Sagebrush communities have been delineated from other shrub communities in some areas using GIS (Basinwide Vegetation Project) but not always to species. Further refinement of sagebrush species mapping has been explored with CPW/USGS. A "Sage Map" proposal was submitted for a portion of the GuSG range. The proposal was not funded due to limitations in current ability to utilize modeling or remote means to quantify sagebrush community composition at a scale that is useful to management. Current remote efforts are limited to total shrub cover, average shrub height, and bare ground measurements relating to land health indicators and not sagebrush community type. The Wyoming Basin Ecoregional Assessment produced several quality models to quantify sagebrush habitat quality relating to patch size, fragmentation, distance to human disturbance, etc. CPW is assessing the applicability of these models to Colorado.	
9.1.1.7	Develop and implement a process and standardized template for acquiring information on habitat projects, activities, and changes. Keep information requests with landowners focused and to a minimum.	CPW	2008	**CPW: General -** At present, CPW maintains a list of GrSG habitat treatments conducted that contains limited information regarding project type, location, etc. The CPW Habitat Coordinators are working on a standardized template/methodology for collecting habitat project data. CPW is evaluating the USGS LTDL program. **MP** - The MP LWG meets twice a year to review projects completed during the prior field season and to propose new GrSG projects. All projects (habitat, education, easements, etc) are recorded in a spreadsheet that contains project title, description, lead party, partners, cost, acres impacted, conception date and completion date. This information has been recorded by the LWG and incorporated in CPW reports forwarded to the FWS annually since 2004. **NP** - Kremmling BLM has been recording a GIS database of habitat improvement projects in NP.	
9.1.1.8	Create a central GIS database to track all sagebrush modification treatments and natural disturbances across GrSG range. This task will include database maintenance and updates.	CPW, BLM	2009	**BLM:** This has not been done for GRSG. All habitat treatment and fire data on public lands are available through individual program databases. **CPW:** See 9.1.1.7. CPW is assessing the USGS LTDL program. This database has not been created for GrSG but a similar one was created for GuSG and can now be used as a template.	
9.1.1.9	Define GrSG seasonal habitats and map them into the GIS database. Incorporate GIS modeling techniques such as slope and aspect, observational data, and habitat assessment data into the seasonal habitat definitions.	CPW	2008	**CPW Research:** See 3.2.3.1 above. **CPW:** General - These mapping efforts occur both at the local population level and rangewide level. Local biologists and district officer update seasonal habitats at least every 4 years during the CPW SAM updates. In September 2012, CPW's Research Section (M. Rice) completed seasonal habitat mapping for GrSG statewide. NP - CPW implemented a radio-telemetry project in North Park to refine the seasonal habitat models for NP. Data are currently being processed. PPR and portions of NWCO - Fine-scale seasonal habitat maps are being developed for the PPR at present (CPW Researcher B. Walker). These fine-scale seasonal habitat models incorporate vegetation types, landscape variables, and telemetry locations.	
9.1.1.10	Evaluate the amount and spatial arrangement of GrSG habitat in Colorado.	CPW	2015	**CPW Research:** See 3.2.3.1. Seasonal habitat maps for the PPR and Hiawatha could be used to estimate the amount of GRSG habitat in these areas, but this has not been done.	**CPW:** More current and higher resolution vegetation maps will be necessary to accomplish this at a meaningful scale and level of detail.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
9.1.1.11	Develop a method of reporting and archiving data that facilitates evaluation of the effectiveness of management programs and how they meet the habitat objectives outlined in this plan.	CCP SC	2008	**CPW:** In 2012, CPW initiated development of a habitat enhancement tracking system that will systematically track project parameters, costs, and spatial data. This will provide a place to collect monitoring data on these projects. CPW has hired a habitat coordinator for sagebrush systems who has been tasked with development and implementation of this system in concert with CPW GIS specialists and field biologists.	
9.1.1.12	Develop and apply landscape-level GrSG habitat monitoring guidelines.	CPW	2010	**CPW Research:** See 3.2.3.1 above. Seasonal habitat mapping analyses have allowed us to generate landscape-scale habitat guidelines for GRSG in the PPR (Walker et al. 2010a). These guidelines show the mean, variation, and range of values for different landscape features that can be considered suitable habitat for GRSG. **CPW:** Several habitat monitoring guidelines have been developed and are being utilized at individual population zones for habitat monitoring. BLM's Habitat Assessment Framework (HAF) is an attempt at this at large scales, but is more an "assessment guideline" than a true monitoring effort. CPW and BLM staff attended joint training on the HAF process in 2012. Monitoring guidelines from the GuSG and GrSG plans are being implemented on several projects. CPW's Sagebrush Steppe Habitat Coordinator is developing monitoring standards that can be implemented more holistically and that will allow comparison with data collected with BLM and NRCS methodologies.	
OBJECTIVE 9.1.2	On a local basis, identify and delineate current GrSG habitat and track future changes in habitat.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
9.1.2.1	Use the standard sage-grouse habitat assessment protocol that was developed through the GuSG Rangewide Conservation Plan to assess GrSG habitat conditions (CCP Appendix C, “Habitat Monitoring Protocol”), and compare results to the GrSG habitat structural guidelines (see CCP Appendix A, “GrSG Habitat Structural Guidelines”). This protocol identifies which habitat variables should be measured (e.g., grass height) and which techniques should be used to measure them.	BLM, CPW, LWGs, NRCS, SLB, USFS, USFWS	Ongoing	**CPW: General -** CPW research data from NWCO and NESR has been used to develop Colorado-specific habitat structural guidelines for GrSG and to create habitat models for seasonal habitat mapping. **NWCO -** GrSG habitat measurements have been taken at a large number of use and non-use sites during CPW research projects in several areas of the NWCO population. **NP** - CPW conducted habitat measurements at over 300 GrSG use and non-use sites in NP as part of the NP telemetry study. The habitat measurement protocol was developed in consultation with CPW Avian Research. The protocol used standard methods so that data would be comparable to the GrSG Habitat Structural Guidelines, as well as data collected in other areas in Colorado. **NESR -** CPW completed vegetation measurements in NESR between 2004 - 2007. CPW used a vegetation protocol developed by CPW Avian Research that was similar to other GrSG and GuSG research studies. The protocol included the standard measurements described in the GrSG Habitat Structural Guidelines. **MP -** Data collected in other Colorado populations has been used when needed in MP. These data and resulting habitat structural guidelines have been shared with other entities.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
9.1.2.2	Develop and implement habitat assessment training for LWGs, private landowners, and other land managers.	CPW	2008	**CPW: General -** Multiple efforts have been employed and additional efforts are ongoing. "Monitoring of Greater Sage-grouse Habitats and Populations", "Colorado Range Monitoring Guide", and many other products have been developed and distributed to the public at large throughout the state. CPW biologists attended a joint training session with BLM biologists on assessing GrSG habitat with the BLM Habitat Assessment Framework in 2012. **NWCO and MWR -**This has not been done in these populations by CPW, but other organizations have intermittently organized grazing management workshops for private landowners and land managers in northwest Colorado. **MP** - The Middle Park LWG hosted a grazing and habitat assessment workshop (Range School) for private and public land managers in November 2008. The workshop had approximately 30 participants. **PPR** - Habitat assessment field trips have been undertaken in the PPR. Attendance consisted mostly of agency personnel. **NESR** - This type of training has not occurred in NESR.	
9.1.2.3	Obtain funding sources to support habitat monitoring implementation on a statewide basis for local GrSG populations. **[See Research Strategy 21.1.1.1]**	BLM, CDA, CPW, Industry, LWGs, NGOs, NRCS, Other Research Institutions, Private Landowners, SLB, Universities, USFS, USFWS, USGS, WAFWA	Begin by 2010	**See** 21.1.1.1 **CPW**: NP - CPW obtained funding for a NP telemetry study and conducted habitat measurements at over 300 GrSG use and non-use sites in NP.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
9.1.2.4	Evaluate the impact of vegetation condition (see "GrSG Structural Habitat Guidelines", CCP Appendix A) on GrSG populations.	CPW	2015	**CPW:** Efforts to accomplish this strategy are ongoing. The population dynamics of GrSG populations and timeframes required for sagebrush communities to responded to management action, make quantifying population responses of GrSG to vegetation condition challenging. CPW will be conducting a research project on Columbian Sharp-tailed Grouse in Routt County to attempt to quantify how modifying habitat conditions and availability will impact populations of this grouse. Results of this project should inform efforts to evaluate vegetation effects on GrSG as well. **NWCO -** Extensive habitat and use data has been collected in several areas within NWCO that will ultimately inform this process. However, no specific cause and effect research assessing the impact of vegetation condition has been conducted to date. **MP** - CPW and BLM Kremmling Field Office are selecting sites to evaluate during the summer of 2013 within GrSG occupied range in Middle Park. **PPR -** Research by B. Walker and T. Apa has looked at the unique vegetation conditions found in the PPR in relation to distribution and success of GrSG in PPR. A current project by CPW Researcher B. Walker is attempting to define the effect of pinyon-juniper removal on reoccupation of sites by GrSG. **NP** - CPW conducted extensive vegetation measurements at over 300 GrSG use and non-use sites in NP. The vegetation data will be used to refine the NP seasonal habitat modeling products. The vegetation data are also being analyzed to compare with the GrSG Structural Habitat Guidelines. **NESR** - CPW conducted vegetation measurements at sage-grouse use sites and random sites in NESR. These data were incorporated into the GrSG Structural Habitat Guidelines.	

10. Housing Development					
Issue 10.1	GrSG permanent habitat loss				
Objective 10.1.1	Short-term strategies, in occupied habitats of 3 GrSG populations				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.1.1.1	Using GIS, identify occupied and seasonally important GrSG habitats and leks that are at highest risk of development (priority areas).	CPW	2008; update every 2 years	**CPW Research:** See 3.2.3.1 above. Seasonal habitat maps can be overlaid with layers of housing development risk to identify such areas, but this has not been done yet. **CPW: PPR** - Telemetry data leading to vegetation modeling has been conducted by CPW Researchers B. Walker and T. Apa and has subsequently been used to identify new leks as well as refine seasonal maps for GrSG in the PPR population. **NP** - Little housing development is occurring in NP. However, an important lek complex area was subdivided and houses placed in breeding habitat. A house was built almost directly on a lek site. Counts on the lek have decreased by approximately 50 -70% since the early 2000s on this lek. **NESR** - Not done at the local level in GIS; however, CPW monitors proposed housing developments.	**CPW: General -** The highest value GRSG habitats have been identified using GIS tools that encompass habitat conditions and breeding bird density. Local knowledge is then applied in determining which areas of highest value GRSG habitat are at risk of development.
10.1.1.2	Identify areas, within priority areas, for potential conservation actions to benefit GrSG (e.g., management plans, conservation easements, leases, Farm Bill programs, land exchanges, acquisition), and share this information with interested stakeholders.	CPW	2008 and ongoing	**CPW:** cooperates with TNC, NRCS, and other Land Trusts to identify and protect important GrSG habitat through conservation easements. CPW has also written letters of support for conservation easements. **MP -** Key areas have been identified and shared with local land trust and NRCS. Effective because Middle Park Land Trust has protected some of these habitats and NRCS uses this information to encourage private land protections and better land management. An example of on-going efforts includes two properties totaling over 3,300 acres that were submitted for protection to CPW Habitat Protection Program in 2012. Also, CPW closed on a 1,120 acre easement (Gunsight Pass) in GrSG habitat in 2012 in Grand County. **PPR -** Research from CPW Researcher B. Walker has generated maps of suitable habitat that will be available to stakeholders to help guide future actions that benefit GrSG. **NESR -** CPW funded a 2,050 acre Conservation Easement that includes extremely valuable GrSG habitat.	**CPW: General -** CPW consistently works with landowners and conservation partners to implement conservation actions within priority areas as opportunities arise. CPW has completed a number of conservation easements and/or management plans in priority GrSG habitat since 2004 (see attached conservation easement table).

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.1.1.3	Incorporate benefits to sage-grouse into existing easements and management plans, as opportunities arise.	CPW	2008 and ongoing	**CPW: General -** All recent conservation easements held by or funded (in whole or part) by CPW that include GrSG habitat include language in both the CE and associated Management Plan to protect and/or enhance GrSG habitat. CPW incorporates the newest and best available information in CPW easement management plans. **PPR -** Wildlife Mitigation Plans for 4 energy companies have been signed that incorporate similar ideas. **MP -** The Skylark easement was an existing easement obtained in the 1980's that was not created for GrSG but is now managed for the species. CPW in MP has protected over 7,700 acres in easements for GrSG and added approximately 950 acres of GrSG range to the existing Hot Sulphur SWA. **NESR -** CPW will be updating an existing management plan for a CE on extremely important GrSG habitat. CPW annually monitors the CE in NESR GrSG habitat and works with the landowner to improve GrSG habitat.	**CPW: General -** All recent conservation easements held by or funded (in whole or part) by CPW that include GRSG habitat include language in both the CE and associated Management Plan to protect and/or enhance GRSG habitat. CPW incorporates the newest best available information in CPW easement management plans.
10.1.1.4	Identify and pursue funding sources for protection of identified GrSG areas (identified in strategy 10.1.1.2), and encourage collaborative conservation funding opportunities.	CPW	2008 and ongoing	**CPW: General -** CPW has pursued regular funding for conservation easements and other land protection strategies through the CPW Habitat Protection Program. NRCS, USFWS Section 6, The Nature Conservancy, and local land trusts have been approached to combine funding possibilities to obtain partner easement funding. CPW has also written letters of support for other conservation easements. CPW writes letters of support for conservation easements when opportunities arise. **See Appendix B: Summary of Expenditures on GrSG in Colorado 2006-2012**	**CPW: General -** Funding for CPW's conservation easement program has ranged from $10 million to $15 million annually since 2005. Protection of GrSG habitat has been a program target in each of these years. NRCS, USFWS Section 6, The Nature Conservancy, and local land trusts have been approached to combine funding possibilities to obtain partner easement funding. **NWCO and MWR -** CPW has partnered with land trusts, NRCS, and other entities to protect approximately 32,000 acres (~15,000 acres in Moffat and Rio Blanco counties, ~17,000 acres total in Routt County) acres of GrSG habitat in NWCO and 14,300 acres in MWR (~30% of overall range for this population) through perpetual Conservation Easements in the last 8 years. **MP -** CPW has protected over 7,700 acres in easements for GrSG and added approximately 950 acres of GrSG range to the existing Hot Sulphur SWA. **NP -** CPW funded a 2,240 acre conservation easement in NP that closed in December 2011. Another 1,750 acre conservation easement has been approved for CPW funding and is expected to close in early 2013. **NESR -** CPW funded a 2,050 acre CE that includes extremely valuable GrSG habitat.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.1.1.5	Within priority GrSG areas (strategy 10.1.1.1), set specific goals for the amount of habitat to protect from housing development.	CPW, LWGs	2010; update every 3 years	**CPW:** CPW is in the process of assessing the acreage needed to conserve current populations of GrSG in each population in Colorado (expected completion in spring 2013). This assessment will factor in the need to private land conservation (including conservation easements and other land protection strategies) in the context of public lands in each population. Population specific goals have not yet been established. **NP -** Currently, housing development is not occurring at a rapid pace. The majority of land is still in large ranches. However, there has been some subdivision that has impacted an important GrSG lek complex and breeding habitat. **PPR -** Housing development is not a major concern.	
10.1.1.6	Pursue opportunities to protect identified GrSG areas (strategy 10.1.1.2) with interested landowners (e.g., CCAAs, land exchanges and acquisition, and management plans and easements that incorporate benefits to sage-grouse).	CPW, LWGs	2010 and ongoing	**CPW: General -** CPW has prioritized the protection of GrSG habitat in its annual conservation easement Request for Proposals (Colorado Wildlife Habitat Protection Program). Each conservation easement acquired under this program includes a management plan to conserve/manage GrSG habitat on the property in perpetuity. CPW has also pursued GrSG habitat management commitments in WMPs with energy companies. CPW has not entered into any CCAAs in GrSG habitat. CPW has also written letters of support for other conservation easements. **MP** -CPW submitted 2 properties totaling 3,300 acres for protection in 2012 application process. The MP LWG supports protecting lands with easements or fee title acquisition and cooperates with agencies and land trusts to identify properties. **NP -** The NP LWG has discussed supporting funding proposals for CEs; however, members do not unanimously support CEs as a tool to protect GrSG habitat. **NESR -** Members of the NESR LWG have pursued opportunities to protect GrSG habitat through conservation easements. Routt County has a Purchase of Development Rights program for conservation easements. CPW easement management plans incorporate benefits to GrSG.	**CPW: NWCO and MWR -** CPW has partnered with land trusts, NRCS, and other entities to protect approximately 32,000 acres (~15,000 acres in Moffat and Rio Blanco counties, ~17,000 acres total in Routt County) acres of GRSG habitat in NWCO and 14,300 acres in MWR (~30% of overall range for this population) through perpetual CE in the last 8 years. **MP -** In 2012, CPW completed a 1,120 acre easement (Gunsight Pass) of GrSG habitat in Grand County. **PPR -** WMPs for 4 energy companies have been signed that incorporate these strategies. **NP -** In 2011, CPW funded a 2,240 acre conservation easement. Another 1,750 acre conservation easement has been approved for CPW funding and is expected to close in early 2013. **NESR -** CPW funded a 2,050 acre CE that includes extremely valuable GrSG habitat .

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.1.1.7	Establish a mechanism for tracking conservation easements that include protection for sage-grouse.	CPW	2009	**CPW: General -** CPW maintains a conservation easement database for all easements held by CPW. COMaP is a statewide protected areas map for CO that tracks easements by other entities. COMaP is maintained at the Colorado Natural Heritage Program (CNHP), in partnership with the Geospatial Centroid at CSU. Current financial support for COMaP comes from the USGS Gap Analysis Program and Great Outdoors Colorado (GOCO). At the population level, both the Meeker and Steamboat Springs CPW Wildlife Biologists maintain a shapefile/database of existing conservation easements within the NWCO and MWR.	**CPW: General -** CPW has a conservation easement database for all easements held by CPW. COMaP is a statewide protected areas map for CO that tracks easements by other entities.
10.1.1.8	Investigate impacts of housing on GrSG, due to noise, pets, and increased activity. Use data to assist with planning and future housing development. **[See Research Strategy 21.2.1.1]**	BLM, CPW, Universities	Begin by 2020		
Objective 10.1.2	Long-term strategies, in occupied habitats of all GrSG populations				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.1.2.1	Reevaluate and identify occupied and seasonally important sage-grouse habitats and leks that are at highest risk of development.	CPW	2015 and ongoing	**CPW: General -** Mapped overall range for the NW Colorado population was updated/refined in 2012 based on radio telemetry data and distribution of modeled suitable habitat. Occupied and seasonal maps have been updated/created for all populations to use when referencing proposed development so that informed decisions can be made. Risk of housing development is assessed in the CCP (2008), but has not been updated/re-evaluated since 2008.	
10.1.2.2	For protection of identified GrSG areas (strategy 10.1.1.2), obtain funding from sources identified in strategy 10.1.1.4.	BLM, CPW, GOCO, Land Trusts, NGOs, USFS, USFWS	2015 and ongoing	**CPW: General -** CPW has prioritized the use of conservation easement acquisition funds available through the CPW Habitat Protection Program to protect GrSG habitat. NRCS and local land trusts have also been approached to combine funding possibilities to obtain partner easement funding.	**CPW: General -** CPW has prioritized the use of conservation easement acquisition funds available through the CPW Habitat Protection Program (~$10 million to $15 million available annually since 2005) to protect GrSG habitat.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.1.2.3	Protect identified GrSG areas (strategy 10.1.1.2) from housing development by continuing implementation of short-term actions (e.g., strategies 10.1.1.3 and 10.1.1.6), through voluntary agreements (e.g., conservation easements, leases) with willing landowners.	BLM, CPW, County Governments, Land Trusts, LWGs, NGOs, federal agencies, USFS, USFWS	2015 and ongoing	**CPW: General -** CPW has prioritized the use of conservation easement acquisition funds available through the CPW Habitat Protection Program to protect GrSG habitat. NRCS and local land trusts have also been approached to combine funding possibilities to obtain partner easement funding. Routt County has a Purchase of Development Rights program that provides funding for conservation easements. **Appendix G: Conservation Easement Strategy**	**CPW: General -** CPW has prioritized the use of conservation easement acquisition funds available through the CPW Habitat Protection Program (~$10 million to $15 million available annually since 2005) to protect GrSG habitat. Routt County has a Purchase of Development Rights program that provides funding for conservation easements. Numerous conservation easements protecting GrSG habitat have been completed and others are in progress.
10.1.2.4	Review, monitor, and update short-term actions (strategies 10.1.1.1 - 10.1.1.7).	CPW	2015 and ongoing	**CPW: General -** CPW will continue to refine land protection programs for GrSG habitat, including the number of easements/acres needed, the highest priority locations for these easements, and the most effective land management practices that should be included in management plans.	
10.1.2.5	Monitor and track land-use changes and infrastructure development in relationship to occupied and seasonally important GrSG habitats and leks (see “Infrastructure” strategy, pg. 383).	CPW	2015 and ongoing	**CPW: MP -** field staff track and provide comments via land use comments to local government and entities during project planning. **NP -** CPW is currently digitizing housing development and infrastructure in NP. This layer will be used in the NP seasonal habitat modeling process. The GIS mapping is occurring during the winter 2012 - 2013.	
Issue 10.2	Reduced GrSG habitat effectiveness (quality)				
Objective 10.2.1	Short-term strategies, in occupied GrSG habitat, habitat fragmentation				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.2.1.1	Identify and map areas where new (proposed and potential) housing development could potentially fragment existing GrSG populations (in conjunction with strategy 10.1.1.1).	CPW	2010	**CPW: General -** Areas most at risk of development are known locally by CPW staff. **MWR -** Areas of highest importance to GrSG in the MWR population were elucidated through a 2-year radio telemetry study, identifying areas were additional housing development would most negatively impact this population. These areas are known to local CPW staff and are identified in a project completion report (January 2013). **NP -** There is relatively little housing development occurring currently in NP. CPW is continually monitoring and identifying area of potential risk. **PPR -** Housing development is not a concern.	**CPW** does not currently have a systematic method of mapping these areas on a range-wide scale. **Jackson County** does not have process for requesting CPW recommendations during the land use permitting process.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.2.1.2	Monitor leks and other seasonally important sage-grouse habitat in jeopardy of fragmentation due to development.	CPW	2008 and ongoing	**CPW: General -** All known active (and some inactive/historic) leks are monitored by CPW annually, regardless of risk of fragmentation.	
10.2.1.3	Meet with land management agencies and local developers to address and recommend management actions to mitigate adverse fragmentation impacts to sage-grouse habitat. **[See also Information, Communication, and Education Strategies 12.2.1.3 and 12.3.1.1]**	LWGs	2009 and ongoing	**General** - LWG members consist of agency personal and private landowners who meet regularly and make recommendations on actions to mitigate adverse impacts to GrSG habitat. They are open to any individual who wishes to attend. Energy industry representatives attend some LWGs, but land developers are not currently active with any of the LWGs. **NESR** - Some members of the NESR LWG have been engaged in development planning within NESR GrSG habitat. **PPR -** not impacted by housing development activity.	
10.2.1.4	Create guidelines or recommendations to address the effects of habitat fragmentation (due to housing and related infrastructure) on sage-grouse populations.	CPW	2013	**CPW: General -** Local land use comments are generally handled by local CPW staff. No statewide/GrSG range-wide guidelines or recommendations have been developed.	
10.2.1.5	Discourage adverse impacts to sage-grouse habitat by conversion of sagebrush lands to 'park space' in developments (e.g., lawns, golf courses). Encourage natural, native landscaping to reduce water consumption and conversion of sagebrush habitats.	Counties, CPW, County Governments, LWGs, Private Landowners	Ongoing	**CPW: General -** CPW local staff provides comments about the impacts of altered native habitats and impacts to GrSG via land-use comment letters. CPW has an advisory, not a regulatory, role in these developments. **MP -** Few large developments with 'open space' have been occurring in Grand County over the last few years. The one active project is the former Orvis-Shorefox property. CPW has been in discussion with new developer and town of Granby concerning GrSG impacts with the proposed redesign. It is not yet certain if CPW recommendations to protect GrSG habitat will be adopted by the town of Granby.	
Objective 10.2.2	Long-term strategies, in occupied and potential GrSG habitat, habitat fragmentation				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.2.2.1	Conduct research to determine (1) sage-grouse habitat patch size and configuration needs; and (2) fragmentation impacts on GrSG movements and population isolation. **[See Research Strategy 21.1.1.1]**	BLM, CPW, Universities	Begin by 2010	**See 21.1.1.1**	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.2.2.2	Prioritize sage-grouse habitat areas (including from a statewide perspective) to protect from or to reduce impacts from habitat fragmentation due to housing and related development.	CPW, LWGs	2015 and ongoing	**CPW: General -** In 2012, CPW created Priority and General habitat maps, based on seasonal habitat suitability and distribution/concentration of GrSG, that identify areas most important to GrSG and that identify areas where private lands habitat protection is most warranted.	
10.2.2.3	Encourage local governments to develop land-use recommendations or guidelines to reduce GrSG habitat fragmentation from housing and related development (see also strategy 10.2.1.3).	CPW, LWGs	2015 and ongoing	**CPW, LWGs: General** - CPW staff comment on land use proposals in Moffat, Rio Blanco, and Routt counties that could affect GrSG habitat. Comments are not always adopted by local governments or planners.	**CPW's** authority is limited to making requests of local governments. These requests are then up to those entities to implement on a voluntary basis. Implementation is inconsistent.
10.2.2.4	Develop predictive models to monitor and assess impacts of habitat fragmentation in sage-grouse habitat. **[See Research Strategy 21.1.1.2]**	CCP SC, CPW, NGOs, Other Research Institutions, Universities	Begin by 2009	**CPW: General -** The CCP includes an assessment of areas most likely to be affected by housing development in the future. This assessment is based on research conducted by NREL/CSU. It has not been updated for GrSG habitat since the completion of the CCP in 2008.	
10.2.2.5	Where housing development is occurring in or near sagebrush habitat, encourage underground utilities (where feasible) along road ROWs to reduce raptor perches and the potential for wire-strikes by GrSG (see "Infrastructure" strategy, pg. 383).	County Governments, Utility Companies	Ongoing	**Moffat**: No proposed housing developments in GSG habitat. **Grand**: No applications for development in GSG habitat. Standard plat note on all development proposals in the county requires that all utilities must be placed underground. **Jackson:** Little housing development in the county that has included new infrastructure.	**Grand**: Since 2000, all developments require underground utility placement, which prevents fragementation of GSG habitat.
Objective 10.2.3	Short-term strategies, invasive plants and contaminants				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.2.3.1	Identify potential contaminants associated with housing developments (e.g., household chemicals, fertilizers, sediments) that could impact sage-grouse.	CPW	Complete by 2009		
10.2.3.2	Develop informational materials regarding the impacts of invasive plants and contaminants on sage-grouse (see "Weeds" strategy, pg. 425). **[See Information, Communication, and Education Strategy 12.2.1.1]**	BLM, CPW, Universities	Begin by 2010		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.2.3.3	Recommend seed-mix guidelines that are beneficial to sage-grouse (see CCP Appendix D, "Recommendations Regarding Plant Species for Use in GrSG Habitat Management and Restoration" and "Habitat Enhancement" strategy, pg. 349). [See also Information, Communication, and Education Strategy 12.3.1.1]	CPW	2008 and ongoing	**CPW: General -** CPW collaborates with NRCS, the HPP program, and other entities where seeding and/or reclamation projects are being undertaken in GrSG habitat. Local CPW staff have provided a seed mixture list to landowners and for use in WMP's. CPW has provided seed for specific private land projects. **NESR -** Routt County Planning considers GrSG habitats and CPW recommendations in permit authorizations. The majority of the GrSG habitat in Eagle County is located on BLM; BLM routinely considers GrSG habitat needs when conducting reseeding efforts.	**MP** - In 2011, a private/county gravel pit, which includes a lek site, was going to be reclaimed. Local CPW staff met with the landowner and provided a recommended GrSG seed mixture for the site.
10.2.3.4	Recommend management and revegetation techniques to decrease noxious and invasive weeds in disturbed areas of GrSG habitat (see "Habitat Enhancement [pg. 349] and "Weeds" [pg. 425] strategies). [See also Information, Communication, and Education Strategy 12.3.1.1]	CPW	2008 and ongoing	**CPW: General -** CPW regularly comments on land use proposals including proposed energy/infrastructure developments, gravel pits, etc. These comments include recommendations for reclamation of disturbed areas to suitable GrSG habitat when applicable.	
Objective 10.2.4	Long-term strategies, invasive plants and contaminants				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.2.4.1	Encourage local governments to formally adopt revegetation requirements (including seed type recommendations beneficial for sage-grouse, strategy 10.2.3.3) for sites disturbed by housing development and related infrastructure (see CCP Appendix D, "Recommendations Regarding Plant Species for Use in GrSG Habitat Management and Restoration").	LWGs	2015 and ongoing	**NWCO LWG**- Local government (Moffat County) has an active representative on the LWG. This representative conveys important issues affecting GRSG to county government, with some intent to reduce GRSG habitat fragmentation when evaluating land use proposals with a county nexus. **MP -** The MP LWG has not completed this strategy since the completion of the MP Plan in 2001. **PPR LWG -** Not Applicable because the PPR population is not impacted by housing development activity.	
10.2.4.2	Develop and implement ongoing outreach program for homeowners (e.g., workshops, brochures) regarding the potential effects of noxious/invasive weeds, fuels management, and contaminants on GrSG. [See Information, Communication, and Education Strategies 12.2.1.1 and 12.2.1.3]	CPW	2009		
Objective 10.2.5	Improve GrSG habitat in existing developments				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.2.5.1	Reduce fragmentation of sage-grouse habitat by encouraging low-impact siting of roads and utilities, as opportunities arise in existing developed areas (see “Infrastructure [pg. 383] and “Roads” [pg. 409] strategies).	County Governments, CPW, Utility Companies	2015 and ongoing	**CPW: General -** CPW regularly comments on land use proposals including proposed energy/infrastructure developments, gravel pits, etc. **PPR -** Currently there are 4 signed WMPs in grouse habitat that have agreed to measures that cluster development, where possible. **NP** - Very little housing development is occurring. **NESR** - CPW provides recommendations to Routt County Planning. Routt County Planning considers GrSG habitats and CPW recommendations in permit authorizations. The majority of the GrSG habitat in Eagle County is located on BLM. CPW works with BLM on travel management.	**CPW** comments and recommendations are not always adopted.
10.2.5.2	Prioritize areas for increasing sage-grouse habitat effectiveness (quality) within and adjacent to existing developments.	CPW, LWGs	2015 and ongoing	**CPW: General -** In 2012, CPW completed a Priority and General Habitat map for GRSG which can be used to prioritize habitat in need of protection/enhancement/etc within and adjacent to existing developments. **MWR** - CPW has identified important seasonal use areas for GRSG within the MWR population area via a 2-year management study using radio telemetry. This work has led to prioritization of areas where habitat protection and/or improvement will be most effective and implementation of one habitat restoration project. **NP** - Very little housing development is occurring.	**CPW: MWR -** CPW has identified important seasonal use areas for GRSG within the MWR population area via a 2-year management study using radio telemetry. This work has led to prioritization of areas where habitat protection and/or improvement will be most effective and implementation of one habitat restoration project.
Issue 10.3	Disturbance to GrSG				
Objective 10.3.1	Reduce disturbance to GrSG				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.3.1.1	Recommend seasonal closures or restrictions on recreational uses on public lands within sage-grouse habitat, in areas in close proximity to housing developments (see “Recreational Activities” strategy, pg. 407).	BLM, USFS	2009 and ongoing	**USFS**: Routt NF has seasonal and permanent road closures on NFSR 150 and NFSR 154 in part to protect grouse habitat.	**BLM:** Seasonal closures in important SG habitats will be considered & analyzed as travel management planning is completed.
10.3.1.2	Work with local governments to encourage homeowner associations and individual homeowners to adopt and enforce pet control measures in and near sage-grouse habitat.	CPW, County Governments, LWGs	2009 and ongoing		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.3.1.3	Incorporate information about the impacts of human disturbance on sage-grouse in other outreach efforts to homeowners (see Issue 10.6). Include information on effects of open garbage on GrSG through an increase in some predators (e.g., skunks and raccoons). [See Information, Communication, and Education Strategy 12.2.1.3]	CPW	2009	**MP -** Local CPW and NRCS staff discuss the impacts of human disturbances (houses, out buildings, fences, some ag practices) with local landowners on a regular basis.	**CPW:** MWR - CPW contacted and requested compliance from one landowner whose dogs were suspected harassing GRSG.
Issue 10.4	Planning of housing developments				
Objective 10.4.1	Address GrSG needs in planning development				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.4.1.1	Provide information to local, state, and federal governments on sage-grouse habitat requirements and the status, location, and possible effects of different land-uses (including right-of-way and inholding access across public lands and land trades) on sage-grouse. Include discussion of issues and state statute regarding 35-acre parcels and estate taxes, and the need for additional incentives for large landowners to not develop lands. Analyze statutes for unforeseen impacts on sage-grouse (e.g., 3-mile annex annually, "leapfrogging" of cities). Discourage disposal of public lands in sage-grouse habitat. [See also Information, Communication, and Education Strategies 12.2.1.3 and 12.3.1.1]	CPW	Ongoing	**CPW: NWCO, MWR, NESR -** CPW regularly collaborates/consults with BLM and Moffat, Routt, and Rio Blanco counties on land use proposals that could affect GrSG. This has included educating parties on local GrSG habitat use and distribution, as well as offering siting and timing recommendations to decrease negative affects on GrSG. **MP** - Local CPW staff provide information via public meetings, land-use comment letters, landowner meetings, project planning meetings, etc. **NP and PPR** - Housing development not a major issue. **NESR -** The majority of GrSG habitat in Eagle County is located on BLM. CPW works closely with BLM to retain unfragmented GrSG habitat.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.4.1.2	Work with county planners and commissioners to develop and modify land-use and zoning plans to protect sage-grouse habitats (e.g., cluster development, density credits, special zoning overlay districts, development rights transfers). Provide updated GrSG GIS layers to county governments, as data become available.	CPW, LWGs	Ongoing	**CPW: General-**CPW provides updated GrSG habitat mapping & Priority Habitat areas to county govts upon request. **NWCO**-Moffat County has active rep on NWCO LWG. This rep conveys important issues affecting GrSG to county govt. **MWR-**CPW has provided updated Priority & General habitat data, as well as maps showing GrSG general distribution and seasonally important areas (obtained from radio telemetry work) to Rio Blanco County & their contracted surveyors. **MP-**Local county GIS staff are informed when GIS layers have been updated by CPW staff & should be downloaded. No modifications have been made by the county to modify land-use zoning to protect GrSG. **PPR-**WMP's (4 signed) with grouse habitat have agreed to measures that cluster development where possible. **NP-**CPW has encouraged Jackson County to develop a land use planning process to minimize fragmentation from housing development. CPW has provided Jackson County with GIS data. **NESR-**CPW provides recommendations to Routt County Planning, including ways to avoid, minimize and mitigate impacts to GrSG habitats. Routt County Planning strongly considers GrSG habitats & CPW recommendations in permit authorizations. Routt County maintains CPW GrSG GIS mapping in the county database & County Planning considers GrSG habitats in permit authorizations. Routt County has a Purchase of Development Rights program for conservation easements as well as a program designed to cluster developments. The majority of the GrSG habitat in Eagle County is located on BLM.	
Issue 10.5	Increasing human water demand: changing water use				
Objective 10.5.1	Address GrSG habitat needs in water use decisions				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.5.1.1	Identify areas of overlap between seasonally important sage-grouse habitat and aquatic and riparian ecosystems.	2009 and ongoing	CPW	**CPW: General -** Via GIS data layers, overlap between GrSG habitats and riparian systems could be identified as part of the CPW seasonal habitat modeling process. CPW has developed seasonal habitat models and is refining a **NP-**specific seasonal habitat model. The models can be used to identify overlap with riparian systems. **PPR -** Mapping products have been developed for PPR this year (2012) and should be available to use in identifying areas of overlap between these habitats in the near future. A specific **NESR** seasonal habitat model will be developed in the future.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.5.1.2	Stay informed about and provide input regarding Colorado Water Conservation Board actions regarding water rights or uses that might affect sage-grouse habitat, referring to areas identified in strategy 10.5.1.1 (e.g., get on mailing list, attend hearings).	As Needed	CPW	**CPW: General -** CPW closely monitors CWCB actions and other water projects. **MP -** CPW was an active participant in commenting on and making mitigation recommendations for the Moffat and Windy Gap firming projects (front range water supply issues), ending in 2011.	
10.5.1.3	Work with water development interests to seek avoidance of, changes to, or mitigation for water projects that could affect sage-grouse.	As Needed	CPW	**CPW: NWCO, MWR** - No significant water development (large reservoir) projects have progressed beyond the proposal stage within GrSG habitat in the past 4 years. **MP** - CPW works with local ranches to maintain the use of water rights on the property for the benefit of wildlife including GrSG and provides support for local ranchers who are working with Water Boards to keep water in the basin. CPW easements require that water rights remain on the ranch to maintain habitat conditions. All easements obtained by CPW in MP have also constrained associated water rights. CPW was an active participant in commenting on and making mitigation recommendations for the Moffat and Windy Gap firming projects (front range water supply issues), ending in 2011. **NP, PPR** - Have not implemented any management related to this action. **NESR** - As proposals are developed, CPW will provide recommendations relating to water development interests.	
10.5.1.4	If a large reservoir project appears likely near sage-grouse habitat, consider the potential impacts to sage-grouse from indirect effects such as recreation, real estate development, and road realignment.	As Needed	CPW	**CPW: NWCO, MWR -** No significant water development (large reservoir) projects have been proposed within GRSG habitat in the past 4 years. **NP, PPR** - Have not implemented any management related to this action. **NESR -** As proposals are developed, CPW will provide recommendations relating to water development interests.	**MP** - From 2007 through 2011, CPW staff was involved in comments for the Windy Gap Firming Project. A proposed new reservoir site was located near the town of Granby and in known GrSG habitat. CPW commented that this site would remove limited existing habitat available for GrSG in east Grand County. The reservoir site was not selected as an alternative.
10.5.1.5	During regional and statewide water planning efforts provide information on relationships between sage-grouse habitat and water uses.	As Needed	CPW	**CPW: NP -** CPW was engaged in the non-consumptive water use planning for NP. GrSG habitats were considered as a non-consumptive use.	
Objective 10.5.2	Provide for adequate water in GrSG habitat				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.5.2.1	Work with willing landowners and public agencies to keep water rights tied to existing uses in local areas in GrSG habitat. Explore incentives to accomplish this task, including filing objections with the water court on any change of use.	CDWR, LWGs, NGOs	As Needed	**CPW: MP -** All easements closed in MP include associated water rights that will be tied to the property in perpetuity. CPW in MP has protected over 7,700 acres in easements for GrSG and added approximately 950 acres of GrSG range to the existing Hot Sulphur SWA. Included in the acreage above is the 1,120 acres easement (Gunsight Pass) that was closed in 2012. **NESR -** CPW and other organizations in the Upper Yampa River basin are working to maintain water rights within the basin. **NP LWG** is active in attempts to keep water rights in the North Park basin.	**CPW: General -** All conservation easements closed with CPW require that sufficient water rights remain tied to the property to maintain the habitat values in perpetuity.
10.5.2.2	Work with willing landowners to develop or maintain GrSG brood-rearing habitat, or replace lost or impacted habitats.	CPW, LWGs, NRCS, USFWS	As Needed	**CPW: General -** Development and maintenance of brood-rearing habitats is one of the habitat enhancement techniques pursued by CPW and partner agencies (particularly the NRCS and USFWS). A number of successful wet meadow developments have been completed in GrSG habitat (see the habitat enhancement project table in that chapter for a listing of completed projects). **MP -** This strategy has not been completed in MP outside of easement protection. **NP -** CPW, NRCS, and USFWS work with willing landowners to improve brood-rearing habitat in NP. **NESR -** CPW, NRCS, and USFWS have worked with a LWG member to develop brood rearing habitat on private land.	
Issue 10.6	Lack of awareness of GrSG				
Objective 10.6.1	Educate public about GrSG				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
10.6.1.1	Compile existing information and guidelines pertaining to housing development-associated impacts on sage-grouse.	CPW	2009		
10.6.1.2	Develop key messages, focused on different types of development (e.g., high or low density rural housing, clustering), to include in informational materials about GrSG (strategy 10.6.1.3). [See Information, Communication, and Education Strategies 12.2.1.1 and 12.2.1.3]	CPW	2009		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.6.1.3	Prepare and distribute informational materials about sage-grouse to land-use planners, developers, landowners, realtors, utility companies, and housing residents. Conduct outreach program to get materials to second homeowners and 35-acre ranchette owners. [See Information, Communication, and Education Strategies 12.2.1.1 and 12.2.1.3]	CPW	2009	**CPW: General -** CPW distributes GRSG data to land-use planners and other entities upon request. **NESR -** CPW has worked with the Community Ag Alliance in Routt County and include this organization on NESR GrSG LWG mailings and issues. The Community Ag Alliance conducts an outreach program to second homeowners and small-acreage homeowners. **PPR and NP -** Housing development is not a major issue.	
10.6.1.4	Develop and implement an ongoing outreach program for homeowners regarding housing development impacts on sage-grouse (e.g., provide workshops and information on the potential effects of fuels management, noxious weeds, and pets on sage-grouse). Contact homeowner associations and landowner cooperatives. [See Information, Communication, and Education Strategies 12.2.1.1 and 12.2.1.3]	CPW	2009		
10.6.1.5	Encourage local agencies, landowners, groups, and interested parties to gain local representatives' support of decisions regarding sage-grouse conservation actions.	LWGs, NGOs	As Needed	**MP LWG -** This strategy has been completed in MP through the support provided by county commissioner and state representative for CPW easement protection. **NP LWG -** Local representatives (County Commissioner and County Administrator) are active on the NP LWG and engaged in GrSG issues. **NESR LWG -** Routt County Commissioners have been engaged in the NESR LWG and are aware of GrSG issues.	
10.6.1.6	Install sage-grouse information signs (e.g., road crossing signs, kiosks) where appropriate.	CPW	As Needed	**CPW: MP** - This has not been identified as a need within the MP population. In addition, there are local concerns with increasing awareness and attracting the public to areas where grouse are known to use or concentrate but are threatened by human impacts. An example is on BLM lands near the town of Granby. CPW, BLM and the MP LWG had discussed putting up a sign for the public to limit off road activity (walking dogs off leash) because of a known lek. There was concern that signing would attract the public by identifying a lek site. **PPR -** CPW has participated with some energy companies in developing and placing GrSG road crossing signs on gas field access roads, generally in association with speed limits to reduce collisions with GrSG.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
10.6.1.7	Promote and expand the "Guide to Rural Living" to include the impacts of housing, pets, lawns, and other housing-associated issues on sage-grouse. Work with homeowners, homeowner associations, county commissioners, and chambers of commerce on impacts of housing to sage-grouse and the importance of leks, nesting, winter and brood-rearing habitat.	CPW, County Governments, LWGs	2009 and ongoing		
10.6.1.8	Encourage county commissioners, planning departments, and other planning groups to include local sage-grouse working groups in discussions regarding housing prioritization and planning at the local landscape (population) level, to minimize adverse impacts to sagebrush habitats.	CPW, County Governments, LWGs	2008 and ongoing	**CPW: NP -** Local representatives (County Commissioner and County Administrator) are active on the NP LWG and engaged in GrSG issues. **NESR -** Routt County Planning and Routt County Commissioners are engaged with the NESR LWG. CPW makes recommendations to Routt County to avoid, minimize and mitigate impacts to GrSG habitats. Routt County Planning seriously considers CPW recommendations during permit authorizations. **MP -** This strategy has not been completed in MP.	
10.6.1.9	Continually look for new partners and educational opportunities. Develop a central location for interested parties to become involved.	CPW, County Governments, LWGs	ongoing	**CPW/LWGs: General -** LWG meetings are open to all interested parties and all meetings are public. **MP** - LWG has hosted 2 public presentation workshops over the last 4 years to provide information on GrSG habitat and life stages needs, as well as research updates. These presentations were directed more toward the large ranch owner than the urban housing development owner or ranchette owner. Local CPW staff works with Middle Park Land Trust to help educate landowners about GrSG and other wildlife habitat needs. **NP -** The County Administrator is the Chairman on the LWG and his office is a central location for anyone wishing to be involved.	

