

A HUNTER-NATURALIST'S OBSERVATIONS OF SHARP-TAILED GROUSE TRENDS IN SASKATCHEWAN

JOSEF K. SCHMUTZ, School of Environment and Sustainability, University of Saskatchewan, 117 Science Place, Saskatoon, SK S7N 5C8

Beginning in 2013, the Saskatchewan Ministry of Environment reduced the daily bag limit for Sharp-tailed Grouse (*Tympanuchus phasianellus*) from three to two.¹ With the original possession formula of twice a daily limit retained, the possession limit is then reduced from six to four. This reduction in allowable take by hunters follows a previous reduction from five to three in 1989.

The reduction in bag limits is a response to a long-term and continuing decline in Sharp-tailed Grouse numbers. Originally, Sharp-tailed Grouse (also called "sharptails") were common from the mid-western United States through Canada to Alaska. This included all four western Provinces where grassland or grassland edge was available, and parts of Ontario and Quebec. Sharptails are now relegated to pockets of grassland and shrub-steppe habitats where these habitats remain.² It appears that Sharp-tailed Grouse are quite tolerant of disturbance on dancing grounds^{3,4} but appropriate nesting and brood-rearing cover nearby may be more critical.⁵

The Ministry's press release¹ invites hunters and naturalists to report their observations in a specially created section of the ministry's website. The release boldly states "Saskatchewan is moving forward in efforts to monitor its upland game populations." Is this "moving forward" anything more than calling on hunters and naturalists to report sharp-tail sightings? The press release acknowledges that "...there has been little research conducted..." and cites no data that would support the change in bag limits.

While the sharptail's decline is not in doubt and action is indeed needed, without direct data it may be difficult or impossible to address the complex pressures faced by grassland birds in Canada generally, including the Sharp-tailed Grouse. What may be more urgent than data is action to address the factors in the declines that are already known. The North American Bird Conservation Initiative Canada⁶ states "Native grasslands and pasture lands continue to be lost or degraded through agricultural intensification, such as conversion to grains, oilseed or fibre crops

which provide poor habitat for most birds. Oil and gas development, fragmentation by road and fire suppression also reduce habitat.”

There is no insinuation in the Ministry’s press release that the hunters’ take is the cause of sharptail declines. Judging from the popular literature, hunters are secure in the thought that their craft is appropriately regulated⁷ once market hunting had been banned; barring a recent resurgence of hunt farms and commercialized hunting.^{8,9} The ecological essence informing appropriate regulation is that game animals compete with one another within a species for a maximal contribution of young to the future breeding population, creating a so-called ‘surplus.’ This surplus is harvested in an anticipated ‘compensatory’ manner in the fall, before winter mortality or lack of breeding habitat in spring¹⁰ impose the final population limit. While the ecological principles underlying such hunting are well accepted, their administration still requires considerable care.¹¹

In Saskatchewan, hunters point to winter severity as a major factor in game bird fluctuations, noting a dramatic decline among the introduced Gray Partridge (*Perdix perdix*) following two severe winters in 2011-12 and 2012-13. Although finding that sharptails’

food intake could not always meet expected energy demand for parts of the winter in a study near Duperow, Saskatchewan, Schmidt¹² did not find excessive weight loss during those periods. This suggests that the native sharptails are well adapted to the normal range in severity of Saskatchewan winters under the habitat conditions studied. Hunters also point to the risk of extirpation for Greater Sage-Grouse (*Centrocercus urophasianus*), a species that has never had a hunting season in Saskatchewan. In general, hunters believe in habitat management and support programs toward that end.^{13,14}

Having hunted Sharp-tailed Grouse regularly for decades, I have observed declines primarily in small, isolated pockets of non-functional grassland remnants. Here, hunters report sharptails when winters are mild and, more importantly, when early summer rains are interspersed with dry periods. During the vulnerable time of early brood rearing, grouse chicks can get chilled and succumb when wet. Gray Partridge, like sharptail chicks, also require periods of dry weather. Insects need to be accessible to chicks in areas with vegetation structure where insects are within reach and where escape cover is always nearby. Unlike the introduced partridge, however, the native

Sharp-tailed Grouse appears to be less dependent on seeds revealed on the ground through scratching. Sharptails routinely feed in trees and shrubs above a deep layer of snow.^{5,15}

Hunting Area and Methods

During the 2013 hunting season, I made systematic records while hunting. Responding to the Ministry's call for information, I recorded time afield, habitat where sharptails were found, and the age, sex and food items found in crops of the shot birds.

As in previous years, I hunted on the Purdue Ranching Co-op Association pasture approximately 15 km NW of Purdue, Saskatchewan. The Saskatchewan Crown owns the contiguous 29 km² of pastureland. Day-to-day management decisions, including the timing, duration and intensity of grazing, are made by the rancher-members of the co-operative in the style of the so-called 'co-op pastures.'

