are attached to them with a 1.5 inch pipe U-bolt. The apron is standard galvanized steel roofing sheets anchored to the steel studs with sheet metal screws. The apron has worked well, is easy to put up, and should require minimum maintenance for many years.

Units providing more than 1,500-gallon capacity require a storage tank of bottomless tank type construction. Our 5,000-gallon unit consists of a six-section, 18-foot diameter galvanized steel ring which is two-feet high. The tank bottom is sealed with a two-inch layer of pure bentonite. We do not know how effectively bentonite will perform.

Evaporation is a significant factor starting in July and through the fall months. Since it is possible to lose all stored water by evaporation, it is necessary to reduce evaporation by 80 percent or more. The problem is testing reduction methods for effectiveness and their maintenance. Floating six-mil plastic or a parafin surface work well -- but only for one year. Other materials will be tested.

We are just beginning a research program in precipitation catchments. There is no doubt in this researcher's mind that practical and operable solutions exist and that they will be found. Precipitation catchments one day will help us manage desert and forested rangelands as well as provide water for animals that graze there.

STREAMBANK EROSION IN A BLUE MOUNTAIN STRINGER MEADOW IN RESPONSE TO LIVESTOCK AND BIG GAME GRAZING MANAGEMENT[1]

J. C. Buckhouse and J. M. Skovlin

For several years, streambank erosion research has been conducted on Meadow Creek, Starkey Experimental Forest and Range, Union County, in conjunction with a larger project designed to study the vegetative, animal production, terrestrial, and aquatic habitats as they relate to several systems of livestock and big game grazing.

The experiments are being conducted on a four-mile long portion of Meadow Creek. The creek drains the Starkey Experimental Forest Range which lies at elevations between 3,680 and 4,500 feet. The stream varies in discharge from 2 to 195 cubic feet per second. Low flows generally occur in late August and peak discharges are associated with spring thaw in April.

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[1]This research is supported cooperatively by the Pacific Northwest Forest and Range Experiment Station, USDA Forest Service, LaGrande, Oregon, and the Oregon State University Agricultural Experiment Station, Corvallis.

METHODS

The study area was laid out in five blocks of streamside habitat (Figure 1). Phase (block) I was broken into five units with No. 1 farthest upstream. This phase was under continuous grazing with one consecutive unit being scheduled for grazing each year. Phase II also consisted of five units, two grazed under a rest rotation system, and one each under deferred rotation, season long grazing, and no grazing (control). Phase III was limited to cattle grazing only, with big game being excluded by a game-proof fence. It was composed of a five-unit group, managed similarly to Phase II. Phase IV has been separated into two units. Unit A was deferred from grazing until the middle of the season and Unit B was deferred until the latter part of the season. A control area, composed of three units, was at the upstream end of the study.

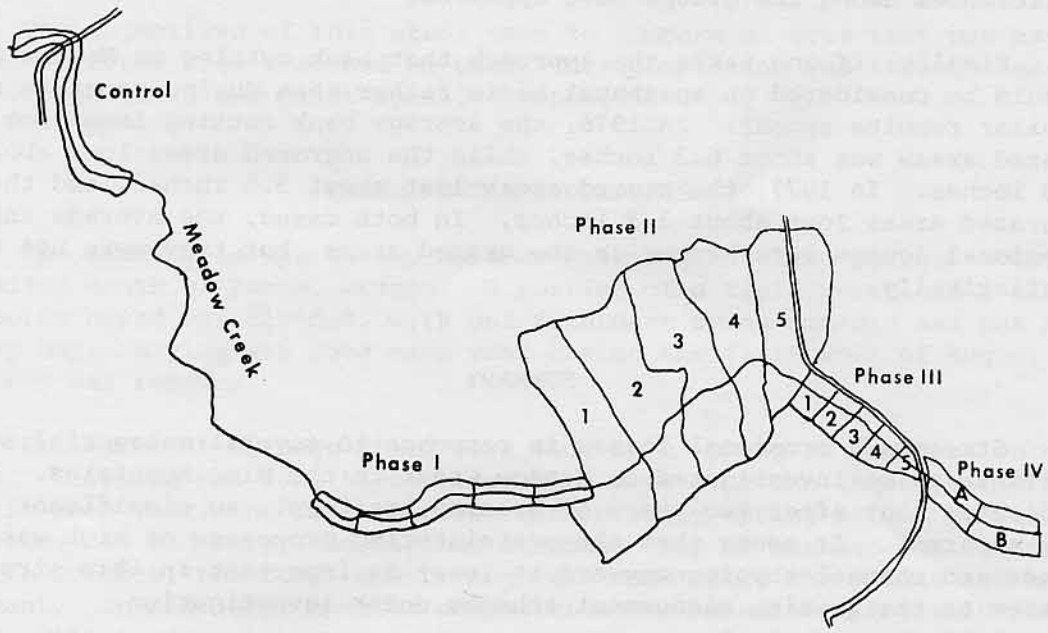

Figure 1. Meadow Creek study area showing Phase I, Phase II, Phase III, Phase IV, and the control area

Bank cutting was assessed by distance measurements from reference stakes driven into the ground along the stream course. Sixteen stakes were located in each unit, for a total of 304 stakes. Each erosion stake was read at the end of the grazing-free winter period and at the end of the grazing season.

RESULTS

Results were variable, as one might expect when looking at relatively short treatment periods. During the years we have been monitoring Meadow Creek, we have noticed that the overwintering periods tend to be more erosive than the summer grazing periods. This situation holds true for the ungrazed control areas as well as for each of the various grazing-system treatments. Probably the anchor ice, ice floes, and high water associated with the winter periods were responsible.

Another way of looking at this would be to check what happened to those areas subjected to different kinds of grazing systems at any given time. When we do this, we find that the areas being grazed tend to fall at the higher end of the erosional scale. But interestingly enough, this is not a significant trend. There are enough ungrazed areas exhibiting high erosion rates, and enough grazed areas showing low rates, that no statistical differences among the groups have appeared.

Finally, if one takes the approach that bank cutting on Meadow Creek should be considered on an annual basis rather than during separate seasons, similar results appear. In 1976, the average bank cutting loss from the grazed areas was about 6.3 inches, while the ungrazed areas lost about 4.3 inches. In 1977, the grazed areas lost about 5.5 inches, and the ungrazed areas lost about 3.3 inches. In both cases, the average annual erosional losses were higher on the grazed areas, but they were not different statistically.

SUMMARY

Streambank erosional losses in response to several managerial schemes continue to be investigated on Meadow Creek in the Blue Mountains. Evidence indicates that after two years of grazing treatment, no significant differences are apparent. It seems that the overwintering processes of high water ice floes and channel physiognomy are at least as important in this stream system as the grazing management schemes under investigation.

This work represents the mid-point in the study. It is our intention to monitor this stream through 1981 to quantify the processes at work over a full five-year period.