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**Trapping and Radio Telemetry of Lesser Prairie Chickens  
on BLM Lands: 1997 Final Report**

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## Introduction

Over the last 100 years, Lesser Prairie Chicken (LPCH, *Tympanuchus pallidicinctus*) populations have been declining sharply over the bird's entire range in Kansas, Oklahoma, Texas, Colorado, and New Mexico. In 1995, the US Fish and Wildlife Service received a petition to list the LPCH as threatened. A recent 90-day finding concludes that a thorough review of the species' status is warranted. This review is currently underway.

Long-term lek survey data collected by the Bureau of Land Management (BLM) Roswell Resource District suggest that LPCH populations in New Mexico, although still larger than in some states, are no exception to the range-wide trend. Because BLM lands harbor the largest population of LPCH on public lands in New Mexico, the BLM initiated this 5-year study of the LPCH on their lands.

The purposes of this study were: 1. to enter 26 years of BLM's lek attendance data into a database to be delivered to BLM. 2. to query the resulting database to determine long-term trends, and 3. to initiate a banding and radio telemetry study of LPCH habitat use in the Caprock Wildlife Management Area.

## Methods

### Databasing

Data from all data sheets provided by BLM were entered into an Access database. These data span 26 years of lek surveys, beginning in 1971. Basic data on observer, survey date, weather, lek location, bird behavior, and bird count were entered. Pasture names and management practices will be entered at a later date. We performed queries on each lek site number over the entire period for which data were available, as well as a query of the total number of birds detected at all lek sites over the 26-year period. Total number of birds was defined as the maximum number of LPCHs detected at each lek site in each year, summed over all leks.

### Trapping and Telemetry

During April and early May, 1997, we trapped Lesser Prairie Chickens on BLM lands in the Caprock Wildlife Habitat Area. We, along with BLM surveyors, located only three BLM leks with large enough numbers of displaying males to justify trapping efforts: 45N, 10N, and 2N, with male populations of 7, 10, and 10, respectively.

We set up wire leads and walk-in traps for nine days at 45N, seven days at 10N, and six days at 2N, for a total of 22 trap mornings. On days that we trapped a lek site, we observed the lek from before the beginning of booming (usually around 0500) until all birds had left the lek for the morning (around 0900), such that we observed all males and all females that attended the lek.

All trapped birds were banded with a NMDGF aluminum leg band on the left leg, two colored plastic bands on the right leg, and one colored plastic band on the left leg, above the aluminum band. Each bird received a unique color combination. Band color combinations are designated as follows: G/G G indicates green over green on the right leg and green over aluminum on the left leg. The following measurements were also taken for each bird captured: sex, age, weight, right and left wing chord, right and left tarsus, culmen. One wing and one tarsus were measured twice, for purposes of computing repeatability when sample sizes become larger. Ages were determined according to Campbell (1972). Birds were released as soon as they were processed. We attempted to locate the single radioed bird from two to four times weekly for the three weeks between the time it was tagged and the time it was found dead.

## Results

### Databasing

We entered data for 194 leks. Histograms of individual lek histories (see histograms delivered under separate cover) suggest that numbers of birds attending leks were overall considerably lower in the 1990s than in the 1980s. The "S" leks in particular show drastic declines over the last ten years. About a dozen "N" leks, including for example 10N, 45N, 4N, and 2N, have remained relatively strong during this decade, but even for these few leks, numbers have declined. No lek showed appreciably larger numbers of birds in attendance in the 1990s than in the 1980s.

We also plotted the total number of birds observed at all leks visited each year (Figure 1). Due to funding allocations and competing project needs, survey effort varied greatly among years. We therefore plotted effort, measured as the number of leks visited each year, on the same graph with total number of birds in attendance. This graph reveals that, up until about 1987, the number of birds detected on all leks was a function of the amount of effort expended. However, in 1987 a discrepancy appeared between effort and number of birds detected, and this discrepancy widened until 1996 and 1997, when it was the highest of any time during the study (Figure 1).

