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PRESETTLEMENT VEGETATION IN THE
SAGE-GRASS AREA OF THE
INTERMOUNTAIN WEST

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Highlight: *Twenty-nine journals and diaries were reviewed for their vegetation descriptions of the sagebrush grass area in an attempt to assess the relative importance of herbaceous plants and woody brush in the northern Intermountain West. The early writings suggest a pristine vegetation visually dominated by shrubs. Stands of grass apparently were largely confined to wet valley bottoms, most canyons, and mountain slopes, with more extensive areas in eastern Oregon near the Cascade Range. The major area was apparently covered by thick stands of brush.*

In determining pristine vegetation conditions in areas long devoted to range livestock grazing, researchers often use journals and diaries from pre-grazing years. Workers characterizing the sagebrush-grass vegetation of the Intermountain West, for example, have largely depended upon the journals of travelers in the early 19th century (see Christensen and Johnson, 1964; or Hull, 1974). These historical accounts have been used to describe the vegetative history of immediate locales, but the environmental conditions and human history of small areas may not be representative of the general range. Consequently, it is difficult to generalize from these studies about the entire vegetation type.

The purpose of this paper is to review the early written descriptions of the sagebrush-grass vegetation areas in an attempt to assess the relative importance of herbaceous plants and woody brush in the northern Intermountain West. Such an extensive view not only has its own inherent interest but also provides a valuable framework within which local studies may be related.

Procedure

Twenty-nine journals and diaries were reviewed for their vegetation descriptions (Table 1); the more informative of these are discussed below. Selection of sources was based on the frequency and completeness of plant cover references, the routes of travel (Fig. 1) and the years during which observations were made. Emphasis was placed on journals from trips in years prior to the onset of heavy immigrant movement because vegetation along the major trails was grazed by the settlers animals. Accounts for years after 1843 were considered unreliable for the Oregon Trail, as were those after 1849 for the Humboldt River area of the California Trail. For such remote areas as central Nevada, pristine conditions were assumed to exist as late as the mid-1850's. In addition to these early sources, a few journals from the initial years of heavy immigrant travel were reviewed as a comparison to those from pre-grazing times.

This method of evaluating human impact on vegetation has drawbacks that must be recognized to be overcome. The most important problem is one of recreating a valid image of the past landscape from words written by people with biases and backgrounds different from those of present-day researchers. Although this difficulty cannot be eliminated, it can be minimized by restricting interpretation to words and phrases that are relatively free of ambiguity; such terms as "barren," "sterile wasteland," or "prairie" are so vague that conclusions based on them may be misleading. Another problem arises from the failure of most early travelers to discriminate among the many shrub species (This difficulty prompted Cottam to dismiss the value of Simpson's early description of vegetation in Nevada; see Cottam, 1961). This paper will attempt to establish a portrayal of the landscape by focusing on the dichotomy of woody brush versus grasses rather than on finer subtleties in vegetation composition. The reliance of nearly all early explorers and settlers on grass for their livestock, and hence their frequent referrals distinguishing between the two, aids this analysis.

Table 1. Sources reviewed for the study with year of observation and name (in parentheses) of observer if different from the reference to published source.

Published source	Year of observation
----- Beckwith 1855	1853-1854
Carroll 1941	1845 (J.W. Abert)
Clark 1967	1849 (E.D. Perkins)
Cross 1851	1849
Dale 1918	1822-1829 (Ashley)
Delano 1936	1849
DeSmet 1843	1840
DeSmet 1847	1845-1846
Duncan 1964	1859 (II. Greeley)
Farnham 1843	1839
Ferris 1940	1830-1835
Field 1957	1843
Franchere 1854	1811-1814
Fremont 1845	1842-1844
Gass 1811	1804-1806
Humphreys 1871	1867 (S. Watson)
James 1923	1819-1820
Palmer 1847	1845
Parkman 1892	
Platt and Slater 1852	
Root 1955	1848
Schiel 1959	1853
Shaw 1896	1849
Simpson 1876	1859
Spaulding 1953	1812-1813 (R. Stuart)
Stansbury 1852	1849-1850
Torrey 1845	1842
Townsend 1839	1833
Wislizenus 1912	1839

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The Plains of Wyoming

Most travelers along the North Platte River noted the change in vegetation from the grasslands of western Nebraska to the sagebrush of eastern Wyoming; the first mention of big sagebrush was usually made between Fort Laramie and Casper, Wyoming. The comments suggest that the shrub cover became thicker rapidly as South Pass was approached, and that woody brush was even more dominant west of the continental divide. As the shrubs increased, grasses became more scarce:

The country has now become more level, but the prairie is barren and inhospitable looking to the last degree. The twisted, aromatic wormwood covers and extracts with the strength from the burnt and arid soil. The grass is dry and brown, and our horses are suffering extremely for want of food (Townsend, 1839).

