

**SURVEY OF GRAZING INTENSITY AND SOIL CONDITIONS
ON THE MONTANA ALLOTMENT, CHILTON RANCH
ARIVACA, ARIZONA: NOVEMBER 6-7, 1998**

by

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November 14, 1998

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Introduction

On October 28, 1998, Dr. Jerry Holechek and Dr. Dee Galt were formally contacted by the Chilton Ranch and Cattle Company regarding a survey of grazing intensity and soil stability on Schumacher, Ruby, Warsaw, Chimenea, and Bolsa pastures on their ranch. These pastures are part of the Montana Allotment under grazing permit issued by the U. S. Forest Service, and are south of Arivaca, Arizona near the Mexican border. The purpose of our survey would be to evaluate grazing intensity on the Montana Allotment using the Anderson and Currier (1973) procedure. We also qualitatively assessed rangeland and soil conditions. Special emphasis was placed on the Schumacher Pasture. This is because the Sonoran Chub, in recent years, has expanded its habitat a few hundred meters north of the Mexican border to the extreme south end of Schumacher Pasture. The degree to which cattle grazing during July through early October, 1998 had impacted vegetation and soils on both upland and riparian portions of Schumacher Pasture where the Sonoran Chub now occurs (California Gulch) would receive particular emphasis in our survey.

We (Holechek and Galt) accepted the assignment. On November 5, we arrived at the Chilton Ranch headquarters. On November 6 and 7 we conducted visual grazing intensity surveys of Schumacher, Ruby, Warsaw, Chimenea, and Bolsa pastures with the aid of Jim and Sue Chilton. Quantitative data on grazing intensity on upland and riparian areas were collected in Schumacher and Ruby Pastures.

Montana Allotment and Chilton Ranch Descriptions

The portion of the Chilton Ranch we surveyed (Montana Allotment) is on the Coronado National Forest in the Nogales Ranger District in the Atascosa/Pajarito mountains, west of Nogales, Arizona. Elevations range from 3,500 feet at the Mexican border to 5,376 feet at the summit of

Montana Peak. Annual precipitation varies from 17 to 22 inches in Schumacher Pasture, 20 - 22 inches in Ruby Pasture, and 16 - 22 inches in Warsaw Pasture. The pattern of precipitation is bimodal with peaks in winter (February) and summer (August) and a dry period in the spring (April through June). We characterize the vegetation as Sonoran Desert Chaparral/Grassland.

Dominant plant species include various live oaks (*Quercus emoryi*, *Quercus oblongifolia*), various cacti (*Ferocactus wislizenii*, *Opuntia engelmannii*, *Fouquieria splendens*), sideoats grama (*Bouteloua curtipendula*), sprucetop grama (*Bouteloua chondrosioides*), plains lovegrass (*Eragrostis intermedia*) and cane beardgrass (*Bothriochloa barbinodis*). In riparian areas, deergrass (*Muhlenbergia rigens*), bullgrass (*Muhlenbergia emersleyi*), and giant sacaton (*Sporobolus wrightii*) are dominant grasses. Plant species diversity is quite high.

Several important game animals are found on the survey pastures. They include white-tailed deer, mule deer, cougar, javelina, Mearns' quail, Gambel's quail, white-winged doves, and mourning doves. The Sonoran Chub and lesser long-nosed bat are threatened/endangered species that apparently use the survey pastures periodically. It should be noted that the three pastures (Schumacher, Ruby, Warsaw) have very high esthetic value and receive high recreational use by campers and hunters.

Mining activity occurs throughout the study pastures, but has had greatest impact in Schumacher Pasture. Here, considerable disturbance of soil has resulted from recent road building activities associated with mining operations. To some extent this has impaired esthetic value of the pasture, has increased erosion potential, and may be a threat to water quality.

Based on information from the Forest Service (File Code 2100), the Montana Allotment (Chimenea, Schumacher, Ruby, and Warsaw Pastures) is permitted for 500 animal units (cow-calf)

for year-long use. The actual number turned out in recent years has varied between 400 and 500 head. The Montana Allotment involves 27,940 acres total with 25,240 acres of National Forest lands and 2,700 acres of lands owned by other entities. An itemization of these lands by pasture along with condition/trend (based on Forest Service surveys) and season of use is given below:

Pasture	Acres (total)	Acres (fall capacity)	Condition/ Trend	Season of use
Schumacher	3,520	2,250	fair/down ¹	Summer/fall
Warsaw	4,140	2,940	good/up	Summer/fall
Ruby	5,900	4,190	good/up	Spring/fall
Ruby Trap	480	340	good/up	Fall
Casa Piedra Holding	40	40	good/up	Not restr.