11. Hunting					
ISSUE 11.1	There is a perception that GrSG populations cannot sustain sport hunting, or that sport hunting is inappropriate.				
OBJECTIVE 11.1.1	Influence the perception about the status of GrSG populations by providing accurate information about GrSG populations, their management, and the sustainability of sport hunting.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
11.1.1.1	Inventory all existing education and awareness materials regarding GrSG population status and management (e.g., brochures, posters). **[See Information, Communication, and Education Strategies 12.2.1.1 and 12.2.1.2]**	CPW	2009		
11.1.1.2	Conduct initial and annual reviews of information and all materials regarding GrSG. Review for accuracy and information gaps, and produce new materials if necessary. **[See Information, Communication, and Education Strategy 12.2.1.1]**	CPW	2009		
11.1.1.3	Develop an integrated communication strategy about upland bird sport hunting to inform and educate the non-hunting public about sport hunting. **[See Information, Communication, and Education Strategies 12.2.1.1 and 12.2.1.3]**	CPW	2009	**CPW:** CPW has presented information regarding the effect and sustainability of GrSG harvest to the Parks and Wildlife Commission on several occasions. Hunters and non-hunters alike are present at those public meetings.	**CPW:** The 2010 USFWS listing decision regarding GrSG is specific that continued sport harvest of GrSG is well regulated by the states and is not believed to constitute a threat to the long-term viability of the species. This finding has also been articulated in a 2012 letter from USFWS to the states. **See Appendix H: Hunting Letter from USFWS**
11.1.1.4	Encourage and coordinate with LWGs to initiate articles in local newspapers and electronic media about their activities and successes with GrSG. **[See Information, Communication, and Education Strategy 12.3.2.1]**	CPW	2009		
ISSUE 11.2	There is a lack of rigorous research on the harvest rate at which sport hunting of GrSG becomes additive and could result in population declines.				
OBJECTIVE 11.2.1	Foster and support the research and the collection of data to gain knowledge about additive and compensatory mortality thresholds and sport harvest in GrSG.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
11.2.1.1	Initiate experimental field research designed to specifically address appropriate and sustainable harvest levels for GrSG (the harvest level at which mortality due to hunting becomes additive and causes populations to decline). Collaborate with other westerns states that hunt GrSG. [See Research Strategy 21.6.1.1]	CPW	Begin 2009, Continue 5 - 10 years		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
ISSUE 11.3	There is concern regarding the quality of GrSG hunter and harvest information.				
OBJECTIVE 11.3.1	Foster and support the collection accurate information on hunters and GrSG harvest.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
11.3.1.1	Identify and implement more effective techniques to collect GrSG hunter statistics.	CPW	2009	**CPW:** CPW has implemented sampling strategies to improve the precision of GrSG hunting statistics through the Hunter Information Program (HIP), including specific online survey questions pertaining to the hunting of GrSG. CPW has considered implementation of a GrSG-specific hunting permit, but has not determined the need to do so to date.	
11.3.1.2	Evaluate the efficacy of implementing a required free permit, a sage-grouse stamp, a limited sage-grouse license, and/or an improved phone survey for GrSG hunters.	CPW	2009		
11.3.1.3	Using local communities and LWGs, provide educational materials to ensure that hunters accurately identify sage-grouse in the field. **[See also Information, Communication, and Education Strategy 12.3.1.1]**	LWG's	2008	**CPW:** Wildlife identification is a part of standard hunter education courses. Field law enforcement efforts have not identified significant issues with misidentification of GrSG. CPW has not implemented this strategy with any LWG. **PPR, MWR, and NESR** are not open to hunting.	
11.3.1.4	Evaluate, and if needed, improve the wing receipt (wing barrel) program and assess its accuracy for reporting GrSG harvest statistics.	CPW	2009	**CPW:** CPW continues to collect GrSG and other grouse wings in wing barrels during hunting seasons to gain harvest data and population demographic data. Wing barrel location is reviewed periodically to obtain the best possible sample of harvested birds. GrSG harvest is low enough in most locations that insufficient wings are collected for effective application of statistical techniques.	
11.3.1.5	Educate hunters about the importance of wing receipt data and harvest reports in GrSG management. **[See Information, Communication, and Education Strategy 12.3.1.1]**	CPW	Annually beginning in 2008		
ISSUE 11.4	There is concern regarding the relationship between the GrSG hunting public and landowners.				
OBJECTIVE 11.4.1	Foster and support a strong relationship between the GrSG hunting public and landowners.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
11.4.1.1	Encourage GrSG hunters to participate in LWG and statewide plan implementation.	CPW, CWF, LWGs	Ongoing	**CPW:** GrSG LWG meetings are open to the public. GrSG hunters have not generally participated in LWG-sponsored meetings/events in any of the LWG areas to great extent. However, sportsman's funds, applied by CPW, are used towards GrSG conservation.	
11.4.1.2	Contact hunting groups and organizations (e.g., sportsmen's councils) to encourage participation in sage-grouse conservation. **[See Information, Communication, and Education Strategy 12.2.2.1]**	CPW	2010	**CPW:** Several sportsman's organizations (e.g., Quail Unlimited, Pheasants Forever) have funded GrSG conservation efforts in portions of the range.	
ISSUE 11.5	There is a concern that the CDOW's system for annually setting GrSG hunting regulations (e.g., season length, bag limits, open/closed areas) cannot adapt and respond quickly enough to potential changes in GrSG populations.				
OBJECTIVE 11.5.1	Develop a system for adjusting season lengths, bag limits, and areas of closure or re-opening that is rigorous, predictable, and responsive to changes in sage-grouse populations.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
11.5.1.1	Develop a biologically-based adaptive GrSG statewide harvest management system that responds to the current LWG trigger systems to close or open areas to GrSG hunting.	CPW, LWGs	2010	**CPW:** Completed. **General -** CPW reviews the hunting season in each open hunting area following the completion of lek counts each spring. The Parks and Wildlife Commission makes final decisions on open/closed units and bag limits each July, based on whether local GrSG populations are meeting the triggers contained in the LWG conservation plans. Triggers are contained in the **NP and NWCO** Local Conservation Plans and have been used to modify bag limits, season length, open or closed units since 1998 in NWCO and 2001 in NP. **PPR, MWR, and NESR** have been closed to GrSG harvest for many years.	**CPW:** The 2010 USFWS listing decision regarding GrSG is specific that continued sport harvest of GrSG is well regulated by the states and is not believed to constitute a threat to the long-term viability of the species. This finding has also been articulated in a 2012 letter from USFWS to the states.
11.5.1.2	Implement an intensive monitoring system of GrSG population and harvest to refine the adaptive harvest model periodically, to affect season length and bag limit.	CPW, LWGs	2010	**CPW: General -** GrSG hunting decisions are based on 3-year running averages of lek counts. If lek counts do not occur in a hunted population, no hunting occurs in that population. **NWCO -** Per the LWG conservation plan, each hunting unit is open only where >= 100 male GrSG are counted on leks in the unit. **NP -** season length and bag limit are reduced when lek counts for the basin as a whole fall below 850 males, with a lower threshold for closing the season outright. **PPR, MWR, and NESR** have been closed to GrSG harvest for many years.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
11.5.1.3	Create a procedure for rapid-response adjustments in GrSG hunting season to address potential risks in GrSG populations (e.g., late-season discovery of WNV in population).	CPW	2009	**CPW: General -** The Parks and Wildlife Commission establishes small game hunting seasons, including GrSG, for three years at a time. However, the Commission annually reviews lek data prior to making final hunting season decisions (season length, bag limit, open/closed) each July, prior to approving the final regulations for each year's hunting season. Late breaking population effects from a West Nile Virus outbreak or other cause of mortality can also be addressed at that time.	
11.5.1.4	Consider reducing the length of the sage-grouse falconry season to eliminate overlap with the GrSG strutting season (i.e., March).	CPW	By 2012	**CPW:** A reduction in the GrSG falconry season has been considered, but CPW has decided not to implement a change at this time. Harvest from falconry season is very low and is not believed to constitute a significant cause of mortality.	

12. Information, Communication, and Education					
Issue 12.1	Need for information and education central coordination				
Objective 12.1.1	Establish GrSG information, communication, education program				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
12.1.1.1	Identify and earmark funding resources to cover personal services and operating expenses for an interagency statewide sage-grouse education and communication coordinator.	CPW	2008	**CPW: General -** CPW has hired a Grouse Conservation Coordinator, based in Grand Junction to coordinate CPW programs for GrSG, Gunnison sage-grouse and Columbian sharp-tailed grouse. This individual's duties do not extend to interagency management or I and E efforts, but CPW's grouse coordinator routinely interacts with other entities active in GrSG conservation. CPW has determined that sufficient funds are not currently available for the broader coordination envisioned in this strategy. For now, these duties remain with local CPW staff.	
12.1.1.2	Recruit and hire an interagency statewide sage-grouse education and communication coordinator and assign tasks to this person across institutional and local work group boundaries (ombudsman, interagency, independent).	CPW	2008		
12.1.1.3	Assign tasks to the sage-grouse education and communication program, including all strategies under Objective 12.2.1.	CPW	2008 budget process		
Issue 12.2	General public and those not involved in GrSG conservation need information				
Objective 12.2.1	Inform general public and those not involved in GrSG conservation				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
12.2.1.1	Gather information and develop programs for informing groups (those not already involved in GrSG conservation) whose activities may potentially impact GrSG and/or their habitat about the species' requirements, management, and conservation. Facilitate similar ongoing informational programs.	CPW	2009	**CPW: NP -** CPW conducts GrSG educational talks with NP Chamber of Commerce lek viewing program.	
12.2.1.2	Gather information and develop programs for informing school groups about GrSG requirements, management, and conservation.	CPW	2009	**CPW: MWR, NP and NESR -** CPW has worked with the schools to include information on GrSG. Information is presented through classroom presentations and discussions.	
12.2.1.3	Present, and facilitate presentation of, information about GrSG requirements, management, and conservation to groups (those not already involved in GrSG conservation) whose activities may impact the species and/or its habitat.	CPW	2009	**CPW: NP -** CPW conducts GrSG educational talks with the NP Chamber of Commerce lek viewing program. **NESR** - CPW presents GrSG information at Routt County Planning and Routt County Commissioner meetings.	
12.2.1.4	Present, and facilitation presentation of, information about GrSG requirements, management, and conservation to school groups.	CPW	2009		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
Objective 12.2.2	Involve general public and those not already involved in GrSG conservation				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
12.2.2.1	Focusing on the general public and those not already involved with GrSG conservation, facilitate communication with and pursue opportunities to engage them in the conservation process.	CPW	2010	**CPW: NP -** CPW conducts GrSG educational talks with NP Chamber of Commerce lek viewing program. **MP -** CPW has hosted 2 public forums in the past 4 years to present information about GrSG conservation.	
Issue 12.3	Those already involved in GrSG conservation: need for data sharing, information dissemination, better communication				
Objective 12.3.1	Provide information and training to those involved in GrSG conservation				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
12.3.1.1	Provide accurate and timely information and training opportunities (and facilitate the same) to those already involved in GrSG conservation. Facilitate ongoing efforts in these areas.	CPW	Annually beginning in 2008	**CPW: General -** CPW routinely provides accurate and timely information to a variety of groups and individuals, particularly through the LWGs. CPW is in regular contact with public land management agencies, hunters, conservationists, energy operators, and other constituencies regarding GRSG management and conservation. CPW regularly includes GrSG information in internal biological in-services. CPW hosts a semi-annual workshop where current CPW research results (including GrSG) are presented to industry partners. CPW research reports are available on CPW's public website.	
Objective 12.3.2	Facilitate local work group process, data sharing, communication among those involved in GrSG conservation				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
12.3.2.1	Pursue all opportunities to support and facilitate the GrSG local work group process, including professional facilitation of work group meetings, as requested by LWGs.	CPW	2008 and ongoing	**CPW: General -** CPW staff coordinates each of the LWGs. These meetings are held regularly to facilitate information sharing and stakeholder involvement. CPW organizes, coordinates, and records minutes for LWG meetings. **NP -** When developing the priority issues for NP to be included in the Statewide Implementation Plan, CPW hired professional facilitation. **MWR -** No LWG.	
12.3.2.2	Among those already involved in GrSG conservation, facilitate and promote sharing of data relevant to GrSG management and conservation.	Industry, CPW	2008	**COGA:** Yes, 2 of 6 operators surveyed, who hold a total of 32% of the permits in GrSG SWH and operate a total of 11% of the wells in GrSG SWH or RSO **CPW:** General - The LWG meetings promote information sharing and CPW routinely shares GRSG data with a variety of groups and individuals. CPW regularly includes GrSG information in internal biological in-services. CPW hosts a semi-annual workshop where current CPW research results (including GrSG) are presented to industry partners. CPW research reports are available on CPW's public website.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
12.3.2.3	Promote and facilitate communication among those already involved in the GrSG conservation process.	Industry, CPW	2008	**COGA:** Yes, 2 of 6 operators surveyed, who hold a total of 32% of the permits in GrSG SWH and operate a total of 11% of the wells in GrSG SWH or RSO **CPW:** General - CPW staff coordinates each of the LWGs. The LWG meetings facilitate communication among all parties. CPW is in regular contact with public land management agencies, hunters, conservationists, energy operators, and other constituencies regarding GRSG management and conservation.	

