A Yellowbrush/Grass Community Type From the Uinta Mountains and Utah Plateaus

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Abstract—Ecological inventory and vegetation monitoring in the Uinta Mountains and Utah Plateaus on the Ashley National Forest and Manti-LaSal National Forest of the past several years suggest a community type in which yellowbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*), and slender wheatgrass (*Elymus trachycaulus*) are indicator species. This community type is common at elevations or slope positions where snow depth and duration are sufficient to greatly suppress big sagebrush. Features of this community type are discussed in context of management implications.

Yellowbrush

Yellowbrush (*Chrysothamnus viscidiflorus* spp. *lanceolatus*) is a common plant over much of mid montane Utah. It is known from lower British Columbia east to Montana and south to northern California and Colorado with outlying populations in Arizona and New Mexico (Anderson 1986). By association with some of its generic relatives, yellowbrush has been much maligned. However, yellowbrush has high value for ungulate forage. In late summer, fall, and winter it is highly selected by domestic and wild ungulates. It has been rated with moderate value for watershed protection (USDA Forest Service 1993).

In numerous studies on the Ashley National Forest, it has not displaced other vegetation by forming dense, closed stands as is sometimes the case of other members of the genus. Most often it contributes to species diversity and structural diversity without assuming high dominance that greatly suppresses other plant taxa. In contrast to rubber rabbitbrush (*Chrysothamnus nauseosus*) and big sagebrush (*Artemisia tridentata*), yellowbrush commonly does not overtop associated herbaceous vegetation. It is not uncommon for associated grasses to exceed the height of yellowbrush.

Even at sites where yellowbrush is a dominant with high frequency and high percent crown cover, there is usually a diverse mix of other plant species. Such sites are the focus of this paper.

The common name of yellowbrush is used in this paper to reduce association of this plant with some other members of the genus with less forage value and of more aggressive nature. This common name has a long history. It was used as early as 1937 (USDA Forest Service 1937). Other common names included mountain low rabbitbrush, lanceleaf yellowbrush, lanceleaf rabbitbrush, and Douglas rabbitbrush.

Study Sites

Information for this paper came from seven sites on the Wasatch Plateau, Manti-LaSal National Forest, and from five sites on the Ashley National Forest. Of the Ashley National Forest sites, three were from the western Uinta Mountains, and two were from the West Tavaputs Plateau. Range in elevation of the sites was from 2,743 to 3,048 m (9,000 to 10,000 ft). Average elevation of the sites was 2,936 m (9,633 ft). Study sites included all exposures except northerly. Gradients were mostly from 0 to 15 percent. Study sites from the Manti-LaSal National Forest are identified as RR-102, YB-1, WH-1, TSR-1, WR-1, CB-101, and RR-102N. Those from the Ashley National Forest are identified as 34-2, 34-3, 35-5, 58-1B, and 58-2. Locations for these study sites are documented at the Supervisors Offices of these National Forests at Price, Utah, and Vernal, Utah.

Methods

Data was taken from long-term monitoring sites that are permanently marked and included in study inventories of the Ashley National Forest and Manti-LaSal National Forest. Plots from which information was taken were of various sizes and from various methods of vegetation measurements. These included percent composition based on air-dry weight, rooted nested frequency, and line intercept. Although plot size varied and purpose and design of studies varied, the plot data does provide site consistency and plot frequency. Because various plot sizes and various numbers of plots were used, percent site consistency and percent frequency is used to standardize the information from the data.

Although percent composition by weight might not be statistically friendly, it does provide comparative information. This method of vegetation measurement does provide a comparative measure of the ability of different plant taxa to command the resources of a site. Ability to command resources is perhaps more accurately expressed by relative production than by frequency. Small annuals of high frequency might be much less able to command resources than larger plants of lower frequency. Percent composition by weight (table 1) is one of the parameters used in this paper to define yellowbrush-grass communities.

