An Inventory of Columbian Sharp-tailed Grouse *Tympanuchus phasianellus columbianus* in the East Kootenay

by

P. Ohanjanian

for

The Columbia Basin Fish and Wildlife Compensation Program

February 2006

[1]Penny Ohanjanian, Consulting Biologist, 4481 L D Ranch Rd.
Kimberley, B.C. V1A 3L4

Acknowledgements

The author would like to thank the following people for their help

Irene Manley for excellent field work.
Volunteers Shirley Hansen, Walter Latter, and Robin Bentley-Williams who tried very hard to find Sharp-tailed Grouse.
Keith and Eleanor Innes for their time and the use of their talented pointers.
Anne Skinner, Barb Banting and Jodie Kekula of the BC Ministry of Forests
Doug Adama & Larry Ingham (Columbia Basin Fish & Wildlife Compensation Program)
Don Cantanzaro
Ted Antifeau
Bill Warkentin
Hugh McLuckie
Tim Ross
Tony Wideski
Joe Gnucci
Dale Lucas
Mark Hogan
Tom Melnick
Roger Mitchell
Glynn Killins
Tim Their
Peter Davidson
Neil and Pat McClure
Brian and Amy Edmonds
Peter Lye
Shawn Lye
Steve Foster
Dean Nicholson

EXECUTIVE SUMMARY

The Columbian subspecies of Sharp-tailed Grouse has experienced marked declines throughout its range. In British Columbia its range has contracted and it is now on the provincial Blue-list. Once common in the East Kootenay, sightings of the species are now extremely rare. Sharp-tailed Grouse require abundant cover for nesting, brood-rearing and survival. In the East Kootenay, they are dependent on climax bunchgrass communities in good range condition. They also need shrubs for over-wintering habitat.

The objectives of this project were to a) compile recent (within the past 10 years) anecdotal information on Sharp-tailed Grouse sightings in the East Kootenay b) attempt to locate remaining birds, and c) characterize the habitat in which surveys were conducted. A preliminary discussion on the feasibility of re-introduction and recommendations is provided.

The study took place at three main areas in the southern Rocky Mountain Trench. These were Newgate, Wycliffe and Skookumchuck. Anecdotal information was collected, and lek surveys, flush surveys and bird-dog surveys were carried out from April 11 to Sept 27, 2005. Habitat and site data included an evaluation of residual grass in spring, range condition, dominant species and environmental conditions.

Nine of twenty two interviewees reported having seen Sharp-tailed Grouse. Five of these reports were deemed to be very reliable, and two moderately reliable. Two were poor. Four of the very reliable reports were near Sharptail Pasture at Newgate, where the most recent sighting dated from 2002. One report was from private lands at Wycliffe dating from the late 1990s. Other less reliable reports from 2000 and 2004 suggest it was possible for Sharp-tailed Grouse to have been in that area. If so, their populations were extremely low and vulnerable to extinction.

Sharp-tailed Grouse were not located in 75 hours and 45 minutes of survey effort. Four blue grouse, five ruffed grouse and one wild turkey were detected.

Excellent Sharp-tailed Grouse nesting habitat structure was located in an un-grazed experimental exclosure at Skookumchuck, 1 ha in size. Elsewhere, the best range condition was on the upper elevations of Lone Pine Hill, in a cattle-only exclosure at Skookumchuck, and on a small (< 20 ha) parcel of private land in Wycliffe. Residual vegetation from the previous year's growth was absent or sparse at most sites, making even good range unsuitable for nesting Sharp-tailed Grouse.

Anecdotal information proved to be unreliable, largely due to observers' inability to distinguish between grouse species and failure to recall dates, times, etc.

Four reasons for the decline of this species in the East Kootenay were identified. These were forest ingrowth, poor range condition and lack of residual vegetation, commercial and rural residential development and lack of over-wintering habitat.

Re-introduction of the species is not recommended at present due to lack of habitat. A long-term commitment to Ecosystem Restoration that includes grouse habitat needs is required.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION

1.1 Status and distribution

On March1, 1806, the Columbian subspecies of Sharp-tailed Grouse, *Tympanuchus phasianellus columbianus*, was first recorded at Fort Clatsop, Oregon, by the Lewis and Clark expedition (National Geographic 2005). Once one of the most numerous birds in the Columbia Basin and the Pacific Northwest, the species had cultural significance to the indigenous peoples of the region (Berger et al. 2004, Gullet and Catanzaro 2004). Its historic range extended from central British Columbia south to California, Nevada and Utah and east to western Montana, Colorado, and Wyoming (Schroeder and Tirhi 2003; Ramsey et al. 1999).

At present, Columbian Sharp-tailed Grouse exist only in isolated, remnant populations, with 50-70% of the total population in southeastern Idaho and northern Utah. In Washington State, its current range is estimated to be less than 3% of its historic 79,865 km ^{2} range (Schroeder et al. 2000). In British Columbia, the Columbian Sharp-tailed Grouse is Blue-listed (Conservation Data Centre 2005), having experienced marked declines during the past century. It is extirpated from the Okanagan, but remains in the Thompson and Cariboo Basin, the Chilcotin Plateau and the Fraser Basin (Fraser et al.1999; Campbell et al. 1990). Sharp-tailed Grouse were common in the East Kootenay in the mid-1970s (B. Warkentin, pers. comm.), but by the late 1980s, sightings of the species were extremely rare (Ohanjanian 1990).

1.2 Habitat requirements and life history attributes

Sharp-tailed Grouse depend on open grassland habitats intermixed with shrub communities and patches of deciduous trees (Connelly et al. 1998). In British Columbia, the Columbian subspecies is associated with two habitat types, the climax bunchgrass habitats in the south and south-central portions of their range, and the seral grasslands created by clear cuts or large burns in forests further north (Ritcey 1995, Fraser et al. 1999, Cannings 2002). They require abundant cover for incubation, brood rearing and survival; range condition must be good to provide optimal habitat (Marks and Marks 1987, Connelly et al. 1998).

In the winter, Sharp-tailed Grouse use shrub communities, riparian zones and aspen copses with a dense understory for thermal protection and food (Evans and Moen 1975). Important food items include willow and aspen buds, birch, chokecherry, saskatoon and rose (Marks and Marks 1988, Leupin 2003).

Sharp-tail males gather on dancing grounds (leks) in spring to display and attract mates. These dancing grounds are often on a knoll, and the vegetation height is lower than the surrounding habitat (Leupin 2003). Populations are cyclical, for reasons that are not clearly known (Akcakaya et al. 2004). Recruitment into the breeding population may be high in years when brood sizes are large, mortality low and food is abundant.

Conversely, mortality can be very high in winter. Ulliman (1995) found mortality rates to be as low as 14% in mild winters and 75% in severe winters.

1.3 Objectives

The objectives of this project were to a) compile recent (within the past 10 years) anecdotal information on Sharp-tailed Grouse sightings in the East Kootenay, b) carry out lek and summer surveys in an attempt to locate remaining birds, and c) characterize the habitat in which surveys were conducted to help inform future actions. This report concludes with a preliminary discussion of the feasibility of re-introduction and provides recommendations.

2 STUDY AREA

This study took place on selected grasslands in three main areas of the Rocky Mountain Trench of southeastern British Columbia (Figure 1). The survey sites are in the Kootenay Dry Hot Ponderosa Pine (PPdh2) Biogeoclimatic variant (Braumandl and Curran 1992) of the Southern Interior Mountains Ecoprovince (Demarchi 1996). The elevation ranges from approximately 770 to 1160 m. The climate is dry, summers are hot, and winters are mild with low snow accumulations (Braumandl and Curran 1992). Climax vegetation is characterized by bunchgrasses, including bluebunch wheatgrass, *Pseudoroegneria spicata* (formerly *Agropyron spicatum*) (Stewart and Hebda 2000) and rough fescue, *Festuca campestris*, with ponderosa pine, *Pinus ponderosa*, as the dominant tree. On many sites, antelope-brush, *Purshia tridentata*, is found in association with bluebunch wheatgrass. This association is provincially Red-listed (Conservation Data Centre 2005). Other shrubs include prairie rose, *Rosa woodsii*, saskatoon, A*melanchier alnifolia* and pasture sage, *Artmesia frigida.* Trembling aspen, *Populus tremuloides*, snowberry, *Symphoricarpos occidentali*s, and chokecherry, *Prunus virginian*a occur on slightly moister sites, such as swales, beside downed logs and in riparian zones. Many of these shrubs provide winter forage for Sharp-tailed Grouse, while the bunchgrasses and shrubs provide cover for nesting (Marks and Marks 1987; Connelly et al. 1998).

