

# RESOURCE NOTES

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## *Multiple Use Management— Dixie Harrow Style*

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Many rangeland areas within the Bureau of Land Management (BLM) Richfield (Utah) Field Office were severely overgrazed by uncontrolled livestock during the late 1800s. This resulted in a loss of cool-season grasses and perennial forbs and a conversion to highly palatable, young, productive big sagebrush (*Artemisia tridentata* Nutt.). The conversion to big sagebrush created beneficial habitat for species such as the mule deer (*Odocoileus hemionus*), greater sage-grouse (*Centrocercus urophasianus*), and pygmy rabbit (*Brachylagus idahoensis* [Merriam, 1891]) and resulted in an increase in their populations during the early and mid-1900s. Many of these rangeland areas now consist of a monoculture of old, decadent, big sagebrush (80 to 100 years old), which is less desirable for sagebrush-steppe species. Desirable perennial grasses and forbs are still absent from the rangeland, resulting in minimal vegetative diversity. The rangeland needs active management to become productive and diverse in its vegetation and wildlife.

In 1997, Richfield Field Office personnel began using the Dixie Harrow method for treating sagebrush-steppe areas. After seeing the results that the USDA Forest Service had with this method on the Fishlake National Forest (Utah), the BLM decided that it would be an excellent tool for multiple use rangeland treatments. The Dixie Harrow method allows for site-specific treatment, which creates

a diversified landscape that meets the needs of multiple use management. The average cost per acre is \$60.00.

An advantage of the method is that the user can design what is to be treated and what is to be left untreated. With the Dixie Harrow, a resource specialist is able to create better habitat and improve the watershed by maintaining important cover, improving forage diversity and availability, and leaving litter on the ground.

The method can be used to restore sagebrush-steppe areas and also to re-treat existing seedings that are a monoculture of crested wheatgrass (*Agropyron cristatum* [L.] Gaertn.) or have encroaching pinyon-juniper trees as old as 50 years. For the latter, the area needs to be double harrowed or broadcast seeded to maximize the kill on the trees. This is especially true of juniper, which will resprout if it is single harrowed. The method can be used to redesign existing seedings by leaving islands and corridors of untreated vegetation for visual resource management (VRM) and wildlife thermal cover.

The Dixie Harrow method uses a combination of harrowing and broadcast seeding. A 425-horsepower John Deere tractor is used to pull a Dixie Harrow. The tractor tires are filled with water, which maximizes traction and allows the method to work. Richfield Field Office personnel have used two different sizes of harrows, depending on terrain. A 43-foot wide, 16,000-pound harrow is used in terrain that is flat to gently sloping. A 27-foot wide, 8,000-pound harrow is used in broken terrain that consists of foothills and steeper terrain. On-ground use and

experience has revealed that the ideal all-purpose harrow would be 33 to 35 feet wide.

A broadcast seeder (Herd Model 2440, 32 bushel capacity) is hooked into the tractor hydraulic system and used to apply the seed. Seed should be broadcasted at a rate of 15 pounds per acre. Single harrowing results in the need for re-treatment 5 to 7 years after the original treatment. Double harrowing extends the life of the treatment to 10 to 14 years. The major exception to double harrowing is when the project involves crucial deer or sage-grouse winter range in an area that has old, tall, and decadent big sagebrush. In these areas, it may be most desirable to single harrow and broadcast seed to ensure that plenty of sagebrush is left as forage and thermal cover for wintering deer and sage-grouse. Double harrowing can also be used on these crucial deer or sage-grouse winter ranges if they are extremely rocky (the rocks protect the sagebrush plants and cause the harrow to ride over them) or if a minimum of 50% of the area is not treated and left as winter forage-thermal cover areas (islands and corridors). Single harrowing generally results in a 40% to 60% reduction of decadent sagebrush; double harrowing results in a 70% to 90% reduction.

The Dixie Harrow method is designed to diversify the age class of desirable shrub species and improve their productivity. The harrow takes out unwanted, decadent browse and encroaching, young pinyon-juniper trees and leaves the desirable grasses, forbs, and young, productive browse. Harrowing does not negatively affect the native grasses and forbs that are present on the site. Instead, it releases the grasses and forbs by removing the



decadent sagebrush that competes for water and light, allowing their overall composition to increase.

Treatments using the Dixie Harrow method should occur in fall. This prevents unnecessary negative effects on various wildlife species by keeping the treatment activity out of nesting seasons, fawning—calving seasons, and the like. Fall treatment also helps ensure project success for several reasons. First, the onsite existing seed from grasses, forbs, and browse is fully mature and viable and ready to be planted by the action of the harrow. Second, the onsite vegetation has gone through a full growing season and is ready to enter into winter dormancy; therefore, damage to desirable plants is minimized. Third, the amount of onsite vegetative litter is maximized and helps create a better seedbed.

The action of the harrow in fall actually plants desirable perennial seeds that are onsite and are not in the seed mixture. This is especially true of sagebrush and is one reason that sagebrush seed is not needed in the mixture if there is a good crop of seed on the existing sagebrush within the treatment area.

The Dixie Harrow can be used in areas that have as much as 50% rock as ground cover. Although it is

designed to handle rock, rocky areas result in more repairs to the harrow. The main problem is high centering and damage to the underside of the tractor. Areas with large boulders (2 feet or more aboveground) have to be avoided and are incorporated into islands or corridors.

Many islands and travel corridors are left untreated for wildlife and VRM values. The untreated areas provide crucial thermal cover, forage diversity, and habitat requirements for such species as greater sage-grouse and pygmy rabbits. The edge effect is maximized by feathering all harrowing boundaries. The islands and feathered edges give the treatment a natural look and satisfy VRM concerns. Also, because the seed is broadcasted instead of drilled, the result is a natural, well-distributed look rather than a drilled, unnatural look, which often occurs with drill seeding. Treated versus untreated ratios should be 50:50 or 60:40 to meet all multiple use values.

From 1997 through 2003, the Richfield Field Office has successfully restored 14,000 acres of sagebrush—steppe habitat by using the Dixie Harrow method. The restoration has met the needs of multiple use management. The treatments were not performed with single use management in mind. The Dixie

Harrow may be a feasible means for modifying sagebrush to create the type of landscape suitable for the sage-grouse, pygmy rabbit, and other wildlife. However, other factors must be considered in determining the feasibility of the Dixie Harrow treatment, such as management objectives, previous land use of the site, soil type and depth, slope, and existing habitat conditions. Presently, there is only anecdotal evidence to link an increase in either sage-grouse or pygmy rabbit populations to the Dixie Harrow mechanical treatment. Further studies could quantify the effects on obligate species from Dixie Harrow treatments.

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