Why hunt upland game birds? Pheasant, grey partridge and sharp-tailed grouse hunter motivations, satisfaction and recreation specialization.

by

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Abstract

Upland game bird hunting is a popular outdoor recreation pursuit in Alberta, Canada yet little is known about the people who participate in the activity. The purpose of this thesis was to investigate the characteristics, satisfaction, and motivations of upland game bird hunters. Upland game bird hunters were examined through motivation orientations, the multi-satisfaction approach and the recreation specialization framework using data obtained from a sample of 452 individuals who hunted pheasant (*Phasianus colchicus*), grey partridge (*Perdix perdix)* or sharp-tailed grouse (*Tympanuchus phasianellus)* in Alberta during at least one season from 2015 to 2019. These approaches and differences between them framed two studies:

The first study (Chapter 2) applied the multiple satisfaction approach in a new context by exploring the characteristics of released pheasant and wild upland game bird hunters. Motivation clusters were identified that included enthusiast, nature-sport and least engaged hunters. Results suggest that the motivations and satisfaction of hunters who pursued pen-raised and released pheasants did not differ from those who hunted wild birds. Hunting regulation strategies that increased the number of days available to hunt and promoted game species diversity provided the greatest levels of satisfaction. While harvest was a motivation of most hunters, non-harvest related motivations, including the opportunity to exercise, were most important. I propose that lifestyle experiences, rather than harvest alone form the fabric of hunter motivations.

The second study (Chapter 3) applied the recreation specialization framework to characterize the different levels of involvement that prairie upland game bird hunters had to the activity. Three levels of upland game bird hunting involvement were identified: avid, intermediate and casual hunters. Low scores on the measures of centrality may suggest the secondary importance of upland game bird hunting to big game or waterfowl hunting. The

findings demonstrate the multidimensionality of recreation specialization, that avid hunters demonstrated a greater commitment to the activity through association with a leisure social world, that avid hunters demonstrated greater perceived skill and knowledge, and that hunters with higher levels of specialization scored higher on harvest related dimensions. The overall findings, theoretical and practical implications, and limitations of these studies and future research suggestions are summarized in Chapter 4.

Preface

This thesis is an original work by Eric W. Smith. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name "Upland game bird hunter satisfaction in Alberta, Canada: How do recreation specialization, species hunted, value orientations and hunting regulations influence satisfaction?" No. Pro00093026, August 7, 2019. This thesis is formatted for two published papers (chapters two and three). The work was led by Eric W. Smith as the lead author with contributions from Dr. Howard Harshaw and Dr. Doug Manzer. Both papers will be submitted to peer-reviewed journals. Financial support for this thesis was provided by the Social Science Research Council of Canada and the Alberta Graduate Excellence Scholarship. Support in-kind was provided by the Alberta Ministry of Environment & Parks and the Alberta Conservation Association.

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Chapter 1

Introduction

Hunters are important to wildlife conservation. Hunters contribute economically, politically, culturally and ecologically to environmental conservation (Heffelfinger et al., 2013). Hunting provides opportunities for people to interact with nature, helps to foster a conservation ethic in the lives of hunters and contributes to the cultural relevance of environmental conservation (Heffelfinger et al., 2013). Maintaining these benefits to individuals and society requires the retention, reactivation and recruitment of hunters. Hunter retention, reactivation and recruitment (R3) initiatives refer to a movement to reduce the declining trend in hunters and shooters in North America (Council to Advance Hunting and Shooting Sports et al., 2016). U.S. conservation agencies and organizations have initiated hundreds of programs and invested over $30 million annually to support this effort (Council to Advance Hunting and Shooting Sports et al., 2016). Larson et al. (2014) suggest that success in these initiatives requires an understanding of the social support for hunting at the individual, family, community and society level. This research aims to explore individuals and groups of hunters. The goal of this research was to gain a deeper understanding of the motivations, satisfaction and participation of Albertan upland game bird hunters in order to characterize their motivations, degree of involvement in the activity, and to assess their satisfaction with their hunting experiences. The study explored upland game bird hunters using the multiple satisfaction approach and recreation specialization framework.

Hunting in North America can be characterized as three types: big game, waterfowl and small game. Upland game bird hunting is a form of small game hunting that involves the pursuit of Galliformes, a taxonomic order of heavy-bodied ground-feeding birds such as turkeys. Galliformes have been hunted for centuries; the European tradition of hunting these birds came to North America with the European colonists. Hunting species such as pheasant in North America began in the late 1800s (Oldham, 2007). Upland game birds are hunted in many Canadian provinces and U.S. states (Government of Canada, 2014; Mustin et al., 2011).

Various species of upland game birds that are native to Europe were introduced into Alberta, Canada in the early 1900s to create hunting opportunities (Fish and Wildlife Historical Society & Federation of Alberta Naturalists, 2005). The tradition of introducing game birds for hunting is a practice that has generally continued to today in Alberta and many other jurisdictions in North America and Europe. In 2019, 28,610 pheasants were released between September and November in Alberta as part of a provincial release program (Alberta Conservation Association, 2020). These birds were hatched and raised in a domestic environment and released into the wild for hunting. The hunting of farm-raised and released upland game birds can be controversial as some hunters and biologists see this practice as unethical and inconsistent with the ethos of conservation (Delibes-Mateos et al., 2015; Sokos et la., 2008). Others see this practice as a means to make hunting accessible to urbanites and new hunters (Gamborg et al., 2016; Schultz et al., 2003).

Gaining insights into the motivations of hunters can support R3 program efforts to appropriately market and deliver programs to suit the preferences of hunters. Hunters are motivated to hunt for a number of reasons, including to socialize with friends (Decker, 1989), interact with the environment (Watkins et al., 2018), acquire meat for food (Hayslette et al.,

2001), and to get away from everyday life (Decker, 1989). Hunters obtain satisfaction from many dimensions of the hunting experience; their satisfaction with these experiences can be characterized through the multiple satisfaction approach (Hendee, 1974). This approach suggests that hunters derive satisfaction from the experience that includes the social and physical environment and the outcomes, such as harvesting game. The multiple satisfaction approach argues that identifying different types of hunters requires characterizing the multiple dimensions of the experience – not simply whether or not they shot game (Hendee, 1974). Applying this approach to hunter research has demonstrated that the factors contributing to satisfaction vary depending on the hunt characteristics and location (Hammit et al., 1990; Wright et al., 1997).

Another way to explore the heterogeneity of hunters that can be helpful for wildlife conservation is to segment hunters into groups based on their preferences and behaviours (Anderson et al., 2014; Wam et al., 2013). Several typologies have been generated including those using hunter motivations (Watkins et al., 2018), experience outcomes related to satisfaction (Schroeder et al., 2006), and recreation specialization (Needham & Vaske, 2013). The recreation specialization framework is an approach that can be used to characterize the heterogeneity of commitment and experiences of outdoor recreationists ranging from the general to specific (Bryan, 1977). Recreation specialization represents a process whereby skills, knowledge, equipment, attitudes, and the preferred experience vary from one individual to another along a continuum of commitment to the activity and can be expressed as a multidimensional construct (Scott & Shafer, 2001). The constructs address the centrality of the activity (affect), the participation and equipment use (behaviour), and skills and knowledge (cognitive) (McIntyre & Pigram, 1992).

Study Setting

The hunter population selected for this study comes from Alberta, Canada, an area rich in upland game bird hunting opportunities. Nine species of upland game birds are hunted; all have wild populations with six that are native species and three that were introduced to Alberta (Alberta Environment & Parks, 2018; Alberta Government, 2019). In addition to hunting self-sustaining wild populations, pheasants are raised in farms and released for hunting at 42 Pheasant release sites (Alberta Conservation Association, 2020). Hunting seasons generally occur from September to mid-January with daily bag and possession limits of two and six pheasants; five and 15 grouse; and five and 15 grey partridge (Alberta Government, 2019).

Limited information exists about upland game bird hunters in Alberta. The Alberta Ministry of Environment and Parks collects annual hunter harvest, effort, and hunting location information through a self-administered voluntary questionnaire (Caswell, 2019, pers. comm.). Economic assessments of game bird hunters (Econometric Research Limited, 2009), pheasant hunters (Bodden & Lee, 1986; Paul et al, 2011; Smith & Bodden, 1984) and the Taber Pheasant Festival (Bertram et al., 2017) have occurred. A survey of game bird hunting took place in 1983 (Moyles & Boxall, 1986) which summarized information about game bird hunting effort, harvest and methods by species. To the author's knowledge, no research has explored the motivation, satisfaction and recreation specialization of upland game bird hunters in Alberta.

Objectives and Research Questions

The purpose of this research was to gain deeper insights into the characteristics of upland game bird hunters including their motivations, satisfaction, participation and level of recreation specialization. I developed two studies that examined upland game bird hunters through

motivation orientations, the multi-satisfaction approach and recreation specialization framework. The research objectives were:

Study 1: Motivation and satisfaction of released and wild game bird hunters

Objective 1: Identify typologies of upland game bird hunters based on their motivations.

Objective 2: Compare the motivations and levels of satisfaction among released pheasant hunters to those of wild native and non-native upland game bird hunters.

Objective 3: Compare hunting regulation preferences of released pheasant hunters to those of wild native and non-native upland game bird hunters.

Study 2: Recreation specialization among prairie upland game bird hunters.

Objective 4: Explore the recreation specialization of prairie upland game bird hunters.

Objective 5: Compare the motivation, participation and satisfaction of recreation specialization among subgroups of hunters.

Conclusion

Hunting provides benefits to environmental conservation and contributes to its cultural relevance in society (Heffelfinger et al., 2013). Maintaining these benefits requires continued participation in hunting. Increasing our understanding of the motivation orientations, satisfaction and recreation specialization of hunters can help conservation organizations design marketing strategies and hunting opportunities to match hunter preferences and retain their participation. Obtaining a characterization of why individuals hunt (motivation orientations), what brings them satisfaction and the variation in commitment and experiences (recreation specialization) provides a foundation for further inquiry and tailoring of hunting experiences. Gaining insights into the relative satisfaction derived by hunting regulations may inform wildlife management agencies as

they adapt hunting regulations to changing environments and hunter preferences. In Chapter Four, I synthesize the findings and recommend approaches for using this characterization to support R3 efforts. Research limitations and future research are described.

Chapter 2

Motivation and satisfaction of released and wild game bird hunters.

Abstract

I characterized upland game bird hunters using motivation typologies and compared these motivations and the satisfaction of hunters who pursue released pheasants (*Phasianus colchicus)* and wild upland game birds. Cluster analysis yielded three groups of hunters in terms of their motivations: enthusiast (64%), nature-sport (31%) and least engaged (5%). The motivations and satisfaction of those hunters pursuing pheasants raised on a farm and released into the wild generally did not differ from those who hunted wild birds. While harvest was a motivation of most hunters, non-harvest related elements, including the opportunity to exercise, were most important. Strategies for hunting regulations that increased the number of days available to hunt and promoted game species diversity provided the greatest satisfaction. Taken together I suggest that lifestyle experiences, rather than harvest alone form the fabric of hunter motivations. Hunting recruitment, retention, and reactivation (R3) efforts may benefit from promoting a more holistic lifestyle approach that includes physical activity and non-harvest motivations.

Introduction

Pheasant (*Phasianus colchicus)* hunting has a rich cultural heritage dating back several centuries. Colonialists brought the tradition of pheasant hunting to North America in the late 1800s and it remains a valued hunting tradition (Oldham, 2007). Pheasants were first introduced to Alberta, Canada in 1908 to establish self-sustaining populations and seasonal hunting opportunities (Fish and Wildlife Historical Society & Federation of Alberta Naturalists, 2005). People take part in hunting in order to derive satisfaction, which comes from multiple components of the hunting experience (Decker et al., 1980). Pheasant hunters derive satisfaction from many aspects of hunting, including being outdoors and seeing pheasants (Frey et al., 2003). Insights into what contributes to hunter satisfaction can support wildlife managers to make hunting regulations that promote positive hunting experiences (Hendee, 1974).

Designing satisfying hunting experiences requires an understanding of the hunters. Segmenting hunters into groups based on their preferences and behaviours is a common approach to inform wildlife management (Anderson et al., 2014; Wam et al., 2013). Several typologies have been generated including those using hunter motivations (Watkins et al., 2018) and experience outcomes related to satisfaction (Schroeder et al., 2006). Few studies have explored the motivation and satisfaction of pheasant hunters (Frey et al., 2003) and to my knowledge, no studies have compared the motivation and satisfaction of released pheasant hunters with those of wild upland game bird hunters. The objectives of this study were to: (a) identify typologies of upland game bird hunters based on their motivations, (b) compare the motivations and levels of satisfaction among released pheasant hunters to those of wild native and non-native upland game bird hunters, and (c) compare hunting regulation preferences of released pheasant hunters to those of wild native and non-native upland game bird hunters.

Study Context

In many jurisdictions, upland game bird hunting, including pheasant hunting, is supplemented through the release of pen-raised birds. This approach allows for a greater range of land to be used for hunting, including areas without the habitat integrity to sustain the full life-cycle needs of these hunted upland game birds. Further, upland game birds can be released at densities that exceed natural population densities with stocking rates adjusted throughout the hunting season to meet hunter demand. However, the release of pen-reared game birds may contrast with the hunting ethos and may not be supported by some hunters and conservation professionals (Delibes-Mateos et al., 2015; Gamborg et al., 2016).

There is a trade-off between the resources expended on near-term hunting opportunities (i.e., within the current year) compared to investments toward the long-term sustainability of huntable game bird populations. Both approaches are costly (Sokos et al., 2008), with the release of pen-reared birds designed for within year hunting opportunity and hunter recruitment, while habitat improvements are investments for long-term hunting opportunities and improving habitat that will benefit a suite of non-game species as well. Selecting what is perceived as the best approach is a subjective valuation and one that requires an understanding of the hunters. In this study, I explore the motivations and satisfaction of hunters pursuing released pheasants compared to those after wild non-native and native upland game birds. I examine these hunter populations in Alberta, a province where opportunities exist to hunt released pheasants, wild non-native pheasants, wild non-native gray partridge (*Perdix perdix)* and wild sharp-tailed grouse (*Tympanuchus phasianellus)*. I explore this comparison through the theoretical lens of motivation orientations and the multiple satisfaction approach.

Motivations are helpful for understanding hunters as they can be used to describe why people participate in specific aspects of the hunting experience (Manfredo et al., 1996). Decker, Provencher, and Brown et al. (1987) proposed that there are three general motivations that underlie hunters' participation: affiliation, achievement and appreciation. People who hunt based on an affiliative motivation orientation do so to build or maintain a connection with other people. Achievement-oriented hunters seek goals such as harvesting meat or a trophy. Hunters motivated by an appreciative-orientation hunt for the experience, connection with nature, and peace in the outdoors (Decker et al., 1987). Although the motivations of hunters rarely fall strictly within one motivation orientation, knowledge of these orientations is useful to inform hunting management, as hunting regulations can be tailored to the motivations of hunters (Wam et al., 2013). Further, studies characterizing hunter motivations can provide insights into which hunter subgroups are most likely to hunt in ways that facilitate wildlife population reduction goals (Anderson et al., 2014). For example, Norway red deer (*Cervus elaphus*) hunters displayed variation in their motivations related to hunting in a team, willingness to travel, and obtaining trophies or meat which may support deer reduction in some areas while limiting success in others (Anderson et al., 2014). In a study of Alaskan hunters, beginner, intermediate and advanced hunters displayed differences in motivations reinforcing the importance of targeting hunter recruitment, retention and reactivation programs and messaging to each type of hunter (Aastrup et al., 2020).

Satisfaction refers to the agreement between expectations and experiences (Manning, 2011) and can be investigated using the multiple satisfaction approach (Hendee, 1974). The principles of the multiple satisfaction approach suggest that satisfaction derived from hunting experiences is the product of the physical and social environment and not from harvest alone, and that satisfaction leads to benefits "that are known, expected, and valued" (Needham &

Rollins, 2009, p. 137). Although success is an important component of satisfaction, it is not the only one. The model is helpful for examining and improving hunting experiences as the satisfaction of hunters can be used as a measure of successful hunting management (Larson et al., 2014).

The multiple satisfaction approach has demonstrated its effectiveness in several hunting management contexts. Research using this approach has demonstrated that the variety of benefits that hunters receive are based on the type of hunt and its location (Hammit et al., 1990; Wright et al., 1997). Most hunting research has explored big game and waterfowl contexts, while relatively few studies have explored upland game birds such as pheasant, sage grouse (*Centrocercus urophasianu)*, dove (*Columbidae)* and turkey (*Meleagris gallopavo*) hunting (Decker et al., 1980; Gutery et al., 2015; Hazel et al., 1990; Kerr, 2019; Manfredo et al., 2004). Several factors contribute to hunter satisfaction including those related to shooting game, for example, harvest success (Guttery et al., 2015) or obtaining wild meat (Hayslette et al., 2001). While other factors are socially derived by spending time with friends and family (Decker, 1989) or with a dog (*Canis lupus familiaris*) (Schroeder et al., 2006). Experience also plays a role in satisfaction by being outdoors and in nature (Gigliotti, 2000), getting away from everyday life (Decker, 1989), and seeing game (Schroeder et al., 2019) or other wildlife (Watkins et al., 2018). Thus, the multidimensional element of satisfaction has been well described in the hunting literature.

