

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	<p>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.)</p> <p>Where this is not feasible, consider the following options:</p> <ul style="list-style-type: none"> • 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 <p>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.)</p> <p>Where this is not feasible, consider the following options:</p> <ul style="list-style-type: none"> • 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 <p>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.)</p> <p>Where this is not feasible, consider the following options:</p> <ul style="list-style-type: none"> • 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	<p>Tri-State: engages the USFWS and CPW early and often in the planning process to ensure sensitive species concerns and data are incorporated into the routing and siting process. Uses comprehensive, GIS based routing & siting process when planning new transmission lines. Tri-State sites new infrastructure, whenever possible, in proximity to existing linear features and existing disturbance to minimize overall impacts. Lek sites are identified & excluded from siting and routing during planning ahead of any consultation.</p> <p>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.</p> <p>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.</p> <p>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</p>	<p>CPW: CPW has limited authority in the siting of facilities.</p> <p>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.</p>

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	<p>Tri-State: Tri-State uses perch deterrents where appropriate to mitigate predation impacts from corvids and other raptors on sage grouse.</p> <p>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.</p> <p>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.</p> <p>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</p>	<p>Tri-State: A report prepared by Utah Wildlife in Need Cooperative, (“Contemporary Knowledge and Research Needs Regarding the Potential Effects of Tall Structures on Sage Grouse”-2010) showed that there is no peer-reviewed experimental studies that have evaluated the impacts of tall structures on the greater sage grouse.</p> <p>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.</p>

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
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	<p>Tri-State: BMPs for retrofitting powerlines to prevent raptors from perching on the cross arms have been implemented at the Colowyo mine.</p> <p>CPW: CPW local staff encourages these actions through comment letters, verbal communications, & on-site visits with entities.</p> <p>LWG: The MP LWG recognized infrastructure concerns in the March 2012 Scoping EIS letter sent to BLM.</p>	<p>Tri-State: Tri-State: See 3.1.1.2. Burying high-voltage transmission lines is not a viable option for utilities in most situations from a construction, operation, maintenance, and economic perspective. From an environmental perspective, burying transmission lines also creates larger direct and indirect impacts to sagebrush habitat (habitat fragmentation, noxious weeds, etc) compared to an overhead transmission line. Sagebrush is difficult to reclaim and these types of impacts/considerations should be evaluated when discussing burial of transmission lines as a mitigation option. Tri-State supports CPW recommendation that this type of mitigation would only apply to certain scenarios and should be determined based on the best available science.</p> <p>CPW: BMP's, comment letters, & on-site visits by CPW staff make these recommendations which may or may not be adopted.</p>
13.1.1.4	<p>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:</p> <ul style="list-style-type: none"> • 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	<p>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</p>	
13.1.1.5	Encourage the use of vegetation establishment techniques in <i>existing</i> pipeline corridors to reduce predator effectiveness.	Industry	Ongoing		

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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 I& tenure options such as I& 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	<p>Jackson: County encourages cluster development. Rural L& Use Process authorizes cluster development.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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</p>	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	<p>USFWS: provided recommendations for two communication towers, one SW of Rifle & one just east of there.</p> <p>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.</p> <p>NESR - CPW makes recommendations to Routt County regarding infrastructure in GrSG habitat.</p>	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.

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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	<p>Tri-State: Regularly implements seasonal buffers during new construction & routine maintenance.</p> <p>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</p>	
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	<p>BLM: This has not been completed to date.</p> <p>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.</p> <p>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.</p>	
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	<p>BLM: All reclamation activities consider site capability, & incorporation of an appropriate diverse seed mixture.</p> <p>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.</p> <p>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</p>	CPW has no regulatory authority over the adoption of its recommendations.

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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 standards that include coordinated weed management. Recognize that reclamation &/or weed control are continual & long-term efforts.	BLM, CPW, Industry	Ongoing	<p>BLM: Interim reclamation is already implemented as part of the Surface Use Plan of Operations on federal leases. Performance based (% surface disturbance caps) reclamation standards have only been developed in the White River & Little Snake FO to date.</p> <p>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.</p> <p>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</p>	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	<p>CPW: General - CPW sets bonds for infrastructure projects affecting State Wildlife Areas. CPW has not recommended bond for projects involving other land management jurisdictions.</p> <p>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.</p>	
13.2.1.10	Enforce & ensure compliance with conditions, stipulations, & reclamation for leases & permits in GrSG habitat.	BLM, COGCC, DRMS	Ongoing	<p>BLM: Compliance with O&G permit conditions of approval is conducted.</p> <p>OGCC: This is being done, see 3.3.1.13.</p>	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 <i>Fences may adversely affect GrSG & their habitats.</i>					
OBJECTIVE 13.3.1 Minimize the potential for adverse impacts of <i>fences</i> on GrSG.					
Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness

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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	<p>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.</p> <p>CPW Research: See 3.2.3.1 above. Seasonal habitat maps can be used to recommend avoidance areas for fencing (or fence marking) projects.</p> <p>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.</p> <p>USFS: No active leks or lek buffers on any of the three USFS National Forests in range. Very small portion of forests has habitat.</p>	
13.3.1.2	<p>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:</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>BLM: New fence constructions would follow these recommendations (not many- if any have been constructed).</p>	
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.

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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.	
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 identified & 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		

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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 misunderstanding & 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
13.5.1.1	Present information & data about infrastructure development & GrSG so that it is readily understandable to stakeholders & the general public. [See also Information, Communication, & Education Strategies 12.2.1.3 & 12.3.1.1]	BLM, CPW, Industry	Ongoing	<p>Tri-State: Colowyo mine permitting is a multi-year process with input from state & federal agencies. Information & data available to the public upon request.</p> <p>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.</p> <p>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</p> <p>BLM: Few infrastructure projects have been completed recently. BLM presents data concerning SG habitat, threats, & infrastructure during the planning & NEPA process for the public to review.</p>	
13.5.1.2	Share GrSG data among agencies, & with counties, private landowners, & 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	<p>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.</p>	<p>CPW: Many entities incorporate this information while developing planning efforts.</p>
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	<p>Tri-State: Colowyo provides these plans to agencies as part of permitting process.</p> <p>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</p>	
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	<p>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.</p>	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
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	<p>Tri-State: Has attended working group meetings. Interested in continued participation.</p> <p>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 entities.</p> <p>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</p>	
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	<p>Tri-State: Colowyo a member of its Local Working Group for GSG.</p> <p>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.</p> <p>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</p>	

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
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	<p>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.</p> <p>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.</p> <p>Jackson: Public notice given for hearings. Notice published in newspapers, & written notice provided to adjacent landowners. Zoning Resolution requires extensive outreach.</p> <p>BLM: Public involvement on infrastructure projects usually occur during the NEPA process.</p> <p>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.</p> <p>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</p>	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.
13.5.1.9	Promptly & frequently update information related to infrastructure development & GrSG to foster a better understanding of impacts to the species. [See also Information, Communication, & Education Strategy 12.3.2.2]	BLM, CPW, Industry	Ongoing	<p>BLM: Few infrastructure projects have been completed recently. As research is reviewed or completed it is shared with agency biologists for their consideration.</p> <p>CPW: CPW routinely communicates & coordinates with the public often via the LWGs.</p> <p>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</p>	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.

Reference Number	Conservation Strategy	Responsible Parties	Timeline	Implementation	Effectiveness
13.5.1.10	Improve the understanding, 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.