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Arizona  
Bob Schultz  
Ned Habich  
Jack Rietz  

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Joe Patti  
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IN REPLY REFER TO:

# United States Department of the Interior

4112.16 (930)

BUREAU OF LAND MANAGEMENT  
Idaho State Office  
Federal Building Room 334  
550 West Fort Street  
Boise, Idaho 83702

December 6, 1971

## Memorandum

To: A. L. "Gus" Hormay, Range Conservationist  
Bureau of Land Management, P. O. Box 245,  
Berkeley, California 94701

From: State Director, BLM, Boise, Idaho

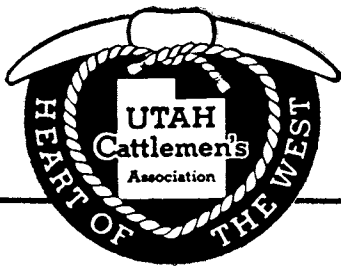
Subject: Request for Your Services - Idaho Department of  
Public Lands - May 29-June 12, 1972

Attached is a copy of a self-explanatory letter pertaining to the subject request. If you can conduct this session, we will get as much publicity out as we can through the Spokane and Coeur d'Alene BLM Districts, other agencies, county agents, etc.

We appreciate all the assistance you have given us in Idaho. It has been extremely helpful to us. Merry Christmas to you, Gus, and we hope that next year will be another rewarding year for you.

Attachment





# Utah Cattlemen's Association

## Publishers of The Utah Cattleman

Fifty-three East Fourth South • Salt Lake City, Utah 84111 • 355-5748  
Suite 211

December 8, 1971

### OFFICERS:

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A.L. Hormay  
Bureau of Land Management  
P.O. Box 245  
Berkeley, California 94701


Dear Gus:

Please accept our sincere thanks and appreciation for the two fine talks you gave during our annual convention in Salt Lake City.

We heard many fine comments regarding the entire program, and your contribution to it.

Please accept our very best wishes to you and yours for a very happy holiday season, and a prosperous new year.

Very best regards,  
UTAH CATTLEMEN'S ASSOCIATION

  
Sherman D. Harmer  
Secretary-Manager

SDH/sd



Affiliated With The  
American National  
Cattleman's Association

# SRM

## SOCIETY FOR RANGE MANAGEMENT

LORENZ F. BREDEMEIER, President (1971)  
P.O. BOX 11222  
FORT WORTH, TEXAS 76110

(817) 923-8316

December 16, 1971

Dr. August L. Hormay  
101 Acadia  
San Francisco, California 94131

Dear Dr. Hormay:

You have been selected by the Society for Range Management to receive its Outstanding Service and Achievement Award for 1971.

This honor and recognition is well placed and I am most pleased to convey this information to you. The award will be presented at the Society's Silver Anniversary Banquet Thursday evening, February 10, 1972. I hope you will be present to personally receive your award.

Would you please notify me if you can not be present? In that case you may wish to designate someone to accept your award for you. Congratulations!

Most sincerely,

*Lorenz F. Bredemeier*  
Lorenz F. Bredemeier  
President

cc: F. T. Colbert





# United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

P. O. Box 245  
Berkeley, Ca. 94701

December 17, 1971

Mr. Wynn G. Freeman  
State of Montana  
Department of Fish and Game  
Helena, Montana 59601

Dear Wynn:

I believe I see a way out of the difficulties on the Gallatin and Wall Creek elk winter ranges in Montana. I'm sorry I'm so late writing you about my trip with members of your Department and Montana State University this past September, but I have been away from my desk most of the time since then. The following men were present on the Gallatin range tour, September 8:

Montana Fish and Game Department  
Joe Egan  
Dr. Richard Mackie  
LeRoy Ellig  
Arnold Foss  
John Cada

Montana State University  
Dr. Donald C. Quimby

Bureau of Land Management (Montana)  
Donald McIntosh

Tom Schurr, Howard Chrest and John Ormiston of your Department joined this group on a tour of the Wall Creek range on September 9.

Your men and Dr. Quimby gave me a clear picture of the situation on both ranges. We quickly focused on the main problem, at least as I see it -- deterioration of elk habitat.

Livestock and elk have both contributed to deterioration of the elk habitat. Livestock no longer graze on the Gallatin range nor on a substantial portion of the Wall Creek range. Yet the range is

continuing to deteriorate because of elk use. Grazing and trampling both are having harmful effects.

Desirable forage plants are being weakened and killed and soil is eroding at a rapid rate, particularly where elk tend to concentrate in winter -- on wind-swept ridges and southerly exposures. Elimination of livestock and control of elk numbers through hunting has not resulted in improvement of key elk grazing areas.

I'm confident these ranges could be improved and maintained, however, if the elk were managed under a rest-rotation grazing system. Fence control of elk would be necessary. Fences would be used to keep the animals off certain areas for certain periods of time -- not to enclose them as in the case of livestock. Is this feasible? I think so. It is being done on a small scale with the game exclosures on both the Gallatin and Wall Creek ranges right now. I feel confident it can be done on a large scale.

I suggest you try rest-rotation grazing on the Gallatin range. I believe a 2-pasture rest-rotation system would give good results and could be applied here. One pasture would be grazed one year and the other the next. In severe winters both could be used. The setup would call for one stretch of fence between summer and winter range and another, separating the two pastures, down through the middle of the main elk migration route to the end of the winter range. The fences would form an irregular giant T.

The effectiveness of the grazing system could be checked out in advance on a small scale. I suggest using pastures about the size and shape of the game exclosure in the Porcupine Creek drainage. The pastures could lie side by side separated by a common fence. Two sets of pastures would be desirable, one located on a stream bottom site and the other on an upland site. Results should be evident in 2 or 3 years.

Results that may be expected with rest-rotation grazing can be seen in the big game exclosure in the Porcupine Creek drainage. See the photograph. The exclosure has been established 20 years or so. Comparable if not better results can be obtained with rest-rotation grazing in a shorter period of time.

I hope you find it possible to set up a rest-rotation grazing system with elk on the Gallatin range. It would be the first in the United States. I will be glad to discuss this matter further with you any time. The situation on the Wall Creek range is more complex and I will not comment on it at this time.

Proper harvesting of animals as well as good habitat conditions is necessary for maintaining a vigorous, productive elk herd. Accurate herd

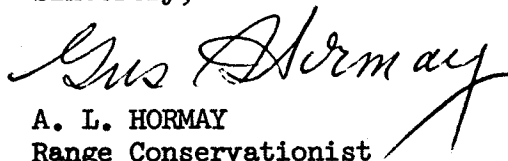
population counts and herd composition information are essential for this purpose. I have long visualized getting this kind of information by means of electronic equipment and cameras strategically located along a line crossed by a migrating herd during the year. The Gallatin herd crosses such a line -- between summer and winter range -- twice a year. With rest-rotation grazing a fence would be located on this line. Counting and scanning devices could be located in this fence.

I haven't searched for equipment to make such counts. Your game management specialists should be able to find some or get some developed and to test it. It could be tested in connection with the proposed small pasture trials.

Incidentally, we observed work of the sagebrush defoliator Aroga websteri on the Wall Creek range. Several of the men wanted more information on this important range insect. Enclosed is a relatively recent publication on it. Additional copies can be obtained by writing the Pacific Southwest Forest and Range Experiment Station.

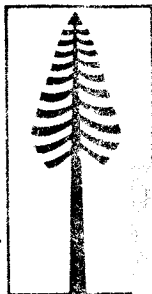
I appreciated the warm hospitality extended me during my visit, and I was impressed by the dedication of your men to their work.

Sincerely,

  
A. L. HORMAY  
Range Conservationist

Enclosures

cc: State Director, Montana  
George Lea, W.O.



## Sagebrush Defoliator Outbreak in Northern California<sup>1</sup>

RALPH C. HALL

**ABSTRACT:** The sagebrush defoliator was responsible for varying degrees of sagebrush defoliation and mortality over a widespread area in southeastern Oregon, northeastern California, and northwestern Nevada in 1963 and 1964. Severe defoliation sometimes killed sagebrush in a single season. Indications are that the outbreak will continue at least another season. *A. websteri* has a single annual generation. It is attacked by several species of parasites and predators; the most important of these in California was a *Copidosoma*.

