

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.	

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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.	