With the change in the geological formation on leaving Fort Laramie, the whole face of the country has entirely altered its appearance. Eastward of that meridian, the principal objects which strike the eye of a traveller are the absence of timber, and the immense expanse of prairie, covered with the verdure of rich grasses, and highly adapted for pasturage. Wherever they are not disturbed by the vicinity of man, large herds of buffalo give animation to this country. Westward of Laramie River, the region is sandy and apparently sterile; and the place of the grass is usurped by the "artemisia" and other odoriferous plants, to whose growth the sandy soil and dry air of this elevated region seem highly favorable.

One of the prominent characteristics in the face of the country is the extraordinary abundance of the "artemisia." They grow everywhere on the hills, and over the river bottoms, in tough, twisted, wiry clumps; and wherever the beaten tract was left, they rendered the progress of the carts rough and slow. As the country increased in elevation on our advance to the west, they increased in size; and the whole air is strongly impregnated and saturated with the odor of camphor and spirits of turpentine which belongs to this plant. This climate has been found very favorable to the restoration of health, particularly in cases of consumption; and possibly the respiration of air so highly impregnated by aromatic plants may have some influence (Fremont, 1845).

From Laramie's Fork to this point [i.e., South Pass] different species of artemisia were the prevailing and characteristic plants; occupying the place of the grasses, and filling the air with the odor of camphor and turpentine (Torrey, 1845).

The wild and sterile regions immediately east of the mountains [i.e., east of the Wind River Mountains] are distinguished by one feature that must live forever in the traveller's remembrance. Legions of leagues (the expression is by no means too strong) are covered with a wild growth of sage, that seems designed by Nature than for nothing else than to feed a certain variety of the feathered family known as "sagecocks" [i.e. sage grouse]. For days and weeks we travelled through this solitary species of vegetation, till it became wearisome to the sight, even as the everlasting green of a thousand miles of prairie was before. The night before reaching Independence Rock we were compelled to make our encampment by the side of a shallow, muddy streamlet winding among those bushes and so thick was their growth that Hatchets and axes were brought into employment before we could pitch tents or find space to lodge upon (Field, 1857).

Nothing was to be seen but the artemisia, or wild sage.... There must be something in the composition of the earth particularly adapted to its growth, for, whenever grass was scarce, we invariably found it in great quantities. I have travelled for days, before reaching the Columbia River, where nothing could be seen on the highlands or plains but the artemisia, which for miles looked as if the whole country has been cleared of all other vegetation to make room for it (Cross, 1851).

The contrast in vegetation was also striking farther south, near the southern end of the Laramie Range. In 1843, John C. Fremont remarked about the grasslands east of present-day Greeley, Colorado:

With occasional exceptions, comparatively so very small as not to require mention, these prairies are everywhere covered with a close and vigorous growth of a great variety of grasses (Fremont, 1845).

West of Laramie Range, the vegetation was much different:

...although the road was not rendered bad by the nature of the ground, it was made extremely rough by the still rough bushes of "artemisia tridentata," in this country commonly called sage.... The greater portion of our subsequent journey was through a region where this shrub constituted the tree of the country (Fremont, 1845).

Even after passing into the area dominated by sagebrush, travelers continued to find grass in moist lowlands along the rivers. As late as 1852, the area along the Sweetwater River continued to provide good forage:

Along the Sweet Water, most of the way, are narrow bottoms of good grass. Adjacent to these bottoms are large, arid, wild-sage plains, extending to the mountains (Platt and Slater, 1852).

The Snake River Plains

Comments about the Snake River Plains of southern Idaho suggest that the pristine vegetation was largely brush with scant grass. The range provided so little forage that travelers frequently complained about hungry livestock. Even the abundant water in the river failed to provide wide expanses of lush herbaceous growth because the stream is incised in a canyon across much of Idaho. Of all the areas in the Intermountain West, none generated such disparaging remarks as the Snake River Plains.

The whole face of the country appears level before us, a sight we have scarcely been indulged with, even in miniature since we left the Columbia Plains than which these seem far more extensive, and like them, the sage, wormwood, and salt wood cover a patched soil of sand, dust and gravel (Spaulding, 1853)

...one of the most arid plains we have seen, covered thickly with jagged masses of lava and twisted wormwood bushes (Townsend, 1839).