The sagebrush defoliator (*Aroga websteri* Clarke [Lepidoptera: Gelechiidae]) is one of the most important insect pests of browse plants in the Western United States. From 1962 to 1964 the sagebrush defoliator, along with several other insect species, caused extensive sagebrush mortality in northeastern California and parts of neighboring States. This infestation is continuing and

extensive sagebrush mortality is expected.

Whether such an infestation is desirable or undesirable depends upon one's viewpoint. Where a perennial grass understory exists, sagebrush mortality improves livestock range conditions by releasing the grass. In this instance the insects causing defoliation serve the same purpose as chemical herbicides. The insects are not selective in killing sagebrush, however, while herbicides generally are.

Because the insects, including *Aroga*, are not selective, they often kill sagebrush on ranges that have no understory of perennial grass. There the plants that replace sagebrush--rabbitbrush and cheat grass are examples--are often less desirable than sagebrush. This is a particularly serious problem on deer winter ranges and antelope ranges because sagebrush is an important food plant for deer and antelope<sup>2</sup>. Sagehens may also suffer from uncontrolled loss of sagebrush.

The sagebrush defoliator has been reported active in California, Oregon, Idaho, Montana, Nevada, Utah, Washington, and probably

<sup>1</sup>This note summarizes a more detailed report prepared under terms of a contract with the Pacific Southwest Forest and Range Experiment Station, Forest Service, U. S. Department of Agriculture, Berkeley, California. The report is on file at the Station.

<sup>2</sup>Sampson, A. W., and Jespersen, B. S. California range brushlands and browse plants. Calif. Agr. Expt. Sta. Ext. Serv. Manual 33: 1-162. 1963.



also in Wyoming. In California it has been found in Lassen, Modoc, Nevada, Placer, Plumas, Shasta, Sierra, and Siskiyou Counties. It may also occur in Inyo and Mono Counties. A native insect, it probably is in other areas where sagebrush is abundant.

### MEASURING POPULATION DENSITY

This study, carried out mainly during the summer of 1964, attempted to measure the population density of the sagebrush defoliator from field collections made just before adult emergence. Samples of 10 randomly selected sagebrush tips, each 7 inches in length, were collected from 34 locations ranging from Summer Lake, Oregon to Reno, Nevada (fig. 1). The tips were transported to the Pacific Southwest Station's Hat Creek field laboratory for rearing. They were examined at about 2-week intervals. Information was collected on the number of adults of the sagebrush defoliator, parasites, predators, and other insects that had emerged. When emergence had ceased, each tip was examined under a microscope to determine the number of parasitized larvae and pupae.

R. L. Hubbard and D. L. Neal of the Pacific Southwest Station also helped collect data on defoliation damage from sample plots established in Modoc County in 1963. Further information on damage and areas of infestation was obtained from the California Department of Fish and Game, the Oregon State Game Commission, Oregon State University, the U. S. Bureau of Land Management, and the Bureau of Sports Fisheries of the U. S. Fish and Wildlife Service. An earlier report<sup>3</sup> was also consulted. Taxonomists at the California State Bureau of Entomology, Sacramento, identified the insects.

### THE INSECT

A small gray moth, the adult sagebrush defoliator has a wing expanse of about 14 to 16 mm. The moths vary considerably in color but are generally light gray with black markings on the front wings (fig. 2A). Their eggs are pearly white and about 0.5 mm. long. The mature larva (fig. 2B) is about 12 mm. long, has a dark brown head, a creamy-white body, and a row of black spots on either side of the abdomen. Henry<sup>4</sup> has described in detail all stages of the insect.

### HOSTS

Henry<sup>4</sup> reported that the sagebrush defoliator infests Artemisia arbuscula, A. tridentata, A. cana, A. nova, A. tripartita, and A. longiloba. I have reared the sagebrush defoliator from the first three

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<sup>3</sup>Hall, Ralph C. Impact on antelope and deer sagebrush ranges by the sagebrush defoliator, *Aroga websteri* Clarke. Trans-Interstate Antelope Conf., pp. 40-45. 1963.

<sup>4</sup>Henry, John E. The biology of the sagebrush defoliator, *Aroga websteri* Clarke, in Idaho. 1961. (Unpub. master's thesis on file Univ. Idaho, Moscow.)

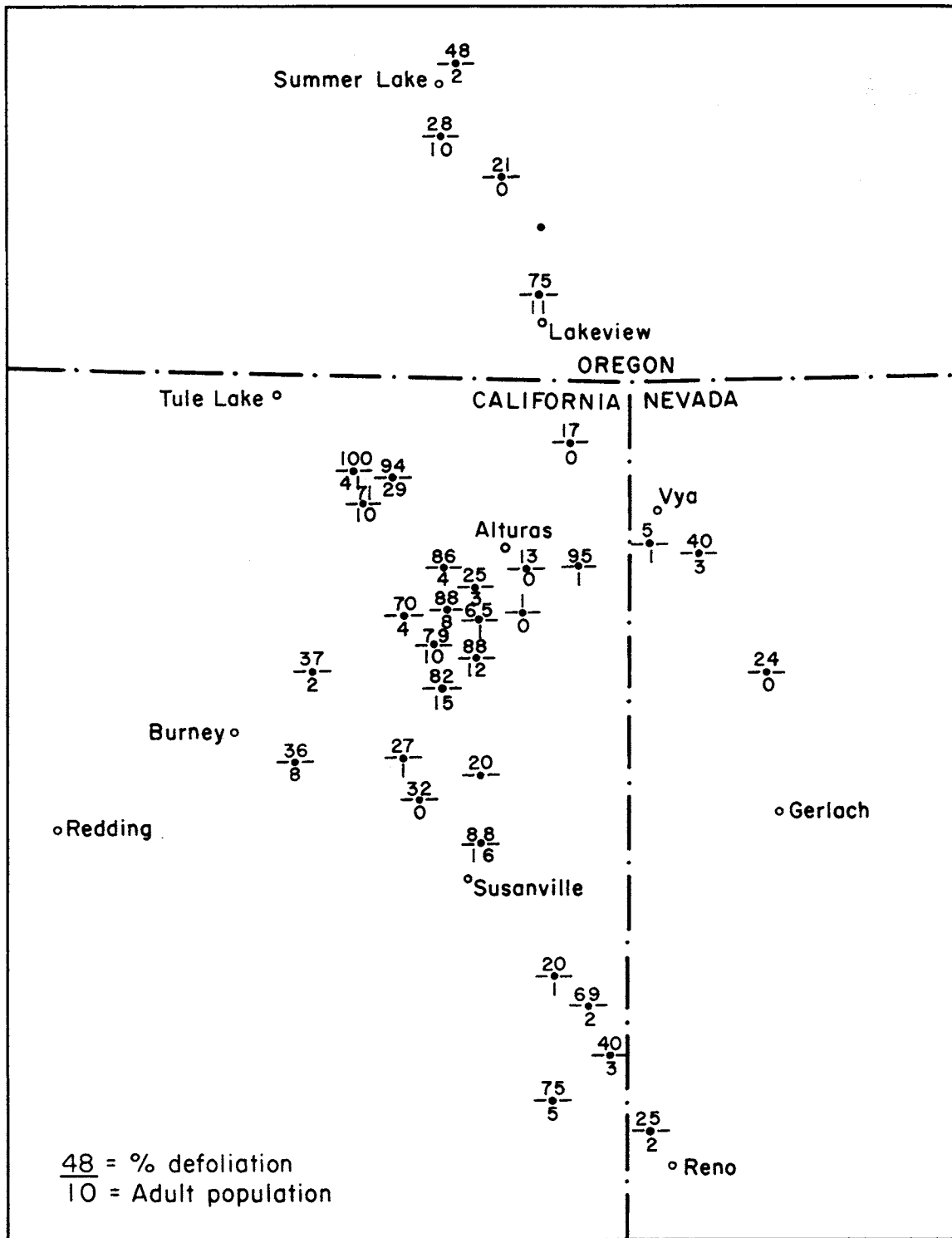


Figure 1.--Location of sagebrush defoliator population samples, 1964.



Figure 2.--A, Adult; B, fully developed larva of the sagebrush defoliator.

