duction may increase as high as 600 percent on some sites. On pine sites the difference is attributed to the type of stand of pine at time of treatment. Forage production decreases quite rapidly as stands of pine approach a fully stocked condition. The high increase of forage production in open pine stands and newly cut over pine stands is attributed to the control of the heavy amount of hardwood brush.

Time of year of aerial application of chemicals for hardwood control was studied on areas treated from April 17 to October 4. The herbicides which are useful in aerial application must be effective in small quantities and must be adaptable to low-volume application. The herbicides act as growth regulators or as synthetic growth substances, and when applied to a plant they are translocated and affect other parts of the plant. The movement is determined largely by the growth activity of the plant at the time of application. Since it has been determined that the chemicals generally move with the food materials of the plant, it is important to spray when the leaves are fully developed and beginning to manufacture food materials in excess of the requirements for growth. Applications made too early will burn the leaves but will not kill the plant. Applications made later in the summer after the growth has slowed down are not too effective. However, some fall applications in 1957 gave good results. Some May applications, where diesel oil was used in the mixture, did some damage to the needles and tips of pine. The pines appeared to recover with no apparent damage.

Aerial application appears to be the only feasible method for applying spray rapidly and economically on large areas of moderate to heavy brush and to large areas of pine lands. Also, airplanes can operate when the ground is too wet for other equipment. Aerial application of chemicals for brush control is a very exacting operation. Good results are obtained only when all phases of the operation are carried out correctly.

ACKNOWLEDGMENT

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A Method of Managing Sportsmen on Rangeland

G. W. PHILPOTT, W. E. HOWARD, and C. A. GRAHAM,
Formerly President, Sportsmen Council of Central California, 1278 Arthur, Fresno; Specialist, Field Station Administration, University of California, Davis; and Superintendent, San Joaquin Experimental Range, U. S. Forest Service, O'Neals, California

The bulk of our wildlife resource is no longer available to the average sportsmen, for the amount of private land in farm, forest or range includes almost three quarters of continental United States. Much of this private domain is now closed to outdoor enthusiasts because so many people seek this form of recreation that landowners are literally forced to close their land to unregulated free access. Some farmers have been invaded by so many sportsmen “friends” that they have had to close their land completely, because it becomes too involved to allocate access privileges. Also, the “opening day” stampede creates many problems.

The crux of this private-land-versus-too-many-sportsmen dilemma is in the management of sportsmen access. If methods can be developed that will create an incentive among ranchers and farmers, the principal landlords of fish and game, to open their land to sportsmen, more opportunities will then be provided for outdoorsmen as well as reducing the demands for further “opening-up” the few remaining wilderness areas (Howard and Longhurst, 1956).

Permit Card

The objectives of our study were to develop and test a more or less standard sportsmen's access permit card, as shown in the accompanying figure, that would serve to make it easier for landowners to open up land they have been forced to close to sportsmen.

There are a number of other conditions or modifications that can be incorporated in a permit and registration card that are not apparent in the illustration. It should be small enough to be carried in a billfold (our permit and registration cards are each 2¼ x 3¾ inches. Different color combinations can be used on the cards to denote regular permit, guest permit, landowner permit, custodian or attendant permit, different dates, and other features. Holes can be punched in the permits if they are to be tied
on, although we found ordinary sewing pins were adequate for displaying permits on outer garments. In most instances the permit should be made transferable until the registration card is non-transferable, the permittee's name can be written or typed under the space for signature prior to its being issued.

The permit and registration card can be used as a daily or seasonal permit, or it can be used as a supplement to a salesman-landowner lease, since it is subject to all other printed regulations distributed along with the cards. The landowner can sign and date the permits in advance of the season at his convenience to regulate the number of sportsmen having access to his property at any time. The blanks for this information appear high on the cards so they can be typed, if such is desired. If a sportsman's club or other organization sponsors the sporting event, there is a place where this can be advertised, which then acts as a source of new, voluntary members for that club.

