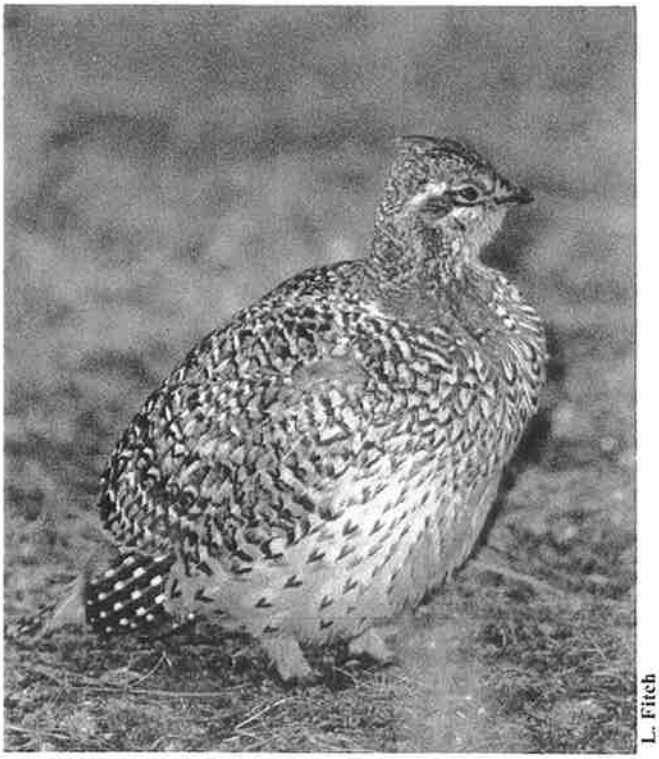
Sharp-tailed Grouse Dancing Ground Surveys in Southern and Central Alberta 1999 - 2000



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Alberta Conservation Association

Funded by Alberta Anglers, Hunters, and Other Conservationists

Executive Summary

The Natural Resources Service initiated the Alberta Sharp-tailed Grouse Habitat Program in 1995. Funding for this project was provided from the Fish and Wildlife Trust fund. In 1997, the Alberta Conservation Association took responsibility of this program with monitoring conducted by both organizations. The goal of the program is to enhance habitat by developing range/wildlife habitat management plans in cooperation with landowners. As part of this program, spring lek or dancing ground surveys were to be conducted to identify sharptail activity and obtain site specific habitat information. This is the programs fifth year and summaries of the results of the sharptail lek surveys conducted in 1999 are located in this report.

The basic method used to inventory sharp-tailed grouse numbers involved ground counts of birds displaying on leks from mid March to the end of April. Surveys have been conducted in 1999 in areas of the Milk River Ridge, Writing-On-Stone, Foothills, and Special Area #4. Dancing grounds in the Milk River Ridge area were ground surveyed with 38 leks surveyed, 6 of these were new leks and 3 were considered inactive/ abandoned. A total of 1117 birds were observed, consisting of 368 males, 33 females, and 716 unclassified birds. The Writing-On-Stone area had 8 identified leks (3 new) through ground surveys with 1153 birds (32 males, 6 females, and 115 unclassified). Seven dancing grounds in the Foothills area were surveyed, of which 6 were on co-operating landowners properties, consisting of 7 unclassified birds sighted. Six lek surveys, including 1 new lek in this area, were on co-operating landowner sites with 19 males, 0 females and 85 unclassified birds. Special Area # 4 had a total of 305 birds sighted in 1999. Of this total, 22 leks were surveyed with 124 males, 14 females and 167 unclassified birds. Comparisons of each of these areas were completed for all the years surveyed.

Trend Blocks were initiated in 1999 with 3 block areas, two in the Milk River area and one in the Writing-On-Stone area. A total of 318 birds were seen on the blocks in the Milk River Ridge area (Block I= 254 birds, Block II= 64) and 170 birds on the Writing-On- Stone block.

Some preliminary trends are provided, however there has not been consistent monitoring of all identified dancing grounds. Of the data collected there appears to be a constant trend throughout many of the dancing grounds that were surveyed.

It is recommended that all known dancing grounds on co-operating landowners ranches be surveyed every year to allow for better trend comparisons. Trend block surveys conducted in 1999 provided some preliminary information on the general numbers of sharp-tails and should be continued. Habitat management and monitoring should be encouraged on a regular basis when trends show large differences from year to year, which could also influence other species utilizing the area.

Acknowledgements

I wish to thank the following Natural Resources Staff for there time and effort in conducting the surveys; Gary Erickson and Leo Dube in Lethbridge, the following Alberta Conservation Association Staff; Randy Lee, Paul Jones, Jim Potter, Rob Corrigan, and Shane Roersma and Derek Kroeker of the University of Manitoba. The survey area map was created by personel from Alberta Environment Natural Resources Service Prairie Region. Cover photograph courtesy of Lorne Fitch.

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1.0 Introduction

Population trends for sharp-tailed grouse (*Tympanuchus phasianellus jamesi*) in Alberta have been based on sporadic surveys, with some areas receiving more attention than others. It is generally believed that population levels have shown declines ranging from 50 to 70 % in some areas over the past 30 years (Goddard 1995). Though sharptail population levels naturally fluctuate in response to local conditions, it is believed that the loss of habitat and intensified agricultural development within the aspen parkland and grasslands of central and southern Alberta have significantly contributed to the observed population declines (Goddard 1995).