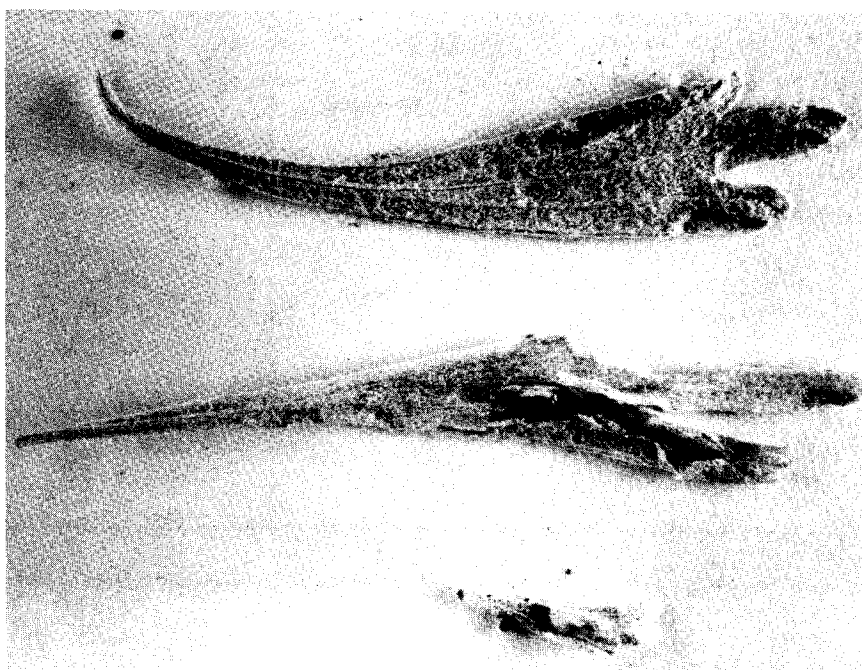


Figure 3.--Sagebrush leaves mined by overwintering larvae of the sagebrush defoliator.

of these species in California, and also from rabbitbrush (Chrysothamnus nauseosus) and bitterbrush (Purshia tridentata). Sagebrush is probably the principal host. The sagebrush defoliator feeds on other species only if the principal host has been completely defoliated and if these other species are associated with sagebrush.

### BIOLOGY AND HABITS

The sagebrush defoliator has a 1-year life cycle. The adults are nocturnal and are generally active during July and August. They lay eggs on the stems of the sagebrush plants; eggs hatch in about a month. Henry<sup>4</sup> reported that the insects overwinter as young larvae, mining in the leaves (fig. 3). They resume activity and complete their larval development in spring, pupating along the leaves or stems.

### EVIDENCES OF INFESTATION

Aroga larvae eat the leaves of the host plants. Defoliation is not immediately apparent, however, except on close examination because the larvae eat only the basal part of the leaves, leaving the rest attached to the twigs by webbing; these remain until washed off by the winter rains. At a distance the principal difference in appearance between a defoliated plant and a normal plant during the year of defoliation is the change in color from a sage green to ash gray of the defoliated plants. The webbed leaves are a sure indicator of sagebrush defoliator activity (fig. 4).

### RESULTS OF 1964 OBSERVATIONS

#### POPULATION DENSITIES AND DEFOLIATION

Larval populations averaged 24 larvae per 10-tip sample, and ranged from 0 to 75. Emergence ranged from 0 to 41 moths per sample; the differences from larval populations were accounted for by mortality between the mature larval and adult stages.

The severity of defoliation was closely correlated with larval population density. Eight larvae resulted in about 25 percent defoliation, 25 larvae in 50 percent defoliation, 46 larvae in 75 percent defoliation, and 66 or more larvae in 100 percent defoliation (fig. 5).

#### EFFECT ON HOST PLANTS

Data were collected in 1963 and 1964 on 17 randomly selected sample plots in Modoc County, California; the plots included 198 tagged sagebrush plants. Results showed that the sagebrush defoliator can cause mortality of sage plants after 1 year of complete defoliation. The extent of mortality observed in 1964 was closely associated with the degree of defoliation the previous year (fig. 6). Of 63 plants completely defoliated in 1963, 50--or about 80 percent--were completely dead in 1964. The amount of dead crown on the 63 completely defoliated plants averaged 96 percent. Indications were strong that young healthy plants

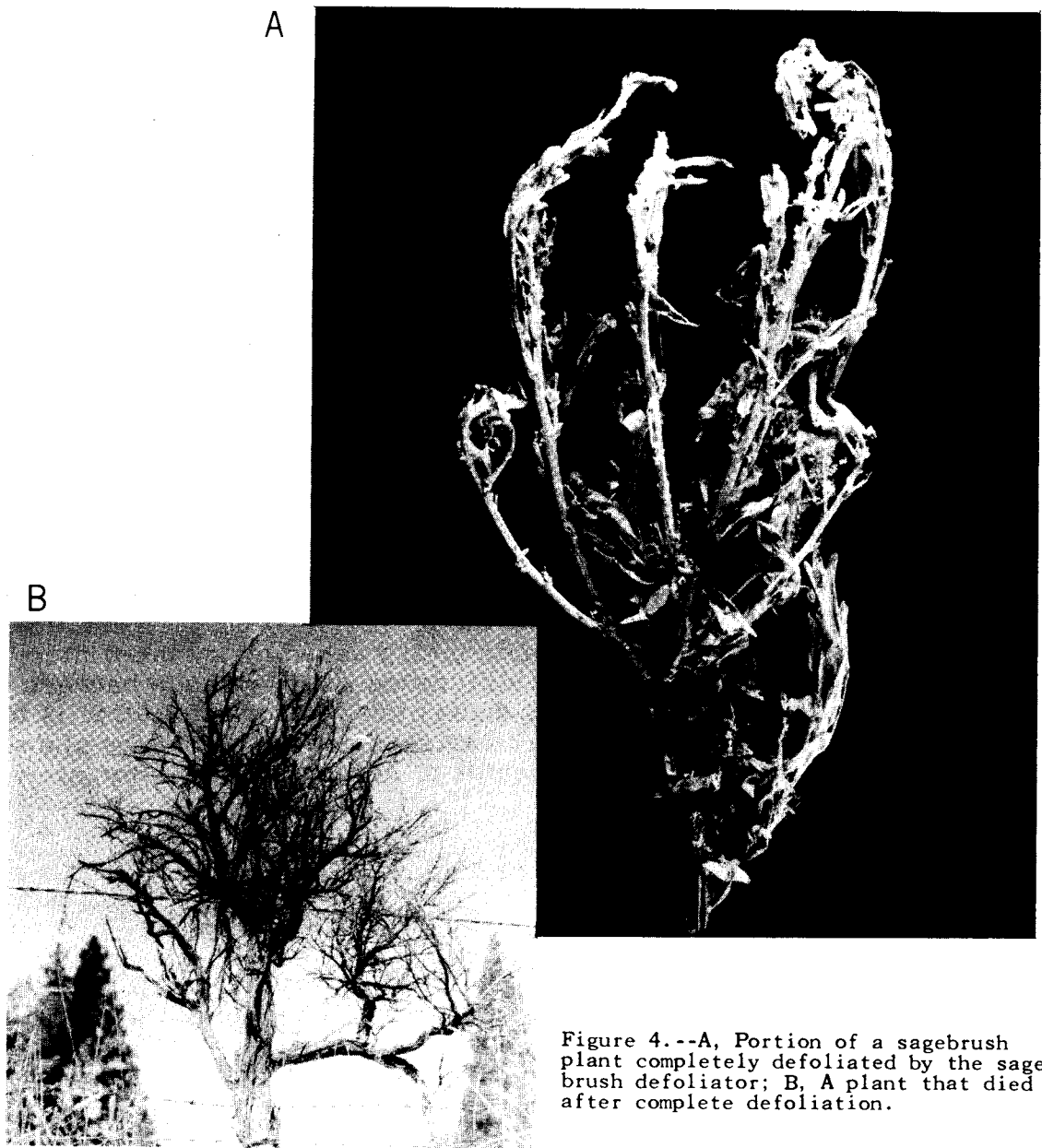


Figure 4.--A, Portion of a sagebrush plant completely defoliated by the sagebrush defoliator; B, A plant that died after complete defoliation.

are better able to recover after defoliation than older plants. Almost without exception the plants that survived complete defoliation were young, thrifty seedlings.

