Wyoming Game and Fish Department
Protocol for Treating Sagebrush
January 2024

Sagebrush treatments have been implemented or proposed with the assumption of benefiting sage-grouse. Research, monitoring, and anecdotal observations suggest that treatments can result in beneficial, benign, or harmful impacts to sage-grouse habitat depending on many known and unknown factors.

These protocols are to be used to guide the development of Wyoming Game and Fish Department (WGFD) sponsored or supported sagebrush treatments in sage-grouse occupied habitat, as well as to provide guidance to non-WGFD projects. The purpose of these protocols is to provide a framework for WGFD projects to ensure that they are consistent with sage-grouse core area and non-core area stipulations. This framework may not answer all questions associated with treatments, and these protocols may be revisited as new science becomes available. If project-specific circumstances fall outside the conditions outlined in this framework, communication with the WGFD Habitat Protection Program (HPP) and/or the Department's sage-grouse biologist will be necessary.

All Treatments

Planning Criteria

A. Consider what seasonal habitat requirements are provided to sage-grouse in the treatment area, similar to Third Order Selection in the Sage-Grouse Habitat Assessment Framework (HAF) (Stiver et al. 2015).
B. Evaluate the juxtaposition, extent, importance, and value of the sagebrush patch in the landscape (is this the only patch of undisturbed sagebrush in the vicinity?).
C. Identify the sagebrush species/subspecies/variety and assess the ecological site potential and treatment effects, utilizing Ecological Site Descriptions where available.
D. Determine the associated vegetation composition and condition (e.g. composition of desirable and undesirable species and their response to treatment) and their contribution to all wildlife habitat requirements.
E. Assess other existing site influences (e.g. current grazing use, presence of noxious/exotic plant infestations, cumulative impacts, indirect disturbance effects, past management history of site, etc.).
F. Establish post-treatment vegetation management objectives tiered to the management plan of the site.
G. Create a baseline for short-term and long-term post-treatment monitoring of the site. Refer to the HAF for an example of standard methods and data analysis tools.

Core Area Treatments

The following sagebrush treatment protocols are designed to ensure future habitat treatments conform to the provisions of the Wyoming Executive Order for Greater Sage-Grouse Core Area Protection (SGEO), to conserve sage-grouse and prevent population declines in core habitat areas. Treatments that will NOT reduce sagebrush canopy cover to less than 5% at the project scale are NOT required to have a Density/Disturbance Calculation Tool (DDCT) analysis completed. However, such treatment proposals should still follow the other steps described below in order to determine and document purpose and need, appropriately apply stipulations, and monitor results. The use of a 5% sagebrush canopy cover threshold for disturbance at the project scale is in order to be consistent with the Suitability Criteria in the SGEO. Maintaining sagebrush canopy cover at 15% or greater after treatments is preferred, and is a more conservative approach to managing habitat to sustain all seasonal requirements of sage- grouse (adapted from Connelly et al. 2000, Stiver et al. 2015). Treatments including juniper or other conifer removal, as well as cheatgrass and invasive species management should be a high priority for implementation in core areas.

Because sagebrush habitat is ecologically limited in Northeast Wyoming Core Area, treatments that will result in sagebrush canopy cover being reduced to less than 15% should not be conducted unless compelling evidence is provided to WGFD HPP demonstrating the treatment would result in improved habitat function for sage-grouse.

Stipulations Common to All

A project plan for sagebrush treatments must be developed that considers, evaluates and appropriately applies the following stipulations:

A. No treatment that results in less than 5% sagebrush canopy cover at the project scale should occur within 0.6 mile of any occupied lek unless the proposed treatment is necessary to maintain the viability of the lek, such as removing conifers or sagebrush encroaching on the lek site. Maintenance of sagebrush cover within the 0.6 mile buffer of occupied leks should be prioritized.
B. Treatment implementation should not occur within 4 miles of any occupied lek from March 15 - June 30, unless it can be demonstrated that nesting does not occur in the area. Treatments may occur in aspen, conifer, or other unsuitable habitats within this timeframe if implementation activities do not compromise the function of adjacent suitable habitat. If high elevation areas without nesting sage-grouse are targeted for treatment, implementation within this window may be considered on a case-by-case basis by consulting with the local WGFD biologist to determine seasonality of sage-grouse use.
C. Treatment implementation should not occur in designated winter concentration areas from December 1-March 14.
D. Avoid the use of fire to treat sagebrush in precipitation zones of less than 12 inches.
E. Prevention of annual grass establishment on sites with lower resistance and resilience (Chambers et al. 2016, Crist et al. 2019) should take priority over potential shrub benefits of a treatment.