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Table 1—Consistency, frequency, and composition by weight of vascular plant taxa in yellowbrush communities

Taxa	Site consistency (%) (n = 12)	Plot freq. % (n = 12)		Composition by weight (%) (n = 11)	
		Range	Average	Range	Average
Yellowbrush	100	13–100	73	12–54	26
Slender wheatgrass	100	20–100	79	7–41	17
Letterman needlegrass	100	30–100	79	2–20	11
Yarrow	92	0–94	49	0–7	3
Peavine	92	0–100	41	0–15	7
Mountain brome	58	0–100	25	0–30	5
Sandberg bluegrass	50	0–100	26	0–37	5
Sedges	58	0–77	22	0–6	3
Everywhere aster	50	0–37	7	0–6	1
Potentilla	50	0–52	19	0–11	2
Dandelion	58	0–100	29	0–4	1
Douglas knotweed	50	0–40	15	0–1	<1
Oniongrass	42	0–80	18	0–3	1
Rockcress	42	0–20	4	0–1	<1
American vetch	42	0–40	12	0–1	<1
Muttongrass	33	1–10	2	0–1	<1
Penstemon	33	0–60	12	0–14	2

Features of Yellowbrush/Slender Wheatgrass Communities

Yellowbrush/slender wheatgrass communities are typically found at higher elevations than mountain big sagebrush communities or on concave leeward slopes where persistent snowbeds suppress sagebrush. They appear to be more common on basic substrates than on acidic or neutral ones. In Utah, they are found in the aspen and spruce-fir belts. They are found in the western Uinta Mountains and on the plateaus that run down through the center of Utah. Ground cover (ground covered by vegetation, litter, and rock greater then 2 cm diameter) varied between 35 and 98 percent with three sites at 35 percent and three sites over 90 percent. Potential for ground cover might be above 90 percent. Sites with lower ground cover values were highly disturbed by northern pocket gophers (*Thomomys talpoides*).

Yellowbrush communities are distinguished by yellowbrush being the dominant shrub and sometimes the only shrub with greater than a trace of crown cover. Line intercept of crown cover of yellowbrush was measured at three of the sites. Crown cover of this shrub ranged from 8 to 37 percent. Graminoid representatives of these communities include slender wheatgrass (*Elymus trachycaulus*), letterman needlegrass (*Stipa lettermanii*), and Hood sedge (*Carex hoodii*). Although mountain brome (*Bromus carinatus*) is occasional to these communities, it is not nearly so common here as in tall forb communities. Forbs common to these communities include peavine (*Lathyrus lanzwertii*), yarrow (*Achillea millefolium*), Rydberg penstemon (*Penstemon rydbergii*) and Watson penstemon (*Penstemon watsonii*).

Although yarrow was found at relatively high site consistency, and high plot frequency, this plant is a generalist of broad ecological amplitude. Its broad amplitude limits the indicator value of this plant for a specific community type. The same might be said of Letterman needlegrass.

Several species had site consistency of 33 percent or greater. However, due to broad amplitude or low plot frequency these plants are not considered reliable or specific indicators of yellowbrush/grass communities. These include Sandberg bluegrass (*Poa secunda*), sedges (*Carex* spp.), everywhere aster (*Aster chilensis*), potentilla (*Potentilla* spp. and mostly *P. gracilis*), dandelion (*Taraxacum officinale*), Douglas knotweed (*Polygonum douglasii),* oniongrass (*Melica bulbosa*), rockcress (*Arabis* spp.), American vetch (*Vicia americana*), muttongrass (*Poa fendleriana*), and penstemon (*Penstemon* spp. and mostly *P. rydbergii* and *P. watsonii*).

Over 70 vascular plant taxa were recorded in plots. The 17 taxa listed in table 1 had site consistency of 33 percent or greater. All other taxa had site consistency less than 33 percent, average plot frequency less than 15 percent, and contributed no more than 1 percent of composition by weight.

The three methods of classifying plants of table 1 all point to the same few taxa as being most reliable as indicators of the community type. These are yellowbrush, slender wheatgrass, Letterman needlegrass, and peavine. The large gap in site consistency from 92 percent to 58 percent between peavine and mountain brome shown in table 1 is likely significant.

These plants have rather broad amplitude. However, the combination of these plants as dominants does seem unique. The name of yellowbrush/slender wheatgrass serves well to identify this community type.

Abundance of slender wheatgrass, mountain brome, peavine, and other plants common to tall forb communities might be considered an indication that yellowbrush/slender wheatgrass communities are degraded tall forb communities. However, the classic indicators of degraded tall forb communities including western cone flower and tar weed were lacking or of comparatively low frequency at these sites. Of the 12 sites, tarweed was found at only one site. Western coneflower (*Rudbeckia occidentalis*) was not recorded in plots at any of the sites. Tall larkspur (*Delphinium occidentale*) was found in low abundance at one site. Additional evidence of two distinct communities includes abrupt boundaries between some tall forb and yellowbrush/slender wheatgrass communities. However, gradual gradients between the two communities can be expected at some locations.