Human activities in the Rocky Mountain Trench have altered historic Sharp-tailed Grouse nesting and over-wintering habitat. Grassland species composition and range condition reflect a history of over-grazing by domestic livestock. Fire suppression has altered the natural fire regime that removed trees and maintained grasslands. These historic fires were frequent, with intervals as small as 6.4 years in the Newgate area, (Dorey 1979). The absence of fire has resulted in grassland “pockets” surrounded by dense stands of immature trees. Over-wintering habitat has also been altered by flooding; riparian zones along the Kootenay River were lost as a result of the construction of the Libby Dam. Native grasslands were converted to agricultural production in the Wycliffe area. This activity is continuing today.

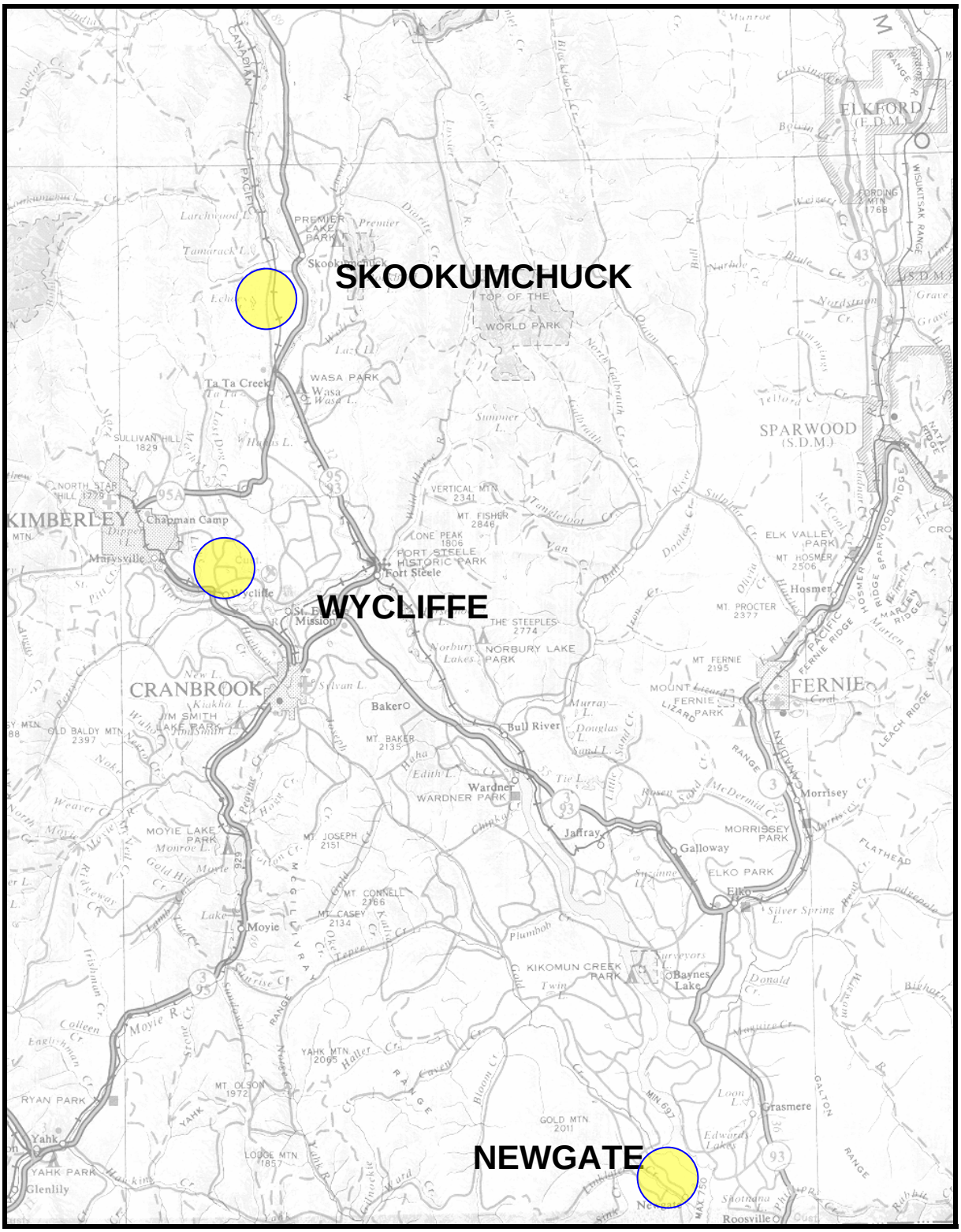

Figure 1. Locations of study sites in the southern Rocky Mountain Trench (1:600,000)

3 METHODS

3.1 Anecdotal and historical sources

Interviews with biologists, hunters, naturalists, and ranchers who may have observed the species within the last 10 years were carried out in the spring of 2005. A questionnaire was used that included the name of the observer, an assessment of his/her reliability, and the dates and locations of sightings. Where possible, UTMs, numbers of birds and activities were recorded also. A copy of the questionnaire is provided in Appendix B and the results of interviews have been placed in a Confidential Database.

3.2 Survey Methods

Resource Inventory Standards for Upland Game Birds (RISC 1997) were used with some modifications to direct the methodology for this project. A "present / not detected" level of intensity was chosen. To maximize the probability of detecting Sharp-tailed Grouse, survey sites were selected based on historic information provided by the BC Ministry of Environment, interviews and historic sightings (Conservation Data Centre 2005, Ohanjanian 1990). These were:

a. Newgate (Sharptail, Ashfire and Gory/Wakefield Pastures and the Earle Ranch) (Figure 2)
b. Wycliffe (Lone Pine Hill, Aupet Land Co. and adjacent private holdings on which grouse had been observed in 1989) (Figure 3)
c. Skookumchuck exclosure experimental site (Figure 4).

Total effort and the size of areas surveyed were recorded for all methods.

3.2.1 Lek Surveys

As birds are concentrated at dancing grounds primarily in the early hours, surveys began at dawn and lasted for 3-4 hours. To detect possible leks in spring, transects were driven or walked in suitable grassland habitats. During the driving surveys, 5 minutes were spent listening for the calls and foot-drumming of dancing males at pre-determined stations. UTM coordinates (NAD 83) were recorded at each station and inter-station distance varied from 200 to 500 m. This variability was a function of the presence or absence of forest, housing or other unsuitable habitat. Elsewhere, systematic transects covering the grassland were walked. Surveyors also listened at unspecified stops and during the walks. The ground was closely watched for collections of feathers or droppings that may have indicated a dancing ground. Lek surveys were carried out between April 11 and May 2, 2005.

