

A REPORT ON
THE STATUS, ORIGIN, AND COMPARATIVE ECOLOGY
OF SELECTED BACK COUNTRY MEADOW AREAS
IN
YOSEMITE NATIONAL PARK
THAT RECEIVE HEAVY VISITOR USE

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by
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Carl W. Sharsmith

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INTRODUCTION

The present report is an attempt to indicate the status or condition, the ecology, and the changes that are occurring, in certain selected back country meadow areas in Yosemite National Park, all of which are receiving heavy use. Furthermore, it is also an endeavor to show various important aspects of their comparative ecology by means of comparisons with comparable areas or sites of as nearly unmodified a character as it has been possible to find during the period that was devoted to the investigations in the field. The end in view has been not only to bring forward the contrast that exists between comparable areas or sites of drastically different status, but also to provide, as much as it has been possible so to do, a comparison between the ecological changes occurring in the heavily used areas and the ecological changes occurring in comparable areas unmodified by man or his domestic stock.

A study of comparative relationships in connection with differences in ecological changes involves consideration of various often difficult, interrelated problems. First of all, in order to discover the comparison, it is necessary to reconstruct, as it were, the original unmodified condition of the heavily used area. If some of the original vegetation remains, even as relicts, this is not difficult. On the other hand there are cases in which all the original vegetation has disappeared, and in this case one has to make various inferences. For success in this direction one is dependent not only upon judgments as to the original ecological potentials of the area but also upon information as to the ecological characteristics of unmodified comparable areas which in turn are sometimes difficult to find, and furthermore, there is also the question as to whether the areas discoverable are truly comparable. Unfortunately or otherwise, no two areas are ever exactly alike.

In the attempt to provide comparisons advantage has been taken of the following fact. The more closely two physically similar areas neighbor each other the more closely comparable they are apt to be as to their ecology and as to the composition of their original vegetations. Therefore, in all those instances where it has been found possible to do so, comparisons for any given instance have been drawn from the most closely adjacent, unmodified areas or sites in which the physical conditions most closely resemble those of the heavily used area with which they may be compared. As a supplement to this means of solving the problem an attempt has been made to utilize such information as to the changes occurring in unmodified comparable areas as has been available through observations elsewhere in the region. Unfortunately, however, the data are extremely few.

Finally it should be mentioned that the areas which are the primary concern of this report are all (except one at Buck Camp) receiving heavy visitor use.

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Upper Lyell Fork meadows	July 30; Sept. 4.
Creed Lake and vicinity	Aug. 1 - 5; Sept. 3
ate Valley	Aug. 11 - 12; 16 - 17.
onson Lake	Aug. 14 - 15.
len Aulin	Aug. 18.
oraine Meadows	Aug. 25 - 26.
uck Camp	Aug. 27.

SUMMARY DISCUSSION

With very few exceptions the areas which have been considered in the foregoing portion of this report are clearly being overused, and most of them are active overuse problems of long standing as well. This is quite evident in the changes of importance which have occurred and that are continuing to be produced. Damage resulting from the direct, immediate action of the forces involved is becoming increasingly more conspicuous and severe. The existence and advance of the deteriorational process is being made evident in indications of increasing depletion and in invasions and other conspicuous vegetational changes. In the area at Benson Lake, because of the particularly vulnerable nature of the site, and not alone because of the intensity of use, damage and disruption of cover predominate in the scene. The irreversibility of the change that is being created has already been emphasized. In the area at Moraine Meadows, as at the area at Benson Lake, invasions, which might develop, are absent possibly because they have had no opportunity to develop. In both instances, however, no such indications are necessary to point out that deterioration is occurring. The increasing damage is a sufficient basis for establishing that fact. Moreover, on further consideration, irreversibility poses itself as a possible eventuality at the area at Moraine Meadows, in which rapidly thinning loams directly overlying a relatively sterile substratum also occurs. Standing in contrast to these drying areas are the likewise uninvaded but wet areas that form the lower and middle Grand Lake pastures, in which the absence of vegetational changes of the conspicuous kind usually associated with deteriorated areas are absent because of the inhibiting effect of the high water table.