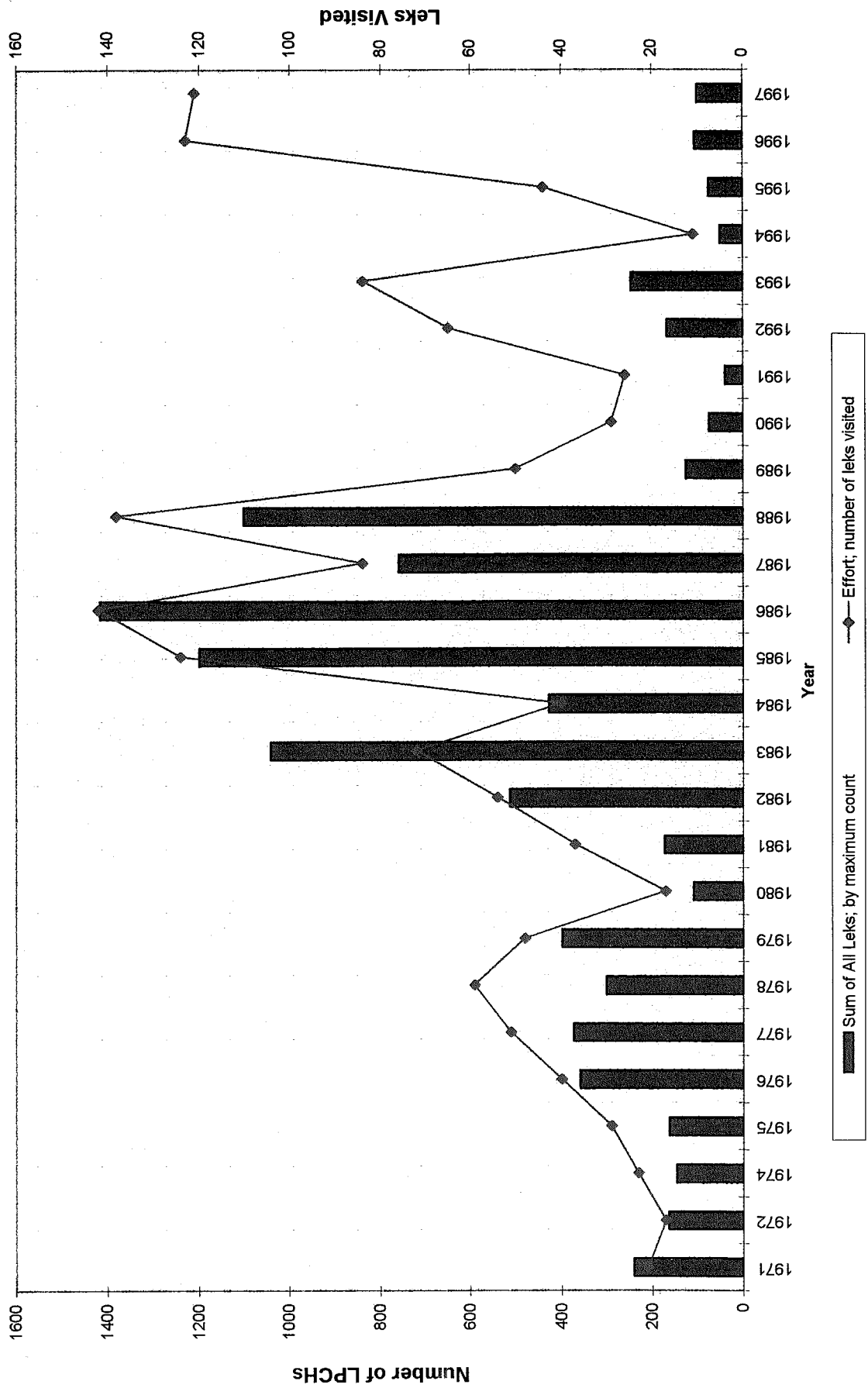
### Banding and Telemetry

Seventeen sightings of females were made, all except one at lek 45N (Table 1).

Date	Lek	# of Females	Copulations
4/9/97	45N	5	
4/10/97	45N	2	
4/14/97	45N	1	
4/15/97	45N	3	1
4/16/97	45N	2	
4/18/97	45N	3	1
4/24/97	2N	1	

**Table 1.** Females sighted during trapping and surveys at BLM lands, April, 1997.

**Lesser Prairie Chicken Population Summary**  
 Caprock Wildlife Habitat Management Area



**Figure 1.** Total number of individuals counted on all leks, 1971-1997. Total, indicated by bars, is defined as the sum of the maximum number of birds seen on one visit to each lek each year, summed over all leks. Effort, indicated by line, is the total number of leks visited each year.

One radio-tagged female was observed twice at lek 45N, once on the day she was captured and again when she returned two days later. Because only two copulations were observed, both at 45N, it appears that females visit a lek at least twice before copulating. Thus, we probably observed substantially fewer than 16 individual hens total.

Eight birds, seven males and one female, entered traps (Table 2). Two males escaped before we reached the trap. The first escaped out a trap top that was not securely fastened. The second happened to be trapped in the same trap as another male and may have been chased out by the other male. Four males were measured, banded, and released (Table 3). One male died while being handled. The female (Table 3) was

Lek	Dates Trapped	# Males Caught	# Females Caught	Total for Lek
45N	4/15-4/23		1	1
10N	4/17-4/23	2		2
2N	4/24,25,29;5/1-3	3		3

**Table 2.** Results of trapping efforts, April and May, 1997.

Date	4/16/97	4/17/97	4/22/97	4/24/97	4/24/97	5/2/97
Lek Site	45N	10N	10N	2N	2N	2N
Wind	1	3-4	0-1	4	4	0
Time	0605	0555	0554	0720	0819	0548
Sex	F	M	M	M	M	M
Age	AHY	AHY	SY	ASY	ASY	ASY
Weight	740	735	725	718	780	710
L. Tarsus	50.6/50.3	52.7/51.5	50.9/50.2	51.5	54.3/55.0	51.8/50.2
R. Tarsus	50.4	52.7	50.6	51.5/51.4	53.8	51.4
L. Wing	205/205	211/210	204/204	216	221/220	211/210
R. Wing	205	207	205	210/210	220	208
Culmen	15.1	missing	missing	16.2	16.05	13.9
NMDGF #	01	02	03	04	05	06
Band Color	G/G G	NA	P/P P	B/B B	P/G P	Y/Y Y
Transmitter	55086, 165.122	NA	NA	NA	NA	NA
Comment	vigorous, flying next day	bird died during processing, ecto- parasites on head and neck			ecto- parasite noted	

**Table 3.** LPCHs banded, April-May, 1997. Weights are in g, lengths are in mm. Transmitter numbers are followed by frequencies in MHz. Wind speeds are taken from the Beaufort scale: 0=calm; 1=rising smoke drifts; 2=light breeze, leaves rustle; 3=gentle breeze, leaves and twigs move; 4=moderate breeze, moves thin branches, raises dust and paper; 5=fresh breeze, trees sway.

measured, banded, radio-tagged and released. The dead male was donated to the New Mexico Department of Game and Fish to be made into a study skin. Tissue was taken and frozen for possible DNA study at a later date. The crop contents and gut contents will be examined for dietary and parasite analysis, respectively.

