

**SURVEY OF GRAZING INTENSITY AND SOIL CONDITIONS ON THE
MONTANA ALLOTMENT, CHILTON RANCH, ARIVACA, ARIZONA,
SEPTEMBER 27 – 29, 2001**

By

Jerry L. Holechek, Ph. D.¹

And

Dee Galt, Ph. D.²

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¹Authors are private Range Consultants, Las Cruces, NM. Address: Jerry L. Holechek, 2328 Terrace Court, Las Cruces, NM 88001. ²Dee Galt, 3000 Devendale Drive, Las Cruces, NM 88005.

Summary

1. Forage utilization in Warsaw Pasture was 31%.
2. Forage utilization across the entire Montana Allotment in 2001 was 20%. Grazing use in Chimenea Pasture was 25%, Ruby Pasture grazing use was 26%, and Schumacher Pasture was rested.
3. We rate watershed health on the Montana Allotment to be excellent. We observed no signs of accelerated erosion due to cattle grazing. Water has always been clear in creeks and ponds on our seven surveys of Montana Allotment beginning in April 1998.
4. We rate esthetic and wildlife values excellent on the Montana Allotment. High amounts of perennial grass cover exist in all pastures for Mearns quail.
5. During the past four years (1998, 1999, 2000, 2001) forage use across the Montana Allotment has consistently been about 25% or light.

Introduction

On September 11, 2001, Dr. Jerry Holechek and Dr. Dee Galt were formally contacted by the Chilton Ranch and Cattle Company regarding a survey of range conditions 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 primary purpose of our survey would be to evaluate grazing intensity on the Warsaw Pasture within the Montana Allotment using the Holechek and Galt (2000) procedure. We also were requested to assess rangeland and soil conditions across the allotment.

We (Holechek and Galt) accepted the assignment. On September 26, we arrived at the Chilton Ranch headquarters. On September 27-29 we conducted surveys of Warsaw, Chimenea, Bolsa and Schumacher pastures with the aid of Jim and Sue Chilton. Quantitative data on grazing intensity were collected in Warsaw Pasture. This is our seventh survey of grazing intensity and rangeland and soil conditions on the Montana Allotment. Others were conducted in spring 1998, autumn 1998, spring 1999, autumn 1999, spring 2000, and autumn 2000.

Montana Allotment and Chilton Ranch Description

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. This portion of the ranch includes Schumacher, Ruby, Ruby Trap, Warsaw, Chimenea and Bolsa pastures and excludes the Lake, House, Yellow Jacket and Mare pastures. Elevations range from 3,500 feet at the Mexican border to 5,376 feet at the summit of Montana peak. Annual precipitation varies from 17-22 inches in Warsaw pasture.

The pattern of precipitation is bimodal with peaks in winter (February) and summer (August) and a dry period in spring (April through June). Total precipitation in 2001 (Oct. 1, 2000 to Sept. 30, 2001) was about 44% above average (Table 1). Precipitation in 2000 was well below average in July and August, but well above average in October and November. We characterize the vegetation as Sonoran Desert Chaparral/Grassland.

Dominant plant species include various liveoaks (*Quercus emoryi*, *Quercus oblongifolia*) various cacti (*Ferocactus wislizenii*, *Opuntia engelmannii*, *Fouquieria splendens*), plains lovegrass (*Eragrostis intermedia*), sideoats grama (*Bouteloua curtipendula*), cane beardgrass (*Bothriochloa barbinodis*), and tanglehead (*Heteropogon contortus*). 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, Mearn's quail, Gambel's quail, white-winged doves and mourning doves. Most of California Gulch is usually dry during the months of April-June and long reaches are dry most of the year except following periods of heavy rainfall. It should be noted that the three pastures (Schumacher, Ruby, Warsaw) have very high esthetic value and receive considerable 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, Bolsa, Ruby, Ruby Trap, and Warsaw pastures) is now permitted for 400-500 animal units (cow-calf) for year-long use. The actual number turned out in recent years has averaged 490 head. During the summer of 2001, 380 head grazed the Montana Allotment. The Montana Allotment involves 21,430 acres with 11,550 suitable acres after correction for slope and distance from water using Holechek (2001) procedures.