In observations near Lakeview, Oregon, in 1963, McLaury<sup>5</sup> found the amount of dead crown after complete defoliation averaged only 40 percent, which is much lower than the 96 percent found in California. He also reported that many of the completely defoliated plants grew new leaves in the fall after defoliation. Of 53 plants

<sup>5</sup>McLaury, Eldon L. Larva infestation study on the Sheldon National Antelope Refuge and Range. 1964. (Unpub. rpt. on file Bur. Sport Fisheries and Wildlife, Lakeview, Oreg.)

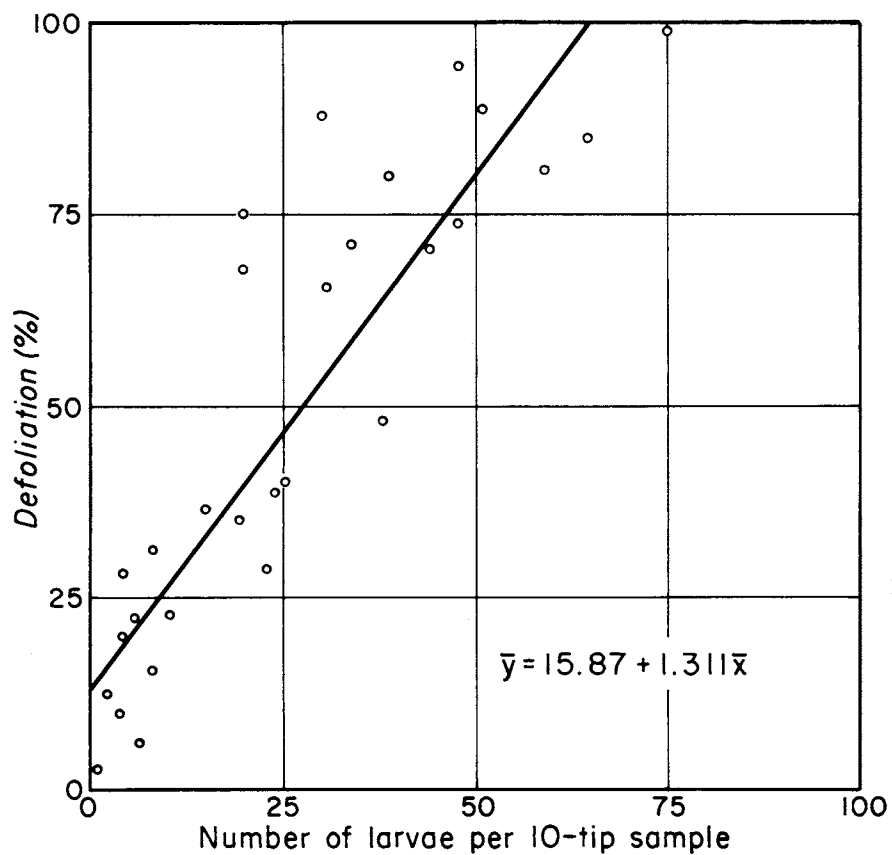
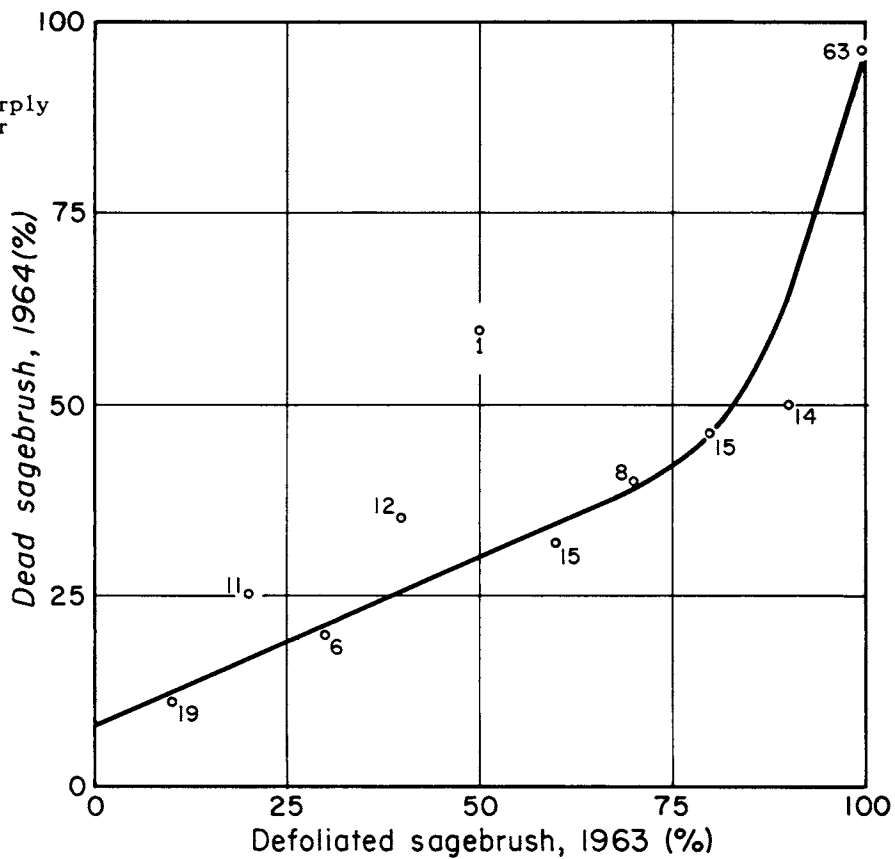


Figure 5.--As population density increased, the amount of defoliation by the sagebrush defoliator increased.

Figure 6.--Mortality rose sharply when plants were 80 percent or more defoliated.



completely defoliated, 46 developed new leaves. Only a few completely defoliated plants in California developed new leaves in the fall after defoliation. Regrowth of defoliated plants has also been reported in Oregon by Drs. Paul O. Ritcher and E. A. Dickason of Oregon State University, and Ira D. Luman of the Oregon State Game Commission. I have no satisfactory explanation for these differences in response of defoliated sagebrush in Oregon and California, but they likely reflect different factors of the physical environment.

### PARASITES AND PREDATORS

Parasites and predators greatly reduced sagebrush defoliator populations throughout the area sampled in 1964. Parasitism and predation in the 1964 samples ranged from 25 to 100 percent, and averaged 74 percent. These figures are conservative since they do not include any larvae or eggs which might have been destroyed before midsummer when sampling was started.

Three species of hymenopterous parasites and one predaceous beetle were found in the 1964 rearings. The most common of these parasites was a polyembryonic wasp, presumably Copidosoma (fig. 7). Copidosoma accounted for more than 80 percent of the total parasitism recorded. The predator is believed to be Phyllobaenus subfasciatus. Henry<sup>4</sup> reported three species of hymenopterous parasites and two species of predaceous beetles in Idaho.

### OTHER SAGEBRUSH INSECTS

Other kinds of insects feed on sagebrush. And several were encountered during these observations. In the 1963 rearings a sagebrush leaf miner (Bucculatrix tridenticola) was commonly found with the sagebrush defoliator. In the 1964 rearings, the sagebrush leaf miner was found in 29 out of 33 samples. The leaf miner by itself can cause heavy defoliation.

The sagebrush leaf miner has a 1-year life cycle; the adults emerge well ahead of the sagebrush defoliator. The 1964 rearings started too late to establish the time of initial emergence, but was probably in early July. The last emergence recorded in 1964 was July 31. Populations in the 10-tip samples, from counts of empty pupal cases, ranged from 0 to 455 and averaged 67. The only stages found in 1964 were the pupae and adults. A papery white cocoon attached to the leaves or stems encloses the pupa. The moth is similar in color and markings to the sagebrush defoliator, but has half its wing span (fig. 8). A closely related species, Bucculatrix seorsa, has been reported by H. H. Keifer, California Bureau of Entomology, from sagebrush near Susanville.

Another unidentified moth reared from sagebrush in 1964 was about the size of the sagebrush defoliator but with wings nearly pearly white. Pringle<sup>6</sup> reported that larvae of a chrysomelid beetle (Trirhabda

<sup>6</sup>Pringle, W. L. A new look at sagebrush control. Rpt. Ann. Mtg., Pac. NW. Sect., Amer. Soc. Range Mangt., pp. 28-29, Nov. 1955.