At the warm or low elevation end, yellowbrush communities grade into mountain big sagebrush communities.

Recently burned big sagebrush sites at high elevation can take on the appearance of yellowbrush/slender wheatgrass communities. At one site on the Manti-LaSal National Forest (Baldy Swamp Burn), yellowbrush and Letterman needlegrass were common after burning. However, bluebunch wheatgrass (*Elymus spicatus*) and not slender wheatgrass was the dominant grass.

Topographic position and elevation are also indicators of yellowbrush/slender wheatgrass communities. These communities are most common on leeward slopes and/or at elevations above that commonly occupied by mountain big sagebrush. These communities appear to occupy sites not as productive as tall forb communities and often more exposed to wind. Although they are often on concave slopes, they are more commonly on convex slopes than are tall forb communities.

Resource Values

Although yellowbrush is often held in low esteem as a forage plant by association with other members of the rabbitbrush genus, it is highly selected during parts of the year by mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), cattle (*Bos tarus*), and sheep (*Ovis aries*). Dayton (1931) noted a good representation of this plant by no means necessarily indicates a deteriorating range. He indicated carrying capacity of grass communities was likely increased by presence of this plant.

Stubble height of individual shrubs of yellowbrush monitored over a 10-year period on the face of Mosby Mountain of the Uinta Mountains has been reduced on an average of about 50 percent each winter by elk and deer from an average of 41 cm in the fall to 19 cm in spring (unpublished data on file at the Supervisors Office, Ashley National Forest, Vernal, Utah). Observations on the Ashley National Forest indicate cattle and sheep on the Tavaputs Plateau commonly use the flowers and upper parts of stems in late summer and fall after grasses have cured. These observations are consistent with those recorded by the U.S. Department of Agriculture, Forest Service (1937) that the plant is used by cattle and sheep mostly after the middle of August. The graminoids of yellowbrush/grass communities have moderate to high value for elk and livestock forage. There is often a moderate diversity of forbs associated with these communities. These forbs are of various resource value.

Yellowbrush/grass communities are often within close proximity to aspen and/or coniferous tree cover. Thus, they provide high value elk foraging areas close to hiding cover.

These communities have high potential for uniform dispersion of ground cover, and high percent ground cover. They often have high value for watershed protection. Where pocket gophers have cast up much bare soil, infiltration rates appear to be high and these sites appear to remain highly capable of maintaining watershed values.

Management Implications

Although this is a comparatively minor community type, it is important to recognize this community type and not confuse it as a degraded phase of tall-forb communities. These communities should not be expected to have capabilities of tall forb communities. Although in some cases, yellowbrush/grass communities develop as seral communities in burned mountain big sagebrush sites, there are areas where this community is exclusive of sagebrush sites. To understand capabilities of the land, it is important to recognize yellowbrush community types that have low or no potential to support sagebrush.

Ground cover appears to be highly influenced by pocket gophers. Although ground cover was found at over 90 percent at three sites, it was as low as 35 percent at three sites. Livestock and wild ungulates have used all of the study sites, and ungulate use is a likely factor in reduced ground cover. However, the sites with high percent ground cover have a similar history of grazing to those with low percent ground cover. A conspicuous difference between sites with low percent ground cover and those of high percent ground cover was the abundance of gopher casts. The influence of pocket gophers on ground cover should not be overlooked when making evaluations of ungulate grazing.

Yellowbrush communities are indicated to have high value for watershed stability. This stability has been maintained under light and moderate livestock grazing. These communities are indicated to have moderate to high capability to support livestock and wild ungulates without loss of watershed values under light and moderate grazing intensities.

Yellowbrush is a plant of high resource value especially where associated with high frequency of grasses and forbs. It has been recognized with high capacity to withstand grazing. It is reasonable to expect high abundance, cover, and production of this plant is to some degree a function of livestock grazing at the sites where data was taken for this study. However, this highly competitive plant can be expected at moderate levels in yellowbrush/grass communities not grazed by livestock. Vigor of graminoids at some sites on the Ashley National Forest indicates a history of light to moderate livestock grazing in the past decade or more. Yellowbrush was as abundant here as it was at other sites with a history of higher levels of livestock use.

The studies from which the above information was taken are part of long-term study inventories. The sites can be revisited. Repeat information has already been collected from some of these sites. A clear advantage of this approach is the opportunity to revisit sites in the future to reevaluate management implications. Interpretations or management implications made here are based on data collected to date. Future information might have other implications.

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