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

Hereford-Brahman crossbred cows, that are well adapted to local terrain and climate, are grazed on the Montana Allotment. These cows are bred to Red Angus bulls. Calf crops average about 80% and calf weaning weight average 525 pounds. No supplemental feeding has been used. Annual calf crops are reduced 5% by predication, primarily from mountain lions.

The Chiltons have owned the Montana Allotment for over 10 years (since April 1991). Mr. Jim Chilton grew up on a ranch in Arizona and has had considerable cattle ranching experience. He holds a M.S. degree in economics and another in political science. Mrs. Sue Chilton currently serves as State Game and Fish Commissioner. Grazing management on the Montana Allotment involves a modification of the Santa Rita rest rotation grazing system discussed by Martin (1978). 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 a four month summer grazing; followed by a 20 month rest period. Ruby pasture receives light use in the fall of every year as cattle are drifted through it to winter range (Chimenea pasture).

Ruby pasture is grazed again in the spring of each year. Chimenea pasture is grazed every year from October to mid April.

Methodology

We closely followed procedures of Holechek and Galt (2000) in our grazing intensity survey of Warsaw Pasture. This procedure involves averaging grazing intensity estimates from cages, visual appearance, and stubble heights to determine percent forage use at each key area.

Three key sites were carefully selected by Forest Service range personnel for representative features in Warsaw Pasture. We consider these key areas to be well located. We used the Forest Service key areas plus 17 additional sample points. These plots were systematically selected. All production data were converted to a dry matter basis.

We measured 25 systematically selected plants at 10 key areas for stubble height. The average stubble height was converted to percent forage use using charts in Holechek and Galt (2000).

Duane Thwaits and Mark Hocken, Forest Service range conservationists, worked closely with us on the grazing intensity survey of Warsaw Pasture on September 27, 2001. Larry Allen, retired Forest Service range conservationist, also helped with the survey.

Results and Discussion

Warsaw Pasture

Various indicators of grazing intensity on the 3 key areas on Warsaw Pasture are summarized in Table 2. A graphic display of grazing intensity across Warsaw Pasture is shown in Figure 1. Our ocular estimates, quantitative indicators and map of use zones are consistent in showing grazing use of Warsaw Pasture to be 31% or conservative. Actual

grazing use from the 3 Forest Service key areas averaged 19% (0, 52, 5%). Midgrasses were conservatively used (33%) while shortgrasses were lightly used (24%) based on stubble heights. About 14% (635 acres) of Warsaw Pasture was heavily used, 24% (1,070 acres) was moderately used, 12% (561 acres) was conservatively used and 50% (2,264 acres) was lightly used. Overall the proportion of the area heavily used (14%) was well below the limit of 33% suggested by Holechek et al. (2001).

Overall we estimated riparian grasses, particularly deergrass, to be conservatively used (35%). Generally riparian shrubs were unbrowsed or lightly browsed. We did note some heavy use areas in the Nogalito Spring and Warsaw Tank areas in the northwestern part of the pasture.

Suitable habitat for white-tailed deer and Mearns quail are well dispersed through Warsaw Pasture (Figure 1). We observed 12 white-tailed deer and a wide variety of songbirds during our horseback ride through Warsaw Pasture on September 27, 2001.

All water in tanks was clear and we saw no signs of accelerated soil erosion. We consider the area along the road to be better vegetated presently than in autumn 1999 when cattle were previously in the pasture.

The primary problem in Warsaw Pasture in summer 2001 was a lack of livestock water in the northwestern and southwestern portions of the pasture. Nevertheless we commend Mr. Chilton and his cowboys for their intensive herding efforts and minimizing the zone of heavy grazing. This problem did not occur in 1999 and we doubt it will occur in 2003. Controlling access to watering points in the heavy use areas through fencing could be effective in future years if this utilization pattern should continue.

We did note that Mr. Chilton was rapidly moving the cattle out of Warsaw Pasture. The pasture was almost completely destocked by Oct. 8 with 30 head remaining in the pasture. Considerable opportunity for regrowth exists during October and early November. Some regrowth has already occurred from rainfall in early October. We took several photos of Warsaw Pasture during our survey.

Schumacher Pasture

We conducted a roadside inspection of Schumacher Pasture and took several photos on September 28, 2001. We were highly impressed with the vigor of both upland and riparian grasses. We saw no signs of accelerated erosion from livestock grazing and water was clear in all tanks. California Gulch was completely dry and there was no stream flow all summer. Riparian shrubs have shown a rapid increase in recruitment and cover over the past 4 years.

