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SHARP-TAILED GROUSE
AND THE ALASKA HIGHWAY
TRANSPORTATION CORRIDOR

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PART ONE

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YUKON WILDLIFE BRANCH

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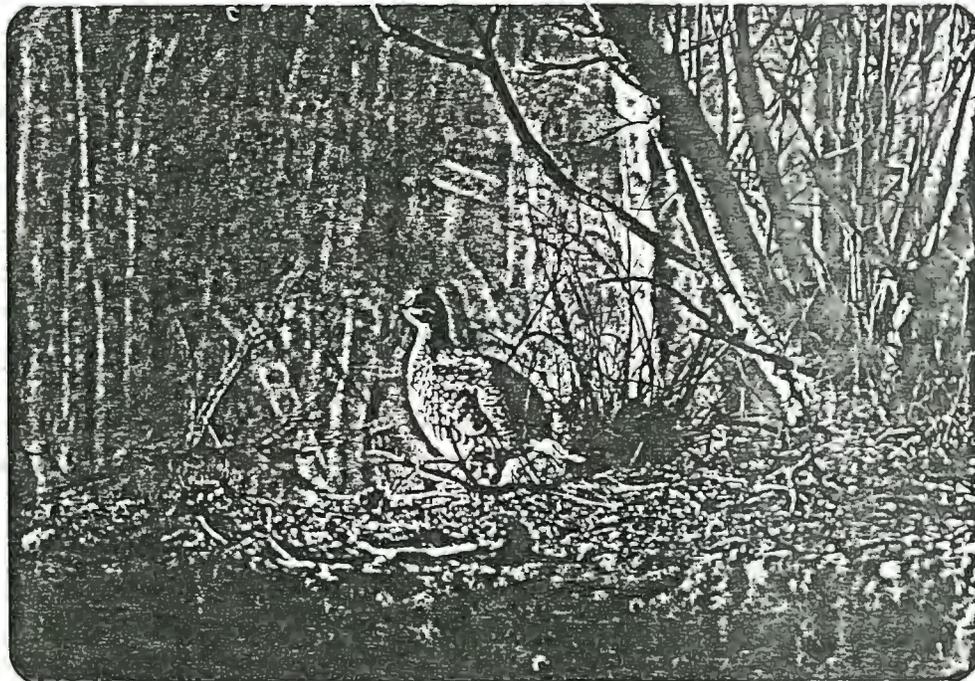
TABLE OF CONTENTS

Introduction	1
Backbround	2
The study	3
Results	8
A. distribution	8
B. habitat utilization and movements	25
late winter habitat and movement	29
food habits	31
C. lekking	33
timing	33
lekking habitats	33
Discussion and protective measures	37
population vulnerability	37
susceptibility to disturbance	38
timing	39
lekking grounds	39

SHARP-TAILED GROUSE AND THE ALASKA
HIGHWAY TRANSPORTATION CORRIDOR

PART I - Population Estimates and Habitat Utilization During
Early Spring.

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INTRODUCTION

In the preliminary assessment of the impacts of construction of a gas line along the Alaska Highway corridor as proposed by Foothills Pipe Lines (S. Yukon) Ltd., Sharp-tailed grouse populations in the corridor were identified as a possible source of concern. The Yukon Wildlife Branch (In: Environmental Concerns and Recommendations of the Yukon Wildlife Branch;

July 7, 1977) proposed that a basic ecological study including inventory and analysis of critical habitats be conducted to properly ascertain and mitigate possible adverse effects. Two years of study were proposed. This would cover all seasons although lekking (communal courting) habitats were suggested as the most immediate concern.

Subsequently, in the summer 1978, funding for the portion of the study addressing habitat usage during lekking was advanced. The present report treats the results of that study. A second part to the study, addressing brood habitat usage and wintering habitats is currently underway and will form Part II of the study.

BACKGROUND

The occurrence of sharp-tailed grouse in localized areas of the South - Western and West - Central Yukon has been known for some time (Rand, 1946). Godfrey (1976) describes sharp-tails in the Yukon as *Pediacetes phasianellus caurus*. Virtually no census or other population research had been conducted prior to the present work. Hunter questionnaire returns indicate the bird is shot regularly in the Alaska Highway corridor and a variety of authors have cited the bird as occurring there (Hoefs, 1970).

The concern for their welfare was mostly hypothesized prior to this study. It was generated from the very localized distribution, their apparently small sub-population and their suspected vulnerability during spring lekking - a process completely unknown in the Yukon birds. It was hypothesized that

winter habitat would be localized and perhaps vulnerability to alternate land uses as well.

THE STUDY

An area 2 km either side of the proposed gas pipeline was chosen as the study corridor. Sharp-tailed grouse records are primarily restricted to western sections of the corridor. This study was largely oriented to that area and most concentrated work was conducted from Destruction Bay to the Alaska border.

(a) Questionnaire Analysis: In late summer 1978, a search of hunter returns was carried out to isolate respondents that reported shooting sharp-tailed grouse in the study corridor. A questionnaire was taken to all available hunters who had reported shooting sharp-tailed grouse in Management Zone 5 in 1976 and 1977. Twelve of sixteen hunters were contacted and nine of these were visited in person. A picture from an Alberta Government pamphlet was used to identify sharp-tailed grouse. The questionnaire was designed to determine where, how many and in what habitats sharp-tailed grouse were being shot or observed. These areas were later visited to determine the major plant species present and to census for grouse.

(b) Late Winter Habitat Utilization: The objectives of this work were to 1) locate grouse during late winter and decide the general habitat used; 2) quantify foods used during late winter; 3) record the timing of commencement of display activities and any associated movements from wintering habitat.

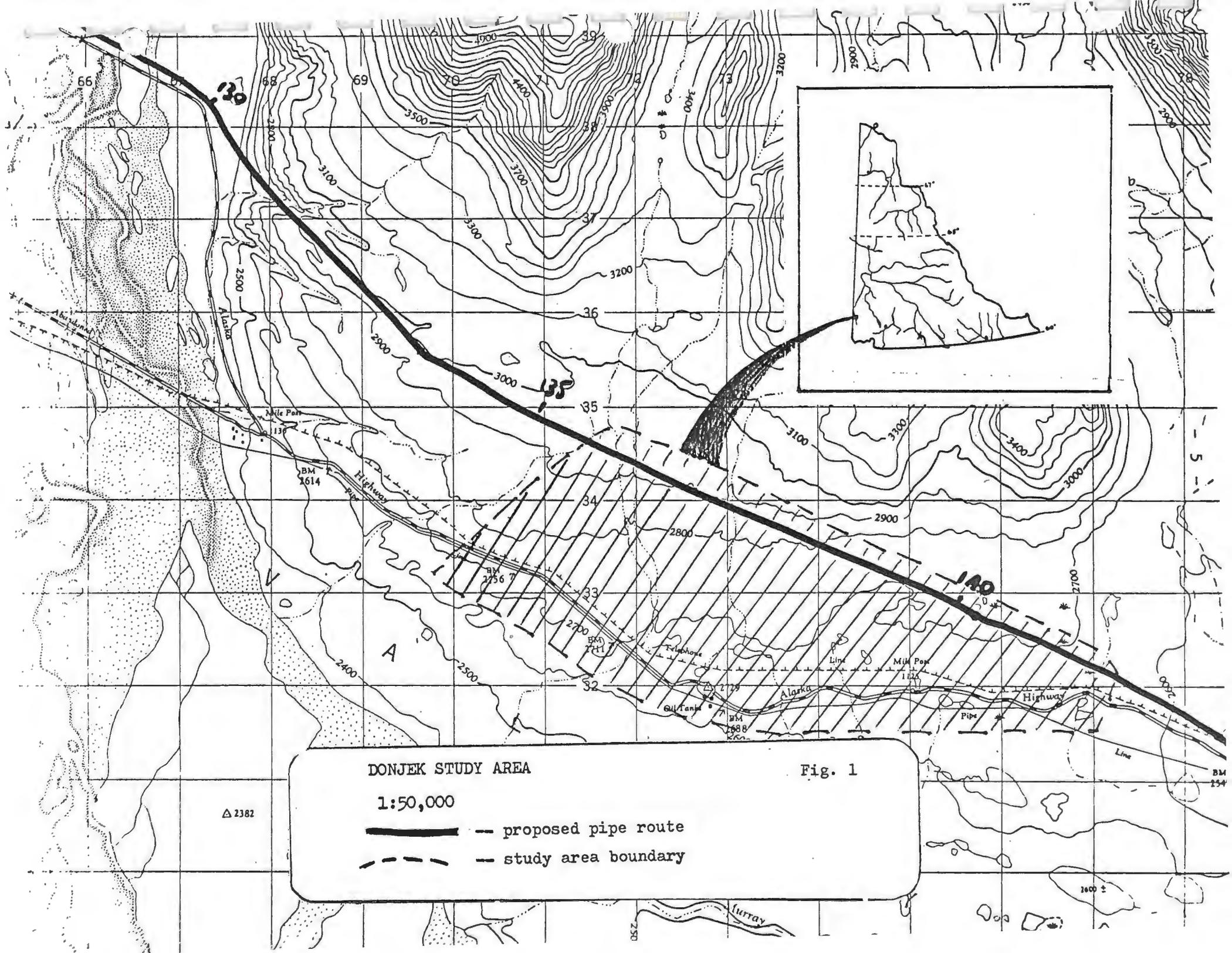
In late winter, 1979 field searches were conducted on all areas identified as potential grouse habitats. Skis were used to traverse the areas. Field times covered periods from dawn until grouse activity ceased in mid-day and during evening until dark. An attempt was made to cover areas systematically. Brief stops were made throughout to listen for calling grouse. All calls, tracks and sighted grouse were recorded on standardized data cards. 34 observation slots were filled in on each card detailing species, time, flock size, behaviour, vegetative cover and location.