...Face of the country the same as that passed over on the 8th scarcely grass enough to feed our animals, and that dried to hay (Farnham, 1843).

This is unquestionably the most barren of all the mountain deserts. It abounds in absynth, cactus, and all such plants and herbs as are chiefly found on arid lands (DeSmet, 1843).

[The Snake River Plains] were covered as far as could be seen with artemisia, the dark and ugly appearance of this plain obtained for it the name of the "Sage Desert" (Fremont, 1845).

It was fortunate for us it has been so little travelled, for we were soon to enter a country, on Snake River, that was entirely destitute of grass to the Cascade mountains, a distance of 700 miles (Cross, 1851).

It is said that the Indians of this place are snakes in the grass, but it is much to be regretted that the river is not a snake in the grass, whilst our cattle are in so starving a condition (Root, 1850).

The Columbia River Area

The early accounts from along the Columbia River suggest a vegetation cover that had more grass than the Snake River Plains. Stands of pure grass occurred in some locales, but a mixture of woody shrubs and herbaceous growth was characteristic. In the area near Walla Walla, Washington sagebrush was apparently abundant:

The country through' which we are now passing was a mingling of hills, steep rocks, and valleys covered with wormwood, the stems of which shrub are nearly six inches thick, and might serve for fuel (Franchere, 1854).

...a great sandy plain which supports little vegetation, except the wormwood and thorn-bushes...the only vegetation along the margin is the wormwood, and other low arid plants, but some of the bottoms are covered with heavy, rank grass (Townsend, 1839).

[The] face of the country [is] dry, barren, swelling plains; not an acre capable of cultivation; some bunch grass, and a generous supply of wild wormwood (Farnham, 1843).

Farther downstream on the Columbia, near its junction with the Deschutes River, grass was dominant:

The crests of the distant swells were fringed with bunch grass, not a shrub or tree on all the field of vision (Farnham, 1843).

Even thorough observer Fremont failed to remark about sagebrush in this region:

[We passed] through a fertile, hilly country, covered as all the upland here appears to be with good green grass (Fremont, 1845).

Areas both north and south of the Columbia supported a mixture of grass and shrubs:

The Nez-perce and Spokane plain is at least a thousand feet elevated above the bed of the river. It is dry, stony, undulating, covered with bunch and nutritious grass, with prickly pear and wormwood (DeSmet, 1847).

We are twenty days going from Willamette to Walla Walla, across desert and undulating lands, abounding in absinthium or wormwood, cactus, tufted grass, and several species of such plants and herbs as are chiefly found in a sterile and sandy soil (DeSmet, 1847).

We are now immediately on the verge of the forest land, in which we had been travelling so many days; and looking to the east, scarce a tree was to be seen. Viewed from our elevation, the face of the country exhibited only rocks and grass, and presented a region in which the artemisia became the principal wood (Fremont, 1845).

Nevada

Travel across Nevada started in earnest after the discovery of gold in California, and most immigrants followed the Humboldt River. Moist bottomlands provided forage for livestock, but the uplands were poor in grass.

Our road was across a sage desert. As far as the eye could reach nothing could be seen but the blue sky and a wilderness

of wild sage. The sun was excessively hot and there was not a breath of air in motion. A profound stillness hovered over the landscape and we seemed to travel in a world of sunshine, silence, and sage (Shaw, 1896).

The Valley of the Humboldt is more or less covered with the several varieties of artemisia, which occupy so large a proportion at least nine-tenths of the plains - of our territory between the Rocky and Sierra Nevada Mountains, and characterize its vegetation (Beckwith, 1855).

I thought I had seen barrenness before - on the upper course of the Republican, on the North Platte, Green River, etc. -but I was green, if the regions washed by those streams were not ...On the above-named rivers, I regarded cottonwood with contempt; here, a belt, even the narrowest fringe, of cottonwood would make a comparative Eden. The sagebrush and greasewood, which cover the high, parched plain on either side of the river's bottom, seem thinly set with broad spaces of naked, shining, glaring, clay between them (Duncan, 1864).

Government expeditions in central Nevada found grass on high-elevation slopes, mountain canyons, and moist valley bottoms. Elsewhere, brush and scattered bunch grass characterized the vegetation.

The entire country between the Humboldt Mountains and the Sierra Nevada of California is a rugged mountain area with only the most miserable vegetation.

Only here and there on the slope of a mountain or in the narrow valleys and ravines can one find grass for the animals (Schiel, 1859).

Grass is found in abundance upon nearly every range...(the valleys) generally support several varieties of artemisia, relieving them from the character of barrenness of desert (Beckwith, 1855).

