Protective Exclosure Evaluation: Oregon Salt Desert Shrub Forage Production Potential

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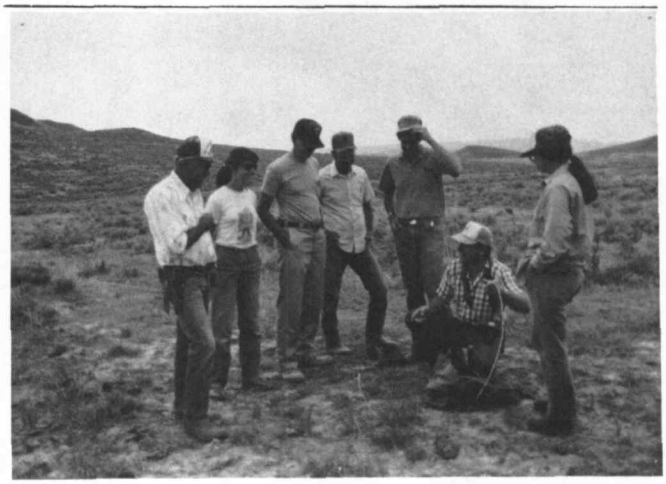
The Salt Desert Shrub rangeland community is one of the least studied ecosystems in the Great Basin of the northwestern United States. Yet this vegetative type is extensive, covering approximately 41 million acres in western North America. Among the reasons for the apparent lack of research are the comparatively low forage production of the community and the fact that the majority of the land is administered by the U.S. Bureau of Land Management (BLM), an agency that, traditionally, has not been funded for research.

Alkali Flat Test Plot #1 was established in 1961, as one of the nearly two dozen similar plots built by the Vale District of the BLM to determine the site potential for livestock forage production from introduced grasses and other values including native range recovery potential when protected from livestock use. Members of the Malheur Chapter of the Pacific Northwest Section, Society for Range Management, jointly conducted a field analysis of the vegetative production of this 26-year old experimental exclosure in June of 1987.

This test plot is located in one of the northernmost salt desert shrub communities in western North America. It is 10 miles southwest of the community of Adrain, in Malheur County, Oregon, and 10 miles west of Homedale, Owyhee County, Idaho. The vegetation is dominated by shadscale saltbush with understory grasses of bottlebrush squirreltail, Sandberg bluegrass, Cusick bluegrass, and exotic annual cheatgrass. Annual precipitation varies greatly among years but seldom exceeds 8 inches, most of which falls during the winter months. Summers are hot and dry at the 2,900 ft. elevation of the study site. Soils are of a silty clay loam texture to a depth of about 10 inches. A clay pan then restricts root penetration. Soils have been classified as a fine, mixed, mesic, shallow xeric durargid. The potential natural vegetative community is very likely shadscale saltbush and bottlebrush squirreltail grass, the dominant vegetation at present. Livestock use was excessive on this range, located near farming communities, from the late 1800's to the mid 1960's. Sheep, cattle, and horses typically grazed the area yearlong. Since that time, use has been conservative at 16 acres per animal unit month (acres/AUM).

In October of 1961, a two-acre area (300-ft × 300-ft) was fenced with barbed wire. Poultry fence was additionally installed in an effort to exclude blacktailed jackrabbits. Two thirds of the area was disked and harrowed to form a seedbed. Three grass species were planted separately on 1/2-acre plots, all by drilling at a rate of 6 lb/acre. Russian wild ryegrass, crested wheatgrass, and a mixture of intermediate wheatgrass and fescue. Nomad alfalfa was then broadcast seeded and harrowed on all three plots. The remaining one third of the site was left undisturbed to enable assessment of the recovery potential of the then depleted vegetation.