When birds or tracks were located, trails in the snow were followed, each plant fed upon was identified and recorded. Sample of trails covering 10 plants visited were recorded, 10 samples from each observation period. A small number of grouse were collected to confirm these food habit data.

(c) Dancing Ground Utilization: The following objectives were pursued:

- 1) Locate lekking areas;
- 2) Describe habitat at lekking sites;
- 3) Census lekking males;
- 4) Describe movements and use of habitat near lekking sites.

Leks were located by listening for the sound of displaying birds in the period one half hour before sun rise to mid-morning. The calls of displaying grouse can be heard for considerable distance in good weather; it is unlikely that any major dancing grounds were missed. All areas identified as potentially supporting grouse were visited and surveyed.



Concurrent with this extensive survey, one of the better areas of occupied habitat at the Donjek River was chosen for more intensive study. This area (Fig. 1) was used to address the problem of lekking habitats, and the movements of grouse during spring.

All leks on the area were located and mapped. The vegetation on the lekking areas and all areas where grouse were found was described by growth form, relative frequency of occurrence of the dominant cover and by the approximate percent ground covered.

The number of cocks attending the various leks was determined by observing from concealment. A sample of cocks from each lek was captured with mist nets stretched along the borders of the display ground. These birds were marked with coded coloured plastic leg bands to facilitate individual identification. Cocks were also equipped with radio transmitters powered by solar cells. A harness affixing the radio to the back of the birds was utilized (Fig. 2). Only two cocks could be radioed in the lekking period. The telemetry study will be reported more fully in later reports as it will relate more directly to summer and winter movements.

The movements of colour marked birds and the radioed birds were followed throughout the spring lekking period.

Fig. 2



Sharp-tails were captured with mist nets on dancing grounds and marked with coloured leg bands.



A cock sharp-tailed grouse equipped with a solar powered transmitter.

RESULTS

A. Distribution

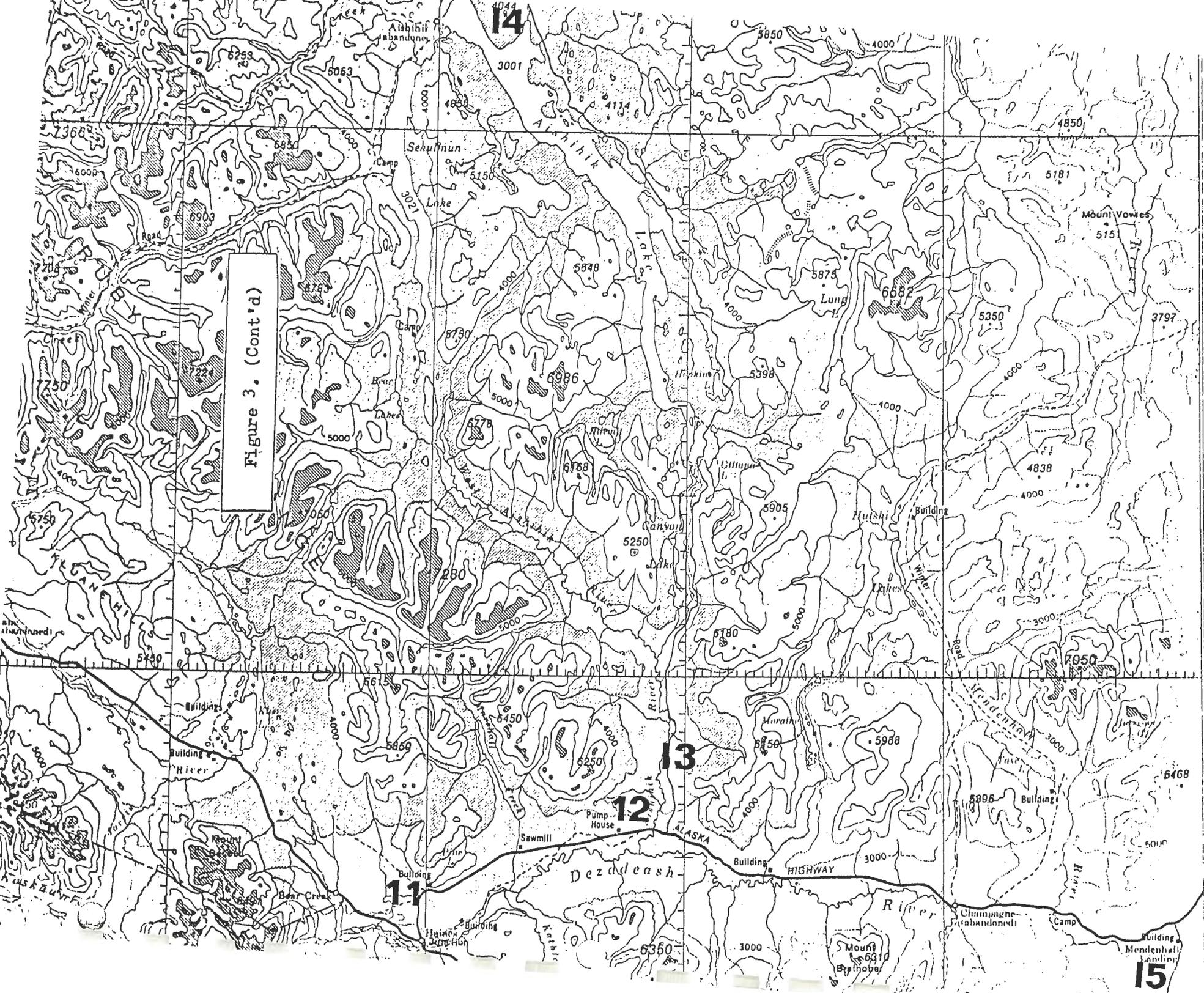
Figure 3 gives approximate locations of areas identified by hunter returns, Y.T.G Wildlife Branch files and this study as supporting sub-populations of sharp-tailed grouse.

Area 1. Location: Scottie Creek; 1 km east of the Alaska border.

Population Size: Two respondents and Y.T.G. files report scattered groups of sharp-tailed grouse along the bog flats of Scottie Creek. No birds were seen in the area during this survey. Spring population is estimated at 20 to 40 adults.

Leks: No leks were identified in the study corridor. It is unlikely that display is occurring in the corridor.

Vegetation: The major species (approximate height and density in parentheses) were willow (1.5 to 2 m, 55%), dwarf arctic birch (0.1 to 0.2 m, 20%), labrador tea (0.15 m, 10%) and sphagnum mosses (0.01 to 0.02 m, 30%). Grass hummocks covered about 60% of the area. Paper birch (4 m, 15%) was scattered over the area, mainly in a 2.0 to 3.0 mile stretch in the middle of the bog. Black spruce was found towards the periphery of this open area and were less than one metre tall towards the road. In