13. Infrastructure					
ISSUE 13.1	Utility corridors or other structures (excluding fences: see Issue 13.3) may increase opportunities for predation on GrSG in an area.				
OBJECTIVE 13.1.1	Minimize the potential of increased predation pressure on GrSG as a result of human infrastructure (see also "Predation" strategy, pg. 401).				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
13.1.1.1	Where technically & economically feasible, locate new utility corridors, communication towers, wind turbines, & other above-ground facilities outside GrSG seasonal habitats as defined by this plan (as per CCP "GrSG Disturbance Guidelines", Appendix B), with particular attention to lek sites. (Lek data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.) Where this is not feasible, consider the following options: • route new utility corridors & locate new surface facilities as far from key habitat sites (e.g., leks) as possible • use topographic relief to reduce predator perch potential when designing new utility corridors & facilities • encourage utility burial when feasible where key habitat sites (e.g., leks) cannot be avoided for new utilities Where technically & economically feasible, locate new utility corridors, communication towers, wind turbines, & other above-ground facilities outside GrSG seasonal habitats as defined by this plan (CCP as per "GrSG Disturbance Guidelines", Appendix B), with particular attention to lek sites. (Lek data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.) Where this is not feasible, consider the following options: • route new utility corridors & locate new surface facilities as far from key habitat sites (e.g., leks) as possible • use topographic relief to reduce predator perch potential when designing new utility corridors & facilities • encourage utility burial when feasible where key habitat sites (e.g., leks) cannot be avoided for new utilities Where technically & economically feasible, locate new utility corridors, communication towers, wind turbines, & other above-ground facilities outside GrSG seasonal habitats as defined by this plan (CCP as per "GrSG Disturbance Guidelines", Appendix B), with particular attention to lek sites. (Lek data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.) Where this is not feasible, consider the following options: • route new utility corridors & locate new surface facilities as far from key habitat sites (e.g., leks) as possible • use topographic relief to reduce predator perch potential when designing new utility corridors & facilities • encourage utility burial when feasible where key habitat sites (e.g., leks) cannot be avoided for new utilities Where technically & economically feasible, locate new utility corridors, communication towers, wind turbines, & other above-ground facilities outside GrSG seasonal habitats as defined by this plan (CCP as per "GrSG Disturbance Guidelines", Appendix B), with particular attention to lek sites. (Lek data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.) Where this is not feasible, consider the following options: • route new utility corridors & locate new surface facilities as far from key habitat sites (e.g., leks) as possible • use topographic relief to reduce predator perch potential when designing new utility corridors & facilities • encourage utility burial when feasible where key habitat sites (e.g., leks) cannot be avoided for new utilities	BLM, CPW, Industry, LWGs	Ongoing	**Tri-State:** Uses comprehensive, GIS based siting & routing process when planning new transmission lines. Tri-state acquires new data including GSG habitat info when conducting planning effort. Objective to site new infrastructure wherever possible in proximity to existing linear features & to minimize overall impacts. Lek sites are identified & excluded during planning. **CPW:** CPW managers, biologists, & land use specialists routinely work with regulatory agencies to site these facilities outside of GrSG habitat, where possible or to minimize impacts (i.e., avoid leks, priority or seasonally important habitat). NWCO & MWR - When contacted &/or made aware of such projects in GRSG habitat, CPW consults with project proponents & submits formal comment letters to appropriate permitting entities on the design/scope/siting/timing of infrastructure projects in order to avoid, minimize, or mitigate impacts to GRSG. MP - Local MP staff provide written comments to local towns, county governments & utility companies to encourage protection of GrSG habitat from disturbance from new or maintaining infrastructure. PPR - Local PPR staff out of the Gr& Junction & Meeker offices provide written comments to local towns, county governments & utility companies to encourage protection of GrSG habitat from disturbance from new or maintenance infrastructure. Four WMP's signed by energy companies incorporate such BMP's. NP - All of North Park is priority GrSG habitat so it is not possible to locate new infrastructure outside of GrSG habitat. CPW has recommended installing raptor perch deterrents. NESR - CPW provides recommendations to Routt County Planning. Recommendations include ways to avoid, minimize & mitigate impacts to GrSG habitats. The majority of the GrSG habitat in Eagle County is located on BLM. CPW recommendations include perch deterrents. **LWG:** The NWCO LWG has been very involved in evaluating the potential impacts of recent electrical transmission line proposals, & has made recommendations to project proponents on many aspects of the project, including siting, construction timing, means to compensate for habitat loss, etc. The MP LWG recognized infrastructure concerns in the March 2012 Scoping EIS letter sent to BLM. The PPR LWG did consider Infrastructure, specifically related to energy development, as a serious concern when ranking issues as part of an Implementation Plan Effort. NESR LWG - CPW, BLM, & Utility companies are members of the NESR LWG. Routt County Planning considers GrSG habitats in permit authorizations. CPW makes recommendations to minimize the negative effects of infrastructure where feasible. NP LWG - CPW & BLM (as members of the NP LWG) make recommendations to minimize the impacts of infrastructure in NP. **COGA:** Yes, 3 of 6 operators surveyed, who hold a total of 59% of the permits in GrSG SWH and operate a total of 21% of the wells in GrSG SWH or RSO	**CPW:** CPW has limited authority in the siting of facilities. **NWCO - CPW, BLM, & LWGs** have been successful in eliminating the most impactful route alternatives through GrSG priority habitat proposed by 2 interstate transmission lines (TransWest & Gateway South). NP - In a recent case, Mountain Parks Electric moved an existing powerline from GrSG habitat & installed the line directly adjacent to a well travelled county road. The company agreed to install perch deterrents. Burial of utility lines is not considered an option in NP.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.1.1.2	Design new powerlines & other above-ground facilities to minimize use of the structures by avian predators. Install appropriate perch deterrents where appropriate, in consultation with CDOW, using the most current science regarding the use & application of deterrent devices.	BLM, CPW, Industry, LWGs	Ongoing	**Tri-State:** Uses perch deterrents. **CPW:** All populations - When contacted &/or made aware of such projects in GRSG habitat, CPW consults with project proponents & submits formal comment letters to appropriate permitting entities on the design/scope/siting/timing of infrastructure projects in order to avoid, minimize, or mitigate impacts to GRSG. These recommendations include tower design, spacing between adjacent lines, & perch deterrents. **LWG:** The MP LWG recognized infrastructure concerns in the March 2012 Scoping EIS letter sent to BLM. NESR LWG - CPW, BLM, & Utility companies are members of the NESR LWG. Routt County Planning considers GrSG habitats in permit authorizations. CPW generally recommends installing perch deterrents on new powerlines. Routt County Planning strongly considers CPW recommendations when authorizing permits. NP LWG - CPW & BLM (as members of the NP LWG) make recommendations to minimize the impacts of infrastructure in NP, including installing perch deterrents. The local rural electric association is a member of the LWG & has agreed to install perch deterrent devices on some proposed projects. **COGA:** Yes, 2 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	**Tri-State:** Experience with perch deterrents shows minimal success as raptors find ways to perch on strcutures even with various types of deterrents in place. **CPW**: NP - CPW has recommended installing raptor perch deterrents. In a recent case, Mountain Parks Electric moved an existing powerline from GrSG habitat & installed the line directly adjacent to a well travelled county road. The company agreed to install perch deterrents.
13.1.1.3	Encourage retrofitting of existing powerlines & other overhead structures (e.g., communication towers, wind turbines) to deter raptor perching where utility corridors impact GrSG seasonal habitats as defined by this plan (as per CCP "GrSG Disturbance Guidelines", Appendix B). Prioritize areas identified in need of retrofitting, using the most current science regarding the use & application of deterrent devices. Encourage burial of the utility where predation effects are high, predation cannot be otherwise mitigated, &/or key habitat sites (e.g., leks) are involved. All design & location recommendations should be based on the most current science. Because of the inherent limitations with burying power lines, this approach could only apply to certain project scenarios & line voltages.	CPW, Industry, LWGs	Ongoing	**Tri-State:** BMPs for retrofitting powerlines to prevent raptors from perching on the cross arms have been implemented at the Colowyo mine. **CPW:** CPW local staff encourages these actions through comment letters, verbal communications, & on-site visits with entities. **LWG:** The MP LWG recognized infrastructure concerns in the March 2012 Scoping EIS letter sent to BLM.	**Tri-State**: Data from utiliies operating throughout the GSG range have shown perch deterrents do not prevent perching & actually increase electrocution risk to raptors. Tri-State has not retrofitted any existing lines & is unlikely to do so unless a more effective device can be designed & research indicates that predation from powerlines is a signficant source of mortality to GSG. **CPW:** BMP's, comment letters, & on-site visits by CPW staff make these recommendations which may or may not be adopted.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.1.1.4	In new pipeline construction, encourage reclamation practices that reduce predator effectiveness in the pipeline corridor. To reduce the linear habitat effect of pipelines, consider reclamation & management techniques including: • feathering edges of vegetation cleared along the line • planting of sagebrush patches within the right of way • bridging the pipeline clearing with sagebrush patches at appropriate intervals • use least surface disturbing technique suitable for necessary development	Industry	Ongoing	**COGA:** Yes, 2 of 6 operators surveyed, who hold a total of 35% of the permits in GrSG SWH and operate a total of 11% of the wells in GrSG SWH or RSO	
13.1.1.5	Encourage the use of vegetation establishment techniques in *existing* pipeline corridors to reduce predator effectiveness.	Industry	Ongoing		
13.1.1.6	Coordinate the location & design of utility corridors & sage-grouse species conservation efforts with management of other species within occupied GrSG habitat.	Industry	Ongoing	**COGA:** Yes, 2 of 6 operators surveyed, who hold a total of 35% of the permits in GrSG SWH and operate a total of 11% of the wells in GrSG SWH or RSO	
ISSUE 13.2	Utility corridors, wind turbines, communication towers (including those associated with remote monitoring of oil & gas development), or other structures may increase the potential for disturbance to or direct mortality of GrSG, & may adversely impact GrSG habitats				
OBJECTIVE 13.2.1	Minimize (1) the direct adverse impacts on GrSG; & (2) fragmentation of GrSG habitat resulting from the development of infrastructure related to mineral, utility, energy, & housing development (see also "Energy & Mineral Development" [pg. 313], "Housing Development" [pg. 358], & "Roads" [pg. 409] strategies).				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
13.2.1.1	Identify & map existing utility corridors, wind turbines, communication towers, & designated utility corridors in GrSG habitat.	CPW	Begin by 2008	**CPW:** NP - CPW is collecting GIS information to map existing utility corridors in NP as part of the NP seasonal habitat modeling effort. PPR, MP, NESR, NWCO, MWR- Mapping of such developments has not yet been accomplished.	
13.2.1.2	For placement of new utility corridors or other infrastructure, GrSG seasonal habitats should be mapped, prioritized, & avoided where possible. If seasonal habitats are not mapped, prioritize the areas to avoid by using the buffers described in CCP "GrSG Habitat Disturbance Guidelines", Appendix B. Consider l& tenure options such as l& exchanges or easements to minimize conflicts with leks & other key seasonal habitats.	County Governments, CPW, Industry	Ongoing	**Grand:** Has dedicated GIS Coordinator who uses CPW data to create maps of habitat for local users. **Tri-State:** This is standard practice for siting new utilities. **CPW Research:** See 3.2.3.1 above. Seasonal habitat maps can be overlaid with proposed or existing infrastructure layers to identify avoidance areas. **CPW:** General - In 2012, CPW created updated seasonal habitats & priority habitat areas for GRSG throughout Colorado. These maps are available for reference when evaluating infrastructure projects & provide supplemental information to the buffers described in the "GrSG Habitat Disturbance Guidelines" in the CCP. Where local habitat information is available it is substituted for the App. B buffers. Portions of NWCO [Hiawatha] & PPR - finer scale seasonal habitat maps are being developed through our research unit (B. Walker).	**Grand:** all GSG habitat currently mapped.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.2.1.3	Cluster development of new roads, utility corridors, & other infrastructure facilities & use existing, combined corridors, ROWs, or previously disturbed areas, where possible; consider safety issues associated with high-voltage power lines & high pressure oil & natural gas lines in the same corridors. Place new structures & infrastructure outside of key GrSG seasonal habitats as defined by this plan (see CCP "GrSG Disturbance Guidelines", Appendix B) whenever possible to minimize loss & fragmentation of habitat. Use the least surface-disturbing technique suitable for necessary development. Balance the benefits of clustered developments against the potential impact of wider disturbed corridors on GrSG movements. Consider road closures &/or signing following development.	BLM, County Governments, CPW, Industry	Ongoing	**Jackson:** County encourages cluster development. Rural L& Use Process authorizes cluster development. **Tri-State:** Transmission program encourages siting & routing of new facilities within existing corridors. Does not share ROW due to federal safety requirements, but does share corridors & access roads. **BLM:** Limited energy & utility development projects have been implemented since the CCP was completed. These type of BMPs are considered & analyzed during NEPA for all projects proposed in SG habitat. **CPW:** CPW managers, biologists, & land use specialists routinely work with regulatory agencies to site these facilities outside of GrSG habitat, where possible or to minimize impacts (i.e., avoid leks, priority or seasonally important habitat). CPW's BMPs for energy development include recommendations to cluster oil & gas infrastructure. When contacted &/or made aware of such projects in GRSG habitat, CPW consults with project proponents & submits formal comment letters to appropriate permitting entities on the design/scope/siting/timing of infrastructure projects in order to avoid, minimize, or mitigate impacts to GRSG. Recommendations include ways to avoid, minimize & mitigate impacts to GrSG habitats. In PPR, 4 WMPs (signed) with grouse habitat have agreed to measures that cluster development when possible. **COGA**: Yes, 3 of 6 operators surveyed, who hold a total of 42% of the permits in GrSG SWH and operate a total of 13% of the wells in GrSG SWH or RSO	Transwest & Gateway South interstate high voltage power line routes were re-located based on CPW mapping information. Those routes now go around GSG habitat.
13.2.1.4	Encourage appropriate marking of structures &/or altering tower features to minimize GrSG collisions with wind turbines, communication towers, powerlines, other overhead structures, & associated guy wires, in identified or potential collision areas near leks & other important seasonal GrSG habitat (see CCP "GrSG Disturbance Guidelines", Appendix B).	BLM, CPW, County Governments, Industry, LWGs, Private L&owners, SLB, USFS	Ongoing	**USFWS:** provided recommendations for two communication towers, one SW of Rifle & one just east of there. **CPW:** CPW managers, biologists, & land use specialists routinely influence regulatory agencies to site these facilities outside of GrSG habitat, where possible or to minimize impacts (i.e., avoid leks, priority or seasonally important habitat). CPW has not developed marking protocols. MP - CPW provide written comments to local towns, county governments & utility companies to encourage protection of GrSG habitat from disturbance from new or maintaining infrastructure. PPR - BMP's, comment letters, & on-site visits by agency staff make these recommendations. NP - There are few communication tower or other such structures in NP. CPW & other interested parties have not identified collision areas near leks or in other seasonal habitat. **NESR** - CPW makes recommendations to Routt County regarding infrastructure in GrSG habitat.	**USFWS:** Status of FCC approval for Rifle tower unknown. BLM approved site of second tower in the Arapaho National Wildlife Refuge in Jackson County, modifying the access road placement & implementing a timing restriction.
13.2.1.5	Cooperatively plan construction & routine maintenance of utility corridors, wind turbines, or other infrastructure to avoid critical periods & sensitive areas, where technically & economically feasible. Emergency maintenance & repairs are not subject to any timing restrictions.	Industry	Ongoing	**Tri-State**: Regularly implements seasonal buffers during new construction & routine maintenance. **COGA**: Yes, 1 of 6 operators surveyed, who hold a total of 0.2% of the permits in GrSG SWH and operate a total of 0.1% of the wells in GrSG SWH or RSO	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.2.1.6	Encourage effective off-site mitigation (see descriptive process in “Energy” strategy, Objective 3.3.4), when infrastructure impacts cannot be mitigated or avoided on site.	BLM, CPW	Ongoing	**BLM:** This has not been completed to date. **CPW Research:** See 3.2.3.1 above. CPW (Brett Walker) & TNC (Holly Copeland) generated a breeding habitat map for GRSG for all of Moffat Co. specifically to help identify potential areas of off-site mitigation for the proposed Hiawatha Regional Energy Development Project area. **CPW:** NWCO & MWR - CPW is a cooperating agency to several current projects proposed within GRSG range in northwest Colorado (e.g. large electrical transmission lines). Encouraging off-site mitigation is one component of our consultation on these projects. PPR - Near or off-site mitigation has been implemented by operators that have signed a WMP with CPW.	
13.2.1.7	Where GrSG habitat disturbances occur that require reclamation or habitat restoration, the potential vegetation community should be identified (Winward 2004) & a diverse seed mixture of native shrubs, grasses, & forbs should be used where ever possible (see CCP Appendix D, “Recommendations Regarding Plant Species for Use in GrSG Habitat Management & Restoration”, Monsen 2005, & “Habitat Enhancement” strategy, pg. 349).	BLM, CPW, Industry	Ongoing	**BLM:** All reclamation activities consider site capability, & incorporation of an appropriate diverse seed mixture. **CPW:** CPW managers, biologists, & land use specialists routinely work with regulatory agencies to reclaim these facilities. CPW's BMPs for energy development include recommendations for reclamation with native plant materials. NWCO, MWR, NP, & MP - CPW consults with project proponents & submits formal comment letters to appropriate permitting entities on the design/scope/siting/timing of infrastructure projects in order to avoid, minimize, or mitigate impacts to GRSG. PPR - CPW local staff encourages regeneration of disturbed areas with native plants through comment letters, verbal communications with entities, & WMP's signed with 4 companies. NESR - CPW provides recommendations to Routt County Planning. Recommendations include habitat reclamation with appropriate seed mixes. **COGA**: Yes, 2 of 6 operators surveyed, who hold a total of 35% of the permits in GrSG SWH and operate a total of 11% of the wells in GrSG SWH or RSO	CPW has no regulatory authority over the adoption of its recommendations.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.2.1.8	Use early & effective reclamation techniques, including interim reclamation, to speed the return of disturbed areas to use by sage-grouse. Develop & implement performance-based reclamation st&ards that include coordinated weed management. Recognize that reclamation &/or weed control are continual & long-term efforts.	BLM, CPW, Industry	Ongoing	**BLM:** Interim reclamation is already implemented as part of the Surface Use Plan of Operations on federal leases. Performance based (% surface disturbance caps) reclamation st&ards have only been developed in the White River & Little Snake FO to date. **CPW:** CPW managers, biologists, & land use specialists routinely work with regulatory agencies to reclaim these facilities. CPW's BMPs for energy development include recommendations for use of interim reclamation & integrated weed management. NWCO & MWR - When contacted &/or made aware of such projects in GRSG habitat, CPW consults with project proponents & submits formal comment letters to appropriate permitting entities on the design/scope/siting/timing of infrastructure projects in order to avoid, minimize, or mitigate impacts to GRSG. MP - CPW local staff encourages regeneration of disturbed areas through comment letters & verbal communications with entities. There is no performance-based reclamation standards implemented or practiced. NP - CPW has recommended interim reclamation. **COGA**: Yes, 3 of 6 operators surveyed, who hold a total of 42% of the permits in GrSG SWH and operate a total of 13% of the wells in GrSG SWH or RSO	PPR - Research by CPW researcher D. Johnston is studying the most efficient & effective reclamation techniques in the PPR with an emphasis on control of cheatgrass while establishing native plants.
13.2.1.9	Recommend setting bonds sufficient to ensure that appropriate GrSG habitat reclamation is met.	BLM, COGCC, CPW, DRMS	Ongoing	**CPW:** General - CPW sets bonds for infrastructure projects affecting State Wildlife Areas. CPW has not recommended bond for projects involving other land management jurisdictions. **OGCC:** See 3.3.1.9. When the data is compiled from 3.3.3.7 this should be readdressed to determine if the financial assurance levels need to be modified.	
13.2.1.10	Enforce & ensure compliance with conditions, stipulations, & reclamation for leases & permits in GrSG habitat.	BLM, COGCC, DRMS	Ongoing	**BLM:** Compliance with O&G permit conditions of approval is conducted. **OGCC**: This is being done, see 3.3.1.13.	**BLM:** staffing may not be sufficient to keep up with the need.
13.2.1.11	Evaluate the need for restoration of previously reclaimed infrastructure sites. Prioritize areas in need of additional restoration efforts & identify potential funding sources.	BLM, CPW, LWGs	Ongoing	**BLM:** All previously reclaimed sites have not been evaluated or prioritized for future actions. However, if issues are identified in the field they are addressed as soon as possible.	
ISSUE 13.3	*Fences may adversely affect GrSG & their habitats.*				
OBJECTIVE 13.3.1	Minimize the potential for adverse impacts of *fences* on GrSG.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.3.1.1	GrSG seasonal habitats should be mapped prior to fence construction, in coordination with CDOW. When feasible, new fences should not be constructed within a buffer around active leks (see CCP Appendix B, "GrSG Disturbance Guidelines"). Lek & telemetry data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management.	CPW	Ongoing	**SLB**: maps all of its leases with PPH & PGH habitat. Grazing & multiple use leases impacted in whole or in part by GSG habitat total over 393K acres. Of those, 49% fall within PPH & 18% are within PGH, leaving 32% not directly important. Fencing on SLB properties within GSG habitat includes 166 miles of woven wire fence & 439 miles of barbwire fence, which means there is approximately 1 mile of fence per section. **CPW Research**: See 3.2.3.1 above. Seasonal habitat maps can be used to recommend avoidance areas for fencing (or fence marking) projects. **CPW:** General - In 2012, CPW created updated seasonal habitats & priority habitat areas for GRSG throughout Colorado. These maps are available for reference when evaluating infrastructure projects & provide supplemental information to the buffers described in the "GrSG Habitat Disturbance Guidelines" in the CCP, Appendix B. Where local habitat information is available it is substituted for the App. B buffers. Portions of NWCO [Hiawatha] & PPR - finer scale seasonal habitat maps are being developed through our research unit (B. Walker). Lek data are provided for development projects but are limited to project area & require a non-disclosure agreement. CPW makes fence construction recommendations to avoid sensitive habitats, & if not possible, then to mitigate to minimize impact of the fence (marking fence to make more visible). NP - BLM is conducting a fence inventory of NP & plans to document problematic fences in GrSG habitat. NESR - CPW has worked with willing l&owners to construct wildlife friendly fences & to avoid particularly sensitive areas near leks. CPW has worked with NRCS to remove old fences and install wildlife friendly fences in a lek complex area in NESR. **USFS:** There are no active leks or lek buffers on any of the three USFS National Forests in range. Very small portion of forests has habitat.	
13.3.1.2	If fences are constructed within the recommended buffer for leks (see CCP Appendix B, "GrSG Disturbance Guidelines"), or within other known GrSG seasonal habitats where significant collision issues are identified through LWGs, consider the following options to minimize the possibility of GrSG collisions: • place fences to use topographic features to minimize the possibility of GrSG collisions • clearly mark fences in strategic locations to increase visibility • discourage the use of net-wire fencing to allow easier movement of grouse under fences, where feasible • if fences are needed for seasonal livestock use, consider using let-down fences that can be put down during times of non-use	BLM, Private L&owners, SLB, USFS	Ongoing	SLB: Standard Grazing Agreement, section 11.G for lessees m&ates that lessees have responsibility for keeping & maintaining the fences on the properties they lease. BLM: New fence constructions would follow these recommendations (not many- if any have been constructed).	
13.3.1.3	Timing of fence construction on public l& should be scheduled according to the GrSG seasonal habitat in the area & the timing guidelines provided in CCP Appendix B, "GrSG Disturbance Guidelines".	BLM, SLB, USFS	Ongoing	**BLM:** Fence construction follows the recommended timing limitations.	**BLM:** Limit disturbance to the bird.
13.3.1.4	Minimize the width of cleared areas along fences to reduce predator effectiveness.	BLM, Private L&owners, SLB, USFS	Ongoing	**BLM:** Fence construction would disturb the smallest area necessary for completion.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.3.1.5	Where habitat disturbances occur that require reclamation or habitat restoration, the potential vegetation community should be identified (Winward 2004) & a diverse seed mixture of native shrubs, grasses, & forbs should be used wherever possible (see CCP Appendix D, "Recommendations Regarding Plant Species for Use in GrSG Habitat Management & Restoration", Monsen 2005, & "Habitat Enhancement" strategy, pg. 349).	BLM, Private L&owners, SLB, USFS	Ongoing	**USFS**: Forest revegetation policy designed with native species in mind. Sagebrush Enhancement Project underway on Eagle / Holy Cross Ranger District in the WRNF. Sagebrush seed mix in use across the WRNF. **BLM:** All reclamation activities consider site capability, & incorporation of an appropriate diverse seed mixture.	
13.3.1.6	In consultation with permittees or private l&owners, relocate or redesign site-specific segments of existing fences where significant adverse effects on GrSG have been documented, as opportunities arise, to reduce the impacts to GrSG. Identify potential funding sources to assist private l&owners in modifying or marking existing fences.	BLM, SLB, USFS	Ongoing	**BLM:** To date, no significant adverse effects have been identified related to SG & Fences in Colorado. Fences at risk for SG are being idetified & marked in the KFO & LSFO (Stevens et al., 2012), & this model will be completed for the entire state as fenceline data becomes available.	
13.3.1.7	Minimize duplication of fences & facilitate removal of abandoned fences within GrSG habitat.	BLM, Private L&owners, SLB, USFS	Ongoing	**BLM:** BLM already strives to minimize duplication of necessary fences, & removes hazardous abandoned fences. Other abandoned fences will be removed as priorities & workloads allow.	**BLM**: See Stevens et al. 2012
ISSUE 13.4	Effects of human infrastructure on GrSG are poorly understood.				
OBJECTIVE 13.4.1	Evaluate & quantify the effects of human infrastructure on GrSG.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
13.4.1.1	Evaluate the impact of utility corridors, communication towers, wind turbines & other infrastructure on predator effectiveness & resulting effects on GrSG populations. [See Research Strategy 21.4.1.3]	APHIS, BLM, CPW, Universities, USFWS, USGS	Begin by 2015	**See 21.4.1.3**	
13.4.1.2	Evaluate the impacts of utility corridors on GrSG habitats (i.e., fragmenting effects on habitat). **[See Research Strategy 21.1.2.3]**	CPW, CCP SC, LWGs, Universities	Begin by 2015		
13.4.1.3	Evaluate the impacts of communication towers, wind turbines, & associated infrastructure on GrSG (both disturbance impacts & habitat fragmentation impacts). [See Research Strategies 21.1.2.3 & 21.2.1.2]	CPW, CCP SC, LWGs, Universities	Begin by 2015		
13.4.1.4	Evaluate the impact of fences on GrSG populations (both disturbance impacts & habitat fragmentation impacts), & identify options to minimize those impacts. [See Research Strategies 21.1.2.3 & 21.2.1.2]	CPW, CCP SC, LWGs, Universities	Begin by 2015		
13.4.1.5	Develop effective methods to mark various types of infrastructure to increase visibility & minimize sage-grouse collisions. [See Research Strategy 21.2.1.2]	CPW, Industry, LWGs, Universities	Begin by 2015		
ISSUE 13.5	There is a lack of communication among agencies, industry, & affected publics involved with human infrastructure development, resulting in misunderst&ing & less effective management for GrSG.				
OBJECTIVE 13.5.1	Improve communication among agencies, industry, & affected publics involved with human infrastructure development, to facilitate improved trust, working relationships, planning, & more effective management of GrSG & their habitats.				

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
13.5.1.1	Present information & data about infrastructure development & GrSG so that it is readily underst&able to stakeholders & the general public. [See also Information, Communication, & Education Strategies 12.2.1.3 & 12.3.1.1]	BLM, CPW, Industry	Ongoing	**Tri-State:** Colowyo mine permitting is a multi-year process with input from state & federal agencies. Information & data available to the public upon request. **CPW:** CPW researchers present research findings at LWG meetings & at CPW's semi-annual seminars for industry. All research projects have annual reports that are posted to the CPW public website. **COGA**: Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO **BLM**: Few infrastucture projects have been completed recently. BLM presents data concerning SG habitat, threats, & infrastructure during the planning & NEPA process for the public to review.	
13.5.1.2	Share GrSG data among agencies, & with counties, private l&owners, & industry to allow for better planning of infrastructure development to minimize impacts to the species. Lek & telemetry data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management. [See also Information, Communication, & Education Strategy 12.3.2.2]	CPW	Ongoing	**CPW:** CPW routinely shares data with agencies, counties, & private entities in order to foster better planning of infrastructure development. Lek & telemetry data are provided for development projects but are limited to the project area & require a non-disclosure agreement.	**CPW:** Many entities incorporate this information while developing planning efforts.
13.5.1.3	Share infrastructure development plans with agencies ASAP to facilitate improved planning, analysis, & management of GrSG within sagebrush habitats, recognizing confidentiality sensitivities. Lek & telemetry data are considered sensitive information by CDOW. Limit data distribution to the extent necessary for effective management. [See also Information, Communication, & Education Strategy 12.3.2.2]	Industry	Ongoing	**Tri-State:** Colowyo provides these plans to agencies as part of permitting process. **COGA**: Yes, 4 of 6 operators surveyed, who hold a total of 60% of the permits in GrSG SWH and operate a total of 21% of the wells in GrSG SWH or RSO	
13.5.1.4	Encourage open communication among companies to entertain opportunities to reduce impacts &/or maximize benefits to GrSG. [See also Information, Communication, & Education Strategy 12.3.2.3]	BLM, CPW, Industry	Ongoing	**CPW:** CPW conducts semi-annual seminars for industry to foster communications between entities. CPW encourages entities to minimize duplication of infrastructure through our WMP process.	
13.5.1.5	Encourage infrastructure companies to participate in local GrSG work groups. [See Information, Communication, & Education Strategies 12.3.2.1 & 12.3.2.3]	CPW, Industry	2008 & ongoing	**Tri-State:** Has attended working group meetings. Interested in continued participation. **CPW:** NWCO - The NWCO LWG has encouraged the participation of infrastructure/utility companies, & recently (2011) hosted presentations by proponents of the TransWest Express transmission line project. Utility companies are engaged in the LWGs in PPR, NWCO, NESR, & NP. MP - There has not been energy development in MP. The few infrastructure projects that arise are handled individually with the different entitities. **COGA**: Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.5.1.6	Promote regular communication & continual coordination among agencies, industry, LWGs, & counties to improve infrastructure-related planning & management of GrSG. [See Information, Communication, & Education Strategy 12.3.2.3]	CPW, Industry	2008	**Tri-State:** Colowyo a member of its Local Working Group for GSG. **CPW:** CPW conducts semi-annual seminars for industry to foster communications between entities. CPW encourages entities to minimize duplication of infrastructure through our WMP process. **COGA:** Yes, 1 of 6 operators surveyed, who hold a total of 0.2% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	
13.5.1.7	Promote & provide regular opportunities for public involvement to improve infrastructure planning as it relates to management of GrSG & GrSG habitat. [See also Information, Communication, & Education Strategy 12.2.2.1]	BLM, County Governments, Industry, LWGs	Ongoing	**Moffat:** Holds monthly land use meetings, monthly Planning Commission meetings, & weekly County Commissioner meetings. GSG issues are common, & the public is invited to attend all of these meetings. **Grand**: Every land use action requires a hearing before the Planning Commission & one before the BCC. All hearings open to the public. Mineral extraction operations require SUP that is reviewed at these meetings too. Public notice placed in county newspaper to encourage public input. Each proposal also sent to CPW for comment. **Jackson**: Public notice given for hearings. Notice published in newspapers, & written notice provided to adjacent landowners. Zoning Resolution requires extensive outreach. **BLM:** Public involvement on infrastructure projects usually occur during the NEPA process. **CPW:** LWG Meetings are open to the public & often provide comments on projects. Much infrastructure development is occurring on private lands owned by energy companies or on BLM lands. The BLM provides public commenting periods for any actions requiring an EIS. The NWCO LWG has been very involved in the planning of recent transmission line projects. **COGA**: Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	**Counties:** Good turnout from the public at these meetings.
13.5.1.8	Communicate to affected publics the need to balance infrastructure development with GrSG habitat & population requirements. [See Information, Communication, & Education Strategy 12.2.1.3]	CPW	2009	**CPW:** CPW routinely communicates & coordinates with the public often via the LWGs.	**CPW**: In 2012, for example, information was presented at the following meetings: WAFWA Technical Meeting, Coal & Water Conference, Colorado Mining Association, State Board of Land Commissioners, Boards of County Commissioners (each county in GrSG range), CPW's semi-annual industry seminar, & LWG meetings.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.5.1.9	Promptly & frequently update information related to infrastructure development & GrSG to foster a better underst&ing of impacts to the species. [See also Information, Communication, & Education Strategy 12.3.2.2]	BLM, CPW, Industry	Ongoing	**BLM:** Few infrastucture projects have been completed recently. As research is reviewed or completed it is shared with agency biologists for their consideration. CPW: CPW routinely communicates & coordinates with the public often via the LWGs. COGA: Yes, 1 of 6 operators surveyed, who hold a total of 25% of the permits in GrSG SWH and operate a total of 10% of the wells in GrSG SWH or RSO	**CPW**: In 2012, for example, information was presented at the following meetings: WAFWA Technical Meeting, Coal & Water Conference, Colorado Mining Association, State Board of L& Commissioners, Boards of County Commissioners (each county in GrSG range), CPW's semi-annual industry seminar, & LWG meetings.
13.5.1.10	Improve the underst&ing, sharing, & acceptance of research & modeling efforts regarding GrSG & infrastructure development. Ensure that current management, reclamation techniques, & appropriate BMPs are shared with contractors & consultants to improve on-the-ground implementation. [See also Information, Communication, & Education Strategies 12.3.1.1 & 12.3.2.2]	CPW	Ongoing	**CPW:** CPW conducts semi-annual research up-date seminars for industry where current findings on impacts of infrastructure on GrSG & appropriate mitigations techniques are shared. CPW meets at least annually with each energy company involved in a WMP to review progress, incorporate recent research findings, & develop future plans.	**CPW:** 4 WMPs in GrSG habitat are in effect. CPW conducts semi-annual research up-date seminars.