Ruby Pasture

We conducted inspections of Ruby Pasture on September 28 and 29 both by vehicle and on foot. We noted very high vigor of perennial grasses on both upland and riparian areas. It was our observation major increases in mid-grasses occurred in Ruby Pasture at several locations such as Japanese Tank. Water was clear in all tanks and we observed no signs of accelerated erosion due to livestock grazing. We observed 10 white-tailed deer in Ruby Pasture. A Forest Service range personnel (Duane Thwaits) report shows grazing use was light (26%) across Ruby Pasture in spring 2001 (Table 3).

Chimenea Pasture

We conducted a roadside inspection of Chimenea Pasture on September 29, 2001. We noted very high vigor of perennial grasses on both upland and riparian areas. Water was clear in all tanks and we observed no signs of accelerated erosion. This pasture is in near

climax ecological condition and is heavily dominated by midgrasses, particularly sideoats grama. A Forest Service range personnel (Duane Thwaites) report shows grazing use across Chimenea Pasture was light (25%) (Table 3).

Bolsa Pasture

We conducted both roadside and foot inspections of Bolsa Pasture on September 28. We noted very high vigor of perennial grasses in both upland and riparian areas. We observed clear water in all tanks and saw no signs of accelerated erosion. It is our observation this pasture is in a strong upward trend and midgrasses are increasingly replacing shortgrasses on flat areas in the northern part of the pasture.

Summary and Conclusion

In 2001, grazing intensity across the entire Montana Allotment was light averaging 20%. Our intensive quantitative survey of Warsaw Pasture on September 27 and 28, 2001 showed overall grazing use to be 31%. Based on our interviews with Forest Service personnel grazing use in Chimenea Pasture was 25% and Ruby Pasture was 26%. Schumacher Pasture was rested. Precipitation was above average during fall 2000 through mid-summer 2001 (Table 1). However August 2001 precipitation was below average. It is our observation that favorable precipitation and light to conservative grazing resulted in a strong trend towards more midgrasses throughout Montana Allotment during 2001. The Chiltons have demonstrated excellent public land stewardship through their decisions to adjust cattle numbers to water and forage conditions within each pasture and aggressive application of herding practices that keep cattle well distributed. Our grazing intensity surveys on the Montana Allotment now involve four consecutive years (1998 -2001). In all four years

overall grazing intensity across the Montana Allotment has been light (about 25% use of forage) (Table 4).

Literature Cited

Holechek, J.L. and D. Galt. 2000. Grazing Intensity guidelines. *Rangelands* 22 (3): 11-14.

Holechek, J.L., R. Pieper, and C.H. Herbel. 2001. *Range Management Principles and Practices*. 4th Edition. Prentice-Hall. Upper Saddle River, N.J.

Martin, S.C. 1978. The Santa Rita Grazing System. *Proc. Intn'l Rangel. Congr.* 1:573-575.

Table 1. Precipitation (inches) totals by ten year periods and monthly precipitation for 2000 and 2001 for Arivaca, Arizona.

	1956-1959	1960s	1970s	1980s	1990s	2000s
0	-----	19.98	14.28	11.67	22.33	25.05
1	-----	14.48	20.49	17.26	15.26	
2	-----	16.12	15.58	16.67	19.43	
3	-----	15.25	12.77	28.45	27.53	
4	-----	21.13	14.51	27.74	22.63	
5	-----	19.02	11.01	16.87	18.54	
6	8.28	19.31	18.74	16.54	17.30	
7	12.54	20.37	18.68	21.84	16.00	
8	18.67	13.63	24.68	19.83	28.25	
9	<u>16.57</u>	<u>14.51</u>	<u>14.99</u>	<u>11.31</u>	<u>16.35</u>	
\bar{x}	14.10	17.38	16.57	18.82	20.29	25.05

	<u>Monthly Precipitation</u>	
	<u>2000</u>	<u>2001</u>
January	0.00	2.50
February	0.00	0.55
March	1.20	1.55
April	0.00	1.45
May	0.00	0
June	4.75	0.90
July	0.10	5.00
August	6.95	2.10
September	1.15	1.00
October	8.90	----
November	1.75	----
December	0.25	----
Total		

Table 2. Summary of various measures of grazing intensity on 20 location's on Warsaw Pasture, Montana Allotment, Sept. 27-29, 2001.

