

**A Review of British Columbia's Limited Entry Hunting System:  
Examining Resident Hunter Satisfaction and Limited Entry  
Hunting's impact upon Recruitment and Retention**

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**Conducted on behalf of the British Columbia Conservation Foundation by**

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## Executive Summary

The resident hunter population in British Columbia declined nearly 50% between 1981 and 2006. During the same period the number of Limited Entry Hunting authorizations increased almost 165%. The intent of this review was to identify and measure factors which affect resident hunter satisfaction, participation, recruitment and retention through the Limited Entry Hunting system in British Columbia. The Limited Entry Hunting system allocates hunting opportunities through a random draw when hunter demand exceeds wildlife availability.

Public consultation was conducted through focus groups and email feedback, to establish factors relating to satisfaction and motivations in regards to hunting, limited entry hunts and the limited entry draw. Statistical significance was added through a random sample of hunters who purchased a basic resident hunting license in 2006, via a mail-out survey (B=3.75%).

Survey respondents identified themselves as meat hunters (35.8%), meat, then selective (43.5%), selective (18.8%) and trophy (1.9%).

Respondents indicate they apply for a limited entry hunt due to the potential of success, knowledge of the area, few hunters in the area, traditional hunting area and the ability to hunt other species on general open season. The potential to harvest a trophy was not a significant factor for the majority of respondents.

Significant factors that positively relate to the hunting experience include getting out in the wilderness, the opportunity to harvest a legal animal and spending time with friends and family. The opportunity to harvest a trophy was the least important factor.

Longer antler/horn restricted hunts and general open seasons are preferable to shorter general open seasons. It appears hunters do not enjoy shorter general open seasons due to crowding and perceived ethics issues.

Overall, 59.8% of respondents indicated they are not satisfied with the current Limited Entry Hunting system. Resident hunters believe their chances of being drawn should increase every year; the draw isn't fair; others are drawn repeatedly; and that they never get drawn. In addition to the current system, three other draw systems (points, pool, priority) were evaluated based on feedback from the survey and their suitability given the constraints of supply and demand. There is no single type of draw which will solve the issues expressed in the survey. It appears that a points system, whereby applicants are awarded a point, or points are increased exponentially, every year they are unsuccessful in the draw, will mediate dissatisfaction with the draw; however, there is no guarantee as there is in a priority style draw. Changes to the type of draw will not increase participation or opportunity.

Managers have employed several tools which reduce participation, opportunity and harvest. To increase participation where maximum utilization occurs shared hunts, which are currently only used for moose, should be expanded particularly for species such as elk, buffalo and deer. The concept of guaranteed group size, split seasons and balancing odds with participation rates by

offering opportunities inside and outside periods of high success rates have also been recommended to increase participation where maximum utilization occurs.

Several limited entry hunts were found where resident hunters do not achieve allocated harvest. Resident hunter opportunity and harvest has been artificially limited in several hunts, particularly for grizzly bear, goat and sheep. 6 of 17 hunts which allowed analysis will likely result in maximum utilization. For maximum utilization to occur in the other 11 hunts another ~1,844 additional LEH authorizations are required. Managers avoid risk as opposed to managing it. Allocation spreadsheets, which show the number of authorizations to achieve the allocated harvest, vary greatly and often lack relevant data. Accountability and transparency needs to be improved at a regional and provincial level. Adoption of and compliance with the *Provincial Harvest Allocation Policy* varies throughout the Province. This has resulted in a significant loss of resident hunter opportunity through the Limited Entry Hunting system. According to the Allocation Policy this under-utilization will result in a decreased share of wildlife for resident hunters in 2012 as their share of wildlife will be transferred to non-residents. A generic spreadsheet to ensure resident allocation will be met has been recommended as well as development of a risk analysis tool.

Wildlife management policies, the *Limited Entry Hunting Policy* and procedures intent and application are not consistent. There has been a shift towards the use of Limited Entry Hunting from General Open Seasons. General Open Seasons as well as Limited Entry Hunts have shifted towards the production of a larger male component of wildlife. It appears trophy hunters make up less than 2% of the population; however, hunting regulations cater to hunters who are looking to harvest more mature animals. Changes in regulations sometimes have little to do with wildlife conservation and have been detrimental to resident hunter opportunity, participation, recruitment and retention. In some cases hunting regulations are not consistent with provincial wildlife harvest strategies. Wildlife management strategies and sex ratios are much higher than those required for population conservation which limits resident hunter opportunity, participation and harvest. Maximum sustainable harvest, given budgetary constraints, has been recommended.