In all the remaining areas in which overuse has been the rule, invasions

occur. In two of the areas the original vegetation has practically if not entirely disappeared. In Pate Valley in former years the area known as the Pate Valley pasture was a meadow of native vegetation. The perennial bunchgrasses and sedges that formed a large and very conspicuous part of a cover otherwise composed of annual and perennial forbs, were deep-rooted, and indicated the existence of soil moisture at relatively deep levels. The shallow-rooted exotic annual grass invaders, however, which entered the scene through the altered conditions produced by overgrazing, now indicate, just as they did when they dispossessed the natives, that the soil moisture is only of shallow depth. In the meanwhile an increasing woody invasion is also in evidence and is indicating the progress of still further ecological change. Change of an ecological nature is also evident in the pasture at Buck Camp. In the dry or moderately moist loams formerly occupied by the bunchgrasses the invasion is of a low growth of native weeds that form an early stage of secondary succession. The area, apparently stripped of its original dominant, has therefore received a very severe set-back, and furthermore, the pauceness of the stand of weeds may or may not be due simply to the trampling.

In all the above situations a positive relation between the heavy use and the ecological changes that are occurring is obvious. A relation of this kind is, however, not clear at the Glen Aulin sites around which a lodgepole increase is taking place. The reason for this uncertainty is the rather strong evidence indicating that an unbalanced situation, favoring lodgepole increase and invasion, exists in many places, quite independently of man-made disturbances, in the upper Tuolumne region (of which Glen Aulin may be considered a part).

This, in a way, brings us to the question as to the comparison shown between the ecological changes occurring in the areas that receive heavy use

and the ecological changes occurring in comparable areas that remain unmodified by man or his domestic stock.

As a means of showing the contrast between the results produced by the overuse on the one hand, and the results that are the outcome of undisturbed, unmodified conditions on the other, at various points in this report an attempt has been made to bring forward for comparison areas or sites that are comparable with the overused areas except that they are devoid of, or else have completely overcome, the effects of any important disturbance which man or his domestic stock may have produced in them at any time previously. To pursue the comparison much beyond that already attempted would merely belabor the issue. However, reducing all to a generalization with no exceptions, and speaking in terms of universals, the results of overuse are always those of deterioration, while those of unmodified conditions are always those of the wholly constructive kind that are invariably produced through the reactions between green plants and environment.

As to changes of importance which may or may not be occurring in unmodified comparable areas, the following may be said at the outset. In an earlier report by the present writer (1953) various instances and observations are brought forward, all of which supported the general conclusions reached, namely, that although exceptions doubtless occur, meadows or meadow areas that exist in an essentially or completely unmodified condition generally tend to be only very slowly developed. With this as one basis and inferences derived from a consideration of the ecological characteristics of the areas concerned as the other basis, it is possible to arrive at some conclusions. It must, however, be stated that such records as would enable the recognition of changes in comparable areas appear to be completely lacking, and that any other data in regard to their changes are extremely scanty.

Therefore the following merely brings together the few additional statements which the data warrant.

In general it may be said that comparable areas in the back country of Yosemite National Park which remain unmodified by man or his domestic stock are relatively stable, and that of all the areas concerned, those comparable to the lower and middle Merced Lake pastures are by their very nature the least changing of any. In Pato Valley the area which has been shown as being essentially comparable to the pasture in that valley is a rare type. Its presence is a fortunate circumstance with reference to the problem in hand, and moreover, it represents a recovery area. The changes occurring in the area have already been mentioned, as has likewise brief mention of the relation of the area to the fire factor. Turning to another comparison, unmodified comparable areas of bunchgrass for comparison with the present Buck Camp pasture are rare in the back country at the altitude of Buck Camp, and probably the comparison provided by the slope that lies in the close vicinity of the pasture and described earlier in this report is as indicative of the stability of unmodified or recovery areas of this type as can be found. At Moraine Meadows the overused swale is an element of shorthair areas which are small and large tend to be resistant to lodgepole invasion, but as to unmodified areas comparable to the area at Benson Lake and the overused sites along Alkali Creek at Glen Aulin, nothing more can be said other than that already mentioned.

CONCLUSIONS

The areas receiving heavy use which have been the subject of this report show an urgent need of measures that will reverse the trend that is rapidly adding their already deteriorated condition into a still more advanced stage. The area at Benson Lake stands first in the order of priority of concern. Those at Merced Lake, Moraine Meadows, Pato Valley and Buck Camp rapidly follow.