I predicted that the satisfaction associated with seeing game and harvesting game of hunters pursuing released game birds (i.e., pheasants) would be higher compared to those after wild native and wild non-native species. I thought hunters pursuing wild game birds would derive a higher sense of overall satisfaction, as well as place greater value on the scenery where wild birds are found and lower competition with other hunters. Alberta Conservation

Association had approximately 42 pheasant release sites in operation from 2015 to 2019, with reasonable proximity to urban centers (60-90 min drive) a factor in their distribution (Alberta Conservation Association, 2020). I expected the accessibility of release sites to derive greater satisfaction among hunters pursuing released pheasants, compared to those accessing hunting locations for wild game birds. I also predicted that hunter density would negatively affect satisfaction.

Methods

The study population included people who had hunted pheasant, grey partridge or sharp-tailed grouse in Alberta, Canada during at least one season from 2015 to 2019 (i.e., five hunting seasons). In order to legally hunt these species as a non-indigenous hunter, individuals are required to purchase a game bird license and to participate in pheasant hunting, the hunter must also purchase a pheasant license. To estimate the number of individuals to contact for the survey, I assumed a 15% response rate (based on response rates from previous email surveys to Alberta hunters) and a sample size of 400 participants per species to obtain a 95% confidence level with a 5% margin of error (Salant & Dillman, 1994). The Alberta Ministry of Environment and Parks randomly selected 4,000 game bird license holders with no pheasant license and 4,000 with a pheasant license. All contacts were completed by the Alberta Ministry of Environment and Parks. Participants were contacted by email on November 25, 2019 and invited to take part in the survey (Appendix A). A draw for one of five $100 hunting store gift cards was used as an incentive to encourage responses. A reminder email was sent to all participants on January 24, 2020 (Appendix B). The survey (Appendix C) and study protocols were approved by the University of Alberta Research Ethics Board (Pro00093026) (Appendix D). Of the 1372 people that responded to the survey (17% response rate), 452 (35%) were pheasant, grey partridge and

sharp-tailed grouse hunters who had hunted in the last five years and met the inclusion criteria. Respondents identified the hunted species that they wanted to focus on for the survey: 76 (17%) responded based on their released pheasant hunts; 39 (8%) on the wild pheasant hunts; 121 (27%) on their wild grey partridge hunts; and 216 (48%) on their wild sharp-tailed grouse hunts. The survey was administered by the Alberta Ministry of Environment & Parks which limited the interface with participants and inhibited the ability to conduct a non-response evaluation.

The web-based questionnaire consisted of 29 question sets that asked about hunter participation, motivations, and satisfaction; information about demographic characteristics were also collected. The questionnaire was piloted with ten Alberta upland game bird hunters and its design and content were guided by input from provincial wildlife managers. Survey questions related to hunter satisfaction were derived from Schroeder et al. (2019) (seeing game), Gutery et al. (2015) (harvest success), Kaltenborn (2012) (shooting a daily limit), Delibes-Mateos et al. (2014) (natural setting), and Frey et al. (2001) (hunter density). Hunter motivation questions were derived from Schroeder et al. (2006) (spending time with a dog), Decker (1989) (spending time with friends and family), Gigliotti (2000) (getting outdoors and enjoying nature), McFarlene (1994) (getting away from everyday life), Watkins et al., (2018) (spending time around wildlife), Hayslette et al. (2001) (obtain wild meat), Watkins et al. (2018) (judge success by number shot), and McFarlene (1994) (judge success by the number of birds seen).

Data Analysis

The Data was cleaned by examining the distribution of responses for anomalies, repeated data, scores outside the range of possibilities and missing values. Data were assessed for normality and outliers. Data cleaning resulted in the removal of three cases that were outside the range of

possible values for age and annual harvest.

I used factor analysis to examine responses to sixteen hunter motivation questions related to harvest, experience and social behaviour (Decker, 1989; Gigliotti, 2000; Watkins et al., 2018). Items that had correlations greater than 0.8 were excluded (Field, 2013). As this is an exploratory study, we accepted factor loadings greater than 0.298, as is appropriate for samples of 300 people or fewer (Field, 2013). I used K-means cluster analysis on the items that were included in the exploratory factor analysis to identify hunting motivation typologies. Clusters were generated until the addition of another cluster created a group that represented less than 3% of participants (Manfredo and Larson, 1993).

One-way ANOVA and Welch tests were used to compare differences among motivation typologies and to compare differences in released, non-native and wild native upland game bird hunters. Homogeneity of variances was tested using Levene's Test. Hochberg GT2 and Games-Howell post hoc tests were used. I evaluated the satisfaction associated with hunting regulatory options using a Related-samples Friedman Two-way analysis of variance by ranks test and coupled with a Dunn-Bonferroni post hoc test.

Results

Demographic and General Hunting Characteristics

The average age of respondents was 53 years old (16 - 85 years old) and 97.6% were male. A plurality of hunters had completed university/college (32%), made between $50,000 - $99,999 per year (36%), and lived in a rural area with less than 2,000 people (29%). Respondents hunted an average of 3.7 years of the last five years with 51% hunting each year. Hunters pursuing

released pheasants on average hunted 5.0 days and harvested 4.3 birds per year. Hunters pursuing wild non-native upland game birds hunted an average of 6.5 days and harvested 7.5 grey partridges and 3.2 wild pheasants per year. Those pursuing wild native upland game birds on average hunted 6.4 days and harvested 4.1 sharp-tailed grouse per year. Among respondents, those pursuing released pheasants judged the success of their hunt based more on the number they shot compared to wild non-native hunters ($F_W(2, 156.159) = 4.163$, $p < 0.05$, $\eta^2 = 0.026$). However, there wasn't a significant difference among hunter types in determining a hunt was successful if at least one bird was shot ($F(2) = 1.271$, $p > 0.05$, $\eta^2 = 0.007$) or if they got exercise ($F(2) = 0.677$, $p > 0.05$, $\eta^2 = 0.003$).

Motivation

All motivation question items that met the inclusion criteria loaded into one factor that explained 51% of the variance (Table 1). Factor loadings ranged from 0.87 (get outdoors and enjoy nature) to 0.45 (spend time with friends and/or family). The internal reliability of the motivation dimension was deemed as acceptable using Cronbach's alpha ($\alpha = 0.700$). I retained the motivation item *spending time with friends and/or family* even though removing it would have increased the reliability score (Table 1). It was retained because this is an exploratory study and other studies have demonstrated the importance of this motivation among hunters (Grams, 2018; Guttery et al., 2015; Hayslette et al., 2001). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.77, which was above the recommended value of 0.6, and Bartlett's Test of Sphericity was significant (χ^2 (10) = 480.272, $p \leq 0.001$) suggesting an adequate correlation matrix (Ho, 2006). I identified three hunter motivation clusters including least engaged, nature-sport, and enthusiast. I found no difference in the proportion of each cluster in

released, wild non-native and wild native upland game bird hunters ($F_W(2, 171.692) = 1.137$, $p > 0.05$, $\eta^2 = .005$).

Table 1. Summary of motivation items and reliability alpha (n = 362).

Motivation	Factor loading	Item *M*	*SD*	α if item deleted	α
Appreciative					
get outdoors and enjoy nature	0.81	4.33	0.682	0.587	0.700
get away from everyday life	0.79	4.14	0.825	0.597	
get exercise	0.45	4.1	0.763	0.616	
Achievement					
obtain wild meat	0.57	3.73	1.006	0.701	
Affiliative					
spend time with friends and/or family	0.87	3.59	1.128	0.751	

Least engaged hunters comprised 5% of respondents and hunted the fewest number of days per season (*M* = 4.5 days). These respondents never or rarely hunted with dogs ($F_W(2, 70.379) = 14.645$, $p < 0.05$, $\eta^2 = .012$) and had the lowest need to shoot a daily limit to have a satisfying season ($F_W(2, 88.173) = 12.159$, $p < 0.05$, $\eta^2 = 0.014$). This cluster had the lowest scores for four of the five motivation items (Table 2).

Nature-sport hunters comprised 31% of respondents and were the most motivated to hunt in order to get outdoors and enjoy nature ($F_W(2, 40.666) = 29.898$, $p < 0.05$, $\eta^2 = 0.387$) and get away from everyday life ($F_W(2, 41.592) = 41.674$, $p < 0.05$, $\eta^2 = 0.331$) (Table 2). They hunted

by themselves more than enthusiast hunters ($F(2) = 8.409$, $p < 0.05$, $\eta^2 = 0.046$) and hunted with friends and/or family more than least engaged hunters did (19.621, $p < 0.05$, $\eta^2 = 0.100$).

Enthusiast hunters comprised 64% of respondents and their primary motivation was spending time with friends and/or family (Table 2). This cluster hunted the most ($M = 6.5$ days) and harvested the most ($M = 5.5$ birds) on average per season. Enthusiast hunters were the most motivated of all the hunter clusters (Table 2). They judged the success of their hunt by the number of upland game birds they saw ($F(2) = 4.312$, $p < 0.05$, $\eta^2 = 0.025$) and hunted with friends and/or family more than nature-sport hunters $F(2) = 19.621$, $p < 0.05$, $\eta^2 = 0.100$). A satisfying season relied on regularly shooting a daily limit more than the other clusters ($F_W(2, 88.173) = 12.159$, $p < 0.05$, $\eta^2 = 0.014$).

Table 2. Motivation cluster mean response scores.

Motivations	Least engaged	Nature-sport	Enthusiast
Spend time with friends and/or family	2.59	2.47	4.22
Get outdoors and enjoy nature	2.47	4.28	4.49
Get away from everyday life	2.06	4.09	4.32
Obtain wild meat	2.41	3.27	4.06
Get exercise	2.65	3.98	4.26

Note: Responses were measured on a scale of 1 (strongly agree) to 5 (strongly disagree).

Satisfaction

Overall, game bird hunters were somewhat satisfied to neutral with their hunting experiences (Table 3). However, hunters pursuing released pheasants were significantly more satisfied with the accessibility of sites compared to those pursuing wild game birds. I did not find significant

differences in the other satisfaction measures among hunter types. When comparing the contribution of various hunting regulations to satisfaction, season length and season overlap with other huntable species ranked the highest among the regulatory options presented (Table 4). Perhaps surprising, the allowable daily bag limit was the least important regulation strategy across all hunter types.

Discussion

Our study provides evidence that the hunters pursue upland game birds primarily for the experience, not the kill. Those pursuing released and wild upland game birds generally did not differ in their motivations or reported satisfaction. Overall, hunters were primarily motivated by the experience, followed by the desire to obtain wild meat, which may influence the lack of variation among hunter types. Results were consistent with findings in other hunting studies that displayed evidence that non-harvest motivations are the most important (Grams, 2018; Hayslette et al., 2001; Shroeder et al, 2006). Regulatory strategies that enable hunters to take part and provide a diversity of species to hunt at the same time were most important. Taken together I suggest that lifestyle experiences, rather than harvest alone form the fabric of hunter motivations.

Hunters pursuing released pheasants were more satisfied with on-site accessibility compared to those pursuing wild game, which may suggest the effectiveness of this program. However, I did not detect a difference in satisfaction levels related to travel distance. Hunters who pursued release birds travelled less time to hunt but not to a significant degree. This may suggest that hunters have normalized the travel distances required to hunt in Alberta, as expressed in their neutral satisfaction with travel distance. Encountering other hunting parties has been suggested as detrimental to satisfaction (Hammit et al., 1990), although perhaps not in all

situations. A study of Utah pheasant hunters observed a positive relationship between hunter density and satisfaction (Frey et al., 2001) providing this contrary perspective. Frey et al. (2001) suggested that hunters changed their expectations when in locations where they expected to see more hunters. I predicted that hunter density would negatively affect satisfaction, although this was not the case. Satisfaction with hunter density was neutral among hunter types suggesting that hunter density may not impact satisfaction as much as often thought, particularly when expectations are tempered to the situation.

Table 3. Satisfaction of released (n = 60), wild non-native (n = 135) and wild native (n = 162) upland game bird hunters.

	Released		Wild non-native		Wild native		
	M	***SD***	***M***	***SD***	***M***	***SD***	***F***
Overall hunting experience.	3.9	1.002	3.8	1.05	3.8	0.915	0.092
On-site accessibility[1]	3.9[ab]	0.777	3.5[a]	1.078	3.5[b]	0.979	4.479**
Opportunity to exercise	4.2	0.715	4.1	0.841	4.0	0.844	1.052
Travel distance	3.1	1.062	3.4	1.07	3.3	1.078	1.508
Natural setting	4.1	0.979	4.0	0.9	4.0	0.912	0.455
Number of game birds seen	3.3	1.422	3.1	1.12	3.1	1.116	0.277
Number of game birds shot	3.3	1.162	3.1	0.989	3.1	1.035	0.185
Number of other hunters seen	3.1	0.951	3.4	0.978	3.4	0.885	2.325
Number of days in the season	3.5	1.049	3.6	0.974	3.3	1.054	2.859
Daily bag limit	3.6	1.125	3.8	0.897	3.8	1.000	1.040
Possession limit	3.6	1.079	3.7	0.975	3.7	1.011	0.520

Note: The above items were measured with a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). [1] Means with different superscripts are significant at $^{**}p < 0.01$. Significant differences between groups were determined using a One-way ANOVA or Welch statistic. Post hoc test included Hocherg GT2 and Games-Howell tests.

Table 4. Ranking of hunting regulation importance to released (n = 59), wild non-native (n = 131) and wild native (n = 153) game bird hunter satisfaction.

	Released		Wild non-native		Wild native	
Regulation	***M***	***SD***	***M***	***SD***	***M***	***SD***
Hunting season length[1]	3.63^{a***b*}	1.312	3.69^{abc***}	1.183	3.69^{abc***}	1.232
Hunting season overlap[1]	3.29^{c**}	1.427	3.44^{d***e**}	1.45	3.75^{de***}	1.354
Late season (Nov - Jan) [1]	2.76^{b*}	1.512	2.76^{c***e**}	1.452	2.79^{c***f*}	1.431
Daily bag limit[1]	2.86	1.279	2.69^{b***}	1.233	2.54^{be***}	1.147
Possession limit[1]	2.46^{a***c**}	1.277	2.41^{ad***}	1.329	2.22^{ad***f*}	1.199

Note: The above items were measured with a 5-point scale ranging from 1 (least important) to 5 (most important). [1] Means with different superscripts are significant at $^{*}p < 0.05$, $^{**}p < 0.01$ and $^{***}p < 0.001$. Significant differences between groups were determined using a Friedman Two-Way Analysis of Variance by Ranks Test and Dunn-Bonferroni post hoc test.

I was able to segment upland game bird hunters by motivation and recorded appreciative, achievement and affiliative motivations. Lifestyle (i.e., non-harvest) experience motivations were the most important to all hunters. One survey participant described this perspective well: “I like to get out and hunt whether I get anything or not. The chance to be with nature is more important than the kill to me.” Further, over two-thirds of hunters evaluated success by the number of game birds seen rather than shot, while greater than four-fifths considered a hunt successful if they got exercise. Hunters also quantified success by harvest, with the majority considering an outing successful if one bird was brought home. These observations demonstrate

that although harvest plays a role in deriving satisfaction, the motivations leading to satisfaction go far beyond the kill itself. In the words of Jose Ortega Y Gasset "One does not hunt in order to kill; on the contrary, one kills in order to have hunted" (Y Gasset, 1985, p. 97). These findings support the messaging of the Alberta Conservation Association that emphasizes hunting as a lifestyle experience, rather than simply a shooting experience (D. Manzer, personal communication, June 15, 2020). This study demonstrated that 88% of upland game bird hunters were motivated by their desire to get exercise. Few studies have examined the value portioned towards exercise in hunting (Hayslette et al., 2011), although some have examined the associated health risks (i.e., cardiovascular disease with deer hunting) (Haapaniemi et al., 2007; Peterson et al., 1999; Verba et al., 2016). Alberta upland game bird hunters appeared to be motivated by exercise more than dove and non-dove hunters in Alabama (Hayslette et al., 2011), which may be linked to the physical pursuit of walked-up game in this study compared to more sedimentary approaches using decoys or pass shooting.

Healthy lifestyle pursuits are gaining attention in popular culture and promoting hunting as a source of healthy food is now common. For example, some agencies have worked to connect the locavore movement to hunting and focus on the relationship between health and hunting participation (Tidball et al., 2014). Results from this study suggest that hunting recruitment, retention, and reactivation (R3) efforts may benefit from broadening the health benefits of hunting to include exercise/physical activity. Mobile apps have shown some effectiveness in promoting physical activity (Coughlin et al., 2016); combining physical activity and hunting promotion via mobile technology could work well to encourage hunting participation. Therefore, I suggest that the role of exercise is an attractive motivator for many upland game bird hunters and another key attribute to promote hunting participation.

Hunting regulations are used to create or constrain hunting opportunities, both to match ecological constraints and the ethos of socially acceptable standards. Consistent with some other studies, hunting regulations that supported the experience over the harvest were more important to hunter satisfaction (Hayslette et al., 2001; Kaltenborn et al., 2012; Schroeder et al., 2006). Hunters sought regulatory strategies that increased the number of days available to hunt reaffirming the theme that creating opportunities for experience matters more than harvest. Consistent with partridge hunter research in Spain, game species diversity was highly valued for hunter satisfaction (Delibes-Mateos et al., 2014).

