

Successional Pathways of Wyoming Big Sagebrush Communities Historically Seeded with Crested Wheatgrass

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We sought to identify the factors responsible for potential community assemblages of 35 Wyoming big sagebrush communities historically seeded with crested wheatgrass. Species richness, diversity, vegetation cover, and soils were measured in four 20 x 5 m intensive Modified Whittaker plots per community. Hierarchical clustering analysis of indicator plant species cover identified that the 35 communities clustered in four distinct assemblages. Assemblage 1 was dominated by crested wheatgrass and had the lowest species richness and big sagebrush cover. Assemblages 2 and 3 had intermediate amounts of crested wheatgrass cover, but assemblage 2 had higher native grass cover, but lower sagebrush cover than assemblage 3. Assemblage 4 was dominated by big sagebrush and had the lowest cover of crested wheatgrass and other herbaceous species. The four assemblages also differed significantly ($P < 0.05$) for soil texture, soil nitrogen, and ground cover characteristics. Bare soil was nearly two-fold greater on loam-textured soils, and clay loam texture soils had higher rock and native plant cover. Communities previously cropped occurred on coarser textured soils, had six-fold lower native species cover, and two-fold greater exotic herbaceous and crested wheatgrass cover. Cropping occurred on favorable, non-rocky, fine textured soils, the same soils that favored crested wheatgrass cover and low recovery of native species. These results reveal a broader understanding of successional pathways and potential management opportunities, and may assist with developing resilience-based management models for communities with similar histories.