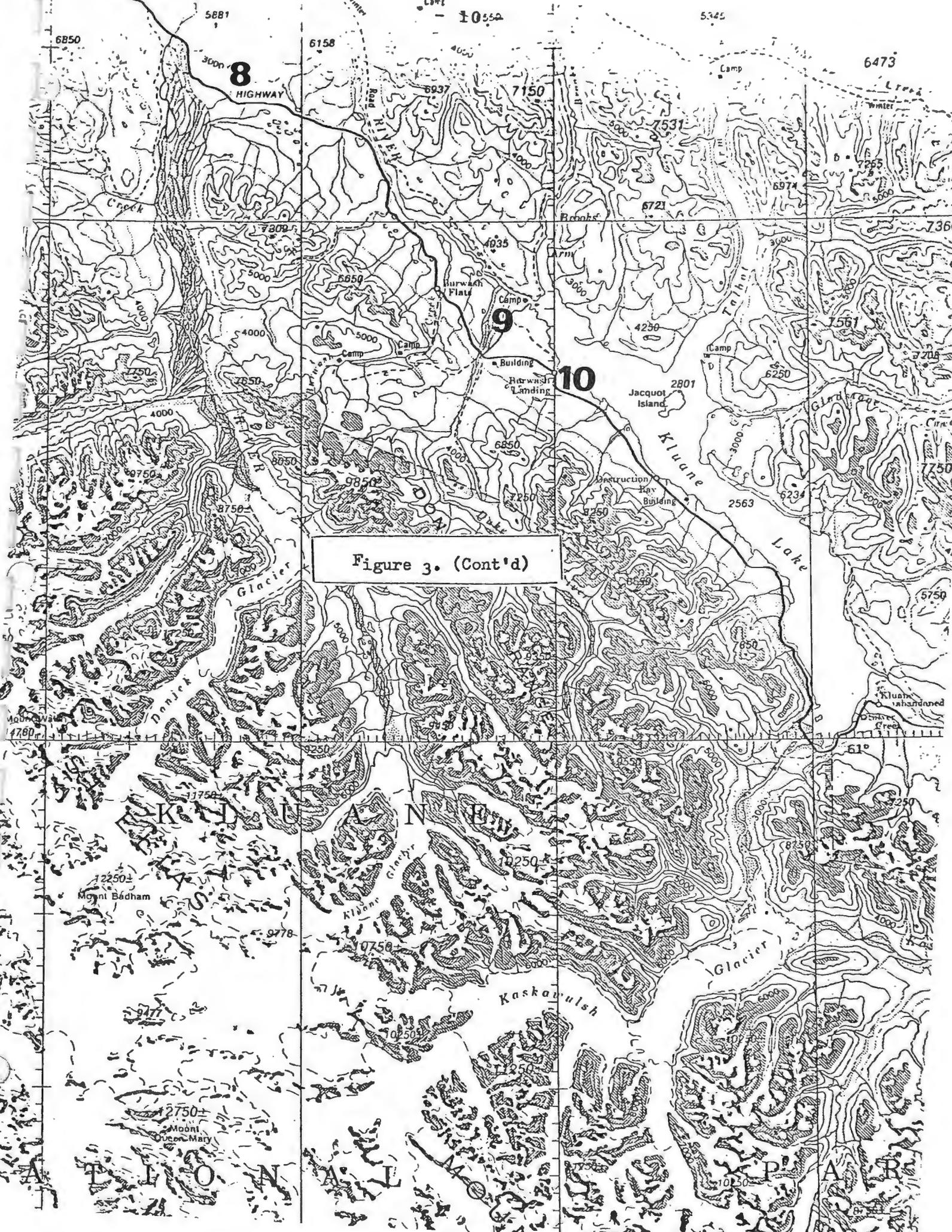


Figure 3. (Cont'd)

addition to the Alaska Highway, there were some open areas in the bog suitable for display.

Area 2. Location: Snag Creek willow flats; 9 km north of Beaver Creek. The area of similar habitat is extensive on other side of the corridor which crosses it about the middle.

Population Size: One respondent reported shooting sharp-tailed grouse here and several sight records exist for the area. This study recorded no grouse in the corridor area. Population size here is estimated at 50 birds in spring.

Leks: No leks were identified in the corridor. It is unlikely any display is occurring in the corridor.

Vegetation: Black spruce (3 m, less than 5%), willow (1 to 2 m, 60%), dwarf arctic birch (0.75 m, 30%), grass hummocks (0.2 m, 60%), bush cinquefoil (0.1 to 0.2 m, less than 5%) and raspberry (0.05 m, less than 5%) were major species. Poplar (3 to 4 m, 40%) was clumped along the road in a 0.5 square mile area. In addition to the Alaska Highway, there were open areas in the bog suitable for display. There were road improvements being carried out on the portion of the Alaska Highway bisecting this area.

Area 3. Location: Old Saw Mill Road; 4.3 km north of Beaver Creek. (NOT IN STUDY CORRIDOR).

Population Size: One respondent reported shooting sharp-tails here and saw "several" flocks of eight to ten.

No birds were observed in this study. No estimate of population size is possible.

Leks: No leks are known to occur in study corridor.

Vegetation: Within one mile of the highway the tree species were poplar (15 to 20 m, 80%) and black spruce (5 to 6 m, 10%). The understory was composed of bearberry, 60%; willow, 10%; twin flower, 10%; mountain cranberry, 20%; prickly rose, less than 10%; fireweed, 20%; lupine, 10%; and grasses, 40%. Along the next mile black spruce predominated with scattered stands of poplar adjacent to the road. At mile two the road divided. The right fork was 0.1 mile long and stopped at Beaver Creek. Immediately alongside the creek were willow (3 m, 90%), poplar (4 m, less than 5%), horsetail (80%), fireweed and three species of grasses. Beyond this border the forest was comprised mainly of 10 to 12 metre black spruce to the north, with the addition of scattered 10 metre poplar to the south. The creek made a U-shaped curve in this area and the inside of this was vegetated by dense poplar, willow immediately adjacent to the creek and scattered alder. The left fork of the road had a dense border of alder and willow two to three metres high. Behind this was an extensive spruce bog. Fireweed and equisetum predominated in the ground cover.

Area 4. Location: Western boundary of Beaver Creek townsite.

Population Size: Hunters and local residents suggested that in past years this area was productive for sharp-tails. The trapper in the area, however, said he had never found sharp-tails there. There may have been a small group of birds utilizing disturbed areas caused during road construction. The present study recorded tracks in the area which may have been sharp-tailed grouse.

Leks: None are known in the study corridor.

Vegetation: There had been a lot of disturbance due to the construction of buildings, roads and trails. This had created many open areas suitable for display. Near these disturbed areas the vegetation consisted of willow, dwarf arctic birch, alder and aspen poplar up to two metres in height. The herb layer was made up of fireweed, lupine, mountain cranberry and grasses. White spruce, mainly seven to eight metres but up to 15 metres and aspen poplar, 15 to 20 metres in height, were scattered throughout. About 350 metres north and west, the number of spruce increased both in size and number; labrador tea and sphagnum were abundant; and the area became slightly boggy.

Area 5. Location: Snag Road and Snag Airport area (NOT IN STUDY CORRIDOR).

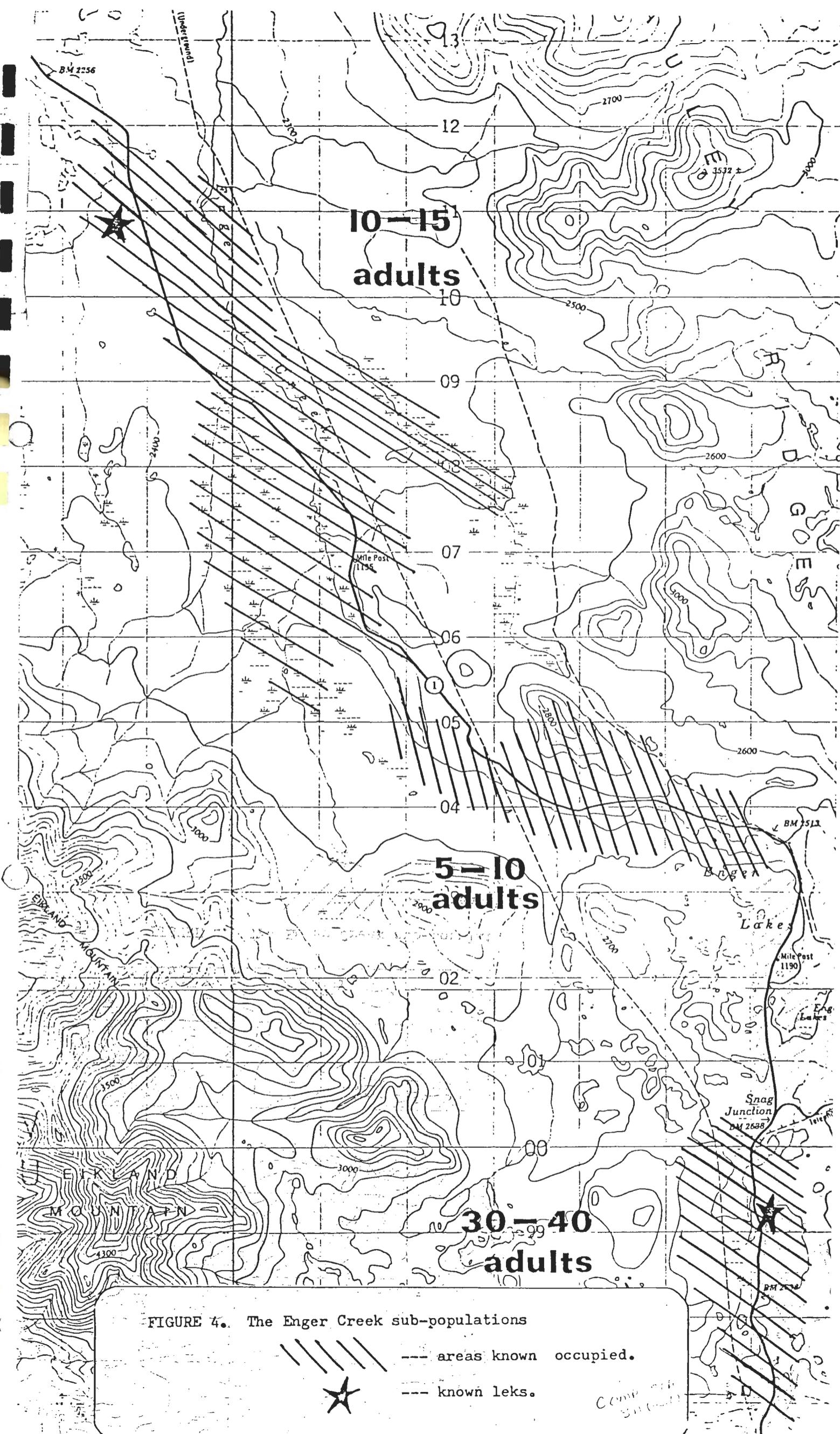
Population Size: Many people report hunting and observing sharp-tailed grouse in this area. Birds were reported from all areas along the road but were