Handling Permits

A landowner can have the permits made available in a great many different ways. The proper quota of such permits can be distributed to individual sportsmen by the landowner, or he can turn the responsibility over to a sportsmen's club, sporting goods store, farm organization, tavern, etc., with or without making a charge for the access privilege. The cards are also convenient to mail. Where a large number of people are involved on a daily basis, like with a pond farm or at camping sites, a vending machine would help reduce the amount of operational manpower needed. One can service many machines; comparable vending machines are in use at some parking lots and for issuing life insurance at airports.

The landowner can obtain the completed permit and registration cards by having them mailed to him, by having the sportsmen put them in a mailbox receptacle on the farm, or by having a member of a sportsmen club responsible for collecting them. To aid and encourage the landowner in practicing game management, there is a place on the permit for the sportsman to record the amount of game he has taken.

Test Permit Hunt

To test the registration-permit principle, a permit quail hunt was conducted in 1955 and 1956 at the San Joaquin Experimental Range, O'Neals, California. The Sportsmen's Council of Central California made the necessary signs, printed the permits, advertised the program, supervised the drawing of permit requests from members and nonmembers of the affiliated clubs, and mailed the mimeographed instructions, permit and registration card to the lucky individuals whose names were drawn. There are many different ways that a landowner or club can determine who gets a permit and on what day. All the landowner is concerned with is that the number allowed at any one time be restricted, that he know who is on his property, and that all arrangements be made with a minimum of disturbance to him and his property.

Each hunter was mailed a mimeographed list of instructions, with a map of the area on the back side, and a red registration-permit card. Each sportsman selected as custodian was sent a green card and an additional list of instructions. The quail hunters were very

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Permits Available</th>
<th>Number of Adult Hunters</th>
<th>Percent of Permits Used</th>
<th>Average Number of Quail per Hunter</th>
<th>Birds Taken per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1955</td>
<td>171</td>
<td>105</td>
<td>61</td>
<td>3.46</td>
<td>.19</td>
</tr>
<tr>
<td>1956</td>
<td>172</td>
<td>134</td>
<td>72</td>
<td>3.48</td>
<td>.25</td>
</tr>
</tbody>
</table>
grateful for what many called “exclusive” hunting. By spreading the hunters out over the entire season, large numbers of sportsmen were never present at one time, which is desirable to both hunter and landowner. Hunters at the end of each season still had good quality hunting. We do not want to leave the impression that permit hunting is always a panacea, but a good system of managing sportsmen access will probably have fewer human problems for the landowner than will occur if an attempt is made to lock all sportsmen out of the area with “No Trespass” signs.

A rough yardstick for determining quail hunting pressure in the vicinity of the Experimental Range proved to be one hunter-day for every 15 to 20 acres. If permits are issued in advance so that one third or more of the hunters can be expected not to show up on their day because of unfavorable weather conditions or personal reasons, then one one-day permit per 10 acres can be issued.

Summary

A permit-registration card to simplify the regulation of sportsmen access to private land and to improve farmer-sportsmen relations is described. Both sportsmen and landowners want the number of people present in an area at any one time to be limited and regulated.

To test the effectiveness of the permits in regulating sportsmen access in a desirable manner, two permit quail hunts were conducted at the San Joaquin Experimental Range. The landowner's participation was kept to a minimum and the sportsmen managed the drawing of names and the hunting.

LITERATURE CITED


The Ranchman's Issue

This is the third Ranchman's Issue of the Journal of Range Management. Unlike the previous issues the majority of the articles herein are not by ranchmen. The articles are, however, mainly concerned with problems of practical range management or are illustrative of principles and practices applicable to the solution of those problems under a wide variety of conditions.

Articles by rancher authors have not been excluded by intent. The articles in this issue were selected from manuscripts received during the year as the best available for this particular issue. We think that they represent a substantial contribution to the field of practical range management. The Editorial Board and the Editor earnestly solicit contributions from rancher authors.