The radio-tagged female was re-located on five days subsequent to her capture date (Table 4, Maps 1-5). We attempted to locate her on 4/29, 4/30, and 5/1, without success, but we were unable to access the area NE of lek 45N, which contains good nesting habitat. She was found dead south of lek 45N on 8 May, 1997 by a BLM biologist (Map 15). The mortality sensor on the transmitter was operating and led him to the remains. Only feathers remained, and the wire loop on the transmitter was bent, suggesting predation by a strong-jawed predator such as a coyote. Because this female was not located at a nest before she was predated, we have no nest site data for her, and her reproductive success was apparently zero.

In summary, trapping efforts resulted in four males being banded and released and one female being banded and radio tagged. The single radio-tagged female was predated approximately three weeks after she was tagged.

Date	Female Located	Approximate UTM Easting	Approximate UTM Northing
4/17	Y	612360	3703880
4/18	Y	611860	3704140
4/21	Y	614700	3703800
4/22	Y	614100	3702700
4/24	Y	612900	3713900
4/29	N		
4/30	N		
5/1	N		
5/8	Y, found dead	612100	3702700

**Table 4.** Results of telemetry study of one collared hen, April and May, 1997.

### Discussion and Recommendations

#### Databasing

Because survey effort was inconsistent in both time and place over the 26 years of this study, it is difficult to draw firm conclusions regarding LPCH populations. Many leks were visited for several years and then surveys were dropped, presumably due to funding limitations. Some of these lek sites were picked up again later, but others were not. Nevertheless, if lek sites for which we have good data are considered, our queries suggest that LPCH populations, as measured by lek attendance, have declined during the 26 years that BLM has been surveying for this species.

Although there has been concern about this species for a number of years, the general belief is that declines have been occurring for upwards of 50-100 years. This trend notwithstanding, our queries reveal the most drastic decline over the last ten years (Figure 1). This decline began in 1988, before the recent drought that has been blamed for LPCH population declines.

BLM data also suggest that numbers were particularly high during the period from 1983-1988. However, except for 1983, when detections were disproportionately high relative to effort, survey effort was also high during this period. A crucial question is whether increased survey effort during the 1980's was independent of LPCH populations or whether surveyors increased their efforts in response to increased attendance at leks.

### **Banding and Telemetry**

The number of females attending BLM leks was substantially smaller than the number of males, which was greatly reduced relative to previous survey years (BLM unpublished data). Females appeared to visit leks more than once before copulating; thus, we conclude that we observed fewer than 16 females in over five weeks of working at BLM leks. The small numbers of both males and females attending these historically large leks is cause for concern.

Males more readily enter traps than do females. Trapping success of males was comparable to that reported in other studies (Schroeder and Braun 1991) but nevertheless still low (7/27 males, or 26% of all lekking males over 22 trap mornings). Trapping efforts will continue during the 1998 lekking season. We will attempt to have two teams trapping during the peak weeks of the 1998 lekking season, and we will also experiment with trapping in the evening. Provided that lek attendance is at least as high as during 1997, this should result in increased trapping success in 1998.

The telemetry methods, although not thoroughly tested with only one female, gave mixed results. We were not able to locate the female at every attempt, probably due to the topography of the dunes. It is clear that females moved while we were tracking them; thus, it was not always possible to determine precise locations (Maps 11-14). Next year we will attempt to locate radioed females while standing on top of the truck, a method that proved fruitful in finding the dead hen in 1997. In addition, a paired triangulation method may be required to effectively track hens to nests. Even using these methods, we expect that considerable effort will be required to find collared females in the dune habitat.

The scanner, receiver, and transmitter appeared to function well, as did the mortality sensor. We have concerns about the weight of the transmitters. The transmitters we are using weigh between two and three percent of the hen's body weight, which is higher than recommended by some workers (Terry Riley, Ken Giesen, pers. comm.). We recommend that a trade-off between weight and transmitter life could be rewarded in hen

mobility and survival. The Game and Fish Department is planning to purchase several lighter transmitters for trial use in this study during 1998.

Studies conducted in the 1970s (e.g., Davis et al. 1974, 1979, 1980) specify that quality LPCH habitat in BLM's Roswell Resource Area consists of ample shinnery oak for brood cover and foraging, and adult winter forage; and senescing sand bluestem grass for nesting. These studies were conducted prior to shinnery oak control conducted on BLM lands during the 1980s. One purpose of the present study is to make a post-brush-control assessment of habitat use in the area.