14. Lek Viewing					
ISSUE 14.1	The disturbance from lek viewing may be impacting the breeding success of GrSG.				
OBJECTIVE 14.1.1	Minimize disturbance to GrSG at leks while allowing for public viewing of lek activity.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
14.1.1.1	Develop and implement a lek-viewing protocol for guidance in managing lek-viewing activities to minimize the impacts to GrSG. Include activities such as monitoring visitors to leks, and providing an opportunity for the public to view leks without disturbing the birds (e.g., lease of private property, signs, viewing blinds, defining parking areas).	CPW, LWGs	2008	**NP - CPW** developed a lek viewing brochure for NP and directs lek viewers to specific leks on State Land. **MP -** Public, organized lek viewing does not occur in MP and is not encouraged. All known leks in MP are regularly checked by CPW staff and so it would be known if public view was occurring. **NESR** - no public viewing.	
14.1.1.2	Develop public lek-viewing areas in consultation with CDOW and land management agencies to minimize disturbance to GrSG. Encourage local communities to develop and implement a managed lek-viewing opportunity.	LWGs	2008	**NP** - The NP LWG has discussed the need for managed lek viewing in NP. Commercial lek viewing tours are completed in NP, despite the fact that the BLM has not permitted these tours through special use permits. There is large public desire for additional lek viewing opportunities. The LWG and CPW cooperate with the NP Chamber of Commerce to provide lek viewing educational programs. CPW has designated a lek on a State Wildlife Area as a Watchable Wildlife Site. **NESR -** CPW does not recommend lek viewing opportunities in this population. Private landowners do not allow lek viewing on private property. **MP and PPR -** LWGs do not promote or encourage lek viewing of leks. In PPR, most leks are on private land or inaccessible due to weather. **NWCO -** strategy not occurring.	Commercial lek viewing is not currently managed well.
14.1.1.3	Manage lek viewing on developed sites to minimize the impacts to GrSG. Encourage managed lek-viewing (using protocols) on private lands as a revenue source for landowners, or provide incentives, if possible.	CPW	2008	**NWCO -** There is only one known "developed" lek viewing site that CPW knows of in the NWCO population and it is on private land. CPW has let a private organization borrow a lek-viewing trailer and requested that certain conditions be met to minimize adverse impacts to breeding GRSG as a condition of loaning the trailer. **MWR** - There is currently only one known active lek within the MWR population. It is located on private land and is not viewable by the general public or visible from a public road.**NP -** CPW has worked with BLM to assess the amount of non-permitted commercial lek viewing in NP. There is extensive commercial lek viewing in NP; however this activity is technically illegal because BLM has not issued any special use permits. CPW works with the NP Chamber of Commerce to provide managed lek viewing tours on State land. CPW is currently working with a private landowner to provide a lek viewing opportunity on private land in NP. There is a huge desire for lek viewing in NP. Current lek viewing is not effectively regulated or monitored. **MP and PPR** - Public, organized lek viewing does not occur and is not encouraged. **NESR** - NESR has very few leks and CPW does not encourage public lek viewing sites in NESR. There are no public lek viewing sites in NESR. Most of the leks are on private land and the private landowners do not allow access. The leks on BLM in Eagle County are protected through a seasonal closure to protect winter wildlife.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
14.1.1.4	Limit the number of managed lek viewing sites for each GrSG population, and encourage the public to use developed sites. Encourage agencies to develop a remote lek-viewing opportunity (e.g., “webcam”).	CPW	2008	**NWCO -** There is only one known "developed" lek viewing site that CPW knows of in the NW Colorado population area. MWR - There is currently only one known active lek within the MWR population. It is located on private land and is not viewable by the general public or visible from a public road. MP - Public, organized lek viewing does not occur in MP and is not encouraged. The public is directed toward tours in NP, an hour north of Granby. All known leks in MP are regularly checked by CPW staff and so it would be known if public view was occurring. NP - CPW has attempted to limit he number of leks used as viewing sites through the development of a NP lek viewing brochure that directs lek viewers to a specific lek on State land. CPW is also working with BLM to try and reduce the amount on non-permitted commercial lek viewing on BLM. CPW does not share the vast majority of lek locations with the public. PPR - none. NESR - NESR has very few leks and CPW does not encourage public lek viewing sites in NESR. There are no public lek viewing sites in NESR. Most of the leks are on private land and the private landowners do not allow access. The leks on BLM in Eagle County are protected through a seasonal closure to protect winter wildlife.	
14.1.1.5	Educate the GrSG viewing public about ethical viewing and photography of GrSG (e.g., provide information in viewing guides, internet sites focused on bird watching, brochures). **[See Information, Communication, and Education Strategy 12.2.1.3]**	CPW	2009	**General - CPW** has released a watchable wildlife brochure detailing grouse biology with suggestions for viewing to limit negative impacts.	
14.1.1.6	Educate commercial bird watching tour guides and photographers about ethical GrSG lek-viewing protocol. **[See Information, Communication, and Education Strategy 12.2.1.3]**	CPW	2009	**General - CPW** has released a watchable wildlife brochure detailing grouse biology with suggestions for viewing to limit negative impacts. **NP -** CPW has discussed ethical lek viewing with some commercial tours. However, the vast majority of commercial tours in NP are non-permitted and CPW generally does not have the opportunity to meet with commercial tours.	
14.1.1.7	As appropriate, encourage local volunteers (e.g., Audubon Society, Chambers of Commerce) to help with lek counts to increase educational opportunities. Ensure that all volunteers are trained about the sensitivity of lek location information.	CPW	2008	**NWCO - CPW** has encouraged a private organization that runs a commercial viewing operation on private land to share GRSG lek count data to improve monitoring. **NP** - CPW works with the NP Chamber of Commerce to organize lek viewing tours. Counts from these tours are included in the CPW lek count database. **NESR -** NESR has very few leks and CPW does not use volunteers to help with lek counts.	
14.1.1.8	Evaluate the impact of lek viewing on GrSG. **[See Research Strategy 21.2.1.5]**	CPW, Other Research Institutions, Universities	Begin by 2020		
14.1.1.9	Treat lek locations as “sensitive information”, i.e, not published on the web or in books. Lek locations need to be available for planning purposes to appropriate agency or private consultant biologists.	BLM, CPW, LWGs, NRCS, SLB, USFS, USFWS	2008	**CPW:** considers lek locations sensitive information and requires a non-disclosure agreement prior to release of the information for all agencies that require the information for specific project planning purposes. Local CPW staff protect location information and does not share this with the general public.	
14.1.1.10	Monitor and quantify the effects of viewing on lek attendance patterns. **[See Research Strategy 21.2.1.5]**	CPW, Other Research Institutions, Universities	Begin by 2020		

15. Pesticides

ISSUE 15.1	Some herbicide use recommendations for sagebrush treatment in GrSG habitat are obsolete.				
OBJECTIVE 15.1.1	Update recommendations on sagebrush herbicide treatment methods that reduce adverse impacts to and/or improve GrSG habitat.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
15.1.1.1	Conduct research on the effects of various herbicide treatments on GrSG habitat. **[See Research Strategy 21.1.2.1]**	BLM, CDA, CPW, LWGs, NRCS, Private Landowners, UCEPC, USFS, USFWS, USGS	Begin by 2015	**UCEPC** installed a native seed mix in 2012 in GSG habitat in a post-herbicide treated area. Used site as source of information on which species respond positively to herbicide application and revegetation success, compared with non-treatment areas.	
15.1.1.2	Using an interagency team approach, develop recommendations for methods of sagebrush herbicide treatments that reduce adverse impacts to and/or improve GrSG habitat.	BLM, CPW, LWGs, NRCS, USFS, USFWS	2008	**CPW: General -** CPW biologists interact regularly with BLM, NRCS, and private lands biologists to plan GrSG enhancement projects. CPW routinely comments on project proposals to improve their benefit or reduce their impact on GrSG.	
ISSUE 15.2	Sagebrush herbicide treatment methods that have fewer adverse impacts to GrSG habitat can be more expensive than traditional methods.				
OBJECTIVE 15.2.1	Encourage the use of non-traditional sagebrush herbicide treatments that have fewer adverse impacts to GrSG habitat.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
15.2.1.1	Provide monetary incentives to promote the use of non-traditional herbicide treatments where appropriate in GrSG habitat (see “Habitat Enhancement” strategy, pg. 349).	CPW , NRCS, USFWS	Ongoing	**CPW: NWCO -** CPW, BLM, and NRCS designed and implemented (with cost-share funding for landowners) several non-traditional sagebrush herbicide treatments on Cold Spring Mountain to replace plans for large scale spraying with small, random treatment areas by varying the distribution of herbicide.	**CPW: General -** CPW provides project funding (including cost share with other agencies) for GrSG enhancement projects. Use of the funding requires that projects be designed to improve GrSG.
ISSUE 15.3	Land managers are not informed about the various herbicide treatment methods and associated impacts to GrSG habitat.				
OBJECTIVE 15.3.1	Inform land managers about sagebrush herbicide treatment methods and the associated impacts to GrSG habitat.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
15.3.1.1	Conduct local field trips to observe the results of different herbicide treatment methods in GrSG habitat. **[See also Information, Communication, and Education Strategies 12.2.1.3 and 12.3.1.1]**	CPW, CSU Extension, LWGs, NRCS, Private Landowners	2008	**CPW: NWCO -** CPW has participated in several field trips in central Moffat County to evaluate herbicide applications, including "thinning rate" treatments where varying amounts of herbicide were used.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
15.3.1.2	Provide technical assistance and information to land managers regarding herbicide treatment design and application methods that minimize adverse impacts to GrSG habitat.	BLM, CPW, NRCS, USFWS, USFS	2008	**CPW: General -** CPW staff routinely provides technical assistance with herbicide (and other GrSG habitat treatment) design. CPW's recently hired sagebrush steppe habitat coordinator's role includes providing technical assistance with project design, both inside and outside the agency. CPW provides part of the salary of 3 private lands biologists housed in NRCS offices who also provide technical assistance with project design.	
ISSUE 15.4	Insecticide used for Mormon cricket control has the potential to impact GrSG.				
OBJECTIVE 15.4.1	Avoid using Mormon cricket treatments that are harmful to GrSG.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
15.4.1.1	Provide information on (1) important GrSG areas to avoid; (2) best timing for applications; and (3) least toxic methods of control, to aerial applicators of insecticides used to control Mormon crickets.	CPW, CSU Extension	Ongoing	**CPW: NWCO -** CPW has provided guidance during Mormon cricket outbreaks on areas to avoid during baiting operations to minimize effects on GrSG (particularly chicks). CPW's recommendations include the use of less toxic and less persistent baits.	

16. Piñon-Juniper Encroachment					
ISSUE 16.1	In some areas of Colorado, loss of GrSG habitat can be attributed to piñon-juniper expansion and encroachment into sagebrush communities.				
OBJECTIVE 16.1.1	Reduce the encroachment of piñon-juniper in those portions of NESR, NWCO, and PPR GrSG populations identified in Fig. 30, pg. 182.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
16.1.1.1	For each of the 3 GrSG populations, prioritize areas (Fig. 30, pg. 182) where removal of piñon-juniper to enhance GrSG habitat is needed (see "Habitat Enhancement" strategy, pg. 349). Focus should be on sites having appropriate characteristics (e.g., soil characteristics, sagebrush understory; also review historic photos) to support sagebrush communities, due to increased probability of success and reduction in cost. Identify options, schedules, and funding opportunities for specific projects.	BLM, CPW	2008	**CPW: General -** CPW has identified a number of areas (including areas noted in Figure 30 of the CCP) where piñon-juniper encroachment of sagebrush habitat has occurred. In the 3 areas identified as priority areas in the CCP (**NWCO, PPR and NER**) options, schedules and funding opportunities have been indentified. In the 2 other populations **(MWR andMP),** not identified in the CCP, PJ removal projects have also occurred. **NP -** Piñon-Juniper encroachment is not an issue. **See Appendix A: Habitat Treatments** **See Appendix B: Summary of Expenditures on GrSG in Colorado 2006-2012**	**CPW: General -** Prioritized areas have been identified and treatments have been implemented. See 16.1.1.4.
16.1.1.2	Identify ecological site characteristics and sagebrush species (Winward 2004) associated with GrSG habitat project areas identified in strategy 16.1.1.1 (Monsen 2005).	BLM	2008 and ongoing	**CPW: General -** Determination of site characteristics, including sagebrush species is a standard part of CPW project planning.	
16.1.1.3	Conduct pre-project planning (e.g., necessary archaeological clearances, EAs) and pre-restoration monitoring for sites selected for treatment in GrSG habitat in strategy 16.1.1.1.	BLM, USFS	Begin 2008, and ongoing	**USFS:** Completed as part of Standard Operating Procedure. **CPW:** General - CPW has conducted a number of PJ encroachment treatments on public lands. Necessary pre-project planning has been conducted as required by the land owning agency, sometimes at CPW expense and sometimes at the land owning agency's expense. The Little Snake and White River BLM Field Offices have developed programmatic Environmental Assessments that have streamlined the design and implementation of PJ encroachment projects in those Field Offices.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
16.1.1.4	Implement appropriate treatment/restoration action(s) (Monsen 2005) for selected sites (identified in strategy 16.1.1.1) in GrSG habitat, as funding/personnel levels allow. Treatment options include, but are not limited to: prescribed fire, mechanical treatments (such as roller chopping, hydro-axing, or chaining), and reseeding, if necessary.	BLM,USFS	Begin 2008, and ongoing	**USFS:** Routt NF has conducted re-seeding in the California Park Area. White River NF has conducted on the Eagle / Holy Cross Ranger District and Rifle RD. **CPW:** General - CPW has implemented a number of treatments in the prioritized areas where piñon-juniper encroachment of sagebrush habitat has occurred. Projects have been implemented in the 3 areas identified as priority areas in the CCP (NWCO, PPR and NER)sa well in the 2 other populations (MWR andMP) not identified as priority areas. NP - Piñon-Juniper encroachment is not an issue. **NWCO** - CPW has implemented 6 different piñon-juniper encroachment projects totaling approximately 2,600 acres in the NW Colorado population since 2008. Additional projects are in the planning stages. **NESR** - In 2011 and 2012, CPW funded the removal of 898 acres of piñon-juniper with a hyrdo ax in an historic lek area. This area is also a travel corridor and winter area for GrSG in the NESR population. In 2012, BLM funded an additional 263 acres of hand-cutting of piñon-juniper in the same area. MWR and MP - While the MWR and MP population areas were not identified in the CCP as populations where PJ Encroachment was an issue, CPW has implemented 3 small projects in MWR on the Oak Ridge SWA totaling about 50 acres to benefit GRSG. and in 2012, MP CPW, USFWS Partners for Fish and Wildlife, and NRCS partnered to removed 500 acres of PJ encroaching on private lands north of Kremmling. The sites in MP are Level 1 and 2 PJ sites.	**CPW:** General - CPW has secured approximately $900,000 of SCTF funds that have/can be used for treatment of PJ encroachment. PPR - CPW Researcher B. Walker is studying the effectiveness of using PJ removal to grouse occupancy using telemetry. Several study plots in the North PPR have been established on BLM lands and PJ was removed with a Hydroax. Monitoring of these plots for GrSG use will continue over the next couple of years. This project is a joint effort with the BLM. **See Appendix A Habitat Treatments for details of projects completed.**
16.1.1.5	Monitor vegetation response to treatments in GrSG habitat (implemented in strategy 16.1.1.4), and evaluate treatment success (Monsen 2005).	BLM,USFS	Post-treatment	**USFS:** Occurring or planned in restoration areas across the Routt and WRNF.	**CPW:** PPR - CPW Researcher B. Walker is studying the effectiveness of using PJ removal to grouse occupancy using telemetry. Several study plots in the North PPR have been established on BLM lands and PJ was removed with a Hydro ax. Monitoring of these plots for GrSG use will continue over the next couple of years.
16.1.1.6	Reseed if necessary in areas treated in GrSG habitat (strategy 16.1.1.4), to reestablish understory shrubs and herbs using methods outlined in Monsen (2005). See also CCP Appendix D, “Recommendations Regarding Plant Species for Use in GrSG Habitat Management and Restoration”.	BLM,USFS	Ongoing	**USFS: R**estoration plan developed and implemented in Routt NF. This is also part of the Sagebrush Enhancement Project on Eagle / Holy Cross RD. **CPW:** General - Supplemental seed has not been necessary in projects conducted to date, except in a limited basis where equipment was trailed, etc.	
16.1.1.7	Re-treat areas in GrSG habitat (identified in strategy 16.1.1.1), as necessary, to control re-invading trees.	BLM,USFS	Post-treatment, every 5-10 years	**USFS:** Ongoing in WRNF. **CPW:** General - PJ encroachment treatments conducted by CPW have not yet reached the point where re-invasion has occurred.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
ISSUE 16.2	In some areas of Colorado, loss of GrSG habitat can be attributed to piñon-juniper expansion and encroachment into sagebrush communities.				
OBJECTIVE 16.2.1	Refine and regularly update mapping of piñon-juniper encroachment areas within occupied and potential GrSG habitat in all populations.				
Reference Number	**Conservation Strategy**	**Responsible Partie**	**Timeline**	**Implementation**	**Effectiveness**
16.2.1.1	Re-evaluate and update (for accuracy and currency) existing maps of piñon-juniper distribution in GrSG habitat (Fig. 30, pg. 182).	CPW	Every 5 years or as needed	**CPW: General -** No comprehensive effort to update areas of piñon-juniper encroachment has been undertaken. Recently developed seasonal habitat models may have some utility in looking at PJ encroachment across landscape scales. **PPR -** Habitat suitability maps generated by CPW Researcher B. Walker are based on birds with radio transmitters and could be used to determined areas where PJ might be reduced to improve GrSG habitat. However, no specific maps have been developed that depict PJ distribution across the PPR specifically.	

17. Population Monitoring and Targets					
ISSUE 17.1	It is important to assess GrSG population size and trends, but current methods of estimating population size from lek counts make many untested assumptions.				
OBJECTIVE 17.1.1	Assess GrSG population size and trends and provide for the long-term monitoring of GrSG.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
17.1.1.1	Maintain consistent current GrSG lek count protocols (include searching for new leks), but use research results to establish protocols for future population monitoring and record keeping, including mechanisms to assure consistent implementation and reporting. [See also Research Strategy 21.8.1.1]	CPW	Ongoing	**CPW: General** - Lek counts follow state protocols (leks are counted at least 3 times annually within certain date ranges to incorporate early, mid, and late season lek attendance). All data is compiled for each population and provided to the statewide grouse coordinator and the GIS Specialist. Searches for new lek sites and rechecks of historic lek sites occur with variable frequency depending on the population. CPW is evaluating the use of Dual Frame sampling to search for new leks and to estimate the proportion of leks that are counted during standard lek counts. Dual Frame sampling has been investigated in north-central and northwestern NWCO, NP and PPR. CPW Researcher B. Walker is evaluating male GrSG movements and lek attendance during the breeding season to better understand some of the variability inherent in lek counts. **PPR** - Due to difficult counting conditions from the ground, active leks in the PPR are flown at least three times during the breeding season using a helicopter. Inactive leks are generally visited at least once to document any if any renewed activity is occurring. **NP** - CPW has consistently counted leks in NP for 40 years and provides one of the best long-term data sets in GrSG range.	Consistent lek count protocols have been in place and fully implemented since 1997 in all populations. All lek data is housed in CPW's GIS data base and with the CPW Grouse Coordinator therefore consistent reporting is also achieved across all populations.
17.1.1.2	Consider and implement conservation actions to achieve the GrSG male population targets outlined in this plan (see “Colorado GrSG Population Management Zones”, pg. 248).	CPW	Ongoing	**CPW:** General - CPW uses lek counts (3-year running averages of high male counts by population and/or management zone (in NWCO)) as the primary indicator of population trend and the need for, or adequacy of, conservation actions. These trend data are updated for each population each year. NP, MP, and NESR are currently within the population target zones in the CCP. NWCO, MWR, and PPR are currently below the population target zones. CPW has implemented a number of conservation actions to conserve populations, including protecting and enhancing habitat, and conducting more intensive monitoring to determine important use areas, seasonal movements, etc., via radio telemetry. All actions are reported in various chapters of this document.	**See Appendix I: Population Trends**
17.1.1.3	Develop statistically defensible methods to estimate GrSG population size and/or trends. **[See Research Strategies 21.8.1.1, 21.8.1.2, 21.8.1.3, and 21.8.1.5]**	CPW, Universities	Begin by 2010	**CPW/CSU: NWCO, PPR -** CPW Researcher B. Walker and graduate student are evaluating methods to better estimate GrSG population sizes through intensive radio-telemetry of male GrSG, including male movements and lek attendance during the breeding season, and intensive Dual Frame sampling in the PPR to compare results to traditional lek counts.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
17.1.1.4	Coordinate with private landowners to gain access to expand GrSG lek search areas.	CPW	Ongoing	**CPW: General -** CPW works with many private landowners on a annual basis to monitor known active, inactive, and historic lek locations. CPW has access to the vast majority of known leks. CPW annually collaborates with private landowners to conduct expanded lek searches in areas of high quality modeled habitat as the opportunity arises and staff time allows. **PPR -** Most lek counts in the PPR are conducted by helicopter flights. CPW Researcher B. Walker is studying the use of Dual Frame sampling and lek count accuracy and has permission from private landowners to access leks so that required double counts can be performed.	CPW has access to or is able to monitor from nearby roads on at least 98% of known leks.
17.1.1.5	Develop a single, statewide, standardized lek data base for all Colorado GrSG population, and update data annually.	CPW	2008 and update annually	**CPW: General -** CPW has compiled population-specific lek data into statewide totals for many years. CPW instituted updated procedures to standardize the collection and reporting of lek data, through the use of a standard reporting spreadsheet in 2011. CPW biologists have also worked with the CPW GIS section to increase the accuracy and completeness of spatial lek data in recent years, including the annual correction of lek locations, activity status, and high male count.	
ISSUE 17.2	Population targets are based on current population estimates and potential habitat conditions, but habitat conditions and availability are expected to change over time.				
OBJECTIVE 17.2.1	Reevaluate population targets as habitat conditions change and knowledge increases with regards to GrSG behavior and population dynamics.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
17.2.1.1	Use adaptive management approach (see pg. 10) to re-evaluate current population management zones.	CPW	2010	**CPW: General -** CPW uses lek counts (3-year running averages of high male counts by population and/or management zone (in NWCO)) as the primary indicator of population trend and the need for, or adequacy of, conservation actions. The current running average is compared to the targets annually for each population.	

18. Predation					
ISSUE 18.1	Public misunderstanding of the role of predation in GrSG populations can make GrSG predation management challenging.				
OBJECTIVE 18.1.1	Improve the public's understanding of the role of predation on GrSG populations.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
18.1.1.1	Actively provide accurate information to the general public and stakeholders to improve their understanding about the relationship between predation and GrSG. **[See Information, Communication, and Education Strategies 12.2.1.3 and 12.3.1.1]**	CPW	2009- Annually beginning in 2008	**CPW: General -** CPW provides information to interested publics through a variety of formal and informal methods. The effect of predation on GrSG is a regular part of this communication and seeks to differentiate between the fact of predation (that it occurs in all populations) from the effect of predation (if and where it constitutes an unnatural/unsustainable cause of excess mortality).	
ISSUE 18.2	Information is lacking on the role of predation on GrSG populations.				
OBJECTIVE 18.2.1	Conduct research and monitoring to investigate the role of predation on GrSG populations in Colorado.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
18.2.1.1	Conduct a thorough review of the existing literature on the relationship between predation and GrSG populations and habitat. **[See Research Strategy 21.4.1.1]**	APHIS, BLM, CDA, CPW, LWGs, USFS, USFWS, USGS	Begin by 2010	**See 21.4.1.1**	
18.2.1.2	Establish a process to develop GrSG predation research priorities within Colorado, and encourage innovative and progressive research questions. **[See Research Strategy 21.4.1.1]**	APHIS, BLM, CDA, CPW, LWGs, USFS, USFWS, USGS	Begin by 2010	**See 21.4.1.1**	
18.2.1.3	Document and monitor current predator population levels in GrSG habitat. **[See Research Strategy 21.4.1.1]**	APHIS, BLM, CDA, CPW, LWGs, USFS, USFWS, USGS	Begin by 2010	**See 21.4.1.1**	
18.2.1.4	Evaluate relationships among GrSG predator species, including how GrSG predator species population levels change relative to each other. **[See Research Strategy 21.4.1.2]**	APHIS, BLM, CDA, CPW, Universities, USFWS, USGS	Begin by 2015		
18.2.1.5	Investigate and evaluate the natural variability in GrSG predator populations. **[See Research Strategy 21.4.1.2]**	APHIS, BLM, CDA, CPW, Universities, USFWS, USGS	Begin by 2015		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
18.2.1.6	Investigate the effects of predation on all GrSG life stages. **[See Research Strategy 21.4.1.1]**	APHIS, BLM, CDA, CPW, LWGs, USFS, USFWS, USGS	Begin by 2010	**See 21.4.1.1** **CPW:** General - While CPW has not conducted specific research to experimentally test the effect of predation on GrSG life stages, CPW has maintained hundreds of radio-marked GrSG (male, female, adults and chicks) over many years in NWCO, NP, NESR, MWR, and PPR. At no time, and in no population, have demographic rates been detected that differ markedly from expected levels found elsewhere in the range of GrSG.	**CPW:** At a coarse level, this evidence is strong indication that excessive predation of GrSG is not occurring in Colorado.
18.2.1.7	Investigate the influence of GrSG habitat on predation rates. **[See Research Strategy 21.4.1.3]**	APHIS, BLM, CDA, CPW, Universities, USFWS, USGS	Begin by 2015	**See 21.4.1.3**	
18.2.1.8	Investigate how predation rates on GrSG are influenced by the natural temporal and spatial variability in sagebrush ecosystems (e.g., plant age class, fire intervals). **[See Research Strategy 21.4.1.3]**	APHIS, BLM, CDA, CPW, Universities, USFWS, USGS	Begin by 2015	**See 21.4.1.3**	
18.2.1.9	Investigate the quantity of habitat (i.e., patch size) needed to sustain GrSG. **[See Research Strategies 21.1.1.1 and 21.4.1.3]**	APHIS, BLM, CDA, CPW, Universities, USFWS, USGS	Begin by 2010 / Begin by 2015	**See 21.1.1.1 and 21.4.1.3**	
18.2.1.10	Investigate how invasive weed species impact predation rates on GrSG. **[See Research Strategy 21.4.1.3]**	APHIS, BLM, CDA, CPW, Universities, USFWS, USGS	Begin by 2015	**See 21.4.1.3**	
18.2.1.11	Investigate the influence of habitat quality (e.g., nutrition, forb/insect quality and quantity) on GrSG chick vulnerability to predation. **[See Research Strategies 21.1.1.1 and 21.1.1.3]**	APHIS, BLM, CDA, CPW, CSU Extension, Industry, LWGs, NRCS, Private Landowners, USFS, USFWS, USGS	Begin by 2010 /2012	**See 21.1.1.1**	
18.2.1.12	Evaluate the impact of infrastructure, powerlines, roads, and fences on predation rates in GrSG populations. **[See Research Strategy 21.4.1.3]**	APHIS, BLM, CDA, CPW, Universities, USFWS, USGS	Begin by 2015	**See 21.4.1.3**	
18.2.1.13	Investigate the roles of and relationships between native and non-native predators in the sagebrush ecosystem. **[See Research Strategy 21.4.1.2]**	APHIS, BLM, CPW, Universities, USFWS, USGS	Begin by 2015		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
18.2.1.14	Evaluate whether vegetation treatments improve GrSG habitat in a way that affects GrSG population parameters, such as nest success. **[See Research Strategy 21.1.2.1]**	BLM, CDA, CPW, LWGs, NRCS, Private Landowners, UCEPC, USFS, USFWS, USGS	Begin by 2015		
ISSUE 18.2	Information is lacking on the role of predation on GrSG populations.				
OBJECTIVE 18.2.2	Secure funding for research on predation and GrSG populations.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
18.2.2.1	Identify funding sources for research on predation and GrSG. **[See Research Strategy 21.4.1.1]**	APHIS, BLM, CPW, LWGs, USFS, USFWS, USGS	Begin by 2010	**See 21.4.1.1**	
18.2.2.2	Secure funding for research on predation and GrSG. **[See Research Strategy 21.4.1.1]**	APHIS, BLM, CPW, LWGs, USFS, USFWS, USGS	Begin by 2010	**See 21.4.1.1**	
ISSUE 18.3	Although predation has always occurred in GrSG populations, increases in numbers or types of specific predators may affect sage-grouse population numbers.				
OBJECTIVE 18.3.1	Encourage timely, innovative GrSG predation management strategies (including adaptive predator management and monitoring), to assist in achieving GrSG population targets (see “Colorado GrSG Population Management Zones”, pg. 248).				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
18.3.1.1	Identify appropriate types of predator control for GrSG populations and coordinate potential actions locally and regionally.	APHIS, CDA, CPW, LWGs	2008	**CPW:** CPW has maintained hundreds of radio-marked GrSG (male, female, adults and chicks) over many years in NWCO, NP, NESR, MWR, and PPR. At no time, and in no population, have demographic rates been detected that differ markedly from expected levels found elsewhere in the range of GrSG. At a coarse level, this is strong indication that excessive predation of GrSG is not occurring in Colorado. Per the CCP, active predator control will only be considered in areas where documented excessive predation is occurring. However, other types of management actions to deter predators (e.g., perch preventers, removal of piñon-juniper trees, etc) are being implemented and are detailed in other chapters (e.g., Infrastructure and Piñon-Juniper Encroachment).	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
18.3.1.2	Implement GrSG predator control, as necessary and appropriate and coordinate activities locally and regionally.	APHIS, BLM, CPW, County Governments, LWGs,	2009	See 18.3.1.1.	
18.3.1.3	When applying predation management techniques, abide by existing laws, including: • Colorado Amendment 14 • Bald and Golden Eagle Protection Act • Migratory Bird Treaty Act	APHIS, CPW, USFWS	As Needed		
18.3.1.4	Design an effective and consistent monitoring program to determine if predation management actions are achieving desired results in GrSG populations.	CPW	ASAP		
18.3.1.5	Work with implementing parties to ensure that GrSG predation management monitoring results are reported.	CPW	As Needed		
18.3.1.6	Establish an annual meeting to coordinate reporting of LWG progress towards implementation of predation management strategies (in both local and statewide conservation plans), and to encourage communication among LWGs regarding predation management. [See Information, Communication, and Education Strategy 12.3.2.1]	CPW	2008 and ongoing		
18.3.1.7	Encourage and allow risk-taking (e.g., experimental predator control in limited areas) so that implementers and collaborators have the flexibility to conduct adaptive GrSG predation management.	CPW	Ongoing		
18.3.1.8	Report predation management strategy results to GrSG steering committee.	LWGs	Annually		
18.3.1.9	Educate interested publics regarding which management actions are most biologically and cost-effective in increasing reproductive success in GrSG populations. **[See Information, Communication, and Education Strategy 12.3.1.1]**	CPW	Annually beginning in 2008		
ISSUE 18.4	Funding is needed to support predation strategies (in both local plan and statewide GrSG conservation plans).				
OBJECTIVE 18.4.1	Identify and secure the funding needed to implement predation strategies (in both local plan and statewide GrSG conservation plans).				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
18.4.1.1	Identify potential funding sources for predation management strategies.	CPW	2008		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
18.4.1.2	Secure funding for predation management strategies.	BLM, CPW, Industry, LWGs, Private Landowners, NRCS, USFS, USFWS	2008		
18.4.1.3	Develop a process to allocate funding for LWG predation strategies.	CPW	2008		
18.4.1.4	LWGs identify local plan funding needs and submit proposals within funding process framework (see strategy 18.4.1.3).	LWGs	2008 and annually		
ISSUE 18.5	Special consideration regarding the implementation of predator management may be required in small isolated GrSG populations.				
OBJECTIVE 18.5.1	Protect GrSG small populations from excessive predation when populations (3-year average) fall to either of 2 “trigger” levels: (1) below 25 birds in the spring breeding population; or (2) to 25% of the long-term average goal for the population.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
18.5.1.1	Identify relevant predator species within local GrSG populations that meet the established trigger(s).	BLM, CPW, LWGs, Other Research Institutions, Universities, USFS, USFWS	2009	**See 18.3.1.1.**	
18.5.1.2	Determine age-specific mortality and identify relative risks from avian and mammalian predation within local GrSG populations meeting the described trigger(s).	BLM, CPW, LWGs, Other Research Institutions, Universities, USFS, USFWS	2009	**See 18.3.1.1.**	
18.5.1.3	Evaluate whether predator management aimed at a specific predator species is an effective management tool that increases production and recruitment of sage-grouse in local populations that meet the established trigger(s).	BLM, CPW, LWGs, Other Research Institutions, Universities, USFS, USFWS	2009	**CPW:** CPW has recently tested the effectiveness of predator control in improving recruitment in a small population of Gunnison sage-grouse.	**CPW:** Evaluation of the effectiveness of this project will be completed in 2013. The results of this project may shed light on the effectiveness of predator control in small GrSG populations as well.
18.5.1.4	If predator control is likely to be effective, then develop and implement predator management strategies designed for specific GrSG population that is in accordance with CPW and federal regulations and policies.	BLM, CPW, LWGs, Other Research Institutions, Universities, USFS, USFWS	2009	**CPW:** Predator management strategies (beyond perch preventers, removal of piñon-juniper trees, etc.) is not needed at this time.	