In 1997, the Alberta Conservation Association took responsibility of a 5 year Sharp-tailed Grouse Habitat Program. The goal of the program is to enhance habitat by developing range/wildlife habitat management plans in cooperation with landowners. As part of this program, spring lek or dancing ground surveys are to be conducted to identify sharp-tailed grouse activity and obtain site specific habitat information (Goddard 1995). With the assistance of lek surveys, areas identified with potential to improve sharptail habitat are included in the habitat program.

Initially 2 areas were identified as pilot project areas. They were Special Areas #4 in the Central Region and the Milk River Ridge area in the Southern Region. Throughout the past 4 years, the project has expanded to include six areas (Jones and Millar 1998). A total of 170 previously unknown dancing grounds have been located (Miller 1999) since the program began. In 1999, only 4 of these 6 areas were surveyed with the addition of a new trend count method applied to two of them.

2.0 Project Areas

Four areas were surveyed in the spring of 1999 for sharp-tailed grouse leks (Figure 1). These areas were the Milk River Ridge, Writing-On-Stone, Foothills, and Special Area #4. The Milk River Ridge, Writing-On-Stone and the Foothills areas fall within the Southern Region while Special Area #4 area is within the Central Region of Alberta. The majority of the area is located within the fescue grassland or mixed grass ecoregions. Habitat types include grassy plateaus, riparian draws, wetlands, croplands, and tame pasturelands.

3.0 Methods

3.1 Dancing Ground Surveys

The main method used to inventory sharp-tailed grouse numbers in the spring involved ground counts of birds displaying on leks. Ground surveys consisted of visiting known or potential leks, by foot or ATV. In identifying an active lek, Johnsgard (1973) indicated that 8-12 males should be present on the grounds. Surveys are conducted from ½ hr before sunrise to 2 hrs after sunrise. The close proximity of dancing grounds usually allowed an observer to plan a pre-determined route to visit 2-3 leks per morning. To ensure assigned leks were counted that day, observers

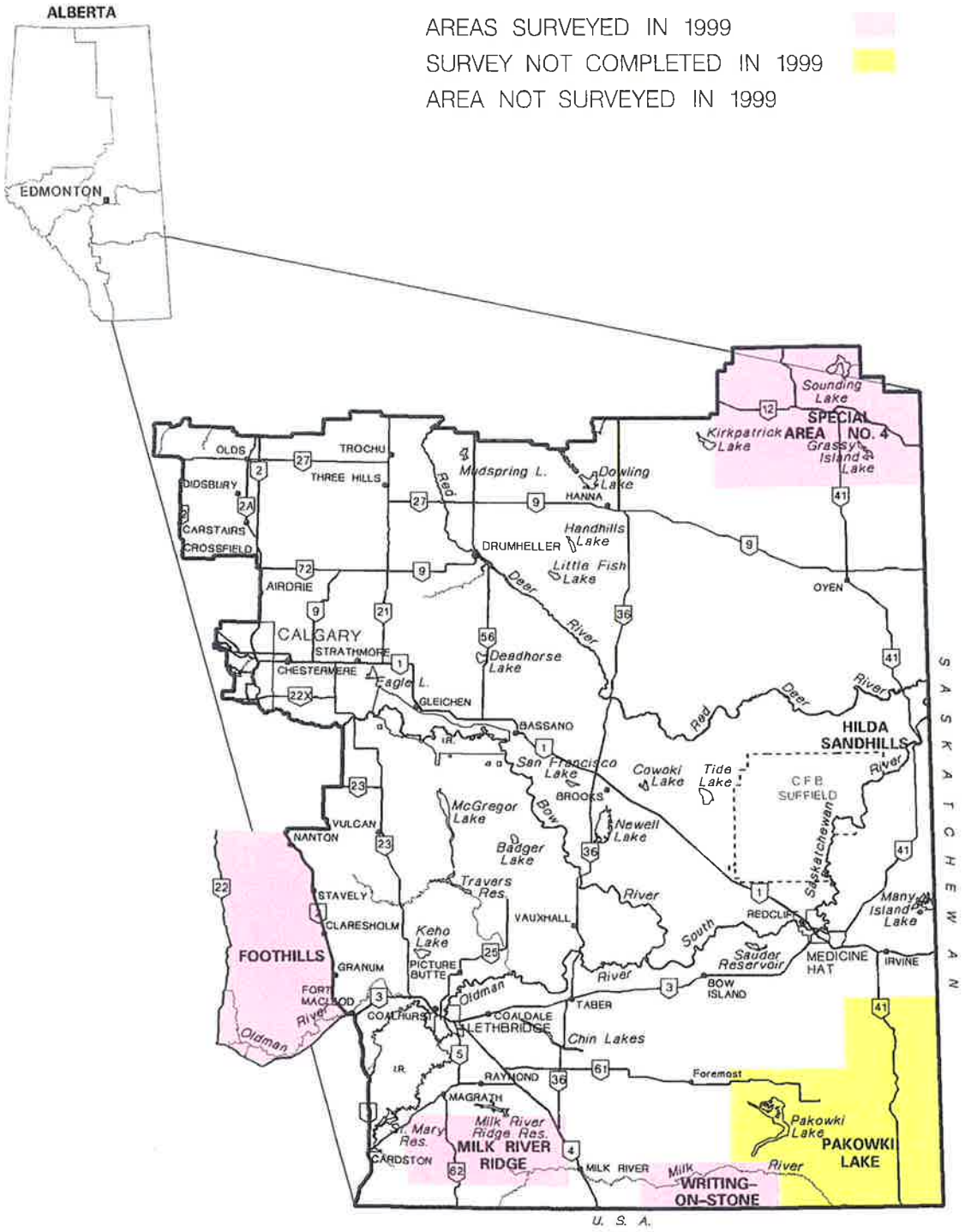

Figure 1 Sharp-tailed Grouse Habitat Program Dancing Ground Survey Area.

usually remained at a lek for less than 5 minutes. Leks were usually visited once with counts believed to adequately reflect male numbers (Dube 1997). Birds observed were categorized into males and females and total numbers recorded. If the sex of birds couldn't be identified they were recorded as unclassified. When no birds were observed at a known lek location, it is believed to have been abandoned unless a new lek was located within the area of this mapped ground. If a new ground was located, a GPS recording at the site was taken for future reference.