Our results suggest the values influencing hunters are complex and much greater than harvest alone. It may be possible to elevate satisfaction levels with regulatory changes, but alone these tools are somewhat coarse, and if used in isolation are unlikely to drive the retention and recruitment of hunters within Alberta, or further abroad. Our results suggest that hunters derive satisfaction from a suite of values that contribute to their lifestyle, such as the health benefits from exercise, spending time with friends and taking in wild food for the table. Taken together, hunters forge lifestyle experiences with the potential to fill many values. Perhaps the greatest opportunity to influence hunter numbers is through promoting this more holistic lifestyle approach, rather than focusing on the regulatory options alone.

This study sought to characterize and compare Alberta upland game bird hunters and in so doing has inherent limitations. Participants were asked to select which species hunt to focus on for the survey, this resulted in an unequal response rate per species hunted. The Alberta Ministry of Environment and Parks invited and reminded hunters to participate in the survey, which limited the researcher's ability to conduct a non-response survey or obtain any information about non-respondents. The study requested participation by individuals who had

hunted pheasant, grey partridge or pheasant between 2015 – 2019, it did not ask about all upland game bird hunted species and therefore only represents the results of hunters who target those species. A limitation of this study was the lack of information that exists on upland game bird hunters in Alberta. Although upland game bird hunting has a long tradition in the province, little research has explored these hunters. I noted a prevalence of ruffed grouse hunting participation among our participants, therefore future research should include ruffed grouse, spruce grouse and ptarmigan hunting to capture the full spectrum of upland game bird hunting opportunities in Alberta. Further, this study surveyed provincially licensed hunters, future research may benefit from including indigenous hunters in order to capture a larger spectrum of perspectives.

Conclusion

This study revealed that lifestyle elements, rather than harvest alone form the fabric of upland game bird hunter motivations. Our findings suggest that hunting recruitment, retention, and reactivation (R3) efforts for pen-raised and released and wild game bird hunters may benefit from the promotion of a holistic lifestyle approach that includes physical activity and non-harvest motivations such as spending time with friends or family, enjoying nature and the outdoors, and getting away from everyday life. Wildlife agencies that are interested in hunting regulation reform for R3, could promote hunter satisfaction by increasing hunting opportunities that maximize days available to hunt and the diversity of hunted game. To better understand the role of physical activity in hunting, future research could examine its importance among other hunter types (for example big game or waterfowl) or its relative contribution to overall hunter participation.

Chapter 3

Recreation specialization among prairie upland game bird hunters.

Abstract

In this study, I explored the recreation specialization, motivation, satisfaction, and participation of hunters who pursue prairie upland game birds. Data were obtained from an online survey of 229 hunters in Alberta, Canada. Cluster analysis yielded three types of hunters in terms of their recreation specialization: avid (33%), intermediate (39%) and casual (28%) hunters. The findings demonstrate the multidimensionality of recreation specialization framework and that highly specialized hunters were more consumptive focused. The results suggest that avid hunters demonstrated a greater commitment to the activity through association with a leisure social world and demonstrated greater skill and knowledge than casual and intermediate hunters. Hunter recruitment, retention and reactivation (R3) programs may benefit from delivering education programs to increase the public land knowledge of casual and intermediate hunters and promote diverse hunting opportunities that cater to hunters with highly specialized equipment and those with minimal equipment. R3 initiates may benefit from promoting dog ownership as a means to retain hunter participation.

Introduction

Upland game bird hunting is a popular activity across North America. Upland game birds are readily available in most hunted landscapes, allowing for a diverse range of hunting experiences. Hunting of small game, which includes upland game birds, provides an important role as a gateway species for initiating children into hunting (U.S. Fish & Wildlife Service & Leonard, 2001). Although participation in upland game bird hunting requires little equipment (e.g. a weapon and a knife), some hunters use an expensive array of specialized weapons, gun dogs, clothing and all-terrain vehicles. Relative to big game hunting or other forms of hunting, participation in upland game bird hunting requires a minimal commitment of time to travel to hunt locations and hunting effort to obtain and process game. Given the equipment and time demands of participation, upland game bird hunting can work well as a hunt for new or time-constrained hunters.

Considering the range of experiences and opportunities available in upland game bird hunting, upland game bird hunters are likely diverse in their motivations, how they participate and what brings them satisfaction. The recreation specialization framework can be used to characterize people's level of engagement in hunting (Needham & Vaske, 2013). Wildlife organizations looking to promote upland game bird hunting could benefit from understanding the range of specialization present among hunters. Insights about levels of specialization, motivations, satisfaction and participation characteristics of hunters can help decision-makers design better management practices, policies and marketing campaigns. For example, in a similar sport, anglers with different levels of specialization had different preferences for regulations (Oh & Ditton, 2006) and gaining insights into those characteristics may help agencies tailor experiences and laws to suit participant subgroups.

Recreation Specialization in Hunting Research

Recreation specialization provides a theoretical approach to understand the variation in commitment and experiences of outdoor recreation participants ranging from the general to the specific (Bryan, 1977). Recreation specialization represents a process whereby users may move from one developmental stage to another as skills, knowledge, equipment, attitudes, constraints and the preferred experience change. This progression is not linear and not all recreationists develop a deep commitment to particular activities nor do all individuals progress (e.g., Oh, Sorice, & Ditton, 2011; Scott & Lee, 2010; Kuentzel and McDonald, 1992). Recreation specialization provides a framework in which to explore the continuum of commitment in a recreation activity that individuals can develop. Recreationists with high levels of specialization in particular activities exhibit focused behaviour, higher levels of skill and knowledge, and generally consider the activity central to their lives (Scott & Shafer, 2001). Whereas more casual recreationists demonstrate motivations associated with social benefits and getting away from everyday life and perceive success as influenced by external factors such as luck rather than skill (Chipman & Helfrich, 1988). Casual recreations prefer more liberal regulations and those that allow for higher catch rates (Oh & Ditton, 2006).

The original work by Bryan (1977) conceptualized recreation specialization around recreationists' behavioural involvement; since that time it has evolved into a multidimensional construct (Scott & Shafer, 2001). The framework is comprised of three dimensions: affect, behaviour, and cognition (McIntyre & Pigram, 1992). The affective dimension concerns individuals' enduring involvement and the central role that the activity plays in their lives. The behavioural dimension can be characterized by prior participation in the activity and equipment

use. The cognitive dimension is expressed by activity-specific skills and knowledge (McIntyre & Pigram, 1992).

Recreation specialization has been applied in many contexts (Scott & Shafer, 2001). Several studies have employed recreation specialization to gain insights into hunter behaviour through examinations of elk and deer hunters' response to Chronic Wasting Disease (Needham et al., 2007), hunt location choice of more and less specialized goose hunters (Kuentzel & Heberlein, 1992) and activity substitution of deer and elk hunters (Needham & Vaske, 2013). Whereas other studies have characterized the range of specialization among hunters, one study explored the range of recreation specialization among types of hunting and found that waterfowl and archery deer hunters were the most specialized (Miller & Graefe, 2000). This study characterized pheasant and grouse hunters as being moderately specialized. Another study found that hunters considered deer hunting to be a more central part of their lives than upland game hunting was (Grams, 2018). However, to our knowledge, no study has explicitly characterized the specialization of prairie upland game bird hunters. Therefore, the objectives of this study were to (a) explore the recreation specialization of prairie upland game bird hunters and (b) compare the motivation, participation and satisfaction of recreation specialization subgroups of hunters.

Study Context

This study took place in Alberta, Canada, a province with diverse ecology and hunting opportunities. The province is 640,330 km^2 in size and sparsely populated with 4.371 million inhabitants; 60% of its land is held publicly (Alberta Government, 2020a; Statistics Canada, 2016). Eleven species of upland game birds occur in the province; nine are hunted (Alberta Environment & Parks, 2018; Alberta Government, 2019). Upland game birds can be hunted in

all regions of the province that are open to hunting. Of the nine species that are hunted, six are native and three are exotic and have feral self-sustaining populations. In addition to self-sustaining populations, pheasants are released at 42 locations across the Province. In 2019, 28,610 male pheasants were released between September and November (Alberta Conservation Association, 2020). There are a total of 131,000 hunters in Alberta (Alberta Government, 2020b). Although the province collects annual voluntary harvest reporting and records game bird and pheasant licenses, no information exists about the number of individuals who take part in upland game bird hunting annually. Between 2015 - 2019 an average of 8,500 individuals purchased pheasant licenses and 59,500 purchased game bird licenses (which include waterfowl and upland game birds) (Alberta Government, 2020b). Prairie upland game bird hunting seasons occur from September to mid-January with daily bag and possession limits of two and six pheasants; five and 15 grouse; and five and 15 grey partridge (Alberta Government, 2019).

Methods

The study population included people who had hunted pheasant, grey partridge or sharp-tailed grouse during at least one season from 2015 to 2019 (i.e., five hunting seasons) in Alberta, Canada. Hunting of grey partridge and sharp-tailed grouse requires individuals to purchase a game bird license whereas pheasant hunters must purchase a game bird license and pheasant license, as a non-indigenous hunter. I assumed a 15% response rate (based on response rates from previous email surveys to Alberta hunters) to estimate the number of individuals to contact for the survey, and a sample size of 400 participants per species to obtain a 95% confidence level with a 5% margin of error (Salant & Dillman, 1994). The Alberta Ministry of Environment and Parks randomly selected 4,000 game bird license holders with no pheasant license and 4,000 with a pheasant license. In order to preserve the privacy of hunting permit holders, all contacts

were completed by the Alberta Ministry of Environment and Parks. Invitations to take part in the survey were sent by email on November 25, 2019 (Appendix A). A draw for one of five $100 hunting store gift cards was used as an incentive to encourage responses. On January 24, 2020, a reminder email was sent to all participants (Appendix B). Study protocols and the survey (Appendix C) were approved by the University of Alberta Research Ethics Board (Pro00093026) (Appendix D). Participation, motivations, satisfaction and demographic characteristics were collected via 29 question sets. The questionnaire's design and content were guided by input from provincial wildlife managers and piloted by ten Alberta upland game bird hunters.

Data Analysis

Examination of the distribution of response for anomalies, repeated data, scores outside the range of possibilities, outliers, normality and missing values was used to clean the data. Three cases were removed as a result of data cleaning as they were outside the range of what was possible for age and annual harvest.

Measurement Items[1]

I used nine questions to measure the three dimensions (centrality, cognitive, and behavioural) of recreation specialization (Table 5); these variables were not highly correlated (i.e., $r \leq .460$, $p < .01$). I used four items to measure the centrality dimension: one item measured investment, and three items measured how central the activity was to their lives. Two items had been used in past studies to assess enduring leisure involvement (Lee et al., 2015). Respondents indicated their level of agreement with each item on a 5-point scale (1-strongly disagree to 5-strongly agree).

[1] Confirmatory factor analysis was conducted by H.W. Harshaw.

I used two questions to measure the behavioural dimension. The first item asked whether respondents had specialized firearms or archery equipment for upland game bird hunting. The second item asked whether respondents had clothing, footwear, and other equipment so that they could hunt upland game birds (Miller & Graefe, 2002). Respondents indicated their level of agreement with each item on a 5-point scale (1-strongly disagree to 5-strongly agree).

I used three questions to measure the cognitive dimension. The first question asked respondents to rate their self-perceived level of expertise as an upland game bird hunter from 1 (novice) to 5 (expert). I also asked respondents to indicate whether they agreed (1-strong disagree to 5-strongly agree) with the statement "I feel I am more skilled in [upland game bird] hunting than other [upland game bird] hunters]" (Needham et al., 2009). I created a summative variable by combining two questions that asked about upland game bird identification when the bird is on the ground and when the bird is in flight, to measure respondents' confidence in identifying Sharp-tailed Grouse, Grey Partridge, Ring-necked Pheasant, Ruffed Grouse, male *vs*. female Ring-necked Pheasant, and Sharp-tailed Grouse *vs*. female Ring-necked Pheasant.

Operationalizing Recreation Specialization

I conducted second-order confirmatory factor analysis (CFA) to assess the construct validity of the variables measuring the latent factors of specialization, with no error covariance specified for the model. I used SPSS AMOS 26.0 for the CFA, and parameters were estimated using generalized least squares estimation, which performs better for samples smaller than 500 (Tabachnick & Fidell, 2007). Four model fit indices that are robust to small samples (Sun, 2005; Hu & Bentler, 1999) were employed: comparative fit index (CFI); root mean squared error of approximation (RMSEA); χ^2/df; and standardized root mean square residual (SRMR).

I specified, tested, and compared four competing models. The model that included all three recreation specialization dimensions performed the best based on item factor loadings, model fit indices, and parsimony (Figure 1). The CFA results generally suggested a good fit (χ^2 = 24.618, df = 24, p > .05; CFI = 0.995; RMSEA = 0.011; χ^2/df = 1.03; SRMR = 0.0404), indicating acceptable construct validity. First-order factor loadings ranged from 0.557 to 0.737 for the centrality dimension, from 0.674 to 0.675 for the behavioural dimension, and from 0.524 to 0.822 for the cognitive dimension (*i.e.*, skill). The behavioural dimension (0.872) represented specialization best compared to both the centrality (0.720) and cognitive (0.519) dimensions. All factor loadings were significant at p < .001. I used Cronbach's alpha to assess the internal reliability of the three recreation specialization dimensions. The reliability score for the centrality dimension was acceptable (α = 0.683). The reliability score for the cognitive dimension was acceptable (α = 0.651). Eliminating items from each of the three dimensions did not result in any gains in reliability. As the behavioural dimension only consisted of two items, reliability was tested using the Spearman-Brown Coefficient; this test indicated that the reliability of the behavioural dimension was acceptable (0.612). The variables that were included in this model were used to operationalize recreation specialization among upland game bird hunters.

I used K-means cluster analysis to identify hunter groups based on the nine items from the CFA model. One-way ANOVA, Welch tests and chi-square were used to compare the participation, motivation and satisfaction of the resultant hunter groups. Homogeneity of variances was tested using Levene's Test. Hochberg GT2 and Games-Howell post hoc tests were used. Cramer's V and Phi were used to calculate the effect size for categorical data; Cohen's *d* and Eta-squared were used for interval and ratio data.

Table 5. Questions used to measure recreation specialization from Albertan upland game bird hunters.

Dimension	Variables	Question Text	*M*	*SD*
Centrality Dimension	Investment	I have purchased a truck or off-road vehicle with the idea of going [upland game bird] hunting.	1.96	1.107
	Centrality_1	I find a lot of my life is organized around [upland game bird] hunting during the hunting season.	1.82	0.888
	Centrality_2	I live where I do because it is easier for me to hunt [upland game birds].	1.92	1.027
	Centrality_3	Most of my friends are in some way connected to [upland game bird] hunting.	1.85	0.940
Behavioural Dimension	Equipment_1	I have one or more specialized firearms/archery equipment so I can hunt upland game birds.	3.07	1.291
	Equipment_2	I have clothing, footwear, and other equipment so I can hunt upland game birds.	3.63	1.184
Cognitive Dimension	Expertise (self-rated)	How would you rate your ability as a [upland game bird] hunter? (5-point Scale: Novice [1] - Expert [5])	2.66	1.099
	Relative skill	I feel I am more skilled in [upland game bird] hunting than other [upland game bird] hunters.	2.72	0.951
	Upland game bird ID skills	When the bird is on the ground / in flight, how confident are you in identifying these game birds?	4.15	0.889

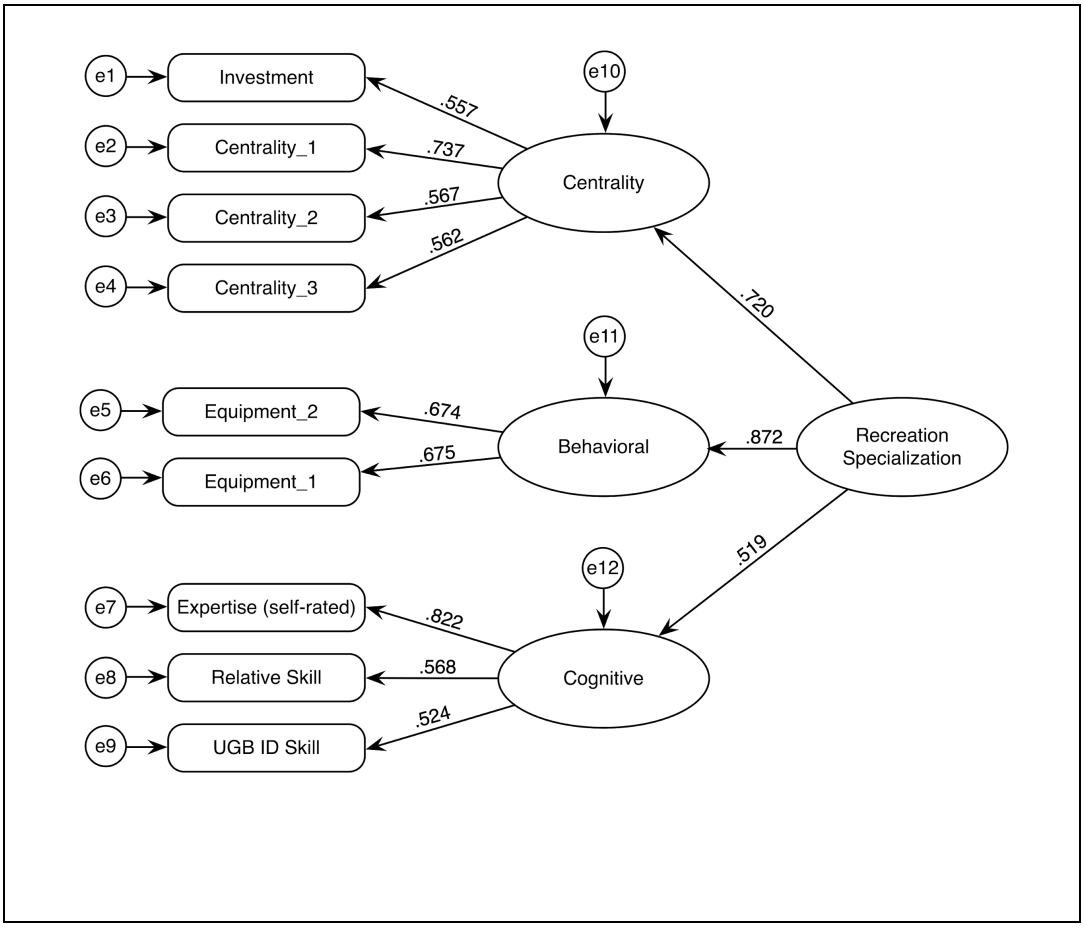

Figure 1. Confirmatory factory analysis recreation specialization model.