¹ Our findings do not agree that Schumacher Pasture is fair range condition and in a downward trend. We found it to be in a strong upward trend based on Forest Service surveys.

The amount of capitalization of fences, waters, corrals, and roads is given below:

Improvement type	Units	Quantity
Fences	miles	26 + 1 proposed
Spring Developments	each	2
Earthen dams	each	25
Pipelines	miles	0.5
Cattle guards	each	3
Corrals	each	8
Roads	miles	23

Generally, the Montana Allotment is well watered and adequately capitalized with roads, fences, and corrals for efficient livestock production.

Based on our interview with Mr. Jim Chilton, Hereford-Brahman crossbred cows that are well adapted to local terrain and climate are grazed on the Montana Allotment. These cows are bred to Angus bulls. Calf crops average about 80% and calf weaning weights average 525 pounds. No

supplemental feeding has been used. Mr. Chilton believed his annual calf crops are reduced 5% by predation, primarily from mountain lions.

The Chilton's have owned the Montana Allotment for about 7 years (since 1991). Mr. Jim Chilton grew up on a ranch in Arizona and has had considerable cattle ranching experience. He holds one M.S. degree in economics and another in political science. The Chilton's own an investment banking firm in Los Angeles, CA in addition to their cattle ranch. We found Mrs. Sue Chilton to be extremely knowledgeable on plant taxonomy, local wildlife, and range management.

Grazing management on the Montana Allotment involves a modification of the Santa Rita rest rotation grazing system discussed by Martin (1978). Apparently this system was initiated on the Montana Allotment in the 1989-90 period after a six year period of fence building and water development. Under the system used on the Montana Allotment, Schumacher and Warsaw Pastures receive only summer grazing (4 months) in alternate years. After 4 months of summer grazing, they receive a 20 month rest period. Use in these pastures is about 45% when grazed and when averaged across years is about 23% on estimates in Forest Service reports. Ruby Pasture receives light use in the fall of every year as cattle are drifted through it to winter range (Chimenea Pasture). In late spring Ruby Pasture is grazed again for a total use level of about 45% based on Forest Service reports. Across the entire Montana Allotment, grazing use at the end forage cycle (June) appears to average about 20 - 30% in most years. This is considered to be a light to conservative level of forage use that promotes rangeland improvement (Holechek et al. 1998a).

Range Survey Methods

We were hired to conduct a fall - end of growing season grazing intensity survey on the Montana Allotment and to qualitatively assess soil stability. Our basic approach in conducting the

grazing intensity and soil survey followed Anderson and Currier (1973). Stubble height guidelines from Holechek et al. (1998) were applied. We measured 25 to 50 plants per key area for stubble height. We used 5 classes of grazing use. These included none to light (0-30% use), conservative (31-40% use), moderate (41-50% use), heavy (50-60% use), and severe (over 60% use). Photographs were taken at key areas and various portions of the allotment. Quantitative measurements of stubble heights were taken at 9 locations in Schumacher Pasture and two locations in Ruby Pasture. All portions of Schumacher Pasture were visually evaluated. This involved considerable hiking. The more accessible (by road) parts of the other pastures were ocularly surveyed for grazing use and soil stability. A map was prepared and specific areas were delineated by acres for the various use areas in Schumacher Pasture. We consider our procedures to be highly repeatable by anyone interested in checking our results.

Results

Schumacher Pasture

Schumacher Pasture was the only pasture that received cattle grazing on the Montana Allotment during the July-September period of 1998. It had been rested for the previous 20 months, and is used only in even numbered years. We measured stubble heights on 4 riparian and 5 upland key areas in Schumacher Pasture. We used deergrass as our key species in the riparian zones and sideoats grama as our key species on the uplands.

Average stubble height for deergrass across key areas was 14.3 inches (Table 1). Deergrass stubble heights at all 4 sites were above 12 inches. A minimum stubble height of 12-14 inches is recommended for tall grasses such as deergrass (Holechek et al. 1998). On this basis, none of the riparian key sites were heavily grazed. We considered grazing use on the deergrass to be moderate

or about 45% use.

