

Wooded Draws in Rangelands of the Northern Great Plains

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Introduction

Wooded draws and natural prairie woodlands occupy about 1.1 percent of the northern Great Plains. While the extent of wooded draws is extremely limited, their importance and value is much greater. These unique communities are important for wildlife and livestock habitats, soil stabilization, watershed maintenance, firewood, esthetics, and species diversity (Fig. 1). An estimate of their value has been placed at \$10 million annually, primarily production of fuelwood, and wildlife habitat and hunting. However, the dominant use is cattle grazing which requires management to control overuse.

Description and classification of woody draws is incomplete. However, recognition of habitat type is sufficient to group into categories used by the Soil Conservation Service as run-in sites, run-off sites, and normal sites. Wooded draws are further grouped as shrubby draws and hardwood draws. The latter grouping is also used by the USDA Forest Service in preparation of Forest Inventory of Plains woodlands. Shrubby draws in this case are "nonforest with trees," the more productive wooded lands are described as "forest land."

This section briefly describes the woody-draws and suggested management for their maintenance and/or regeneration.



Figure 1. Wooded draws are unique communities important for wildlife, livestock, firewood and esthetics.

Descriptions

Vegetation of the northern Great Plains is a mosaic of several different plant communities. The predominant vegetation is broadly classified as Mixed Grass Prairie, interspersed with shrubby stands and woody draws. These communities provide a stark contrast to the barren badland buttes which are also characteristic of the western part of the area. The rolling topography and steep buttes form some of the habitats which are favorable for woody species.

In addition to inherent diversity of plant species, several environmental factors influence community composition. Some of these are slope, aspect, topography, areal distribution, soils disturbances, and amount and seasonal distribution of precipitation. Habitat type descriptions and classification on northern prairies is progressing. Shrub and sapling strata are similar in most of the stands, regardless of the dominant tree species (Fig. 2). The herbaceous layer is high in species richness and diversity. Analysis of the data at this time only allows division of communities based on the dominant tree species which are: paper birch, green ash, Rocky Mountain juniper, ponderosa pine, cottonwood, quaking aspen and bur oak.

The mean number of species encountered in each vegetation layer varies among stands (Table 1). The tree canopy of most

Table 1.

The mean number of species encountered in each strata by wooded communities.

Dominant tree	Tree	Sapling	Shrub	Herbaceous
cottonwood	2	3	6	26
bur oak	3	7	7	24
green ash	2	4	8	32
paper birch	2	5	9	33
ponderosa pine	2	2	4	24
Rocky Mountain juniper	2	2	5	28
quaking aspen	2	6	10	32



Figure 2. Shrub and sapling strata are similar in most stands, regardless of the dominant tree species.

stands is usually dominated by one species, with individuals of trees of other species occasionally found intermingled. The sapling layer ranges from an average of two species in juniper and pine stands, up to seven species in bur oak. Shrub layers also illustrate a wide difference in number of species. An average of four species is found in ponderosa pine, compared with 10 in the quaking aspen. The herbaceous layer was the most diverse, with the average number of species varying from 24 to 32. Ponderosa pine has the lowest species richness values, and quaking aspen the most diversity.

Specific communities were found in association with certain topographic and/or edaphic communities. These communities-habitat types- often have several understory species in common. A brief description of these habitat types follows.

Green Ash Habitat Type

The green ash-dominated community is the most frequent and most widely distributed of all the woodland habitat types in the northern prairies (Fig. 3). It is commonly found in upland coulees and draws, broad valleys, and on floodplains. The canopy coverage in all layers is usually quite dense. The tree canopy is composed primarily of green ash, sometimes associated with American elm and less frequently with Rocky Mountain juniper. The sapling stratum is most often dominated by chokecherry. Green ash is also a significant component of the sapling layer of communities which are in excellent condition, ensuring its replacement in the tree canopy. Chokecherry and snowberry dominate the shrub component. The total number of herbaceous species in green ash communities, 76, is the largest number of species in this layer, compared to other habitat types. This high diversity caused low



Figure 3. The green ash-dominated habitat type is the most frequent and widely distributed woodland habitat type on the northern prairie.