The native grass and shrub cover exists because the hilly and rocky glacial moraine (Photo 1) has proven difficult to cultivate. Non-random clusters of mid-size rocks, including teepee rings, indicate use by native peoples in the past. Buffalo rubbing stones suggest past use by bison. Fescue grasses are common at

this prairie-parkland interface. Woody cover in draws on steep hillsides included Trembling Aspen (*Populus tremuloides*), Canada Buffaloberry (*Sheperdia canadensis*), Choke Cherry (*Prunus virginiana*), Rose (*Rosa* spp.), Snowberry (*Symphoricarpos* sp.), and Silverberry (*Elaeagnus commutata*). The latter two also covered some of the gentler slopes and low-lying areas. All combined, this vegetation no doubt provides important winter food for grouse.^{2,12}

I recorded the time and habitat covered over 7 days of hunting, from 15 Sept. to 2 Nov. 2013. Each of 14 hunting forays lasted 35-170-min. in a loop that lead back to the vehicle for a break and to water the dogs. Each foray covered a new area of the pasture. Hunting took place from 1000 – 1600 H. Hunting time was short each day, because a limit of two grouse was obtained quickly. Some of my grouse-hunting friends hunted no sharptails in 2013, because they felt that driving to and fro would take longer than hunting itself under the reduced bag limit. I shot only grouse pointed by the dogs to heighten the experience and extend the time afield.

I used GPS to mark the locations of the parked vehicle, grouse flushed and grouse shot.



Photo 1. A Large Munsterlander, “Buteo”, is pointing a young Sharp-tailed Grouse in the moraine landscape of the Purdue Ranching Co-op Association pasture, near Purdue, Saskatchewan. The photo shows grassland on hilltops, slopes and low lying areas interspersed with native shrubs, and rare semi-permanent ponds. Photo by J.K. Schmutz, taken on 28 Sept. 2013.

The gender of shot birds was determined by examining gonads internally. Age was based on the molt of outer primaries following G.W. Pepper in Connelly et al.² Grouse were plucked and gutted *in situ*, and gender, age and crop contents determined at home. I judged a fully extended and bulging crop to be full and partially filled crops in tenths of maximum crop volume.

The considerable number of grouse found was strongly influenced by my use of hunting

dogs. On different occasions I followed 2-5 Large Munsterlander dogs, one of several breeds of mid-range versatile hunting dogs.¹⁶ The dogs often searched 150 m to each side, depending on cover and terrain. While the use of dogs clearly leads to more grouse encountered and thus possibly greater hunting pressure, their use also ensured that virtually every grouse shot or crippled was also recovered and thus counted in the bag limit.

I calculated grouse densities

Table 1. A summary of hunting effort and Sharp-tailed Grouse numbers and densities over seven days of hunting on the Purdue Co-op community pasture from 15 September to 2 November 2013 in Saskatchewan.

Hunting foray #	Sharptails			Hrs spent	Approx. linear km	Km ² covered	1st Flush Grouse/km ²	All Grouse/Hr
	All	1st flush	Bagged					
1	0	0	0	1.5	4.1	1.2	0.0	0.00
2	8	8	1	0.75	1.8	0.5	14.8	10.67
3	2	2	0	0.75	3.0	0.9	2.2	2.67
4	5	5	0	1	1.9	0.6	8.8	5.00
5	19	15	2	2.08	3.5	1.0	14.4	9.13
6	4	4	0	1.33	2.2	0.7	6.0	3.01
7	10	7	2	1.92	4.4	1.3	5.3	5.21
8	6	6	1	1.42	2.8	0.8	7.1	4.23
9	7	5	1	0.58	0.8	0.2	21.1	12.07
10	27	23	1	1.42	7.3	2.2	10.5	19.01
11	4	4	1	1.08	0.9	0.3	14.0	3.70
12	25	20	2	2.83	1.9	0.6	35.1	8.83
13	1	1	0	1.92	2.5	0.8	1.3	0.52
14	<u>19</u>	<u>17</u>	<u>1</u>	<u>1.42</u>	<u>4.0</u>	<u>1.2</u>	<u>14.2</u>	<u>13.38</u>
Total	137	117	12	20.00	41.2	12.4		
Average	9.79	8.36	0.86	1.43	2.9	0.9	9.5	6.96

per km² for each hunting foray using an estimate of linear distance walked and a coverage by the dogs of 300 m side-to-side. I estimated distance walked by plotting the parked vehicle, all grouse locations, all other plotted GPS locations of interest (e.g. buffalo rubbing stones) and trees, fences and trails visited. While my walking direction was influenced by promising cover, the pasture was so diverse and grouse found throughout, that all parts of the pasture seemed to have an equal chance of holding grouse.

Grouse Numbers

Sharp-tailed grouse were the most common species (Table 1) on the pasture. One Ruffed Grouse was spotted in 2013, and one was shot in 2012. In the 2013 hunting season, after two long winters with low temperatures and deep snow, Gray Partridge were rare. In other years, partridge occupied the pasture border where cereal crops were grown outside it. Whereas in previous years primarily Mule Deer (*Odocoileus hemionus*) but also White-tailed Deer (*O. virginianus*) were common in the woody cover of draws, I observed only one deer that the dogs had moved

from cover in 2013. One deer carcass was located in a woodlot and the local ranchers noted many more. This deer mortality is indicative of the harshness of the winters, yet Sharp-tailed Grouse fared remarkably well. Sharp-tailed Grouse appeared numerous with 6.9 grouse seen on average per hunting hour, or 6.4 when subtracting presumed re-encounters of previously flushed grouse (Table 1). Although I kept no written record in previous years grouse numbers appeared stable or little changed in 2013.

