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WALLOWA NATIONAL FOREST

THE FORAGE ACRE

BY

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In grazing reconnaissance, the semi-final conclusions are drawn up in terms of forage acres. I say semi-final, because there are other factors — which will be mentioned later — besides the amount of palatable forage which affect the carrying capacity of any allotment.

In the grazing reconnaissance outline a forage acre is described as "an acre having complete ground cover 10/10 density of palatable vegetation possible of use". It is yet at best only an arbitrary unit to standardize the results obtained from reconnaissance.

The factors necessary to compute the forage acres of an area are obtained by a field examination of the area, and are as follows: (1) surface cover; (2) density; (3) palatability of the existing vegetation.

In explanation of surface cover, density and palatability we will cite as an example a mountain meadow area whose surface is completely covered by vegetation. In this case the surface cover and density would be 10/10, but the per cent of palatability would be variable, according to the species growing on the area.

To show how the number of forage acres of an area is obtained, we will say we have an area of 80 acres, 7/10 of the surface of which supports vegetation, and the vegetation on this 7/10 of the area has a density of 8/10, the palatability of which, or in other words the amount of which stock will eat, is 80%. By multiplying these last three figures together we obtain the "forage acre factor", which in this case is .448. This forage acre multiplied by 80, the type area, gives us as a result, approximately 36, which is the number of forage acres on this type area.

Among the more important of the other factors, besides the amount of palatable forage, which enter into the carrying capacity of the range, may be mentioned:

1. The time of grazing.
2. Class of stock.
3. Association of types.
4. Water development.

5. Distribution of salt.
6. Method of handling stock.
7. Utilization of available forage.

Height growth is not and need not be taken into consideration in estimating for forage acres if, as explained later, the forage acres are to be used only for comparison between ranges composed of similar types, for in that case the height growth on each range would balance.

But to show how height growth may be, in some cases, taken into consideration in estimating for forage acres, we will take a piece of winter range, the main forage plant of which is wheat grass. Wheat grass, when compared to a meadow type has appar-ently less than .5 density, but density of wheat grass range is estimated not from meadow type but from the densest stand in which it naturally grows under good condi-tions. Estimated in this way, wheat grass would ordinarily have a density of about .7 or .8, and in this way the extra height growth of the forage is partially taken into account. The comparison of pine grass range and large huckleberry range would work out much the same way as wheat grass range, when compared to meadow type of range.

The surface covered in all cases is estimated the same; that is, the surface cover per cent is that per cent of the surface which could actually produce vegetation.

Grazing reconnaissance would be much more valuable if the forage acre was to the grazing estimates what the board foot is to our timber estimates. This is a point, however, which has not as yet been reached in grazing reconnaissance, and that it will ever be reached is doubtful.

To make the statement that a forage acre on one type of range, say a 6 pine grass type, is not the same as a forage acre on say a 1 wd type of winter range, is not making a damaging admission. Perhaps by the time grazing estimates have been carried on as long as timber estimates, and with the same intensity, we shall be able to estimate forage values somewhat nearer the accuracy of volume tables to timber stands.

It should be a fact, however, that under similar conditions a forage acre on one 6 pine grass type should equal a forage acre on another 6 pine grass type in another part of the Forest, and it is in this phase of the application of the forage acre figures as applied to carrying capacity, that the value of forage acre figures lie.

The range on the Wallowa National Forest may be roughly divided into several classes, as follows: (1) winter range; (2) high mountain summer sheep range; (3) timbered summer pine grass and browse range in the northern half of the Forest, and used principally by cattle; (4) Big Sheep, Snake River and Saddle Creek Cattle and Horse ranges, each of which has several different types of ranges within the allotment boundaries, but in the aggregate are the same; and (5) the medium high summer sheep range, consisting largely of weeds and browse, with some areas of grass.

The carrying capacity of a forage acre on one allotment in one of the above rough subdivisions should equal the carrying capacity of a forage acre on another allotment within the same general type of range. That is, a forage acre on one part of the winter range should be the same as a forage acre on a different part of the winter range.

Ordinarily, one cow is supposed to use as much range as four sheep, but this proportion does not always hold good. It would come closer to being exact if all classes of forage were equally palatable to sheep as to cattle, but this is not the case and could we always take the class of stock into consideration in making our forage acre estimates, our results would be more nearly correct.

Until we have a more definite relation between the palatability and feeding value for both sheep and cattle for the main forage types on a given area, we cannot hope to approach in forage acres what a board foot or cord is to timber estimating. To say that one forage acre should equal a forage acre of a different type under the same or different conditions is the same as saying that a cord of cottonwood timber has the same heating value as a cord of oak wood.