The consultation system is a bottom up approach but may not be representative of the resident hunter population. Consultation is conducted through local fish and game clubs and generally only locals are able to provide feedback. Consultation is often not based on wildlife management, but hunter management, an outcome based qualitative exercise. Resident hunters who are consulted often decide on hunting regulations not management regimes. Hunter education in regards to wildlife management appears to be low. Weighting given to different wildlife stakeholders is not expressed and is another qualitative measure. The consultation system should be reflective of the resident hunter population and if hunters are to be decision makers they should be properly educated before hand.

Limited Entry Hunting is not a tool that encourages resident hunter opportunity, participation, recruitment and retention. It is a tool that breaks up hunting parties and destroys the social factors which are fundamental to the future of hunting. It is one of several tools which can be used to reduce harvest and should be used as a last resort.

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## **Glossary**

Limited Entry Hunting (LEH): A tool for wildlife management which limits the number of hunters who may participate in a give hunt to limit the harvest of wildlife where conservation concerns exist.

Limited Entry Hunting system: a system by which hunting opportunities are awarded to resident hunters based on a lottery, or random draw.

Wildlife Management Region (WMR): Sub region within the Province of British Columbia. The Province is divided into 9 wildlife Management Regions.

Management unit (MU): Sub region within a wildlife management region.

Resident hunter: Someone who purchased a basic resident hunting license in a given year.

Resident hunter number card (RHNC): A British Columbia Resident Hunter Number Card is required in order to participate in the LEH draw, purchase hunting and species' licenses in British Columbia. Completion of a hunter safety training course is the primary requirement in advance of obtaining a hunter number.

## **Abbreviations**

BC, British Columbia

MoE, Ministry of Environment

F&W Branch, Fish and Wildlife Branch

GOS, General Open Season

LEH system, Limited Entry Hunting system

CORE, Conservation Outdoor Recreation Education

GARMS, Government Agent Revenue Management System

RHNC, Resident Hunter Number Card

WMR, Wildlife Management Region

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## Chapter 1 Introduction

The British Columbia (BC) Limited Entry Hunting (LEH) system is a lottery which allocates hunting opportunity to ensure a controlled harvest for species in areas where conservation concerns exist. The impact of LEH on the resident hunter population of BC has not been reviewed nor has hunter satisfaction as it relates to the system. The resident hunter population in British Columbia has declined and aged drastically since the 1980s; the impact upon conservation efforts and funds generated for the BC Ministry of Environment (MoE) and the Habitat Conservation Trust Foundation are measurable. The goal of the LEH review is to identify and understand the factors that relate to resident hunter recruitment, retention, participation and satisfaction.

### **1.1 Background**

LEH was implemented as a means of controlling harvest in areas where conservation concerns existed. It is a random draw system which seeks to achieve allocated harvest goals by the resident hunter population as set out by wildlife managers (BC MoE, 2004, July). LEH has evolved over time; in 1974 the system consisted of a simple random draw with 163 applications (BC MoE, 1988, p.1). Today, applications exceed 150,000 and the system now includes enhanced odds, shared hunts and group hunts (BC MoE, 2004, July, p.1).

Approximately 70,000 individuals with resident hunter number cards (RHNCs) submit applications to participate in the LEH draw (Thornton, personal communication, 2007, September). Applicants do not require a valid hunting license or species license to apply for an LEH hunt, nor are they required to purchase either if successful in the draw. The resident hunter population in BC has plummeted from a high of 174,001 in 1981 to 89,532 in 2006 (BC MoE, 2007a, June). During this 25 year period LEH authorizations increased from 12,476 in 1981 to 32,972 in 2006 (BC MoE, 2007a, p.1). During this period the resident hunter population declined by 49%, hunting regulations became more restrictive, several hunts were removed from General Open Season (GOS) and the number of LEH authorizations increased almost 165%.

Several different lottery hunting systems are employed across North America, most of which have some form of time-related, preference-type system. BC's current LEH system may be criticized by some of its participants (BC MoE, 2006, March). Resident hunter satisfaction as it relates to the LEH system is important; however, LEH's effect on resident hunter participation, recruitment and retention is paramount.

## **1.2 Problem(s) & Objectives**

The original intent of the LEH review, per request for proposal, was to measure resident hunter satisfaction as it relates to the LEH system. There are several issues which have affected the resident hunter population and relate to LEH. Research objectives will measure more than satisfaction encompassing several factors associated with LEH.