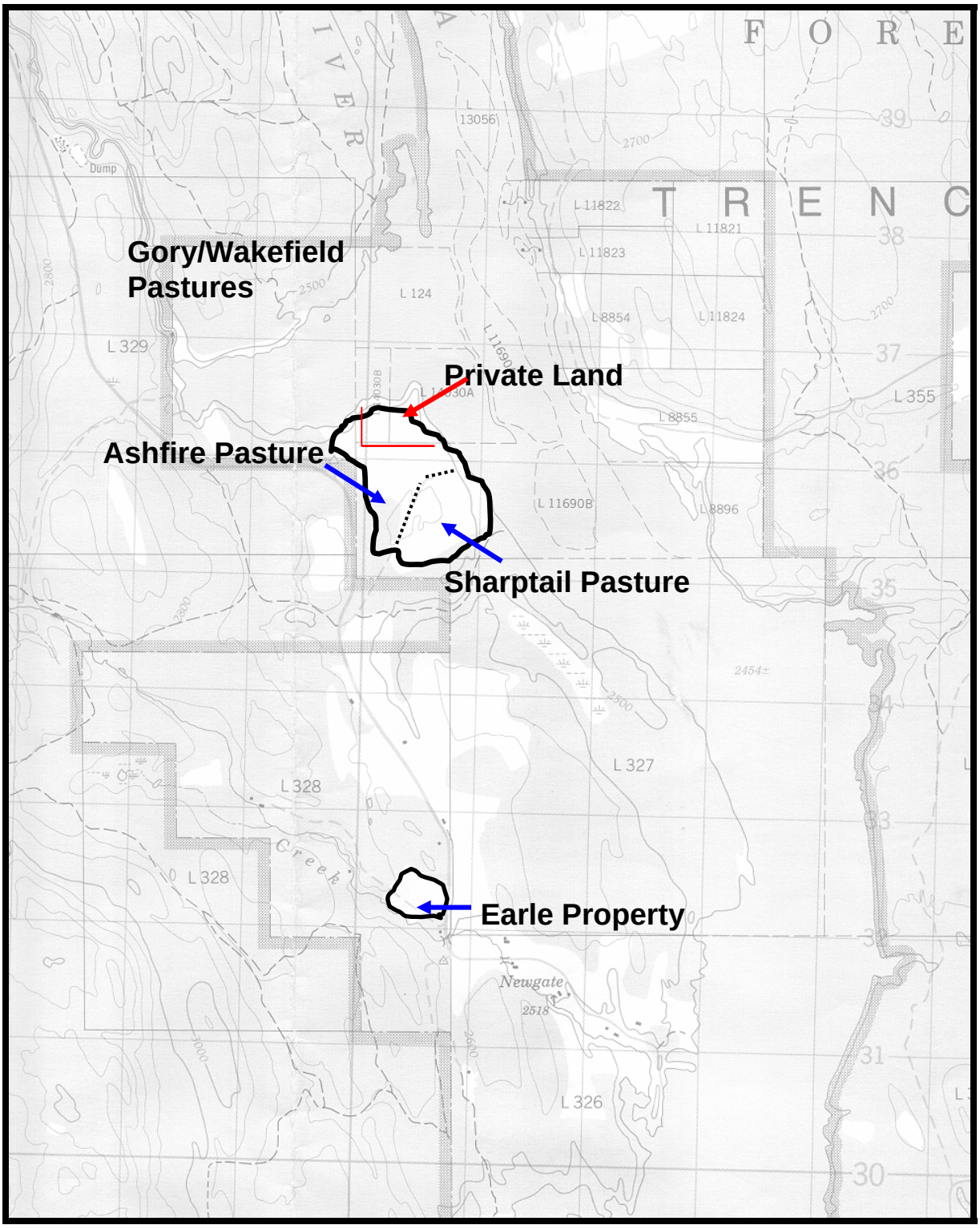

Figure 2. Newgate survey area (1:50,000)

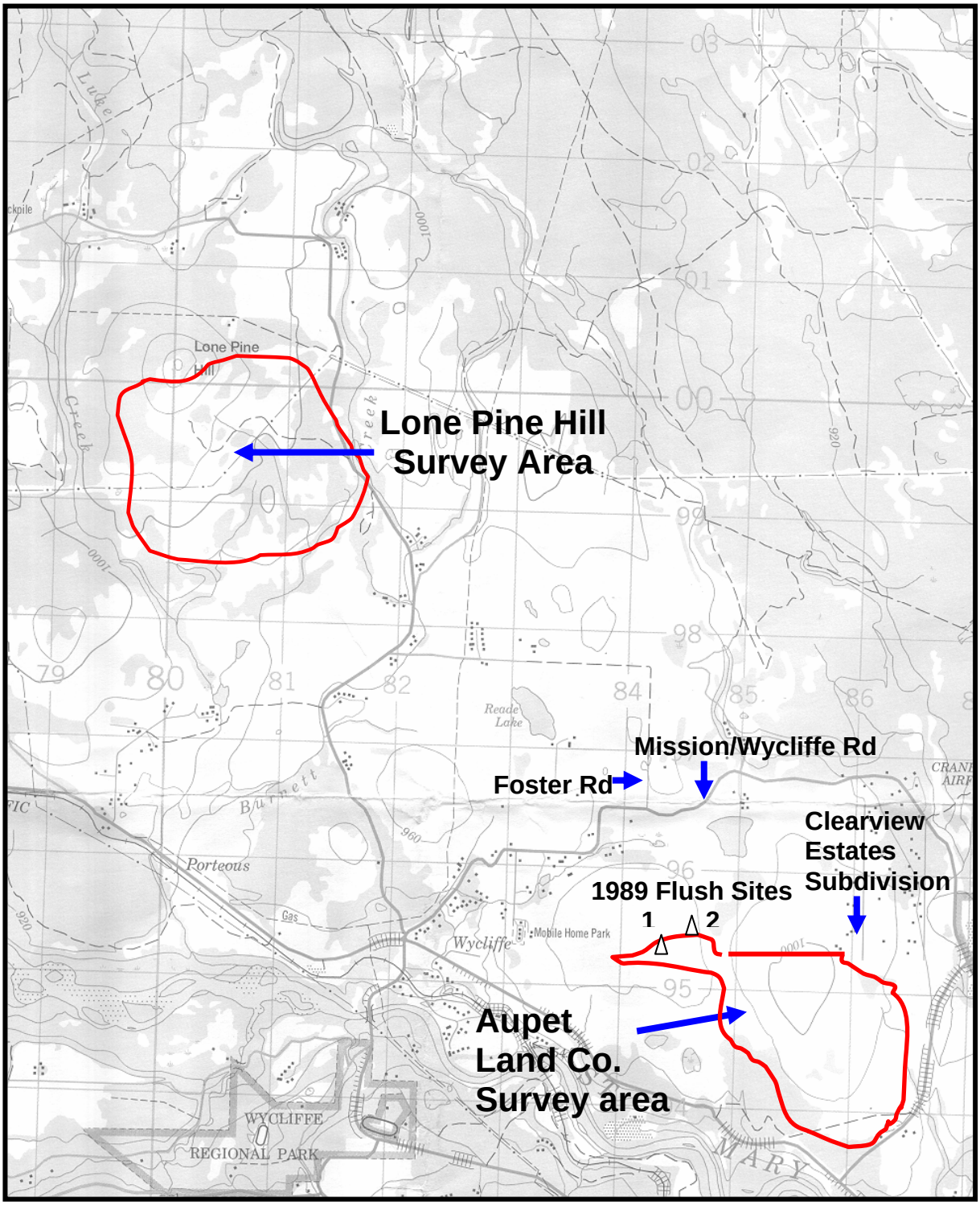

Figure 3. Wycliffe survey areas (1:50,000)