3.2 Landowner Dancing Ground Trends

Landowners that have agreed to partake in the sharp-tailed grouse habitat program have had their land monitored for trends of total bird numbers throughout the years since first discovery and initial agreement by the landowner. Data and information are collected based on and within a mile of each landowner known lek location.

With the limited data, changes in total bird numbers between 0 and 10 constituted a constant trend, while changes of more than 10 birds constituted an increase or decrease in population depending on the direction (increase or decrease) of bird numbers. Trends are based on surveys for the last 3 years (4 for the Milk River Ridge area) with results being preliminary. Currently the Sharp-tailed Grouse Habitat Program is working with landowners in the Milk River Ridge, Writing-On-Stone, Foothills, Special Area #4 and Pakowki Lake project areas. For the purpose of confidentiality a project code has been assigned to each landowner. Note: The graph located in this report indicates general trends (average number of birds/number of leks surveyed) for the 4 areas in 1999, excluding Pakowki Lake.

3.3 Trend Blocks

In 1998, trend blocks were recommended to address biases associated with the designated route ground counts (Jones and Miller 1998, Paulsen 1981). The current method of monitoring sharp-tailed grouse is based on travelling to an existing known lek and counting the number of displaying males, but when a large management area is involved the trend block method is encouraged. This type of survey will identify the number of leks within this set area and will likely provide a reliable index to the numbers of displaying males (Cannon and Knoff 1981) at these leks. In conjunction with Natural Resources staff in Lethbridge, the trend blocks were implemented in 1999, in addition to the dancing ground surveys and the landowner dancing ground trend counts.

The design of the trend block was described in Jones and Millar (1998) and the procedures were generally followed in the 1999 count. Blocks were conducted in three locations: two in the Milk River Ridge area and one at Writing-on-Stone. The block sizes were 62 km^2 (24 mi^2) and 39½ km^2 (15¼ mi^2) respectively. One mile spaced transects were established using four surveyors on ATV's. Pre-designated points along these transects were used by the surveyors to stop, listen and record any sightings of sharp-tailed grouse. The counts were conducted on generally calm days.

4.0 Results
4.1 Milk River Ridge Project Area
4.1.1 1999 Dancing Ground Surveys

Ground surveys of leks were conducted from April 13 to May 20, 1999 to determine sharp-tailed numbers. A total of 38 dancing grounds in the Milk River Ridge area were ground surveyed in 1999. Of these 38 grounds, 6 were new grounds previously not identified and 3 grounds were determined to still be abandoned (MR 28, MR 54 and MR 56). Two grounds had incomplete count numbers (MR 47 and MR 52) on the first survey in April, with more complete numbers collected on May 6 (Appendix A). A total of 1117 birds (including the new grounds) were counted, 368 were males, 33 females, and 716 were unclassified (Appendix A).

4.1.2 Landowner Dancing Ground Trends

The Sharp-tailed Grouse Habitat Program is currently working in cooperation with 9 landowners in the Milk River Ridge area. Jones and Miller (1998) indicated that no dancing grounds were located on or within the vicinity of landowner MR008, therefore this area was not included in the 1999 surveys. Of the 27 known dancing grounds on the ranches participating in the program in1999, 17 grounds were surveyed while10 grounds were not (Appendix B). Figure 2 shows the number of sharp-tailed grouse leks surveyed and the average numbers of birds counted over the 4 years of study.

Three grounds are located on or within the vicinity of landowner MR001, 1 was active having 11 birds, 1 was considered abandoned and the last one was not inventoried. There appears to be a slight decline in the numbers from 1998, taking into consideration that the one lek was not inventoried.

Landowner MR002 has 8 dancing grounds on or within the vicinity of the ranch. A total of 87 birds were seen on 5 active grounds, 2 grounds were not inventoried and one remains abandoned. Two have an increased number of birds indicating a population change (10+ birds) from 1998, 2 had a slight decease over the last 3 years and one had approximately the same number of birds as in 1997.

Landowner MR003 has 4 grounds with bird numbers remaining constant on 2 grounds and of the 2 new grounds found in 1998, 1 had a slight decrease while the other was not inventoried. Fifty-six birds were counted in 1999.

Only 2 grounds were surveyed on Landowner MR004 property in 1999. One has remained constant over the last 4 years and the other discovered in 1998 remains constant also. A total of 37 birds were counted on these 2 grounds. Jones and Miller (1998) indicated that an additional ground was found in 1998, there was no survey completed at this ground in 1999.

