46 million acres, improvement of cover on about 84 million and protection of the grass cover on nearly 178 million acres.

About 90 percent of the pasture and range or more than 157 million acres that need protection only is in an overgrazed condition. Nearly 69 million acres need protection from fire hazards. About 53 million acres of grassland need protection from woody and noxious plants as well as considerable acreage from erosion.

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**TECHNICAL NOTES**

**EARTHEN WINDBREAKS, A NEW MANAGEMENT DEVICE FOR SALT MARSH RANGELANDS**

**THOMAS N. SHIFLET**

Range Conservationist
USDA-Soil Conservation Service
Lake Charles, Louisiana

Earthen windbreaks are proving to be effective in the management of marsh ranges in South Louisiana. Lack of shelter or protection from wind during freezing weather has been one of the hazards to cattle raising and good grass management on Louisiana marsh ranges according to Williams (1955).

The marsh ranges in South Louisiana are in the sub-tropical zone where the winters are relatively mild. However, cold fronts move this far south practically every winter that drive temperatures to freezing or lower (USDA Yearbook, 1941). The usual pattern of these storms is a cold wind accompanied by rain or sleet. As the cold front moves south, temperatures drop rapidly. Temperatures have been known to drop as much as 20 to 40 degrees in just a few hours. It is this type of storm that causes cattle to suffer. They bunch up and travel with the storm or mill in fence corners and often go without food or water until the storm subsides. Death losses have been attributed to these severe cold spells. This is especially true when temperatures drop below 20°F and the storm hangs on for several days. Livestock can stand considerably more dampness, cold and hunger if they can get away from the wind.

Several types of windbreaks have been used by different operators on the marsh ranges with varying degrees of success. However, it wasn't until 1961 that windbreaks of earth were used. Isaac White, a rancher near Hackberry, Cameron Parish Louisiana, constructed two earthen windbreaks on his ranch.

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**FIGURE 1.** Windbreak constructed on the edge of the prairie adjacent to salt marsh rangeland. Wings are attached at a 90° angle.

**FIGURE 2.** Inside view of windbreak. Here the wings are attached at a 45° angle.
in 1961 and found them to be effective as well as inexpensive.

Construction

Both of Isaac White's windbreaks were built with a dragline to accommodate approximately 100 head of cattle. Each is 150 feet long east and west with two wings 75 feet in length that project toward the south. The wings were placed at a 45° angle on one structure and at a 90° angle on the other.

The windbreaks and wings were built to a settled height of six feet with side slopes of 1.5:1 and a top width of six feet. This design gives protection against winds that may blow from the northwest or northeast (Figure 1 and 2). After two year's experience Mr. White believes the windbreak that has wings projecting at a 90° angle is the most effective.

The borrow pits which provided the earth taken for construction were located on the windward side. These pits also served as reservoirs for storing fresh drinking water near the windbreak.

Location

Louisiana marsh ranges are relatively flat. They are covered with water periodically throughout the year. However, there are some elevated places or ridges that water does not cover. These areas are good sites for constructing earthen windbreaks. Also, if there is a choice, the structure should be located where it will serve the greatest acreage without excessive travel by the cattle.

If ridges are not available, it is possible to build up an area a foot or two high for a distance of 30-40 feet out from the main structure on the leeward side. This is necessary to provide drainage as well as a high, dry place for more cattle to stand or lay down.

Approximately 1,000 cubic yards of earth are required for each windbreak. Figuring the cost of earth moved at 25 cents a cubic yard, each earthen windbreak cost Mr. White $250.00. This cost, amortized at five percent for ten years, represents an average annual cost of 32 cents per animal protected.

Summary

Earthen windbreaks provide cheap and effective protection for cattle against cold winds and driving rain or sleet on Louisiana marsh ranges during the winter months.

When properly located, windbreaks are an aid to distribution of livestock over the entire range. This results in better and more uniform utilization of the forage.

These earthen windbreaks can be tied into a system of cattle walkways on some marsh ranges making both facilities more valuable as range practices during the winter grazing season.

LITERATURE CITED


SPRAY PENETRATION IN SCRUBOAK WITH HELICOP TER APPLICATION

R. F. WAGLE
Associate Professor, University of Arizona, Tucson, Arizona
AND
CLIVE M. COUNTRYMAN
Research Forester, Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, Berkeley, California

Tests conducted during Operation Firestop in 1954 showed that spray penetration of heavy brush was aided considerably by the downdraft of the helicopter rotor. The tests were preliminary and tentative but they did investigate a field that is now becoming quite important. Although herbicidal treatment of forest and range lands for brush control or vegetation manipulation is becoming common, hand spraying and mechanized ground spraying is just too expensive except for special purposes. Spraying by aircraft seems to offer the only economic means of covering such areas.

The helicopter offers certain advantages over fixed-wing aircraft for spraying vegetation. It is highly maneuverable, can operate at low speeds and at low elevations (thus minimizing spray loss), and has the aforementioned effect of the rotor downdraft aiding penetration.

Equipment and Procedures

The study was made in the coastal mountains of southern California on the Cleveland National Forest. The study area was located just east of the Camp Pendleton Marine Base in a heavy stand of pure scruboak (Quercus dumosa Nutt.). The individual plants were from ten to 14 feet high. The stems were crowded and mostly within a few feet of each other. The crowns formed a dense, unbroken canopy of foliage. The canopy layer was generally uniform in depth and leaf density.

We used a small Bell helicopter with an agricultural spray boom and chemical side tanks as described by Akesson and Harvey. Diaphragm type spray jets gave instantaneous on and off control of the spray. The low rate of application of this equipment made it necessary to go over the area repeatedly.

The spray compound we used was an aromatic oil with a viscosity of 37.2 Saybolt Universal Units at 100° F. and a gravity

1Arizona Agricultural Experiment Station paper No. 362.

2Recently developed helicopters have greatly improved hovering ability for a much wider range of atmospheric conditions.
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Construction

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