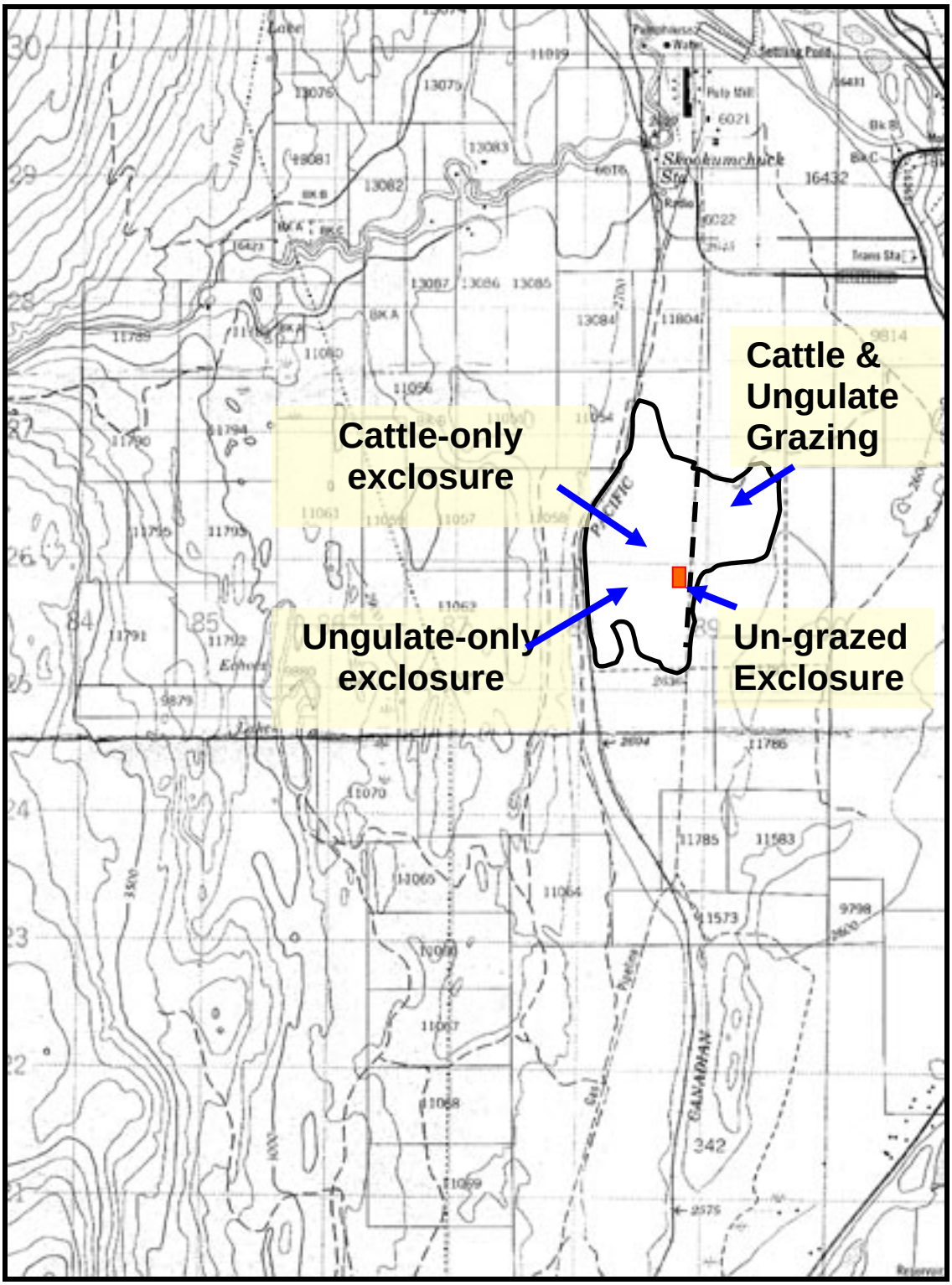

Figure 4. Skookumchuck survey area (1:50,000)
(Exclosure dimensions not to scale)

3.2.2 Flush Surveys

Potential Sharp-tailed Grouse locations were surveyed by walking along transects that systematically covered the entire grassland. The UTMs of start and end points of these transects were recorded, and a sketch made of the zig-zag pattern of coverage adopted by the surveyors. These surveys were carried out between April 11 and May 2 and between Sept 18 and 27.

3.2.3 Bird Dog Surveys

The third method used trained pointers in the late summer to detect grouse. The pointers, owned by Eleanor and Keith Innes of Cranbrook, were highly trained and accustomed to flushing Sharp-tailed Grouse in competitions. During the surveys, at least 3 herding dogs and a minimum of 3 people also participated. Bird dog surveys were carried out between Sept 18 and 27.

3.3 Habitat characteristics

Habitat and site data were recorded, including environmental conditions, bio-geoclimatic zone and variant, height and dominant species of grass, presence and height of residual vegetation and current year's growth, recent grazing history and range condition. Range condition was classified as excellent, good, fair or poor based on the following criteria: grasslands dominated by "decreaser"[1] species such as rough fescue and bluebunch wheatgrass in conjunction with low amounts of exposed ground rated a value of good or excellent. Sites dominated by "increasers" such as Columbian needlegrass, and/or junegrass, but with a component of remnant "decreasers" were rated fair. Sites that were heavily disturbed with large areas of bare ground, invasive species and no relic bunchgrasses were rated as poor. The presence and quality of nearest wintering habitat was also recorded.

[1] This designation (after MacLean 1979) denotes those species whose abundance decreases with heavy grazing. "Increaser" species increase under heavy grazing.

4 RESULTS

4.1 Anecdotal reports

Interviews were conducted with twenty-two people to obtain information on Sharp-tailed Grouse sightings within the past 10 years. Nine reported having seen what they believed to be Sharp-tailed Grouse (Table 1). Five of these reports were deemed to be very reliable, and two moderately reliable (See Confidential Database). The reliability of two was rated as poor, due to the observers' inability to distinguish grouse species. One report was later confirmed to be misidentified Ruffed Grouse.

The shrub/grassland that includes Sharptail and Ashfire pastures at Newgate (Figure 2) was identified from interviews as the most likely area where Sharp-tailed Grouse could be found. The most recent sighting was from 2002, when the species was present on un-grazed private land at the north end. Two broods were also observed in 2001 or 2002 (T. Wideski, D. Lucas pers. comm.). Adult birds were flushed from the eastern slopes of Sharptail pasture, near the Koocanusa Reservoir on two occasions between 1999 and 2001 (B. Warkentin, T. Antifeau, pers. comm.).

In 2004, two grouse were seen on the south flanks of Lone Pine Hill in Wycliffe (Figure 3) (H. McLuckie, pers. comm.). The identity of these birds was not positively confirmed; however the observer is fairly confident that they were Sharp-tailed Grouse. One reliable report indicated that the species was present in Wycliffe in the late 1990s (T. Ross, pers. comm). Mr Ross saw them in the same location at which they were observed in 1989 (Figure 3). He has not seen them since despite regular visits to the area. Other anecdotal reports dating prior to 1995 are available in Ohanjanian (1990).

Table 1. Summary table of anecdotal Sharp-tailed Grouse sightings, 1995-2005

General Location	Observer Reliability	UTMs (± 1000 m)	Year of observation	Birds Seen
Newgate	Very good	640850; 5436250	1999 or 2000	2 on NE slope of reservoir Sharptail pasture
Newgate	Very good	630900; 5435800	2001	1 seen near reservoir Sharptail pasture
Newgate	Very good	629400; 5436500	2001 or 2002	Hen and 4 chicks near Gold Bay Forest Rec site access road
Newgate	Very good	630300; 5436000	2002	Brood of 7-9 on private land N. end Sharptail
Newgate	Poor	629000; 5439000	2003	1 adult, 1 km n. of Gold Cr mouth access via Strauss Rd
Wycliffe	Fair	580148; 5498577	2004	2 on s. flank of Lone Pine Hill
Wycliffe	Good	584177: 5495309	Late 1990s	1 former 1989 flush site 1.
Wycliffe	Fair	585900; 5495000	2000	Brood 4-5 chicks Clearview Acres
Wycliffe	Poor	585343; 5946151	2005	SW forest of Aupet Land Co

4.2 Survey Results

4.2.1 Sharp-tailed Grouse

A total of 75 hours 45 min were spent surveying for Sharp-tailed Grouse in 2005. Of these, 24 hrs 58 min were spent between April 11 and May 2, and 50 hrs 47 min were spent between Sept 18 and Sept 27. No Sharp-tailed Grouse were detected during lek surveys or systematic visual searches. Bird dogs covered survey areas extensively and thoroughly, but these also failed to detect the species.