Figure 4. Quaking aspen trees are usually closely spaced but understory coverage dense.

dual species cover values, which makes it difficult to specify a dominant species. Kentucky bluegrass, burdock, black snakeroot, and northern bedstraw are commonly encountered.

Rocky Mountain Juniper Habitat Type

The Rocky Mountain juniper community is restricted to steep, north-facing slopes. However, scattered individual trees are found on a number of diverse locations as rocky outcrops, butte tops, draws and floodplains. Rocky Mountain juniper dominates the tree, sapling, and shrub layers of the communities, guaranteeing its continued dominance. Little ricegrass are typically herbaceous species. The distribution of little ricegrass is scattered, but it is common for moss to form a continuous thick "carpet" on the substrate.

Cottonwood Habitat Type

Cottonwoods are found distributed as scattered individuals in moist ravines and ditches, and as narrow, stringer types along streambanks, but reach their best expression of community dominance along the floodplains of larger streams (Fig. 5). Cottonwood is a seral or transitional species. There is no regeneration under the mature tree canopy; but younger communities can be found along riverbanks, as meanders deposit sediments favorable for cottonwood seed germination. The tree canopy and individual spacing is naturally more open than other tree types. Composition is cottonwood in association with juniper and green ash; the latter two species are also prevalent in the sapling layer. Snowberry density is high in both the shrub and herb strata. Other common species in the herb stratum are Kentucky bluegrass and poison ivy.

Bur Oak Habitat Type

Distribution of bur oak is quite sporadic; it is limited to specific drainages and buttes. It is often considered a seral species; how-



Figure 5. Cottonwoods often occur as stringer types along streambanks indicative of how they regenerate.

ever, evidence of reproduction can be found. The tree canopy is dominated by bur oak and a significant proportion of green ash. Diversity of sapling and shrub layers is quite high, dominated by beaked hazelnut and chokecherry. The diversity of the herbaceous zone is relatively low, dominated by sedges.

Quaking Aspen Habitat Type

Quaking aspen is found in numerous small stands widely distributed throughout the northern part of the northern Great Plains. It is more prevalent in the northern portions of the area. Communities are found in concavities in the topography, on north facing slopes, and often at the upper levels of green ash draws. Mature aspen trees are usually closely spaced (Fig. 4), and green ash is occasionally intermingled in the canopy. Equal amounts of quaking aspen and green ash are found in the sapling division, which indicates that quaking aspen, often considered a seral species, is being replaced by green ash. Chokecherry and snowberry dominate both the shrub and herb layers where canopy coverage is dense. Other species often encountered are poison ivy and sarsaparilla.

Paper Birch Habitat Type

Paper birch dominance is restricted to areas of high moisture, often in association with springs and north facing slopes. wet conditions also favor a lush understory. Association of paper birch and trembling aspen in the tree and sapling overstory is common. The shrub layer is similar to bur oak, with beaked hazelnut and chokecherry dominating. Snowberry and false melic compose a significant portion of the herbaceous layer.

Ponderosa Pine Habitat Type

Ponderosa pine communities are somewhat of an anomaly. Their distribution is restricted to an isolated area north of Amidon, N. Dak. This stand represents the most northeastern extension of the species. The pines are homogeneously distributed within stands, which are interspersed with grasslands. Rocky Mountain juniper is also found in the tree canopy. This is also the only type where skunkbush sumac dominates the shrub layer. However, the herb layer is similar to many of the other types and dominated by snowberry and poison ivy.

Management Considerations

Wood Component

Woody species associated with wooded draws have the ability to sprout if the stem or trunk is removed. This characteristic results in regeneration of the plant if the top is destroyed. In North Dakota stumps of nearly all felled trees produce sprouts the first growing season, and most retained live sprouts three years later (Table 2). Also, protection from cattle browsing made an important difference in development of sprout clumps but did not affect numbers of sprouts surviving after three years. Heavily browsed sprout clumps may or may not die.