F. Ensure plans are in place and funding is secured pre-treatment to control and monitor noxious and/or invasive vegetation post-treatment.
G. Defer the treated area from grazing for two full growing seasons unless vegetation recovery dictates otherwise.

DDCT Requirements

If there is justified purpose and need for the project, and the canopy cover of sagebrush post-treatment will be **5% or greater** at the project scale (see Monitoring section below for estimating canopy cover), the project may proceed without a DDCT analysis assuring the following steps are taken:

A. Submit project area polygon to the Density and Disturbance Calculation Tool web application and notify WGFD HPP.
B. Coordinate with WGFD personnel within the region(s) where the project is to occur, and obtain concurrence from WGFD HPP staff that this project is designed to improve sage-grouse habitat.
C. The treatment is configured such that treated acres are within 60 meters of suitable sage- grouse habitat (adapted from Danvir 2002, Slater 2003, Dahlgren 2006). If fire is being used in mesic sagebrush for the treatment, consult with regional WGFD staff and WGFD HPP.
D. Submit a shapefile of the "As Built" treatment area to HPP staff once completed to be used for confirmation that all criteria were implemented as planned and in compliance with core area stipulations, and so the treatment area is not erroneously digitized as disturbance.

If there is justified purpose and need for the project, and the canopy cover of sagebrush post-treatment will be **less than 5%** at the project scale, then utilize the DDCT outlined in the SGEO. Conduct the prescribed analysis and adhere to the following:

A. The project must not exceed the 5% disturbance threshold defined in the SGEO. If the project exceeds the disturbance threshold, WGFD personnel will determine the appropriate path forward via the DDCT analysis and consultation process.
B. This project disturbance will henceforth be considered existing disturbance and will contribute to DDCT analyses until canopy cover has reached 5% to meet necessary suitability criteria. Canopy cover must be documented with quantified data collection, such as line-point intercept (see Monitoring section).
C. A project plan must be developed that considers, evaluates, and appropriately applies the stipulations listed under the "All Treatments" section of this document.

Mesic Sagebrush

This section pertains primarily to mountain big sagebrush, silver sagebrush, and other species of sagebrush that have relatively rapid response to disturbance and where the risk of adverse

impacts is much lower. These communities can support a more aggressive proactive treatment plan, relative to more xeric sagebrush communities. The intent is for proactive management activities within these habitats to support diverse, healthy shrub communities long into the future which are able to provide foraging and cover habitat within close proximity to each other. These areas are frequently used as brood rearing habitat and will benefit sage-grouse by managing for highly diverse and productive habitats emphasizing forb productivity and proximity to mesic green habitats late into the brood rearing season.

In communities dominated by mesic species of sagebrush such as mountain big sagebrush, prescribed disturbance should encourage a variety of age classes of sagebrush and diversity of ecological states that benefit sage-grouse within a typical state and transition model. This is encouraged through fine scale mosaic treatments utilizing mechanical, fire, or herbicide applications, or broad scale thinning typically accomplished through herbicide application. Creating random edges across the landscape should improve proximity of foraging and cover habitat components for sage-grouse, and can be accomplished through a wide variety of treatment prescriptions (Figure 1). Block treatments resulting in reduction of sagebrush canopy cover below 5% are not supported in nearly all cases within core area.

Figure 1: Mosaic mechanical treatment design as viewed from aerial imagery one year post-treatment, mountain big sagebrush community, loamy ecological site with 12-15" annual precipitation.

Snowdrift or leeward slopes may create small mesic habitats within an otherwise xeric sagebrush community. These areas likely support a dense canopy of sagebrush, or a diversity of mountain shrubs, and can provide excellent brood rearing habitat due to elevated productivity and species diversity. Disturbance within these areas should be treated as mesic sagebrush even if surrounded by xeric sagebrush communities. However, prescriptions should consider the resulting "ice cream patch" and how livestock and wildlife will be managed to ensure long-term wildlife objectives will be met.