*What are the most significant factors that affect resident hunter recruitment, retention, participation and satisfaction regarding the Limited Entry Hunting System in British Columbia?*

The specific objectives are:

1. To identify, understand and prioritize factors (social and regulatory) which affect resident hunter satisfaction within the Limited Entry Hunting system
2. To identify factors which affect resident hunter participation throughout the LEH process and system
3. To identify factors which affect hunter recruitment, retention, participation and satisfaction.

## **Chapter 2 Secondary Research**

This chapter identifies and examines different lottery-style systems and gives an overview of hunter recruitment and retention. While literature is available regarding hunter recruitment and retention, the perception and effects of BC's LEH System on resident hunters has not been studied. A brief overview of hunter recruitment and retention will allow understanding potential implications of a lottery-style system.

### ***2.1 Recruitment***

The greatest opportunity to recruit and retain new hunters exists through current hunters. The group with the highest recruitment and retention is sons under the age of 20 who are taken afield by their fathers. Recruitment often occurs even before hunters appear in government databases; to be recruited, hunters generally come from a hunting household with a strong and broad hunting related social support group. (Source: Boxall, McFarlane & Watson, 2001; Crews & Summers, 2003, June; Responsive Management, 2003; Brown, Decker, & Enck, 2000; Seng & Wentz, 2000, June; Zeman, 2006)

### ***2.2 Retention***

Retention is also related to the social support group; potential and current hunters must have both interest and social support. The dissolution of the social support group is often correlated to hunter turnover (Crews & Summers, 2003, June; Responsive Management, 2003). In 2006, Zeman found moving to LEH may contribute to the fragmentation or destruction of a hunting party. The social structure ties directly to the opportunity to hunt; without opportunity hunters cannot hunt and diminished opportunities, perceived or real, result in decreased participation (Zeman, 2006).

### ***2.3 Motivations***

In 2003 and 2004 a satisfaction questionnaire was distributed by the MoE to survey resident hunter and angler satisfaction. The leading motivation was obtaining game meat, followed by

being close to nature, getting away from day to day activity and the company of partners and family (BC MoE, 2005a, p.6). Bagging a trophy was the most insignificant motivation to hunt; only 3% of respondents indicated bagging a trophy as their leading motivation (BC MOE, 2005, p.7). These factors may or may not relate to motivations when it comes to selecting LEH hunts.

### **Why do hunters apply for LEH hunts?**

Hunters' motivations in the US appear to differ from those in BC. From 1978 to 2005 hunters' motivations in the US have changed from obtaining meat to being much more of a recreation and social based activity (Responsive Management, 2005; Responsive Management, 1995; Heberlein & Willebrand, 1998; Kellert, 1978). For example, during 2003, hunting motivations in Pennsylvania were as follows: for the sport of recreation: 37%; to be with friends or family: 27%; to be close to nature: 15%; for relaxation: 12%; and the most insignificant was for meat: 11% (Responsive Management, 2004, p.8). There appears to be a marked difference in motivations and resulting potential management strategies between BC and the US. It is important to understand how these factors affect the hunting experience.

### **Which factors affect hunters hunting experience?**

## **2.4 Seasons & Hunters**

In 2006, Zeman identified 4 distinct types of hunters in Wildlife Management Region (WMR) 8, the Okanagan. The types of were: Meat hunters (37%), meat, then selective (41%), selective (18%), and trophy hunters (3%) (p.23). It was also found that antler-restrictions and trophy style management were significant deterrents which resulted in as much as a 62% decline in hunters numbers when a move from 3pt bull elk season to a 6pt bull elk season was instituted in 1999 (p.24). Overall 50% of hunters in WMR 8 found antler restrictions and 40% found the number of legal animals somewhat or extremely discouraging (p.23).

LEH was also found to be extremely discouraging: 71% of respondents found moving from GOS to LEH somewhat to extremely discouraging, and 63% found the LEH System somewhat or extremely discouraging (p.23). This may be linked to hunters' fidelity to a hunting area/species

and the opportunity to hunt annually. Measuring and understanding hunter satisfaction and perception of the LEH System is important.

### **Are hunters satisfied with the current LEH System?**

While hunters prefer a lengthy unlimited hunting season, success and opportunity are often inversely related when conservation concerns exist. In some situations wildlife populations cannot sustain a lengthy GOS, and the resulting tools which can be used include access restrictions, shorter GOSs, antler/horn restrictions and/or LEH.