Trees and shrubs interplanted in decadent wooded draws vary in survival (Table 3). The relatively poor survival of native green ash seedlings in this one case (grown from northern Great Plains seed) was probably a result of the condition of the containerized plants.

Table 2.

Production and growth of stump sprouts on fenced and unfenced plots in woody draws; Little Missouri National Grasslands, North Dakota.

Item	Fenced	Unfenced
Stumps with sprouts, first year; percent	98	100
Stumps with sprouts, third year; percent	95	95
Average number of live sprouts/stump, third year	74	77
Average height of clumps, third year; feet	4	2
Average height, tallest sprouts, third year; feet	5	3

Table 3.

Survival of underplanted trees and shrubs on partially cut, fenced and unfenced plots in woody draws; Little Missouri National Grasslands, North Dakota.

Species	Percent Fenced	surviving ¹ Unfenced
Green ash	21	29
Rocky Mountain juniper	96	90
Bur oak	90	69
Chokecherry	82	60
Wild plum	89	65
Russian olive	40	73

¹At the end of second (7978) growing season.

According to the report most had grown too large for the containers which created an undesirable top-root ratio. The transplanted trees and shrubs performed satisfactorily. In general, after three years, shrub densities showed no effects of protection from grazing by livestock. Height data indicated that positive or negative effects are highly dependent upon individual shrub species. It appears that a long time period would be required to fully assess the possible benefits of protection from grazing by livestock and reduction of tree densities on the shrubs in woody draws.

The deciduous tree-shrub type of the woody draws appears widely threatened by multiple impacts, especially cattle damage (Fig. 6). After only three years in one study there are good indications that: (1) moderate partial cuts will stimulate sprout regeneration of green ash and American elm and promote height growth of Woods rose and green ash seedlings; (2) at least a few kinds of tree and shrub seedlings can be successfully transplanted under partially-cut stands; and (3) protection from cattle grazing improves survival of most underplanted trees and shrubs, development of tree sprout clumps, and height growth of chokecherry and American elm seedlings.

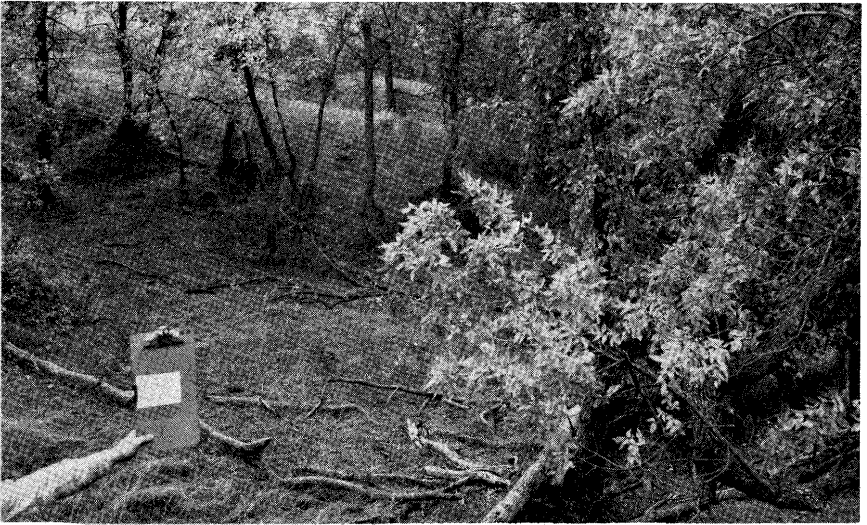


Figure 6. Cattle use of wooded draws can be very demanding of the resources.