Production	Actual Use Cages (%)	Shortgrass Stubble Ht. (inches)	Midgrass Stubble Ht. (inches)	Stubble Ht. Use (%)	Ocular Use Estimate (%)	Overall Use (%)
1	-----	-----	-----	-----	52	52
2	-----	-----	-----	-----	20	20
3 *	0	-----	13.20	0	5	2
4 *	52	1.48	-----	52	53	52
5	-----	-----	-----	-----	45	45
6	-----	-----	-----	-----	8	8
7	-----	-----	-----	-----	8	8
8	-----	-----	-----	-----	58	58
9	-----	-----	-----	-----	15	15
10	-----	-----	-----	-----	12	12
11	-----	3.4	-----	6.5	55	60
12	-----	-----	-----	-----	52	52
13	-----	-----	11.20	8	5	6
14	-----	3.70	5.60	34	30	32
15 *	5	2.75	-----	20	5	10
16	-----	-----	-----	-----	55	55
17	-----	-----	6.64	48	42	45
18	-----	-----	6.36	47	45	46
19	-----	-----	6.36	47	45	46
20	-----	1.98	-----	40	45	42
\bar{x}	19	2.66	8.60	34.89	31.35	32.00

* Forest Service Key Areas.

Table 3. Results from grazing use survey's on Chimenea Pasture (April 13, 2000) and Ruby Pasture (June 15, 2001) on the Montana Allotment conducted by Forest Service Personnel¹.

Key Area	<u>Chimenea Pasture</u>		Grazing use %
	Forage Inside Use (lbs/acre)	Forage Outside Use (lbs/acre)	
1. Pancho Tank	1,280	680	37
2. Cedar Canyon	900	710	20
3. Juan Tank East	300	> 255	< 15
4. Juan Tank West	500	> 375	< 25
5. Papago Tank West	1,200	>1,080	< 10
6. Papago Tank South	<u>1,000</u>	<u>600</u>	<u>40</u>
Average	850	617	25

<u>Ruby Pasture</u>			
1. Pico Tank	-----	-----	25-30
2. Japanese Valley	200	15	25

¹Duane Thwaites (Forest Service) supervised data collection and prepared reports (USDA Forest Service, April 16, 2001, June 19, 2001, Fire Code 2210, Nogales Range District).

Table 4. Grazing use on Montana Allotment Pastures 1998, 1999, 2000, and 2001.

1998				
Pasture	Date	Overall Grazing Use	Grazing Use	
			Upland	Riparian
Schumacher	April, November	Conservative- Moderate (30%)	Conservative	Moderate
Ruby	April, November	Light (15%)	Light	Conservative
Warsaw	April, November	Unused (0%)	Unused	Unused
Bolsa	November	Unused (0%)	Unused	Unused
Chimenea	April, November	Moderate (40%)	Conservative	Conservative

1999				
Pasture	Date	Overall Grazing Use	Grazing Use	
			Upland	Riparian
Schumacher	October	Unused (0%)	Unused	Unused
Ruby	March, October	Light (20%)	Light	Light
Warsaw	March, October	Conservative (34%)	Conservative	Conservative
Bolsa	March, October	Unused (0%)	Unused	Unused
Chimenea	March	Light (25%)	Light	Conservative

2000				
Pasture	Date	Overall Grazing Use	Grazing Use	
			Upland	Riparian
Chimenea	February	Conservative (35%)	Conservative	Conservative
Ruby	July	Light (20%)	Light	Light
Schumacher	November	Conservative (37%)	Conservative	Conservative
Bolsa	November	Conservative (39%)	Conservative	Conservative
Warsaw	November	Unused (0%)	Unused	Unused

Table 4. Grazing use on Montana Allotment Pastures in 1998, 1999, 2000, and 2001 cont.

2001				
Pasture	Date	Overall Grazing Use	Grazing Use	
			Upland	Riparian
Schumacher	September	Ungrazed (0%)	Ungrazed	Ungrazed
Ruby	June	Light (26%) ¹	Light	Moderate
Warsaw	September	Conservative (31%)	Light	Moderate
Bolsa	September	Ungrazed (0%)	Ungrazed	Ungrazed
Chimenea	April	Light (25%)	Light	Conservative

¹Forest Service personnel evaluated grazing use.