### **What kind of opportunity do residents prefer?**

#### **2.4.1 Opportunity and the LEH System**

Opportunity through the LEH System is managed by ensuring a controlled harvest. According to Bill Otway, a member of the committee representing the British Columbia Wildlife Federation (BCWF), LEH was promoted as an opportunity which allowed for a controlled harvest where conservation concerns exist and successful applicants could make plans in advance with flexibility (Otway, 2007, April). Wildlife management prior to LEH was short seasons, high participation and over-crowding issues, apparently disliked by both hunters and managers.

The distribution of LEH hunting opportunities to the resident hunter population is now completed through the *Harvest Allocation Policy*, implemented in 2007. The previous version of the policy was seldom implemented, and often resulted in inconsistent distribution of opportunity between user groups. The current policy seeks to “implement a decision-making *process* that is more objective, data-based, and amicable; and to determine allocation *outcomes* that are more achievable, efficient, and reflective of stakeholders’ interests.” (BC MoE, 2007b, ¶.11,12)

The procedure for calculating allocation begins with a distribution of 75% to resident hunters and 25% to non-resident hunters (BC MoE, 2007c, p.3). *Relative importance*, a form of demand, and *utilization*, past use of allocated harvest, for each user group is then calculated and results in the new allocation for each LEH species in each region. The policy is lengthy and complex. To

maximize resident hunter share of the resource and resulting opportunity through the LEH system resident hunters must:

1. Participate in the LEH draw
2. Purchase the applicable species license if successful in the draw
3. Participate in the hunt
4. Harvest the allocated share of animals

There are several regulatory effects which could affect both resident relative importance and utilization resulting in a decrease in residents’ share of the harvestable surplus.

**Is resident hunter opportunity and success through the LEH system being maximized?**

**2.5 Participation in the Hunt**

On a macro scale participation in the draw, purchasing a basic resident hunting license and a species license has implications to the *Allocation Policy* and can negatively impact the relative importance calculation. Historically, participation rates for grizzly bear, caribou, goat and sheep are extremely low (Table 2.1). This negatively affects resident allocation of the harvestable surplus. There may be opportunity to understand why hunters do not purchase a basic resident hunting license or a species license after being successful in the draw.

Participation Habits of Successful LEH Applicants 1997-2006					
SPECIES	SUCCESSFUL APPLICANTS	SUCCESSFUL APPLICANTS WHO PURCHASED SPECIES LICENSE	% OF SUCCESSFUL APPLICANTS WHO PURCHASED SPECIES LICENSE	SUCCESSFUL APPLICANTS WHO PURCHASED A BASIC RESIDENT LICENSE	% OF SUCCESSFUL APPLICANTS WHO PURCHASED A BASIC RESIDENT LICENSE
GRIZZLY	13,127	7,406	56.4%	12,026	91.6%
MOOSE	108,648	90,594	83.4%	97,772	90.0%
CARIBOU	1,489	734	49.3%	1,393	93.6%
GOAT	29,503	13,592	46.1%	27,344	92.7%
SHEEP	4,381	2,583	59.0%	4,103	93.7%
ELK	13,855	10,740	77.5%	12,830	92.6%
Total	171,003	125,649	73.5%	155,468	90.9%

(Source: BC MoE, 2007d, 1)

Table 2.1: Participation Habits of Successful LEH Applicants 1997-2006

## **Why do successful LEH applicants choose not to purchase a species license?**

### **2.6 Lottery Style Systems**

Lottery style hunting systems have been created throughout North America to allocate hunting opportunity where demand exceeds supply. Disbursement of these opportunities can be broken into 3 basic systems:

- 1) Random draw
- 2) Time related preference-based systems
- 3) Pay-based systems

#### **2.6.1 Random Draws**

Random draws are basic in nature; every year, applicants are placed in a random draw on a straight line with odds. This system, with variations, is the methodology of use in BC. In its simplistic form, the system should be transparent and equitable for all participants regardless of an applicant's history. Over time distribution of hunting opportunity will follow the bell curve.

In BC, modifications which affect hunters' odds include enhanced odds, shared hunts and group hunts. Through the enhanced odds system, once successful in the draw, hunters' odds are decreased in subsequent years. Applicants who are successful for Roosevelt Elk and Moose draws have their chances reduced by 66% for the following three years (BC MoE, 2004, July, p.2). For all other species, other than mule deer and white-tailed deer, applicants' odds are reduced by 50% for the following year (BC MoE, 2004, July, p.2).