We qualitatively assessed riparian shrubs for hedging and breakage by livestock and wildlife. We noted light to moderate browsing on some of the shrubs, but observed no hedging. Little breakage from trampling by cattle was noted. Overall, we rated browsing use of riparian shrubs to be conservative.

Cattle bedding grounds were well scattered through the riparian areas and were generally well under an acre in size. Uplands directly above riparian areas generally showed conservative to moderate use. We observed no signs of accelerated erosion in the riparian zones. A good vegetation cover was prevalent on areas above the stream channel.

Across our 5 upland key sites on Schumacher Pasture, stubble height of sideoats grama averaged 8.74 inches (Table 1). A minimum stubble height of 6 to 8 inches is recommended for sideoats grama (Holechek et al. 1998). Sideoats stubble height averaged over 6 inches on all 5 key sites. Generally, we considered grazing use on uplands areas to be somewhere between 30 and 40%.

We observed no accelerated erosion on upland sites in Schumacher Pasture. Water was clear on all the watering points we visited. We rated most portions of the pasture to have fair or good esthetic appearance with one exception. We rated esthetic appearance poor along the first half mile of road at the north end of the pasture.

Our ocular survey showed some definite heavy use areas occur within Schumacher Pasture (Table 2, Figure 1). These areas occur primarily at the north end of the pasture where cattle normally concentrate prior to movement from the pasture in October. Mr. Chilton believes he can solve this problem by constructing a fence around about 40 acres in the Bill Ewings area (along the road). This would permit separate management of this sensitive area.

Overall, we considered forage use in the Schumacher Pasture in 1998 to be about 38%. Across years, this indicates about 19% annual use because the pasture is used every other year. We noted grasshoppers had made considerable use of several grasses and broom snakeweed. The latter part of the summer (August 8 through September) was dry. Therefore, Mr. Chilton began moving cattle out of Schumacher Pasture in early October, which is a month ahead of schedule. Nearly all the cattle were out of the pasture by October 15.

Ruby Pasture

Ruby Pasture is used in spring and fall with non-use periods in winter and summer. The riparian corridor along the road used to trail cattle from Schumacher Pasture to Chimenea Pasture in October of 1998 showed conservative to moderate use (Table 1). Upland areas above the road showed light use. We observed good growth on short grasses and mid grasses at the C-2 key site near Japanese Tank. This key site was considered to be heavily used when we conducted our April grazing intensity survey.

Overall, we considered forage plants on upland and riparian areas in Ruby Pasture to have high vigor. We were impressed with the amount of forage produced by sideoats grama and other mid grasses. We observed no signs of accelerated soil erosion and all water was clear.

In a previous report, we recommended Mr. Chilton move his cattle more rapidly through Ruby Pasture in the fall. He followed this recommendation and it definitely reduced use levels to conservative/light around Japanese Tank and along the trailing corridor (road). The 20 acres heavily grazed along the Ruby Road at the northeast cattle guard entrance to Ruby Pasture in April 1998 showed only light to conservative use in fall 1998 after cattle movement. We rated esthetic appearance good to excellent.

Warsaw Pasture

Warsaw Pasture receives summer/fall grazing (odd numbered years) followed by a 20 month non-use period. It was last used in summer/fall 1997. We noted high vigor of mid-grasses along the road when we drove through the pasture on November 5, 1998. Soil cover was excellent, and no erosion problems were observed. We rated esthetic appearance good to excellent.

Chimenea Pasture

This pasture is grazed every year in winter. Cattle had recently been moved into the pasture, but we observed very little grazing use. We consider this pasture to be in excellent or climax ecological condition. The pasture is dominated by decreaser mid-grasses (sideoats grama, green sprangletop, Texas bluestem, plains lovegrass, tanglehead, etc.) in very high vigor. The riparian vegetation is in excellent health with considerable regeneration of ashes, some Salix spp. and cotton woods with sacaton and deergrass in the bottoms, and various shrubs occurring. No erosion was noted. We estimated forage production at 2,000 lbs/acre on bottom sites. We rated esthetic appearance excellent.