19. Recreational Activities

ISSUE 19.1	Recreational activities may cause a potential impact to GrSG.				
OBJECTIVE 19.1.1	Use experimentally designed studies to evaluate the cause and effect of recreational activity on the productivity and population viability of GrSG.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
19.1.1.1	Evaluate the effect of recreational activities on GrSG mating behavior. **[See Research Strategy 21.2.1.5]**	CPW, Other Research Institutions, Universities	Begin by 2020		
19.1.1.2	Evaluate the effect of recreational activities on GrSG nesting and brood-rearing success. **[See Research Strategy 21.2.1.5]**	CPW, Other Research Institutions, Universities	Begin by 2020		
19.1.1.3	Evaluate the effect of recreational activities on GrSG winter flocks. **[See Research Strategy 21.2.1.5]**	CPW, Other Research Institutions, Universities	Begin by 2020		
19.1.1.4	Evaluate the effect of recreational activities on recruitment and long-term population dynamics of GrSG. **[See Research Strategy 21.2.1.5]**	CPW, Other Research Institutions, Universities	Begin by 2020		
ISSUE 19.1	Recreational activities may cause a potential impact to GrSG.				
OBJECTIVE 19.1.2	Minimize the potential adverse impacts of recreational activities on GrSG (see CCP "GrSG Disturbance Guidelines", Appendix B).				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
19.1.2.1	Minimize, where possible, the impacts to sage-grouse when designing or modifying recreational roads or trails.	BLM, CPW, County Governments, DPOR, LWGs, Private Landowners, USFS	Ongoing	**CPW: General -** CPW provides comments to land management agencies, recreation groups, and others with sensitive locations and recommendations for minimizing or avoiding impacts to GrSG for use in trail design/modification projects. CPW participates in each of the RMP revisions occurring in GrSG habitat, including travel management planning.	
19.1.2.2	On publicly-owned properties, pets (this excludes working dogs) should be on-leash or restricted from areas within important GrSG breeding habitat (March – July).	BLM, CPW, SLB, USFS, USFWS	2008	**CPW: General -** CPW provides this comment to land management agencies in key GrSG habitats. CPW participates in each of the RMP revisions occurring in GrSG habitat, including travel management planning. For instance, CPW recommends that recreational activities avoid areas within 0.6 miles of leks during the breeding season.	
19.1.2.3	Develop and distribute educational material on (1) general GrSG biology, and (2) the potential harmful effects of recreational activities on GrSG breeding, nesting, and winter areas. Distribute to recreational groups, tourists, pet owners, private landowners, and lek viewers. [See Information, Communication, and Education Strategies 12.2.1.1 and 12.2.1.3]	CPW	2009		
19.1.2.4	Identify and map areas of high recreational use within GrSG habitat for use in guiding management decisions.	LWGs	2008	**BLM: NWCO -** BLM and motorized recreation groups have worked to identify traffic densities in portions of the Little Snake Field Office (particularly the Sand Wash Basin).	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
19.1.2.5	Provide information and signage at areas where management actions relating to GrSG are in effect (e.g., designated trails, seasonal closures). **[See Information, Communication, and Education Strategy 12.2.1.3**	CPW	2009		
19.1.2.6	On land that is important to GrSG, encourage private and public land managers to manage human recreation activities to benefit sage-grouse (e.g., during the breeding season, on winter range). Provide incentives to landowners, if possible. [See also Information, Communication, and Education Strategies 12.2.1.3 and 12.3.1.1]	LWGs	Ongoing	**CPW: General -** CPW provides comments to land management agencies, recreation groups, and others with sensitive locations and recommendations for minimizing or avoiding impacts to GrSG for use in trail design/modification projects. CPW participates in each of the RMP revisions occurring in GrSG habitat, including travel management planning. For instance, CPW recommends that recreational activities avoid areas within 0.6 miles of leks during the breeding season.	
19.1.2.7	Advocate for increased monitoring and enforcement of existing recreational regulations where conflicts with GrSG have been identified	LWGs	Ongoing	**CPW: General -** While areas of specific conflict between recreationists and GrSG have not been widely identified, CPW regularly encourages land management agencies to provide sufficient law enforcement effort to make recreational regulations meaningful.	**CPW: General -** CPW law enforcement officers enforce travel management regulations on State Wildlife Areas.
19.1.2.8	Promote the development of a realistic and enforceable travel management plan on public lands to protect GrSG lek, nesting, brood rearing, and winter habitats.	BLM, CPW, County Governments, LWGs, SLB, USFS	As plans are developed	**CPW: General -** CPW has provided comments on federal land use planning/travel management documents, including necessary protections for GrSG seasonal habitats. Comments have been provided on travel management planning efforts in the Little Snake, Kremmling, and Colorado River Valley draft RMPs and the White River National Forest management plan.	
19.1.2.9	When existing recreational roads and trails conflict with GrSG habitat requirements, consider management options (within authorities) such as seasonal use restrictions, closure, removal, speed limits and realignment (administrative uses may be allowed).	BLM, CPW, County Governments, LWGs, Private Landowners, SLB, USFS	As Needed	**CPW: General -** CPW recommends that land management agencies apply seasonal and/or diurnal closures where recreational trails exist within 0.6 miles of lek sites. PPR - CPW has included speed limits on energy field access roads in some WMPs where conflict with GrSG is likely.	
19.1.2.10	Restrict off-highway vehicles (OHV) to on-trail or on-road use on public lands during the nesting season in occupied GrSG breeding habitat.	BLM, CPW, County Governments, LWGs, SLB, USFS,	As Needed	**BLM: General -** BLM is moving from Open (off-road travel allowed) toward Limited to Existing Routes or Limited to Designated Routes in travel management plans within many important GrSG habitats (examples include the Little Snake and Kremmling field offices).	

20. Roads					
ISSUE 20.1	Roads may impact GrSG populations by direct mortality, behavioral changes, spread of exotic plants, fragmentation of habitat, and by providing additional human access to formerly remote areas.				
OBJECTIVE 20.1.1	Minimize the potential for adverse impact of roads on GrSG and their habitat (see CCP "GrSG Disturbance Guidelines", Appendix B).				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
20.1.1.1	Identify, categorize (e.g., 2-track, gravel, unpaved, paved), and map roads in GrSG range. Maintain a current GIS roads datalayer.	BLM, County Governments	Ongoing	**Moffat**: all county roads mapped and categorized. Maps updated. Grand: GIS system used to map all county roads. Roads are categorized by ownership, surface type, maintenance schedule, and useage allowances. Public road hearings held annually. January each year, these maps are updated and signed by the BOCC. **Jackson:** All country roads mapped and categorized. Roads GIS data layer updated regularly.	
20.1.1.2	For placement of new roads, GrSG seasonal habitats should be mapped and avoided whenever possible. If seasonal habitats are not yet mapped, construction should be avoided within the buffers described in the CCP "GrSG Disturbance Guidelines" (Appendix B).	BLM, CPW, County Governments, Industry, LWGs, NPS, Private Landowners, SLB, USFS	During road planning phase	**CPW: General -** CPW has regulatory authority over road building, siting and operations only on State Wildlife Areas. CPW routinely provides comments to land management agencies regarding the location of and methods for avoiding key GrSG habitats. **PPR -** CPW incorporates avoidance of GrSG habitat in WMPs with energy companies where possible. **NP -** CPW is in the process of developing seasonal habitat models for NP to assist with conservation planning. **NESR** - CPW makes recommendations to minimize impacts to GrSG habitat.	
20.1.1.3	Timing of road building and road maintenance activities should be modified according to the GrSG seasonal habitat in the area and the timing guidelines provided in Appendix B.	BLM, CPW, County Governments, Industry, LWGs, Private Landowners, SLB, USFS	During road planning phase	**CPW: General -** CPW routinely recommends timing limitations that avoid lekking and nesting periods (March-June) for road construction and maintenance (and other surface disturbing activities). **PPR** - Conduct of work outside key seasonal periods is built into WMPs where possible. **NP** - When provided with the opportunity, CPW will consult and make recommendations on seasonal timing when applicable. **NESR** - CPW makes recommendations to minimize impacts to GrSG habitat.	
20.1.1.4	Where opportunities arise, manage existing roads to minimize disturbance to leks or other seasonal habitats, particularly breeding habitat. Employ seasonal closures, permanent closures, rerouting of existing roads, or other measures, as deemed locally appropriate.	BLM, CPW, County Governments, Industry, LWGs, Private Landowners, SLB, USFS	Annually	**CPW: PPR -** Some WMPs employ this strategy.	
20.1.1.5	If new local or unpaved roads are constructed within GrSG seasonal habitats, encourage appropriate governing authorities to restrict speed limits as specified by the CCP "GrSG Disturbance Guidelines", Appendix B).	BLM, CPW, County Governments, Industry, LWGs, NPS, Private Landowners, SLB, USFS	During road planning phase	**CPW: General -** CPW's BMPs for oil and gas development recommend speed limits on oil and gas roads in GrSG habitat. **PPR -** WMPs generally establish speed limits on service roads in GrSG habitat. **NP -** BLM will restrict speed limits when applicable. **NESR -** CPW makes recommendations to minimize impacts to GrSG habitat.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
20.1.1.6	New roads should not be constructed within 0.6 miles of leks (see CCP "GrSG Disturbance Guidelines", Appendix B). If this is impractical, roads should be placed to avoid line-of-sight between strutting males and road/associated traffic. Lek data are considered sensitive information by CPW. Limit data distribution to the extent necessary for effective management.	BLM, CPW, County	During road planning phase	**CPW: General -** CPW routinely recommends that new roads (and other surface disturbing activities) not be built within 0.6 miles of GrSG leks. CPW BMPs for oil and gas development and the COGCC rules contain this recommendation. BLM RMPs are adding this stipulation during revisions. **PPR** - WMPs utilizes this strategy. **NP** - When provided with the opportunity, CPW will consult and make recommendations on new road placement. CPW is in the process of developing seasonal habitat models for NP to assist with conservation planning. **NESR** - CPW makes recommendations to minimize impacts to GrSG habitat.	
20.1.1.7	On federal land, consider GrSG habitat when determining allocation designations for user-created routes. This should be done when developing activity or LUP level Travel Management Plans.	Governments, NPS, SLB, USFS	During travel mgmt. plan phase	**CPW: General -** CPW staff provides comments to BLM for RMP and other federal EIS development, including travel management planning. All RMPs in CO GrSG habitat are either recently revised or are currently in revision.	
20.1.1.8	If habitat disturbance that will require habitat restoration occurs in conjunction with building, maintaining, or reclaiming roads, the potential vegetation community needs to be identified (Winward 2004) and a diverse seed mixture of native shrubs, grasses, and forbs should be used (see CCP Appendix D, "Recommendations Regarding Plant Species for Use in GrSG Habitat Management and Restoration", Monsen 2005, and "Habitat Enhancement" strategy, pg. 349).	BLM, CDOT, CPW, County Governments, Industry, NPS, Private Landowners, SLB, USFS	Immediately following disturbance	**CPW: General -** CPW routinely makes this recommendation to land management agencies with regulatory authority in this area. CPW BMPs for oil and gas development (including roads) contain similar recommendations for revegetation and reclamation. **PPR -** Reclamation and revegetation of facilities (including roads) is specified in WMPs.	**CPW:** Researcher D. Johnston is studying methods to improve revegetation and reclamation success.
20.1.1.9	Prevent and control the spread of noxious and invasive weeds in disturbed areas associated with roads (see "Weeds" strategy, pg. 425).	BLM, CDOT, CPW, County Governments, SLB, USFS	Ongoing	**CPW: General -** CPW BMPs for oil and gas development (including roads) contain weed management recommendations. **MP -** Support is given for local county to spray road side weeds. **PPR -** WMP's include weed management strategies. CPW Researcher, D. Johnston, is studying ways to limit the establishment of weeds (particularly cheatgrass) in disturbed areas. **NP** - At this point, invasive weeds are not a problem in NP.	
20.1.1.10	Evaluate the effects of road placement and traffic levels on GrSG and GrSG habitat. **[See Research Strategies 21.1.2.3 and 21.2.1.2]**	CPW, Industry, LWGs, Universities	Begin by 2015		

21. Research					
ISSUE 21.1	It is not well understood how GrSG population dynamics and sustainability are impacted by (1) the quality and quantity of GrSG habitat; and (2) human-controlled activities in GrSG habitat.				
OBJECTIVE 21.1.1	*Evaluate the effects of habitat quality and quantity* on (1) GrSG behavior; and (2) the dynamics and sustainability of GrSG populations.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
21.1.1.1	Evaluate how the amount (i.e., "patch size"), configuration, and composition of GrSG habitat affect (1) sage-grouse behavior (e.g., movement and dispersal); (2) species distribution; (3) productivity; (4) population dynamics; and (5) population sustainability. Map and analyze landscape metrics (e.g., edge density, fragmentation, heterogeneity, fractal dimension), using the most reliable and current GIS data and examine the spatial and temporal correlation with sage-grouse population dynamics. Evaluate the potential for dispersal of individuals into currently unoccupied suitable habitat.	BLM, CDA, CPW, Industry, LWGs, NGOs, NRCS, Other Research Institutions, Private Landowners, SLB, Universities, USFS, USFWS, USGS, WAFWA	Begin by 2010	**See Appendix J: Literature Review**	
21.1.1.2	Develop a spatially-explicit population model that incorporates current estimates (with appropriate estimates of temporal and spatial variation) of demography and movement in order to evaluate the relative effects of changing land-uses on GrSG populations.	CCP SC, CPW, NGOs, Other Research Institutions, Universities	Begin by 2009	Thompson, T.R. 2012. Dispersal ecology of greater sage-grouse in northwestern Colorado; evidence from demographic and genetic data. Ph.D. Dissertation, University of Idaho, Moscow, Idaho, USA.	Research conducted in NW CO management zones 1, 3A, and 5.
21.1.1.3	Evaluate the effect(s) of vegetation "quality" (e.g., vegetation structure, sagebrush canopy height and cover, forb and grass height, diversity, and abundance, nutrition available to GrSG) on sage-grouse productivity, adult survival, and population dynamics.	BLM, CDA, CPW, Industry, LWGs, NRCS, Private Landowners, SLB, Universities, USFS, USFWS, USGS	Begin by 2012		
ISSUE 21.1	It is not well understood how GrSG population dynamics and sustainability are impacted by (1) the quality and quantity of GrSG habitat; and (2) human-controlled activities in GrSG habitat.				
OBJECTIVE 21.1.2	*Evaluate human-controlled impacts* on *GrSG habitat,* and the resulting implications for GrSG populations.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
21.1.2.1	Examine the effects of different habitat treatments on the quality, quantity, and configuration of GrSG habitat, and the responses of GrSG populations.	BLM, CDA, CPW, LWGs, NRCS, Private Landowners, UCEPC, USFS, USFWS, USGS	Begin by 2015		
21.1.2.2	Evaluate the effects of varying grazing management practices (domestic and wild ungulates) on the quality of GrSG habitat (e.g., grass and forb abundance, diversity, and vegetation structure).	BLM, CPW, CSU Extension, LWGs, NAGP, NRCS, Universities, USFS, WAFWA	Begin by 2015		
21.1.2.3	Evaluate the impacts of infrastructure, energy, and mineral development (including reclamation efforts following development), on the quality, quantity, and configuration of GrSG habitat.	CPW, CCP SC, LWGs, Universities	Begin by 2015		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
21.1.2.4	Evaluate the potential impact of (and techniques for) converting CRP to sagebrush habitat on sage-grouse distribution and population viability.	CPW, LWGs, NRCS, Private Landowners, Universities, UCEPC, USFS	Begin by 2010	**UCEPC** has installed one project in 2012 to benefit wildlife in previously cropped land. Another project underway, will be completed summer 2013.	**CPW** proposed research project (2014) that will evaluate the population and demographic response of Columbian sharp-tailed grouse to CRP habitat improvements.
ISSUE 21.2	It is not well-understood how GrSG behavior and demographics are impacted by human-controlled activities.				
OBJECTIVE 21.2.1	Evaluate the *impact of various human-controlled activities on GrSG behavior* , and the resulting implications for GrSG populations.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
21.2.1.1	Evaluate the impact of agricultural and residential development on the behavior, distribution, demography, and population dynamics of sage-grouse.	BLM, CPW, Universities	Begin by 2020		
21.2.1.2	Evaluate the effect of powerlines, fences, roads, and other human infrastructure on the behavior, distribution, demography, and population dynamics of sage-grouse.	CPW, Industry, LWGs, Universities	Begin by 2015		
21.2.1.3	Evaluate the impact of energy development on the behavior, distribution, demography, and population dynamics of sage-grouse. Include: (1) how specific factors affecting population parameters are influenced by energy development; and (2) the relative impact of specific aspects of oil and gas development (e.g., intensity, duration, and timing elements in PVA [see pg. 210]). Recognize the need and timeline necessary to integrate research data and results into energy development planning cycles.	USFWS, Industry, CPW, BLM	Begin by 2020	**CPW Research:** See 3.4.3.3	
21.2.1.4	Evaluate the effect of mining development on the behavior, distribution, demography, and population dynamics of sage-grouse.	CPW, Universities	Begin by Dec. 2008		
21.2.1.5	Evaluate the effect of recreational activities (e.g., lek viewing, hiking, camping, off-road vehicles, etc.) on the behavior, distribution, demography, and population dynamics of sage-grouse.	CPW, Other Research Institutions, Universities	Begin by 2020	This research not conducted, but CPW could use existing data to conduct post-hoc analyses with Colowyo Coal Pit.	
ISSUE 21.3	The effectiveness of current measures designed to protect GrSG from the impacts of energy and mineral development is not well understood.				
OBJECTIVE 21.3.1	Determine the effectiveness of the various programs and approaches designed to protect GrSG from the potential adverse impacts of energy and mineral development, and related infrastructure.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
21.3.1.1	Determine the effectiveness of energy and mining mitigation actions, reclamation, existing stipulations, and BMPs in protecting GrSG habitat and populations.	Universities, CPW	Begin by 2010	**CPW Research:** See 3.3.1.2 and 3.3.4.7	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
21.3.1.2	Determine the effectiveness of stipulations, restrictions, and guidelines designed to protect GrSG populations and habitat from the potential adverse impacts of infrastructure (e.g., powerlines, wind turbines, roads).	USGS, USFWS, USFS, NRCS, LWGs, CPW, CDA, BLM, APHIS	Begin by 2010	**BLM:** Habitat and population monitoring will continue in areas of development. BLM will continue to consider and incorporate new science in recommended restrictions and guidelines for SG in coordination with CPW. CPW has the lead on SG research in CO. **CPW Research:** See 3.3.1.2 above	
ISSUE 21.4	The impacts of predation on GrSG are not well understood.				
OBJECTIVE 21.4.1	Examine the effect(s) of predation on GrSG behavior and population dynamics.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
21.4.1.1	Determine age-specific mortality (especially for chick and adult females, as per the PVA sensitivity analysis [see pg. 217]) and identify the relative risks from avian and mammalian predation within local GrSG populations.	USGS, USFWS, USFS, LWGs, CPW, CDA, BLM, APHIS	Begin by 2010	Thompson, T.R. 2012. Dispersal ecology of greater sage-grouse in northwestern Colorado; evidence from demographic and genetic data. Ph.D. Dissertation, University of Idaho, Moscow, Idaho, USA.	Too early to assess to inform management. This work provided the first estimate of survival (1st yr of life) for GSG. Cause specific mortality was only assessed for broad grouping of avian vs. mammalian.
21.4.1.2	Implement research to better understand the behavioral and spatial interactions of GrSG predators with prey and other predator species.	USGS, USFWS, Universities, CPW, BLM,APHIS	Begin by 2015		
21.4.1.3	Evaluate the large-scale effects of landscape structure (e.g., composition and configuration of landcover types) and small-scale effects (e.g., perch site availability, vegetation structure, and predator exclosures) on GrSG predator-prey interactions.	USGS, USFWS, Universities, CPW, CDA, BLM, APHIS	Begin by 2015	Thompson, T.R. 2012. Dispersal ecology of greater sage-grouse in northwestern Colorado; evidence from demographic and genetic data. Ph.D. Dissertation, University of Idaho, Moscow, Idaho, USA.	Too early to assess.
21.4.1.4	Evaluate whether predator control aimed at specific predator species is an effective management tool that increases production and recruitment of sage-grouse in local populations.	USGS, USFWS, Universities, CPW, CDA, BLM, APHIS	Begin by 2015		
21.4.1.5	Evaluate the spatial and temporal interactions between different trophic levels (e.g., predators and prey) and between similar trophic levels (e.g., examine the impact of grazing by deer and elk on the quality of sagebrush habitats and its effect on sage-grouse behavior and productivity).	USGS, USFWS, USFS, Universities, NRCS, LWGs, CPW, CDA, BLM, APHIS	Begin by 2015		
ISSUE 21.5	WNV is lethal to GrSG and has been detected in Colorado, but few details are known about its potential impact on GrSG.				
OBJECTIVE 21.5.1	Investigate the potential impacts of WNV on GrSG populations in Colorado.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
21.5.1.1	Determine the level of susceptibility to WNV and survival patterns of each GrSG age and sex class. Examine whether sage-grouse can develop immunity to WNV and whether the immune response can be inherited.	CPW, NWRC, Other Research Institutions, Universities	Ongoing	Not conducted and not needed. CPW tested 16 samples in 2007 and only 1 tested positive for WNV. Colorado does not have a problem with WNV.	
21.5.1.2	Examine the spatial interaction of mosquito species that are the main vectors of the virus (e.g., Culex tarsalis and C. pipiens) with seasonal habitat use by GrSG (e.g., evaluate whether sage-grouse are more likely to be exposed to the virus in relatively wetter brood-rearing habitat than in lekking and nesting habitats).	CPW, Other Research Institutions, Universities	Begin by 2010	Not conducted and not needed. CPW tested 16 samples in 2007 and only 1 tested positive for WNV. Colorado does not have a problem with WNV.	
21.5.1.3	Examine the potential impact of WNV on GrSG population dynamics and viability.	CPW, Other Research Institutions, Universities	Ongoing	Not conducted and not needed. CPW tested 16 samples in 2007 and only 1 tested positive for WNV. Colorado does not have a problem with WNV.	
ISSUE 21.6	There is a lack of credible research on the theories of additive and compensatory mortality and sport harvest of GrSG.				
OBJECTIVE 21.6.1	Foster and support the research and the collection of data to gain knowledge about additive and compensatory mortality thresholds and sport harvest in GrSG.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
21.6.1.1	Initiate experimental field research designed to specifically address the issue of compensatory and additive mortality and GrSG. Collaborate with other western states that hunt GrSG.	CPW	Begin 2009, Continue 5 - 10 years		
ISSUE 21.7	Small isolated populations of greater sage-grouse may have low genetic diversity, which may facilitate inbreeding depression.				
OBJECTIVE 21.7.1	Monitor genetic diversity within the smaller isolated populations of greater sage-grouse in Colorado.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
21.7.1.1	Continue to develop and refine, if it proves feasible, techniques to obtain DNA from sage-grouse fecal droppings so that genetic testing can be accomplished without capturing birds.	CPW, Universities	Ongoing		
ISSUE 21.8	Current methods for monitoring trends in GrSG populations and for estimating GrSG population size from lek counts make many unsupported assumptions.				
OBJECTIVE 21.8.1	Conduct research to establish reliable and effective methods for monitoring GrSG population trends and estimating population size.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
21.8.1.1	Develop and evaluate protocols for the inventory and monitoring of GrSG populations and to evaluate factors that influence the population ecology of GrSG.	CPW, Universities	Begin by 2010		
21.8.1.2	Evaluate whether GrSG lek counts can be calibrated and measurements of accuracy and precision can be assessed using mark-resight or sightability models.	CPW, Universities	Begin by 2010		
21.8.1.3	Evaluate alternative methods for estimating GrSG population abundance (e.g., line transects or DNA fingerprinting using fecal samples).	CPW, Universities	Ongoing		

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
21.8.1.4	Determine the causes of mortality in different GrSG age and sex classes and the consequences for population dynamics.	USGS, USFWS, USFS, Universities, NRCS, LWGs, CPW, CDA, BLM, APHIS	Begin by 2015	Thompson, T.R. 2012. Dispersal ecology of greater sage-grouse in northwestern Colorado; evidence from demographic and genetic data. Ph.D. Dissertation, University of Idaho, Moscow, Idaho, USA.	
21.8.1.5	Examine the correlation (and time lag) between the variation in annual GrSG productivity and subsequent lek counts and its impact on the precision of population estimates.	USGS, USFWS, USFS, Universities, NRCS, LWGs, CPW, CDA, BLM	Begin by 2010		
21.8.1.6	Refine the population viability assessment of GrSG based on more accurate and precise estimates of demographic parameters.	USGS, USFWS, USFS, Universities, LWGs, CPW, CDA, BLM	Ongoing	**BLM:** BLM will partner with CPW on any updates to the PVA for GRSG and other research projects as appropriate. This has not been done to date.	

22. Weather					
ISSUE 22.1	There is a need to understand weather impacts on GrSG survivability and reproduction.				
OBJECTIVE 22.1.1	Investigate GrSG responses to drought and wet conditions.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
22.1.1.1	Review the literature and existing data regarding whether drought, precipitation, or temperature extremes during specific times of the year have a negative or positive effect on GrSG survivability and reproduction. Also search the literature regarding the effect of climatic conditions on insect and forb availability, as it pertains to the survivability of GrSG broods.	CPW, Other Research Organizations, Universities	2009	**CPW: General -** CPW staff keeps up-to-date on scientific literature. CPW recently contracted Rocky Mountain Wild to conduct climate change risk modeling for a number of wildlife species in Colorado, including GrSG (completed in 2012).	
ISSUE 22.2	There is a need to address drought impacts on GrSG survivability and reproduction.				
OBJECTIVE 22.2.2	Manage GrSG habitats in anticipation of drought conditions.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
22.1.2.1	Develop springs, wells, and other water sources, in appropriate GrSG areas, to provide reliable water and forb/insect production during drought conditions. Consider appropriate water development design to reduce WNV risk to GrSG. Consider appropriate fencing to protect these areas for sage-grouse use.	BLM, CPW, NRCS, Private Landowners, USFWS	2008 and ongoing	**CPW: General** - Wet meadow development is one of the habitat enhancement techniques employed by CPW to improve GrSG habitat. CPW staff supports efforts by local landowners, NRCS and FWS to improve water sources and to provide overflow and create wet seeps for GrSG. **See Appendix A: Habitat Treatments**	**CPW:** Several projects have been completed in GrSG areas. **MP -** On SWA lands, CPW has built water tanks for cattle and piped over flow to an adjacent area of GrSG. In addition CPW has created several shallow water development projects. **NWCO, NP** - CPW, BLM, USFWS, and private landowners have developed wells and seeps to increase forb/insect production for GrSG broods.
22.1.2.2	Manage invasive species in riparian, wet meadow, and uplands in GrSG range to improve the water table (see “Weeds” strategy, pg. 425).	BLM, CPW, County Governments, NRCS, Private Landowners, USFWS	2008 and ongoing	**CPW: General -** CPW has participated in tamarisk removal projects in several areas in NWCO, including portions of the Yampa, White, and Colorado river drainages. Projects have occurred on BLM, USFWS (Browns Park NWR), NPS (Dinosaur National Monument), and private lands. Dinosaur National Monument is leading an effort to eradicate tamarisk from the entire Yampa River drainage basin. CPW has provided significant funding for tamarisk and other riparian weed control efforts through the state's Wetlands Program.	
22.1.2.3	Educate the public and agencies on management that affects riparian and wet meadow areas used by GrSG. **[See Information, Communication, and Education Strategies 12.2.1.3 and 12.3.1.1]**	CPW	2009 / Annually beginning in 2008	**CPW: General -** In working with land management agencies and private landowners, CPW stresses the importance of improving the quality and quantity of riparian and wet meadow habitats. This issue is incorporated into CPW comments on land management plans, grazing permit renewals, habitat management plans, etc.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
22.2.2.4	In areas experiencing sagebrush mortality due to drought, adjust grazing practices, prescriptive fire, and/or vegetation management to minimize additive impacts on GrSG (see “Fire and Fuels Management” [pg. 334], “Grazing” [pg. 342] and “Habitat Enhancement” [pg. 349] strategy sections).	BLM, CPW, Private Landowners, USFWS	As needed.	**CPW: NWCO -** Significant portions of the NWCO population experienced sagebrush defoliation (and mortality in some instances) during the drought of 2001-02. Similar conditions were developing in western portions of the NWCO population in the summer of 2012.	**CPW: NWCO -** CPW has been actively reducing elk populations in the NWCO population to bring numbers down to the long-term population objective. This has been achieved in most herd units in the NWCO GrSG population.
22.2.2.5	Encourage land managers to reduce herbivory, and adjust prescriptive fire and/or vegetation management during times of drought.	BLM, CPW, Private Landowners, USFWS	As needed.	**CPW: General -** CPW regularly encourages grazers to plan for drought by grazing lands sustainably in the good years, so the land retains the capability of producing during drought years. This is a routine part of habitat evaluations conducted on ranches enrolled in CPW's Ranching for Wildlife program. Many of these ranches are concentrated in the **NWCO** population, but also occur in **NP, MWR and NESR**. CPW has also participated in discussion with BLM about appropriate levels of domestic and wild ungulate herbivory, particularly in the NWCO population. This has included participation on BLM Rangeland Health assessments, review and comment on grazing permit renewals, incorporation of BLM comments in big game herd management plans, etc. CPW has sponsored grazing management workshops in several key GrSG areas. **MP** -CPW staff have discussed stocking rates with landowners that have CPW easements.	
22.2.2.6	Develop grass banks for livestock producers to graze during extreme drought conditions (see “Grazing” strategy, pg. 342).	BLM, CPW, LWGs, NRCS, Private Landowners, SLB, USFS, USFWS	2008 and ongoing	**CPW: General (but with emphasis in NWCO) -** CPW has occasionally provided State Wildlife Areas as grass banks to offset grazing on GrSG habitat restoration areas. CPW has encouraged BLM to develop grass banks during RMP revisions, particularly in the NWCO population.	
22.2.2.7	Review agency policies and practices to explore adjusting agency policy (if deemed necessary) for the benefit of selected GrSG habitats during drought conditions.	BLM, CPW, USFWS	2008 and ongoing	**CPW: General (but with emphasis in NWCO) -** CPW has been actively reducing elk populations across GrSG range to bring herds into line with long-term objectives (that are sustainable across a range of environmental conditions). CPW authorizes domestic grazing on State Wildlife Areas to condition vegetation to provide high quality wildlife habitat. Grazing agreements include provisions for modification, or avoidance, of domestic livestock grazing in these areas during drought conditions.	