Group hunts allow applicants to apply in a party of up to four hunters whereby one of the group's applications is entered in the draw. If selected, all members receive an authorization to harvest an animal. In ensuing years, each member of the group's odds will be reduced per the enhanced odds system.

Shared hunts have been instituted for moose and allow participants to increase their opportunity to be drawn by entering all of the group's applications in the draw. The caveat is that, if

successful, two applications result in one permit, three or four applications result in two permits. Enhanced odds apply to all in subsequent years.

Perception of transparency and equity under the current system may be debated. A review of MoE documents reveals a perception of inequity measured by papers specifically directed at explaining and justifying the type of lottery system used in British Columbia (BC MoE, 2004, March; BC MoE 2004, July; BC MoE, 2000; BC MoE, 1988).

### **2.6.2 Time Related Preference Draws**

Preference draws of different forms exist throughout North America. The intent, construction and application of preference-based systems varies greatly from jurisdiction to jurisdiction; most allocate animals by some form of increased odds or guaranteed opportunity for hunters loyal to the system.

The majority of lottery-style systems use some sort of preference or seniority based draw. The systems include pool, priority, or point. They are all fundamentally the same in the sense that the longer a hunter applies the more likely he is to be successful, or even guaranteed to receive a draw.

A Priority System, such as Alberta's, can be likened to a never ending ladder (Alberta Sustainable Resource Development, 2007). Opportunities are awarded to those on the top rung of the ladder; after being successful, hunters return to the bottom of the ladder. The number of rungs climbed to be successful in the draw depends on demand (applicants) and supply (authorizations).

A Pool System such as Saskatchewan's is also a form of a ladder, but it has a limited number of rungs (Saskatchewan Environment, 2007). Different jurisdictions have a varying numbers of rungs, anywhere from 2 to 4, usually dependant on demand. Essentially this system eliminates the possibility of being drawn repeatedly when demand exceeds supply. When demand is high and there are not enough rungs in this system, applicants at the top of the ladder compete in a random draw.

A points system, such as Washington State's, increases a hunter's chances of being drawn each year he is unsuccessful (Washington Department of Fish and Wildlife, 2007). The number of chances can be increased exponentially or simply added as one point annually. In the case of Washington State, an applicant's chances are squared each year he is unsuccessful. For example, a hunter in year one would have one opportunity to be drawn, year two he would have 4, year three 9, year four 16, and so on, until such time he is drawn. Once successful in the draw, a hunter returns to one point.

Generally, in the case of a hunter not wishing to be awarded a permit to hunt in a given year the hunter is given the opportunity to apply for a virtual area in order to increase his points or position on the ladder. The virtual area allows hunters to accumulate points or priority without being selected for a hunt. Several jurisdictions require the hunter who applies to the draw to have a hunting license and/or automatically purchase a species license once drawn.

### **2.6.3 Auction Style Draws**

Auction style draws also occur in several jurisdictions. Essentially this type of draw allocates opportunity based on those with the most money. For the intent of the LEH System review this type of draw will not be considered.

The BC MoE has created at least four separate papers since the 1980s explaining and comparing systems. The intent of this report is not to recreate work, but to give an overview of the systems.

### **How would other lottery systems apply in BC?**

## **Chapter 3 Methodology**

### ***3.1 Type of Design***

Ex Post Facto was employed to identify resident hunter satisfaction, participation, recruitment and retention as it relates to the LEH system. The consultant has no ability to control or manipulate independent variables or the setting which may affect satisfaction. Field research through focus groups refined issues as they relate to satisfaction. Surveys added statistical significance to the concepts and factors identified in the focus groups.

### ***3.2 Target Population***

In 2006, basic resident license sales totaled 89,532, an increase of 4.5% (3,889 hunters) from 2005 (BC MoE, 2007a, June, p.4). Not all current hunters participate in the draw; on average approximately 70,000 different individuals who possess RHNCs apply for hunts in the LEH draw. There are also some hunters who apply and are successful in the draw but do not purchase either a species license or a basic resident hunting license. To ensure all active hunters are represented, the target population was hunters who purchased a basic resident hunting license in 2006.

### ***3.3 Primary Research***

Primary research was the most effective tool to identify factors that relate to and affect satisfaction. Primary research was conducted through regional focus groups with statistically rigorous data derived from a provincial mail-out survey. One focus group in each of the 9 Wildlife Management Regions (WMRs) was necessary. Each region is managed differently and has different needs due to species variability, opportunity and access. Focus groups are best conducted in groups of 8 to 12 interviewees; however, due to the nature of the contract regarding public consultations, larger groups were accommodated. To identify key factors which affect hunter satisfaction, regional representatives of the BC Wildlife Federation were contacted via email to consult clubs and members regarding satisfaction with the LEH System. This allowed the consultant to define major topics for public consultation.