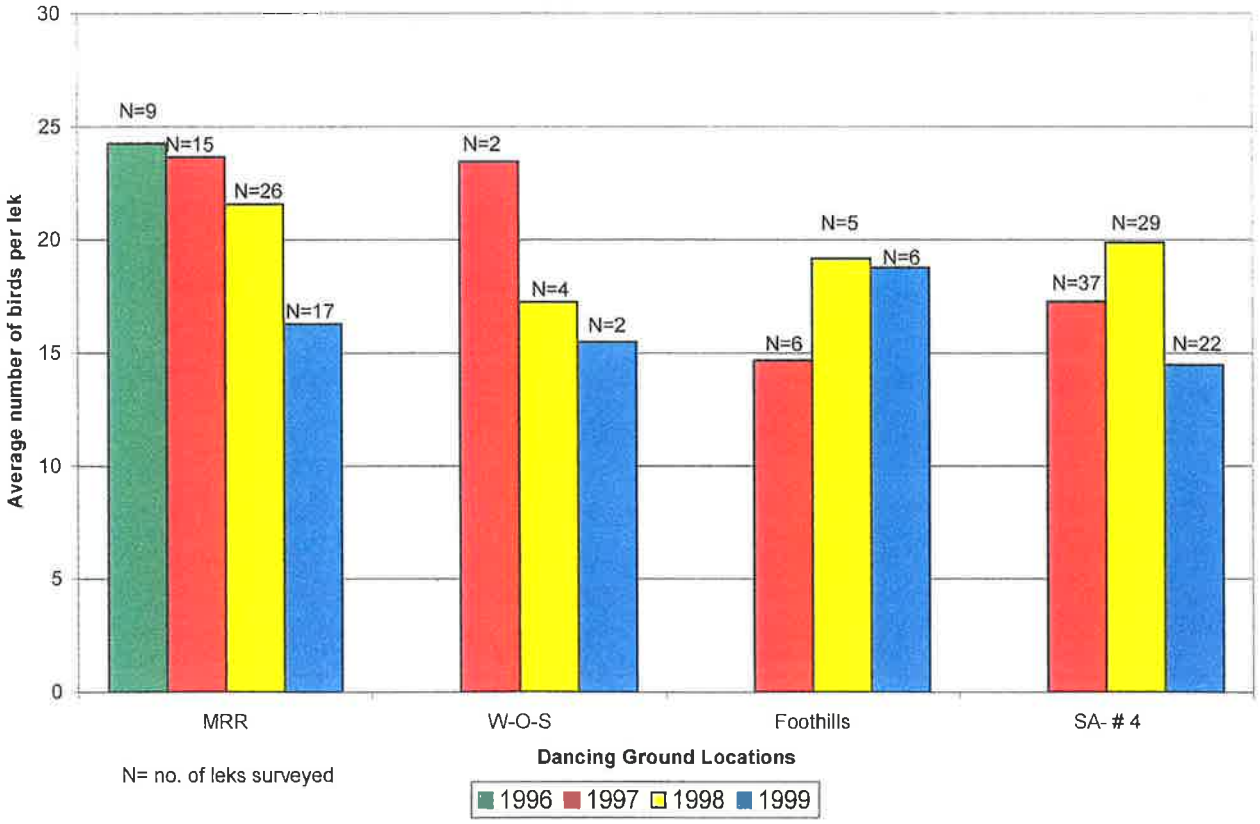

Figure 2: Trend index for leks on co-operating landowners ranches.

Six dancing grounds are located on or within the vicinity of landowner MR005, however only 1 was surveyed (23 birds) and the remaining grounds status are unknown. This single surveyed ground has remained constant since 1996.

In 1998, 3 new grounds were found on the ranch of landowner MR006 and of the 2 years of surveys there has been a decrease in numbers of birds for all these grounds. Thirty-eight unclassified birds were seen.

The 3 dancing grounds discovered in 1998, on or within the vicinity of landowner MR007 were active in 1999. The trend generally remained constant, with two grounds that had a few less birds from the previous year and the other one had a slight increase. In 1999, 62 sharp-tailed grouse were active on these leks.

As previously mentioned, no dancing grounds are located on or within the vicinity of landowner MR008 and was therefore not inventoried in 1999.

Landowner MR009 has 1 ground that was discovered in 1996. The status in 1999 of the ground is unknown as no survey was completed at this ground and no comparison can be completed. The 1998 report (Jones and Miller) indicated that the numbers of birds have been dramatically decreasing since 1996. (See Appendix B)

Overall total bird numbers for these landowners in 1999 were 277 birds consisting of 82 males, 12 females and 183 unclassified. Due to the amount of landowners surveyed, numbers are low compared with that in 1998. Approximately 285 less birds were seen from the previous year with 9 grounds not surveyed in 1999. The average numbers of bird sightings over 4 years for the Milk River Ridge landowner dancing grounds are 354 birds.

4.2 Writing-On-Stone Project Area

4.2.1 1999 Dancing Ground Surveys

No dancing ground surveys were conducted in the Writing-On- Stone area other than the data collected during the block surveys. (See section 4.6.3 for results).

4.2.2 Landowner Dancing Ground Trends

The Sharp-tailed Grouse Habitat Program is currently working in cooperation with 1 landowner in the Writing-On-Stone project area (Appendix C).

Of the 4 grounds located on landowner WOS 001, 2 are active and 2 were not surveyed. Bird numbers on one of them has remained the same while the other has decreased somewhat from the previous year. A total of 31 birds were seen on these 2 grounds in 1999. (See Figure 2 for trends). For the 3 years of surveys, the number of birds averaged to 49.

4.3 Foothills Project Area

4.3.1 1999 Dancing Ground Surveys

Seven dancing grounds were surveyed in the foothills project area in 1999. FH10 had 7 unclassified birds while the remaining 6 grounds were located on the property of co-operating landowners. To simplify matters, the results for these 6 grounds are summarized in section 4.3.2.

4.3.2 Landowner Dancing Ground Trends

The Sharp-tailed Grouse Habitat Program is currently working in cooperation with 8 landowners in the Foothills project area. Two of them are newly involved with this program, as their land shares a dancing ground with another landowner already in the program. Seven dancing grounds have been surveyed in 1999 (Appendix D). See Figure 2 for trends.