At this stage of the study we can draw no conclusions regarding LPCH nesting or wintering habitat use. Our telemetry data suggest that the hen we tagged stayed near the lek site where she was captured. If many females behave similarly, it may be important to evaluate the habitat near lek sites for nesting suitability. Our data suggest that females visit lek sites more than once before copulating; thus, adequate cover near leks may enhance survival during the mating season. The radio-collared female also returned to the lek site a few days after she was captured, suggesting that birds stay near the lek site for several days or even weeks. At minimum the habitat near lek sites should provide adequate cover for females and males that are in the area to attend the lek.

It is very disappointing that the only hen we collared was predated so soon after she was tagged. Only further study will reveal how common such predation is, and how frequently hens are able to complete a nesting effort.

#### Literature Cited

- Campbell, H. 1972. A population study of lesser prairie chickens in New Mexico. *Journal of Wildlife Management* 36:689-699.
- Davis, C.A., P.E. Sawyer, J.P. Griffing, and B.D. Borden. 1974. Bird populations in a shrub-grassland area, southeastern New Mexico. *Bulletin* 619. Las Cruces: New Mexico State University Agricultural Experiment Station. 29 pp.
- Davis, C.A., T.Z. Riley, R.A. Smith, H.R. Suminski, and M.J. Wisdom. 1979. Habitat evaluation of lesser prairie chickens in eastern Chaves County, New Mexico. Report to Bureau of Land Management, Roswell. Las Cruces: New Mexico State University, Department of Fisheries and Wildlife Science. 141 pp.
- Davis, C.A., T.Z. Riley, R.A. Smith, and M.J. Wisdom. 1980. Spring-summer foods of lesser prairie chickens in New Mexico. Pp. 75-80 *In* P.A. Vohs and F.L. Knopf, eds., *Proceedings of the prairie grouse symposium*. Stillwater: Oklahoma State University. 89 pp.
- Schroeder, M.A. and C.E. Braun. 1991. Walk-in traps for capturing greater prairie-chickens on leks. *J. Field Ornithol.* 62:378-385.



## Appendix 1. Map Legends

Lines represent directional detections of the radio-collared hen. Triangles represent the area within which she was located.

Map 1. Location via telemetry of hen GGG on 4/17/97 and 4/18/97.

Map 2. Location via telemetry of hen GGG on 4/21/97.

Map 3. Location via telemetry of hen GGG on 4/22/97.

Map 4. Location via telemetry of hen GGG on 4/24/97.

Map 5. Location via telemetry of hen GGG, found dead on 5/8/97.

MESCALERO POINT NE QUADRANGLE  
NEW MEXICO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

Map 1

911 | 912 | 47'30" | 913 | 670 000 FEET | 914 | 915

Telemetry Data

Color Band G/G G Frequency 165.122  
Date 4-18-97 (A); 4-17-97 (B) Time 8:45am (A); 9:30am (B)  
Quad Mescalero Point NE County Chaves  
Description Walk-in telemetry location  
A - signal at ± 20 m; she had visited the lek  
B - visual  
Surveyor H. Smith