4.2.2 Other Gallinaceous Birds

Four blue grouse, five ruffed grouse and one wild turkey were identified during surveys (Table 2). On Lone Pine Hill, the two blue grouse were found in small, rocky outcrops, with a few immature ponderosa pine trees and pockets of residual bluebunch wheatgrass. Two blue grouse observed at Sharptail pasture were found on the east slope over-looking the reservoir. When sites were re-visited with bird dogs on September 18 and 27, no blue grouse were found.

Four ruffed grouse were flushed by pointers from the north end of Ashfire pasture near the powerline. Habitat at the flush site consisted of antelope brush and bluebunch wheatgrass. Two of these were juveniles. One male ruffed grouse was heard drumming near an aspen copse in spring in Wycliffe, and a single turkey was heard displaying at Newgate.

Table 2. Gallinaceous birds detected during Sharp-tailed Grouse surveys

Species	General Location	UTM (NAD 83)	Date	Comments
Blue grouse	Lone Pine Hill One on-top of butte, other at mid-elevation	579799; 5499545 580092; 5500260	05/04/11	2 males
Blue grouse	Sharptail pasture on e. slope by reservoir	630810; 5436020	05/04/12	1 female
Blue grouse	Sharptail pasture on e. slope by reservoir	630815; 5436195	05/04/26	1 male
Ruffed grouse	Ashfire pasture at n. end near powerline	630120; 5436500	05/09/19	2 juveniles 2 adults
Ruffed grouse	Wycliffe in trees: Aupet Land Co	585343; 5946151	05/04/22	1 male
Wild turkey	400-500 m south of Sharptail pasture	630242; 5435106	05/04/12	1 male

4.3 Habitat characteristics

Habitat quality, range condition and species composition varied among the survey areas.

4.3.1 Newgate

Sharptail and Ashfire pastures (Figure 2) were antelope-brush-dominated grasslands in fair to good range condition (Table 3). In April 2005, grasses and forbs had been heavily grazed through the winter by ungulates, residual was lacking, and there was little to no cover for grouse throughout these pastures. Saskatoon bushes were few and heavily browsed, as were immature pine trees which had been stripped of needles and bark. New grass growth was 2 – 3 cm high on April 12. The only residual cover in the Newgate area in April was at the Earle Ranch Wildlife Property to the south of Sharptail pasture (Table 3). This was a field of domestic brome (*Bromus inermis*), that was less than 10 ha in size.

In September, the vegetation profile on Sharptail and Ashfire pastures was strikingly different from that in April. Plants appeared to have responded favourably to good growing conditions of 2005 (Table 3). In Ashfire pasture, grouse cover values were good; bluebunch wheatgrass clumps were tall and vigorous with culms and leaves reaching up to 100 cm and 40 cm, respectively on September 19 (Figure 5). In Sharptail Pasture the current year's growth of grass provided fair vertical cover values in September, with culm heights of 50-60 cm and 20 cm leaves. The eastern slope of that pasture was in the best range condition, and supported rough fescue plants and some rose (Figure 6).

Potential wintering habitat at Newgate was found in Gory and Wakefield pastures to the north of Sharptail and Ashfire Pastures. There were abundant small rose patches (10-15 cm) and extensive aspen, chokecherry and saskatoon in draws. Additional shrubs included rabbitbrush, *Chrysothamnus nauseousus,* and pasture sage on driest slopes.

In summary, residual vegetation on Sharptail and Ashfire pastures, while poor in spring was adequate in September to provide good nesting cover for Sharp-tailed Grouse. It is not known if this cover will still be available, however, in spring 2006, or will have been removed by ungulates through the winter.

Table 3. Summary table of range condition, residual vegetation and current year's growth at all survey sites

Survey Area	Date	Range Condition	Residual Present	Current year's grass height (cm)
Sharptail Pasture	12-Apr	Fair	Sparse	2-3
	19-Sep	Fair	--	50-60 (culms) / 20 (leaves)
Ashfire Pasture	12-Apr	Fair	Sparse	2-3
	19-Sep	Fair to Good**	--	80-100 (culms) / 40 (leaves)
Earle Ranch*	12-Apr	n/a*	Abundant (brome) Sparse (native)	3 cm
	19-Sep	n/a*	--	no data
Lone Pine Hill (upper elev)	11-Apr	Good	Scattered clumps in rocky areas	2-5
	18-Sep	Good to Excellent	--	80 (culms) 60 (leaves)
Lone Pine Hill (mid elev)	11-Apr	Fair to Good	no	2-5
	18-Sep	Fair to Good	--	60 (culms) 30 (leaves)
Lone Pine Hill (lower elev)	11-Apr	Fair	no	
	18-Sep	Fair	--	60 (culms) 30 (leaves)
Aupet Land Co.	22-Apr	Fair to Good	yes	10
	22-Sep	Fair to Good	--	60 (culms) 40 (leaves)
1989 Flush site 1*	22-Apr	n/a*	yes*	2
	22-Sep	n/a*	--	130 (culms)*
1989 Flush site 2	22-Apr	Excellent	yes	15
	22-Sep	Excellent	--	70 (culms) 40 (leaves)
Skookumchuck exclosure (cattle only allowed)	26-Apr	Good	30-40	10
	23-Sep	Good	--	30-40 culms, 20-30 (leaves)
Skookumchuck exclosure (no grazing allowed)	19-Apr	Excellent	30-70	10
	23-Sep	Excellent	--	40-70
Skookumchuck exclosure (wild ungulates only)	19-Apr	Fair	No data	3
	23-Sep	Fair	--	60-70 (culms), 30-50 (leaves)
Skook Pulp Mill Pasture (cattle and elk allowed)	19-Apr	Poor to Fair	Sparse, scattered stems	3
	23-Sep	Poor to Fair	--	No data

* A narrow hedgerow of domestic brome

**Prescribed burn in spring 2005

Figure 5. High vertical cover values - Ashfire pasture, September19, 2005

Figure 6. East slope Sharptail Pasture, September 19, 2005

4.3.2 Wycliffe

Three main areas of Wycliffe were surveyed (Figure 3). These were Lone Pine Hill, the Aupet Land Company property and two historic flush sites (Ohanjanian 1990). In addition, one lek survey was conducted along the Mission / Wycliffe Road near Foster Road, the site of a previous transplant of grouse in the mid-1970s. All sites were on private land.

4.3.2.1.1 Lone Pine Hill (Pine Butte)

Lone Pine Hill is a grassland butte in Wycliffe whose grasses have been carefully managed by the owners, Pine Butte Ranch (Fig. 7). Range condition improved with increasing elevation on this site, with excellent stands of rough fescue, bluebunch wheatgrass, Kentucky bluegrass, *Poa pratensis*, balsamroot, *Balsamorrhiza sagittata*, and scattered rose persisting at mid to high elevations. The lower elevations appeared to be recovering from historic over-grazing, and supported only a few rough fescue plants, some sulphur cinquefoil, *Potentilla recta*, Columbian needlegrass, *Stipa nelsonii*, and occasional bluebunch wheatgrass clumps.

On April11, 2005, almost all residual grasses had been removed, except near the top of the butte, where scattered remnant bluebunch and fescue stems remained among the rocky outcrops. New growth of rough fescue was 3-5 cm high on that date (Table 3). When the site was re-surveyed on September 18 and 27, there was good growth of Columbian needlegrass on the lower flanks (culms to 60 cm high), and it, as well as bluebunch wheatgrass and rough fescue in the middle to upper elevations provided high cover values (Figure7). Grazing of domestic livestock on Lone Pine Hill was limited to six horses throughout the summer. There will be abundant residual vegetation when entering the winter. Overall range condition is adequate to support sharp-tailed grouse, but it is not known if residual vegetation will be available in spring of 2006, for nesting. Eighty elk and ten deer were observed feeding there on April 11, 2005.