Bolsa Pasture

Bolsa Pasture has not been grazed for the past year. It appeared to be in excellent (climax) ecological condition. It is dominated by decreaser mid-grasses. Sideoats grama is the primary forage species. We estimated forage production in this pasture to be about 1,200 lbs/acre. In the future, Mr. Chilton plans to place 50 head of cattle in this pasture during the even-numbered summers to reduce some of the grazing pressure on Schumacher Pasture. We consider this a sound idea. We saw no sign of erosion in Bolsa Pasture. We rated esthetic appearance excellent.

Wildlife

We observed a wide variety of wildlife when we surveyed Schumacher Pasture. During the course of our survey, we saw 12 Coues white-tailed deer, 2 herds of javelina (about 15 in each herd), several songbirds, ducks at most of the tanks, and a variety of raptors.

Summary

1. Our survey showed soils in Schumacher, Ruby Warsaw, Bolsa, and Chimenea Pastures were stable with no signs of accelerated erosion.
2. Our survey showed overall grazing use of Schumacher Pasture in 1998 to be 38%, or conservative to moderate.
3. Our survey indicated grazing use on riparian grasses in Schumacher Pasture was about 45% or moderate.
4. Our survey showed light to moderate browsing of riparian shrubs in Schumacher Pasture. We observed no hedging and little breakage of shrub stems by cattle.
5. Our survey showed mid-grasses on upland areas received about 30-40% use.
6. Our survey showed only light to conservative use of forage plants along the trailing corridor in Ruby pasture. Mr. Chilton moved cattle more rapidly through Ruby Pasture this fall. This has been effective in eliminating the heavy use that occurred in a few small areas last year.
7. We found water quality to be good in all pastures. All streams and tanks had clear water with no signs of pollution.
8. We considered vegetation vigor on Chimenea, Bolsa, Warsaw, and Ruby Pastures to be excellent. These pastures are ranked excellent in esthetic quality.
9. Jim and Sue Chilton are information oriented ranchers, as discussed by Holechek et al.

(1998b). They are willing to make adjustments in their management as they gain more information and whenever environmental conditions change. They are willing to fence 40 acres at the north end of Schumacher Pasture to better control grazing. They are willing to put 50 head of cattle in Bolsa Pasture during even-numbered summers to reduce grazing pressure on Schumacher Pasture.

10. Our surveys indicate the Chiltons, in most years, only use about 20-25% of the forage resources on the Montana Allotment. In future years, some of the cattle (about 100-150 head) could be scattered over other pastures during the summer. This would have little effect on vegetation in these pastures (Warsaw, Bolsa, Ruby) and should improve the esthetic appearance of Schumacher Pasture when it is grazed.
11. In our opinion, livestock grazing as presently practiced is having no negative effects on the Sonoran Chub and may be positively improving vegetation on the Montana Allotment.
12. We consider range management on the Montana Allotment to be excellent. High amounts of forage were present on 90% of the Allotment in our Fall 1998 survey. Our April 1998 survey of the Montana Allotment also showed light to conservative overall use (Table 3). Even in Schumacher Pasture, we found large areas that had received light to conservative grazing in the eastern part. We rate overall esthetic quality of the Montana Allotment excellent. We made the same observation when we conducted our spring survey of the Montana Allotment in April 1998.
13. We strongly believe that reduction in the grazing permit for the Montana Allotment, to protect endangered species and other ecological values, is completely unnecessary.

Table 1. Stubble heights on key species by pasture and by site on the Montana Allotment, California Gulch, Arivica, Arizona, on November 6 and 7, 1998.

Pasture	Key Site	Site	Key Species	Average Stubble Height (in inches)
Schumacher	Riparian - Schumacher Wash	1	Deergrass	14.4
Schumacher	Riparian - SW Corner Schumacher Wash	4	Deergrass	16.0
Schumacher	Riparian Vernon Dale	5	Deergrass	13.1
Schumacher	Riparian Ralph Griffen	6	Deergrass	13.7
Schumacher	Upland SW Corner	2	Sideoats grama	6.6
Schumacher	Upland Hidden Tank	3	Sideoats grama	11.4
Schumacher	Upland Southcentral	7	Sideoats grama	7.4
Schumacher	Upland NE Corner Mujeres Tank	8	Sideoats grama	9.0
Schumacher	Upland East Cental Alto Site	9	Sideoats grama	9.3
Ruby	Upland C2 Transect above Japanese Tank	10	Curly mesquite	2.1
Ruby	Riparian Above Marijuana Flat	11	Deergrass	12.8