The age and gender of shot birds were: two adult females, three juvenal females and three juvenal males. The gender of two adults and two juveniles was not determined. In his study near Asquith, Saskatchewan 1968-71, Pepper⁵ found that adult males generally came to dancing grounds in fall also and tended to feed and rest in groups of males. The females and young moved separately from the males at this time.

My bag included at least one adult female that was removed from her brood of young. What influence such a removal has on the subsequent survival of her young is apparently unknown. Of five juvenals bagged in September, four were then growing their last primary feather

for the year, #8, and one was also still growing primary #7. Thus, the replacement of primaries was nearly complete; primaries #9 and #10 are not replaced during the hatch year. Hunters are well aware that sharptails tend to form large flocks late in the season when their vigilance is increased, approach to within gun range is difficult and they typically fly far to cover once flushed. Early-season family groups are much more vulnerable to being hunted and could be pursued several times each, given their much shorter escape-flight distances. Thus, by simply moving the onset of hunting season to later in the year, the take by hunters could be reduced and the hunt made more challenging without altering bag limits.

Connelly et al. (1998) report that counting the number of dancing grounds and the number of grouse on dancing grounds provides a good indication of both population size and habitat use. A partial survey of the pasture in the spring of 2012, using a motorcycle for transportation, yielded five dancing grounds with grouse, trampled grass and droppings. One Co-op member reported a sixth dancing ground (Lloyd Hunter, pers. com.) One of the dancing grounds visited twice near sunrise yielded at

least 29 grouse flying away. Connelly et al.² report a range in the number of grouse attending dancing grounds. Their reported maximums exceed Perdue's 29 in only four of the eight studies cited. The studies were carried out in five U.S. States in the past, from the 1940s in Michigan and Wisconsin to 1993 in Idaho.

Connelly et al.² report estimates of grouse densities for the breeding period and winter. My estimate of grouse density based on 41 km walked and a 300 m swath searched by the dogs, yielded 9.5 grouse/km². In this estimate I corrected for the same grouse

sighted a second time, judging from direction flown, distance and time between sightings. In this way I removed 20 sightings from the total of 137 observed. I am not aware of comparable estimates in fall, at a time when flight-feather molt is near complete, and the number of well-flying, fully grown birds may be at its peak. Connelly et al.² report numbers of grouse in summer ranging from 0.6-7.0 grouse/km² in five studies

Considering i) the substantial number of grouse encountered while hunting, ii) the extrapolated density, iii) the high number of dancing grounds found in only