While range condition on the lower flanks of Lone Pine Hill was inadequate to support nesting Sharp-tailed Grouse, there was some over-wintering habitat available at lower elevations, including aspen copses with a well-developed rose understory, saskatoon, snowberry, and chokecherry.

4.3.2.1.2 Aupet Land Company

The Aupet Land Co. is a private tract of grassland at the junction of Highway 95A and the Airport Access Road (Figure 3). This property was variable in range condition and species composition. There were some good stands of rough fescue in the northeast and south, while introduced crested wheatgrass and Canada bluegrass, *Poa compressa*, dominated the hilltop. Ten percent of the ground was exposed and the range condition was fair to good.

Figure 7. Lone Pine Hill: Vegetation Profile, September 2005.
Upper elevations (above) Lower flanks (below).

In April, the Aupet Land Co. site had some residual grass remaining, with scattered clumps that reached a height of 20-40 cm. This was primarily crested wheatgrass – a species that is only of moderate value as forage for wildlife in winter (Pratt et al. 2002). The current year's growth of rough fescue had reached 10 cm on April 22. This growth and the presence of some residual provided only fair cover values for sharp-tailed grouse in spring of 2005.

In September, the current year's growth was tall and plants appeared vigorous (Table 3) (Figure 8).

Over-wintering habitat was very limited on the Aupet Land Co. property with a small-stand (<5 ha) of aspen, rose and chokecherry in the southwest. The riparian areas of the St. Mary River are within 1 km of the site, and these could provide over-wintering habitat. The Aupet Land Co. property will not provide habitat in future as an irrigation system has been built and there are plans to cultivate in 2006 (M. Hogan, pers. comm.)

4.3.2.1.3 1989 Sharptail Flush sites

In 1989, Sharp-tailed Grouse were flushed from two locations within a few hundred meters of each other (Ohanjanian 1990). Flush Site 1 was a narrow hedgerow of brome, scattered rose bushes and wild tarragon between cultivated fields. This hedgerow was only 3-4 m at its widest place and has not been greatly altered in the intervening years. Flush site 2 was on native range that was in excellent condition. As in 1989, rough fescue was still the dominant species. In 2005, there was some residual vegetation 20-40 cm tall, and new growth of fescue plants had reached 15 cm by April 22. The cryptogamic crust was intact and clumps of rose remained on the site. This grassland could provide excellent vegetative structure for Sharp-tailed Grouse, but it is small (< 20 ha), and there is now a house on the property. The owners, Brian and Amy Edmonds, are keen observers of birds and report never having seen a Sharp-tailed Grouse.

4.3.2.1.4 Foster Road / Mission Wycliffe Road / Clearview Acres

In 1974, Sharp-tailed Grouse were captured near the junction of Foster Road and the Mission / Wycliffe Road for transplant to the U.S. (B. Warkentin, pers. comm.). In the same year, breeding birds were reported adjacent to a nearby subdivision now known as Clearview Acres (A. Farr 1977) (Figure 3). While some stands of rough fescue remain in this area, these are small and highly fragmented. The intervening land supports hobby farms and residences. Its historic value as sharp-tailed grouse habitat has been lost.

Figure 8. Aupet Land Co. property, Sept. 22, 2005.

4.3.3 Skookumchuck

There is an experimental 3-way range exclosure in a shrub/grassland south of the Skookumchuck Pulp Mill (Figure 4). One exclosure allows cattle grazing only, one allows ungulate grazing only and one excludes all grazers and browsers. A fourth area, Pulp Mill Pasture, is unfenced and grazed by both wild ungulates and cattle.

Excellent Sharp-tailed Grouse nesting habitat structure was found in the exclosure that was un-grazed (Table 3, Fig. 9). On April 18, high residual rough fescue was present, reaching from 30 to 70 cm in height. Current year's growth of these plants had already reached 10 cm. Chokecherry shrubs were present and healthy, while absent in the immediate area outside the fence. This exclosure was illustrative of what range condition could be like in the absence of both grazers and browsers. It was only 1 ha in size, however.

The cattle-only exclosure had good residual vegetation in April, 2005 (30-40 cm high). In 2005, it was lightly grazed with a total of 67 AUMs (B. Banting, pers. comm.). On September 23, fescue culms were 30-40 cm and leaves 20-30 cm high. The cows appear to have selected for Canada bluegrass, and had been removed leaving the current year's growth of rough fescue partly intact.

The elk-only exclosure had a stand of bluebunch wheatgrass in the east, but most of the area was dominated by cheatgrass, *Bromus tectorum*, sulphur cinquefoil, and Indian wheat, *Plantago patagonica*. This species mix indicated that the site had been disturbed. Neither it, nor Pulp Mill Pasture provided Sharp-tailed Grouse nesting habitat. Residual vegetation was lacking in Pulp Mill Pasture in April and overall range condition was only poor to fair.

Figure 9. Excellent Sharp-tailed Grouse nesting habitat structure in un-grazed exclosure, Skookumchuck (1 ha in size)

4.4 Habitat Reconnaissance of Other Areas

A preliminary habitat suitability assessment of West Columbia Lake grasslands was carried out on October 22. The grassland is extensive, and may have the potential to be enhanced for Sharp-tailed Grouse. Some of this land is now owned by Nature Trust, primarily as an ungulate winter range.

A habitat reconnaissance was carried out on the east shore of Lake Koocanusa, opposite Sharptail pasture. Cover was poor; there were few shrubs and high RV use. Small thickets of rose and snowberry, bitterbrush and saskatoon under pine trees may serve as over-wintering habitat. Reports of sharptails from the east side of the reservoir have been shown to be Blue Grouse (I. Manley, pers. comm.).

5 DISCUSSION

5.1 Anecdotal information

Anecdotal sources of information on Sharp-tailed Grouse were largely unreliable. The superficial similarity between grouse species made it difficult or impossible for some observers to make a positive identification. Dates and locations were also vague, even when observer reliability was high. Some reports did stand out as credible, however, and it can be said with confidence that Sharp-tailed Grouse were present in Newgate between 1999 and 2002.

It is likely that Sharp-tailed Grouse were also present in Wycliffe in 1999 and 2000, and it is possible that they were on Lone Pine Hill as recently as 2004. The unconfirmed report of a brood in Clearview Acres in 2000 (Table 1) should not be ignored, as it was approximately 400 m from an area that supported a breeding population in 1974 (A. Farr 1977). That actual breeding area, however, is now a residential property and the owner, R. Mitchell, has never seen any of these birds.

5.2 Survey results

5.2.1 Sharp-tailed Grouse

Prior to the declines of the late twentieth century, Columbian Sharp-tailed Grouse populations west of the Rocky Mountains were extremely large (Warheit et al. 2004). Throughout the southern Rocky Mountain Trench the species was common until the mid-1970s; they were hunted and used as a source population for a transplant to the United States (Ohanjanian 1990, D. Lucas pers. comm.). Despite extensive searches of historic Sharp-tailed Grouse occurrence areas, no birds were detected in 2005. The possibility exists, however, that a remnant few birds remain. If so, their numbers are very low and their likelihood of extinction is high.

Despite the hunting season being closed for 30 years, Sharp-tailed Grouse have not recovered in the East Kootenay. The decline appears to be in response to four main factors: forest ingrowth, poor range condition, commercial and residential development, and loss of over-wintering habitat.

Forest ingrowth

The succession of grassland habitats to coniferous forest has reduced habitat quality for Sharp-tailed Grouse in several regions (Nature Conservancy 2000, Gieson and Connelly 1993; cited in Ramsey et al. 2000). Caused in part by fire suppression, the rate of forest encroachment and ingrowth in the southern Rocky Mountain Trench has been estimated by Gayton et al. (1995) to be 1% – 3% annually. The effect of this has been to fragment suitable habitat patches and isolate breeding populations of Sharp-tailed Grouse.