Table 6. Descriptive statistics for the recreation specialization dimension scores.

Recreation Specialization Measure	n	Min.	Max.	*M*	*SD*	*SE*	*M*	Mode
Centrality dimension	229	1.74	7.91	3.28	1.237	0.082	3.09	1.74
Behavioural dimension	229	1.18	5.88	3.94	1.236	0.082	4.12	4.71
Cognitive dimension	229	1.15	4.97	3.06	0.780	0.052	3.14	3.95

Results

Of the 1372 people that responded to the survey (17% response rate), 229 (17%) were pheasant, grey partridge and sharp-tailed grouse hunters who had hunted in the last five years and met the inclusion criteria. Respondents identified the hunted species that they wanted to focus on for the survey: 44 (19%) responded based on their released pheasant hunts; 20 (9%) on the wild pheasant hunts; 62 (27%) on their wild grey partridge hunts; and 103 (45%) on their wild sharp-tailed grouse hunts.

Recreation Specialization Clusters

Three clusters were generated based on recreation specialization including avid, intermediate and casual hunters. K-means cluster analysis generated final clusters using 13 iterations. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.76, which was above the recommended value of 0.6, and Bartlett's Test of Sphericity was significant (χ^2 (36) = 377.643, $p \leq 0.001$) suggesting an adequate correlation matrix (Ho, 2006).

Avid Hunter Cluster

Avid prairie upland game bird hunters represented 33% of participants. This group had the highest scores on the centrality, behavioural and cognitive dimension measures (Table 7). The behavioural and cognitive dimension measures had the highest scores and centrality dimensions had the lowest. Hunters in this cluster were significantly older (Table 8) than the casual hunting cluster; this association had a medium effect size (Cohen, 1988). Similar to the other clusters, avid hunters were mostly male, had completed some university/college or university/college, and lived in a small city. Hunters within the avid cluster hunted upland game birds significantly more years in the last five years than hunters in the casual cluster and more days per season than hunters in the intermediate cluster (Table 9). The majority of these hunters used a shotgun (88%) and few used archery (3%) or rifle (9%) equipment to hunt upland game birds[2]. Avid hunters participated more often in hunting provincial pheasant release sites, private pheasant release sites, and grey partridge significantly more often than the other clusters and hunted wild pheasants significantly more often than the casual cluster (Table 10). Avid hunters represented a greater proportion (47.7%) of participants who hunt upland game birds while scouting for waterfowl with a moderate effect size (χ^2 (2) = 20.654, $p < 0.001$, $\phi_C = 0.300$) (Cohen, 1988). This group was motivated to hunt upland game birds in order to spend time with a dog and hunts significantly more often with a dog than the other clusters; this association was moderate (Cohen, 1988). Hunters within the avid cluster hunted conservation sites significantly more often than the intermediate cluster and hunted heritage rangelands significantly more often than the other clusters (Table 9).

[2] The distribution of data resulted in a violation of chi-square assumptions; therefore, percentages are shown here.

Behaviour and satisfaction related to harvest was higher among avid hunters than the other hunter clusters. These hunters harvested their daily limit more than causal and intermediate hunters; this association was moderate (Cohen, 1988). These hunters harvested more upland game birds per season than hunters in the other clusters (Table 10). Avid hunters felt a need to shoot their limit more frequently to have a satisfying season than intermediate hunters. Avid hunters were significantly more satisfied with the number of upland game birds they shot than the other clusters. While harvest was important to this group, so too were their hunting sites relative to intermediate hunters, as demonstrated through their higher satisfaction with the natural setting, on-site access and opportunity to get exercise (Table 10).

Intermediate Hunter Cluster

Intermediate hunters represented 39% of respondents. For this group, the questions related to the cognitive dimension scored higher and behavioural dimension questions scored lower than casual hunters (Table 7). These hunters were significantly older than casual hunters (Table 8). Respondents in this cluster hunted released pheasants and grey partridge significantly less often than avid hunters (Table 9). These hunters hunted upland game birds more years in the last five than casual hunters, but fewer days per season than avid hunters (Table 10).

Table 7. Descriptive statistics for recreation specialization dimension question items of avid (n = 76), intermediate (n = 89), casual (n = 76) hunters.

	Avid		Intermediate		Casual	
Question	***M***	***SD***	***M***	***SD***	***M***	***SD***
I have purchased a truck or Off-Road-Vehicle with the idea of going [upland game bird] hunting.	2.5	1.249	1.4	0.638	2.0	1.105
I find a lot of my life is organized around [upland game bird] hunting during the hunting season.	2.5	1.025	1.4	0.586	1.7	0.57
I live where I do because it is easier for me to hunt [upland game birds].	2.4	1.168	1.5	0.725	1.9	0.971
Most of my friends are in some way connected to [upland game bird] hunting.	2.3	1.027	1.5	0.755	1.7	0.826
I have one or more specialized firearms/archery equipment for [upland game bird] hunting.	4.1	0.862	2.0	0.767	3.4	1.125
I have clothing, footwear, and other equipment so I can hunt upland game birds.	4.3	0.684	2.7	1.148	4.1	0.844
How would you rate your ability as a [upland game bird] hunter?	3.6	0.698	2.6	0.953	1.7	0.749
I feel I am more skilled in [upland game bird] hunting than other [upland game bird] hunters.	3.3	0.985	2.6	0.81	2.3	0.786
Upland game bird identification	4.6	0.57	4.1	0.895	3.7	0.972

Table 8. Demographic characteristics of avid (n = 76), intermediate (n = 89), and casual (n = 64) hunters. Significant differences among groups were determined using a One-way ANOVA and Hochberg GT2 post hoc test.

	Avid		Intermediate		Casual			
	M	***SD***	***M***	***SD***	***M***	***SD***	**F**	**η^2**
Gender [c]	1.0	0.000	1.1	0.259	1.1	0.213		
Age[1]	56.8[a***]	14.354	53.0[b***]	15.645	44.4[a***]	13.126	13.061	0.104
Education [d]	3.9	1.330	3.6	1.294	3.5	1.391		
Income [e]	3.0	1.131	3.1	1.209	2.7	0.889		
Residence [f]	2.9	1.610	2.7	1.571	2.9	1.615		

The above items were measured with (c) 2-point scale with 1 (male) and 2 (female) and (d) 1 (some high school); 2 (high school); 3 (some university/college); 4 (university/college); 5 (graduate degree) and (e) 1 (less than $49,999); 2 ($50,000 - $99,999); 3 ($100,000 - $150,000); 4 (over $150,000) and (f) 1 (rural area); 2 (small town); 3 (small city); 4 (medium urban area); and 5 (large urban area). Means with different superscripts are significant at $^{***}p < 0.001$.

Intermediate hunters used shotguns (78%), rifles (14%) and archery equipment (8%). Intermediate hunters pursued upland game birds while scouting for waterfowl the least; this group represented a significantly lower proportion (29.7%) of hunters who hunt upland game birds while scouting for waterfowl. The participants in this cluster hunt to get outdoors and enjoy nature, get away from everyday life, and spend time around wildlife less than casual hunters. Intermediate hunters pursued upland game birds on conservation lands and heritage rangelands less often than avid hunters. Intermediate hunters harvested fewer birds per season and were less satisfied with the number of birds they shot than avid hunters were. Intermediate hunters were less satisfied with the on-site access, natural setting and opportunity to get exercise than avid hunters.

Casual Hunter Cluster

Casual hunters represented 28% of respondents. Casual hunters reported higher levels of agreement on the two behavioural dimension measures than intermediate hunters did (Table 7). Hunters in this group expressed disagreement with all of the centrality dimension measures. Casual hunters were significantly younger than the avid and intermediate hunters (Table 8). Casual hunters used rifles (20%) and archery (13%) the most and shotguns (67%) the least to hunt upland game birds. Hunters in this group hunted released pheasants, wild pheasants and grey partridge less often than avid hunters (Table 9). Casual hunters hunted a significantly lower proportion of their life and fewer years in the last five years than avid and intermediate hunters (Table 10). Casual hunters were motivated to get outdoors and enjoy nature, get away from everyday life, and spend time around wildlife more than intermediate hunters. Casual hunters hunted provincial grazing reserves, municipal land, and irrigation district land significantly less than avid hunters. Casual hunters harvested fewer birds and were less satisfied with the number of game birds they shot than avid hunters were.

Table 9. Participation and satisfaction characteristics of avid (n = 76), intermediate (n = 89), and casual (n = 64) hunters. Significant differences among groups were determined using a One-way ANOVA or Welch test or Chi-square test and Games-Howell or Hochberg GT2 post hoc tests.

Question		Avid		Intermediate		Casual		Effect Size
		M	*SD*	*M*	*SD*	*M*	*SD*	
Proportion of life hunted[1]		0.39^{ab***}	0.346	0.32^{a***}	0.260	0.19^{b***}	0.198	$\eta^2 = 0.08$
Do you hunt upland game bird while scouting for waterfowl? Yes[1]		$47.7\%^{a***}$		$29.7\%^{b***}$		$22.5\%^{ab***}$		$\phi_C = 0.300$
How many years have you hunted in the last 5 years? [1]		4.04^{a**}	1.428	3.78^{b*}	1.380	3.09^{a**b*}	1.697	$\eta^2 = 0.065$
How many days did you typically hunt per hunting season? [1]		7.87^{a**}	6.277	5.72^{b**}	5.119	5.64	4.996	$\eta^2 = 0.034$
On an average season, how many did you harvest in a hunting season? [1]		6.5^{a***b*}	7.14	4.17^{b*}	4.294	3.17^{a***}	4.014	$\eta^2 = 0.062$
How often did you harvest your daily limit? [1] (c)		2.285^{ab***}	1.091	1.69^{b***}	0.887	1.47^{a***}	0.854	$\eta^2 = 0.110$
How many times did you feel you needed to shoot a daily limit to have a satisfying season? [1] (c)		1.57^{a*}	1.063	1.22^{a*}	0.559	1.25	0.695	$\eta^2 = 0.038$
How satisfied have you been with [1] (d)	The number you shoot	3.4^{ab*}	1.119	2.98^{b*}	0.977	2.89^{a*}	1.01	$\eta^2 = 0.04$
	The natural setting	4.2^{a*}	0.914	3.8^{a*}	0.881	4.05	0.844	$\eta^2 = 0.039$
	The on-site access	3.78^{a**}	0.974	3.33^{a**}	0.997	3.52	0.926	$\eta^2 = 0.038$
	The opportunity to get exercise	4.3^{a*}	0.693	3.97^{a*}	0.832	4.19	0.774	$\eta^2 = 0.035$

The above items were measured with a 5-point scale ranging from (c) 1 (never); 2 (on at least one of my hunts); 3 (occasionally on my hunts); 4 (most of my hunts); 5 (every time I hunted) and (d) 1 (very dissatisfied) to 5 (very satisfied). [1] Means with different superscripts are significant at $^{*}p < 0.05$; $^{**}p < 0.01$; and $^{***}p < 0.001$.

Table 10. Motivation and participation characteristics of avid (n = 76), intermediate (n = 89), and casual (n = 64) hunters. Significant differences among groups were determined using a Welch test or One-way ANOVA and Games-Howell or Hochberg GT2 post hoc tests.

	Question	Avid		Intermediate		Casual		η^2
		M	*SD*	*M*	*SD*	*M*	*SD*	
How often do you participate in each of these hunts [(c)]	Provincial Pheasant release site[1]	2.2^{ab**}	1.522	1.5^{b**}	0.977	1.9^{a**}	0.788	0.082
	Private Pheasant release site[1]	1.5^{a*}	0.954	1.2^{b*}	0.59	1.1^{a*}	0.468	0.048
	Wild Pheasant[1]	1.8^{a**}	1.242	1.4	0.858	1.3^{a**}	0.749	0.046
	Gray Partridge[1]	2.6^{a***b*}	1.28	2.1^{b*}	1.213	1.9^{a***}	1.027	0.058
	Sharp-tailed Grouse	2.6	1.331	2.4	1.028	2.1	0.978	
	Ruffed Grouse	3.2	1.41	3.3	1.204	3.5	1.221	
How often do you hunt [(c)]	with a dog[1]	2.6^{ab***}	1.641	1.6^{a***}	1.135	1.7^{b***}	1.072	0.113
	Private land	3	1.289	3.2	1.536	2.8	1.543	
	Conservation sites[1]	2.3^{a***}	1.452	1.5^{a***}	0.893	2.0	1.282	0.071
	Heritage rangelands[1]	1.6^{ab*}	0.83	1.1^{b*}	0.504	1.2^{a*}	0.486	0.049
	Provincial Grazing Reserves[1]	2.0^{a*}	1.115	1.7	0.984	1.6^{a*}	0.912	0.032
	Municipal Land[1]	1.6^{a***}	0.877	1.3	0.757	1.1^{a***}	0.409	0.057
	Irrigation district land[1]	1.6^{a*}	0.923	1.4	0.851	1.2^{a*}	0.608	0.035
I go hunting to [(d)]	Get outdoors and enjoy nature[1]	4.3	0.681	4.2^{a*}	0.732	4.5^{a*}	0.666	0.032
	Get away from everyday life[1]	4.1	0.779	4.0^{a**}	0.885	4.4^{a**}	0.809	0.039
	Spend time around wildlife[1]	4.3	0.575	4.1^{a***}	0.772	4.5^{a***}	0.666	0.056

The above items were measured with a 5-point scale ranging from (c) 1 (never) to 5 (always) and (d) 1 (strongly disagree) to 5 (strongly agree).
[1]Means with different superscripts are significant at $^{*}p < 0.05$; $^{**}p < 0.01$; and $^{***}p < 0.001$.

Discussion

This study explores user specialization in prairie upland game bird hunting. The results illustrate that heterogeneity exists among hunters that participated in upland game bird hunting in Alberta. I identified three groups of upland game bird hunters based on their level of recreation specialization: avid hunters, intermediate hunters and casual hunters. The findings demonstrate the multidimensionality of recreation specialization, that avid hunters demonstrated a greater commitment to the activity through association with a leisure social world, that avid hunters demonstrated greater perceived skill and knowledge, and that hunters with higher levels of specialization scored higher on harvest related dimensions.

The three dimensions of recreation specialization were exhibited in prairie upland game bird hunters with the centrality dimension scoring low across all hunter groups, which may suggest the lower importance of upland game bird hunting relative to other forms of hunting. These findings support the multidimensionality of recreation specialization (Kuentzel & Heberlain, 1992; Scott & Shafer, 2001). Avid hunters reported higher scores for the questions that measured the three dimensions than intermediate and casual hunters did. Intermediate hunters did not consistently report higher scores than casual hunters on all three dimensions of recreation specialization. Further, avid and casual hunters reported generally agreeing to have specialized equipment (behavioural dimension) to take part in upland game bird hunting, unlike intermediate hunters. This demonstrates that prairie upland game bird hunters reported different patterns of response in the three dimensions: although recreation specialization dimensions can be moderately related, they may not be mutually reinforcing and it is unlikely that individuals

progression in these different dimensions is uniform and they may not covary (Lee & Scott, 2004). All hunters in Alberta are required to take a hunter education course, which may help explain why all three clusters ranked their identification abilities as high.

A key element of recreation specialization is the degree of commitment a person has to the activity (Bryan, 1977). In this study, avid hunters demonstrated commitment to the activity through higher levels of equipment acquisition, annual participation and days hunted per hunting season. In addition, avid participants hunted with a dog more often than the other hunter types did, which demonstrates a substantial commitment, as maintaining a dog throughout the year (e.g., training, feeding, sheltering) is a big responsibility (Williams et al., 2018). The choice to keep a dog may also place these avid hunters in a form of dog hunting fraternity, which may support Bryan's (1977) proposition that the most specialized recreationists join a *leisure social world*. Leisure social worlds are a unique association of individuals who share special meaning through cultural elements including activities, conventions, technology, knowledge, and experiences (Scott & Godbey, 1992). Specialized recreationists involved in a leisure social world may become more connected to the activity as their identity becomes more linked to elements associated with participation, which in this case is dog ownership (Jun et al., 2015). As the individual identifies more with a recreational activity, the satisfaction they derive from it increases and in doing so promotes greater involvement (Jun et al., 2015). Thus, involvement in a leisure social world can create a positive feedback loop that promotes greater recreational participation and satisfaction.

