PRESCRIBED FIRE AS A MANAGEMENT TOOL IN XERIC SAGEBRUSH ECOSYSTEMS: IS IT WORTH THE RISK TO SAGE-GROUSE?

A White Paper prepared by the Sage and Columbian Sharp-tailed Grouse Technical Committee for the Western Association of Fish and Wildlife Agencies

Executive Summary

The sagebrush biome has diminished and been fragmented across much of its historic range. Several factors are responsible including agricultural conversion, large wildfires, pinyon pine and juniper expansion, urban development and, more recently, energy development. Xeric sagebrush communities typically receive ≤12" precipitation and include Wyoming big sagebrush, low elevation mountain big sagebrush, and low or black sagebrush communities. These habitats are not adapted to frequent fire and an extensive amount of this habitat type has been lost to wildfire, particularly in the Great Basin, over the last two decades. Natural fire return intervals in these settings have recently been estimated at 100 years or more. Invading exotic species such as cheatgrass are often spread as a result of fire, leading to vegetation type conversion, particularly where understory herbaceous vegetation is already depleted.

In the past, land managers implemented sagebrush eradication projects to enhance forage production for livestock. More recently managers have implemented habitat treatments, including prescribed fire, on remaining sagebrush grasslands to achieve a number of objectives, which at times have included benefits to sage-grouse. Although researchers have documented sage-grouse use of treated areas, no research has shown a direct benefit to sage-grouse survival or reproduction. Our review of scientific literature, however, includes considerable documentation revealing direct negative impacts of prescribed fires on sage-grouse nesting, wintering, and brood rearing habitats, which in some cases have resulted in population declines. Effects of fire on insect communities, important to juvenile sage-grouse, have been variable. No study presents a case where prescribed fire resulted in a significant increase in either ants or beetles for an extended period of time, diminishing the idea of using prescribed fire to improve insect abundance and diversity. In general, negative effects of prescribed fire appear more profound and prolonged in xeric sites. Numerous researchers have alternatively realized the need for maintaining sagebrush as a critical habitat component for sage-grouse and many other native species.

Managers considering treatments in xeric sage-grouse habitats that will result in a reduction in sagebrush cover should be aware of the negative impact this type of treatment could have, potentially for an extended period of time. Prescribed fire and other treatments can result in furthering habitat conversion or fragmentation. Aggressive vegetative treatments require a complete understanding of habitat availability and sage-grouse use of the treatment area and the broader landscape. Cumulative impacts to sage-grouse and other species should be well-understood and considered before proceeding with any treatment. As an example, a sagebrush habitat that lacks understory may be important for wintering sage-grouse. A treatment of the area for improving understory could inadvertently reduce or eliminate winter habitat, which may already be depleted as a result of other human activities. In general, smaller treatment sizes spread over multiple decades are likely to reduce negative impacts.

Prescribed burning may have application in pinyon and juniper woodlands. Vegetative thresholds pertaining to tree canopy cover and understory components directly affect potential for restoring sagebrush grasslands overtaken by conifers. The risk of invasion by annuals and associated factors affecting invasibility should be considered when assessing treatment appropriateness and technique. When prescribed fire is used to control pinyon pine and juniper woodland expansion, sagebrush stands should be protected to conserve sagebrush habitat and allow sagebrush recruitment into burned areas.

In some circumstances where sagebrush occurs but severely lacks herbaceous understory, chemical or mechanical treatments that reduce sagebrush cover and allow for mechanical seeding of native grasses and forbs may be necessary for accelerating sagebrush grassland habitat restoration. These sites would be characterized by: an absence of typical dominant native species and depleted seed bank; bare soils dominate–even under sagebrush; and long-term attempts to restore habitat through herbivore rest, deferment, and proper stocking have failed. Treatments are most appropriate where loss of topsoil is an imminent risk. Treatments should not be implemented without a high likelihood of success. From an ecological standpoint, treatments should always emphasize use of native species adapted to treatment areas to avoid eventual dominance by competitive exotic species and resultant loss of habitat function. Mechanical or chemical treatments that conserve sagebrush and enable re-establishment of native herbs are preferred. By comparison, fire treatments are less selective, tend to burn the best remaining habitats, and are at risk of invasion by cheatgrass or other invasive species in areas where they occur. The likelihood of habitat restoration success using aggressive vegetation treatments in areas lacking topsoil is very low. In these settings any remnant native cover should instead be protected.

Given the large losses of xeric sagebrush habitats that have occurred to date, we encourage managers to first consider protecting and improving vegetative integrity and habitat function in place of stand replacing treatments that further fragment degraded sagebrush habitats and face other risks. Realizing these habitats deteriorated over long periods of time and over large expanses, a long-term approach to large-scale restoration appears more feasible. A combination of fire suppression and conservative management techniques such as proper grazing strategies should be considered first. For most circumstances, this approach conserves sagebrush, allows herbaceous vegetation to recover – directly benefiting sage-grouse. This involves the least amount of risk and cost, both financially and ecologically. We question vegetation models that do not recognize sagebrush grasslands as an ecological endpoint or sustainable climax community. Instead we recommend such models be based on principles of plant ecology and iterative refinement involving scientific testing, observation, and adaptation. For those habitats in a healthy intact status, actively conserving these areas pays ecological dividends and avoids the future prospect of intensive treatments with uncertain outcomes.

Position Statement

With the attached white paper as justification provided by the Western States Sage and Columbian Sharp-tailed grouse Technical Committee, the Western Association of Fish and Wildlife Agencies adopts the following position statement:

"Sagebrush grasslands, which support sage-grouse and a host of other wildlife species, have declined in area by more than 50%. Remaining habitats are becoming increasingly important to the sustainability of sage-grouse. These habitats face considerable threats from wildfire, conversion, exotic plant invasion, and many forms of human development. In addition to these perturbations, treatments are often recommended to set back succession in sagebrush communities. Prescribed fire is often promoted to achieve this objective, which has the potential to alter sagebrush communities for long periods of time. As agencies responsible for conserving wildlife associated with these habitats, we strongly caution against the use of prescribed fire within xeric sagebrush communities. Exceptions may apply, but only if a comprehensive assessment indicates desired sage-grouse habitat objectives will be achieved. Such areas typically receive ≤12 inches precipitation and include Wyoming big sagebrush, low elevation mountain big sagebrush, and low or black sagebrush communities. Prescribed fire fragments and reduces available sagebrush stands and increases the risks for cheatgrass and other invasive weed establishment, leading to negative impacts to seasonal sage-grouse habitats. These changes can result in long term effects on sage-grouse populations. Further, we recommend maintaining sagebrush through a conservative long-term approach to management and habitat restoration."