Xeric Sagebrush

This section pertains primarily to Wyoming big sagebrush and other species of sagebrush that have slower canopy cover recovery time after disturbance. The intent is for proactive management activities within these habitats to support diverse, healthy shrub communities long into the future which are able to provide reproductive, nesting, foraging, and cover habitat based on the seasonal needs of sage-grouse in the area in question. Where winter concentration areas are known to exist, managing for abundant sagebrush plants with height above persistent snow depth should be a priority for any management activities. Management of these habitats should encourage long-term health of sagebrush communities and requires careful evaluation of objectives during project planning. Incorporating a finer scale of disturbance is appropriate in many circumstances in order to continue to provide short-term habitat requirements in more limiting habitats. Use of prescribed fire in suitable sage-grouse habitat will be limited to a case by case basis in these more xeric areas due to long recovery times and the risk of invasive plants spreading. When necessary, fuel breaks or strip removal should be minimized as much as possible in order to avoid spread of invasive plants and annual grasses into areas that have not already been invaded.

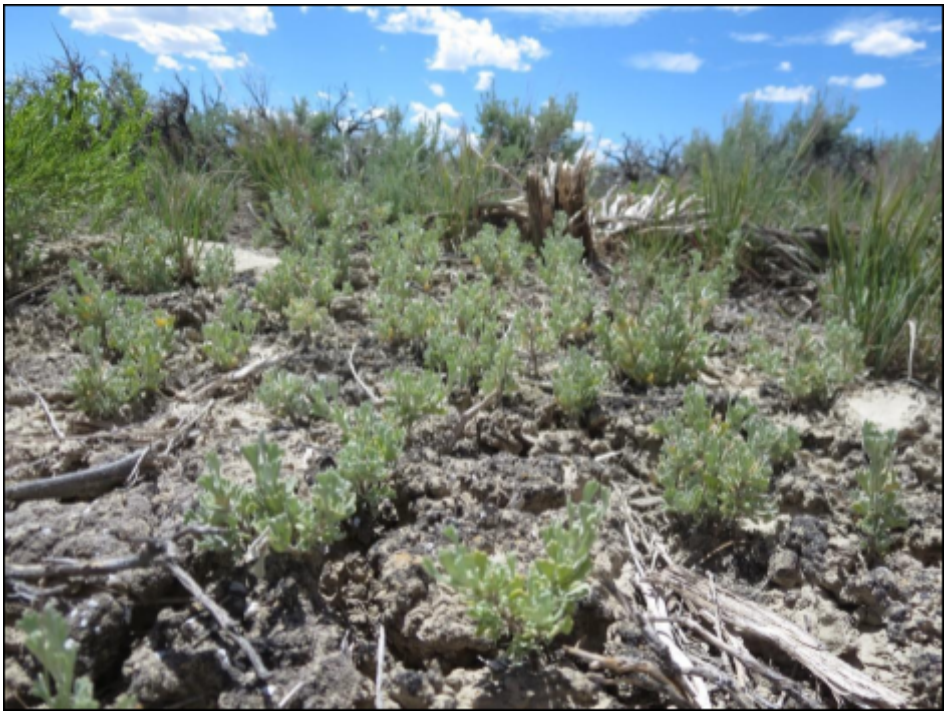

Figure 2. Wyoming big sagebrush seedling response from a mowing treatment in the Little Colorado Desert, loamy calcareous ecological site with 7" annual precipitation.

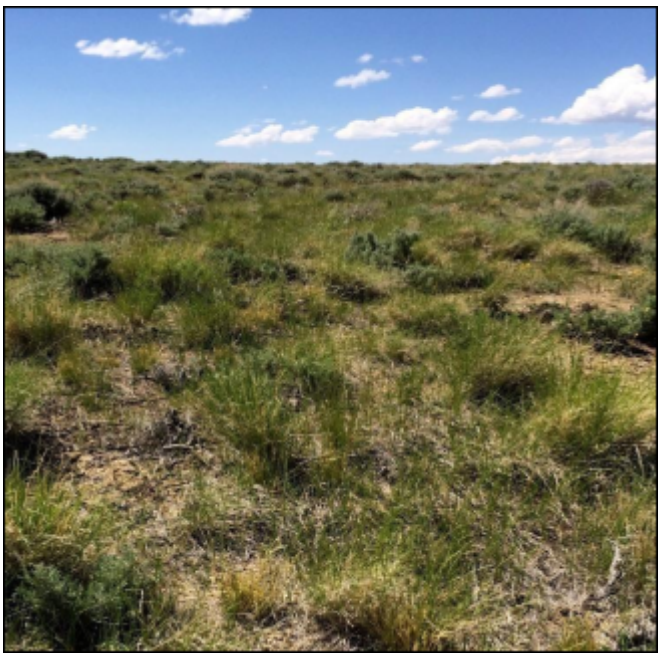

Figure 3. Herbaceous response to mowing in Wyoming big sagebrush, south LaBarge Creek, loamy ecological site with 7" annual precipitation.