76N

51N

52N

A  
45N

B

67N

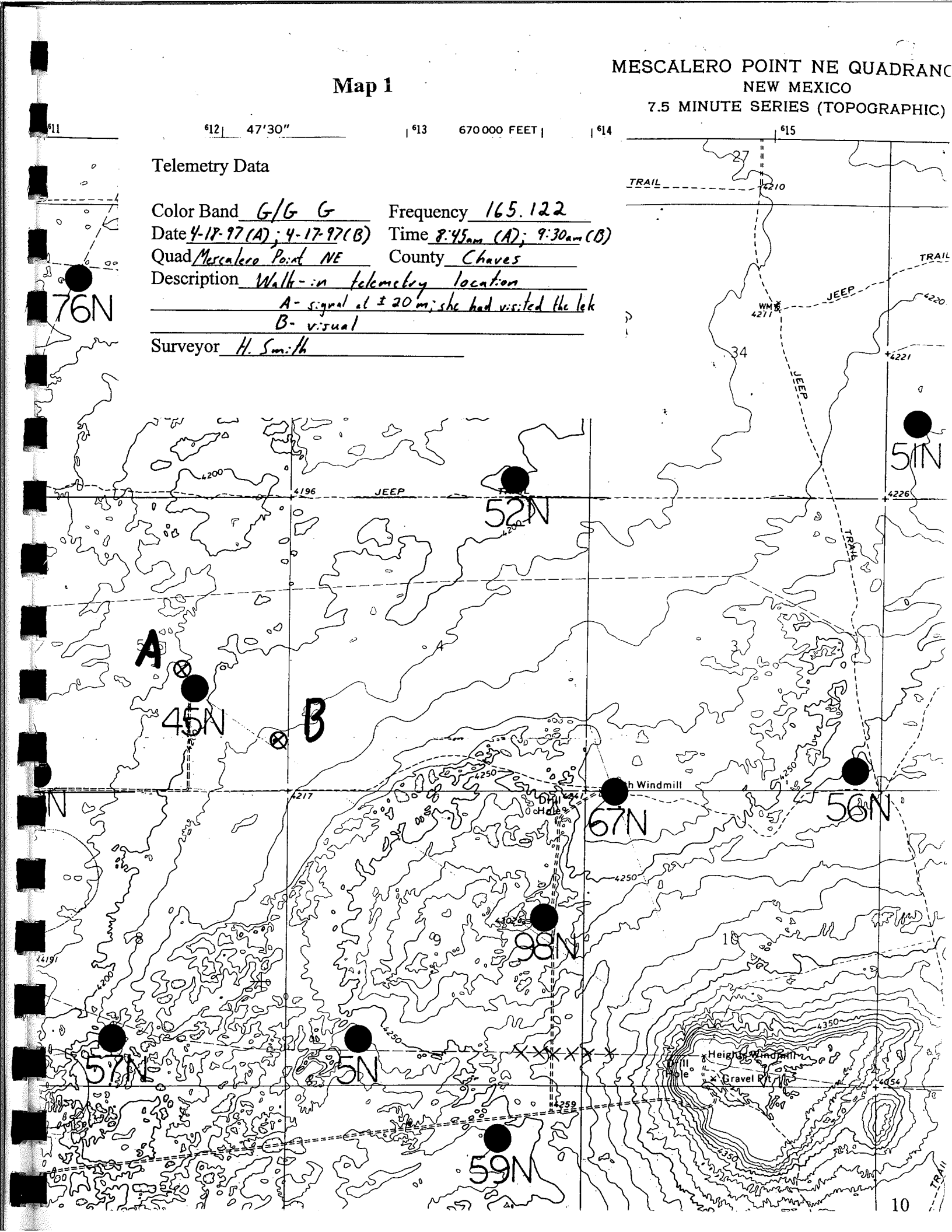
58N

58N

57N

55N

59N



# Map 2

MESCALERO POINT NE QUADRANT  
NEW MEXICO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