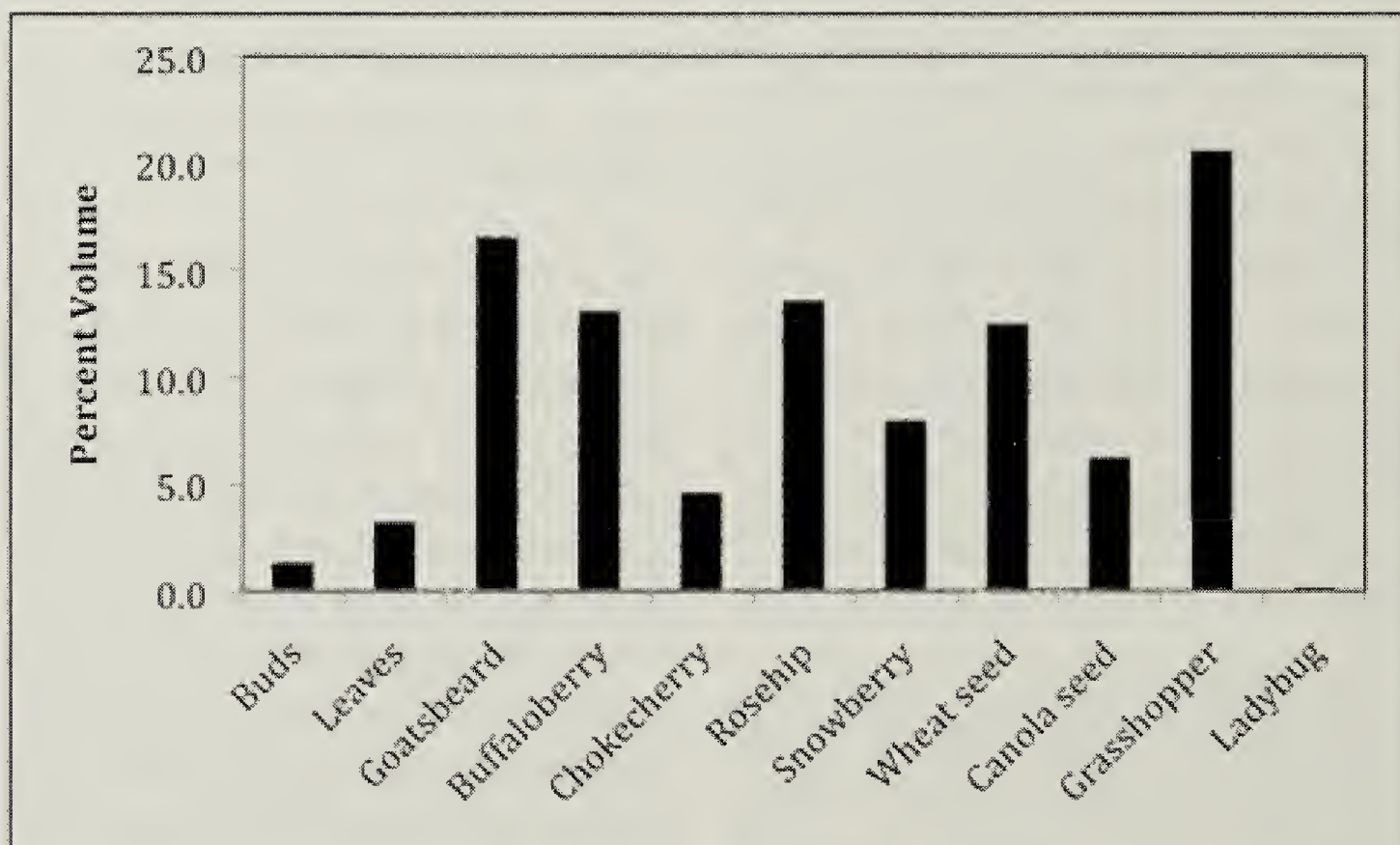


Figure 1. Crop contents showing visually estimated volumes of various food items from Sharp-tailed Grouse bagged on the Purdue Co-op community pasture between 15 Sept. and 2 Nov. 2013.

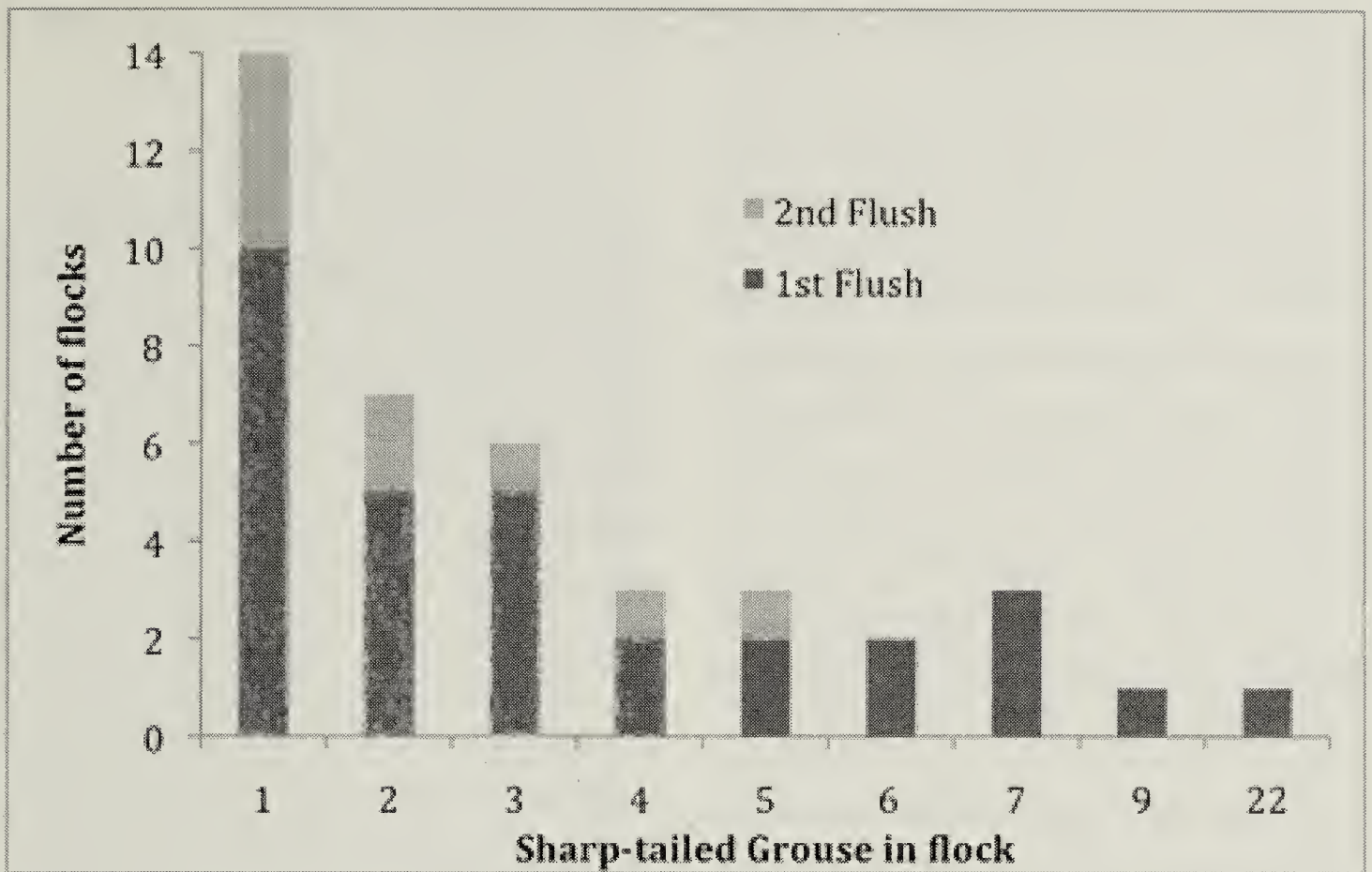


Figure 2. Number of Sharp-tailed Grouse encountered as singles or in flocks of varying size on the Purdue Co-op community pasture.