23. Weeds: Noxious and Invasive Plants					
ISSUE 23.1	There is a lack of information on invasive weed distribution in GrSG range in Colorado.				
OBJECTIVE 23.1.1	Gather and share information regarding the distribution of noxious and invasive weeds in GrSG range.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
23.1.1.1	Continue to cooperatively identify, map, and monitor undesirable noxious and invasive weed invasions that occur within GrSG habitat.	BLM, CPW, County Governments, LWGs, NPS, NRCS, SCDs, SLB, USFS	Ongoing	**SLB:** Funds treatment of noxious weeds through the Enhancement Fund (for improvements on trust lands enrolled in CPW's public access program) and the Noxious Weed Fund. Since 2004, SLB has spent over $582K on lands in the NW counties. **CPW: General** - CPW controls weeds on State Wildlife Areas and participates in weed management activities in other areas also. CPW provides significant funding for weed management efforts in several GrSG areas through the Habitat Partnership Program. **MP** - CPW staff monitor weeds on SWA and CPW easement properties and encourage weed control. Ongoing efforts have occurred on the Kemp-Breeze SWA for years and the owner of the Wolf-Taussig easement hired a private weed spray contractor to help with weed control along ditches and roads on the ranch. The local county sprays weeds along the road side. **NP** - At this point, invasive weeds are not a problem in NP. **NESR** - The BLM and USFS manage weeds within GrSG habitat. **PPR** - CPW agreements with energy companies in WMPs contain standards for weed management that are monitored on an annual basis. **Jackson County:** Actively monitors and controls invasive weeds in the NP area.	
23.1.1.2	Inform local work groups of identified invasive weed problems in GrSG range.	BLM, CPW, County Governments, NPS, NRCS, SCDs, SLB, USFS	Ongoing	**MP LWG -** LWG and CPW discuss weed control with landowners. Weeds in MP are limited mostly to ditches and roadsides (houndstongue and thistle), no wide spread problems with cheatgrass in MP.	
ISSUE 23.2	Within GrSG habitat, noxious and invasive weeds may adversely impact GrSG habitat.				
OBJECTIVE 23.2.1	Minimize the impacts of noxious and invasive weeds on GrSG habitat.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
23.2.1.1	Prevent new damaging invasions of noxious and invasive weeds in GrSG habitat. This refers to both new infestations of known weedy species and future infestations of as-yet-unidentified weed species. Coordinate efforts across property boundary lines.	BLM, CPW, County Governments, LWGs, NPS, NRCS, SCDs, SLB, USFS, USFWS	Ongoing	**Grand**: 1) Middle Park Habitat Partnership Program provides landowners in production ag up to $500 year to be used for purchase of herbicides. 2) Includes weed control conditions to Special Use Permits related to gound disturbance in sage grouse habitat. Penalties for non-compliance include a hearing before the BCC, which may result in revocation of permit. **CPW**: General - CPW BMPs for oil and gas development recommend construction equipment be cleaned to remove weed seeds prior to moving to new sites. Similar requirements are included in the COGCC Rules. CPW regularly makes recommendations that weed free mulch be used for reclamation and that weed free hay be required for backcountry stock feeding.	**Grand**: seeing substantial decrease in houndstongue, thistle and black henbane on private lands in GHG habitat.
23.2.1.2	Conduct local workshops emphasizing the prevention of new weed infestations. Include topics on cleaning equipment and vehicles including recreational equipment, minimizing ground disturbance, and spread of seeds.	County Governments	2008	**Moffat**: See 3.2.1.10-3.2.2.7. **Grand**: Works actively with landowners. Policy to fill an approved container each week up to 4 gallons of pre-mixed herbicide free of charge (Free Friday Herbicide Program).	**Grand**: substantial decline in noxious weeds throughout the county.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
23.2.1.3	Treat all new and existing noxious weed infestations. Treatments may include biological controls, cultural controls such as grazing (see "Grazing" strategy, pg. 342), chemical controls and any other method considered safe and effective. Coordinate efforts across boundary lines. See "Habitat Enhancement" strategy, pg. 349.	BLM, CPW, County Governments, LWGs, NPS, NRCS, SCDs, SLB, USFS, USFWS	Ongoing	**Grand County**: contracts with BLM to treat weed infestation on BLM grazing allotments in GSG habitat. **CPW:** General - CPW actively manages weeds on State Wildlife Areas. CPW provides significant funding for weed control activities on other lands through the Habitat Partnership Program, particularly in the **NWCO and MWR** populations. **MP** - Effort is made to treat known weed infestations on SWA and conservation easements in MP. **PPR** - WMPs include weed management standards that are reviewed annually with energy companies. **NP** - At this point, invasive weeds are not a problem in NP. **NESR** - Cooperative efforts are made to control weed infestations in GrSG habitat.	**Grand:** Noxious weeds in GSG habitat in Grand County treated now since 2001. Obvious substantial reduction in % cover. Native vegetation including sage brush is naturally reestablishing.
23.2.1.4	Monitor the effectiveness of treatments of noxious and invasive weeds in GrSG habitat.	BLM, CPW, County Governments, LWGs, NPS, NRCS, SCDs, SLB, USFS, USFWS	Ongoing	**CPW: General -** CPW monitors weed control efforts on SWA and conservation easements. **PPR -** Weed management requirements are built into WMPs. CPW and WMP energy companies meet annually to review weed management progress.	
23.2.1.5	Keep land managers informed of the latest technology in habitat restoration techniques for weed-infested areas in GrSG habitat by providing periodic technology transfer workshops. [See also Information, Communication, and Education Strategies 12.2.1.3 and 12.3.1.1]	BLM, CPW, County Governments, LWGs, NRCS, USFS	Every 5 years starting in 2008	**CPW: General -** CPW Researcher D. Johnston is conducting research on weed infestations (particularly cheatgrass) on disturbed lands. Research results are disseminated widely, including in semi-annual research up-date conferences for industry and other stakeholders. Research reports are available on CPW's public website.	
ISSUE 23.3	Within GrSG habitat, there is a need for information sharing and coordination among weed managers.				
OBJECTIVE 23.3.1	Improve communication and coordination among those involved with weed and pest management within GrSG range.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
23.3.1.1	The local weed program manager or other entities will keep a database of all lands with developed weed management plans, within occupied GrSG habitat.	BLM, CPW, County Governments, LWGs, NPS, NRCS, SCDs, SLB, USFS	Ongoing	**CPW: General -** CPW maintains records of weed infestations and treatment efforts on State Wildlife Areas.	
23.3.1.2	Inform local weed program managers of all pest management plans developed within GrSG range.	BLM, CPW, County Governments, LWGs, NPS, NRCS, SCDs, SLB, USFS	Ongoing		
23.3.1.3	Organize and participate in annual workshops with all land managers to identify the most threatening weed problems in GrSG habitat, and to prioritize efforts for control. [See also Information, Communication, and Education Strategies 12.2.1.3 and 12.3.1.1]	BLM, CPW, County Governments, Industry, LWGs, NRCS	Ongoing	**Grand County, Summit County**, and "Friends of the Lower Blue" working together to educate landowners on importance of noxious weed control. Kickoff meeting will be spring 2013.	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
ISSUE 23.4	There is a lack of funding for developing integrated weed management plans, and for application of weed control treatments.				
OBJECTIVE 23.4.1	Identify and provide funding for land managers to scout, map, develop management plans for, and apply treatments to address invasive and noxious weeds.				
Reference Number	**Conservation Strategy**	**Responsible Parties**	**Timeline**	**Implementation**	**Effectiveness**
23.4.1.1	Encourage land management agencies and industry to fund integrated weed management programs in GrSG range.	BLM, CPW, County Governments, Industry, LWGs, NRCS, SLB, USFS	Ongoing	**CPW: General -** CPW provides significant funding for weed control efforts to improve habitat conditions through the Habitat Partnership Program. **NWCO -** CPW has been an active participant in integrated weed management efforts (generally in partnership with BLM and Moffat County) in several GrSG areas within the NWCO population (e.g., Axial Basin, Hiawatha).	
23.4.1.2	Develop a list of funding opportunities for invasive and noxious weed management.	NRCS	2008		

Appendix A. Vegetation treatments and other projects designed to improve GrSG habitat. First 2 tables summarize acreages of plans and treatments, respectively. The 3rd table provides details of each treatment / plan. All treatments are 2001 ï January 2013. Rows highlighted in yellow indicate projects that were completed or where progress occurred from January 2012 through January 2013.

PLANS - (e.g., Wildlife Mitigation Plans, Grazing Plans, Ranch Management Plans, and Habitat Suitability Plans) Affected Acres

	GrSG Population						
Completion Date	**MP**	**MWR**	**NESR**	**NP**	**NWCO**	**PPR**	**Total**
2004	4,500						4,500
2005	4,500						4,500
2006	4,500				55,332		59,832
2007	4,500						4,500
2008				123	114,997		115,120
2009					26,802	57,697	84,499
2012					800		800
Total	18,000			123	197,931	57,697	273,751

Treatments (Habitat Manipulation) -Affected Acres

	GrSG Population						
Completion Date	**MP**	**MWR**	**NESR**	**NP**	**NWCO**	**PPR**	**Total**
2001					550		550
2002					200		200
2003					197		197
2004	1,921				50		1,971
2005	3,020		50	4,123	750		7,943
2006	1,268		280	813	360		2,721
2007	3,891		265	651	5,966		10,773
2008	490		936	13	4,408		5,847
2009	645	227	400	206	7,687		9,165
2010	80	26	167		172	221	666
2011	565		488		5,052	894	6,999
2012	500		958		1,376		2,834
Total	12,380	253	3,544	5,806	26,778	1,115	49,876

Details of vegetation treatments and other projects designed to improve GrSG habitat.

Popula-tion	Date	Project Name	Objectives	# Acres	Partners
MP	2005	Cow Gulch rangeland Aerial Fertilization	Increase herbaceous and grass production and stimulate sagebrush growth, also increase the amount of crude protein in sagebrush	40	BLM, CDOW, Summit County
MP	2005	Pinto Creek mechanical sagebrush treatment and seeding	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	300	Private, CDOW
MP	2006	Woods Sagebrush treatments via Brushbeating and Lawson Aerator	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	36	Private, CDOW
MP	2005	Multiple ranches, clover and ladak alfalfa interseeding around meadow edges	Improve brood rearing forage by planting a beneficial plant throughout Middle Park along irrigation ditches	750	CDOW, NRCS, Private
MP	2006	Multiple ranches, clover and ladak alfalfa interseeding around meadow edges	Improve brood rearing forage by planting a beneficial plant throughout Middle Park along irrigation ditches	120	NRCS, Private
MP	2007	Multiple ranches, clover and ladak alfalfa interseeding around meadow edges	Improve brood rearing forage by aerial application of clover seed along irrigation ditches throughout Middle Park	1,600	CDOW, NRCS, Private
MP	2007	East Fork Troublesome Creek Riparian Fencing	Improve sagebrush and riparian habitat by fencing out livestock	19	CDOW, USFWS Partners
MP	2007	Whitely Peak Sagebrush treatments via mowing	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	5	CDOW, USFWS Partners
MP	2007	Antelope Creek aerial herbicide spraying	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	245	CDOW, NRCS, USFWS Partners
MP	2007	Gunsight Pass Sagebrush treatments via brushbeating	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	5	CDOW, USFWS Partners
MP	2007	Gunsight Pass aerial herbicide spraying & range seeding	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	128	CDOW, NRCS, USFWS Partners
MP	2007	Gunsight pass riparian fencing	Improve sagebrush and riparian habitat by fencing out livestock	3,700 ft.	CDOW, NRCS, USFWS Partners
MP	2004	Red Mountain Rangeland Aerial Fertilization	Increase herbaceous and grass production and stimulate sagebrush growth, also increase the amount of crude protein in sagebrush	100	BLM, CDOW
MP	2005	Sulphur Gulch rangeland Aerial Fertilization	Increase herbaceous and grass production and stimulate sagebrush growth, also increase the amount of crude protein in sagebrush	40	BLM, CDOW
MP	2005	Muddy Creek Kremmling, rangeland Aerial Fertilization	Increase herbaceous and grass production and stimulate sagebrush growth, also increase the amount of crude protein in sagebrush	70	BLM, CDOW
MP	2006	West of Corral Creek, Rangeland Aerial Fertilization	Increase herbaceous and grass production and stimulate sagebrush growth, also increase the amount of crude protein in sagebrush	275	BLM, CDOW
MP	2006	Sulphur Gulch Rangeland Aerial Fertilization	Increase herbaceous and grass production and stimulate sagebrush growth, also increase the amount of crude protein in sagebrush	234	BLM, CDOW
MP	2007	Sulphur Gulch crested wheat removal	Improve rangeland and habitat quality by removing crested wheatgrass and planting native shrubs, forbs and grasses	100	BLM, CDOW
MP	2007	Sulphur Gulch native reseeding	Improve rangeland and habitat quality by removing crested wheatgrass and planting native shrubs, forbs and grasses	100	BLM, CDOW

Popula-tion	Date	Project Name	Objectives	# Acres	Partners
MP	2004	Derringer Dixie Harrow Project	Reduce woody overstory, increase forage production and species diversity, watershed hydrology, seral diversity, wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	374	Private
MP	2004	BVR Brush Beating, 2004	Reduce woody overstory, increase forage production and species diversity, watershed hydrology, seral diversity, wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	40	Private
MP	2004	Camp Creek Prescribed Burn	Reduce woody overstory, increase forage production and species diversity, watershed hydrology, seral diversity, wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	600	Private
MP	2004	BVR Noxious Weeds, 2004	Reduce cover and spread of noxious weed species, propagate native forage production, expand wildlife habitat	30	Private
MP	2004	East Side Watershed Project	Capture and hold water runoff, catch sediment and slow erosion, foster creation of artificial wetlands, provide water sources for livestock and wildlife,	20	Private
MP	2004	East Side Prescribed Grazing, 2004	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	4,500	Private
MP	2005	BVR Brush Beating, 2005	Reduce woody overstory, increase forage production and species diversity, watershed hydrology, seral diversity, wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	35	Private
MP	2005	BVR Noxious Weeds, 2005	Reduce cover and spread of noxious weed species, propagate native forage production, expand wildlife habitat	20	Private
MP	2005	East Side Prescribed Grazing, 2005	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	4,500	Private
MP	2006	BVR Brush Beating, 2006	Reduce woody overstory, increase forage production and species diversity, watershed hydrology, seral diversity, wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	30	Private
MP	2006	BVR Noxious Weeds, 2006	Reduce cover and spread of noxious weed species, propagate native forage production, expand wildlife habitat	103	Private
MP	2006	East Side & State Pasture Prescribed Grazing, 2006	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	4,500	Private
MP	2007	BVR Brush Beating, 2007	Reduce woody overstory, increase forage production and species diversity, watershed hydrology, seral diversity, wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	33	Private
MP	2007	BVR Noxious Weeds, 2007	Reduce cover and spread of noxious weed species, propagate native forage production, expand wildlife habitat	110	Private
MP	2007	East Side & State Pasture Prescribed Grazing, 2007	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	4,500	Private
MP	2008	BVR Noxious Weeds, 2008	Reduce cover and spread of noxious weed species, propagate native forage production, expand wildlife habitat	86	Private

Popula-tion	Date	Project Name	Objectives	# Acres	Partners
MP	2009	BVR Brush Beating, 2008	Reduce woody overstory, increase forage production and species diversity, watershed hydrology, seral diversity, wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	35	Private
MP	2004	Lone Pine Timber Project	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	42	Private
MP	2005	Four-Forty Timber Project	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	101	Private
MP	2006	Welcome Point Timber Project	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	300	Private
MP	2007	State Pasture Timber Project	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	450	Private
MP	2008	Hunter & Sheephorn Timber Projects	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity)	404	Private
MP	2005	Junction Butte sagebrush treatments and Lawson Aerator	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	361	BLM
MP	2005	Mitchell Reservoir sagebrush treatments via and Lawson Aerator	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	90	BLM
MP	2005	McQuery Gulch sagebrush treatments via Lawson Aerator	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	528	BLM
MP	2005	Moore Reservoir sagebrush treatments via Lawson Aerator	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	475	BLM
MP	2005	Barger Gulch sagebrush treatments via Lawson Aerator	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	200	BLM
MP	2005	BLM Wolford Management Area seeded seven miles of closed routes	Reclaim closed vehicle routes with beneficial forbs and grasses.	10	BLM
MP	2006	Antelope Creek Riparian Fencing	Improve sagebrush and riparian habitat by fencing out livestock	40	BLM
MP	2006	South of Pinto Creek sagebrush treatments via Brushbeating	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	100 out of 300	BLM
MP	2007	South of Carter Creek sagebrush treatments via Dixie Harrow	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	160	BLM

Popula-tion	Date	Project Name	Objectives	# Acres	Partners
MP	2007	Gunsight Pass sagebrush treatments via Dixie Harrow	Improve brood rearing and summer habitat by stimulating re-growth of sagebrush, forbs and grasses.	200	BLM
MP	2004	Hartman Divide Piñon Juniper Removal	Remove piñon juniper within historic range to improve habitat conditions	715	BLM
MP	2006	Hartman Divide Piñon Juniper Removal	Remove piñon juniper within historic range to improve habitat conditions	30	BLM
MP	2007	Junction Butte Fertilization	Increase herbaceous and grass production and stimulate sagebrush growth; also increase the amount of crude protein in sagebrush.	400	CDOW
MP	2007	Hunter Springs Weed Spraying	Canada thistle reduction to favor native plant species.	1	USFS
MP	2007	Muddy Allotment Weed Spraying	Yellow toadflax and Canada thistle control for native plant species recovery.	15	USFS
MP	2009	Back Troublesome Grouse Friendly Fencing	NRCS & FWS developed ponds on private property in close proximity to a sage-grouse lek. The DOW paid for fencing material for a temp electric fence so as to negate the need for a permanent fence which can cause grouse collisions and predator perches.	20	CDOW, NRCS, PFW, Private
MP	2009	DOW SWA Kemp Flats Shallow Pond Development	Develop shallow water ponds for wildlife. Will benefit sage-grouse by providing brood and summer foraging habitat. Flooded a weed infested patch of sagebrush habitat.	40	CDOW
MP	2009	BVR, Noxious Weed Control, 2009	Reduce cover and spread of noxious weed species, propagate native forage production, expand wildlife habitat.	100	Private
MP	2009	BVR, 2009 Jones Res/Romaine Timber Harvest	Increase forage production and species diversity, watershed hydrology, forest health and age class diversity, aspen regeneration and wildlife habitat improvement (landscape heterogeneity, edge, species diversity).	450	Private
MP	2010	Brood and Summer Habitat Fencing and Improved Grazing Project	Protection and restoration of brood and summer habitat via fencing and deferred grazing	80	Private, USFWS Partners, CDOW
MP	2011	Fertilized land	BLM Fertilized lands north of Granby landfill	350	BLM
MP	2011	Dixie Harrow	BLM Dixie Harrowed lands near Antelope Pass	200	BLM
MP	2011	Private lands water development project	Rangeland improvements to better water supply for livestock and provide 3 stock tanks and overflow.	2	Private
MP	2011	Alfalfa seeding	Alfalfa seeding on private lands	6	Private
MP	2011	Reclamation of Gravel Pit lek site.	Reseeding and contouring of gravel pit for lek site. Completed with seed from CPW.	5	CPW, Grand County, Private
MP	2011	Legume seeding in agricultural fields	Private lands test plots of legume seeding in agricultural fields. Testing different plant species over a 3 year period.	2	Private
MP	2011	Clover Seed Availability	NRCS clover seed made available to the public to seed along irrigated hay meadows and ditches. They make 2,000 lbs available each year to MP landowners.	NA	CPW, NRCS, Private
MP	2012	Pinyon-Juniper Removal	Pinyon-Juniper removal via hand clearing on 500 acres north of Kremmling.	500	CPW, FWS, NRCS, Private

Popula-tion	Date	Project Name	Objectives	# Acres	Partners
MP	2012	Fence Marking	Fence marking of 500m on private property. Wooded stays were added on long spans (12-16') to increase visibility and reflectors were placed over the draw where stays could not be added. The fence is located adjacent to a lek and winter concentration area. One fence strike was identified prior to the marking project.		CPW, NRCS, Private
MWR	2009	Wenschhof Easement Pasture Fence	Install wildlife-friendly fence on the Wenschhof Easement (held by CDOW) to better manage cattle grazing between irrigated pasture areas and upland sagebrush habitat. The fence will allow for better seasonal use of areas important for sage-grouse nesting.	202	CDOW, Private
MWR	2009	SCTF: Oak Ridge SWA PJ Removal	Remove encroaching PJ to restore GrSG habitat	25	CDOW
MWR	2010	SCTF: Oak Ridge SWA PJ Removal	Remove encroaching PJ to restore GrSG habitat	26	CDOW
NP	2005	Owl Ridge II Brush beat	Create small openings in sagebrush stand. Increase grass and forb component and create diversity of sagebrush age classes in brood habitat.	310	BLM/ North Park Habitat Partnership Program (NPHPP), Owl Mountain Partnership (OMP)
NP	2005	Owl Ridge II Lawson Aerator	Create small openings in sagebrush stand. Increase grass and forb component and create diversity of sagebrush age classes in brood habitat.	200	BLM/ NPHPP
NP	2006	Big Horn reseeding	Restore understory in a degraded grazing allotment	300	BLM, OMP, CDOW, Partners for Wildlife (PFW), Private, NPHPP
NP	2005	Refuge Cross Fence	build cross fence to improve grazing management options	1,693	CDOW, USFWS Refuges
NP	2005	Deer Creek WHIP	Install cross fence to improve grazing management; small sagebrush treatment	1,920	NRCS, PFW, OMP
NP	2007	Mexican Creek brushbeat and wet seep development	100 acres of small sagebrush treatments (brushbeating 1-5 acres); install solar pump on well and dribble water across ground to create wet seep for brood habitat	150	CDOW, PFW, OMP, Private
NP	2006	Tointon brushbeat	Create small openings in sagebrush stand. Increase grass and forb component and create diversity of sagebrush age classes in brood habitat.	200	BLM
NP	2006	Mexican Ridge brushbeat	Create small openings in sagebrush stand. Increase grass and forb component and create diversity of sagebrush age classes in brood habitat.	200	CDOW, OMP
NP	2006	Snakeweed removal	Herbicide treatment to remove snakeweed in order to improve grass and forb component	100	BLM
NP	2007	Owl Ridge Brush beat	Create small openings in sagebrush stand. Increase grass and forb component and create diversity of sagebrush age classes in brood habitat.	200	BLM
NP	2006	Government Creek Exclosure Repair	Fencing to protect riparian/wetland habitat	0.6	BLM
NP	2006	Sheep Mtn. Fen	Fencing to protect riparian/wetland habitat	7.2	BLM
NP	2006	Sheep Mtn. Fen - Electric Fence	Fencing to protect riparian/wetland habitat	3.5	BLM
NP	2006	Soap Creek riparian - electric fence 2006	Fencing to protect riparian/wetland habitat	0.6	BLM

Popula-tion	Date	Project Name	Objectives	# Acres	Partners
NP	2007	Soap Creek riparian - electric fence 2007	Fencing to protect riparian/wetland habitat	0.6	BLM
NP	2007	Seymour brushbeat	Create small openings in sagebrush stand. Increase grass and forb component and create diversity of sagebrush age classes in brood habitat.	100	OMP, Mule Deer Foundation (MDF)
NP	2007	McFarlene brushbeat	Create small openings in sagebrush stand. Increase grass and forb component and create diversity of sagebrush age classes in brood habitat.	200	OMP
NP	2008	Bush Draw Wet Seep	Dribble water across ground to create a wet seep area to enhance grass and forb growth and improve the insect component in brood habitat	2	CDOW, BLM
NP	2008	Walden Reservoir Wet Seep	Dribble water across ground to create a wet seep area to enhance grass and forb growth and improve the insect component in brood habitat	2	CDOW, BLM
NP	2009	Owl Mountain State Wildlife Area (SWA) Wet Seep	Dribble water across ground to create a wet seep area to enhance grass and forb growth and improve the insect component in brood habitat	2	CDOW, NPHPP, OMP
NP	2009	Refuge Wet Seep	Dribble water across ground to create a wet seep area to enhance grass and forb growth and improve the insect component in brood habitat	2	CDOW, USFWS, OMP
NP	2008	N/S State Lease Wet Seep	Dribble water across ground to create a wet seep area to enhance grass and forb growth and improve the insect component in brood habitat	2	CDOW, SLB, OMP
NP	2008	Cat Canyon Spring Development and Fencing Project	Develop spring and fence out the riparian area to relieve grazing pressure. Improve mesic vegetation condition and improve brood rearing habitat.	5	RMEF, SLB, Private, North Park Habitat Partnership Program (NPHPP), Owl Mountain Partnership (OMP)
NP	2008	Cowdrey Irrigation Improvement/Grazing Plan	Grazing plan and irrigation agreement to improve sage-grouse breeding and brood rearing habitat. Increased overall vegetative cover, residual cover and improved forb condition. Fence removal to improve overall wildlife habitat.	123	CDOW, Private, PFW
NP	2008	Box Spring Exclosure	Fencing to protect riparian/wetland habitat	2	OMP, CDOW
NP	2009	Shawver Wet Seep Development	Create wet seep; improve insect component in brood habitat.	2	CDOW, Private, North Park Habitat Partnership Program (NPHPP), Owl Mountain Partnership (OMP)
NP	2009	MacFarlane State Trust Land Sagebrush Treatment	Improve sagebrush age class diversity and density and improve understory communities. Improve brood-rearing habitat. Dixie Harrow	200	CDOW, Private, North Park Habitat Partnership Program (NPHPP), Owl Mountain Partnership (OMP)
NESR	2005	Redmond WHIP - NRCS	Create small openings in sagebrush stand. Increase grass and forb component and create diversity of sagebrush age classes in brood habitat. Restore riparian habitat	50	NRCS, PFW
NESR	2008	Devil's Grave WHIP	Improve grazing management through cross-fencing and water development. Create Wet seeps for brood habitat.	936	NRCS, PFW, CDOW
NESR	2007	State Bridge Hand Cutting	Hand cutting PJ in and around GrSG habitat to improve and restore habitat.	220	BLM
NESR	2006	Sunnyside PJ Treatment	Remove encroaching PJ to restore functional habitat	120	BLM, CDOW

Popula-tion	Date	Project Name	Objectives	# Acres	Partners
NESR	2006	Sunnyside PJ Treatment	Remove encroaching PJ to restore functional GrSG habitat	160	CDOW, Private
NESR	2009	Windy Point PJ Treatment	Remove encroaching PJ to restore functional GrSG habitat	400	BLM, CDOW
NESR	2007	Watson Creek treatment	Create small openings in sagebrush stand. Increase grass and forb component and create diversity of sagebrush age classes in brood habitat.	45	BLM, CDOW, Private
NESR	2010	SCTF: PJ Removal	Hydroaxe treatment to remove pinyon juniper in sagebrush community. Sage-grouse fitted with GPS transmitter documented sage-grouse use of similar hydroaxe on adjacent property	167	CDOW, Private
NESR	2011	SCTF: PJ Removal	Remove encroaching PJ to restore functional GRSG habitat.	488	CPW, BLM
NESR	2012	SCTF: PJ Removal	Remove encroaching PJ to restore functional GRSG habitat (Hydroaxe treatment).	410	CPW, BLM
NESR	2012	PJ Removal	Remove encroaching PJ to restore functional GRSG habitat (Handcutting treatment).	263	BLM, CPW
NESR	2012	SCTF: PJ Removal	Remove encroaching PJ to restore functional GRSG habitat (Hydroaxe treatment).	85	CPW, USFS
NESR	2012	PJ Removal	Remove encroaching PJ to restore functional GRSG habitat (Handcutting treatment).	200	USFS
NWCO	2008-2009	Butler WHIP Seeding	Improve grass and forb diversity and improve structure in old ag field that had been planted for upland hay	330	NRCS, CDOW, PFW
NWCO	2003	Mystic WHIP	Improve grass and forb diversity and improve structure in retired CRP	197	CDOW, NRCS
NWCO	2005	Sevenmile Ridge PJ project - Phase 1	Remove PJ to restore areas back to sagebrush to provide GrSG habitat	750	BLM
NWCO	2007	Bighole Gulch Sagebrush Treatment	Enhancement of GrSG brood-rearing habitat through sagebrush management.	875	NRCS, Private
NWCO	2007	Dunkely Flattops Sagebrush Treatment	Enhancement of GrSG brood-rearing habitat through sagebrush management.	108	NRCS, Private
NWCO	2009	Sevenmile Draw Brushbeat	Stand age diversity and improved understory	660	BLM
NWCO	2009	Sevenmile Ridge PJ treatment - Phase 2	Remove young piñon and juniper trees to maintain sagebrush communities. Handcutting.	1,000	BLM
NWCO	2007	Cold Springs Phase 1	Improve brood rearing habitat and create a diversity of sagebrush age classes. Small, randomly located patches aerially sprayed with 2,4-D to treat about 20% 4121 acres of sagebrush. Patches 0.1-0.4 acres each.	4,121	BLM, State, Private
NWCO	2008	Cold Springs Phase 2	Improve brood rearing habitat and create a diversity of sagebrush age classes. Small, randomly located patches aerially sprayed with 2,4-D to treat about 20% of 3248 acres of sagebrush. Patches 0.1-0.4 acres each.	3,248	BLM, State, Private
NWCO	2009	Cold Springs Phase 3	Improve brood rearing habitat and create a diversity of sagebrush age classes. Small, randomly located patches aerially sprayed with 2,4-D to treat about 20% of 4213 acres of sagebrush. Patches 0.1-0.4 acres each.	4,213	BLM, State, Private
NWCO	2008	Diamond Peak Phase 1	Improve brood rearing habitat and create a diversity of sagebrush age classes. Small, randomly located patches aerially sprayed with spike to treat about 20% of 1000 acres of sagebrush. Patches 0.1-0.4 acres each.	1,000	BLM