Landowner FH001 has 2 active dancing grounds on or within the vicinity of the ranch. One of these is a new dancing ground found in 1999 and is shared with landowner FH006. The other dancing ground had a slight increase but is considered constant since the last survey was conducted in 1997. This dancing ground is shared with landowner FH005. Twenty-five bird sightings were recorded for both these dancing grounds.

Two dancing grounds are located on or within the vicinity of the ranch of landowner FH002. Bird numbers have remained constant on one of the leks and the other had a large population (10+ birds) increase in 1999 since they were located in 1997. Surveys in 1999 indicated numbers totalling 40 birds.

The 1999 sharp-tailed grouse numbers (13) on the single dancing ground found on the ranch of landowner FH003 has remained constant since 1997. This dancing ground is shared with landowner FH002.

Landowner FH004 has 3 grounds on or within the vicinity of this ranch. Two were surveyed in 1999 with a decrease in the number of birds over the 3 years and having a total of 48 birds seen. The 3rd dancing ground was abandoned in 1998 and no inventory was conducted in 1999 at this location to reconfirm its abandonment.

Overall, 113 bird sightings were seen on all those landowners properties. Total bird numbers have increased since 1997 of approximately 10 birds per year with an overall average of 99 sharp-tailed grouse sightings.

4.4 Pakowki Lake Project Area
4.4.1 1999 Dancing Ground Surveys

In 1999, a grazing association in the Pakowki Lake project area joined the Sharp-tailed Grouse Habitat Program. A survey of the ranch was initiated in April 1999, but was not completed due to poor weather conditions.

4.5 Special Area #4 Project Area
4.5.1 1999 Dancing Ground Surveys

Dancing ground surveys in the Special Area #4 project area consisted of inventories of known leks. Emphasis was placed on leks located on property owned by ranchers involved with the Sharp-tailed Grouse Habitat Program. Lek identification numbers were recoded with new identification codes that follow those of other areas. These identification codes will appear as SA4-#. There are 66 dancing grounds that have been found in Special Area #4 and of them, 22 dancing grounds were surveyed in 1999 with a total of 305 birds counted (Appendix E). These grounds appear within the landowner dancing ground trends also.

4.5.2 Landowner Dancing Ground Trends

The Sharp-tailed Grouse Habitat Program is currently working in cooperation with 5 landowners in Special Area #4 (Appendix F). A total of 305 birds were counted on 21 of the 38 dancing grounds on these landowner properties.

Landowner SA001 has 7 grounds on or near his ranch. Three grounds were not inventoried and the remaining 4 have decreased in bird numbers to a total of 55 birds. One ground had a significant decrease in birds from 1998 (15 birds), however is comparable to numbers in 1997. Another ground had no count in 1998 but indicated that the ground was active (Jones and Millar 1998), so comparing the 1997 and 1999 data, there was a loss of 14 birds.

Nine active and 2 abandoned grounds are located on or within the vicinity of the ranch of landowner SA002. Of the active grounds, bird numbers since 1997 have remained constant on 4 leks, the remaining 5 have some population changes. Of these 5 leks, 1 has increased numbers by 11 and the remaining 4 leks had significant decreases of 10 to 28 birds from the previous years count. One hundred twenty- four total sharp-tailed grouse were counted.

Landowner SA003 has 12 identified dancing grounds, 5 are active dancing grounds (4 counted, 1 not counted) and 7 were not surveyed on or near his property. The active grounds all had a decrease in the number of birds at the grounds from the previous year. However, 2 are somewhat constant while the remaining 2 have had a decrease of 10 and 14 birds. There were 46 birds total for these 5 dancing grounds in 1999.

Four leks are found on or within the vicinity of the ranch of landowner SA004. Only 1 of these leks was surveyed in 1999 and bird numbers have decreased over the previous 2 years. There were 21 birds seen at this single lek.

Landowner SA005 has 5 grounds on or near his property. Four were surveyed and bird numbers are compared with 1997 due to logistic constraints in 1998 (Jones and Millar 1998). Three have remained constant, and the other one has increased by 13 birds. A total of 65 sharp-tailed grouse were seen.

Of the 305 total birds seen, 124 were males, 14 females and 167 unclassified. Dancing ground surveys conducted in 1999 were lower than that of 1998 and 1997 therefore overall sharp-tailed grouse numbers are lower. See Figure 2 for trend comparisons.

4.6 Trend Blocks

4.6.1 Milk River Ridge

Two separate trend blocks (62 km^2 / 24 mi^2) were conducted on the Milk River Ridge. Block I was surveyed on April 21, 23 and 26, 1999 with bird numbers observed totaling 254 birds (28 confirmed males, 2 confirmed females and the remainder 224 unclassified birds). Block II was surveyed on April 19 and 20, 1999 having 64 (all unclassified) bird sightings. Two new leks were discovered during this survey consisting of lek MR 62 with 6 birds and MR 63 having 20 birds (18 males, 2 females).

4.6.2 Writing – On - Stone

Writing-On-Stone was another area that had the trend block survey conducted. It consisted of 39 ½ km (15 ¼ miles). Survey dates were April 29 and May 3 – 6, 1999 with 170 sharp-tailed grouse sightings (22 known males, 15 females and 133 unclassified). Three new leks were discovered during this count, these include leks WR 24 with 16 birds, WR 25 had 15 birds flush and WR 26 had approximately 35 birds.