Livestock Component

Livestock use of wooded draws (mainly cattle), has been described as demanding. Livestock use wooded draws in summer for shade, to escape insects (mainly horn flies), and to graze the relatively long “green” season of herbaceous forage associated with the moisture “run-in” characteristic of the draws (Fig. 7). The last characteristic also provides the best location for stock dams to provide water for livestock.

Shade: Providing shade to increase gain in beef production remains questionable. However, shelter has reduced death losses caused by extreme temperatures. Research in the central United States indicates that grazing behavior of cattle changes with small changes in air conditions. A close relationship of time spent grazing and a temperature-humidity index (T.H.I.) where $T.H.I. = 0.4 (T_a + T_w)$ + where T_a = dry-bulb temperature and T_w = wet-bulb



Figure 7. Wooded draws are “run-in” moist sites with a long “green” season compared to adjacent upland sites.

temperature- where humidity as well as temperature has been determined to affect grazing time. Cattle grazed hot days if the humidity was low. Grazing time increased when wind speed increased on hot-humid days. Therefore, shade shelters would provide some cooling.

This suggests constructed shelters placed at strategic locations would be better suited to improve grazing distribution across the land and increased beef production than would voluntary and/or forced use of wooded draws which concentrates grazing use. The latter forces concentrated use of small areas which eventually lack available forage.

Insects: One reason livestock use wooded draws is to avoid insect attacks and dislodge insects by rubbing. The major insect pests on cow herds in the northern Great Plains are horn flies and mosquitos. Wood draws provide cows with shade, which horn flies avoid (Fig. 8). Fly control has shown positive benefits to good grazing distribution. Recent development and use of insecticide-impregnated ear tags has provided excellent control of horn flies. Ranchers who have used insecticide-impregnated ear tags on cattle observed cattle to disperse over rangelands without demonstrations of tormented behavior due to horn flies. This has resulted in less rubbing and use of wooded areas.

Consequently, the uses of fly controls, particularly true with the use of insecticide-impregnated ear tags may result in good grazing distribution and less use of wooded draws.

Green belt: Because of the moisture "run-in" characteristic of wooded draws, the herbaceous vegetation of these areas remain green later than most uplands. This encourages longer and more intensive use of livestock in the latter part of the summer. Management practices such as fertilization of underused areas will delay maturity of forage plants and provide a longer green feed period. Interseeding of highly palatable species in unused areas will at-



Figure 8. Wooded draws provide cows with shade which dis-horn fly activities.

tract livestock to these areas. Other management, such as burning and mowing, will provide longer green periods but not as effectively as fertilization and interseeding.

Longer green periods of areas other than wooded draws can be achieved by fertilization, interseeding, burning and mowing.

Water: Wooded draws occur in the drainage system for the adjacent land areas and these drainage ways are used for construction of stockponds—water for livestock (Fig. 9). This encourages livestock to linger in wooded draws.

Quality of stockpond water has been a major concern during the latter part of the summer grazing, because of decreasing water quality and reduced water consumption by cows and calves with lower weaning weights of calves. The installation of plastic pipe has made available a continuous supply of high quality water. The use of buried lines serving several water tanks provides management with a device to rotate grazing and encourage uses of wooded draws, particularly true during the latter part of the summer grazing period.

Several livestock management options are available to discourage demanding use of wooded draws by cattle. The most promising appear to be constructed shade shelters, fly control with insecticide-impregnated ear tags, practices such as fertilization, interseeding, burning, and mowing on areas other than wooded draws, and pipe systems to provide high quality water away from wooded draw areas. However, these options need economic rationalizing before implemented. The benefits of reduced livestock use of wooded draws to land managers and society would be continued higher level of return from production of fuelwood, wildlife habitat and fur and game.



Figure 9. Wooded draws often are sites for **stockponds**—water for livestock which encourages livestock to linger in wooded draws.

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Guidelines for Increasing Wildlife On Farms and Ranches

**With Ideas for Supplemental Income
Sources for Rural Families**

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Editor**

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Wildlife Resources Committee and
Cooperative Extension Service
Kansas State University - Manhattan**

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