Avid hunters demonstrated greater perceived skill and knowledge beyond the recreation specialization dimensions measured. Avid participants hunted a greater variety of public land types, which may indicate their skill, knowledge and experience in knowing where to hunt. The

effort required to learn about the public land types and obtain access to hunt them may demonstrate their increased commitment to the sport as they worked to overcome constraints to access hunting lands and meet their hunting preferences. The ability of this group to access hunting lands likely maintains their participation in the sport as the perceived and actual access to good hunting land is a necessary element of the social habitat required for hunter participation (Responsive Management & National Shooting Sports Foundation, 2010). Further, avid hunters had greater levels of satisfaction with hunting site characteristics, including the natural setting, on-site access and opportunity to get exercise leading greater support to this argument.

The motivations of highly specialized Albertan upland game bird hunters were different than expected given the assumption of the recreation specialization framework that more specialized hunters become less consumption orientated and more motivated by experiential elements (Bryan, 1977). However, contrary to findings of a study on Wisconsin goose hunters (Kuentzel & Heberlain, 1992), in this study less specialized hunters were slightly more motivated to hunt prairie upland game birds in order to get outdoors and appreciate nature. Furthermore, avid hunters harvested their daily limit more often, harvested more birds per season, and felt a need to shoot their daily limit to have a satisfying season more frequently than less specialized prairie upland game bird hunters did. This finding is similar to studies where specialized anglers were more consumptive focused (Dorow & Arlinghaus, 2012; Sutton & Oh, 2015) and specialized goose hunters harvested more game (Williams et al., 2018). The increased consumption focus of specialized recreationists may be a result of the local context, as in the case of eel anglers in Germany: highly specialized anglers valued greater daily catch rates over the large size whereas casual anglers preferred large-sized eels (Dorow et al., 2010). In this case, specialized anglers were culinary-focused and may have perceived larger fish to be of less

culinary value (Dorow et al., 2010). In this study, upland game bird hunters rarely felt the need to shoot a daily limit to have a satisfying season, which may suggest that although avid hunters are more consumption focused the need to harvest many birds per day is not necessary for satisfaction.

There are a number of limitations associated with this study. A limitation of this study was the lack of information that existed on upland game bird hunters in Alberta. Although upland game bird hunting has a long tradition in the province, little research has explored these hunters. The Alberta Ministry of Environment and Parks conducted all survey communication to hunting license holders, which resulted in the inability to conduct a non-response survey. Further, this study surveyed provincially licensed hunters, future research may benefit from including indigenous hunters in order to capture a larger spectrum of perspectives.

Conclusion

Our results suggest that recreation specialization is a useful construct to understand prairie upland game bird hunters. I observed differences in motivations, satisfaction and participation of hunters with avid, intermediate and casual recreation specialization. Hunting regulations and R3 initiatives would benefit from providing a diversity of experiences to support hunter preferences. I demonstrated that 20-30% of casual and intermediate hunters use rifle and archery equipment, which suggests a preference for hunting upland game birds while targeting big game. Hunting regulations that overlap upland game bird hunting seasons with those of big game may support R3. R3 programs could benefit from providing a diversity of marketing messages that reach out to hunters focused on specialized equipment and those with little specialized equipment. The findings of this study suggest that casual and intermediate hunters use a low diversity of public lands, which may suggest a lack of awareness of the full suite of public lands available for

hunting. Developing educational programs on land designations and accessibility may benefit R3. I demonstrated that some avid hunters are associated with a hunting dog leisure social world, R3 initiatives may benefit from promoting social organizations that support hunting dog activities as dog ownership may promote hunter retention.

Chapter 4

Conclusion

I sought to characterize and compare upland game bird hunter motivations, degree of satisfaction and levels of recreation specialization. To achieve this goal two studies were performed. The first study addressed a gap in the literature, by characterizing and comparing the motivations of released pheasant hunters to wild upland game bird hunters. Although the current literature focuses on pheasant and other game species hunters, to my knowledge it does not compare released pheasant hunters to wild upland game bird hunters. Gaining a deeper understanding of the motivations and satisfactions of released pheasant and wild upland game bird hunters is beneficial because investment by wildlife managers in either type of hunt can result in controversy and resource demands (Delibes-Mateos et al., 2015; Sokos et al., 2008). Releasing game birds may contradict the hunting ethos (e.g. by risking the introduction of pathogens, degradation of genetic diversity, or eliminating fair chase) and may not be supported by some conservation professionals and hunters (Delibes-Mateos et al., 2015; Gamborg et al., 2016). While allocating resources to pen-raised and released birds may support within-year hunting opportunities and hunter recruitment goals, habitat improvements require long-term investments in hunting opportunities that may improve habitat that benefits game and non-game species. Selecting the best approach is a subjective valuation and insights into the preferences of hunters can inform these decisions. To understand these differences the motivations and satisfactions of released pheasant hunters and wild game bird hunters were identified and compared.

The second study characterized the levels of specialization of prairie upland game bird hunters and compared the motivations, participation characteristics and satisfaction of hunters with different levels of recreation specialization. Identifying hunter subgroups based on their

engagement in the activity is useful to wildlife management agencies as this can inform efforts to tailor marketing, programs and hunting opportunities to meet the preferences of hunters. Characterizing hunters or anglers using recreation specialization is important because hunt quality and regulation preferences can differ among hunters with different recreation specializations (Kuentzel & Heberlain, 1992; Oh & Ditton, 2006).

Little is known about upland game bird hunters in Alberta and the findings of this exploratory research increase our understanding of this group of hunters. This chapter describes the outcomes of the two studies using the research objectives as a guide and concludes with recommendations for management and for future research.

Objective 1: Identify typologies of upland game bird hunters based on their motivations.

The motivation typologies that were identified (i.e., least engaged, nature-sport and enthusiast) differed in terms of days of participation, use of dogs, judgements of hunt success, motivations, hunting with others and a need to shoot a daily limit. Least engaged hunters had lower levels of participation overall, dog use and need to fill a daily limit. Nature-sport hunters were the most appreciatively motivated and hunted with others more than least engaged hunters, but less than enthusiast hunters. Enthusiast hunters had the highest motivation scores across measures and hunted to spend time with others the most. Harvest and seeing game were more important to the satisfaction of enthusiast hunters.

Objective 2: Compare the motivations and levels of satisfaction among released pheasant hunters to those of wild native and non-native upland game bird hunters

No differences in the motivation and satisfaction of released pheasant and wild upland game bird hunters were found, with the exception of one measure: on-site accessibility. Released pheasant

hunters were significantly more satisfied with the accessibility of sites, which may suggest the effectiveness of the advertising and the access program of the provincial pheasant release program.

Objective 3: Compare hunting regulation preferences of released pheasant hunters to those of wild native and non-native upland game bird hunters

Season length and season overlap with other species' hunting seasons was the most preferred regulatory options for released pheasant and wild upland game bird hunters. These results support previous research that has found that non-harvest motivations are primary to hunters (e.g., Hayslette et al., 2001; Kaltenborn et al., 2012; Schroeder et al., 2006). Similar to partridge hunting in Spain, providing a range of species to hunt was highly valued by hunters (Delibes-Mateos et al., 2014).

Objective 4: Explore the recreation specialization of prairie upland game bird hunters

Prairie upland game bird hunter recreation specialization was characterized using four centrality dimension measures, two behavioural dimension measures and three cognitive dimension measures. Three levels of upland game bird hunting involvement were identified: avid, intermediate and casual hunters. These results demonstrated the multidimensionality of recreation specialization framework, as prairie upland game bird hunters reported different patterns of response in the three dimensions. This provided a means of classifying prairie upland game bird hunters based on the characteristics of their involvement in the activity.

Objective 5: Compare the motivation, participation and satisfaction of recreation specialization among subgroups of hunters

Intermediate hunters were motivated to get outdoors and enjoy nature, get away from everyday life and spend time around wildlife more than avid hunters. Casual hunters were significantly younger than avid and intermediate hunters. Highly specialized hunters scored higher on harvest related questions, demonstrated a greater commitment to the activity through association with a leisure social world and demonstrated greater skill and knowledge than casual and intermediate hunters.

Together these two studies contribute to, and enhance, our understanding of Albertan upland game bird hunters. These studies explain the differences in participation, satisfaction and motivations of hunters based on motivation typologies, recreation specialization, and released pheasant and wild upland game bird hunting. The findings of these studies are expanded to benefit wildlife conservation agencies in the next section by offering management implications.

Management Recommendations

A consistent theme demonstrated in this exploration of motivations, satisfaction, participation and recreation specialization is the heterogeneity of hunters and diversity they express through their participation in upland game bird hunting. It is recommended that this theme be used to inform upland game bird hunter retention, reactivation, and recruitment (R3) marketing strategies and hunting opportunities. Marketing strategies that focus on the different levels of emphasis that are placed on getting outdoors, enjoying nature, spending time with friends and family, getting away from everyday life, getting exercise, and obtaining wild meat should be promoted. Because these motivations have been found to be important among prairie upland game bird hunters, hunting opportunities that provide a variety of different experiences that

emphasize communal hunting, exercise, obtaining wild meat and being outdoors should be encouraged.

Association with a leisure social world was found among avid hunters. Social worlds contain their own subcultures with unique meaning, activities, practices, knowledge, technology and language that set members apart from other participants (Scott & Godbey, 1992). It is likely that several leisure social worlds exist among upland game bird hunters, and may include hunting dog ownership, exercise and owning specialized equipment. Hunting culture is rich and includes magazines and associations that are focused on these social worlds (e.g., magazines such as *The Field*, *Covey Rise Upland Lifestyle Magazine*, and *Journal of Mountain Hunting*). R3 initiatives would benefit from encouraging participation in social worlds as membership in a social world may support hunter recruitment and retention.

Results of Study Two indicated that upland game bird hunters rarely hunt heritage rangelands, provincial grazing reserves, municipal land or irrigation district land; this may suggest barriers exist to using these public hunting areas. Avid hunters used these lands more than casual and intermediate hunters, which suggests that awareness of hunting opportunities increases with the level of specialization. The Alberta Hunter Education Program provides some basic information to hunters about accessing public hunting lands; however, the education manual encourages hunters to read the Public Lands Act (Alberta Hunter Education Instructor Association, 2016), which may be challenging to hunters without experience or education in legal interpretation. Further, the hunter education manual does not provide details about how to access these lands, which may indicate an information need in the education program. The low use of hunting heritage rangelands, provincial grazing reserves, municipal land and irrigation district land lands suggests that opportunities exist to inform hunters about what lands are

available, create programs to make these lands more accessible to hunters and examine the habitat integrity of these lands to sustain wild game bird populations.

The findings of this research suggest that hunting regulation strategies that maximize the days available to hunt and the diversity of game could promote increased hunter satisfaction. The 2019 Alberta hunting season consisted of four-and-a-half month, one-and-a-half month, one-month and three-day seasons for upland game birds depending on the location and species. Revisions to the season length through the creation of, for example, a standard Sept 1 - Dec 21 season could promote hunter satisfaction as it would overlap the majority of big game and waterfowl seasons while maintaining a large number of days open to hunting and simplify the interpretation of this regulation. Risks of upland game bird additive mortality resulting from potential increased hunter harvest could be mediated by reductions of the daily bag limit or by the creation of an annual limit. Alberta government biologists have been concerned about the safety risks associated with hunting sharp-tailed grouse using large bore rifles during the big game season; however, this risk could be mitigated by requiring upland game birds be hunted with shotguns, small-bore rifles or archery equipment (pers comm. D. Manzer, December 2018). Jurisdictions outside of Alberta may benefit from focusing hunting regulations on increasing days available to hunt and overlap with other game species' seasons.

Recommendations for Future Research

The findings of this research suggest that prairie upland game bird hunters are confident in identifying upland game birds in flight and on the ground. This level of knowledge is a basic requirement for compliance with hunting regulations and for lawful participation in the activity. Other questions that specifically ask about ecological content might better differentiate prairie upland game bird hunters' level of recreation specialization. For example, future research could

explore questions related to habitat requirements such as food and cover needs of upland game birds or hunting techniques shown to be effective for hunting upland game birds.

This research demonstrated that more than four in five upland game bird hunters pursue upland game birds while scouting or hunting other game species. Further, almost one-third of casual and intermediate hunters use rifle or archery equipment, which suggests a preference for hunting upland game birds while targeting big game. Insights into the relationships between upland game bird hunting and other forms of hunting, including big game, may provide a deeper understanding of hunter participation characteristics that could be used to focus R3 strategies.

A limitation of this study was the lack of information that exists on upland game bird hunters in Alberta. Although upland game bird hunting has a long tradition in the province, little research has explored these hunters. I hope that this exploratory study encourages scholars and management agencies to continue to gain knowledge about hunters, as insights about hunters can inform management practices in meaningful ways. A limitation of the study was unequal response rates among the species hunted. This study requested survey responses by individuals who had hunted pheasant, grey partridge or sharp-tailed grouse between 2015 – 2019, it did not ask about all upland game bird hunted species, which limits the interpretation of these results to hunters of prairie upland game birds in Alberta. I noted a prevalence of ruffed grouse hunting participation among our participants, therefore future research should include ruffed grouse, spruce grouse and ptarmigan hunting to capture the full spectrum of upland game bird hunting opportunities in Alberta. Further, this study surveyed provincially licensed hunters, future research may benefit from including indigenous hunters in order to capture a larger spectrum of perspectives.

The results of this study add to our understanding of the multidimensional nature of hunting. Like so much of life, there is much to be gained by supporting and encouraging diversity. I hope practitioners and scholars consider creating greater opportunities for the diverse perspective of hunters to be shared and leveraged for conservation gains.

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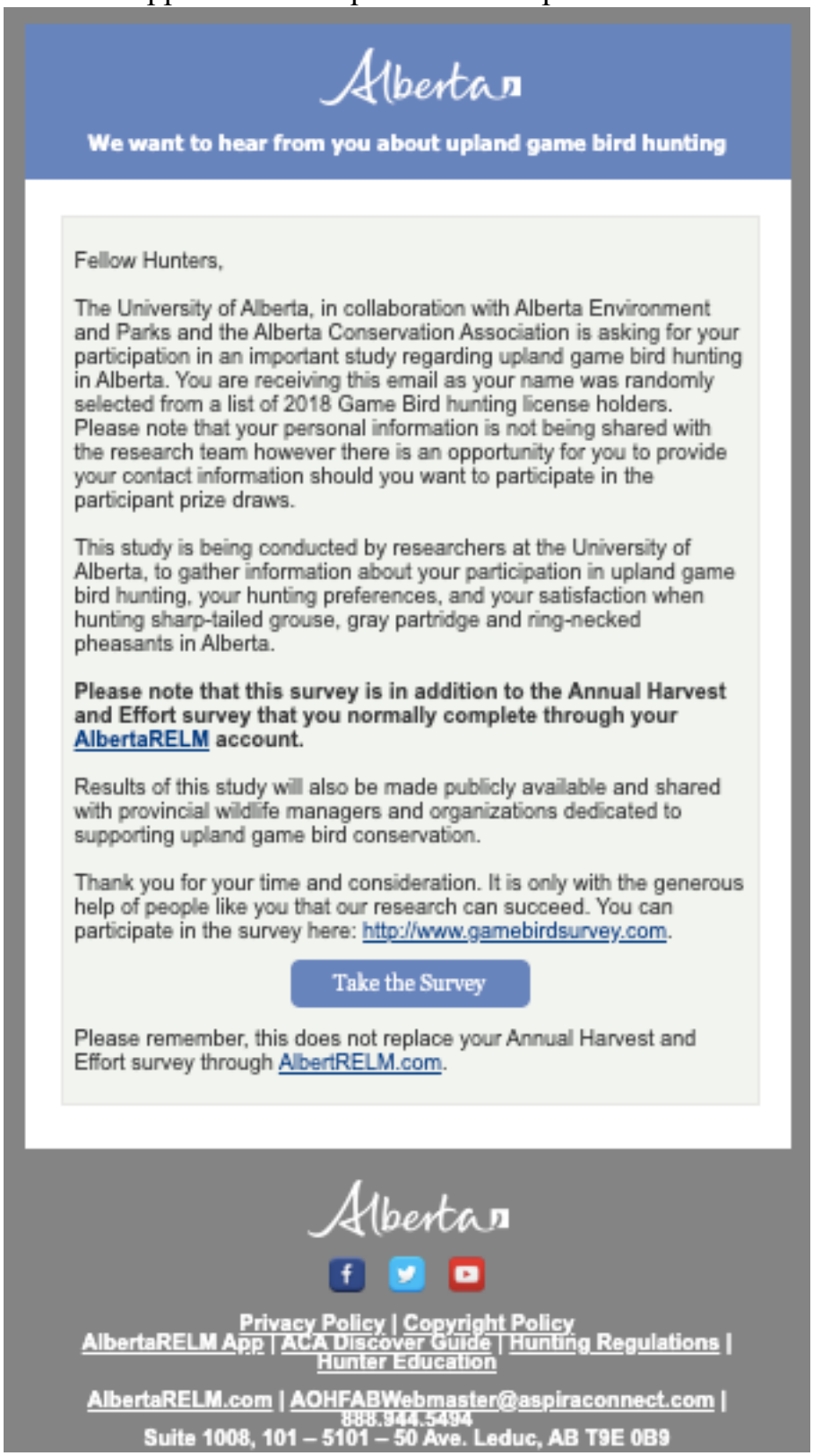
Appendix A. Request to Participate Email



Alberta

We want to hear from you about upland game bird hunting

Fellow Hunters,

The University of Alberta, in collaboration with Alberta Environment and Parks and the Alberta Conservation Association is asking for your participation in an important study regarding upland game bird hunting in Alberta. You are receiving this email as your name was randomly selected from a list of 2018 Game Bird hunting license holders. Please note that your personal information is not being shared with the research team however there is an opportunity for you to provide your contact information should you want to participate in the participant prize draws.