concentrated around the airport site. In the present study, scattered observation of sharp-tailed grouse in small groups and hens with broods were recorded. The best estimate of numbers based on present data would range between 100 to 200 adults.

Leks: None are known in the study corridor.

Vegetation: The dense vegetation immediately alongside the road was composed of 0.1 to 3 metre willow, buffaloberry, cinquefoil, lupine and fireweed. Behind this was an area of balsam poplar (10 to 15 m, 30 to 40%), white spruce (1 to 10 m, 10%), willow (1 to 5 m, 30%), cinquefoil (10%), fireweed (10%), prickly rose (10%), lupine (20%), red fruit bearberry (50%), mountain cranberry (50%), and sphagnum mosses (10%). While censusing farther northwest of the road a female sharp-tailed grouse with five to six young flushed from the ground to trees in a relatively open area. The vegetation was willow (1 to 2.5 m, 30%), white spruce (3 m, 10%), red fruit bearberry (10 to 15%), mountain cranberry (10 to 15%), cinquefoil (less than 10%), labrador tea (less than 10%), fireweed (less than 10%), arrowleaf coltsfoot (less than 5%), and sphagnum mosses (less than 10%).

In general, the area near Snag town was a mixture of spruce and poplar with willow and alder immediately beside Snag Creek and the road edge. Most of the openings were man-made; the vegetation in one such



**10-15
adults**

**5-10
adults**

**30-40
adults**

FIGURE 4. The Enger Creek sub-populations

-  --- areas known occupied.
-  --- known leks.

Camp site

area consisted of poplar (1 to 3 m, 50%), 1 to 1.5 m willow (1 to 1.5 m, 40%), prickly rose (0.1 m, less than 10%), labrador tea (10%), bearberry (15%), fireweed (10%), and lupine (10%). The vegetation around this opening was quite variable: poplar (1 to 20 m, 10 to 80%), spruce (1 to 10 m, 10 to 40%), willow (2 to 4 m, less than 10 to 30%), labrador tea (0.2 to 0.5 m, 20 to 60%), prickly rose (0 to 10%), sphagnum mosses (less than 10%).

Area 6. Location: Enger Creek area, extending about 15 km north and four to five km south of the Snag Junction.

Population Size: This area appears to support three small sub-groups (Fig. 4). In total the area currently supports about 45 to 65 adult grouse in spring.

Leks: Two leks were located. No lek was located in the central area. These birds may join one of the other groups in spring or alternately occupy a lek as yet undiscovered. All leks known occur in the study corridor at the locations mapped in Figure 3.⁴ ?

Vegetation: The vegetation along the west side of the road consisted of poplar (1 to 10 m, 80 to 90%), willow (1 to 3 m, 30%), spruce (0.1 to 15 m, less than 10%), alder (2 m, less than 5%), fireweed (0.2 m, 40%), and occasionally prickly rose. Behind this border there was a very open bog of wet grass hummocks with scattered black spruce (1 to 2 m) and knolls of poplar. The hummock vegetation

consisted of grasses (0.1 m, 90%), dwarf arctic birch (0.5 m, 10%), cinquefoil (0.5 m, 10%), narrow-leaf labrador tea (0.1 m, less than 10%), black spruce (0.1 to 2 m, 10%), mountain cranberry (20%), and red fruit bearberry (20%). In places the water was up to 0.2 metres deep. The knolls, much drier than the remaining bog, and constituting only about 20 to 30% of the area, were vegetated with poplar (5 to 10 m, 70 to 80%), black spruce (1 to 5 m, 50%), willow (1 m, less than 10%), buffaloberry (0.2 to 0.3 m, 20%), prickly rose (0.1 to 0.2 m, 10%), mountain cranberry (70%), and fireweed (0.2 m, 10%). Some knolls had more black spruce, labrador tea, starry cassiope, and sphagnum mosses. The east side of the road had bush edge of willow, prickly rose, fireweed and small amounts of poplar; the black spruce bog behind it was very dense in places and did not have the extensive openings of the west side.

Area 7: Location: The old White River Mine road and gravel flats north of Alaska Highway.

Population Size: Sight records occur for the area but no hunters report killing grouse in the area. No observations of grouse were made during the present study although suitable habitat was identified.

Leks: No leks were identified in the study corridor.

Vegetation: The vegetation in one open bog area consisted of a dense ground cover of bearberry, bog blueberry,

fireweed, sphagnum mosses, horsetail, and sedge (thought to be *Eleocharis* sp., sample lost) as well as paper birch (1 metre bush to 4 metres tree), willow (1 to 3 m), black spruce (2 to 5 m), and alder (1 to 2 m). The tree composition varied from 10% paper birch on the west to 10% black spruce on the east. Immediately along the road for most of the route was a dense three metre thicket of alder and willow. Behind this there was a mixed paper birch - spruce forest with willow and alder shrub layer. The ground cover in part of that area consisted of mountain cranberry, early blueberry, grasses and sphagnum mosses. This appeared to be a rather dense forest extending over the hills on both sides of the road.

Area 8. Location: Six to 15 km south along the study corridor from the crossing of the Donjek River.

Population Size: Several hunters report shooting birds from flocks of 30 to 50 in the area. The current study concentrated effort in this area; based on counts of males at lekking sites the total population is estimated at 80 to 100 adults in spring. Four or five sub-groups were identified with separate dancing grounds.

Interchange between alternate lekking areas was documented on several occasions. These birds apparently can use several small dancing areas and have the ability to shift between them on alternate days.

LEGEND:



--- Location of Dancing grounds. (Arrows show sites known to be temporary or alternate grounds.)