Figure 7.--A mature larva of the sagebrush defoliator killed by *Copidosoma*. Note the numerous capsule-like cocoons, which practically fill the body cavity, and from which the many adults of the parasite have emerged.

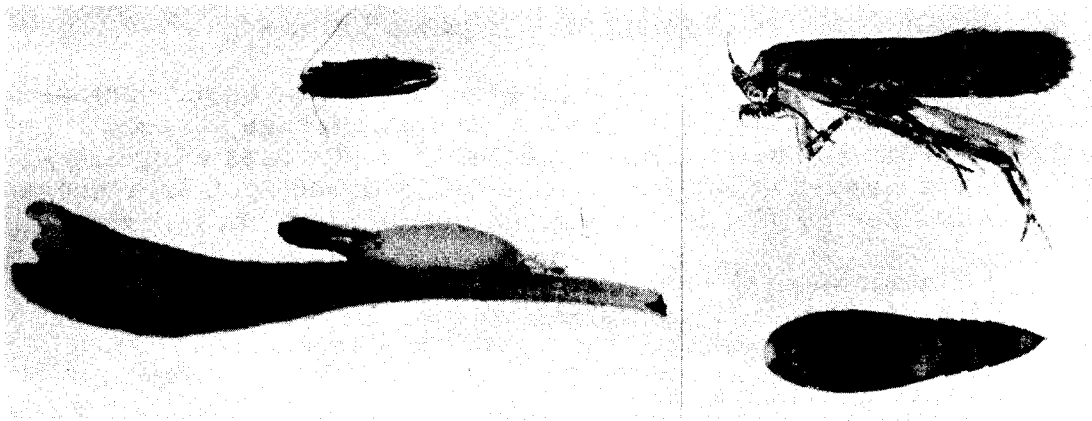


Figure 8.--Adults and pupae of *Bucculatrix tridenticola* (left) and *Aroga websteri* (right). The *B. tridenticola* pupa is attached to its cocoon on a sagebrush leaf.



*pilosa*) caused serious local damage to big sagebrush near Kamloops, British Columbia. This insect has not been reported in California. Ritcher<sup>7</sup> also found small numbers of another species of moth which has not yet been determined.

Sagebrush is commonly infested by dipterous galls of various shapes. Felt<sup>8</sup> reports the following species on sagebrush: *Rhopalomyia tridentatae* Rübsaamen, *R. navasi* Travares, *R. ampullaria* Felt, *Diarthronomyia occidentalis* Felt, *D. artemisiae* Felt, and *Cecidomyia* sp. Fronk et al.<sup>9</sup> report four additional species from Wyoming: *Metatephritis fenestrata* Foote, *Eutreta diana* Osten Sacken, *Phytophaga* sp., and *Asphondylia* sp. These gall insects are believed to cause no serious damage.

### TREND OF INFESTATION

In plots established by the Pacific Southwest Station in the Devil's Garden Interstate Deer Range in northern California, 47 percent of the plants were infested in 1963, and 97 percent in 1964. Twelve percent of the plants were dead in 1963, and 33 percent were dead in 1964.

A similar analysis of plots in the Likely area south of Alturas showed that plants infested dropped from 91 percent in 1963 to 6 percent in 1964. Twelve percent of the plants in this area were dead in 1963. Mortality increased to 91 percent in 1964 as a result of the very high degree of infestation the previous year. From the high level of the 1964 infestation, and our experience in the Likely area, I expect that sagebrush mortality will exceed 90 percent in Devil's Garden in 1965.

In general the population sampling plots showed that the heaviest current defoliation occurred in the Alturas and Devil's Garden areas, in Modoc County, California. The Oregon plots showed light to medium defoliation. And defoliation in the Nevada plots was generally very light.

The outlook for 1965 appears to be as follows:

- In California statewide, a general decline based upon an average adult population of 7 per 10 tips, and an average percent of parasitism of 73. The outbreak is expected to continue at a high level in the Devil's Garden area; such a forecast is based upon an average of 26.7 adults per 10-tip sample and only 50-percent parasitism.
- In southern Oregon, the infestation is expected to decline (average of 4.8 adults per 10-tip sample and 84-percent parasitism).

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<sup>7</sup>Personal communication with Dr. Paul O. Ritcher, Oreg. State Univ., Corvallis. Sept. 1963.

<sup>8</sup>Felt, E.P. Plant galls and gall makers. 364 pp. Ithaca, N.Y.: Comstock Pub. Co. 1940.

<sup>9</sup>Fronk, W. D., Beetle, A. A., and Fullerton, D. G. Dipterous galls on the *Artemisia tridentata* complex and insects associated with them. Ann. Ent. Soc. Amer. 57(5): 575-577. 1964.

° In western Nevada, the infestation is expected to continue to decline and should be at a low level; this expectation is based on an average of only 1.5 adults per 10-tip sample, coupled with 90-percent parasitism.

### IMPACT ON SAGEBRUSH RANGES

The most serious impact of the sagebrush defoliator on sagebrush ranges will be in deer and antelope wintering areas. The situation may become critical on the Devil's Garden deer range. Already sagebrush has been killed outright over extensive areas, and more is expected to die as the result of the 1964 defoliation. Unfortunately, no information is available on how many acres of sagebrush have been seriously damaged so far. Such information is urgently needed before a proper evaluation of the situation is possible. Even less information is available on the extent of damage on antelope ranges.

Except for winter game ranges, the over-all impact is not believed to be serious. It is unlikely that the sagebrush defoliator will completely eliminate sagebrush over vast areas. Even where defoliation is complete, a few sagebrush plants will survive to aid in revegetation. Even where sagebrush is seriously damaged, sagebrush mortality is usually spotty--with patches ranging from a few hundred acres to several thousand acres. Because of the many acres of land covered by sagebrush in California and the other Western States, the percentage of the area denuded is relatively small.

In discussing the management implications of the current infestation, Dr. Dillard H. Gates, of Oregon State University, stated: "The over-all effects of the moth have tremendous range improvement and management implications. The sagebrush kill (by Aroga) appears to be equivalent to a \$75,000 spray job, but the full effects of the insect cannot be accurately determined as yet. If the 'kill' is permanent, then those concerned with range improvement should be planning to take advantage of a favorable situation."<sup>10</sup> While this may be a favorable situation in so far as the cattlemen are concerned, it may develop into a disastrous situation for the game manager.

### NEEDS FOR FURTHER RESEARCH

Henry<sup>4</sup> has adequately investigated most of the important aspects of the biology of the sagebrush defoliator, but his information is still unpublished. This note generally confirms Henry's findings, except on the overwintering stage of A. websteri; I had extreme difficulty in finding the first-instar larvae in mined leaves during the late fall and winter. Possibly larvae overwinter in places other than mined leaves.

This study established differences in the effects of defoliation in different geographical locations. Questions remain of the effect of available soil moisture, plant vigor, age of plant, species of sagebrush,

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<sup>10</sup> Anonymous. Science's newest sagebrush removal weapon--the moth. West. Livestock Jour. 41(57): 78-79. 1963.

exposure, elevation, and other ecological factors on mortality or damage resulting from defoliation.

Different degrees of regrowth after defoliation were discovered but not investigated during the current study. The reasons for these differences should be investigated.

An important aspect of mortality in sagebrush caused by the defoliator is the species of plants which replace sagebrush. Limited evidence shows that most of the succeeding plants are species with much lower palatability or utilization than the original sagebrush. Another problem is the length of time that elapses before the sagebrush again returns as a climax type.

The only phases of Aroga population dynamics investigated in the current study were limited population sampling of the insect in the final developmental stages and some of its parasites and predators. Under the conditions of the study, the effect of predation was not identifiable; it may be important. We need to study more closely the earlier developmental stages of both Aroga and the predator. Further research should include a study of all factors expected to influence population trends, and a study of all stages of the insect.

In several instances the insect population was dramatically reduced the year after complete defoliation of sagebrush in local areas. There was evidence that high populations of adults emerged in the year of heavy defoliation, yet practically no defoliation was noted the following year. This phenomenon cannot be explained on the basis of parasites or predators. Possibly not enough live leaves remained in the heavily defoliated areas for the overwintering larvae; this should be investigated in further studies.