4.6.3 Overall Results

Summary of the 3 trend block counts can be found in Appendix G. Where possible birds were identified by sex, otherwise they are considered unclassified. The majority of the birds flushed when the surveyors approached. Approximately 570 sharp-tailed grouse were recorded in the 3 block counts in 1999.

This was the first year of this type of count, which has given somewhat of an estimate of the numbers of sharp-tailed grouse, found within the set areas. Continuation of the trend block counts for Milk River Ridge Block I and Writing-On-Stone Block could serve as one means of evaluating the Sharp-tailed Grouse Habitat Program. The Natural Resources Service has agreed to take over and continue monitoring the trend blocks with the assistance of Alberta Conservation Association staff.

5.0 Discussion

Total numbers of sharp-tailed grouse have fluctuated throughout the 3 years (4 years for the Milk River Ridge) of surveys for many of the identified leks. The main concern is the number of leks visited every year. This can affect overall general bird numbers, while also taking into consideration those leks that have been abandoned, have an expected loss of birds to mortality, i.e. predation and hunting (Ritcey 1995; Moyles and Boag 1981) and possibly have oversized lek sizes (Widemo and Owens 1999). Pepper (1972) suggested that a yearly fluctuation of dancing ground bird numbers could be related to habitat. He indicated that if numbers of males (in particular) remained approximately the same it could be a permanent condition. However, if numbers fluctuated widely, there could be some instability within the habitat conditions that may influence these changes. Therefore, it is important in future monitoring studies to observe the land conditions in addition to count in the number of birds at each and every lek. It is also important to maintain personal contact with the landowners and their activities and observations on range conditions. Land use changes and various lek disturbances, i.e. human activities, vegetation alterations and overgrazing (Giesen and Connelly 1993) can influence nesting habitat and reproductive opportunities, which in turn can influence lek movements (Miller 1999; Aldridge 1998; Baydack and Hein 1987 and Kirsh et al 1973).

6.0 Recommendations

1. Continue to monitor the leks already identified and make every effort to survey all leks on the property of co-operating landowners. There needs to be some consistency over the number of leks surveyed to be comparable over the years.

2. Continue to use trend blocks for counting birds, as this will cover entire areas and determine general numbers of grouse within an area.

3. Habitat management and monitoring should be encouraged on a regular basis. It will continue to benefit not only sharp-tailed grouse but also other species utilizing these areas.

4. The survey data is just beginning to show trend results and general numbers of sharp-tailed grouse in the selected areas of Alberta. It is suggested that this study continue for another 5 more years, as new leks are being discovered by various field methods, in addition to providing more information on habitat use and land use changes.

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APPENDIX A: Dancing grounds surveyed in the Milk River Ridge Project Area - 1999.

LEK #	DATE	TIME A.M.	NUMBER OF GROUSE SEEN				COMMENTS
			M	F	U	T	
MR03	APRIL 23	08:04	-	-	28	28	
	MAY 2	07:25	-	-	31	31	
	MAY 3	05:20	-	-	59	59	
	MAY 4	05:15	-	-	60	60	
MR06	MAY 2	07:00	16	3	-	19	
MR07	APRIL 13	07:55	20	3	-	23	
MR08	APRIL 18	07:10	-	-	23	23	
MR09	APRIL 18	06:55	9	2	-	11	
	APRIL 21	08:31	10	-	-	10	
MR10	MAY 12	06:40	15	4	4	23	
MR13	APRIL 26	06:20	-	-	11	11	
MR14	APRIL 20	06:30	-	-	28	28	
MR24	APRIL 21	06:20	-	-	10	10	
MR28	APRIL 26	06:40	-	-	-	-	NO LEK
MR30	APRIL 26	07:25	3	1	-	4	
MR33	APRIL 20	07:30	-	-	30	30	
MR34	APRIL 20	06:55	12	1	-	13	
MR35	APRIL 20	08:30	-	-	6	6	
MR39	APRIL 26		14	-	-	14	
MR40	APRIL 19	08:26	-	-	21	21	
	APRIL 26		18	3	-	21	
MR42	APRIL 26		-	-	14	14	
MR44	APRIL 26		15	-	3	18	
MR46	APRIL 18	07:35	-	-	31	31	
MR47	APRIL 21		-	-	50 - 60	50 - 60	ESTIMATE
	APRIL 27	07:37	24	-	UNK	24 +	INCOMPLETE
	MAY 6	07:00	-	-	31	31	
MR48	APRIL 21	06:33	-	-	16	16	
MR49	APRIL 21	07:00	-	-	16	16	
	APRIL 27	07:35	15	2	-	17	
	MAY 6	07:25	15	-	-	15	
MR51	APRIL 27	07:09	17	1	-	18	
MR52	APRIL 27	06:10	40	-	16	56	INCOMPLETE
	MAY 6	05:45	-	-	38	38	
MR53	APRIL 13	07:21	10	-	-	10	

MR54	APRIL 27	07:30	-	-	-	-	NO LEK
MR55	APRIL 27	06:25	5	-	-	5	
	MAY 6	07:20	20	-	-	20	
MR56	APRIL 27	06:05	-	-	-	-	NO LEK
MR57	APRIL 23	06:00	-	-	16	16	
	APRIL 27	07:00	10	2	2	14	
MR59	APRIL 13	07:15	-	-	9	9	
MR60	APRIL 13	07:45	-	-	21	21	
	MAY 2	06:32	16	3	-	19	
MR61	APRIL 13	06:50	-	-	11	11	
MR62	APRIL 26	06:30	-	-	6	6	New 1999
MR63	APRIL 26	08:10	18	2	0	20	New 1999
MR64	APRIL 26	-	22	6	-	28	New 1999
MR65	APRIL 26	06:18	-	-	46	46	New 1999
		08:40	-	-	27	27	
MR66	APRIL 26	06:58	-	-	11	11	New 1999
MR85	MAY 2	08:20	10	-	3	13	New 1999
		08:00	14	-	1	15	
	Total		368	33	716+	1117+	

ESTIMATE : Birds not active, Low count

INCOMPLETE: Birds on knoll, could not get good count

Appendix B: Landowner dancing ground comparisons in the Milk River Ridge Project Area - 1996- 1999.