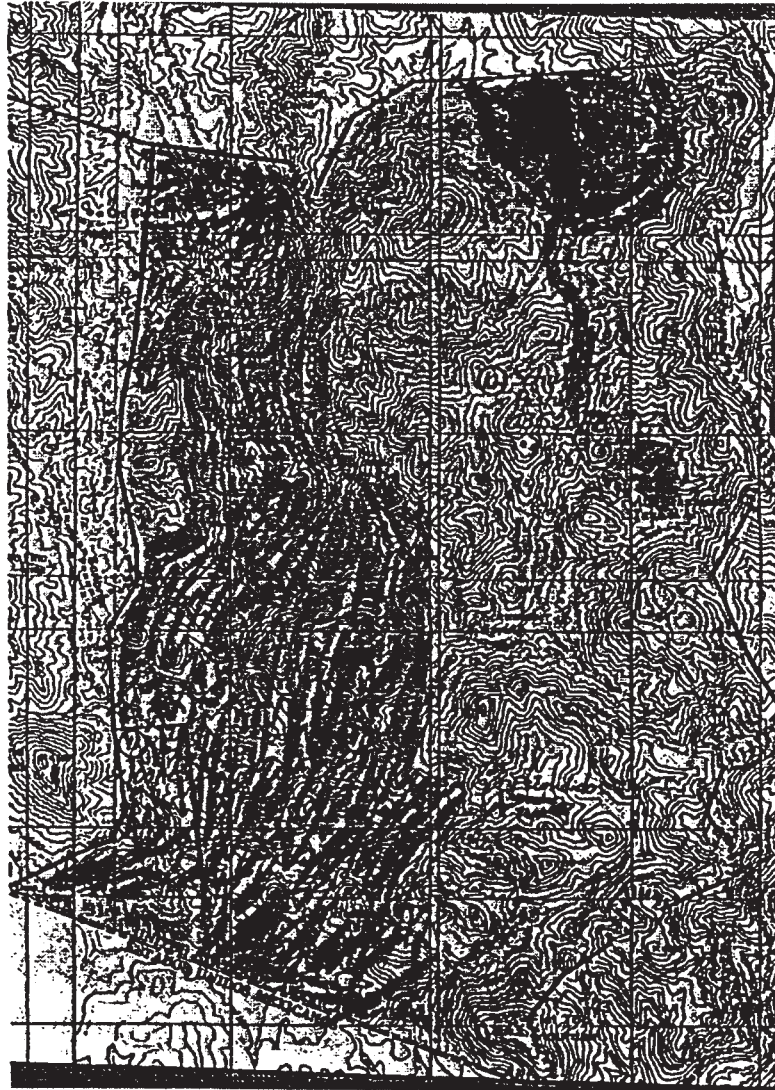
Table 2. Acreage of heavy, moderate, conservative, and light use of forage by cattle in Schumacher Pasture, Nov. 6-7, 1998.

Use of Forage	Acres	% of Pasture
Heavy	300	8.52
Moderate	1,710	48.58
Conservative	280	7.75
Light	1,230	34.94

Table 3. Grazing use on Montana Allotment Pastures in April 10-11 and November 6-7, 1998 grazing intensity surveys.¹

Pasture	Date	Overall Grazing Use	Grazing Use	
			Upland	Riparian
Schumacher	April	Unused	Unused	Unused
Ruby	April	Light - 15-20%	Light	Moderate
Warsaw	April	Moderate - 45%	Conservative- Moderate	Heavy- Moderate
Bolsa	April	Not evaluated		
Chimenea	April	Not evaluated		
Schumacher	November	Conservative- Moderate	Conservative	Moderate
Ruby	November	Light - 5%	Very Light	Conservative
Warsaw	November	Unused	Unused	Unused
Bolsa	November	Unused	Unused	Unused
Chimenea	November	Very Light 1-3%	Very Light	Light

¹ Survey conducted by Jerry Holechek and Dee Galt.



Red = 50 - 60% Use
Yellow = 30 - 40% Use

Blue = 40 - 50% Use
Green = 0 - 30% Use

Figure 1. Map of grazing use zones on Schumacher Pasture of the Montana Allotment, November 7, 1998