a portion of the native pasture and iv) the substantial number of grouse flying from a dancing ground at sunup in spring, together, suggests that the Sharp-tailed Grouse of the Purdue Co-op pasture are doing well in comparison to birds reported in other studies, and in other hunting areas in Saskatchewan based on my hunting experience.

Food

The crops of 12 Sharp-tailed Grouse, shot during the hrs of 1000 – 1600 ranged from empty ($n = 1$), partially filled (10) and full (1). The volume of individual food items in opened crops was estimated visually.

Plant items found in crops included stem buds, leaves, flower buds (goatsbeard), wheat and canola seed, and berries (Figure 1). The approximately 100 grasshoppers in seven crops appeared uniform in size and approximately 20 mm long. Grasshoppers and two ladybugs were the only insects found. Grasshoppers were in crops well after the first frost, up until October 13.

Grouse Distribution

Sharp-tailed Grouse occurred in flocks of varying size. They were found in a variety of habitats and habitat use appeared to change through the fall period. Grouse flushing as a group or in quick succession, even if up to 100 m

apart, were considered a flock. The number of birds per 'flush' or flock varied from 1 to 22 (Fig. 2). Flock sizes in which a young grouse was shot were 7, 6, 6, 5 and 4. The group of 22 also had a young taken from it. This group split into three as it flushed and likely represented three family groups, that is the hens and their young. This small sample suggests that successful hens raised approximately 6 young to near maturity.

Grouse on the pasture flushed from open grass habitat 44% of the time, from grass but near shrubs 17%, and from inside shrubs/trees 39%. Short shrubs such as snowberry and rose seemed to be not as frequently used. Over the years, I found several night roosts in short shrub but never in grass; the cluster of droppings at a cup of depressed vegetation identified night roosts. The presence of a softer, deep brown dropping that reflects evacuation of the cecum further confirmed roosting over night. Whether grouse also roosted over night in tall shrub is unknown since these were difficult to walk through and thus I avoided them while the dogs did not. Given the food items that were consumed by grouse, feeding clearly takes place in shrubs for berries and in open grass for grasshoppers,

where they could be seen while I was walking.

By the last hunting day on November 2nd, the grouse's habits appeared to change. While during previous forays, the grouse were common throughout the interior of the pasture; the dogs could only find one grouse in the pasture's interior in 2 hrs of hunting on 2 November. In contrast, during 1.5 hrs of hunting near the pasture border with stubble fields, we saw 15 grouse in 1.5 hrs of hunting. This was also the only time when the one grouse taken that day had grain (wheat & canola) in its crop. In late afternoon, some of the grouse were in high flight heading from the fields back into the pasture.

This near absence of grouse in the core of the pasture late in the season was also evident in previous two years of hunting. It is plausible, that when grasshoppers stop being active and bury themselves in debris and soil, the grouse seek waste grain in the surrounding fields. Once the waste grain in fields is out of reach below snow, the grouse likely return to consume the berries that were still evident on shrubs. After these are consumed, buds probably become a major food item.²

Grouse, cattle and ranchers in a 'working' landscape

The observations reported here suggest that the Purdue Co-op sharptail population is doing well. This can be logically attributed to the high quality native habitat maintained there – but then, why do the grouse continue to decline and require reduced bag limits? Our human relationships with grouse and grass is not static, it has changed dramatically and continues to change. How we manage this trajectory of change will influence the bag limits in the future and the level of bird watching that naturalists can enjoy. To explore how Saskatchewan might boldly 'move forward' vis-à-vis sharptails, it might be useful to examine our past.

No doubt, the first human residents of the Canadian Prairies, the Assiniboine, Blackfoot, Plains Cree, and Sarcee,¹⁷ also took grouse, perhaps most effectively with snares. Subsequently, our Euro-Canadian relationship with prairie has changed. First, harvesting of grassland commodities for sale began with bison hides, meat and the bone trade.¹⁸ Subsequently, with bison gone, the 'breadbasket mantra' of the early 1900s ran its course with a grassland conversion that was vastly out of sync with what the 'rain-shadow' ecosystem could

sustain. This led to enormous pain to people and a drain on the human economy.¹⁹ Slow grassland loss, to the detriment of Sharp-tailed Grouse, continued to the 1970s.²⁰ Even if some grassland was not permanently cultivated, its quality was often reduced through overgrazing,²¹ the introduction of Eurasian grass varieties^{22,23} and fire suppression.²⁴

Beginning in the 1970s, the remarkable value of native prairie came to be better recognized. After the 1970s a collective wisdom by naturalists, the agricultural community and policy makers began to mature.^{25,26} Remnants of these and other transitions also found their expression on the Purdue Co-op pasture. However, a step backwards may be happening now with the dismantling of the PFRA Community Pasture Program.²⁷