Lek I.D.	Landowner Code	1999				1998				1997				1996				Comments
		M	F	U	T	M	F	U	T	M	F	U	T	M	F	U	T	
MR 02	MR005					31	5	0	36	26		2	28	37	4		41	
MR 04	MR005					39	0	0	39	37		1	38	33	3		36	
MR 07	MR003	20	3		23			22	22	16		7	23	8	3	5	16	
MR 08	MR004,MR005			23	23	22	0	0	22	20	2	0	22	17	5		22	
MR 10	MR003	15	4	4	23	20	3	0	23	27	3	4	34			22	22	
MR13	MR001			11	11	9		10	19			4	4	4			4	
MR 14	MR002			28	28	17		1	18	11	0	0	11	16	2	3	21	
MR 15	MR002																	Abandoned
MR 22	MR009					11	0	0	11	21	2	5	28	22	4	11	37	
MR 24	MR002			10	10	27	2	0	29	30	0	0	30					No Survey 1996
MR 28	MR001				N/L			12	12			17	17			20	20	
MR 29	MR001					25	3	0	28			33	33					New Ground 1997
MR 32	MR002					39	0	0	39			31	31					New Ground 1997
MR 33	MR002			30	30	15		2	17	30		4	34					New Ground 1997
MR 34	MR002	12	1		13	15	0	0	15	11	3	5	19					New Ground 1997
MR 35	MR002			6	6			3	3			4	4					New Ground 1997
MR 38	MR002					27	4	0	31									
MR 46	MR007			31	31			35	35									New Ground 1998
MR 49	MR007	15	2		17			12	12									New Ground 1998
MR 50	MR005							20	20									New Ground 1998
MR 51	MR005					22	4	0	26									New Ground 1998

1999 1998 1997 1996

MR 53	MR003	10			10	12	4	0	16									New Ground 1998
MR 57	MR004,MR007	10	2	2	14			12	12									New Ground 1998
MR 58	MR003							25	25									New Ground 1998
MR 59	MR006			9	9			14	14									New Ground 1998
MR 60	MR006			18	18			25	25									New Ground 1998
MR 61	MR006			11	11			13	13									New Ground 1998
	Total	82	12	183	277	331	25	206	562	229	10	117	356	137	21	61	219	

Note: For grounds that were surveyed more than once, the count with the greatest number of total birds observed was used.

Appendix C: Landowner dancing ground comparisons in the Writing-on-Stone Project Area - 1997- 1999.

Lek I.D.	Landowner Code	1999				1998				1997				Comments
		M	F	U	T	M	F	U	T	M	F	U	T	
WR 04	WOS001					20	2	0	22	31	3	0	34	
WR 05	WOS001			11	11	18	5	0	23					
WR 09	WOS001			20	20	17	2	0	19					
WR 19	WOS001					4	1	0	5	13	0	0	13	
	Total	0	0	31	31	59	10	0	69	44	3	0	47	

Note: For grounds that were surveyed more than once, the count with the greatest number of total birds observed was used.

Appendix D: Landowner dancing ground comparisons in the Foothills Project Area - 1997- 1999.

Lek I.D.	Landowner Code	1999				1998				1997				Comments
		M	F	U	T	M	F	U	T	M	F	U	T	
FH 29	FH004	19			19	9	14	0	23	29	2	0	31	
FH 30	FH004					0	0	0	0	8	1	0	9	Abandoned 1998
FH 38	FH004			29	29	22	27	0	49			22	22	
FH 42	FH002			27	27			9	9	13	1	0	14	
FH 46	FH001,FH005			9	9					3	2	0	5	
FH 47	FH002,FH003			13	13	10		5	15			7	7	
FH 52	FH001,FH006			16	16									
	Total	19	0	94	113	41	41	14	96	53	6	29	88	

Note: For grounds that were surveyed more than once, the count with the greatest number of total birds observed was used.

APPENDIX E: **Landowner dancing grounds surveyed in the Special Area #4 Project Area – 1999. Note: New lek I.D. No.**

Old Lek I.D.	New Lek I.D.	Landowner Code	DATE	TIME A.M.	NUMBER OF GROUSE SEEN				COMMENTS
					M	F	U	T	
K/1	SA4-01	SA004							
7/2	SA4-02								
7/3	SA4-03	SA001							
12/1	SA4-04								
12/2	SA4-05								
12/3	SA4-06	SA003							
12/4	SA4-07	SA001							
13/1	SA4-08								
13/5	SA4-09	SA001							
13/6	SA4-10								
14/1	SA4-11	SA003							
14/2	SA4-12	SA003							
14/3	SA4-13	SA003							
14/4	SA4-14	SA003							
14/5	SA4-15	SA003	APRIL28	16:30	-	-	-	-	Ground active/ no count
14/6	SA4-16	SA003							
14/7	SA4-17	SA003							
16/1	SA4-18	SA001	APRIL27	06:18	15	5		20	
16/2	SA4-19	SA001	APRIL27	06:48	6	1		7	
16/3	SA4-20	SA001	APRIL27	07:04	12	4	2	18	
16/4	SA4-21	SA001	APRIL27	07:21	9	1		10	
17/A	SA4-22								
17/1	SA4-23	SA003	APRIL27	05:38	11	2	1	14	