To account for the comparative inaccuracy of the results of grazing reconnaissance in the light of the results of timber reconnaissance, we may make the following comparison of methods:

Where grazing reconnaissance is new and rather extensive at best, timber reconnaissance is comparatively old and more or less intensive. Where a one-man crew in grazing reconnaissance works three sections per day, at a cost of considerably less than 1 cent per acre, a 2- or 3-man timber reconnaissance crew will work from 1/4 to 1/2 section per day, at a cost of from 10 cents to 15 cents per acre, and the results should be proportionately more exact, not only due to the higher intensity of examina-tion, but also because timber estimating is more or less mechanical, and subjects itself to mechanical measurements, whereby the volume of a certain per cent of the timber is actually ascertained. The estimates of grazing reconnaissance are entirely ocular, and are estimates in every sense of the word, the forage resources allowing of no strictly mechanical measurements, even the area of the types being estimated only by eye.

There are, however, some forms of timber reconnaissance to which grazing can be compared. The comparison between forage resources and the volumes of wood by cords can be carried further in this way. We will say that the cord wood is to be used as fuel, as the forage resources are to be used for animal feed.

It is a well-known fact that different species of wood have different heating values, as determined by actual tests or chemical analyses, so different types of forage have different heating or food values which are being worked out by carrying capacity tests, much as the fuel value of various species of wood have been determined. It may also be possible to determine the food value of different types of forage by chemical analyses, but the intensity of grazing reconnaissance has not yet been carried that far.

Now to compare grazing reconnaissance to this type of timber reconnaissance, let us say we have a large body of timber of various types in a more or less compact body, each type consisting of one principal species with a few trees of other species. Though the following types may not ever occur in any one body of timber, we will say that one type consists mainly of oak, another mainly of aspen, and so on for any number of types in the body of timber. Of course, as has been mentioned before, the fuel value of the various woods has been more or less scientifically determined by actual use and chemical analyses, but suppose such was not the case. It is not probably that a novice, or even one who has had experience in steam and heating engineering could go into the area, even if he knew approximately how many cords there were in each type, and tell how many calories of heat there were in a given type, or how many calories of heat there were in a given type, or how many pounds of water the wood on one type would vaporize.

After estimating the area of each type — I say estimating the area, because that is the intensity to which grazing reconnaissance is carried in getting at the type areas and measuring a certain per cent of the stand on the area, another refinement not applic-able to grazing reconnaissance which, as has been mentioned before is entirely ocular, the examiner could make a fair estimate of the number of cords of wood on the area, but he would still be at sea so far as the actual value of that wood for fuel purposes is concerned. In this way a forage acre is comparable to that cord of wood. We have our results in terms of cords and forage acres, but the next question is, of how much value is that cord of wood, and of how much value is that forage acre? We know that the heat value of a cord of wood is fairly constant, variations in site, soil and climatic condi-tions and innumerable other factors will vary it somewhat, and in the same way, loca-tion, accessibility, method of handling stock, watering facilities and many other things enter into the value of any one forage acre. At the same time one forage acre of a type will have practically the same feed value as a forage acre of a similar type in the same locality, and so will a cord of wood of one type have about the same food for furnace or fuel value as another cord of wood cut from a similar types, but this one cord of wood will not have the same fuel value as a cord of wood cut from a different type of timber. As in grazing reconnaissance, so in timber reconnaissance the amount of heat values obtained from one area will depend to a large extent on how closely all the material is utilized, only in timber utilization a standard can be more closely adhered to than in the utilization of forage resources.

Therefore, we may safely say that when we have actual tests of forage values by carrying capacity tests, or by chemical analyses, we may approach the standard of intensity reached in timber reconnaissance, when our field methods are equally intense. In the meantime it will be necessary for us to confine ourselves to the comparison of forage acres of similar types and allotments, the same as we would have to compare the fuel value of certain types of timber by cords, did we not already know the fuel value of the various species of wood.

In ending, let me say again, the value of the forage acre lies, not in a comparison of the food value of all types indiscriminately, but that a forage acre, within certain limitations,

should have the same food value as another forage acre of similar type. So a cord of aspen wood will have the same fuel value as another cord of aspen wood, whether cut from the same or similar type, located at some distance from the first, but this cord of aspen wood will not have the same fuel value as a cord of ash wood.

To strengthen the argument it might be well to say that palatability, as taken into consideration in computing forage acres, does not take into consideration the food value of the type. Two species of wood may be equally palatable to the furnace fire, that is, they may each burn as readily as the other, yet their fuel values may be different. It is also well known that two types of foods for man may be equally palatable, but may have far different nutritive values. So with the different types of forage, many of which may be equally palatable but still not have equal food values. The palatability and food value of different types of vegetation will also vary as to the class of stock consuming that forage.

Conclusions.

1. The value of forage acre figures are now confined to making comparisons between allotments having the same general types, and in this way have justified the effort to obtain them for the comparison between similar ranges is practically all that is necessary in making out allotments.

2. Carrying capacity tests will eventually show the relationship between a forage acre of one type, and a forage acre of another type, and thus standardize the value of a forage acre, and make the application of forage acre figures much more general.

{signed} **E.H. Steffen**
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Wallowa, Oregon,
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