This study is being conducted by researchers at the University of Alberta, to gather information about your participation in upland game bird hunting, your hunting preferences, and your satisfaction when hunting sharp-tailed grouse, gray partridge and ring-necked pheasants in Alberta.

Please note that this survey is in addition to the Annual Harvest and Effort survey that you normally complete through your AlbertaRELM account.

Results of this study will also be made publicly available and shared with provincial wildlife managers and organizations dedicated to supporting upland game bird conservation.

Thank you for your time and consideration. It is only with the generous help of people like you that our research can succeed. You can participate in the survey here: http://www.gamebirdsurvey.com.

Take the Survey

Please remember, this does not replace your Annual Harvest and Effort survey through AlbertRELM.com.

Alberta

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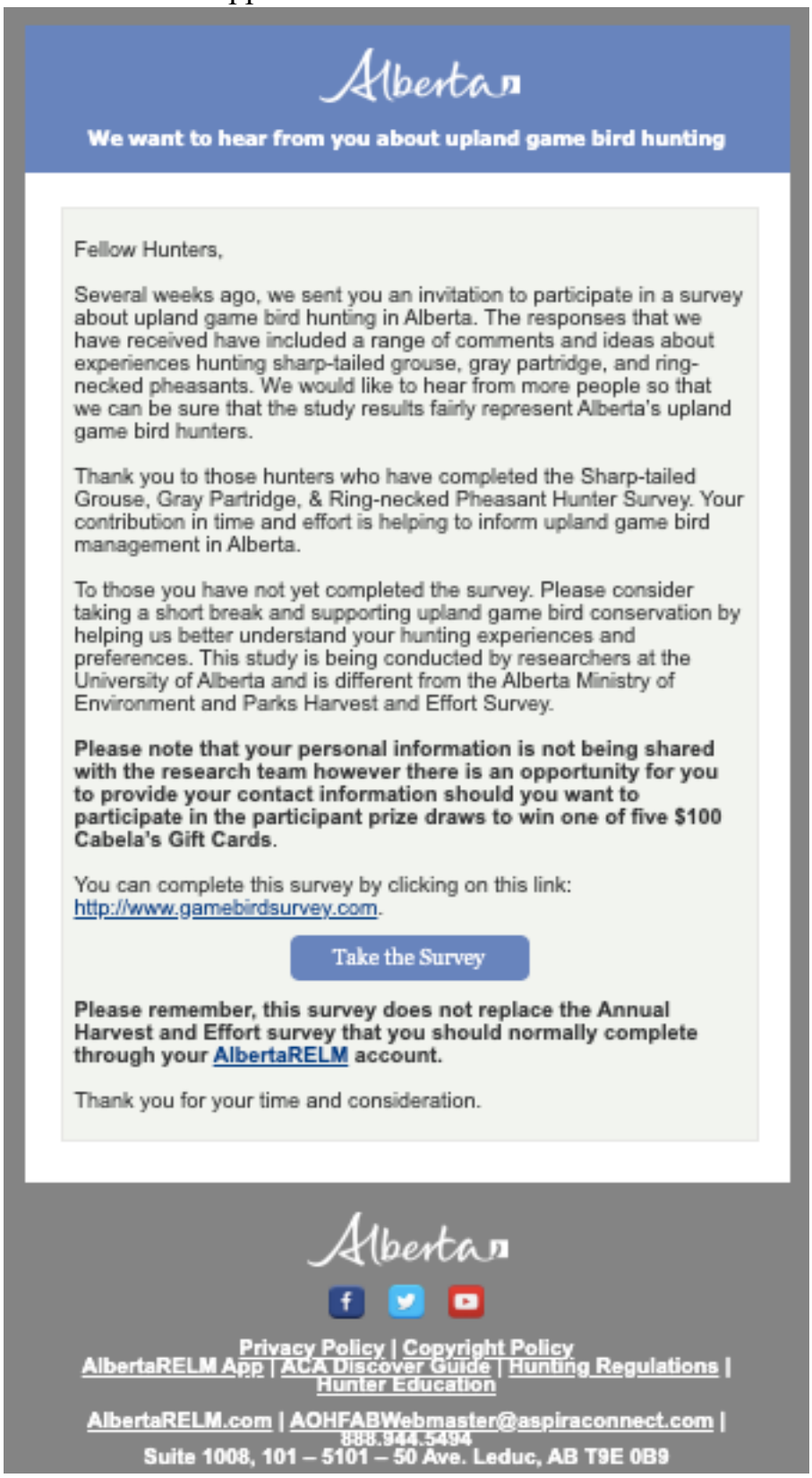
AlbertaRELM.com | AOHFABWebmaster@aspiraconnect.com | 888.944.5494
Suite 1008, 101 – 5101 – 50 Ave. Leduc, AB T9E 0B9

Appendix B. Reminder Email



Alberta

We want to hear from you about upland game bird hunting

Fellow Hunters,

Several weeks ago, we sent you an invitation to participate in a survey about upland game bird hunting in Alberta. The responses that we have received have included a range of comments and ideas about experiences hunting sharp-tailed grouse, gray partridge, and ring-necked pheasants. We would like to hear from more people so that we can be sure that the study results fairly represent Alberta's upland game bird hunters.

Thank you to those hunters who have completed the Sharp-tailed Grouse, Gray Partridge, & Ring-necked Pheasant Hunter Survey. Your contribution in time and effort is helping to inform upland game bird management in Alberta.

To those you have not yet completed the survey. Please consider taking a short break and supporting upland game bird conservation by helping us better understand your hunting experiences and preferences. This study is being conducted by researchers at the University of Alberta and is different from the Alberta Ministry of Environment and Parks Harvest and Effort Survey.

Please note that your personal information is not being shared with the research team however there is an opportunity for you to provide your contact information should you want to participate in the participant prize draws to win one of five $100 Cabela's Gift Cards.

You can complete this survey by clicking on this link: http://www.gamebirdsurvey.com.

Take the Survey

Please remember, this survey does not replace the Annual Harvest and Effort survey that you should normally complete through your AlbertaRELM account.

Thank you for your time and consideration.

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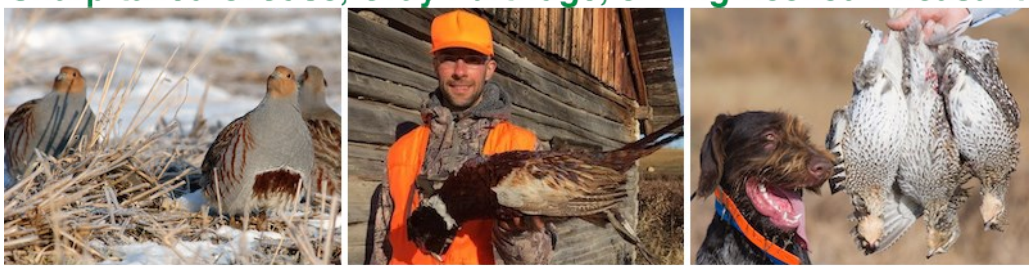
Appendix C. Sharp-tailed Grouse, Grey Partridge, & Ring-necked Pheasant Hunter Survey

Start

Sharp-tailed Grouse, Gray Partridge, & Ring-necked Pheasant



Hunter Survey

We are interested in your upland game bird hunting experiences in ALBERTA.

To begin the survey click on the button below.

Next

Q1

Q1

In the last 5 years, have you hunted sharp-tailed grouse, gray partridge or ring-necked pheasants in Alberta?

Q1=1 **Yes**

Q1=2 **No**

Back Next

0% 100%

Q2

Q2

We are interested in how you take part in upland game bird hunting. Based on the time you spend hunting upland game birds in the last 5 years, how often have you participated in each of the following hunts?

I hunted ...	Never	Rarely	Sometimes	Most of the time	Always	Don't know
One or more of the 42 Pheasant Release Sites	Q2_r1=1	Q2_r1=2	Q2_r1=3	Q2_r1=4	Q2_r1=5	Q2_r1=6
Privately released ring-neck pheasants	Q2_r2=1	Q2_r2=2	Q2_r2=3	Q2_r2=4	Q2_r2=5	Q2_r2=6
Wild ring-neck pheasants south of the Red Deer River	Q2_r3=1	Q2_r3=2	Q2_r3=3	Q2_r3=4	Q2_r3=5	Q2_r3=6
Gray partridge	Q2_r4=1	Q2_r4=2	Q2_r4=3	Q2_r4=4	Q2_r4=5	Q2_r4=6
Sharp-tailed grouse	Q2_r5=1	Q2_r5=2	Q2_r5=3	Q2_r5=4	Q2_r5=5	Q2_r5=6
Ruffed grouse	Q2_r6=1	Q2_r6=2	Q2_r6=3	Q2_r6=4	Q2_r6=5	Q2_r6=6

Q3

Q3

Hunting experiences exist for wild and released upland game birds in Alberta. To support research and management, we are interested in how hunters take part in these hunts.

For the purpose of this survey, we would like to learn about your satisfaction and how you participate in one type of hunting. Please select the hunt that you would like to focus on for the majority of this survey.

Q3=1 sharp-tailed grouse

Q3=2 gray partridge

Q3=3 wild ring-necked pheasant

Q3=4 released ring-necked pheasant

Back Next

0% 100%

Q4a

We are interested in how you take part in [Script] hunting.

Q4a

How would you rate your ability as a [Script] hunter? Please respond on a scale from 1 to 5 where 1 = Novice and 5 = Expert.

1 (Novice)	2	3	4	5 (Expert)
Q4a_r1=1 ◯	Q4a_r1=2 ◯	Q4a_r1=3 ◯	Q4a_r1=4 ◯	Q4a_r1=5 ◯

Q4b

Q4b

Over your lifetime, how many years have you hunted [Script] ? _____

Q5

Q5

When hunting [Script] , what weapon do you use most often?

Q5=1 ◯ Shotgun Q5=2 ◯ Rifle Q5=3 ◯ Archery

Q6

Q6

When do you hunt [Script] ? (check all that apply)

Q6_1 ☐ While hunting big game.

Q6_2 ☐ While hunting waterfowl.

Q6_3 ☐ While scouting for big game.

Q6_6 ☐ While hunting other upland game birds in season.

Q6_4 ☐ While scouting for waterfowl.

Q6_5 ☐ While primarily hunting [Script] .

Q7

Q7

When hunting [Script] , how often do you hunt ...

	Never	Rarely	Sometimes	Most of the time	Always
with friend(s) and/or family.	Q7_r1=1 ◯	Q7_r1=2 ◯	Q7_r1=3 ◯	Q7_r1=4 ◯	Q7_r1=5 ◯
with a dog or dogs.	Q7_r2=1 ◯	Q7_r2=2 ◯	Q7_r2=3 ◯	Q7_r2=4 ◯	Q7_r2=5 ◯
with a guide or guides.	Q7_r3=1 ◯	Q7_r3=2 ◯	Q7_r3=3 ◯	Q7_r3=4 ◯	Q7_r3=5 ◯

by yourself.	Q7_r4=1	Q7_r4=2	Q7_r4=3	Q7_r4=4	Q7_r4=5

Back Next

0% 100%

YrIntro

For questions 8 to 10, please focus your responses on your experiences in the last 5 years (2015-2019).

Q8

Q8

Over the last 5 years, on average in one hunting season when hunting [Script] ...

	Never	On at least one of my hunts	Occassionally on my hunts	Most of my hunts	Every time I hunted
How often did you harvest your [Script] daily limt?	Q8_r1=1	Q8_r1=2	Q8_r1=3	Q8_r1=4	Q8_r1=5
How many times did you feel you needed to shoot a daily limit of [Script] to have a satisfying season?	Q8_r2=1	Q8_r2=2	Q8_r2=3	Q8_r2=4	Q8_r2=5
How often did you encounter other hunters (outside of your group)?	Q8_r3=1	Q8_r3=2	Q8_r3=3	Q8_r3=4	Q8_r3=5

Q9

Q9

For this question, please limit your answers to the last 5 years.

How many years have you hunted [Script] ?	Q9_r1_c1	
How many days did you typically hunt [Script] per hunting season?	Q9_r2_c1	
On an average season, how many [Script] did you harvest in a hunting season?	Q9_r3_c1	
On average, how many hours did you travel per day to hunt [Script] ?	Q9_r4_c1	

Q10

Q10

Did you hunt [Script] outside of Alberta? If so, where? (State/Province, Country)

Back Next

0% 100%

AccessIntro

Access to hunting lands is very important to maintain hunting participation. We are interested in what type of land you hunt and your effort to obtain access to hunt these areas.

Q11

Q11

Where have you hunted [Script] over the last 5 years (2015-2019)?

	Never	Rarely	Sometimes	Most of the time	Always	Don't know
Private land	Q11_r1=1	Q11_r1=2	Q11_r1=3	Q11_r1=4	Q11_r1=5	Q11_r1=6
Conservation sites (e.g. Alberta Conservation Associations, Ducks Unlimited sites, etc.)	Q11_r2=1	Q11_r2=2	Q11_r2=3	Q11_r2=4	Q11_r2=5	Q11_r2=6
Vacant Crown land	Q11_r3=1	Q11_r3=2	Q11_r3=3	Q11_r3=4	Q11_r3=5	Q11_r3=6
Heritage Rangelands	Q11_r4=1	Q11_r4=2	Q11_r4=3	Q11_r4=4	Q11_r4=5	Q11_r4=6
Wildland Parks	Q11_r5=1	Q11_r5=2	Q11_r5=3	Q11_r5=4	Q11_r5=5	Q11_r5=6
Natural Areas	Q11_r6=1	Q11_r6=2	Q11_r6=3	Q11_r6=4	Q11_r6=5	Q11_r6=6
Provincial Recreations Areas (e.g. Blue Rapids, Cooking Lake-Blackfoot, Fickle Lake, Lakeland, North Bruderheim, Redwater, Sulphur Gates, and Wapiabi)	Q11_r7=1	Q11_r7=2	Q11_r7=3	Q11_r7=4	Q11_r7=5	Q11_r7=6
Public Grazing Leases	Q11_r8=1	Q11_r8=2	Q11_r8=3	Q11_r8=4	Q11_r8=5	Q11_r8=6
Provincial Grazing Reserves	Q11_r9=1	Q11_r9=2	Q11_r9=3	Q11_r9=4	Q11_r9=5	Q11_r9=6
Provincial Farm Development Leases	Q11_r10=1	Q11_r10=2	Q11_r10=3	Q11_r10=4	Q11_r10=5	Q11_r10=6
Public Land Use Zones	Q11_r11=1	Q11_r11=2	Q11_r11=3	Q11_r11=4	Q11_r11=5	Q11_r11=6
Camp Wainwright	Q11_r12=1	Q11_r12=2	Q11_r12=3	Q11_r12=4	Q11_r12=5	Q11_r12=6
Municipal land	Q11_r13=1	Q11_r13=2	Q11_r13=3	Q11_r13=4	Q11_r13=5	Q11_r13=6
Irrigation District land	Q11_r14=1	Q11_r14=2	Q11_r14=3	Q11_r14=4	Q11_r14=5	Q11_r14=6

Q12

Q12

	Not at all a problem	Slight problem	Moderate problem	Severe problem	Very severe problem	Does not apply
How much of a problem is obtaining contact information for land holders in	Q12_r1=1	Q12_r1=2	Q12_r1=3	Q12_r1=4	Q12_r1=5	Q12_r1=6

order to request access to lands?						
How much of a problem is it for you to request permission to access hunting areas?	Q12_r2=1	Q12_r2=2	Q12_r2=3	Q12_r2=4	Q12_r2=5	Q12_r2=6
How much of a problem is gaining access to hunting areas?	Q12_r3=1	Q12_r3=2	Q12_r3=3	Q12_r3=4	Q12_r3=5	Q12_r3=6
In terms of maintaining your participation in [Script] hunting, how much of a problem is the amount of effort required to access hunting lands?	Q12_r4=1	Q12_r4=2	Q12_r4=3	Q12_r4=4	Q12_r4=5	Q12_r4=6