17/2	SA4-24	SA002, SA003	APRIL27	06:00	3		3	6	
17/3	SA4-25	SA002							
17/4	SA4-26	SA002	APRIL27	06:15	19		15	34	
17/5	SA4-27	SA003	APRIL27	06:20	16			16	
17/6	SA4-28	SA002	APRIL27	07:00			6	6	
17/7	SA4-29	SA002							
17/8	SA4-30	SA002	APRIL27	07:20	9		11	20	
17/9	SA4-31	SA002	APRIL27	07:45			8	8	
17/10	SA4-32	SA002	APRIL27	07:50			12	12	
17/11	SA4-33	SA002	APRIL27	08:32			2	2	
17/12	SA4-34	SA002	APRIL27	06:35			27	27	
17/13	SA4-35	SA002	APRIL27	08:15			9	9	
18/5	SA4-36	SA003	APRIL28	06:05			10	10	
21/1	SA4-37	SA005							
21/3	SA4-38	SA005	APRIL28	06:55			11	11	
21/4 (22/12)	SA4-39	SA005	APRIL28	06:05	9	1		10	
22/1	SA4-40	SA005	APRIL28	06:03			27	27	Grazed heavily
22/3	SA4-41								
22/8	SA4-42								
22/9	SA4-43								
22/10	SA4-44								
22/11	SA4-45								

22/13	SA4-46								
23/1	SA4-47								
23/2	SA4-48								
23/3	SA4-49								
23/4	SA4-50								
24/4	SA4-51	SA004	APRIL28	07:15			21	21	
24/5	SA4-52								
24/6	SA4-53								
24/7 (24/3)	SA4-54	SA005	APRIL28	06:31	15		2	17	
24/8	SA4-55	SA004							
24/9	SA4-56	SA004							
29/1	SA4-57								
29/2	SA4-58								
30/5	SA4-59								
31/1	SA4-60								
31/2	SA4-61								
32/1	SA4-62								
32/5	SA4-63								
32/6	SA4-64								
32/7	SA4-65								
34/3	SA4-66								
			Total		124	14	167	305	

Appendix F: Landowner dancing ground comparisons in the Special Area #4 Project Area - 1997- 1999.

New Lek I.D.	Landowner Code	1999				1998				1997				Comments
		M	F	U	T	M	F	U	T	M	F	U	T	
SA4-01	SA004					13	1	0	14			12	12	
SA4-03	SA001					17	2	0	19			22	22	
SA4-06	SA003					23	3	0	26			11	11	
SA4-07	SA001					19	1	0	20			23	23	
SA4-09	SA001					13	3	0	16			16	16	
SA4-11	SA003					13	0	0	13			17	17	
SA4-12	SA003					16	7	0	23			14	14	
SA4-13	SA003					18	0	0	18			17	17	
SA4-14	SA003					11	3	0	14			11	11	
SA4-15	SA003	-	-	-	-	12	3	0	15			21	21	
SA4-16	SA003					17	1	0	18			22	22	
SA4-17	SA003					10	0	0	10			4	4	
SA4-18	SA001	15	5		20	17		10	27			19	19	
SA4-19	SA001	6	1		7	0	0	0	0			21	21	Active 1998, no count
SA4-20	SA001	12	4	2	18	25		8	33			21	21	
SA4-21	SA001	9	1		10	17	0	0	17			17	17	
SA4-23	SA003	11	2	1	14	20	8	0	28			19	19	
SA4-24	SA002, SA003	3		3	6	8	1	0	9			12	12	
SA4-25	SA002											0	0	
SA4-26	SA002	19		15	34	21	2	0	23			24	24	
SA4-27	SA003	16			16	20	6	0	26			18	18	
SA4-28	SA002			6	6	18	0	0	18			31	31	

SA4-29	SA002													
SA4-30	SA002	9		11	20	22	6	0	28			24	24	
SA4-31	SA002			8	8	28	8	0	36			22	22	
SA4-32	SA002			12	12	13	2	0	15			10	10	
SA4-33	SA002			2	2	20	3	0	23			17	17	
SA4-34	SA002			27	27	19	4	0	23			14	14	
SA4-35	SA002			9	9	15	4	0	19			32	32	
SA4-36	SA003			10	10	10	2	0	12			8	8	
SA4-37	SA005											20	20	
SA4-38	SA005			11	11							11	11	
SA4-39	SA005	9	1		10							17	17	
SA4-40	SA005			27	27							14	14	
SA4-51	SA004			21	21	18	15	0	33			28	28	
SA4-54	SA005	15		2	17							12	12	
SA4-55	SA004											6	6	
SA4-56	SA004											32	32	
	Total	124	14	167	305	473	85	18	576			639	639	

Note: For grounds that were surveyed more than once, the count with the greatest number of total birds observed was used.

APPENDIX G: Trend Block Survey Data - 1999

BLOCK #	DATE	NUMBER OF GROUSE SEEN				COMMENTS
		M	F	U	T	
I	April 21	10		74	84	
I	April 23			141	141	
I	April 26	18	2	9	29	Two new leks found
II	April 19			59	59	
II	April 20			5	5	
WOS	April 29	5			5	
WOS	May 3	22	3	39	64	One new lek found
WOS	May 4			3	3	
WOS	May 5		12	56	68	One new lek found
WOS	May 6			30	30	
Total		55	17	416	488	