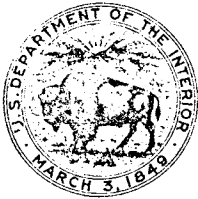
This study clearly demonstrated that the associated sagebrush leaf miner (Bucculatrix) contributed to the over-all defoliation in many areas. In a few areas the leaf miner by itself caused more than 90 percent defoliation. Further studies should be made to evaluate the importance of this insect.

Practically nothing is known about the loss in carrying capacity of a range where high sagebrush mortality occurred. This damage occurs suddenly and is expected to have a drastic effect in local areas, particularly on deer and antelope winter ranges. This is one of the most important problems facing the game manager.

Finally the sagebrush defoliator is definitely a sagebrush killer. Under natural conditions, it frequently is as effective as chemical sprays in the elimination of sagebrush. This insect possibly could be substituted for chemical sprays in the biological control of sagebrush where range management practices call for the elimination of sagebrush. This possibility appears to offer a fruitful area for further study.

The Author

RALPH C. HALL was formerly on the forest insect research staff of the Pacific Southwest Station. A 1925 forestry graduate of the New York State College of Forestry (Syracuse), he also holds a master of forestry degree from Harvard University (1927), and a doctorate from the University of Michigan (1931).



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
UTAH STATE OFFICE  
Post Office Box No. 11505  
Salt Lake City, Ut. 84111

IN REPLY REFER TO:  
1781

*W*  
*12/22*

*300*

December 17, 1970

Memorandum

To: Director W-300  
From: State Director, Utah  
Subject: Services of Gus Hormay

The Utah Cattlemen's Association is planning its December 1971 annual convention program. They have asked if arrangements can be made for Gus Hormay to speak at their session concerning rest rotation management systems as one of their key speakers.

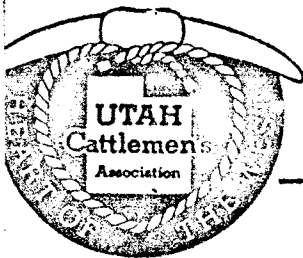
The Cattlemen's Association in Utah is very aggressive in employing new technology to ranch management, and generally Gus' program has "caught on" in many areas.

I would recommend that if at all possible Gus be made available for this presentation. I would suggest that Gus contact Sherm Harmer direct. I am enclosing Sherm's letter to me dated December 15, 1970, in this reference.

Att.

*R.D. Nelson*

cc: Sherman D. Harmer  
Utah Cattlemen's Assn.



# Utah Cattlemen's Association

Publishers of The Utah Cattleman

UTAH CATTLEMAN

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Secretary Manager  
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December 15, 1970

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Mr. Robert D. Nielson  
P.O. Box 11505  
Salt Lake City, Utah 84111

Dear Bob:

The Utah Cattlemen's Association is very interested in obtaining Guss Hormay for our 1971 annual convention to be held in Salt Lake City on December 3-4, 1971.

It was thought with all the information and slides he has available, we would give him time on the program in the morning of both days of the convention.

Anything you can do regarding his attendance at the convention will certainly be appreciated.

Very best regards,  
UTAH CATTLEMEN'S ASSOCIATION

  
Sherman D. Harmer  
Secretary-Manager

SDH/sd



## United States Department of the Interior

4112 (330)

BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240P. O. Box 245  
Berkeley, Ca. 94701

December 20, 1971

## Memorandum

To: (Rest-rotation trainees)

From: A. L. Hormay, Range Conservationist, Berkeley

Subject: Rest-rotation Grazing Management Training

Replies to my memorandum of October 21, 1971 indicate that all of you favor holding the next training session in Monticello, Utah. Here we will deal with the East League Allotment worked on by Sheridan Hansen and Melvin Wilhelm. Sheridan suggested the dates of January 18-20, 1972 for the session. Apparently all of you can meet these dates.

Please contact Sheridan about motel reservations soon. I am asking him to write you about the location of the meeting place, and travel arrangements, if any, to Monticello.

I suggest we concentrate on the plan and results in the sessions dealing with practice allotments -- East League, Hill Camp, Mustang, and Oil Shale -- and leave review of basics until later. Such a review will be more meaningful after you have dealt with a variety of situations. I believe we can complete discussions of practice allotments in 2 days -- one in the field and one in the office.

I have tentatively set the dates for the rest of the practice allotment meetings:

Mustang	Las Vegas District	Nevada	April 4-5
Hill Camp	Lake View District	Oregon	May 30-31
Oil Shale	Grand Junction District	Colorado	June 20-21

These are about the only dates I have open the remainder of the fiscal year. I hope they are satisfactory to you.

We will discuss future scheduling and direction of the training program further in Monticello.

*A. L. Hormay*

Note to Sheridan Hansen: Please reserve a single room for me for January 17, 18, and 19.

ALH



IN REPLY REFER TO

# United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
District Office  
Box B  
Malta, Montana 59538

December 21, 1971

Mr. Gus Hormay  
P. O. Box 245  
Berkeley, California 94701

Dear Mr. Hormay:

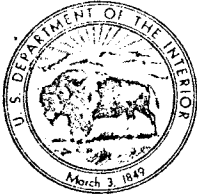
What were the results of the questionnaire we completed for you last summer?

May we have a copy of the results (and the correct answers) to satisfy our curiosity.

Sincerely yours,

Dante Solari, District Manager

  
Acting



# United States Department of the Interior

IN REPLY REFER TO  
4112.15 (D-330)

BUREAU OF LAND MANAGEMENT  
Denver Service Center  
Denver Federal Center, Building 50  
Denver, Colorado 80225

December 21, 1971

## Memorandum

To: Director (330)

From: Chief, Division of S&T, DSC

Subject: Instruction Memos Billings District Office - #BDO 10, Montana State Office 71-17, and Memo to Billings DM Concerning Rancher Flexibility in Grazing Management.

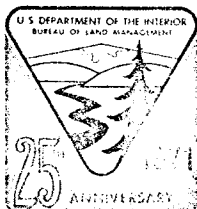
Subject memos (copies enclosed) have been reviewed by our Range and Wildlife staffs. We are concerned about various individual items discussed in the memos as well as possible results of their combined effects.

Our overall impression of the three memos is that their primary emphasis is on livestock production with little concern for other resource values. They stress almost complete control by the rancher of opening and closing dates and numbers of livestock. They would lead to AMPs which provide very few guidelines to the rancher. The BDO-10 memo makes no mention of other resource uses or that livestock may, in some cases, need to be constrained within limits set by the necessity to consider other resource values. Instruction Memo MSO 70-4 is equally as narrow in its language.

Instruction Memo MSO 71-17 to all Montana DM's explains that Memo BDO-10 offers excellent direction and procedures to use in developing and supervising AMPs. At the same time it stresses that other resources may require certain constraints to be placed upon livestock grazing. These two appear to be contradictory. The State Director's October 14 memo to the Billings DM commends him for his memo and states that it is being sent to other Districts to be used as a guide. It also states that exceptions to the given policy are well covered. We can find no instance where mention is made that other uses on the land might place constraints on livestock use.

Our comments on specific items covered in the BDO-10 and MSO 70-4 memos are as follows:

"All grazing systems will be developed using rest-rotation principles---." We would not quarrel with the soundness of rest-rotation principles if we had as complete control over wildlife as we presume to have over livestock. We are extremely concerned with mis-application of rest-rotation systems





resulting from actions presumably based upon ideas similar to those contained in the above quoted directive. Rest-rotation systems are being accepted as the panacea. We are aware of too many instances where rest-rotation systems as designed and implemented will rapidly eliminate browse and replace it with grass even where browse is in a weakened condition and grass is prospering under existing livestock use regimes. Where deer, or other big game, use browse every winter and grass use during the growing season is managed under rest-rotation principles, the browse is bound to suffer.

Too often our field managers try to restrict the application of rest-rotation to a preconceived set of rules, i.e. everything is three pastures or four pastures or we always need a trampling treatment at grass seed ripe time, grass is always the key species, grass is the only good watershed cover, etc.

By virtue of Manual 4112.16, we recognize the existence of more than one grazing system. By virtue of being a multiple use agency, we recognize the value of growth forms other than grass.