611 | 612 | 47'30" | 613 | 670000 FEET | 614 | 615

## Telemetry Data

Color Band G/G G Frequency 165.122

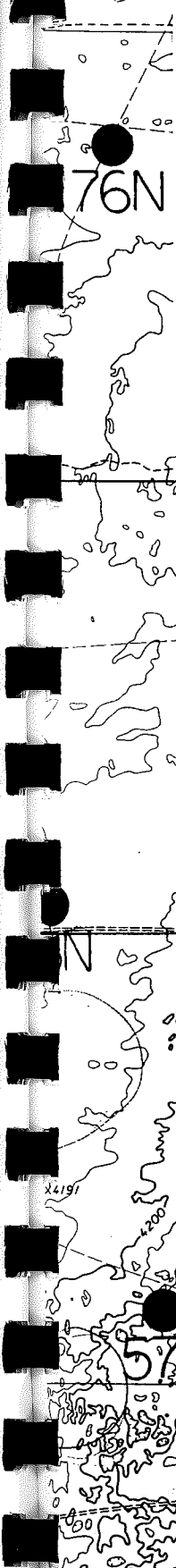
Date 4-21-97 Time 18:07

Quad Mescalero Pt. NE County Chaves

Description Triangulation

A-341°, B-96°, C-126°

Surveyor H. Smith



76N

51N

52N

45N

6N

50N

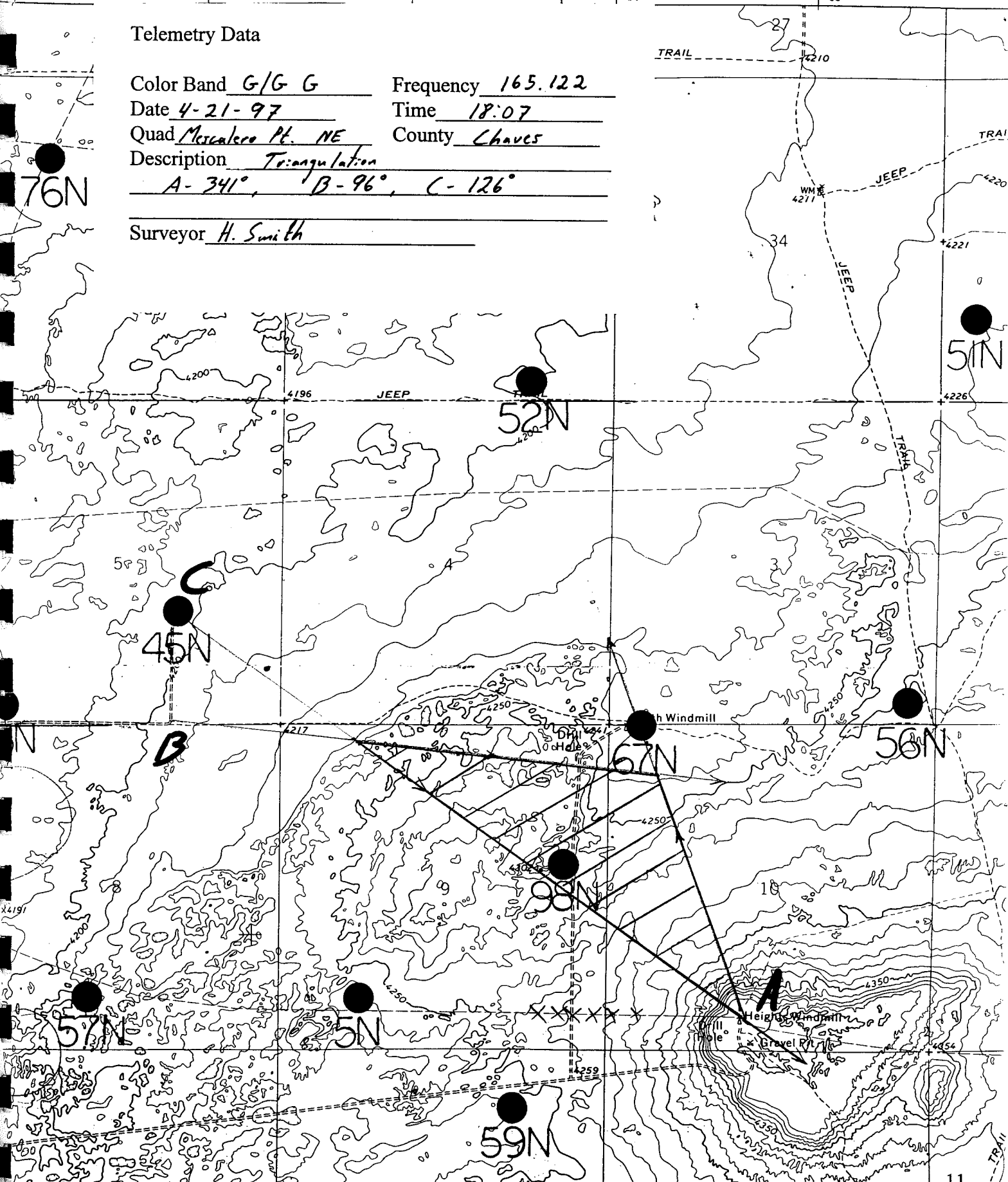
B

57N

58N

59N

A



Map 3

611

612 | 47'30"