Today, when only 20% of the original prairie remains, the way in which this prairie is maintained is important. Maestas et al.²⁸ show that from a generalized biodiversity perspective, ranchers are important allies in conservation, especially those ranchers that are dependent on and derive most of their livelihood from grass and cattle. In cases where specific biodiversity benefits are sought, such as viable populations of Sharp-tailed Grouse, Greater

Sage-Grouse and other grassland birds, there may be a need for specific pasture management that goes beyond maintaining a ranch, however. PFRA pasture manager Mert Taylor²⁹ describes the local knowledge and management-care required in balancing water supply, favourable calf growth rates, healthy grass resources and drought resistance through maintenance of healthy soils, while combating invasive species. Could Saskatchewan move beyond mere monitoring to action by inviting ranchers to become allies in a strategic management of the remaining native prairie? Could such management employ know-how described by Mert Taylor to achieve strategic outcomes, a 'results-based approach' toward sustainable use of all natural resources for our generation and the next?

The management strategies of the ranchers at the Purdue Co-op pasture serve sharptails well. The ranchers have clearly thought through their approach for now, but if beef markets, climate or mixed farm transitions change in the future, will their approach remain viable? Might volatility in beef markets require less sharptail-friendly grass management for farm livelihoods? Will the next generation of farmer/ranchers still have the 100-year-long environmental memory to

make land decisions that support sharptails?

I hope that many hunters and naturalists respond to the Ministry's call and report sightings. Sightings are valuable, but in and of themselves they cannot address the many critical factors identified by NABCI Canada.⁶ Sightings are unlikely to replace strategic and dedicated research. Even research at its finest is a 'means to an end, not an end in itself.' The end in itself will require leadership and dedicated care of the kind Mert Taylor describes.²⁹

Dedicated care for key natural landscapes is a global responsibility. On the Canadian Prairies, this is formally recognized under the Temperate Grasslands Conservation Initiative of IUCN,³⁰ the Biodiversity Convention, and the North American Free Trade Agreement. The community pasture system of the federal PFRA and provincial pastures, represent a significant opportunity for conservation if it can be realized for the future. Le Saout et al.³¹ recommend that increased care is warranted on these small protected areas and that "... preventing species extinctions requires the strategic allocation of management efforts." The same applies in all likelihood to Saskatchewan's community pastures and Sharp-tailed Grouse. On Crown-owned

pastures an opportunity for targeted management exists,²⁹ and if there are costs for this public benefit they should be borne by the public and not the ranchers.

What can hunting dogs reveal about natural predation?

The fescue-grass community of the Perdue Co-op pasture shown in Photo 2 is mature, so much so that it has likely not seen more than a few cows passing over it in several years. Cattle need water to maintain them and to grow calves.

Temporary ponds, dugouts and two wells provide stock water on the pasture. Areas around these water sources tend to be heavily grazed, areas 1 km away are used less and those more distant are grazed rarely if at all. Grouse and dense-grass-loving songbirds sustain themselves in this dense grass cover, and, theoretically, can produce a population surplus to re-populate marginal areas. The ranchers could develop more water bodies or transport it in tanker-trailers. However, they



Photo 2. A Large Munsterlander, "Ulna", is holding a young Sharp-tailed Grouse after she had deciphered the family's tracks in the dense grass, where, judging from crop contents, they had been feeding on grasshoppers. The fescue grass community shown here is very mature. While studies might reveal reduced plant biodiversity at this near climax state, an alternate benefit is the dense escape cover this pasture portion provides for sharptail chicks. Photo by J. K. Schmutz.

have decided to use this pasture lightly most years.

The young grouse held by the dog (Photo 2) was part of a family feeding on grasshoppers. Grouse require the previous year's vegetative growth to hide their nest for about 10 days of laying and 22 days of incubation.² This need to remain unnoticed by predators extends beyond the egg stage to young. Chicks can fly short distances at 7-10 days. Thus vegetation has to be suitable to provide food for chicks and escape cover for a full 40 days.

When the dogs encountered grouse, they used sight to ascertain flight direction and to mark a fall or landing spot. Beyond this limited use of sight, dogs use scent to locate birds. The dogs' use of scent and not sight was so pronounced that dogs at times can nearly step on a grouse without noticing it when wind and microhabitat make scenting difficult. Hunters refer to this as a bird 'air washed' during the fall. Interestingly, when Conover and Borgo³² studied the sharptail's choice of loafing sites, they concluded that the sites selected by grouse made for poor scenting (e.g. updrafts). When visibility by potential predators was considered the sites were no different from random sites.

An explanation other than

'air-washed' is likely. Dogs, and presumably also all mammalian predators, detect two types of scent: 1) a bird's breath or the scent associated with body particles carried by wind or 2) scent left behind on the ground and vegetation while walking. A so-called air-washed bird was likely struck well enough in flight so that it died and stopped breathing by the time it hit the ground. Also, it did not move any more, leaving no track and thus leaving only a small amount of scent for a dog to detect.