"The rancher may commence grazing - - - at his discretion." It is true that under good grazing management the term "range readiness" may have little usefulness. Where grass is provided rest during the growing season following spring grazing, grass plants are allowed the opportunity to recover. However, complete control vested in the rancher leaves the resource manager no options. A normal season of use should be specified and limits of flexibility documented. Natural conditions during any one year may suggest a prudent man delay grazing, for instance, a late spring and melting snow resulting in saturated soils easily damaged by trampling, or plant stress caused by drought.

Too many cattle too early in the season is forcing use of browse (even of low sage-Arar) on critical deer winter ranges. This is the exact season of the year shown by research to be most harmful to browse vigor. Additionally, the generally harmful effects of unrestricted heavy spring use of grass are well documented by scores of research studies made over a period of many years.

"The rancher may remove his cattle in the fall at his discretion." This may be even more critical than the date grazing begins in the spring. We can visualize a variety of reasons the resource manager would want to retain some control over livestock removal in the fall. If the area happens to be important or vital to wildlife, especially big game animals, during the winter, the resource manager may feel that late fall use causes too much direct competition for browse. MSO 71-17 states that fall use limits waterfowl production. A drought caused feed shortage may require early livestock removal. Soil instability may require a lower limit on forage removal.

Proposed changes in the grazing regulations stress that flexibility be documented in the AMP. This includes definition of limits and appropriate action to be taken if these limits are exceeded. Giving a rancher an open ticket is not consistent with this requirement.

"The rancher may run as many cattle as he wants." If he runs out of feed he must remove the stock. Theoretically, this would set a limit on the rancher. But the question is raised, when is the feed gone, how much forage can be removed? Who decides? In the semi-arid west where we are subject to torrential thunder showers, how much vegetation is required to keep soil losses to a minimum? How much trampling can the soil take? Too often resource managers are sympathetic to cries of "no where to go, or I'll have to sell my stock." Some limit should be spelled out in the plan and placed within the control of the land owner (BLM).

"Billing after the fact will be used in all AMPs." How strict is the requirement that this not apply to Section 15 lands? If billing can be changed throughout the life of the permit, then why not grazing capacity or season of use? Shouldn't billing after the fact be discretionary depending upon the integrity of the rancher to provide accurate actual use data?

The points we have raised may leave a question in the public mind of our ability to manage ranges for a variety of resource uses, not just livestock, under the Montana instructions. We question how the resource manager could require a rancher to change his operations based on BLM studies and evaluations showing that resource objectives are not being met or that additional objectives are required. Ambiguous statements or complete control vested with the rancher may make it impossible for the resource manager to require changes in his operation.

Perhaps the most serious overall consideration concerns the possible effect of this type of instruction upon the various conservation and wildlife groups strongly interested in the Federal range lands. Secretary Morton's remarks at BLM's Silver Anniversary, on the nationwide concern for public lands, well illustrates this point. BLM has from the very beginning had to constantly counter the charges of being a stockman's agency with neither the ability or desire to promote multiple use and protection of public lands. We believe an instruction of this kind will be taken in the context of "Suspicious Confirmed," by many groups with a consequent highly adverse criticism of our role as managers of the nation's real estate and its many related values.

Enclosures (4)

- Encl. 1 - Memo to DM-Billings
- Encl. 2 - Instruction Memo MSO 71-17
- Encl. 3 - Instruction Memo BDO 10
- Encl. 4 - Instruction Memo MSO 70-4





# United States Department of the Interior

BUREAU OF LAND MANAGEMENT

STATE OFFICE  
316 NORTH 26TH STREET  
BILLINGS, MONTANA 59101

IN REPLY REFER TO

930: 4112.15

OCT 14 1971

## Memorandum

To: District Manager - Billings

From: State Director - Montana

Subject: Allotment Management Plans Procedures -  
Instruction Memo BDO-10

We commend you on taking the lead in establishing a definite district policy pertaining to the AMP program. You have covered the horizon well. Under this type of leadership district personnel will be able to concentrate on accomplishing the job in the field. We are taking the liberty of sending copies to other districts in Montana and to the range staff in Washington.

Your recognition of the fact that exceptions to this policy may occur is covered well. As our understanding of various grazing formulas grows, we can utilize this knowledge to accomplish resource objectives.

*Ed Bradley*



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

IN REPLY REFER TO:

930: 4112.15

STATE OFFICE  
316 NORTH 26TH STREET  
BILLINGS, MONTANA 59101

OCT 13 1971

Instruction Memorandum MSO 71-17  
Expires 12/31/72

To: District Managers - Montana  
From: State Director - Montana  
Subject: Clarification of Montana State Office Policy on  
Flexibility in Allotment Management Plans

We are enclosing an instruction memo from the Billings District office establishing guidelines for development and supervision of AMP's. The memorandum gives district personnel excellent direction and procedures to use.

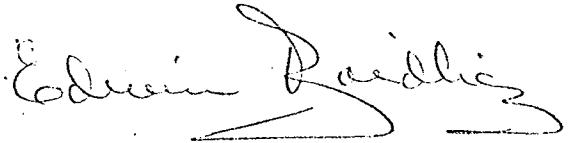
The intent of Instruction Memorandum MSO 70-4, "Montana State Office Policy on Flexibility in Allotment Management Plans," has generated considerable discussion among resource managers. The primary intent of the memorandum was to give the field offices sufficient latitude in the AMP program to meet human and natural resource needs.

We impress upon you that there is no substitute for a well-designed grazing formula. The formula should be designed to accomplish resource objectives. Flexibility concerning numbers should have little or no effect if the formula is followed. When writing resource formulas, rely upon past experiences and observations, quantitative studies on established AMP's and recognized research where available. *Reasonable Flexibility*

Each AMP area contains certain resource values that are unique and require a certain management approach. High values in disciplines other than range may dictate the need to define the limits of flexibility. For example, waterfowl production in northeastern Montana is important nationally; therefore, waterfowl habitat should be an important consideration in allotment management planning. From research on rest-rotation grazing and waterfowl production, the data suggests that production was highest on pastures receiving fall deferment and complete rest the previous

grazing season. Therefore, it may be beneficial to close gates on certain pastures to allow sufficient nesting cover the following year. Inside specialized areas, such as wildlife ranges where the primary objective is wildlife production, maximum allowable AUM's harvested may need to be defined. Other examples could be cited.

In the final analysis, the responsibility lies with the resource manager to decide how livestock in a given AMP area will be manipulated to accomplish management objectives.

A handwritten signature in cursive script, reading "Edwin Radlitz". The signature is written in dark ink and is positioned to the right of the main text block.

Enclosure - 1

Encl. 1-Inst. Memo BDO-10

Billings District Office  
P.O. Box 2020  
Billings, Montana 59103

Instruction Memorandum #BDO 10  
Expires: 6/30/72

September 21, 1971

To: Billings District Employees  
From: District Manager, Billings  
Subject: Billings District AMP Procedures

I hereby establish the following guidelines for AMP's in the Billings District.

1. (A) All grazing systems will be developed using rest-rotation principles of grazing management.

\* \* The rancher may commence grazing in the early use pasture in the spring at his discretion. Therefore, the initial turn in date should not be a fixed date in the AMP.

The rancher may run as many cattle as he wants. Therefore, the number of livestock should not be a fixed number in the AMP.

The rancher may use the pastures in whatever fashion he pleases once the gates have been opened (after the authorized opening date). He can move the cattle and close the gates if he prefers, but the plan should not require such action. If you are concerned about getting enough trampling of seed, bringing in additional stock is just as effective as moving the existing stock.

The rancher may remove his cattle in the fall at his discretion. Therefore, the removal date should not be a fixed date in the AMP.

The significant controls in a rest-rotation grazing system are the points in time that the second and succeeding pastures are opened to use, plus assurance that no use is made in the rest pasture.

A number of cattle should be specified in the AMP as the normal operation. This number should correspond to the active Range Property Qualifications. But, it should be clearly stated that this number is not a limitation on how many cattle the rancher actually grazes. The AMP will include the statement that variations in actual use above or below the active base

Yes - how  
can these  
statements  
be reconciled?

Property Qualification level will not modify the Qualifications.

The "Steading Haystack" in the rest pasture can be made available to the rancher upon special request, and in the event of a serious drought. But the need for this should be infrequent and authorization based upon special request to the A.M.