Figure 4. Improved herbaceous conditions in the mowing treatment compared to the adjacent untreated Wyoming big sagebrush community, loamy calcareous ecological site with 7" annual precipitation. Foreground was not treated and the green paths in the back are from a mowing.

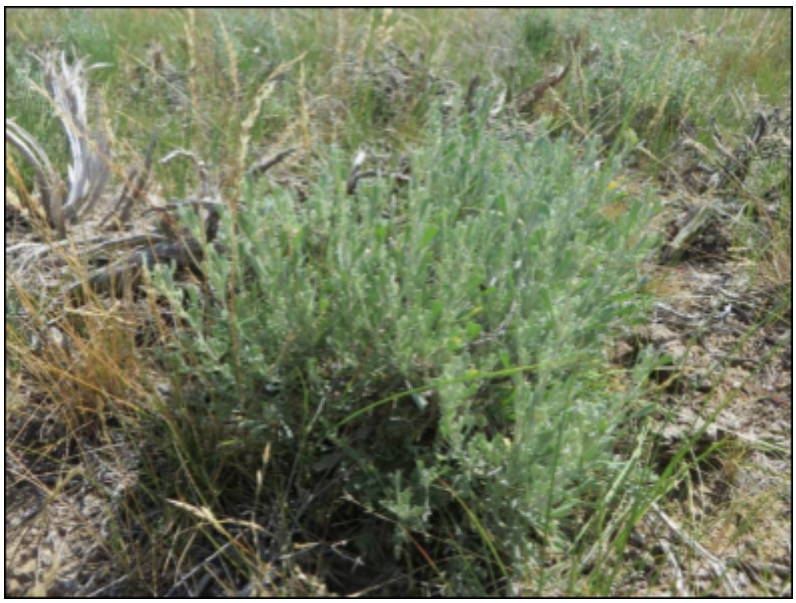

Figure 5. Improved annual leader production on Wyoming big sagebrush plant that persisted after the disturbance, south of LaBarge Creek, loamy ecological site with 7" annual precipitation.

Non-Core Area Treatments

As is the case with industrial development outside of core areas, there will be greater flexibility to conduct sagebrush treatments outside of core areas. There can be more emphasis placed on habitat needs of species other than sage-grouse. However, in occupied sage-grouse habitat, sage-grouse habitat needs should continue to be one of many components considered for management prescriptions. Planning criteria listed above should apply to all treatments in sage-grouse occupied habitat.

Monitoring

In order to determine canopy cover for purposes of the SGEO, the following monitoring methods, or other quantified methods accepted by interagency partners, should be utilized. The project area is the larger planning polygon which will include some treated and untreated areas after implementation. The footprint of disturbance is the actual area impacted by the implement, fire or herbicide within the project area. This impact can be on a scale from entire canopy reduction to a partial thinning relative to pre-treatment conditions.

Methods used to collect percent canopy cover of sagebrush should be similar to Fourth Order HAF data collection, including, but not limited to, line point intercept (Herrick et al. 2017). Pre-treatment data can be collected in representative locations within the treatment or in a randomly stratified design. Post-treatment data should be collected in both representative treated and untreated portions within the project area to capture the variation within the project area. Within the project area, the percent of treated and untreated acres also needs to be estimated. Post-treatment canopy cover across the entire project area will be calculated by averaging the percent canopy cover in treated and untreated acreage together, based on percent treated within the project area. For example, if 1000 acres are in the project area and pre-treatment canopy cover is 30%, and if 40% of the area is treated which results in 2% canopy cover post-treatment in disturbed areas, you would calculate the resulting canopy cover using 400 acres at 2% canopy

cover and 600 acres at 30% canopy cover or ((400 x .02) + (600 x .30))/1000 = .188 or 18.8 % canopy cover. In this case, the project continues to meet suitability criteria post-treatment and does not contribute to future DDCT analyses.

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