Green = light Blue = Moderate
Yellow = center fire Red = Idea only

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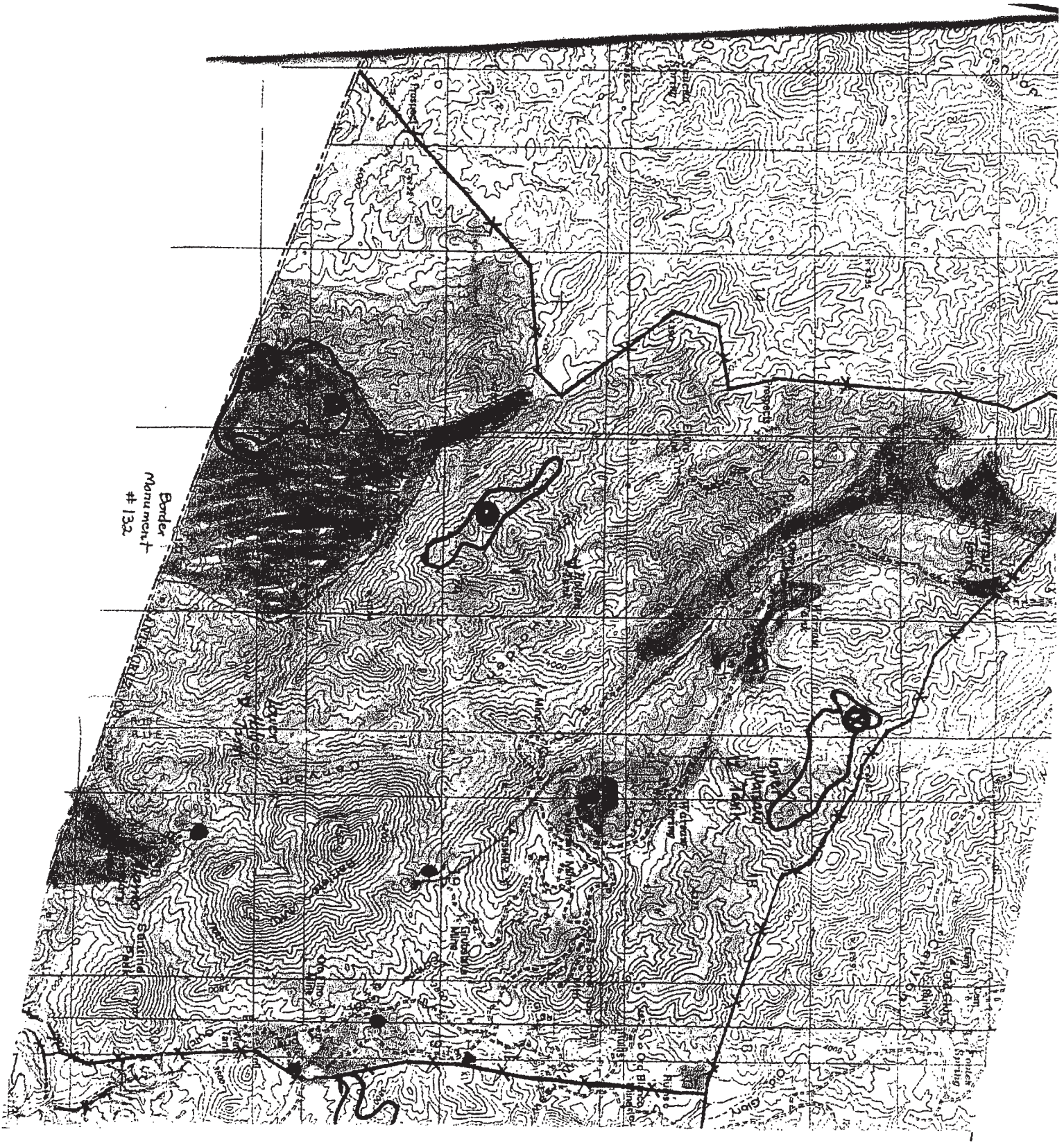


Figure 1,
Grazing Use
Wansaw Pasture, Sept. 28, 2001

• Primary key
Area 0 key