I had taken photographs of the plot on July 17, 1962, during the first growing season following seeding, and again on April 21, 1986. On June 6, 1987, seven members of the Malheur Chapter divided into teams to dig soil examination pits and conduct vegetative production sampling, using standard range inventory techniques in each vegetative type. Some of the results of the team's sampling were the following:



1. Crested wheatgrass and Russian wild ryegrass were very similar in productivity, producing 154 lb/ac and 153 lb/ac, respectively. The intermediate wheatgrass and fescue mixture had disappeared entirely. Crested wheatgrass and Russian wild ryegrass occupied this portion. Occasional robust plants of alfalfa persisted among the seeded grasses.

2. Native range plants, following 26 years of protection from livestock use, produced slightly over half as much (59%) useable forage as the introduced wheatgrass and ryegrass. The latter could be properly stocked at 5.2 acres/AUM while the recovered native plants required 8.8 acres/AUM.

3. Native range plants, outside the protection exclosure, that had historically been grazed at various utilization levels, produced 26% the usuable forage of the recovered native plants and only 16% the usable forage of the introduced grasses.

4. Soil barren of vegetation was greatest in the Russian wild ryegrass (59%) and crested wheatgrass (55%) although grazed native range, at 46%, was a close third in rank. Rested native range, with only 23% bare soil, was 2 1/2 times more vegetated than the wheatgrass and ryegrass stands.

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5. Native perennial grasses were most common in frequency of occurrence in the rested native site (42%). The grazed native range supported 18% frequency of these grass species. Cultivation and subsequent competition from the more aggressive introduced wheatgrass and ryegrass effectively reduced native perennial grasses. Sandberg bluegrass occurred at 10–15% of the points in these stands.

6. Annual grasses and forbs were nearly absent in the seeded plots. In the native vegetation, annual grasses were quite similar in frequency of occurrence in the grazed (25%) and ungrazed (29%) sites.

7. The frequency of shrubs was greatest in the grazed area (11%), and least (absent) in the crested wheatgrass stand. Rested native vegetation supported only one third as many shrubs as the grazed rangeland. The prevalent shrub was shadscale saltbush in all cases.

8. Crested wheatgrass appeared to be a bit more aggressive than Russian wild ryegrass at this site. Crested occurred at 35% of the points in its stand as compared to 23% for ryegrass in its stand. The native bluegrasses were one third more common when associated with ryegrass than when associated with crested wheatgrass.

9. Based upon dry weights of all plants, bottlebrush squirreltail grass was nearly 1 1/2 times more productive in the rested native site than on similar soils under grazing use.

10. Shadscale saltbush was most productive, according to dry weight production, when protected from livestock. This contrasted to the frequency of occurrence data which showed only 1/3 as many saltbush shrubs in the protected area. This can be explained by the probability that browsing by livestock has reduced the size of the saltbush causing a lesser productivity. In fact, dry weight production was 4.8 times greater in the protected area at 115 lb/acre as opposed to 24 lb/acre in the grazed area.

11. Dry weights of vegetative production illustrated that the diminutive bluegrasses occupied a greater proportion of total production in the grazed site when compared to the protected native range site. More productive squirreltail grass decreased with grazing. Thus explaining the difference in present forage production between the sites.

12. Numerous dead shadscale saltbush stumps were observed inside clumps of ryegrass and crested wheatgrass. This suggested that competition from these introduced perennial grasses may be killing shadscale and, at the least, preventing shadscale recruitment.

13. Litter from past vegetative production was more common on the protected native vegetation site than with either Russian wild ryegrass or crested wheatgrass, which were also protected from grazing by livestock. The grazed native range showed little litter accumulation.

14. Fecal pellets from wild hare were more common within the exclosure than without. The poultry fencing had become ineffective many years ago.

A couple of items were noteworthy from this field exercise. First, the forage production of similar portions of Oregon's salt desert shrub community could be greatly increased through the seeding of Russian wild ryegrass or crested wheatgrass. How well these grasses would withstand grazing on such sites is open to question. They would likely have to be managed with gentle hands. Sites with soil erosion problems are best protected by high vigor native vegetation due to greater soil cover. Second, SRM members can contribute a real service toward the advancement of rangeland knowledge through efforts such as that of the Malheur Chapter. A great number of protective exclosures have been established throughout the West and, unfortunatley, many have never been evaluated.