Back Next

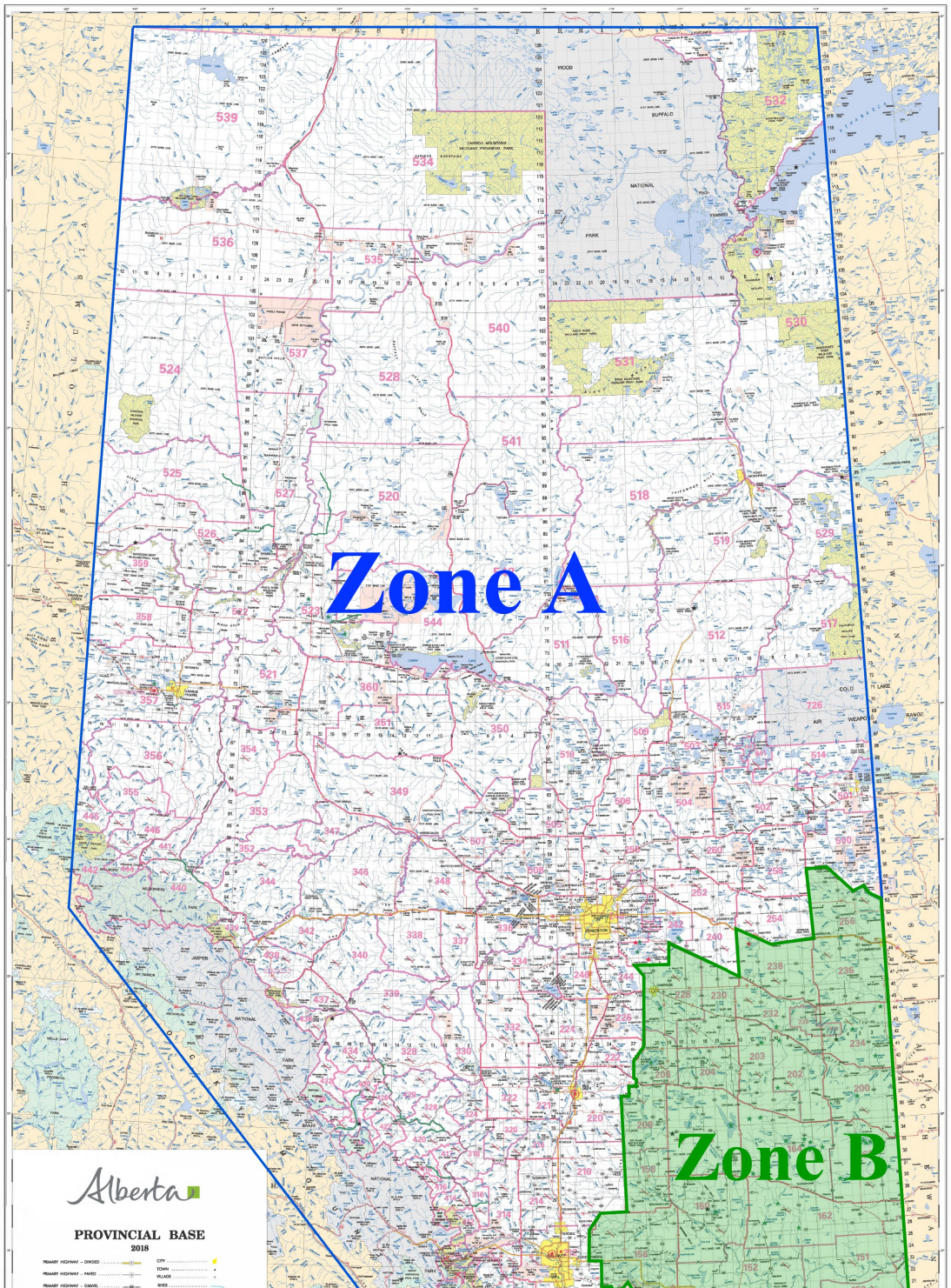
0% 100%

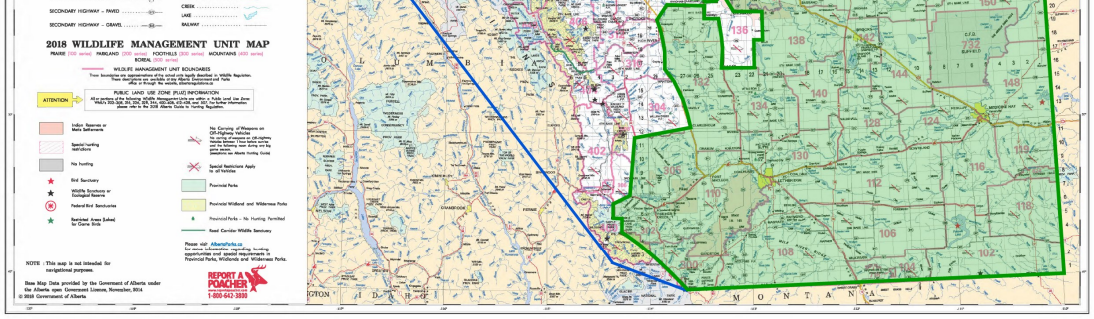
Q13A

Q13

Over the last 5 years, where did you hunt sharp-tailed grouse most often?

	Never	Rarely	Sometimes	Most of the time	Always
Zone A	Q13A_r1=1 ○	Q13A_r1=2 ○	Q13A_r1=3 ○	Q13A_r1=4 ○	Q13A_r1=5 ○
Zone B	Q13A_r2=1 ○	Q13A_r2=2 ○	Q13A_r2=3 ○	Q13A_r2=4 ○	Q13A_r2=5 ○





Back Next

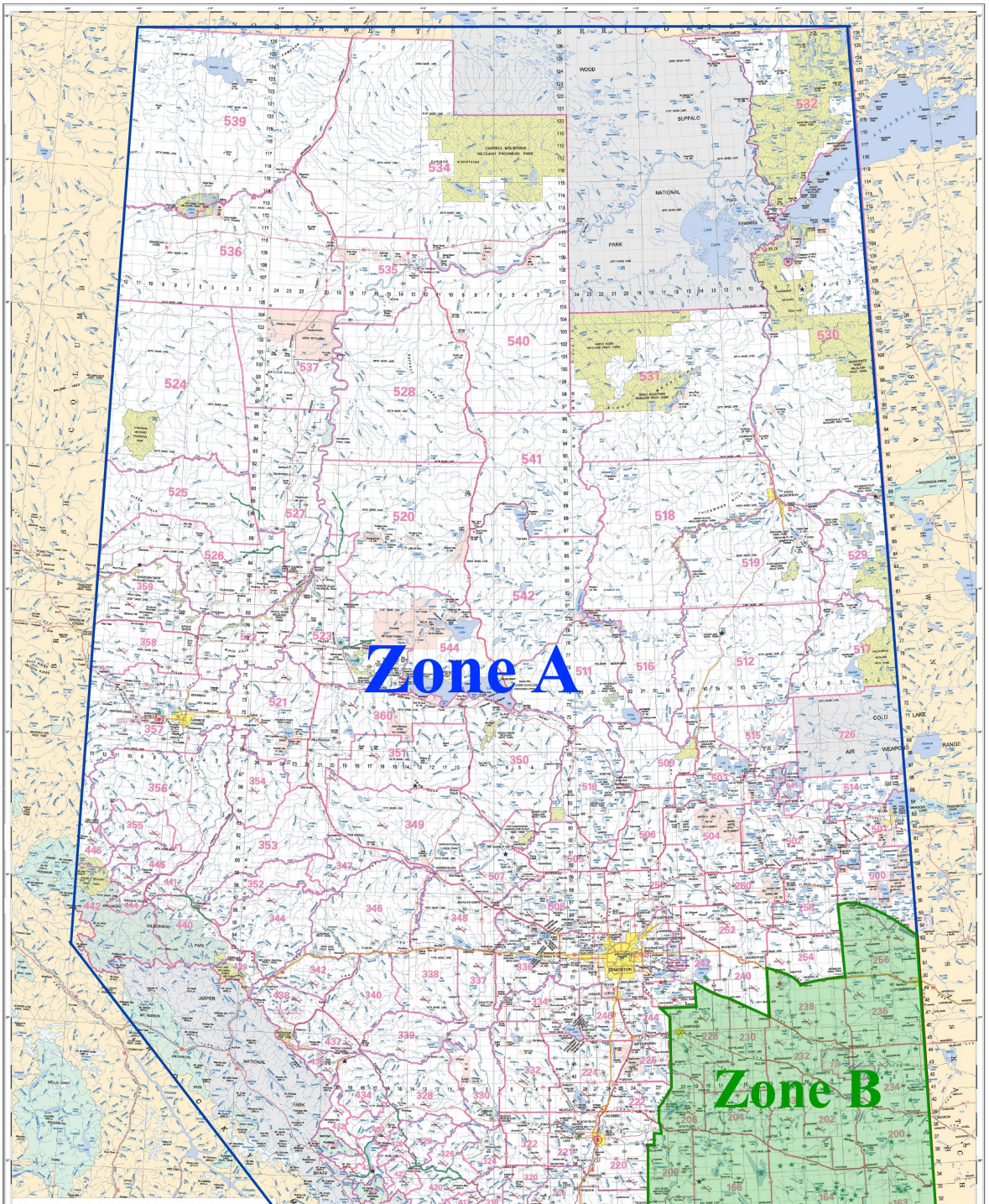
0% 100%

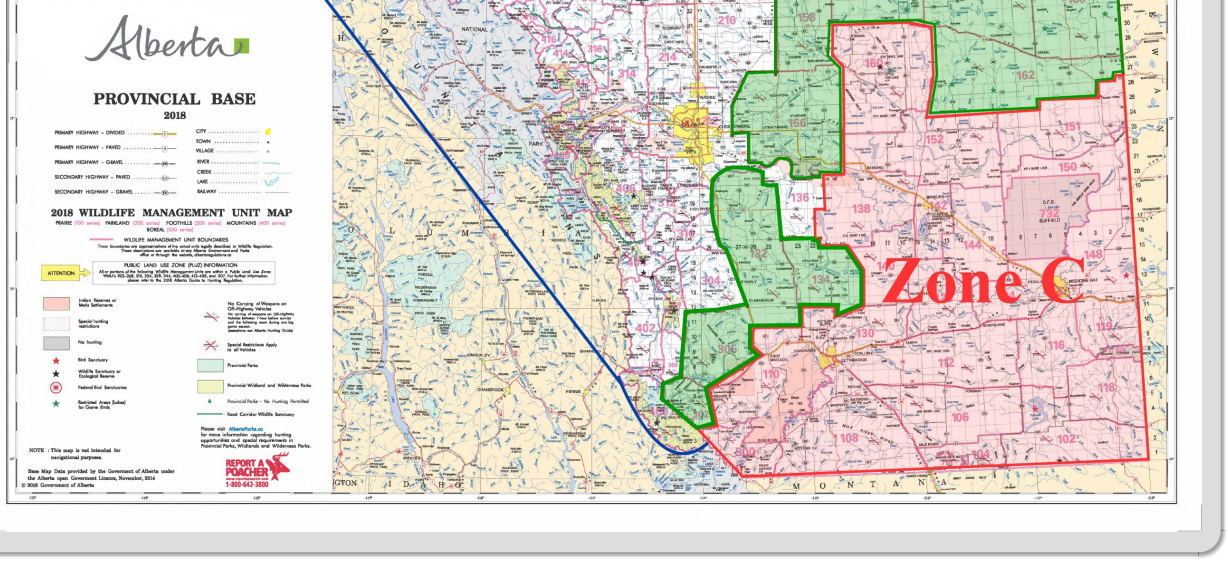
Q13B

Q13

Over the last 5 years, where did you hunt gray partridge most often?

	Never	Rarely	Sometimes	Most of the time	Always
Zone A	Q13B_r1=1 ◯	Q13B_r1=2 ◯	Q13B_r1=3 ◯	Q13B_r1=4 ◯	Q13B_r1=5 ◯
Zone B	Q13B_r2=1 ◯	Q13B_r2=2 ◯	Q13B_r2=3 ◯	Q13B_r2=4 ◯	Q13B_r2=5 ◯
Zone C	Q13B_r3=1 ◯	Q13B_r3=2 ◯	Q13B_r3=3 ◯	Q13B_r3=4 ◯	Q13B_r3=5 ◯





Back Next

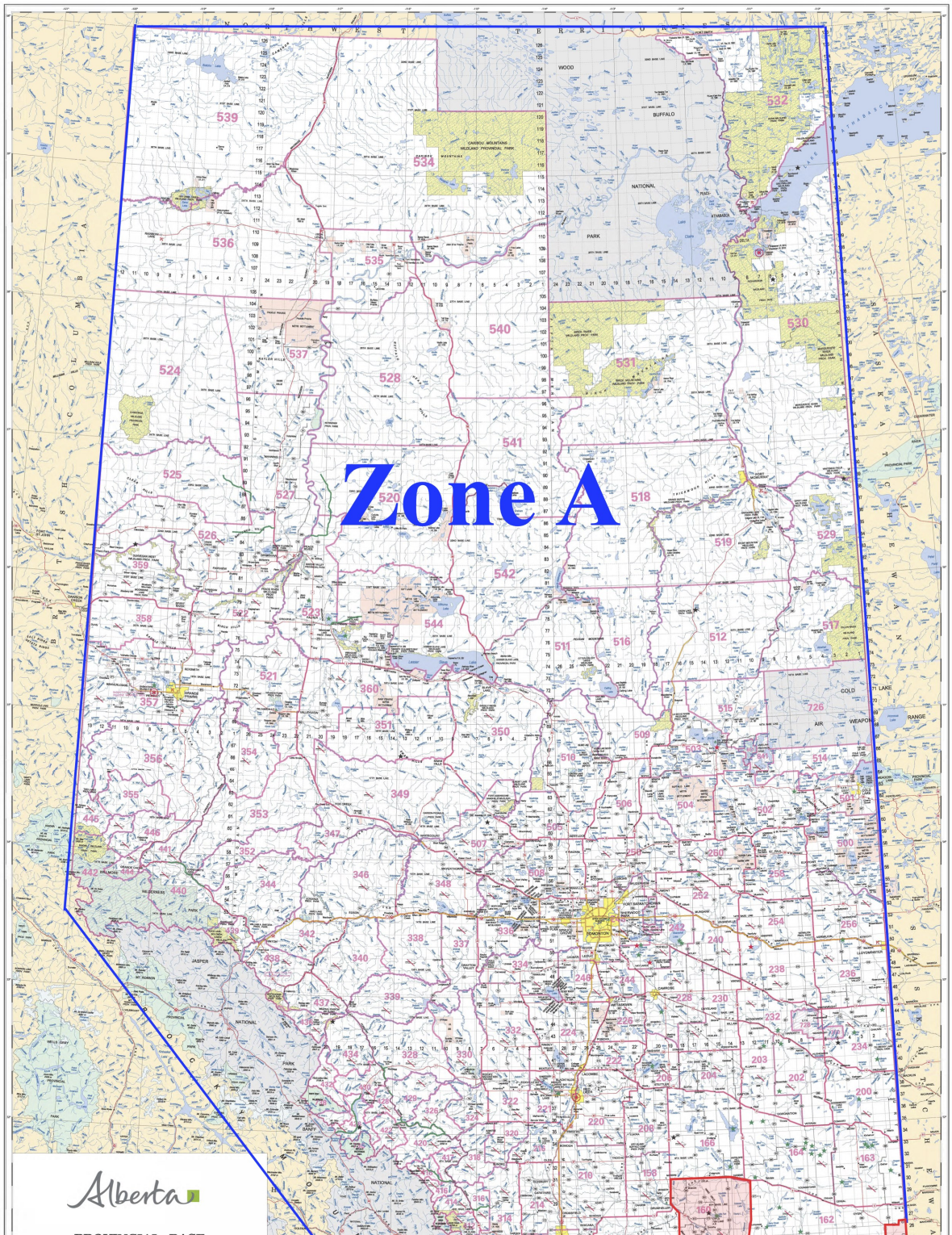
0% 100%

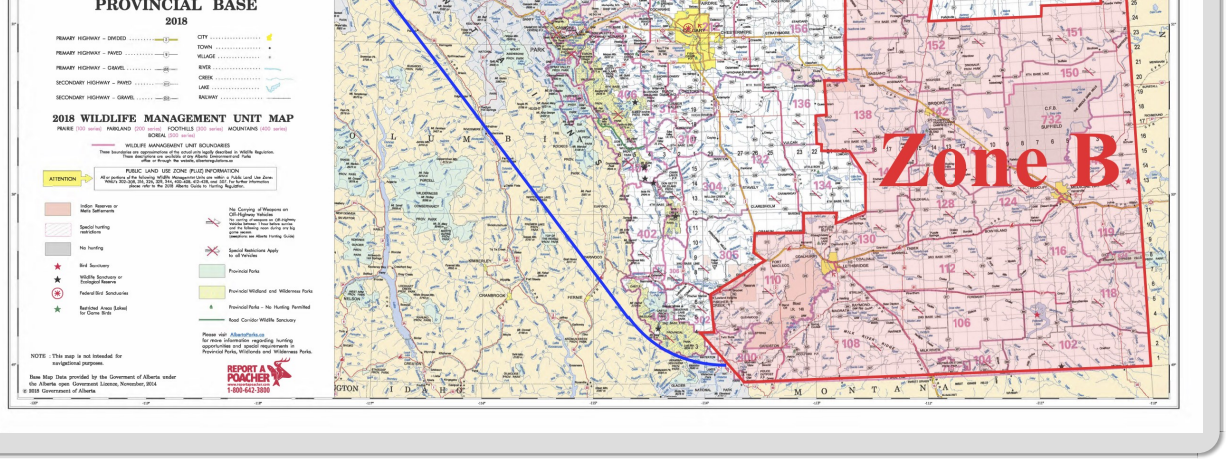
Q13C

Q13

Over the last 5 years, where did you hunt [Script] most often?