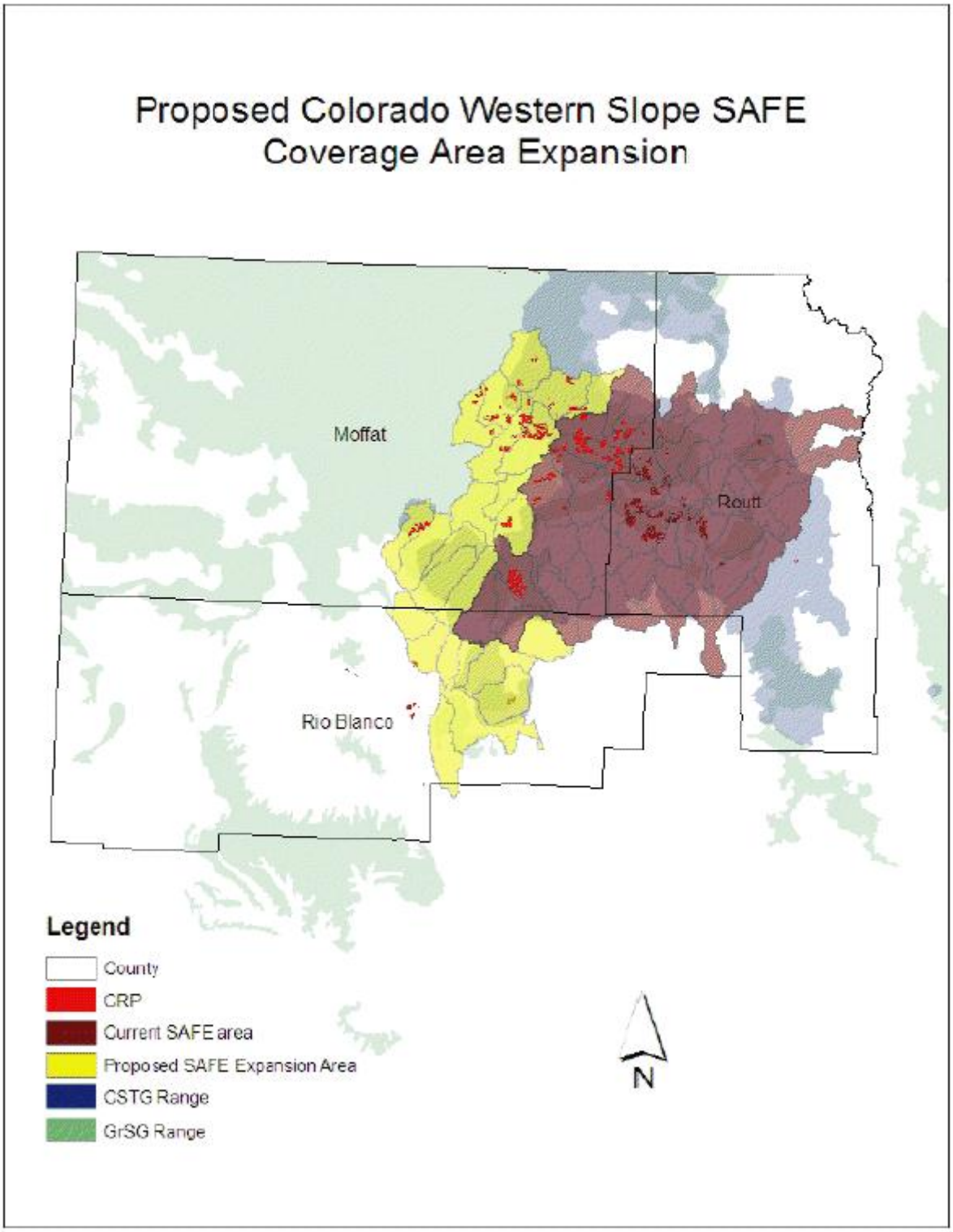
Popula-tion	Date	Project Name	Objectives	# Acres	Partners
NWCO	2009	Diamond Peak Phase 2	Improve brood rearing habitat and create a diversity of sagebrush age classes. Small, randomly located patches aerially sprayed with spike to treat about 20% of 1000 acres of sagebrush. Patches 0.1-0.4 acres each.	500	BLM
NWCO	2008	Blue Mountain Brush Beat	Improve sagebrush age-class diversity and density and improve understory communities. Trying to bring sagebrush vegetative cover closer to ground level for improved nesting habitat. Brush beating	160	BLM
NWCO	2009	Bighole Gulch Grazing Management	Rotational grazing to enhance regionally important brood area	14,000	BLM, Private
NWCO	2009	Axial Basin	Weed management, primarily for whitetop. Is part of the Axial basin CRM	500	BLM
NWCO	2006	Lemon Springs Grazing Mgt.	Grazing Management	20,737	BLM
NWCO	2008	Vermillion Ranch Grazing Management	Grazing Management	58,000	Private, BLM, State
NWCO	2000	CA Park Grouse Habitat Restoration Project 2000	Habitat Restoration - seeding	10	USFS, CDOW
NWCO	2001	CA Park Grouse Habitat Restoration Project 2001	Habitat Restoration - seeding	500	USFS, CDOW
NWCO	2001	CA Park Grouse Habitat Restoration Project - Therber fescue plugs	Habitat Restoration - planting therber fescue plugs	50	USFS, CDOW
NWCO	2002	CA Park Grouse Habitat Restoration Project 2002	Habitat Restoration - fertilization of 2001 seeding	200	USFS, CDOW
NWCO	2004	CA Park Grouse Habitat Restoration Project 2004	Habitat Restoration - seeding	50	USFS, CDOW
NWCO	2006	CA Park Grouse Habitat Restoration Project 2006	Habitat Restoration - seeding	200	USFS, CDOW
NWCO	2006	Rangeland Management Plan	Grazing Management Plan	34,595	USFS
NWCO	2012	CA Park Second Creek Restoration Plan	Overarching Restoration Plan for the Grouse Habitat improvement in CA Park 2nd Creek Pasture	800	USFS, CDOW
NWCO	2009	Stewardship Range Management Plan (Slater Park)	Grazing Management Plan	12,802	USFS
NWCO	2006	Bitterbursh SWA understory enhancement	Enhance/restore degraded meadow understory to improve brood habitat for greater sage-grouse and re-establish nesting cover within closer proximity to meadow. Interseeding bunchgrasses, forbs and big sagebrush.	160	CDOW
NWCO	2007	NPS Slaugh-Wall Sagebrush Treatment	Improve sagebrush structure for more effective nesting habitat.	862	BLM, NPS
NWCO	2008	Cold Springs Vegetative Assessment	Obtain vegetative baseline for future habitat project and grazing management	20,262	SLB, CDOW
NWCO	2008	Baker's Peak Vegetative Assessment	Obtain vegetative baseline for future habitat project and grazing management	12,408	SLB, CDOW
NWCO	2008	Nipple Rim/Sand Wash Vegetative Assessment	Obtain vegetative baseline for future habitat project and grazing management	24,327	SLB, CDOW
NWCO	2009	SCTF: Blue Mountain-Three Springs PJ Removal	Remove encroaching PJ to restore functional GrSG habitat	339	Private, BLM, CDOW

Popula-tion	Date	Project Name	Objectives	# Acres	Partners
NWCO	2009	SCTF: Serviceberry Mountain PJ Removal	Remove encroaching PJ to restore functional GrSG habitat	145	BLM, SLB, CDOW
NWCO	2010	SCTF: Axial Basin Interseed	Increase understory diversity and productivity in pasture grass stand	95	Private, CDOW
NWCO	2010	SCTF: Axial Basin Restoration	Restore agricultural land to native sagebrush community	77	Private, NRCS, CDOW
NWCO	2011	SCTF: Bear Valley PJ Removal	Remove encroaching PJ to restore functional GrSG habitat	1,434	Private, BLM, CDOW
NWCO	2011	SCTF: Peck Mesa PJ Removal	Remove encroaching PJ to restore functional GrSG habitat	167	Private, BLM, CDOW
NWCO	2011	SCTF: Cedar Mountain Restoration	Restore agricultural land to native sagebrush community	192	Private, NRCS, CDOW
NWCO	2011	SCTF: Alkali Fire Restoration	Seed burned area to increase likelihood of desirable species response	1,650	Private, NRCS, FWS Partners, CDOW
NWCO	2011	SCTF: GMU 1 PJ Removal	Remove encroaching PJ to restore functional GRSG habitat	207	CPW, Private
NWCO	2011	SCTF: Ag Restoration in NWCO population.	Began the process of restoring 1290 acres of old CRP (smooth brome and intermediate wheatgrass) with wildlife seed mix that includes sagebrush, native grasses, and forbs. 112 acres cultivated ground seeded with same wildlife mix.	1,402	CPW, Private
NWCO	2012	SCTF: GMU 1 PJ Removal Phase II	Remove encroaching PJ to restore functional GRSG habitat	174	CPW, Private
NWCO	2012	SCTF: Ag Restoration in NWCO population.	Began the process of restoring an additional 571 acres of old CRP (smooth brome and intermediate wheatgrass) to a wildlife seed mix that includes sagebrush, native grasses, and forbs. Practice involves extensive seed-bed prepation prior to seeding.	571	CPW, Private, NRCS, FSA
NWCO	2012	SCTF: Ag Restoration in NWCO population.	Aerial application of locally adapted mountain big sagebrush to CRP restoration areas.	631	CPW
PPR	2009	EnCana Wildlife Mitigation Plan	EnCana wildlife mitigation plan protecting sage-grouse through planning and proper mitigation.	Approx. 10,000	CDOW, EnCana
PPR	2009	Marathon Comprehensive Development Plan	Marathon comprehensive development plan protecting sage-grouse through planning and proper mitigation.	42,697	CDOW, Marathon
PPR	2009	Williams Comprehensive Development Plan	Williams comprehensive development plan protecting sage-grouse through planning and proper mitigation.	Approx. 5,000	CDOW, Williams
PPR	2010	SCTF: Ryan & Galloway PJ Removal	Remove encroaching PJ to restore functional GrSG habitat	221	Private, BLM, CDOW
PPR	2011	SCTF:Piceance PJ Removal	Remove encroaching PJ to restore functional GRSG habitat;	294	CPW, Private, BLM
PPR	2011	BLM Burn on Brush Mtn	Burn to thin sagebrush to create patchy mosaic and create multiple age stands.	Not yet avail. (<644?)	BLM

Appendix B. Summary of Colorado Parks and Wildlife expenditures on Greater Sage-Grouse. These expenditures include conservation planning and implementation, land protection (Conservation Easements /Fee Title), population and habitat monitoring, habitat treatments/restoration, research, and communications. These expenditures include funds such as wildlife cash, GOCO, federal funds, and grants (SCTF), etc. (Values as of 5 Oct 2012).

Year	Expenditure
2006	$777,930
2007	$1,374,709
2008	$7,832,494
2009	$2,871,931
2010	$8,718,139
2011	$8,639,896
Partial 2012	$2,801,592
Total	$33,016,691

Appendix C. Agriculture Conversion. New expanded area in State Acres For wildlife Enhancement (SAFE). The proposed area has been approved to be part of the SAFE program (as of Nov 2012). Strategies 1.1.1.5 and 1.2.1.1.



APPENDIX D

PROTECTION OF WILDLIFE RESOURCES

1201. IDENTIFICATION OF WILDLIFE SPECIES AND HABITATS

Prior to the preparation of a Comprehensive Drilling Plan or the submittal of a Form 2A for a proposed new oil and gas location, an operator shall review the Sensitive Wildlife Habitat map and the Restricted Surface Occupancy map maintained by the Commission on its website and attached as Appendices VII and VIII to determine whether the proposed oil and gas location falls within Sensitive Wildlife Habitat or a Restricted Surface Occupancy area. The operator shall include this determination in the Form 2A or Comprehensive Drilling Plan.

1202. CONSULTATION

a. The purpose of consultation under Rule 306.c is to allow the Director to determine whether conditions of approval are necessary to minimize adverse impacts from the proposed oil and gas operations in the identified sensitive wildlife habitat or restricted surface occupancy area, in an order increasing well density, or in a basin-wide order involving wildlife resource issues and to evaluate requests for variances from the provisions of the 1200-Series Rules. For purposes of this rule, minimize adverse impacts shall mean wherever reasonably practicable, to (i) avoid adverse impacts from oil and gas operations on wildlife resources, (ii) minimize the extent and severity of those impacts that cannot be avoided, (iii) mitigate the effects of unavoidable remaining impacts, and (iv) take into consideration cost-effectiveness and technical feasibility with regard to actions taken and decisions made to minimize adverse impacts to wildlife resources, consistent with the other provisions of the Act.

b. Unless excepted as set forth in Rule 1202.d, when a proposed new oil and gas location is located in sensitive wildlife habitat or a restricted surface occupancy area, the Colorado Division of Wildlife shall consult with the operator, the surface owner, and the Director in accordance with Rule 306.c prior to approval of a Form 2A to identify possible conditions of approval.

c. Any conditions of approval resulting from such consultation shall be guided by the list of Best Management Practices for Wildlife Resources maintained on the Commission website. In selecting conditions of approval from such Best Management Practices or other sources, the Director shall consider the following factors, among other considerations:

(1) The Best Management Practices for the producing geologic basin in which the oil and gas location is situated;

(2) Site-specific and species-specific factors of the proposed new oil and gas location;

(3) Anticipated direct and indirect effects of the proposed oil and gas location on wildlife resources;

(4) The extent to which conditions of approval will promote the use of existing facilities and reduction of new surface disturbance;

(5) The extent to which legally accessible, technologically feasible, and economically practicable alternative sites exist for the proposed new oil and gas location;

(6) The extent to which the proposed oil and gas operations will use technology and practices which are protective of the environment and wildlife resources;

(7) The extent to which the proposed oil and gas location minimizes surface disturbance and habitat fragmentation;

(8) The extent to which the proposed oil and gas location is within land used for residential, industrial, commercial, agricultural, or other purposes, and the existing disturbance associated with such use; and

(9) Permit conditions, lease terms, and surface use agreements that predate December 11, 2008.

d. Consultation under Rule 306.c shall not be required if:

(1) The Director or Commission has previously approved a Form 2A or Comprehensive Drilling Plan which includes the proposed new oil and gas location;

(2) The Colorado Division of Wildlife has previously approved, in writing, a wildlife mitigation plan or other wildlife protection or conservation plan that remains in effect for the area that includes the proposed new oil and gas location and the oil and gas location is in compliance with such plan;

(3) The operator demonstrates that the identified habitat and/or species, where applicable, is not in fact present to support the identified species and use, such as where the proposed oil and gas location is located in a high density area, designated pursuant to Rule 603.b, or within an incorporated homeowners association or city or town limits;

(4) The proposed new well would involve a one-time increase in surface disturbance of one (1) acre or less per well site at or immediately adjacent to an existing well site;

(5) The operator applies for and obtains a Commission order pursuant to Rule 503 providing that there will not be more than three (3) well sites per section, with ground disturbing activity during the period from January 1 to March 31 (or other biologically appropriate alternative period up to ninety (90) consecutive days as determined by the Director for bighorn sheep winter range, elk production areas, bald or golden eagle nest or roost sites, columbian or plains sharp-tailed grouse production areas, greater or Gunnison sage grouse production areas, black-footed ferret release areas, or lesser prairie chicken production areas) limited to one (1) such well site, as determined by the Director. This exemption from consultation shall not apply to operations in occupied greater sage grouse sensitive wildlife habitat in Moffat, Routt, or Jackson Counties or in occupied Gunnison sage grouse sensitive wildlife habitat in Delta, Mesa, Gunnison, San Miguel, Dolores, or Montezuma Counties;

(6) The Director grants a variance pursuant to Rule 502.b; or

(7) The Colorado Division of Wildlife waives the consultation requirement.

e. No permit-specific condition of approval for wildlife habitat protection under this rule shall be imposed without surface owner consent, including any permit-specific conditions for wildlife habitat protection that modify, add to, or differ materially from the general operating requirements in Rules 1203 and 1204. If the surface owner fails to consent to any such permit-specific condition of approval, then the parties shall consult with the surface owner regarding alternative conditions of approval acceptable to the surface owner.

1203. GENERAL OPERATING REQUIREMENTS IN SENSITIVE WILDLIFE HABITAT AND RESTRICTED SURFACE OCCUPANCY AREAS

a. **General Operating Requirements.** Within sensitive wildlife habitat and restricted surface occupancy areas, operators shall comply with the operating requirements listed below.

(1) During pipeline construction for trenches that are left open for more than five (5) days and are greater than five (5) feet in width, install wildlife crossovers and escape ramps where the trench crosses well-defined game trails and at a minimum of one quarter (1/4) mile intervals where the trench parallels well-defined game trails.

(2) Inform and educate employees and contractors on wildlife conservation practices, including no harassment or feeding of wildlife.

(3) Consolidate new facilities to minimize impact to wildlife.

(4) Minimize rig mobilization and demobilization where practicable by completing or recompleting all wells from a given well pad before moving rigs to a new location.

(5) To the extent practicable, share and consolidate new corridors for pipeline rights-of-way and roads to minimize surface disturbance.

(6) Engineer new pipelines to reduce field fitting and reduce excessive right-of-way widths and reclamation.

(7) Use boring instead of trenching across perennial streams considered critical fish habitat.

(8) Treat waste water pits and any associated pit containing water that provides a medium for breeding mosquitoes with Bti (*Bacillus thuringiensis v. israelensis*) or take other effective action to control mosquito larvae that may spread West Nile Virus to wildlife, especially grouse.

(9) Use wildlife appropriate seed mixes wherever allowed by surface owners and regulatory agencies.

(10) Mow or brushhog vegetation where appropriate, leaving root structure intact, instead of scraping the surface, where allowed by the surface owner.

(11) Limit access to oil and gas access roads where approved by surface owners, surface managing agencies, or local government, as appropriate.

(12) Post speed limits and caution signs to the extent allowed by surface owners, Federal and state regulations, local government, and land use policies, as appropriate.

(13) Use wildlife-appropriate fencing where acceptable to the surface owner.

(14) Use topographic features and vegetative screening to create seclusion areas, where acceptable to the surface owner.

(15) Use remote monitoring of well production to the extent practicable.

(16) Reduce traffic associated with transporting drilling water and produced liquids through the use of pipelines, large tanks, or other measures where technically feasible and economically practicable.

b. **Exceptions.** If the operator believes that any of the foregoing operating requirements should be waived for any proposed oil and gas location, it shall so specify in a Form 2A for Director consideration.

1204. OTHER GENERAL OPERATING REQUIREMENTS

a. The operating requirements identified below shall apply in all areas.

(1) In black bear habitat west of Interstate 25 and on Raton Mesa east of Interstate 25, operators shall install and utilize bear-proof dumpsters and trash receptacles for food-related trash at all facilities that generate such trash.

(2) In designated Cutthroat Trout habitat, as identified on the Colorado Division of Wildlife Species Activity Mapping (SAM) system, operators shall disinfect water suction hoses and water transportation tanks withdrawing from or discharging into surface waters (other than contained pits) used previously in another river, lake, pond, or wetland and discard rinse water in an approved disposal facility. Disinfection practices shall be repeated after completing work or before moving to the next water body. Disinfection may be performed by removing mud and debris and then implementing one of the following practices:

A. Spray/soak equipment with a disinfectant solution capable of killing whirling disease spores; or

B. Spray/soak equipment with water greater than 140 degrees Fahrenheit for at least 10 minutes.

(3) To minimize adverse impacts to wildlife resources, plan new transportation networks and new oil and gas facilities to minimize surface disturbance and the number and length of oil and gas roads and utilize common roads, rights of way, and access points to the extent practicable, consistent with these rules, an operator's operational requirements, and any requirements imposed by federal and state land management agencies, local government regulations, and surface use agreements and other surface owner requirements, and taking into account cost effectiveness and technical feasibility.

(4) Establish new staging, refueling, and chemical storage areas outside of riparian zones and floodplains.

(5) Use minimum practical construction widths for new rights-of-way where pipelines cross riparian areas, streams, and critical habitats.

b. **Exceptions.** If the operator believes that any of the foregoing operating requirements should be waived for any proposed oil and gas location, it shall so specify in a Form 2A for Director consideration.

1205. REQUIREMENTS IN RESTRICTED SURFACE OCCUPANCY AREAS

a. Operators shall avoid Restricted Surface Occupancy areas to the maximum extent technically and economically feasible when planning and conducting new oil and gas development operations, except:

(1) When authorized following consultation under Rule 306.c.(3);

(2) When authorized by a Comprehensive Drilling Plan;

(3) Upon demonstration that the identified habitat is not in fact present;

(4) When specifically exempted by the Colorado Division of Wildlife; or

(5) In the event of situations posing a risk to public health, safety, welfare, or the environment.

b. As set forth in Rule 1205.a, new ground disturbing activities are to be avoided in Restricted Surface Occupancy areas, including construction, drilling and completion, non-emergency workovers, and pipeline installation activity, to minimize adverse impacts to wildlife resources. Production, routine maintenance, repairs and replacements, emergency operations, reclamation activities, or habitat improvements are not prohibited in Restricted Surface Occupancy areas. Notwithstanding the foregoing, non-emergency workovers, including uphole recompletions, may be performed with prior approval of the Director on a schedule that minimizes adverse impacts to the species for which the restricted surface occupancy area exists.

c. **Applicability.** The requirements of Rule 1205 are not applicable to Applications for Permit-to-Drill, Form 2, or Oil and Gas Location Assessments, Form 2A, which are approved prior to May 1, 2009 on federal land or April 1, 2009 on all other land. The requirements of Rule 1205 are also not applicable until January 1, 2010, for any proposed oil and gas location in a Restricted Surface Occupancy area where the operator has in good faith initiated and is diligently pursuing consultation on the proposed oil and gas location begun prior to May 1, 2009 on federal land or April 1, 2009 on all other land, pursuant to Rule 306.c or Rule 216.

Appendix E. Summary of oil and gas permits within Greater Sage-Grouse habitat as defined in the 100 Series Rule. Production Areas [also as known as Sensitive Wildlife Habitat Areas (SWHA)] are within 4 miles of a lek (using the 2008 lek database) and Restricted Surface Occupancy Areas (RSO) are within 0.6 mi of a lek.

The actual conditions that are included on Form 2A permits are contained in COGCCs data base. CPW assumes that recommendations made and agreed to by the operator will be attached to the permit as a condition of approval. COGCC enforces permit conditions. Neither CPW nor COGCC monitor BMP effectiveness.

Best Management Practices

Summary of the most commonly recommended Best Management Practices (BMPs) for COGCC Form 2A Permits. A total of 97 Form 2A permits occurred in GrSG Production Habitat Areas (SWHA) since 2010.

BMP	# of times BMP requested	Recommended Best Management Practice
Timing - Seasonal	22	Where oil and gas activities must occur within 4 miles of GrSG leks or within other mapped GrSG breeding or summer habitat, conduct these activities outside the period between March 1 and June 30.
Timing - Daily	21	Restrict well site visitations to portions of the day between 9:00 a.m. and 4:00 p.m. during the lekking season (March 1 to May 15).
Sound	14	Muffle or otherwise control exhaust noise from pump jacks and compressors so that operational noise will not exceed 49 dB measured at 30 feet from the source.
Fencing	14	Fence pits to exclude grouse from entry
Netting	10	Net pits to exclude grouse from entry
Native Veg	45	Reclaim/restore GrSG habitats with native grasses, forbs, and shrubs conducive to optimal GrSG habitat and other wildlife appropriate to the ecological site.
Non Native Veg	12	Avoid aggressive non-native grasses in GrSG habitat reclamation. Include integrated vegetation management plan in reclamation plan.
Mosquito	29	Treat waste water pits and any associated pit containing water that provides a medium for breeding mosquitos with Bti (*Bacillus thuringiensis v. israelensis*) or take other effective action to control mosquito larvae that may spread West Nile Virus to wildlife, especially grouse.
Raptor Perch	23	Design tanks and other facilities with structures such that they do not provide perches or nest substrates for raptors, crows and ravens.
SUA	11	Surface Use Agreement describes surface use actions to minimize impacts to wildlife.
BLM COAs for Fed/Fed Permits	6	CPW affirms that the lease stipulations and conditions of approval assigned to this permit by the BLM suffice to address wildlife habitat and mitigation concerns.
WMP Permit Comments	11	Comments convey permit conditions consistent with BMPs in WMP

Wildlife Mitigation Plans

Acres of Greater Sage-Grouse Habitat by Wildlife Mitigation Plan. (Operator names have been generalized). These operators contribute funding to the Parachute/Piceance/Roan Research Project as partial mitigation for wildlife impacts. Research is focused on the GrSG population in the Parachute/Piceance/Roan Plateau area. Operators contributions vary in amount and to the area of research being conducted ï vegetation management, movement and habitat selection and use, habitat treatments.

CDP/WMP Holder	Total Lease Area *(Acres)*	GRSG Production Areas *(Acres)*	GRSG Lek Areas *(Acres)*	Number of Leks (Not all are entirely within WMP boundary)
A	44,687	17,725	1,590	4
B	17,258	9,963	1,182	3
C	149,946	19,325	5,090	15
D	7,724	577	None	0

Specific BMPs related to GrSG contained in the Wildlife Mitigation Plan (WMP) agreements. All COGCC Form 2A permits in SWHA and RSO areas have language that reference BMPs. Out of 97 Form 2A Permits, CPW reviewed 2 RSO permits and 8 SWHA permits in WMPs.

BMPs* **These BMPs are taken directly from the Wildlife Mitigation Plan Agreements. These apply specifically to GrSG and their habitats.**	WMP OPERATOR			
	A	B	C	D
Continue to provide access to CPW research personnel for ongoing sage grouse population research.	X		X	X
Install raptor perch deterrents on cross arms of power poles and other documented raptor perches, such as radio towers where birds are noted perching. Monitor all structures exceeding six feet in height for the presence of perching raptors or ravens. Perch deterrents need not be installed if they pose a safety issue (e.g., on the handrails of a tank battery).	X	X		
New Disturbance will be concentrated within a Development Area, and preferably confined to a ridgeline, to reduce the duration of development activity within such Development Area to the extent practicable. No new disturbance activities will occur within a Development Area during more than three consecutive Critical Habitat Seasons between Vacated Periods.			X	
Limit any new disturbance [in mapped occupied GrSG habitat] in specific areas for 3 [nesting/brood-rearing] seasons.	X			
Drill areas west of specific areas as opposed to mapped occupied GrSG habitat on ridge tops.	X			
Reoccupy existing pads if possible [as opposed to building new pads in mapped occupied GrSG habitat].	X			

Locate new pads outside occupied grouse habitat wherever possible or in habitat that is already disturbed.	X			
Implement three-phase-gathering on existing locations where possible to reduce onsite facilities and increase the acreage put into interim reclamation.	X			
Reduce traffic impacts by carpooling personnel from the Temporary Living Quarters (TLQ) to project locations.	X			
Reduce additional surface disturbance by utilization of the staging/storage yards at the TLQ and XX gravel pit.	X			
Construct cut and fill slopes of the main access road to a length that decreases the extreme slopes typical of cut and fill to facilitate ground movement by sage grouse for the XX Pipeline Project.	X			
Apply a 0.6 mile radius No Disturbance buffer around active leks sites (documented activity in the last five years) from 5:00 AM to 9:00 AM, March 15th through May 15th. Where practicable, traffic and other disturbances will be restricted after sunset when sage grouse are congregating around the lek until 9:00 AM the following morning when birds depart the lek.	X			
Site new disturbance so as to use topographic features to shield leks from new disturbance whenever feasible.	X			X
Restrict well site visitation in occupied habitat to between the hours of 9:00 AM and 4:00 PM during lekking season (March 15th to May 15th).	X			
Schedule cross-country pipeline construction and installation (not including lines along roads) outside of the Critical Habitat Season.	X			
Restrict New Disturbance within nesting and brood-rearing habitat (occupied habitat as mapped until more concise mapping is available) as much as possible from April 15th to July 1st.	X			X
Use interim reclamation to redevelop, as quickly as possible, ground cover that provides for secure ground movements of sage grouse and is an effective precursor to the reestablishment of appropriate sagebrush cover. Detailed guidelines and practices for interim and final reclamation are outlined in the Integrated Vegetation Management Guidance	X	X	X	
Reseed disturbances exceeding 15 feet in width in mapped occupied sage grouse habitat with local sage brush seed, where topography and weather conditions allow safe access to do so.	X			
Utilize the Wildlife Resources Appendices and wildlife resources database and maps to identify and document (where appropriate) potential impacts or concerns during the project planning phase for proposed drilling operations and construction of roads, pads and pipelines. The Wildlife Resources Appendices reflects a prioritization of species habitat sensitivity as agreed upon by CPW.	X			
Voluntary avoidance of GrSG habitats: Lek avoidance March 1 through May 15	X	X		
Voluntary avoidance of GrSG habitats: 4-mile buffer from March 1 to June 30				X
Voluntary avoidance of GrSG habitats: Winter habitat December 1 and March 15				X

*****Approximately 30 other field wide BMPs, agreed to in the WMPs, may contribute to minimizing impacts to GrSG. These other BMPs are directed toward big game, raptors, cutthroat trout and may minimize development impacts to greater sage-grouse as well.

Appendix F. Elk Populations in GrSG Habitat. Strategies 6.2.2.1 and 6.2.2.3. The table demonstrates a significant decrease in elk populations to bring them down into Big Game Objectives. These objectives include land health as a component with the assumption that these objectives can be sustainable in the long-range while providing GrSG habitat.

Elk Populations in GrSG Habitat (derived from 2011 post-season population models)						
GrSG Population	**Big Game Herd Unit**	**Big Game Objective/Range**	**2011 Population Estimate**	**2008 Population Estimate**	**2004 Population Estimate**	**2000 Population Estimate**
NWCO	E-1 Cold Springs	950	1,171	2,043	3,494	3,104
NWCO	E-2 Bears Ears	15,000-18,000	15,810	18,271	29,678	38,719
NWCO/MWR/NESR	E-6 White River	32,000-39,000	35,868	43,898	52,897	62,455
NWCO	E-21 Blue Mountain	1,200	4,004	4,036	4,974	4,681
NP	E-3 North Park	4,000-4,500	7,992	8,296	8,469	8,443
MP	E-8 Troublesome	3,600-4,300	4,915	4,640	4,699	4,975
MP	E-13 Williams Fork	4,700-5,500	5,023	5,662	5,959	7,168
NESR	E-7 Gore	3,500-4,500	4,540	4,617	5,167	5,222
NESR	E-12 Piney River	2,950	3,761	4,037	5,683	6,560
PPR	E-10 Yellow Creek	7,000-9,000	11,981	11,196	10,860	10,196

Appendix G. Conservation Easement and Fee Title Summary.

Conservation easements and fee title properties in GrSG habitat in Colorado that are in place or in progress. (Rows highlighted in yellow indicate projects that were completed or are in progress since the last US FWS status review, March, 2012). Habitat acquisition either through easement or fee title has been the primary strategy to protect against habitat loss due to urbanization and housing development. CPW has protected approximately 66,560 acres of greater sage-grouse habitat since 2004 (Note these values do not include non-CPW properties shown below).