The option for billing totally at the end of the grazing season will be used in all AMP's. Before each grazing season, each rancher will be sent a letter reminding him that this billing procedure is being used; as well as his obligation to keep and promptly submit accurate actual use records at the end of the season from which we will process his billing. Along with this reminder enclose a sketch of the pastures to remind him which pasture is rented, which is used first, and the opening dates of the succeeding pastures for that particular year.

\*per 3  
11 page 1  
Include the statement in each AMP that the requirement for an annual grazing application is waived and not necessary to protect the Base Property Qualifications as specified in the Federal Range Code.

Allotments that are grazed in common need some special arrangements to assure coordination and self-governing by the groups of ranchers involved. If only two or three ranchers are involved, one of them should be designated as the leader to coordinate the numbers of stock that will be turned out each year, and notify the Area Manager of the numbers prior to turn out. The point of concern is not so much how many will be turned out, as it is making assurance that the pro rata shares have been coordinated in advance. Larger groups of ranchers may be handled similarly, or they may require formation of an Association of Stockmen to carry out these self-governing responsibilities. In any event, I urge that every attempt be made to stimulate self-governing in Common Allotments in order for them to take full advantage of, but at the same time efficiently coordinate, the degree of flexibility described in this rule.

I urge you to visit with each rancher periodically during the grazing season to record the actual use data up to that point in time. This will serve the dual purpose of increasing the accuracy of the actual use records, plus maintaining a constant contact with the rancher to help detect problems at an early stage. The actual use data that is most important is the number of stock grazed from beginning to end in a grazing system, plus the dates the various pasture gates are opened. If the rancher elects to leave his creek and shut the gates, then the related actual use information is desirable.

At the end of each grazing season, prepare a report to the AMP studies file describing how effectively the plan is operating. Include observations and ideas of the plan as well as problems. Interview the rancher(s) to get their input into this rule.

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As a prerequisite to granting the degree of flexibility described in this memo, it is essential that you make considerable effort to educate the rancher to the principles of rest-rotation pertinent to his grazing system, as well as his related responsibility. His responsibility is most importantly the use of careful judgement to stock the pastures in a manner so as to avoid running out of feed before the succeeding pastures are scheduled to be opened. I can't overemphasize this point. If the rancher is to be granted the latitude to exercise this high degree of judgement, he must be fully cognizant of the responsibility that accompanies such discretion.

I fully recognize that under certain circumstances all rules may have exceptions, including the guidelines contained herein. My intent is to establish the contents of this memo as the ground rules for the Billings District; but recognizing that exceptions can be in order occasionally, I leave the door open and ask that you clear with me when you feel exceptions should be considered.

All existing AMP's will be modified to reflect the contents of this memo by December 31, 1972. I wish to have a joint discussion with you and each rancher prior to initialling the modifications generated by this memo and prior to signing any new AMP's.

CRCCleary:ebb

cc: State Director, Montana

W. G. Van Cleary

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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

STATE OFFICE  
316 NORTH 26TH STREET  
BILLINGS, MONTANA 59101

IN REPLY REFER TO:

3: 4112.15

DEC 21 1970

Instruction Memorandum HSO 70-4

Expires 12/31/71

To: District Managers - Montana  
Area Manager - S. Dakota RA

From: State Office - Montana

Subject: Montana State Office Policy on Flexibility in Allotment  
Management Plans

Consistent with the fundamental principles of rest-rotation grazing management, we establish the following policy for flexibility in AMP's which include a rest-rotation grazing system. *or approved by Henry*

The rancher may commence grazing in the first pasture at his discretion. Consequently, the initial turn in date does not have to be specified in the AMP.

The rancher may run as many cattle as he wants. Consequently, the number of stock does not have to be specified in the AMP.

The rancher may use the pastures in whatever fashion he pleases once the gates have been opened. He can move the cattle and close the gates if he prefers, but the AMP does not need to require this. If you are concerned about getting enough trampling to plant seed, bringing in additional stock is just as desirable as moving the existing stock.

The significant variable in a rest-rotation system is the point in time that the second and succeeding pastures are opened to use. It is more relevant to describe these points in time by plant growth stages rather than fixed dates, since growth rates vary from year to year.

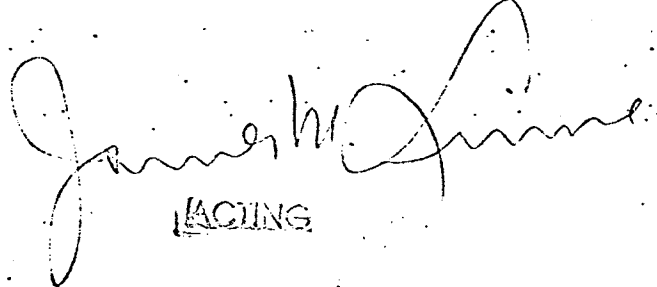
We encourage you to grant this degree of flexibility in all rest-rotation grazing systems. However, along with this grant you need

to fully educate the rancher to the principles of rest-rotation grazing so that he comprehends his related responsibility. The responsibility we refer to is the use of careful judgment to avoid running out of feed in a pasture before the succeeding pasture is scheduled to be opened.

The "Standing Haystack" in the rest pasture is available to him in the event of a serious drought, but this should not be a frequent necessity.

By contrast, the flexibility allowed in any other type of grazing system such as a deferred-rotation will be quite limited and relatively rigid. The reason is the other systems do not have the built-in insurance for seedling establishment and successful reproduction of the more desirable plant species.

In all other types of grazing systems, all opening dates will be specified as well as the number of animals to be grazed. Some flexibility can be granted, but it will be with a specified percentage leeway, either in time or numbers, or a combination of the two.

  
JACING

*Handwritten:*  
Hormay  
File

P. O. Box 245  
Berkeley, Ca. 94701

December 28, 1971

Memorandum

To: George D. Lea, Chief, Division of Range Management (330) Wash., D.C.  
From: A. L. Hormay, Range Conservationist, Berkeley  
Subject: McEuen Allotment and San Simon Watershed, Arizona

Following are my recommendations on management of the above areas:

McEuen Allotment

I see no problems that cannot be resolved with rest-rotation grazing management here. I suggest the allotment be put under a rest-rotation grazing system as quickly as possible using the number of cattle currently grazing on the range. Properly set up and managed, the allotment would be an excellent demonstration area.

Everything considered, a 3-treatment formula appears to fit the allotment best, but a 4-treatment or even a 5-treatment formula may prove to be most practical. Fitting pastures to the terrain and water so management is feasible will require careful planning with the permittee.

San Simon Watershed

Deterioration of the San Simon watershed was caused mainly by mismanagement of livestock grazing. Clearly the first step in rehabilitation of the area is elimination of the cause of damage. This means substituting good grazing management -- rest-rotation grazing -- for poor. Results with rest-rotation grazing on the Murchison Allotment (in the San Simon basin) indicate what may be accomplished with this system. The vegetation cover on that allotment has increased perceptibly in 4 years of management.

The severe erosion in the watershed resulted from thinning of the plant cover by grazing. Vegetation is inadequate not only on areas in the central portion of the basin, but also on areas in the surrounding mountains. A large acreage has been entirely denuded. See photographs.

Proper grazing management and artificial reseeding are urgently needed in the watershed. In many cases, if not most, these measures should be applied simultaneously because of the seriousness of the situation.

Additional structures (dams, water spreaders) probably will be needed to help keep soil within the drainage basin. But construction of these should await indications of vegetation control.

Steps in future action as I see them, therefore, are:

1. Proper grazing management
2. Artificial seeding
3. Structures

Poor land conditions occur throughout the watershed. Federal, state, and private lands are all affected. Concerned agencies and interests include the Bureau, Forest Service, State Lands Department, State Department of Fish and Game, Soil Conservation Service, State University, Extension Service, and stockmen. Solution of the watershed problem depends on a cooperative effort by all these interests. The Bureau administers more than half the land in the basin and should lead the way. Grazing management and seeding could start as soon as funds become available.

Enclosures (5)

December 30, 1970

Memorandum

To: State Director, Utah  
From: Acting Chief, Division of Range  
Subject: Services of Gus Hornay

We agree with your December 17 recommendation regarding attendance by Gus at the Utah Cattlemen's Association Annual Convention.

To assure proper follow-up, we are forwarding copies of your correspondence to Gus for his concurrence and direct reply to the Association.

*1/s/ Carl P. McCuller*

*Mr. Hornay*