613

670 000 FEET |

614

615

Telemetry Data

Color Band G/G G Frequency 165.122

Date 4-22-97 Time 0945

Quad Mescalero Pt. NE County Chaves

Description Triangulation

A-336°, B-108°, C-129°

Surveyor H. Smith

TRAIL

4210

WM # 4211

JEEP

TRAIL

4220

4221

JEEP

4226

TRAIL

JEEP

4196

52N

45N

B

4217

67N

Windmill

50N

419

10

419

57N

55N

Height Windmill  
Gravel Pit

4254

59N

4259

Map 4

611 | 612 | 47'30" | 613 | 670 000 FEET | 614 | 615

Telemetry Data

Color Band G/G G Frequency 165.122

Date 4-24-97 Time 10:32

Quad Mescalero Point NE County Chavez

Description Two telemetry positions

A - 315°, B - 286°

Surveyor K. Score

76N

51N

52N

45N

67N

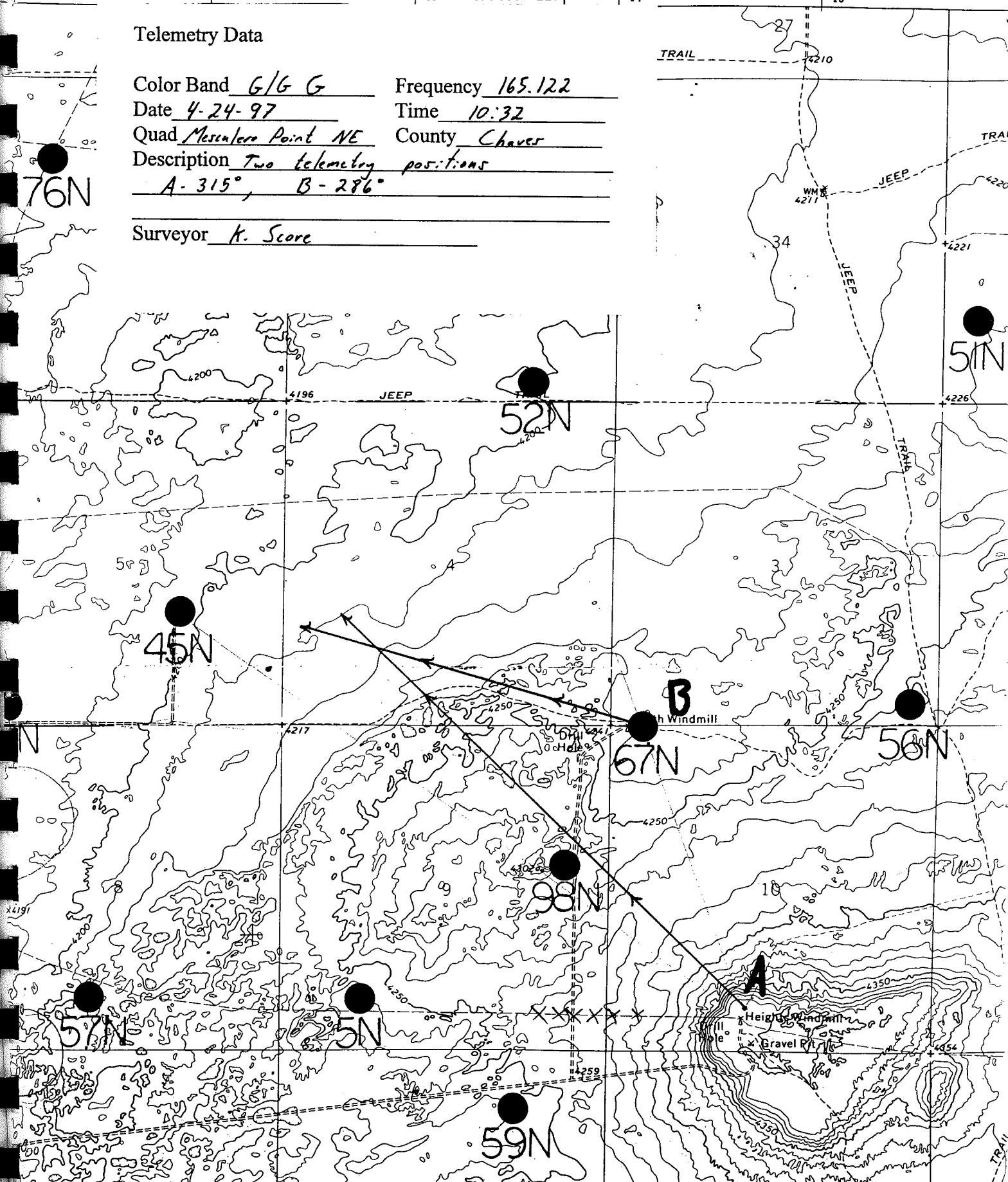
58N

58N

57N

55N

59N



# Map 5

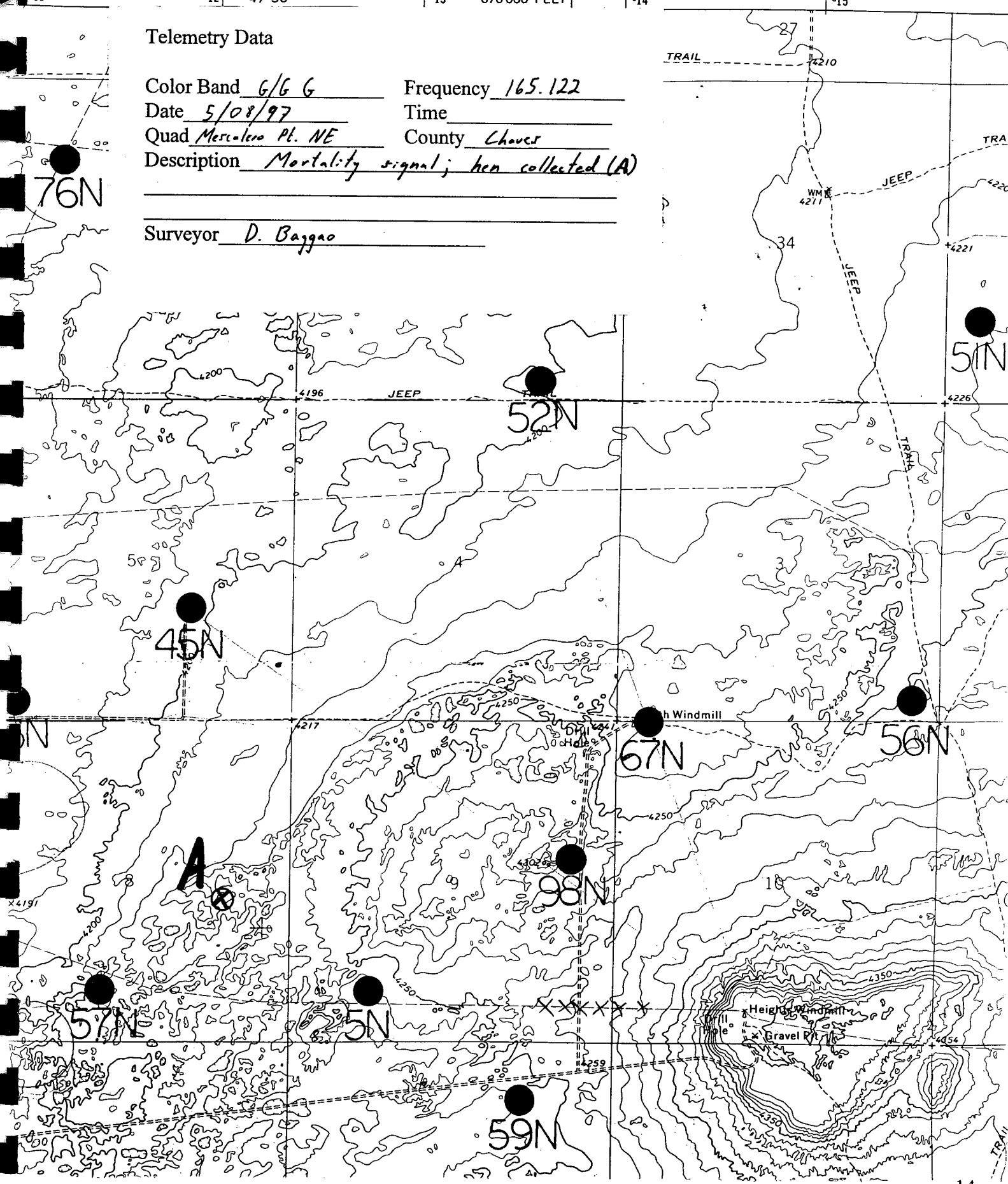
MESCALERO POINT NE QUADRANGLE  
NEW MEXICO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