	Never	Rarely	Sometimes	Most of the time	Always
Zone A	Q13C_r1=1 ○	Q13C_r1=2 ○	Q13C_r1=3 ○	Q13C_r1=4 ○	Q13C_r1=5 ○
Zone B	Q13C_r2=1 ○	Q13C_r2=2 ○	Q13C_r2=3 ○	Q13C_r2=4 ○	Q13C_r2=5 ○





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Q14

Q14

When the bird is on the GROUND, how confident are you in identifying these game birds?

	Not at all confident	Slightly confident	Somewhat confident	Moderately confident	Extremely confident
Sharp-tailed grouse	Q14_r1=1	Q14_r1=2	Q14_r1=3	Q14_r1=4	Q14_r1=5
Gray partridge	Q14_r2=1	Q14_r2=2	Q14_r2=3	Q14_r2=4	Q14_r2=5
Ring-necked pheasant	Q14_r3=1	Q14_r3=2	Q14_r3=3	Q14_r3=4	Q14_r3=5
Ruffed grouse	Q14_r4=1	Q14_r4=2	Q14_r4=3	Q14_r4=4	Q14_r4=5
Male versus female ring-necked pheasant	Q14_r5=1	Q14_r5=2	Q14_r5=3	Q14_r5=4	Q14_r5=5
Sharp-tailed grouse versus female ring-necked pheasant	Q14_r6=1	Q14_r6=2	Q14_r6=3	Q14_r6=4	Q14_r6=5

Q15

Q15

When the bird is in FLIGHT, how confident are you in identifying these game birds?

	Not at all confident	Slightly confident	Somewhat confident	Moderately confident	Extremely confident
Sharp-tailed grouse	Q15_r1=1	Q15_r1=2	Q15_r1=3	Q15_r1=4	Q15_r1=5
Gray partridge	Q15_r2=1	Q15_r2=2	Q15_r2=3	Q15_r2=4	Q15_r2=5
Ring-necked pheasant	Q15_r3=1	Q15_r3=2	Q15_r3=3	Q15_r3=4	Q15_r3=5
Ruffed grouse	Q15_r4=1	Q15_r4=2	Q15_r4=3	Q15_r4=4	Q15_r4=5
Male versus female ring-necked pheasant	Q15_r5=1	Q15_r5=2	Q15_r5=3	Q15_r5=4	Q15_r5=5
Sharp-tailed grouse versus female ring-necked pheasant	Q15_r6=1	Q15_r6=2	Q15_r6=3	Q15_r6=4	Q15_r6=5

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Q16

Q16

Which of the following statements best describes your participation in [Script] hunting?

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Does not apply
I feel I am more skilled in [Script] hunting than other [Script] hunters.	Q16_r1=1	Q16_r1=2	Q16_r1=3	Q16_r1=4	Q16_r1=5	Q16_r1=6
I have one or more specialized firearms/archery equipment for [Script] hunting.	Q16_r2=1	Q16_r2=2	Q16_r2=3	Q16_r2=4	Q16_r2=5	Q16_r2=6
I have clothing, footwear, and other equipment so I can hunt upland game birds.	Q16_r3=1	Q16_r3=2	Q16_r3=3	Q16_r3=4	Q16_r3=5	Q16_r3=6
I keep a dog trained for [Script] hunting.	Q16_r4=1	Q16_r4=2	Q16_r4=3	Q16_r4=4	Q16_r4=5	Q16_r4=6
I have purchased a truck or Off-Road-Vehicle with the idea of going [Script] hunting.	Q16_r5=1	Q16_r5=2	Q16_r5=3	Q16_r5=4	Q16_r5=5	Q16_r5=6
I find a lot of my life is organized around [Script] hunting during the hunting season.	Q16_r6=1	Q16_r6=2	Q16_r6=3	Q16_r6=4	Q16_r6=5	Q16_r6=6
[Script] hunting is very important to me.	Q16_r7=1	Q16_r7=2	Q16_r7=3	Q16_r7=4	Q16_r7=5	Q16_r7=6
I live where I do because it is easier for me to hunt [Script].	Q16_r8=1	Q16_r8=2	Q16_r8=3	Q16_r8=4	Q16_r8=5	Q16_r8=6
I hunt upland game birds in the late season (November - January).	Q16_r9=1	Q16_r9=2	Q16_r9=3	Q16_r9=4	Q16_r9=5	Q16_r9=6
I hunt [Script] when scouting, travelling to, or taking a break from hunting waterfowl or big game.	Q16_r10=1	Q16_r10=2	Q16_r10=3	Q16_r10=4	Q16_r10=5	Q16_r10=6
Because of [Script] hunting, I don't have time to spend on other fun/leisure activities during the hunting season.	Q16_r11=1	Q16_r11=2	Q16_r11=3	Q16_r11=4	Q16_r11=5	Q16_r11=6
If I stopped [Script] hunting, I would probably loose touch with a lot of my friends.	Q16_r12=1	Q16_r12=2	Q16_r12=3	Q16_r12=4	Q16_r12=5	Q16_r12=6
Most of my friends are in some way connected to [Script] hunting.	Q16_r13=1	Q16_r13=2	Q16_r13=3	Q16_r13=4	Q16_r13=5	Q16_r13=6
I hunt [Script] to spend quality time with my dog(s).	Q16_r14=1	Q16_r14=2	Q16_r14=3	Q16_r14=4	Q16_r14=5	Q16_r14=6
I hunt [Script] to spend quality time with friends and/or family.	Q16_r15=1	Q16_r15=2	Q16_r15=3	Q16_r15=4	Q16_r15=5	Q16_r15=6
I hunt [Script] to obtain wild meat.	Q16_r16=1	Q16_r16=2	Q16_r16=3	Q16_r16=4	Q16_r16=5	Q16_r16=6

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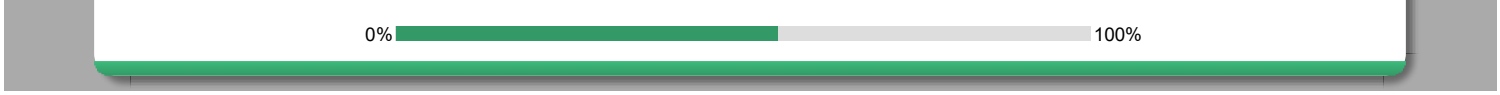
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Q17

Q17

The following questions ask about how you judge the success of your [Script] hunts.

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Does not apply
I judge the success of my hunt based on the number [Script] I SHOOT.	Q17_r1=1	Q17_r1=2	Q17_r1=3	Q17_r1=4	Q17_r1=5	Q17_r1=6
I judge the success of my hunt based on the number of [Script] I SEE.	Q17_r2=1	Q17_r2=2	Q17_r2=3	Q17_r2=4	Q17_r2=5	Q17_r2=6
I judge the success of my hunt based on how well my dog performs based on its training.	Q17_r3=1	Q17_r3=2	Q17_r3=3	Q17_r3=4	Q17_r3=5	Q17_r3=6
A [Script] hunt is successful if one bird is shot.	Q17_r4=1	Q17_r4=2	Q17_r4=3	Q17_r4=4	Q17_r4=5	Q17_r4=6
A successful hunt is one where I have gotten exercise.	Q17_r5=1	Q17_r5=2	Q17_r5=3	Q17_r5=4	Q17_r5=5	Q17_r5=6

Q18

Q18

I go [Script] hunting to...

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Hunt with a dog	Q18_r1=1	Q18_r1=2	Q18_r1=3	Q18_r1=4	Q18_r1=5
Spend time with friends and/or family	Q18_r2=1	Q18_r2=2	Q18_r2=3	Q18_r2=4	Q18_r2=5
Get outdoors and enjoy nature	Q18_r3=1	Q18_r3=2	Q18_r3=3	Q18_r3=4	Q18_r3=5
Get away from every day life	Q18_r4=1	Q18_r4=2	Q18_r4=3	Q18_r4=4	Q18_r4=5
Spend time around wildlife	Q18_r5=1	Q18_r5=2	Q18_r5=3	Q18_r5=4	Q18_r5=5
Obtain wild meat	Q18_r6=1	Q18_r6=2	Q18_r6=3	Q18_r6=4	Q18_r6=5
Get exercise	Q18_r7=1	Q18_r7=2	Q18_r7=3	Q18_r7=4	Q18_r7=5

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Q19

Q19

When hunting [Script] in Alberta, how satisfied have you been with ...

	Very dissatisfied	Dissatisfied	Neutral	Somewhat satisfied	Very satisfied
The number of [Script] you see.	Q19_r1=1	Q19_r1=2	Q19_r1=3	Q19_r1=4	Q19_r1=5
The number of [Script] you shoot.	Q19_r2=1	Q19_r2=2	Q19_r2=3	Q19_r2=4	Q19_r2=5
The number of days in the [Script] hunting season.	Q19_r3=1	Q19_r3=2	Q19_r3=3	Q19_r3=4	Q19_r3=5
The number of [Script] in the daily bag limit.	Q19_r4=1	Q19_r4=2	Q19_r4=3	Q19_r4=4	Q19_r4=5
The number of [Script] in the possession limit.	Q19_r5=1	Q19_r5=2	Q19_r5=3	Q19_r5=4	Q19_r5=5
The distance you travel to hunt [Script].	Q19_r6=1	Q19_r6=2	Q19_r6=3	Q19_r6=4	Q19_r6=5
The natural setting that you hunt [Script].	Q19_r7=1	Q19_r7=2	Q19_r7=3	Q19_r7=4	Q19_r7=5
The number of other hunters you see while hunting [Script].	Q19_r8=1	Q19_r8=2	Q19_r8=3	Q19_r8=4	Q19_r8=5
On-site accessibility of the area you hunt [Script].	Q19_r9=1	Q19_r9=2	Q19_r9=3	Q19_r9=4	Q19_r9=5
Opportunities to exercise while hunting.	Q19_r10=1	Q19_r10=2	Q19_r10=3	Q19_r10=4	Q19_r10=5
The overall [Script] hunting experience.	Q19_r11=1	Q19_r11=2	Q19_r11=3	Q19_r11=4	Q19_r11=5

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Q20

Q20

When wildlife managers consider changes to hunting regulations, trade-offs are often required. We are interested in which hunting regulation factors are most important to you.

Thinking about a satisfying [Script] hunt, order the hunting regulation factors from most important(1) to least important(5) using drag and drop.

Q20_4 The number of [Script] I can keep in my residence (possession limit).

Q20_5 [Script] hunting season overlap with other species' hunting seasons (season timing).

Q20_1 The number of [Script] I can shoot in a day (daily bag limit).

Q20_3 The November to January hunting season (late season).

Q20_2 The number of days open to hunting (hunting season length).

Q21

Q21

When hunting [Script], which habitats do you hunt most often?

	Never	On at least one of my hunts	Occassionally on my hunts	Most of my hunts	Every time I hunted
Row agricultural croplands	Q21_r1=1	Q21_r1=2	Q21_r1=3	Q21_r1=4	Q21_r1=5
Grasslands	Q21_r2=1	Q21_r2=2	Q21_r2=3	Q21_r2=4	Q21_r2=5
Shrub and grasslands	Q21_r3=1	Q21_r3=2	Q21_r3=3	Q21_r3=4	Q21_r3=5
Conifer forests	Q21_r4=1	Q21_r4=2	Q21_r4=3	Q21_r4=4	Q21_r4=5
Wetland/riparian areas	Q21_r5=1	Q21_r5=2	Q21_r5=3	Q21_r5=4	Q21_r5=5
Mixed deciduous and coniferous forests	Q21_r6=1	Q21_r6=2	Q21_r6=3	Q21_r6=4	Q21_r6=5

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Q22

Q22

We are interested in how all upland game bird hunters take part in hunting Provincial Pheasant Release Sites. In areas of the province where the climate is not suitable for pheasants to live year-round and sustain wild populations, pheasant hunting relies on put-and-take hunting. This includes the 42 pheasant release sites and other farm-raised-and-released hunting sites. When hunting one of these sites, a satisfying pheasant hunt is one that I can....

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Does not apply
Harvest a pheasant	Q22_r1=1 ○	Q22_r1=2 ○	Q22_r1=3 ○	Q22_r1=4 ○	Q22_r1=5 ○	Q22_r1=6 ○
See a pheasant	Q22_r2=1 ○	Q22_r2=2 ○	Q22_r2=3 ○	Q22_r2=4 ○	Q22_r2=5 ○	Q22_r2=6 ○
Know an opportunity exists to harvest a pheasant	Q22_r3=1 ○	Q22_r3=2 ○	Q22_r3=3 ○	Q22_r3=4 ○	Q22_r3=5 ○	Q22_r3=6 ○
Get outdoors	Q22_r4=1 ○	Q22_r4=2 ○	Q22_r4=3 ○	Q22_r4=4 ○	Q22_r4=5 ○	Q22_r4=6 ○
Spend quality time with friend(s) and/or family	Q22_r5=1 ○	Q22_r5=2 ○	Q22_r5=3 ○	Q22_r5=4 ○	Q22_r5=5 ○	Q22_r5=6 ○
Spend quality time with a dog	Q22_r6=1 ○	Q22_r6=2 ○	Q22_r6=3 ○	Q22_r6=4 ○	Q22_r6=5 ○	Q22_r6=6 ○

Q23

Q23

When participating in a put-and-take pheasant hunt, if there was a hunting season where both FEMALE AND MALE pheasants could be shot, would you hunt...

Q23=1 ○ Both female and male pheasants

Q23=2 ○ Female pheasants

Q23=3 ○ Male pheasants

Q23=4 ○ No preference

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DemoIntro

To help us compare your responses to those of others, we have some questions about you. Please be assured that all your answers will remain completely confidential.

Q24

Q24

When hunting in Alberta are you a ...

Q24=1 ◯ Resident hunter

Q24=2 ◯ Non-resident (Canadian) hunter

Q24=3 ◯ Non-resident Alien hunter

Q24=4 ◯ Q24_4_other Other

Q25

Q25

How old are you?

Q26

Q26

What is your gender?

Q27

Q27

What is the highest level of education that you have achieved?

Q27=1 ◯ Some high school

Q27=2 ◯ High school

Q27=3 ◯ Some university/college

Q27=4 ◯ University/college

Q27=5 ◯ Graduate degree

Q27=6 ◯ Q27_6_other Other

Q28

Q28

Please check the category that best describes your household income before taxes last year.

Q28=1 ◯ less than $49,999

Q28=2 ◯ $50,000 to $99,999

Q28=3 ◯ $100,000 to $150,000

Q28=4 ◯ over $150,000

Q28=5 ◯ I'd prefer not to say.

Q29

Q29

Which category best describes the place where you live?

- Q29=1 ◯ Rural area (population less than 2,000)
- Q29=2 ◯ Small town (population between 2,000 and 9,999)
- Q29=3 ◯ Small city (population between 10,000 and 49,999)
- Q29=4 ◯ Medium urban area (population between 50,000 and 499,999)
- Q29=5 ◯ Large urban centre (population 500,000 or more)

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Comments

Please use this space for any additional comments you would like to provide about upland game bird hunting in Alberta.

Contact

To enter the draw to win one of five $100 Cabelas Gift Cards. Please provide your first name and email address below. Your name and email will be deleted immediately following the distribution of the gift cards.

First name:	Contact_r1_c1	
Email:	Contact_r2_c1	

LaterContact

If you would be interested in participating in a follow-up interview or survey about your hunting experiences in the future, please enter your contact information above and check the box below.

LaterContact_1 ☐ Yes, you can contact me about future hunting research opportunities.

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Thankyou

Thank you for your time and effort. We appreciate your support and interest in the study. Click the next button to complete the survey. Please check this link in the summer of 2020 for results. www.hd-research.ca/current-research/alberta-upland-game-bird-hunter-study/

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Nonhunter

We appreciate your interest in the study. Our questions are about current ring-necked pheasant, gray partridge and sharp-tailed grouse hunters, so at this time we are only requesting input from these hunters. Take care and happy hunting.

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Finish

Note:

When respondents take the survey in regular mode this page will not be displayed. Respondents will be redirected to the link below:

https://www.hd-research.ca/current-research/alberta-upland-game-bird-hunter-study/

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Appendix D. Ethics Approval

Notification of Approval

Date:	August 7, 2019
Study ID:	Pro00093026
Principal Investigator:	Eric Smith
Study Supervisor:	Howard Harshaw
Study Title:	**Upland game bird hunter satisfaction in Alberta, Canada: How do recreation specialization, species hunted, value orientations and hunting regulations influence satisfaction?**
Approval Expiry Date:	August 6, 2020
Sponsor/Funding Agency:	SSHRC - Social Sciences and Humanities Research Council SSHRC

RSO-Managed Funding:

Project ID	Project Title	Speed Code	Other Information
RES0033980	Refining the recreation specialization framework to account for social networks and environmental worldviews: Implications for understanding recreation preferences.	ZI657	

Thank you for submitting the above study to the Research Ethics Board 2. Your application has been reviewed and approved on behalf of the committee.

Any proposed changes to the study must be submitted to the REB for approval prior to implementation.

A renewal report must be submitted next year prior to the expiry of this approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the Research Ethics Board does not encompass authorization to access the staff, students, facilities or resources of local institutions for the purposes of the research.

Sincerely,

Ubaka Ogbogu, LLB, BL, LLM, SJD
Chair, Research Ethics Board 2

Note: This correspondence includes an electronic signature (validation and approval via an online system).