In some narrow mountain-gorges, where there is abundance of moisture, we find a quite luxuriant vegetation, but wherever the country opens out, it assumes the character of barrens and deserts. The growth of the valleys consists mostly of several species of *Artemisia* [sic] (sage) and allied plants, becoming more and more dwarfish, and assuming a more sterile character, where the soil is more sandy and poor. In spots which receive moisture only periodically and have a stiff clay soil, greasewood is the prevailing vegetation. Places which are subject to overflows, and kept moist during the greater part of the year, favor the growth of wire-grass, and other coarse swamp-grasses occupy the surface. Over dry, deep sandy slopes, an exceedingly nutritious grass is scattered in single bunches, bearing large sweet seeds, which are eagerly sought for by animals and Indians' (Simpson, 1876).

A tridentata is the "everlasting sagebrush"! This is by far the most prevalent of all species, covering valleys and foothills in broad stretches farther than the eye can reach, the growth never so dense as to seriously obstruct the way, but very uniform over large surfaces, very rarely reaching the saddle height of a mule and ordinarily, but half the altitude (Humphreys, 1871).

Valleys of the Southern Rockies

Westbound travelers along the Arkansas River encountered plants they identified as "sage" west of Bent's Fort, Colorado; it is likely that the species was sand sagebrush (*Artemisia filifolia*) and not big sage brush:

Beyond [i.e., west of] this the variety of artemisia known as sage first begins to appear in quantity: and grass and water away from the main water-courses becomes scarce (Beckwith, 1855).

West of the Sangre de Cristo Range, thick sagebrush dominated the vegetation:

The grass along our path was scattered, and we experienced considerable difficulty in driving over the thick masses of sage.... The ridge was rough and thickly covered with several varieties of artemisia the sage so large and stiff that our animals were very reluctant to pass through it (Beckwith, 1855).

For four days we moved up the San Luis Valley along the base of the Sierra Blanca in a northwesterly direction through fields thick with artemisia, the only thing which grows well in the deep sand soil (Schiel, 1859).

Elsewhere in the area west of the Colorado Rockies, the plant cover was similar; along the Yampa River, Farnham found travel was impeded by shrubs:

The hills were destitute of timber and grasses: the plains bore nothing but prickly pear and wild wormwood.... It [sagebrush] stands so thickly over thousands of acres of the mountain valleys, that it is nigh impossible to urge a horse through it; and the individual who is rash enough to attempt it will himself be likely to be deprived of his moccasins, and his horse of his natural covering of his legs (Farnham, 1843).

In the area around Great Salt Lake, grass was abundant in the wet valley bottoms and on mountain slopes. Farther west, the increasingly dry soils supported mostly shrubs:

Beyond the Jordan, on the west, the dry and otherwise barren plains support a hardy grass (called bunch grass), which is peculiar to these regions, requiring but little moisture, very

nutritious, and in sufficient quantities to afford excellent pasturage to numerous herds of cattle (Stansbury, 1852).

Our path led all day through fine fields of grass, which sometimes occupied the surface unopposed by more hardy plants, but at others was thickly interspersed with artemisia, of the greasewood and rabbit bush varieties. The large central portion of this valley towards the lake is an alkaline plain (Beckwith, 1855).

[The desert] produces only a small growth of "artemisia" and greasewood...at the springs there is an abundance of grass (Simpson, 1859).

...artemisia covering the whole face of the country. (Beckwith, 1855)

It is clear from the comments that these observers failed to differentiate among shrub species and that the woody plants were collectively referred to as "artemisia" or "sage".

Conclusions

In summary, the early writings describing the northern Intermountain West suggest a pristine vegetation visually dominated by shrubs. The importance of herbaceous plants within this brush cover is difficult to discern from the journal descriptions, but the frequent references to the lack of abundant forage for livestock imply that such growth was far from luxuriant. Stands of grass were usually confined to wet valley bottoms; moist canyons, and mountain slopes, although more extensive areas of eastern Oregon near the Cascades may also have been grassland. However, the major area of the Intermountain West was covered not by grass, but by thick stands of brush, when the first Europeans began probing those unknown regions.

The original condition of the range has implications for management. As brush was abundant in times prior to livestock grazing, its dominance of the vegetation today cannot always be considered evidence of over-grazing. Moreover, attempts to eradicate brush and encourage pure stands of grass cannot be justified in terms of reestablishing the "natural" plant cover. Grazing has caused an increase in the density of brush in many areas, but woody shrubs were an important, perhaps a dominant, component of the pristine ranges of the Semiarid west.

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