611 | 612 | 47'30" | 613 | 670 000 FEET | 614 | 615

## Telemetry Data

Color Band G/G G      Frequency 165.122  
Date 5/08/97      Time \_\_\_\_\_  
Quad Mescalero Pt. NE      County Chaves  
Description Mortality signal; hen collected (A)

Surveyor D. Bagao



**Appendix 2. Banding Data Sheets**

Date	4-16-97
Lek Number	45 N
Location/Ownership	sand Ranch
Wind/Weather	1 at time of capture, gusting to 3-4 by 7:30
Temperature	
Time of Capture	6:05 Am
Capture Method	W-drift fence, bisecting lek N-S, 4 traps
Sex	F
Age	AHY
Weight	740
Left Tarsus	50.6 / 50.3
Right Tarsus	50.4
Left Wing	205 / 205
Right Wing	205
Fat	
Blood Smear	2 smears
Fecal	
Alum. Band Number	07
Color Band	G/G G
Transmitter	AVM# 55086 - 17.22 → 166.122
Comment	vigorous
Bill	15.1
	located - tracked 4-17-97
	to area ESE of lek First low
	dunes. Flying Dwell



Date	4/17/97
Lek Number	10 N
Location/Ownership	
Wind/Weather	Dark (05:53a) when we noticed bird in trap. Overcast, wind 3, 4 gusting.
Temperature	
Time of Capture	5:55 A
Capture Method	"W-" shaped funnel traps
Sex	M
Age	AHY
Weight	140/w Bag - 5g Bag = <u>135g</u>
Left Tarsus	52.7 mm, 51.5
Right Tarsus	52.7 mm
Left Wing	211 mm, 210 mm
Right Wing	207
Fat	
Blood Smear	
Fecal	
Alum. Band Number	#2, trouble w/ banding plier sticking to band
Color Band	
Transmitter	
Comment	Ectoparasites noticed on bird's head & neck
Culmen	
* Note the sock that we were using to "blind fold" the chicken was too thick. Chicken overheated and suffocated	

Deceased @ 0620

Date	04-22-97
Lek Number	10N
Location/Ownership	
Wind/Weather	Wind 0-1, calm, clear
Temperature	
Time of Capture	0554
Capture Method	"W" walk in funnel trap
Sex	♂
Age	First year (SY)
Weight	750g - 25g = <u>725g</u>
Left Tarsus	50.9 mm, 50-18
Right Tarsus	50.6 mm
Left Wing	204 mm, 204 mm
Right Wing	205 mm
Fat	NA
Blood Smear	
Fecal	
Alum. Band Number	#3
Color Band	P/P, P/AI
Transmitter	
Comment	

Released @ 0625  
 Processing time 31 minutes Page 1

Date	4/24/97
Lek Number	2N
Location/Ownership	
Wind/Weather	Overcast, RAINED EARLY in morning, wind @ 4
Temperature	
Time of Capture	0720 capt, 0735 removed from trap, 0805 END PROCESSING
Capture Method	'W' funnel trap - walk in
Sex	♂
Age	outer 1° not spotted to tip, but 9th & 10th had terminal white band
Weight	743g - 25 bag = <span style="border: 1px solid black; padding: 2px;">718g</span>
Left Tarsus	51.5 mm
Right Tarsus	51.5 mm 51.4 mm
Left Wing	216 mm
Right Wing	210 mm, 210 mm
Fat	
Blood Smear	Yes, 01 & 02, RS.
Fecal	
Alum. Band Number	G & F # 4
Color Band	Blue / Blue Blue / AL
Transmitter	
Comment	
Culmen	16.2 mm

743  
25  
718

Date	4/29/97
Lek Number	2N
Location/Ownership	
Wind/Weather	Wind @ 4, Overcast, light rain while processing
Temperature	
Time of Capture	0819 capt, 0823 removed, 0846 released
Capture Method	"W" walking funnel trap
Sex	♂
Age	outer 1° - no white tip / 9+10 1° - white tips
Weight	780g - 28 Bag = <span style="border: 1px solid black; padding: 2px;">752g</span>
Left Tarsus	54.3 / 55.0 mm
Right Tarsus	53.8 mm
Left Wing	221 / 220 mm
Right Wing	220 mm
Fat	
Blood Smear	Yes JBE 01, 02
Fecal	
Alum. Band Number	5 (G & F)
Color Band	P/G, P/AL
Transmitter	
Comment	
Culmen	16.05 mm
* Ectoparasite noticed	

28

55088 = 140

J. Brown-Emmerson  
L. Delay

Date	5297
Lek Number	2N
Location/Ownership	
Wind/Weather	calm clear
Temperature	
Time of Capture	0548 removed from trap: 0555 Released: 0617
Capture Method	walk-in funnel trap
Sex	♂
Age	ADY (see comments)
Weight	740 - 30 = 710g
Left Tarsus	51.8 / 50.2 mm
Right Tarsus	51.4 mm
Left Wing	211, 210 mm
Right Wing	208 mm
Fat	-
Blood Smear	✓ 2 slides JBE
Fecal	
Alum. Band Number	#6 G+Fish
Color Band	<sup>Rt</sup> 1/4, <sup>Left</sup> 1/4 AL
Transmitter	-
Comment	CULMEN: 13.9 mm - No barring spotting to tip of I° #1 (spotting ends ~1" from the tip) - #9 & 10 I°s have white edges