Poor range condition and lack of residual vegetation

Lack of adequate cover during the nesting season can lead to significant nest failure among Columbian Sharp-tailed Grouse (Meintz 1991; cited in Leupin 2003, Manzer and Hannon 2005). Leupin (2001; cited in Leupin 2003) found that the mean vegetation height for nest sites in the Thompson/Nicola region was 36 cm (range 27-45) with an overall cover value of 60%. Broods were located in areas with even higher cover values: mean heights of shrubs and grasses were 150 cm and 60 cm, respectively. Marks and Marks (1987) found perennial bunchgrasses and arrow leaf balsamroot to be particularly important during drought years.

In the East Kootenay, native range that is in good to excellent condition is limited. In addition, the growing season begins late, and new growth on many sites is not tall or dense enough to provide adequate cover in April and May. Rough fescue greens up earlier than other grass species in the East Kootenay (A. Skinner, pers. comm.), but residual grass is also required. Its importance was demonstrated during a study of Sage Grouse; successful nests had significantly greater residual grass cover relative to unsuccessful nests (Holloran et al. 2005). In the present study, there was adequate residual vegetation at only three sites, the cattle-only exclosure at Skookumchuck, the un-grazed exclosure (1 ha in size) and a small, privately owned native range at Wycliffe. There was virtually no residual at Newgate or Lone Pine Hill, and habitat quality was, therefore, poor.

While Columbian Sharp-tailed Grouse declines have been associated with excessive livestock grazing and conversion of native range to agriculture (Schroeder et al. 2000) another factor must also be considered in the East Kootenay. Sharp-tailed Grouse habitat overlaps with important ungulate winter ranges. Ungulates graze the residual vegetation, removing cover that is vital for the grouse the following spring. The degree of impact is not known; the number and distribution of elk, the timing and intensity of cattle grazing, range condition and seasonal growing conditions all play a role.

Commercial and residential development

Since the completion of the Cranbrook to Kimberley highway (95A) in the late 1970s, rural residential development has increased on the grasslands of Wycliffe. There were three dancing grounds within 100 m of the Clearview Estates subdivision. A trailer park was built directly on a dancing ground that was active in the 1960s (Ohanjanian 1990).

Although development has not proceeded as quickly at Newgate, there has been an increase in recreational activity and traffic at the Koocanusa Reservoir in the last ten years (D. Lucas, pers. comm.).

Lack of over-wintering habitat.

Well-developed upland and riparian shrub communities provide winter food and thermal cover (Connelly et al. 1998, Marks and Marks 1987, Evans and Moen 1975). Habitat models in the United States have led researchers to the conclusion that winter habitat is the critical factor limiting Sharp-tailed Grouse populations (Hays et al. 1998; cited in

Schroeder and Tirhi 2003). Many riparian zones there have been heavily impacted by cattle grazing. (D. Cantanzaro, pers. comm.). In the East Kootenay, Sharp-tailed Grouse populations in the Newgate area were likely impacted by the flooding of the Libby reservoir in the early 1970s which destroyed riparian vegetation.

5.2.2 Other gallinaceous birds

A small number of grouse of all species were encountered during this study. Anecdotal information from hunters, suggests that grouse were less frequently observed in 2005 than in other years (K. Innes, pers. comm.). Without data, however, this cannot be verified.

5.3 Feasibility of reintroduction

Connelly et al. (1998) report that 30 km ^{2} is the minimum total habitat area necessary for successful population persistence or re-introduction. The Washington Department of Fish and Wildlife initiated management programs for Sharp-tailed Grouse during the 1990's and has acquired and is managing approximately 40,000 acres for Sharp-tailed Grouse alone (Hays et al. 2004). These are large areas. Reintroduction of the species requires a long-term, extensive commitment of funds and land. The results of this study and that of 1989 (Ohanjanian 1990) indicate that the habitat needs of Sharp-tailed Grouse cannot be met under current conditions in the East Kootenay.

Ecosystem Restoration on crown lands could theoretically provide Sharp-tailed Grouse with good quality habitat. It is critical, however, that it take place over a very large area. Programs that target stem removal may offset effects of forest ingrowth. Prescribed burns, such as that carried out in Ashfire pasture in 2005, may improve cover values and increase opportunities for successful Sharp-tailed Grouse nesting. The habitat requirements of these grouse must be incorporated in Ecosystem Restoration projects at the planning stage and issues such as cattle and ungulate grazing must be addressed. Another potential conflict lies in the vegetation itself. Ramsey et al. (2000) note that secure nesting and brood-rearing habitat was created on grasslands in Idaho, especially where forbs, and alfalfa in particular, were included in the seed mix. Ecosystem restoration implies the re-establishment of native plant communities, not domestic.

6 RECOMMENDATIONS

- Do not re-introduce Sharp-tailed Grouse until habitat conditions are met.

- Seek out long term commitments of funding and develop habitat guidelines/targets that would facilitate reintroduction. Incorporate these into Ecosystem Restoration projects over large areas.

- Study the interactions between ungulate forage requirements, cattle grazing and Sharp-tailed Grouse cover requirements. Use this information to inform Ecosystem Restoration activities and future grazing management.

- Conduct winter bird-dog surveys in shrubby areas near Sharptail, Ashfire, Gory and Wakefield pastures. As Sharp-tailed Grouse are highly social and congregate in flocks in winter (Ritcey 1995, Connelly et al. 1998), bird dog surveys at that time of year may confirm that a remnant population still exists in the Newgate area.

- Work with conservation groups such as the Nature Conservancy, the Land Conservancy and the Nature Trust to improve habitat conditions on conservation properties.

- Develop contacts with agencies in the US that are involved with re-introduction of Sharp-tailed Grouse (Appendix A). Their experiences may help inform future re-introduction efforts in BC.

7 LITERATURE CITED

Akcakaya, H. R., V. C. Radeloff, D. J. Mladenoff, and H.S. He. 2004. Integrating landscape and metapopulation modeling approaches: viability of the Sharp-tailed Grouse in a dynamic landscape. Conservation Biology 18(2): 526-537

Berger, M. T., R. Whitney, and D. Antoine. 2004. Columbian Sharp-tailed Grouse management on the Colville Indian Reservation. *In* Proceedings of the 24th Meeting of the Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee. June 28 – July 1, 2004 .Wenatchee, Washington

Braumandl, T.F. and M.P. Curran 1992. A field guide for site identification and interpretation for the Nelson Forest Region. B.C. Min. of Forests, Nelson

Campbell, W.R., N.K. Dawe, I. McTaggart-Cowan, G.W. Kaiser, M.C.E. McNall 1990.The Birds of British Columbia Volume II

Cannings, S. 2002. Sharp-tailed Grouse Ranking Report. B.C. Conservation Data Centre. Victoria, BC. http//:srmapps.gov.bc.ca/atrisk

Connelly, J. W., M. W. Gratson, and K.P.Reese.1998. Sharp-tailed Grouse (*Tympanuchus phasianellus)*. *In* A. Poole and F. Gill, eds. The Birds of North America.No.354.The Birds of North America, Inc., Philadelphia, PA. 19 pp

Conservation Data Centre 2005. B.C. Ministry of Sustainable Resource Management. Victoria, B.C. http//:srmapps.gov.bc.ca/atrisk

Demarchi, D.A. 1996. An introduction to the Ecoregions of British Columbia. Wildlife Branch, Min. of Environment, Lands and Parks, Victoria, B.C www.elp.gov.bc.ca/rib/wis/eco/bcecode.html

Dorey, R. J. 1979. A fire history investigation and the effects of fire exclusion on a ponderosa pine forest in southeastern British Columbia. B.Sc. thesis (For) Univ. of British Columbia. 53 pp.