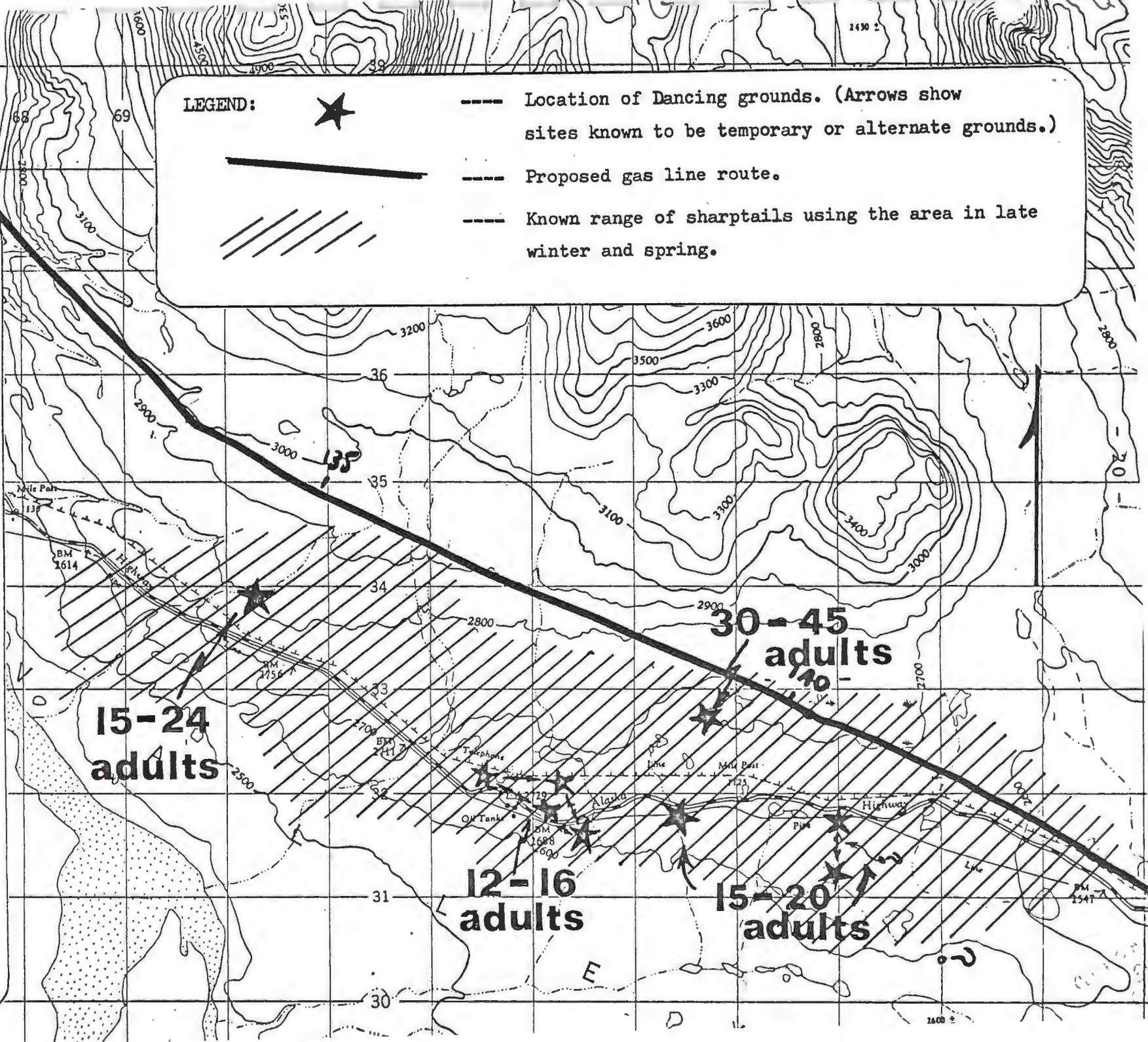


--- Proposed gas line route.



--- Known range of sharptails using the area in late winter and spring.

Figure 5. The Donjek Burn population showing locations of active leks and estimated spring population size in 1979.



More work will be required to document this observation fully and to test the idea that it has significance as a survival strategy in the habitat the sharp-tailed grouse utilize.

Leks: Fourteen lekking areas were identified. Figure 4 gives the locations for nine of the most important of these.

Vegetation: An old burn 5.5 miles south of the Donjek River bridge was vegetated by willow (0.5 to 2 m, 40%), buffaloberry (0.5 m, 20%), cinquefoil (0.3 m, 10%), labrador tea (0.2 m, 40%), bearberry (60%), legumes (10%), red fruit bearberry (20%), and horse-tail (40%). In some areas the willow was taller and denser and poplar (8 to 10 m, 10 to 15%), fireweed, lupine, and dwarf arctic birch were present.

Area 9. Location: Duke River meadows and Burwash Airport.

Population Size: Recent hunters report finding no grouse in the Duke Meadow. Historically, the area has supported a population estimated between 30 to 50 adults. The present study located two broods of sharp-tailed grouse near the meadow indicating that the area is still used by a remnant group.

Leks: None are currently being used within the study corridor and no information exists as to the location of leks in the past.

Vegetation: Vegetation is dominated by a dry grass meadow bordered by willow (1.5 to 5 m), legumes (20%),

and grasses (30%). North of the airstrip was a spruce forest edged by short willow.

Area 10. Location: Half Breed Creek.

Population Size: This area was suggested by a local resident. No grouse specimens are known from the area and the present study recorded no sharp-tailed grouse in the area.

Leks: None are known in the study corridor.

Vegetation: The lower creek valley is vegetated by an open bog association. No detailed description was made.

Area 11. Location: North of the town of Haines Junction.

Population Size: Sight records of flock of about six sharp-tailed grouse have been made in the area. The present study recorded no sharp-tailed grouse in the area.

Leks: None are known in the study corridor.

Vegetation: The forest in this area was generally open and composed by aspen poplar (1 to 15 m, 60 to 90%), buffaloberry (1 m, less than 5%), bearberry (10 to 40%), swamp gooseberry (0.2 m, less than 5 to 15%), and fireweed (less than 5 to 10%). Along the forest edge - grassland interface there was also some balsam poplar. Within the forest itself were scattered areas of resin and dwarf arctic birch (1 m, 70 to 80%), aspen poplar (1 to 2 m, 10%), buffaloberry (1 m, less

than 10%), white spruce (0.5 to 10 m, less than 5%), willow (1.5 m, less than 5%), bearberry (40 to 50%), and fireweed.

On the east side of the highway was an old burn composed of aspen poplar (3 to 10 m, 70 to 80%), willow (1 to 2 m, 30 to 40%), spruce (less than 1 m, less than 5%), buffaloberry (1 m, 10 to 20%), prickly rose (0.5 m, 10%), mountain cranberry (5 to 20%), fireweed (0.75 m, 20 to 40%) and lupine (0.1 to 0.2 m, less than 5%). Mixed among the aspen was a flat area consisting of willow (1 to 2 m, 50 to 60%), aspen poplar (less than 1.8 m, 10 to 15%), spruce 0.2 m, less than 5%), bearberry (0 to 10%), fireweed (15 to 20%), lupine (10%), grasses (less than 5%) and mosses (30%).

Area 12. Location: Two to three km west of the Aishihik River in the study corridor.

Population Size: Sight records of flock of 10 to 12 sharp-tails have been made in the area. The present study recorded no sharp-tailed grouse.

Leks: None are known in the study corridor.

Vegetation: The vegetation was patchy and consisted of stands of white spruce, aspen poplar and mixed white spruce - aspen poplar. The vegetation in the mixed area was composed of aspen poplar (2 to 8 m, 20%), spruce (1 to 10 m, 15%), willow (1 m, 10%), buffaloberry (less than 1 m, 10%), bearberry (80%), fireweed

(less than 10%), globe anemone (less than 5%), grasses (less than 10%), and legumes (less than 5%).

Area 13. Location: Lower Aishihik Road near limits of study corridor.

Population Size: Sight records of flock of 12 have been made in the past. The present study recorded no sharp-tailed grouse.

Leks: None are known in the study corridor.

Vegetation: This rather open area was bordered by dense (1 to 3 m apart) aspen poplar (4 m, 80%), willow (2 m, 20%), spruce (less than 1 to 3 m, less than 5%), bearberry, fireweed, globe anemone and grasses. In some places willow density increased to about 40% and in some areas spruce predominated. A power line cut through the area about fifty metres east of the road thereby creating suitable display areas.

Area 14. Location: Aishihik townsite and willow flats (NOT IN STUDY CORRIDOR).

Population Size: Hunter reports and sight records in the past indicate a population of at least 100 sharp-tailed grouse in the area. cursory search during the present study indicates the area is still used by sharp-tailed grouse but in highly reduced numbers.

Leks: None occur in the study corridor.

Vegetation: Willow (matt to 2 m, 60%), dwarf arctic and resin birch (1 m, 15%), cinquefoil (0.75 m, 5%), yarrow (5 to 10%), grasses (60%) and legumes (50%)

made up the major part of the vegetation in the willow flats between Aishihik airport and wharf. Towards the north edge there was willow (up to 3 m, 15%) and towards the south edge a dry spruce (up to 15 m) bog.

Area 15. Location: Kusawa Lake Road.

Population Size: Sight records of small group (four to five) exist from the past.

Leks: None are known in the study corridor.

Vegetation: There was a large expanse of willow (1 m, 80 to 85%), clumped aspen poplar (3 to 4 m, 5%), white spruce (0.2 m, 5%), bearberry (10 to 20%), strawberry (10%), and grasses (0.1 m, 70 to 80%). Surrounding this on the east edge was aspen poplar (5 to 6 m, 50%). The remaining area was an open mixed forest of white spruce (10 to 15 m, 50%), aspen poplar (6 to 8 m, 15%), bearberry (20%), juniper (30%) which extended into a white spruce forest (unexamined).

B. Habitat Utilization and Movements

General

As described, sharp-tailed grouse were found associated with a variety of habitats in the western Yukon. Even in this cursory examination, they were apparently invariably found in areas with a "parkland" structure - open areas with low ground cover dispersal in shrub or treed groves. In the western extremities this was provided by wet hummock meadows among dwarf birch, willow and spruce - balsam poplar groves. In the eastern

TABLE 1 Plants found in areas surveyed for sharptail grouse, Yukon Territory, July, 1978

Nomenclature of trees and shrubs from Viereck and Little (1972).

Nomenclature of the moss family from Conard (1956).

Nomenclature of herbaceous plants from Hulten (1968), Lyons (1952), or Porsild (1974).

