

An Investigations Progress Report:

Vegetation and Soil Indicators to Hydrologic Potential

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Watershed management investigations in Oregon's rangelands over the last few years have produced a number of interesting facets directed toward understanding the hydrologic potentials of these lands.

Investigations by Buckhouse and Gaither quantified potential sediments from intense, convectional storms by major vegetation ecosystem. The results were interesting in that remarkable differences are present. The forested systems, particularly larch systems, and meadows produced very little sediment (less than 10 lb/acre following a 4 to 6 inches/hour simulated downpour that lasted 30 minutes). Mountain grassland systems produced more—tens of pounds/acre; while sagebrush steppe ecosystems produced sediments in the hundreds of pounds per acre. The most potentially dangerous systems, hydrologically, were the juniper zones, which produced potential sediments in the thousands of pounds/acre with this kind of storm.

Mattison and Buckhouse further explored these relationships by looking at habitat types as an ecological refinement. We found that a refinement by habitat type and by range condition was possible, with the more productive sites experiencing fewer hydrologic problems. This hydrologically better situation is related to decreased bare ground, increased litter, and increased organic matter in the soil on the better, more productive sites . . . and with this increase in vegetation comes an increase in infiltration and a decrease in surface runoff and erosion.

Swanson and Buckhouse attempted to further refine this approach by stratifying sites according to presence of big sagebrush subspecies in the sagebrush steppe regions of

eastern and central Oregon. We looked at the subspecies *tridentata*, *wyomingensis*, and *vaseyana* within the *Artemisia tridentata* species. The relationships between sagebrush subspecies and hydrologic potential were not consistent. There was a tendency for the lands supporting the wyoming big sagebrush group (*A.t. wyomingensis*) to be more erosive, but the overlap between all three groups was high and few significant differences appeared. What did become obvious, however, was that soil characteristics were very important. If soil platiness and/or soil viscosity were present, erosion potentials increased. On the other hand, as large rock fragments and coarse textured particles increased in the soil profiles, the erosion potentials decreased.

If you wish more detail on the studies already conducted, contact me for the following reprints:

Gaither, R.E., and J.C. Buckhouse. 1983. Infiltration rates of various vegetative communities within the Blue Mountains of Oregon. *J. Range Manage.* 36:58-60.

Buckhouse, J.C., and R.E. Gaither. 1982. Potential sediment within vegetative communities in Oregon's Blue Mountains. *J. Soil and Water Cons.* 37:120-122.

Buckhouse, J.C., and J.L. Mattison. 1980. Potential soil erosions of selected habitat types in the High Desert region of central Oregon. *J. Range Manage.* 33:282-285.

Swanson, S.R. 1983. Infiltration, soil erosion, nitrogen loss, and soil profile characteristics of Oregon lands occupied by three subspecies of *Artemisia tridentata*. Ph.D. Thesis, Oregon State University (abstract only available; several journal publications are in preparation, however).

Swanson, S.R., and J.C. Buckhouse. 1984. Soil and nitrogen loss from Oregon lands occupied by three subspecies of big sagebrush. *J. Range Manage.* 37:298-302.

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Sewage to Meat?

Can municipal sewage be converted to beefsteak and lamb chops? "Yes," says Dr. Stan Smith in the New Mexico State University Range-Animal Science Department. Dr. Smith and his research team fed dried sewage to breeding herds of cattle and sheep after it was irradiated. Included in the study was a pelleted sewage base feed used with range cows.

In four of five years, sewage based supplements were

about equal to cottonseed meal. Reproductive performance in both cattle and sheep do not appear to be different when fed supplements containing sewage or cottonseed meal.

For growing ewes and wethers, a 7% sewage solids diet is adequate. A higher level is needed to grow ewe lambs for breeding.