To escape predation, grouse chicks scatter in flight and can do so as early as 7-10 days after hatching,² often prompted by the alarm calling and injury-feigning hen. When chicks land in dense grass, a predator will have more difficulty finding them, not being able to follow a chick's track. The dense vegetation conceals and provides a barrier for wind. Due to the chicks' small body, the exhaled air volume will be small. Whether young birds have additional survival strategies, such as reduced breathing rate under stress, is not known. Mammalian predators would likely have to be very close to find a hidden chick by chance. Dense vegetation, and vegetation like grasses that a chick can move into and out of, is important in this scenario. A corollary to

dense-grass escape cover is the absence of cattle during the vulnerable nesting and brood rearing period, reducing mortality from trampling. Delayed grazing and no mowing are recommended conservation measures for Sharp-tailed Grouse.²

For grassland bird conservation a diversity of vegetation has been recommended that can satisfy the changing ecological needs birds have throughout the year.³³ Hunters can also encounter good numbers of Sharp-tailed Grouse at times when grazing pressure is high. Here, the grouse depend on shrubs for escape cover. A possible advantage for grouse may come from an earlier emergence of grasshoppers and other insects where the sun can warm the less shaded soil and warm it earlier in spring. A diverse matrix, as opposed to uniformity, of microhabitats appears desirable.

The Ministry of Environment's decision to reduce hunter bag limits is a choice that many hunters support vis-à-vis Sharp-tailed Grouse in Saskatchewan today. Fryxwell et al.¹¹ suggest that hunter-take be adjusted up or down regularly as warranted, especially for species faced with random changes in populations (e.g. weather related) or for species with long-term and regular population cycles. Akcakaya et al.³⁴ go

yet further when they suggest that management strategies be balanced and that they "...must consider habitat and population dynamics simultaneously" in the management of Sharp-tailed Grouse. In view of only 20% of prairie remaining and only a portion being in a state that satisfies the Sharp-tailed Grouse's food and habitat requirements, it appears logical that strategic habitat management should become a priority.

A mix of heavily and lightly grazed areas exists on the Purdue Co-op pasture. The reasons for this fortuitous presence of suitable breeding, feeding and escape cover are several. Where water is available on the Purdue Co-op pasture, cattle tend to graze the area heavily. The converse is true at sites distant from water. As rancher Lloyd Hunter (pers. comm.) put it, they are well aware that droughts will recur. It costs the Hunter Ranch \$270/day to feed their cow herd should drought limit pasture and forage supplies. During those dry years, the ranchers will put their cattle on the dense grass carryover of the Co-op pasture that they have saved for that purpose. One of the positive features of native prairie grasses is that they retain adequate forage quality into the following year.

Ranchers can gain weeks worth of grazing a year later, albeit with some loss of protein content (H.A. (Bart) Lardner, pers. comm.). The grass is “banked” for those dry periods, which as local knowledge and environmental memory tells us, will recur every so often in southern Saskatchewan.

These observations suggest that the Sharp-tailed Grouse population on the Perdue Co-op pasture are faring exceptionally well at a time when the species is declining province-wide. The observations also suggest that the habitat on the pasture is maintained in a way that favors sharptails. Sharptails are favoured fortuitously by ranch management that did not succumb to a ‘tragedy of the commons’³⁵ but maintained a view to long-term sustainability of ranch-family livelihoods. Bag limits are a necessary condition in the sustainable management of game species, but in and of themselves not a sufficient condition. The Perdue Co-op pasture serves as a model; the grouse know it, do we? This model provides an example for ‘Saskatchewan to move forward.’

Acknowledgments.

I am grateful to Lloyd Hunter and his rancher neighbours for allowing me to hunt on the Co-op pasture. Lynn Oliphant, Wayne Pepper, John Toepfer, and Blue

Jay editors provided important comments on earlier versions of this manuscript.

1. Saskatchewan Ministry of the Environment (2013) Participants now needed for prairie game bird population survey. *Nature Views* 175:14.
2. Connelly JW, Gratson MW, Reese KP (1998) Sharp-tailed Grouse (*Tympanuchus phasianellus*). In *The Birds of North America*, No. 354 (A. Poole and F. Gill, Eds.). The Birds of North America Inc., Philadelphia, PA, U.S.A.
3. Wedgwood J (1992) Tolerance of short-term disturbances by Sharp-tailed Grouse. *Blue Jay* 50:96-100.
4. Toepfer JE (2003) What the heck is a Lek. *Grouse Partnership News* 5:36-37.
5. Pepper GW (1972) The ecology of Sharp-tailed Grouse during spring and summer in the aspen parklands of Saskatchewan. Saskatchewan Department of Natural Resources Wildlife Report Number One, 56 pp.
6. NABCI Canada (2012) State of Canada's Birds - 2012. Environment Canada, Ottawa, Canada.
7. Tighem KV (2013) Too much of a good thing: The 20th Century's

conservation efforts have been wildly successful -- so much so we now have a new set of problems to contend with. *Outdoor Canada* Winter Issue:60-65.