GrSG Population	Acres	Approximate Cost	Completion Date
MWR	3,700	Not CPW	2005
	140	Not CPW	2006
	1,123	Not CPW	2006
	2,027	$1,000,000	2007
	1,800	Fee exchange for GrSG habitat	2007
	3,000	$2,500,000	2007
	537	$1,137,500	2008
	725	Not CPW	2008
	1,634	$1,840,000	2009
	5,192	$5,427,000	2010
	3, 210	$2,492,500	2011
MP	3,140	$3,480,000	2007
	1,156	$1,461,250	2008
	2,318	$3,281,250	2008
	950	$2,200,000	2010
	1,120	$1,111,000	2012
NP	1,169	Not CPW	2005
	520	Not CPW	2007
	3,725	Not CPW	2008
	3,470	Not CPW (TNC-held) Tionton	2011
	2,240	1500000 (CCALT-held)	2011
	1,738	$1,000,000 (CPW funds; YVLT held)	Expected 2013
NESR	1,400	Not CPW	2004
	2,050	$2,152,500	2006
NWCO	1,812	$1,500,000	2004
	1,768	Not CPW	2005
	561	$503,147	2007
	2,711	$1,935,500	2007
	3,184	$1,705,000	2007
	630	$472,500	2007
	1,613	$1,210,000	2008
	493	Donation (CPW-held CE)	2010
	500	Donation (CPW-held CE)	2011
	2,447	TNC - no CPW funds	2011
	4,162	$4,920,000	2011

NWCO (continued)	2,535	TNC - no CPW funds	2012
	8,658	$8,722,935	2012
	3,582	$1,800,000	2012
	15,076	$4,243,680	2012

APPENDIX H

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

IN REPLY REFER TO:
FWS/R6

MAILING ADDRESS:
P.O. Box 25486, DFC
Denver, Colorado 80225-0486

STREET LOCATION:
134 Union Boulevard
Lakewood, Colorado 80228-1807

NOV 20 2012

Jeff Ver Steeg
Colorado Parks and Wildlife
1313 Sherman Street, Suite 618
Denver, Colorado 80203

Dear Mr. Ver Steeg:

On March 5, 2010, the U.S. Fish and Wildlife Service (Service) published a status review for the Greater sage-grouse (75 FR 13910), with a determination that listing the species under the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 et seq., Section 4(b)(3)(B)) was warranted but precluded. The Greater sage-grouse (sage-grouse) is now identified as a candidate for listing under the Act. Habitat loss, habitat fragmentation and the lack of regulatory mechanisms conserving habitat were the primary factors contributing to the species candidate status. However, recreational hunting of the sage-grouse continues to be an issue raised by several stakeholders, although it was not identified as a primary concern in the Service's listing determination. Some states have asked for a clarification of the Service's thinking on this issue, so we have prepared the following thoughts for your consideration.

In our status review, the Service examined the impacts of hunting and concluded that there was no evidence suggesting that recreational hunting (including falconry) has been a primary cause of range-wide declines of the Greater sage-grouse. Additionally, the Service did not identify State regulations regarding sage-grouse hunting as inadequate, based on the annual review of the sustainability of hunting sage-grouse and the ability of states to quickly make any appropriate adjustments, as part of their annual hunting season regulatory process conducted by each state.

Although regulated, sport harvest as a singular factor, does not threaten the sage-grouse throughout its range. There is strong data supporting that the sustainability of harvest levels depends, to a large extent, on the quality of sagebrush habitats and the health of the affected population. The Service appreciates the long standing attention of states to closely regulate harvest of sage grouse as part of their efforts to conserve the species.

In light of continuing habitat loss, fragmentation, and other factors with the potential to negatively affect sage-grouse (e.g. West Nile virus), the Service supports the States commitment to continue their longstanding practice of carefully managing hunting mortality, including adjusting seasons, adjusting allowable harvest levels, and imposing emergency closures if needed to protect specific local populations.

We appreciate your efforts to ensure the conservation of the sage-grouse. If you have further questions, regarding this letter, please contact Pat Deibert, Sage-Grouse Recovery Coordinator at Pat_Deibert@fws.gov, or by calling (307) 772-2374, ext. 226.

Sincerely,

Norman E Wolfe

Acting Regional Director

Appendix I. Population Status, Trends and Numbers.

The seven populations of Greater Sage-Grouse (GrSG) in Colorado are shown in Figure 1. Most populations in Colorado occur in Management Zone II defined by WAFWA in the GrSG Comprehensive Conservation Strategy (2006). Two populations (Parachute-Piceance-Roan and Meeker-White River) occur in Management Zone VII. Population numbers and trends for six populations are shown here. The seventh population, Laramie River, does not currently have any known active leks and, therefore, lek counts have not been conducted routinely.

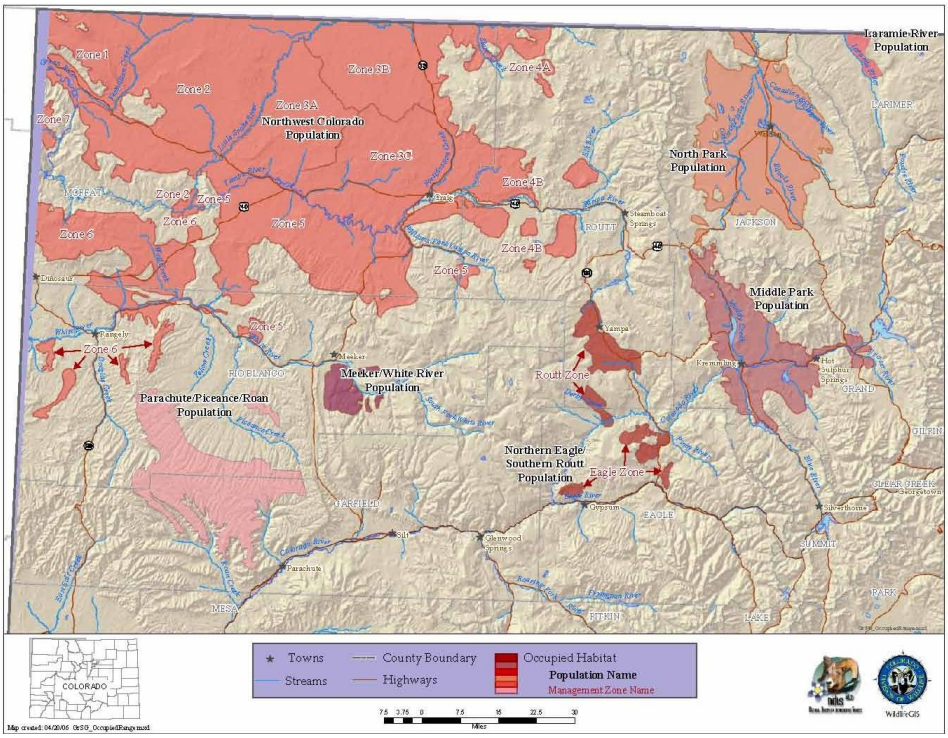


Figure 1. Current distribution of GrSG populations in Colorado.

It is most meaningful to investigate lek counts in terms of 3 -year running averages because CPW does not consider annual fluctuations a good measure when using an index such as lek counts. Lek counts were only designed to be used for long-term trends and not as annual fluctuation indices. Only 10 years of information are included in this dataset because not all populations have data back beyond that. Count methods and overall CPW effort have been consistent during this time period, except for in the PPR population where additional effort is occurring due to various research projects (see PPR specific graph below).

We have detected no significant changes in the status of greater sage-grouse populations within Colorado since 2009 although there has been a very slight increase in most populations in the last few years. Overall, the 2012 counts are slightly higher than 2011 (Figures 2a and 2b). The number of males counted in Colorado is still generally at a 5 - 10 year low, but this is not unexpected given normal periodic fluctuations observed in Colorado lek counts in the past. Based on lek counts in North Park, Colorado, which is arguably the best lek count dataset in North America, numbers are close to a 10 year low although they appear stable with last year.. The level of decline has been observed in the past and we expect the number of males counted in

North Park and throughout Colorado to start increasing in the next few years (3-5 years). There is little concern that the fewer males counted over the last several years represent anything more than normal fluctuations that are expected and somewhat predictable based on weather conditions and population cycling.

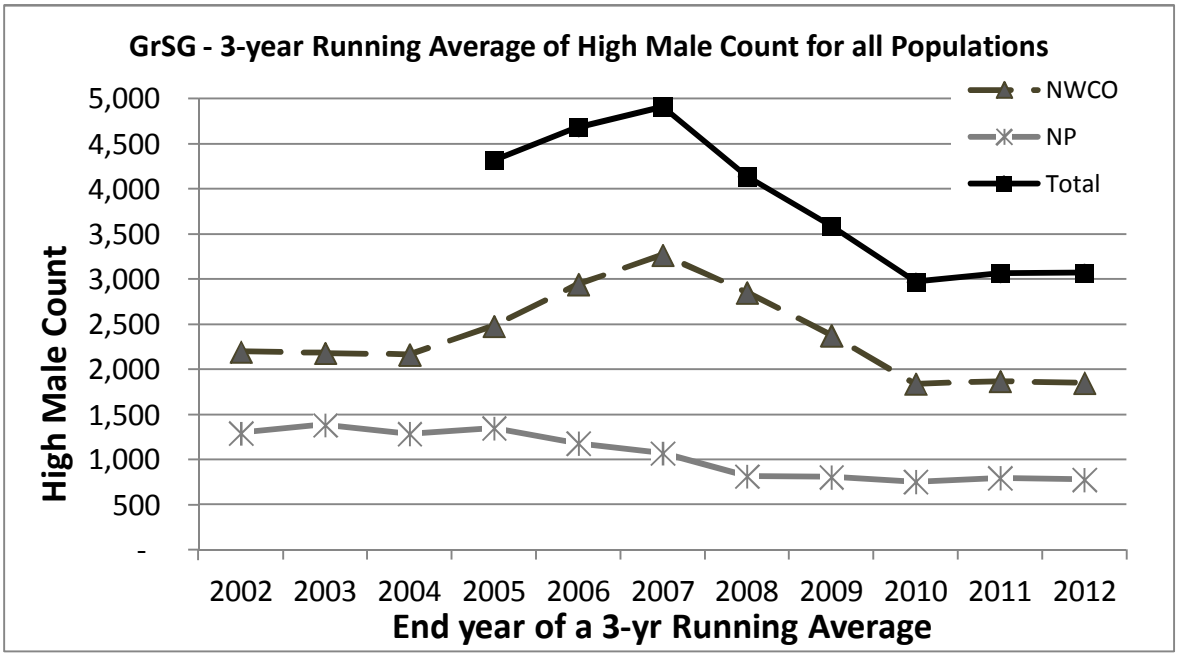


Figure 2a. High male count data for the total of all GrSG Populations and the 2 largest populations (NWCO and NP), 2002-2012. The total data begins in 2005 because PPR and MWR were not counted consistently prior to that.

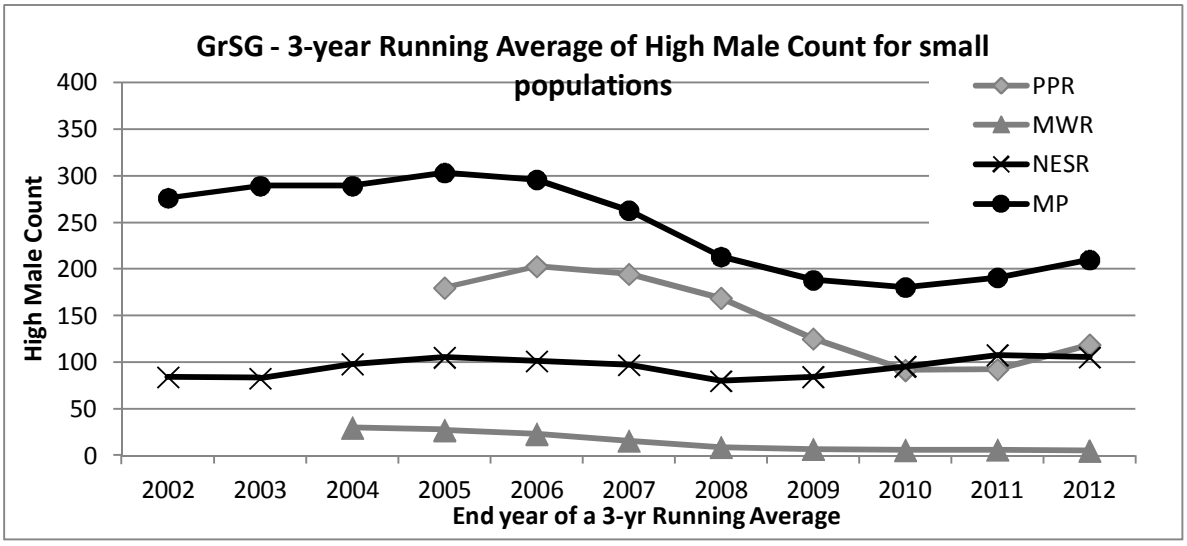
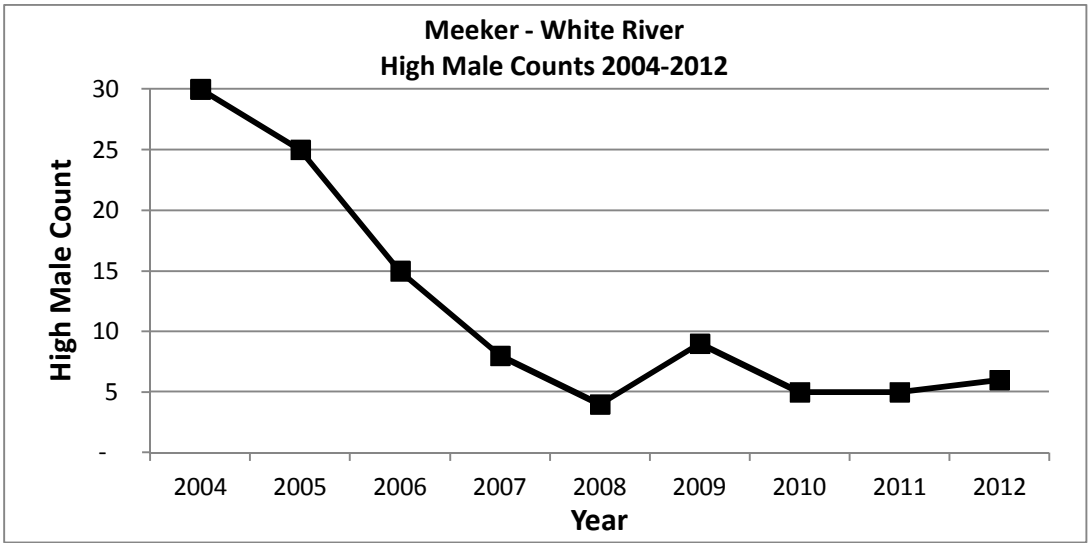


Figure 2b. High male count data for the 4 smallest GrSG Populations (PPR, MWR, NESR, and MP), 2002-2012. Lek counts in the PPR and MWR populations were not consistent prior to the years represented.

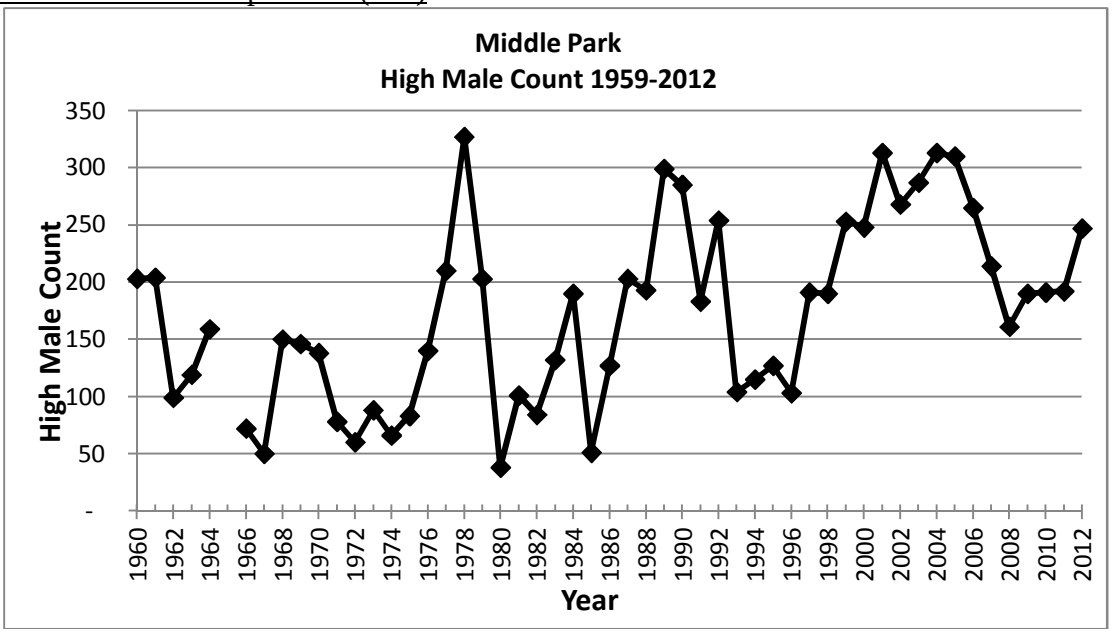
Lek data (high male count) is presented below in more detail for each of the local Colorado GrSG populations. This series of graphs includes all known lek count data for each population through 2012. In general, count methods and effort have been relatively consistent since 1998 although the North Park count effort has been consistent since about 1973 and PPR and MWR only have data for 8 and 9 years, respectively.

A. Meeker ï White River Population (MWR)

The MWR population is the smallest population in Colorado with one active lek. We continue to monitor 6 additional leks that have not shown activity in years (considered ñhistoricò leks). The current lek was discovered in 2004. The population has probably been in decline since the 1950s.

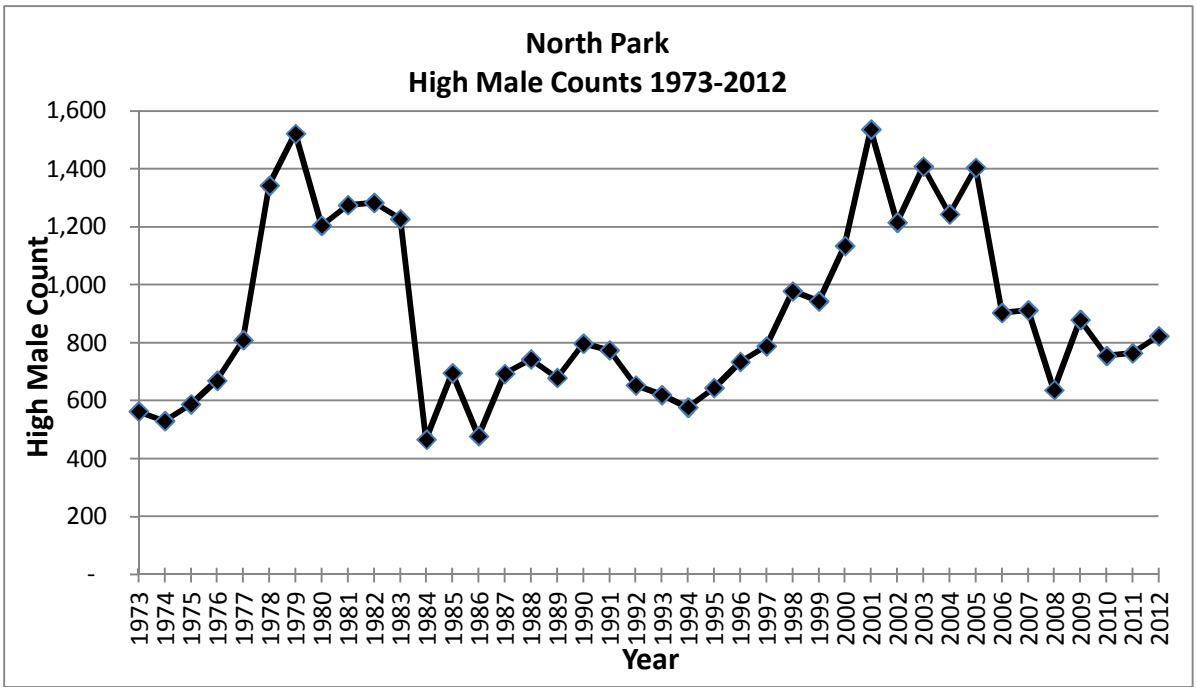


B. Middle Park Population (MP)

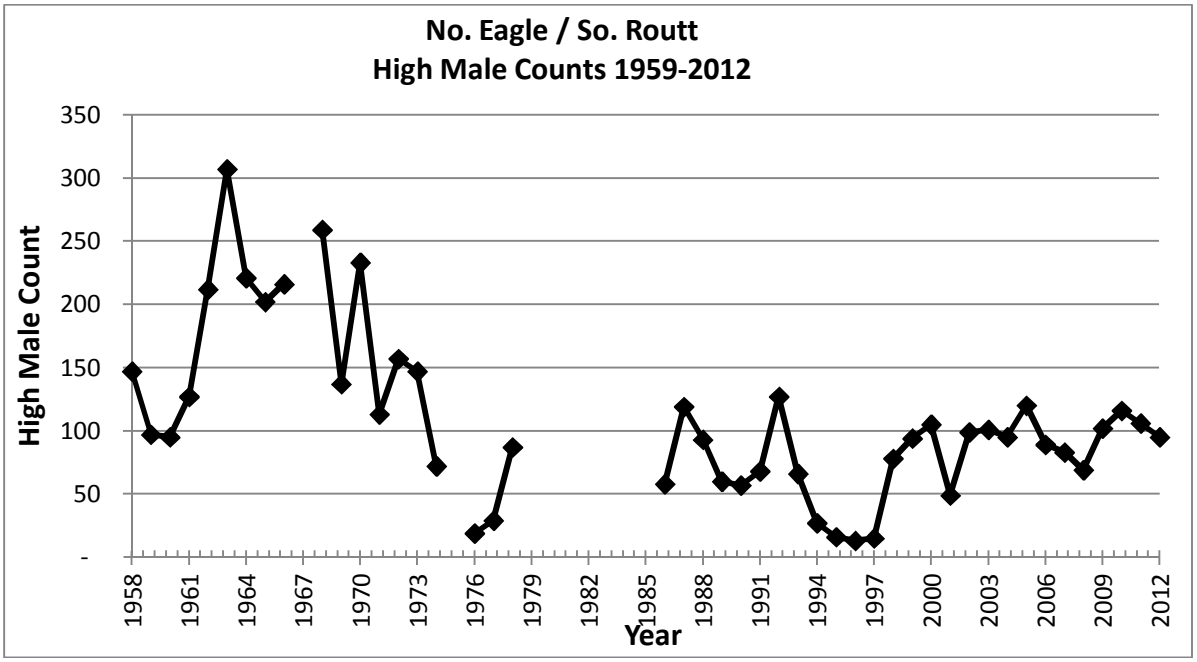


C. North Park Population (NP)

This population, which has arguably the best lek count data set in North America, shows the fluctuating nature of grouse populations. In 2011, some large leks were not counted due to accessibility and the level of late winter/early spring snow.

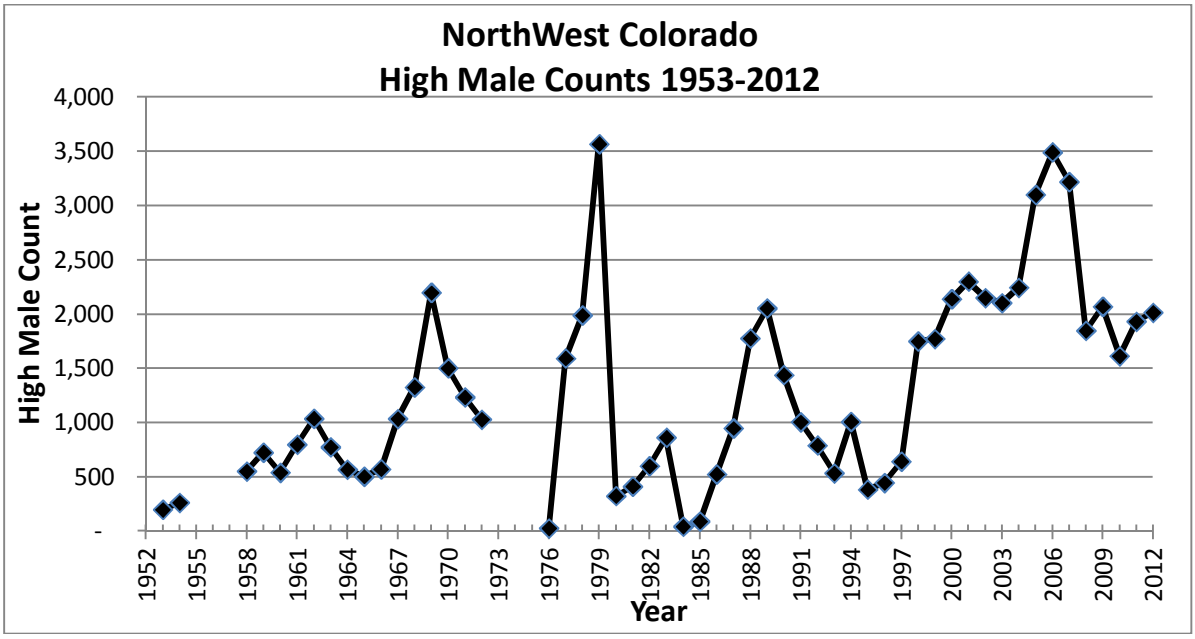


D. Northern Eagle ï Southern Routt Counties Population (NESR)



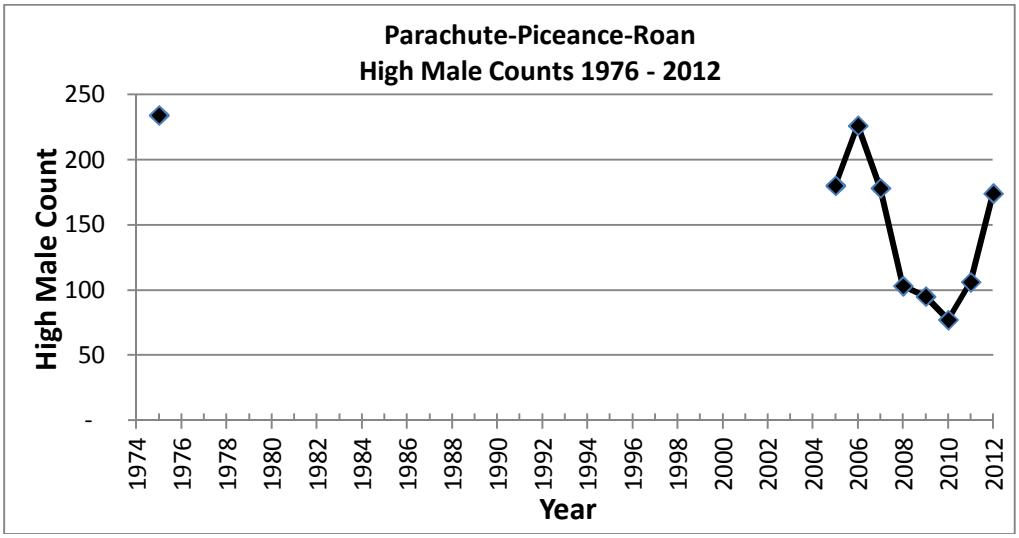
E. Northwest Colorado Population (NWCO)

The NWCO population is the largest GrSG population in Colorado with high male counts more than twice as high as the next largest population (North Park).



F. Parachute ï Piceance – Roan Population (PPR)

Historically, extensive field work in 1976 and 1977 provided the first complete look at sage-grouse distribution and numbers in the PPR (high male count = 234; Kraeger 1977). Recent lek counts have been conducted by helicopter (2005 ï 2012). Data collected in the interim years are not reliable because of the difficulty in obtaining lek count data in the PPR area, and varied effort in conducting lek counts during those years. Lek counts conducted by CPW in the spring of 2006, the most exhaustive count completed since 1976, yielded a high male count of 226 birds. Current, increases in the population may be due to increased efforts due to current research projects by CPW Researcher, B. Walker.



APPENDIX J: Literature Review

21.1.1.1: Evaluate how the amount (i.e., "patch size"), configuration, and composition of GrSG habitat affect (1) sage-grouse behavior (e.g., movement and dispersal); (2) species distribution; (3) productivity; (4) population dynamics; and (5) population sustainability. Map and analyze landscape metrics (e.g., edge density, fragmentation, heterogeneity, fractal dimension), using the most reliable and current GIS data and examine the spatial and temporal correlation with sage-grouse population dynamics. Evaluate the potential for dispersal of individuals into currently unoccupied suitable habitat.

Implementation (Citations)	Effectiveness
a) Thompson, T.R. 2012. Dispersal ecology of greater sage-grouse in northwestern Colorado; evidence from demographic and genetic data. Ph.D. Dissertation, University of Idaho, Moscow, Idaho, USA.	a) It is too early to tell. This research was only recently completed. It will assist in the management of sage-grouse management zones 1, 5, and 3A. This research was central in understanding species dispersal and habitat configuration in management zones.
b) Rice, M.B., A.D. Apa, M.L. Phillips, J.H. Gammonley, B.B. Petch and K. Eichhoff. In Press. Analysis of regional species distribution models based on radio-telemetry datasets from multiple small-scale studies. Journal of Wildlife Management XX:XXX-XXX.	b) Was used in the development of priority habitat map and to refine species distribution in Colorado.
c) Apa, A.D. 2010. Seasonal habitat use, movements, genetics, and vital rates in the Parachute/Piceance/Roan population of greater sage-grouse. Colorado Parks and Wildlife Final Report. Fort Collins, Colorado, USA.	c) Data assisted in the development of the structural and disturbance guidelines in the CCP.
d) Hausleitner, D. 2003. Population dynamics, habitat use and movements of greater sage-grouse in Moffat County, Colorado. M.S. Thesis. University of Idaho, Moscow, Idaho, USA.	d) Assisted in the disturbance buffers, demographic data for the population viability analyses, and structural habitat guidelines in the CCP.
e) Rossi, L., A.D. Apa, and M.B. Rice. 2010. Greater sage-grouse seasonal habitat use and demographics in North Park. Colorado Parks and Wildlife 2010 Progress Report. Fort Collins, Colorado, USA.	e) Too soon to assess.
f) Rossi, L., A.D. Apa, and M.B. Rice. 2011. Greater	

sage-grouse seasonal habitat use and demographics in North Park. Colorado Parks and Wildlife 2011 Progress Report. Fort Collins, Colorado, USA.	f) See "e"
g) Graham, L. and C. McConnell. 2003. Radio-collared greater sage-grouse summary report; southern Routt and northern Eagle Counties, Colorado. Colorado Division of Wildlife, Steamboat Springs, Colorado, USA.	g) Assisted in the development of disturbance buffers and structural habitat guidelines of the CCP.
h) Graham, L. and C. McConnell. 2004. Radio-collared greater sage-grouse summary report; southern Routt and northern Eagle Counties, Colorado. Colorado Division of Wildlife, Steamboat Springs, Colorado, USA.	See "g"