Sphagnum mosses	F. Sphagnaceae
Mosses (other than sphagnum)	Series Eubrya
Horsetail	<u>Equisetum arvense</u>
Spruce	<u>Picea</u> sp.
White spruce	<u>Picea glauca</u>
Black spruce	<u>Picea mariana</u>
Common juniper	<u>Juniper communis</u>
Grasses	F. Graminae
Sedge	F. Cyperaceae (sample lost, tentatively identified as <u>Eleocharis</u> sp.)
Poplar	<u>Populus</u> sp.
Aspen poplar	<u>Populus tremuloides</u>
Balsam poplar	<u>Populus balsamifera</u>
Willow	<u>Salix</u> sp.
Dwarf arctic birch	<u>Betula nana</u>
Resin birch	<u>betula glandulosa</u>
Paper birch	<u>Betula papyrifera</u>
Alder	<u>Alnus</u> sp.
Globe anemone	<u>Anemone multifida</u>
Swamp gooseberry	<u>Ribes lacustre</u>
Raspberry	<u>Rubus</u> sp.
Strawberry	<u>Fragaria glauca</u>
Bush cinquefoil	<u>Potentilla fruticosa</u>
Prickly rose	<u>Rosa acicularis</u>
Lupine	<u>Lupinus</u> sp.
Legumes (other than lupine)	F. Leguminosae
Sticky geranium	<u>Geranium viscosissimum</u>
Wild flax	<u>Linum lewisii</u>
Silverberry	<u>Elaeagnus commutata</u>
Buffaloberry	<u>Sheperdia canadensis</u>
Fireweed	<u>Epilobium angustifolium</u>
Narrow-leaf labrador-tea	<u>Ledum decumbens</u>
Labrador-tea	<u>Ledum groenlandicum</u>
Starry cassiope	<u>Cassiope stelleriana</u>
Bearberry	<u>Arctostaphylos uva-ursi</u>
Red fruit bearberry	<u>Arctostaphylos rubra</u>
Mountain cranberry	<u>Vaccinium vitis-idaea</u>
Early blueberry	<u>Vaccinium ovalifolium</u>
Bog blueberry	<u>Vaccinium uliginosum</u>
High bushcranberry	<u>Viburnum edule</u>

TABLE 1 (continued)

Snowberry
Twinflower
Arrowleaf coltsfoot
Rocky mountain golden rod
Goldenrod
White fleabane
Yarrow
Sage

Symphoricarpos albus
Linnaea borealis
Petasites sagittatus
Solidago multiradiata
Solidago decumbens
Erigeron caespitosus
Achillea sp.
Artemisia sp.

TABLE 2 Summary of the major plant species found in areas visited during a sharptail grouse study, Yukon Territory, July, 1978

SPECIES AREA	Mosses	Spruce	Grasses	Poplar	Willow	Dwarf arctic/resin birch	Paper birch	Alder	Swamp gooseberry	Raspberry	Strawberry	Bush cinquefoil	Prickly rose	Legumes	Buffaloberry	Fireweed	Labrador tea (2 sp.)	Bearberry	Red fruit bearberry	Vaccinium sp.	High bushcranberry	Snowberry	Twin flower	
Border region	✓	✓	✓		✓	✓	✓										✓			✓	✓			
Snag Creek willow flats		✓	✓	✓	✓	✓				✓		✓												
Saw mill road 1		✓	✓	✓	✓								✓	✓		✓		✓		✓			✓	
2		✓	✓	✓	✓			✓								✓								
Beaver Creek	✓	✓	✓	✓	✓	✓		✓						✓		✓	✓			✓				
Snag airport		✓	✓	✓	✓									✓	✓			✓						
Airport-town	✓	✓		✓	✓							✓	✓	✓	✓	✓	✓	✓	✓					
Snag town	✓	✓		✓	✓								✓	✓	✓	✓	✓	✓	✓					
Kilometer 1911-1912	✓	✓	✓	✓	✓	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Mine Road	✓	✓	✓		✓		✓	✓								✓		✓		✓				
Donjek River 1	✓	✓	✓	✓	✓			✓				✓	✓						✓					
2	✓			✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓				
Duke Meadow 1		✓	✓		✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
2		✓	✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Burwash airport		✓	✓	✓	✓								✓	✓										
Haines Junction W		✓		✓	✓	✓		✓							✓	✓		✓						
E	✓	✓	✓	✓	✓								✓	✓	✓	✓	✓	✓	✓	✓				
Aishihik River		✓	✓	✓	✓								✓	✓	✓	✓	✓	✓	✓	✓				
Lower Aishihik Road		✓	✓	✓	✓									✓	✓	✓	✓	✓	✓					
Aishihik Lake willow flats		✓	✓		✓	✓						✓		✓										
Aishihik Lake/burn		✓	✓		✓									✓	✓	✓	✓	✓	✓				✓	
Kusawa Road		✓	✓	✓	✓						✓							✓						

sites dry meadows such as the Duke River flats and the Aishihik River flood plain offer the same structure of habitat but composed by entirely different species.

This agrees with the findings of most sharp-tail habitat researchers. The special features of disruptive parkland habitats in the Yukon responsible for continued use by sharp-tails are unknown. One observation of the present survey supported by studies elsewhere is the apparent association of Yukon sharp-tailed grouse with seral vegetation. Searches in unburnt bog - meadow areas did not produce grouse. Sharp-tails were found in areas with apparently similar structure but in various stages of regrowth after fire. This observation will provide an obvious line of continuing research toward management of the birds in the Territory.

Late Winter Habitat and Movement

Observations of grouse in winter were highly localized. All observations were made within two km of the eventual location of leks.

Many researchers (Pepper, 1972; Sisson, 1976; and others) have documented the very localized nature of sharp-tail populations. This feature of their ecology may be further accentuated in the Yukon situation of small "pockets" of suitable areas in generally unsuitable habitat. The birds are apparently dependant upon the vegetation in a very restricted area even for winter foraging (Fig. 6).

Of 121 observations of grouse in winter, 80 (66%) were in treed habitat or tall shrubs. On the study area these habitats

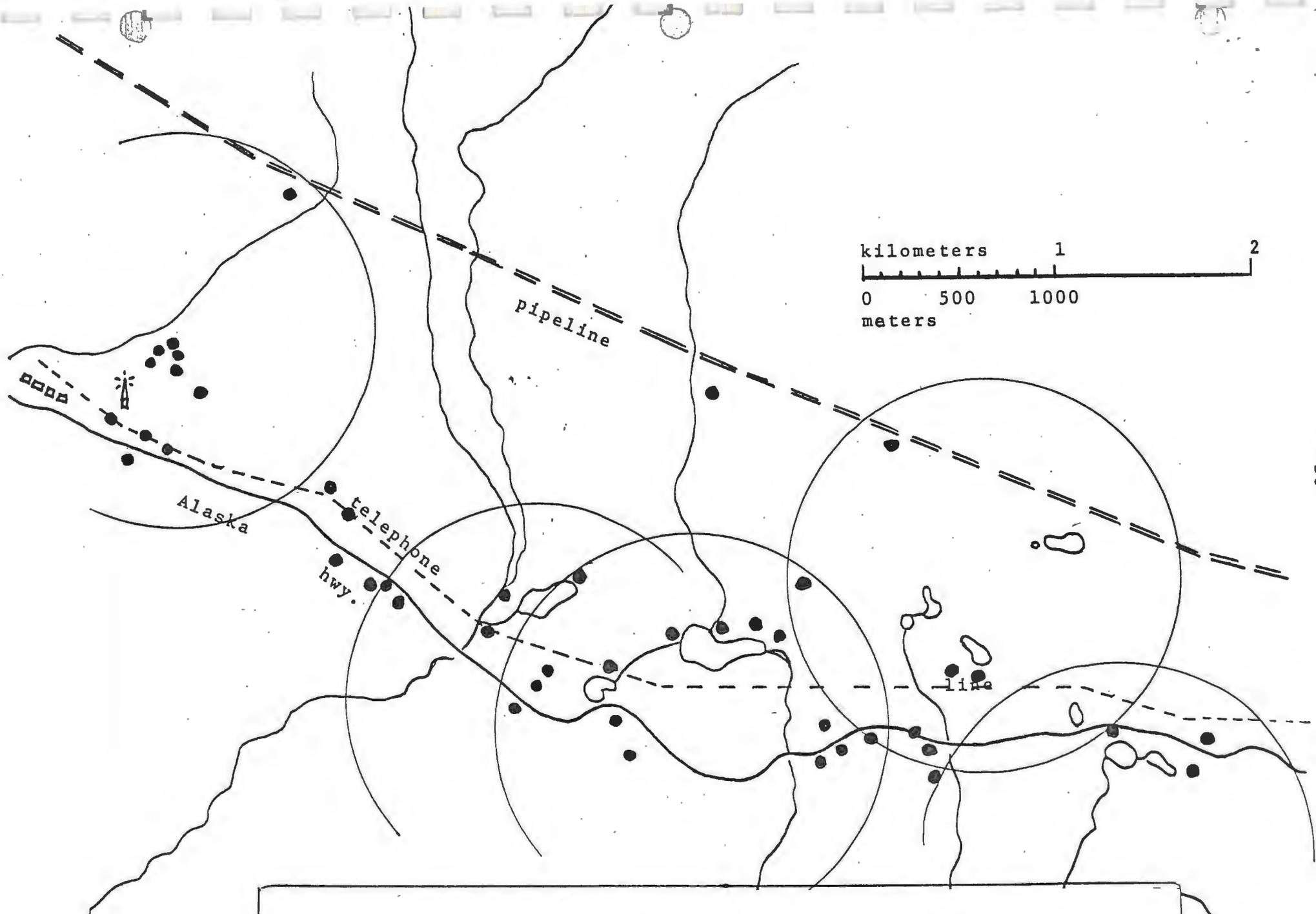


Figure 6. Locations of observations of sharp-tails during March and April. Circles are drawn at 1 Km radius from leks.

are almost exclusively seral stages after a forest fire which burned the entire area about 20 years ago.