8. Raine M (2003) Producers, hunt farm owners differ over bucks. *Western Producer*:100

9. Pedzeric D (2012) The bait debate. *Outdoor Edge* 22:28.

10. Shoberg T, Greenslade F (2013) Strong fall flights shaping up: Second-highest breeding population boosted by ideal water conditions. *Hunting Annual*: 26-28, 30, 34 & 36-39.

11. Fryxwell JM, Parker C, McCann K, Solberg EJ, Saether B-E (2010) Resource management cycles and the sustainability of harvested wildlife populations. *Science* 328:903-906.

12. Schmidt AP (1980) "Ecology of Sharp-tailed Grouse during winter." MSc. Thesis, Department of Zoology, University of Alberta, Edmonton, AB.

13. Saskatchewan Wildlife Federation (1995) Saskatchewan wildlife lands atlas. Moose Jaw, SK; 140 pp.

14. Nelson D (2011) The birth of Waterfowl Management: It all started in 1911. *Delta Waterfowl Magazine* 7:48-51.

15. Hunt HM (1974) Habitat

relations and reproductive ecology of Hungarian Partridge in a hedgerow complex in Saskatchewan. Saskatchewan Department of Tourism and Renewable Resources. Wildlife Report Number Three, 51 pp.

16. Koshyk C (2011) Pointing dogs, Volume one: The continentals. Dog Willing Publications, Winnipeg, Manitoba, Canada.

17. Macgregor JG (1976) The Battle River Valley. Western Producer Prairie Books, Saskatoon, Saskatchewan, Canada.

18. Marchildon GP, Ed. (2011) Agricultural history: History of the Prairie West series. University of Regina Press, Regina, Saskatchewan, Canada.

19. Jones DC (2002). Empire of dust: Settling and abandoning the prairie dry belt. University of Calgary Press, Calgary, Alberta, Canada.

20. Thornton F, Bowman J, Struthers D (1993) Agricultural policy review part 2: Wheat Board quota system. *Blue Jay* 51:65-71.

21. Gayton DV (1991) Grazing pressure on Saskatchewan Rangelands. *Rangelands* 13:107-108.

22. Christian JM, Wilson SD (1999) Long-term ecosystem impacts of an introduced grass

in the northern Great Plains." *Ecology* 80:2397–2407.

23. Li YS, Redmann RE (1992). Nitrogen budget of *Agropyron dasystachum* in Canadian mixed prairie." *American Midland Naturalist* 128:61-71.

24. Gross DV, Romo JT (2009) Temporal changes in species composition in Fescue Prairie: relationships with burning history, time of burning, and environmental conditions. *Plant Ecology (Online)* DOI 10.1007/s11258-009-9693-1.

25. Schmutz JK (1994) Endangered prairie birds and the range cow: opportunities for cooperation. Pages 270-276 in F.K. Taha, Z. Abouguendia and P.R. Horton, Managing Canadian Rangelands for Sustainability and Profitability, Grazing and Pasture Technology Program, Regina, Saskatchewan, Canada.

26. Raine M (1997). "Native grass is the best asset, say award-winning ranchers." *The Western Producer*: 100.

27. Arbuthnott K, Schmutz JK (2013) PFRA Community Pastures: History and Drama of a Prairie Commons. Saskatchewan Notes, Canadian Centre for Policy Alternatives April Issue, p. 1-8.

28. Maestas J, Knight RL,

Gilbert WC (2003) Biodiversity across a rural land-use gradient. *Conservation Biology* 17:1425-1434.

29. Warren J, Diaz H (2012) Defying Palliser: Stories of resilience from the driest region of the Canadian Prairies. Canadian Plains Research Centre, University of Regina, Regina, Saskatchewan, Canada.

30. Henwood WD (2004) The global protection of temperate grasslands: A global perspective. Pages 21-29 in Proceedings: 7th Prairie Conservation and Endangered Species Conference, Coast Plaza Hotel, Calgary, AB, 26-29 February.

31. Le Saout S, Hoffmann M, Shi Y, Hughes A, Bernard C, Brooks TM, Bertzky B, Butchart SHM, Stuart SN, Badman T, Rodrigues ASL (2013) Protected Areas and Effective Biodiversity Conservation. *Science (PolicyForum)* 341:803-805.

32. Conover MR, Borgo JS (2009) Do Sharp-Tailed Grouse Select Loafing Sites to Avoid Visual or Olfactory Predators? *Journal of Wildlife Management* 73:242-247.

33. Dale BC, Gingras BA, Norton M (2004) Grazing for Biodiversity Benefits – The Canadian Forces Base Suffield example. Pages 148-150 in Proceedings: 7th Prairie

Conservation and Endangered Species Conference, Coast Plaza Hotel, Calgary, Alberta, Canada, 26-29 February.

34. Akçakaya HR, Radelhoff VC, Mladenoff DJ, He HS (2004) Integrating Landscape and Metapopulation Modeling Approaches: Viability of the Sharp-Tailed Grouse in a Dynamic Landscape. *Conservation Biology* 18:526-537.

35. Pearce F (2012) What tragedy? Whose commons? Pastoralist PR is dreadful. In the classic cautionary tale, communal land ownership inevitably leads to overgrazing. But maybe the story's got it wrong. *Conservation Magazine* 13:38-44.



Sharp-Tailed Grouse

-Randy McCulloch