Evans, K.E. and A. N. Moen 1975. Thermal exchange between Sharp-tailed Grouse and their winter environment. Condor 1977:160-168 (cited in Fraser et al 1999).

Farr, A. 1977. Observations of Sharp-tailed Grouse (Pediocetes phasianellus) in the East Kootenay Region. B.C. wildlife Branch report. 26 pp

Fraser, D. F., W. L. Harper, S. G. Cannings and J. M. Cooper. 1999. Rare Birds of British Columbia. Wildl. Branch and Resour. Inv. Branch, B.C. Minist. Environ., Lands and Parks, Victoria, B.C. 244 pp

Gayton, D. 1998. Preliminary calculation of excess forest in-growth and resulting forage impact in the Rocky Mountain Trench. Unpublished draft report for B. C. Min. of Forests, Nelson Region. 6 pp

Gullet, B. and D. Catanzaro. 2004. Conservation program of the Columbian Sharp-tailed Grouse on the Flathead Indian Reservation. *In* Proceedings of the 24th Meeting of the Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee. June 28 – July 1, 2004 .Wenatchee, Washington

Hays, D., M. Livingston, C. Leingang, and M. A. Schroeder. 2004. Sage and Sharp-tailed Grouse in Washington: a conservation overview. Proceedings of the 24th meeting of the Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee. June 28 – July 1, 2004 .Wenatchee, Washington

.

Holloran, M. J., B. J. Heath, A.G. Lyon, S. J. Slater, J. L. Kuipers, and S. H. Anderson. 2005. Greater Sage Grouse nesting habitat selection and success in Wyoming. J. Wildl. Manage. 69 (2): 638-649.

Leupin, E. E. 2003. Status of the Sharp-tailed Grouse (*Tympanuchus phasianellus*) in British Columbia. B.C .Ministry of Water, Land and Air Protection Biodiversity Branch, and B. C. Ministry of Sustainable Resource Management Conservation Data Centre Wildlife Bulletin No.B-104, Victoria BC. 25 pp

McLean, A. 1979. Range management handbook for British Columbia. Agriculture Canada Research Station, Kamloops, BC. 104 pp

Marks, J. S. and V. S. Marks. 1987. Habitat selection by Columbian Sharp-tailed Grouse in west-central Idaho. U.S.D.I. Bureau of Land Management, Boise, Idaho. 115 pp

Marks, J. S. and V. S. Marks. 1988. Winter habitat use by Sharp-tailed Grouse in western Idaho. J. Wild. Manage. 52(4):743-746

Manzer, D. L. and S. J. Hannon. 2005. Relating grouse nest success and corvid density to habitat: a multi-scale approach. J. Wildl. Manage. 69(1):110-123

National Geographic 2005. Lewis and Clark Journey Log. http//:www.nationalgeographic.com/lewisandclark/record_species_193_15_4.html

The Nature Conservancy. 2000. Species Management Abstract for Sharp-tailed Grouse (*Tympanuchus phasianellus*). http://conserveonline.org/docs/2001/05/stgr.doc

Ohanjanian, I. 1990. The Columbian Sharp-tailed Grouse in the East Kootenay: a report on their status and options for re-introduction. Unpublished report for the Habitat Conservation Fund, B.C. Wildlife Branch, and Kimmur Forestry Consultants. 55 pp

Pratt, M., J. Bowns, R. Banner and A. Rasmussen. 2002. Range plants of Utah. Utah State University Extension. http://extension.usu.edu/rangeplants/Grases/crestedwheatgrass.htm

Ramsey, R. D., T. A. Black, E. Edgley, N. Yorgason. 2000. Use of GIS and remote sensing to map potential Columbian Sharp-tailed Grouse habitat in southeastern Idaho. Report to the US Department of the Interior, Bureau of Land Management, Malad City, Idaho

Resources Information Standards Committee. 1997. Upland Gamebirds: Grouse, Quail and Columbids. Integrated Land Management Bureau (ILMB), Ministry of Agriculture and Lands, Victoria, B.C. http://ilmbwww.gov.bc.ca/risc/pubs/tebiodiv/gamebirds/index.htm

Ritcey, R. 1995. Status of the Sharp-tailed Grouse in British Columbia. B.C. Minist. Environ., Lands and Parks, Wildl. Branch. Working Rep. WR-70. 52pp.

Schroeder, M. A., D.W. Hayes, M.A. Murphy and D. J. Pierce 2000. Changes in the distribution and abundance of Sharp-tailed Grouse in Washington, Northwestern Nat 81:95-103

Schroeder, M. A. and M. Tirhi. 2003. Sharp-tailed Grouse *in* Washington Dept. of Fish and Wildlife's Priority Habitat and Species Management Recommendations. Volume IV: Birds. Washington Dept. Fish and Wildlife, Olympia

Stewart, H. and R. J. Hebda. 2000. The grasses of the Columbia Basin of British Columbia. Prepared for the BC Ministry of Forests and the Royal British Columbia Museum Natural History Section, Victoria, BC. 228 pp

Ulliman, M. J. 1995. Winter habitat ecology of Columbian Sharp-tailed Grouse in southeastern Idaho. M.Sc. thesis. Univ. Idaho. Moscow.

Warheit, K. I., M. A. Schroeder, A. Spaulding and K. Mock. 2004. Microsatellite DNA phylogeny of Sharp-tailed Grouse and molecular diversity within the Columbian subspecies *(Tympanuchus phasianellus columbianus). In* Proceedings of the 24th Meeting of the Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee. 2004. June 28 – July 1, 2004Wenatchee, Washington

APPENDIX A. Agencies involved with Sharp-tailed Grouse reintroduction in the United States

Idaho: Randall B. Smith Magic Valley Region Wildlife Manager Idaho Department of Fish and Game 319 South 417 East Highway 93 Business Park Jerome, Idaho 83338 (208) 324-4350 E-mail: rsmith@idfg.idaho.gov
Nevada: Craig Mortimore Nevada Department of Wildlife Eastern Region -Elko 60 Youth Center Road Elko, NV 89801 (775) 777-2300 E-mail: cmort@ndow.org
Oregon: Dave Bureau Upland Game Bird Coordinator Oregon Dept. Fish and Wildlife 3406 Cherry Ave N.E. Salem, OR 97303 Ph: (503) 947-6323 E-mail: david.a.budeau@state.or.us
Washington: Michael A. Schroeder Washington Department of Fish and Wildlife P.O. Box 1077 Bridgeport, WA 98813 (509) 686-2692 (office & home) (509)670-8838 (cell) E-mail: schromas@dfw.wa.gov grouse@vib.tv
Montana: Ben Deeble, Sage-grouse Project Coordinator National Wildlife Federation, Northern Rockies Office 240 N. Higgins Ave. #2 Missoula, MT 59802 (406) 721-6705 Email: deeble@nwf.org
Kootenay-Salish Tribe. Sharp-tailed Grouse re-introduction plan to Flathead Ind Reserve, adjacent to Bison range Donald G. Catanzaro, PhD dgc@ftn-assoc.com Landscape Ecologist, **FTN Associates** 2949 Point Circle, Suite 1 Fayetteville, AR 72704 (479)-571-3334 Phone (479)-571-3338 Fax www.ftn-assoc.com

Appendix B. Anecdotal Record

(Results in Confidential Database)

Observation #:_____ **Observation Date:** _____

Approx. Time:_____

Observer:_____

Range Unit:_____ **Pasture:**_____

UTM:_____**East,**_____**North** **Datum:**_____

Elevation:_____

Location Description:_____

_____

Air Photo Number(s):_____

Animals Observations

Number of Birds	Species	Sex	Stage	Activity	BEC	BGU	Forest Type

Activity:

_____

Observer Confidence: High Mod Low

Rationale: _____

Recorder Confidence: High Mod Low

Rationale: _____

Comments:_____

_____

_____

Ground Truthed: Yes / No **Survey #:**_____

Recorder:_____ **Date Recorded:** _____