Food Habits

Ground-feeding sharp-tailed grouse in late winter were utilizing dwarf birch by preference (Fig. 7). Willow, tundra

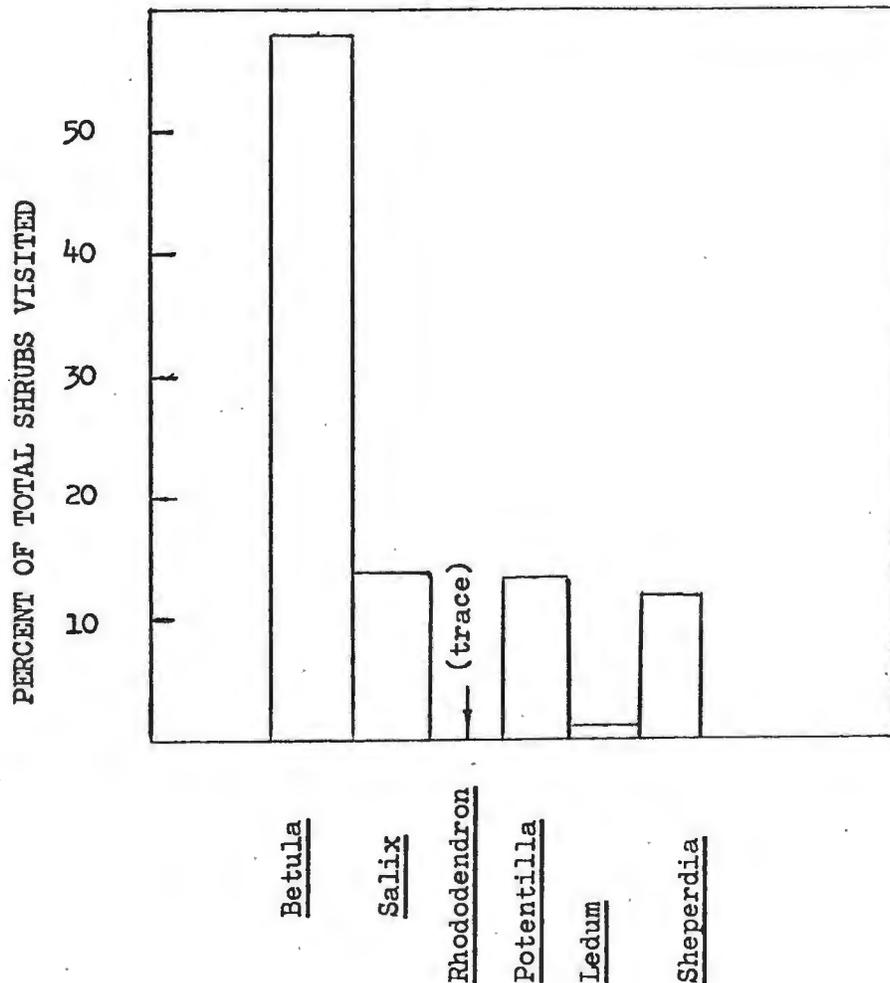


Figure 7. Food shrub utilization by ground-feeding sharptails in late winter.

rose and sheperdia were visited at about the same low frequency. The small sample of collected birds (n=4) suggests that aspen (*Populus tremuloides*) is utilized at a rate at times as high as is dwarf birch. More work will be required to properly assess the relative importance of ground and arboreal feeding during winter.

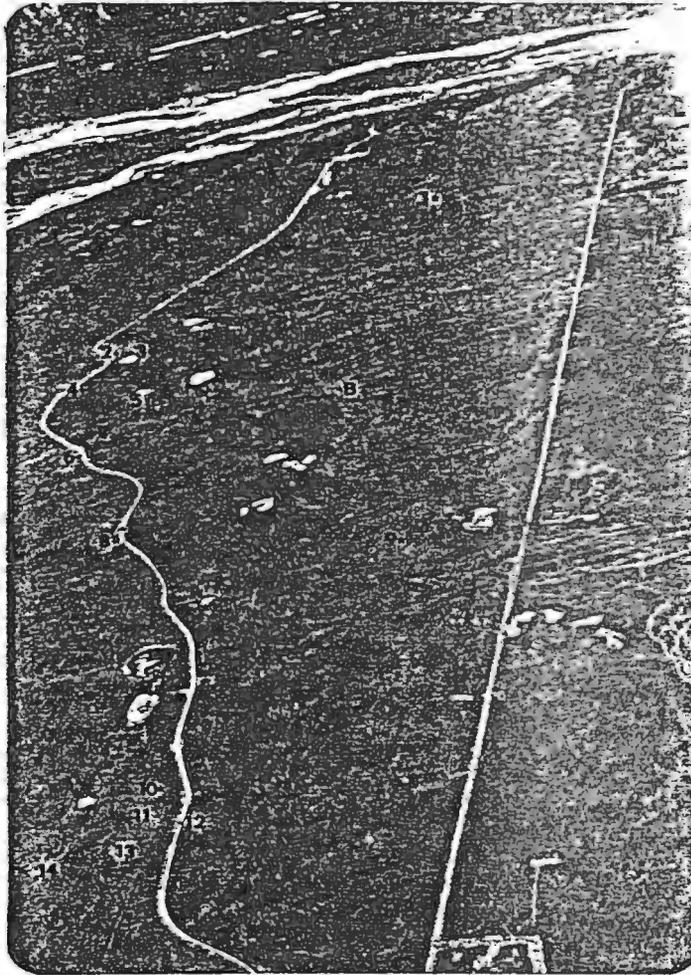


Figure 8. Aerial view of the Donjek study area showing the locations of dunes where lek behavior was observed. Numbers refer to location points on fig 9. Stars mark leks used every day; 'B' locates the first brood observation. Note the extent of the regenerating vegetation after burning.

C. Lekking

Timing of Events

By mid-March there was evidence that on "fine" days grouse were visiting leks. The peak of courtship behaviour occurred in the last week of April and the first week of May. It was not possible, using the techniques employed, to detect the peak of attendance at leks by females. Lek attendance continued at a decreasing level until approximately the 20th of May.

Lekking Habitats

Sixteen sites were identified in the study corridor where sharp-tails were engaged in lekking behaviour. All were areas raised into low mounds with a vantage over the surrounding habitat.

In the Donjek study area where habitat data were recorded, all leks were situated on ancient, stabilized sand dunes. The substrate and ground cover on these sites even on cursory observation contrasted markedly from the general ground vegetation and substrate in the area. Given the large percentage of these dunes actually observed being used for lekking it is clear they are essential to the survival of the birds in their present state. Figure 9 shows the locations of dunes identified on the study area from ground observations and examination of aerial photographs.

Vegetation at the largest lek is illustrated in schematic form in Figure 10. Balsam poplar characterized all leks. The tops of sand dunes were 25 to 50% bare sand, 5 to 15% bearberry (*arctostaphylos*), 20 to 30% willow shrub and sheperdia and 1 to 5% balsam poplar. This association was highly unique on the study area, found only on the tops of sand dunes and best

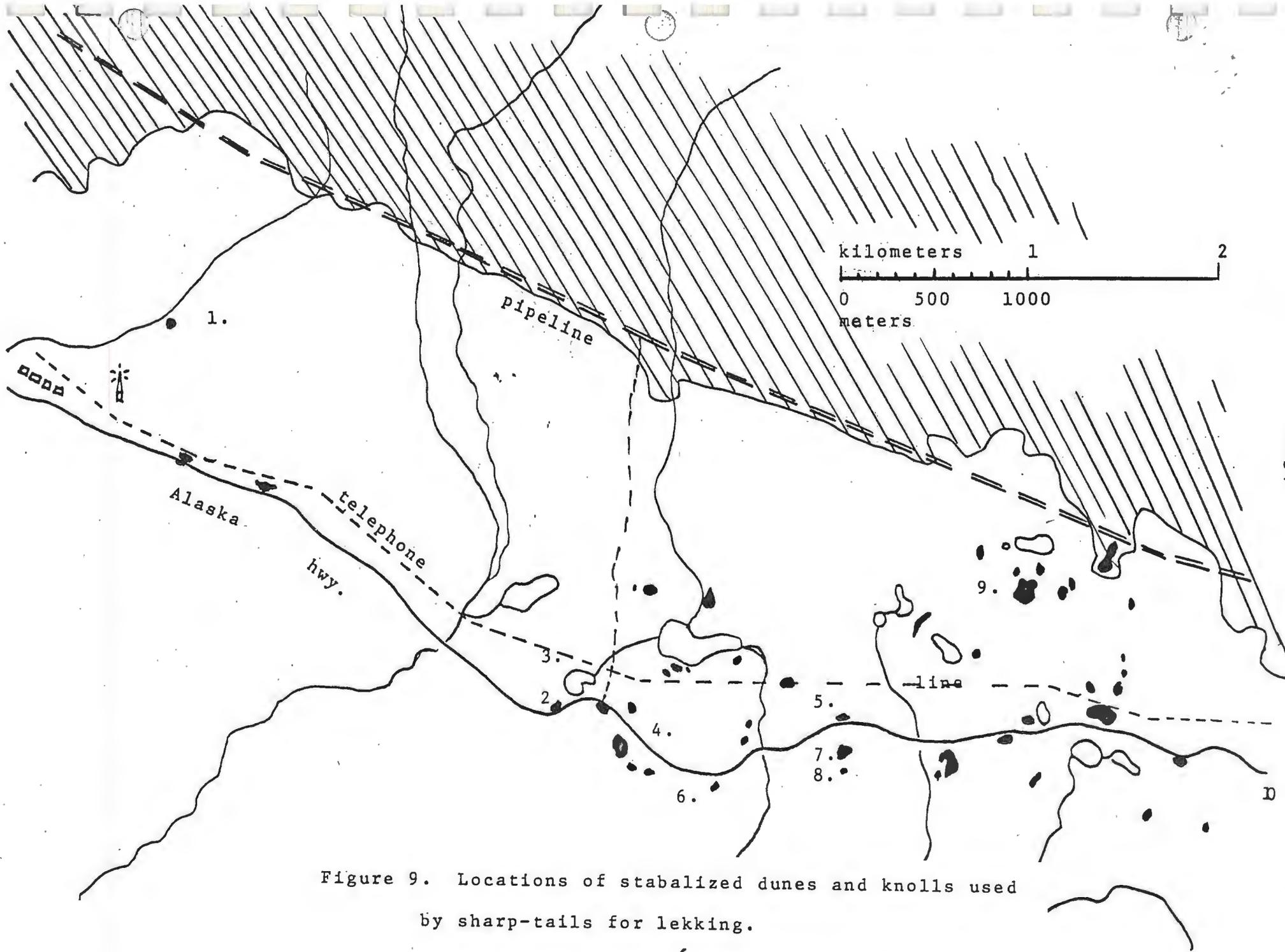


Figure 9. Locations of stabalized dunes and knolls used by sharp-tails for lekking.

Figure 10. Structural elements of cover on and off knoll used for lekking.

(T 1% cover; x=1 to 5%; xx=6 to 10%; xxx=11 to 25%; xxxx=26 to 50%;
 xxxxx=51 to 75%; xxxxxx=76 to 100%)

Vegetative Structural Element	Location Relative to Lek											
	Knoll Center	Knoll Slopes	Plots off Knoll									
Bare sand	xxxx											
Litter	T	xxxxxxx	x	x	x	xx	x	xx	x	x	xxxxx	xx
Slash	T		x	x	x	xx	x	xx	x		x	x
Standing snags	T				T			T	T			
Balsam poplar	xx	xxx										
Aspen						xxx					xxxx	
Conifer				xxxxx								
Tall shrubs	xx	xxx	xxxxx	xxxxx	xxx	xxxx	xxx		xx	x	xxxx	xx
Medium shrubs	x	x	xx	xx	xxx	x	x	x	xx	x	xx	xxxx
Low shrubs	x	T	xxx	xxx	xx	xxx	xxxx	xxxx	xxx	xxxxx	x	xx
Graminoids (sedges)	T	T	xx	x	x	x	xxx	x	x	xxx	x	x
Wet hummock	T	T	xx	xx	xxx	xxx	xx	xx	xx	x	xx	xxx
Forbes	x	x	x	x	x	x	x	x	x	x	x	x
Mosses	X	T	xx	xxxx	xx	x	x	xxxxx	xx	xxxxx	x	
Lichen	T	x	x	x	x	xx	x	x	xx	x	x	xx

developed on the dunes most frequently used for lekking.

DISCUSSION AND PROTECTIVE MEASURES

Population Vulnerability

One of the more striking features of the present survey was the number of areas identified by local residents and Wildlife Branch records as supporting sharp-tailed grouse but which at present contain none or a very reduced remnant. The Duke meadows is perhaps the best known example. The sharp-tails there have been known for many years and have been recorded in published accounts (Hoefs, 1970). In the present study local hunters do not report grouse from there at all and in intensive search only one bird, a female with brood late in the season was found on the fringe of the area.

This result may be best interpreted as an alarming confirmation of the supposed highly vulnerable nature of these small sub-populations. The reasons for their apparent disappearance are not known and obviously do not relate to gas pipe construction. A strong case can be made for over-hunting (especially at critical times of the year) as a possible agent in the disappearance of some groups. However, the disruption of major new land use operations does have the potential for causing further disappearances and must be gauged very carefully if the Yukon is going to save these grouse populations.

To avoid the possibility of over-harvest during gas line construction, some measures must be taken to protect local populations:

MANAGEMENT PROPOSAL (1) *No hunting of any species of grouse should be permitted in a corridor (5 to 8 km) either side of the pipe route during construction.*

MANAGEMENT PROPOSAL (2) *The management authority* should greatly reduce the bag of sharp-tailed grouse in the Yukon until the effects of harvest on local populations is known. This could include complete closure of sharp-tail hunting during the pipeline construction phase.*

Susceptibility to Disturbance

Disturbance factors commonly attributed to commercial land-use operations include the noise of traffic, the noise of heavy machinery, and disturbances associated with low-flying aircraft. One feature of the Yukon sharp-tails encountered in this study is their often close association with roadside habitats along the Alaska Highway. This may result from a variety of factors including the choice of a route for the road through some of the best sand knolls as well as the birds' utilization of seral vegetation common along the road right-of-way. It does demonstrate, however, the ability of the birds to habituate and, at times, thrive in close association with heavy traffic noises.

Obviously new disruptive disturbance may have adverse effects but without further field data to the contrary this can not be predicted accurately. Machinery working and aircraft (especially helicopters) flying low near lekking sites would probably pose

* *The present management authority for sharp-tailed grouse in the corridor and throughout the Yukon is the Yukon Wildlife Branch.*

a serious threat. Lekking areas offer some of the better landing sites for helicopters in the corridor.

MANAGEMENT PROPOSAL (3) *Helicopter land sites and all access roads should be planned in advance in consultation with the management authority. None should be planned within 2 km of known leks.*

Timing

As described, sharp-tails occur in a relatively restricted area throughout the year. It is, therefore, not possible to completely avoid disturbing their populations during construction. By far the most restricted habitat they use is their display ground. Timing of its use again is not simple because attendance of the lek occurs in spring and fall as well as at other times throughout the year. The lek forms the centre of all activities of the population. If activity is unavoidable near leks, the spring display period intuitively seems the most critical to avoid.

MANAGEMENT PROPOSAL (4) *Activities which are unavoidable within 2 km of known leks should not be carried out from April 1st to May 30th.*

Lekking Grounds

Several studies have shown that land-use activities and factors changing vegetation near dancing grounds can dramatically affect sharp-tail populations. Sisson (1976) reported desertion of courtship sites two to five years after land-use activities which altered vegetation cover. There will be a strong temptation

for construction activities to seek to utilize the borrow material that sharp-tails are using as lekking mounds in the western Yukon. The sites have been drawn into construction of the Alaska Highway in the past (with unknown but presumably negative results).

One apparent difference between the Yukon sharp-tails and better known populations further south is the Yukon birds' use of several small lekking sites simultaneously. This feature may have a function related to their image ecology in the Yukon. Whatever its purpose, it cannot be assumed that, for example, leaving one display mound in a groups' home range would be sufficient.

Given the features of lekking sites known to date, it is possible to envision rebuilding, rehabilitating or even building new mounds. This management tool requires much more research but does offer an area of consideration.

MANAGEMENT PROPOSAL (5) *No access roads, campsite construction or other activity should be planned within 2 km of lekking sites.*

MANAGEMENT PROPOSAL (6) *In areas occupied by sharp-tailed grouse borrow materials should be transported from sites outside the birds' home range.*

MANAGEMENT PROPOSAL (7) *Where disruption of leks is unavoidable rehabilitation, reconstruction or rebuilding of the site should be planned with the management authority.*

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