Three consecutive two-hour focus groups were held in one city of each WMR.. Focus groups were advertised once in a local newspaper and electronically through the British Columbia Wildlife Federation, United Bowhunters of British Columbia and the Traditional Bowhunters of British Columbia. The consultant addressed the entire group using protocol techniques whereby participants were informed of topics of discussion, split up and placed into decision making groups. Flow of the discussion was structured by leading groups and asking them to identify:

- 1 Factors which affect participation and satisfaction before the hunt
- 2 Why hunters do not purchase species license(s) or participate in the hunt
- 3 Factors which may increase participation in the hunt
- 4 The type of opportunity hunters are looking for ie., meat, trophy
- 5 Whether hunters prefer General Open Season (GOS) or LEH
- 6 Factors which will increase utilization, success and satisfaction
- 7 Perception and potential for shared hunts
- 8 The various lottery systems and their pros and cons

It should be noted there are other less expensive and time consuming methods of collecting investigatory data such as online surveys, focus groups and the use of hunting forums.

Experience by both the consultant and other hunting related research using these tools has found them to be statistically different or unreliable methods of research for a representative sample of resident hunters (Zeman, 2006; Responsive Management, 2006). Through past research, the consultant found that online hunting forums were not representative of the resident hunter population, and had very different views and perceptions of hunting than results of a random mail-out survey. Online users tend to be younger, more avid hunters, with a penchant to more of a trophy-based hunt than the majority of the population.

Email contact was also provided for those who could not attend the sessions and wanted to provide feedback. The mean age of hunters is high in British Columbia (58% >45 years); as a result, computer literacy impairs hunters ability to contribute and some likely do not have access to the Internet. Among other factors, provincial and national segments of the population with lowest Internet use are older and live in rural areas (BC Stats, 2007, September). In 2005, only 50% of Canadians aged 45 years or older used the Internet versus 85% of those between the ages of 18 and 44 (Stats Can, 2006, August, ¶.18,19). Canada's National Average of Internet use is 68%; Internet use in British Columbia was 69% in 2005 (BC Stats, 2007, September, p.2). Furthermore, access to high-speed Internet is limited throughout the Province. As a result,

online surveys and feedback should not be considered a valid tool to effectively represent resident hunters at this time.

### **3.4 Survey**

Once secondary research and focus group data had been reviewed the mail-out survey was developed (Appendix 1). 2,500 surveys and a postage-paid return envelope were mailed out. Hunters were selected using a systematic sample whereby each hunter is assigned a unique number and the hunters are selected based on the number of surveys divided by the population size, ensuring accurate results (Davis, 2004). From a resident hunter population of 89,532, a sample size of 386 was required to ensure an allowable error of 5% or less (See Appendix 2). Past surveys of resident hunters in the Okanagan Region had a maximum incidence of 78.56% and a response rate of 32.25% of incidence (Zeman, 2006, p.55). The results of the past study suggested 2,500 surveys will result in an incidence of 1,964 and a response rate of 633, well within required limits (See Appendix 3). Mailing 2,500 surveys guaranteed statistically accurate results and accounted for issues expressed by both MoE employees in regards to increases of undeliverable mail.

Likert, ordinal, categorical and numerical scales were used. To encourage decisiveness, respondents were asked to evaluate some responses through Likert scales from 1-5, 1 being not important, 5 being extremely important. For the purpose of analysis, 4 or 5 should be considered very to extremely important and 2 or 3 somewhat to moderately important.

### **3.5 Analysis**

Analysis of secondary and primary data was through SPSS (statistical package for the social sciences) and Microsoft Excel. SPSS was used for data analysis of all surveys. Microsoft Excel and SPSS were used to collect and mine data. Representation of statistical analysis was represented and scrutinized at a basic level to ensure understanding by the target audience.

### **3.6 Limitations**

Interview variability associated with focus groups common to public consultation and research often include group think, interviewee interaction and sampling, all of which may not be

representative of the population. To mediate these issues, group discussion was facilitated by the consultant to ensure all ideas were represented and exhausted. The focus groups were used to define and refine concepts and issues for survey construction. Not all relevant concepts or issues might have been discussed during public consultation which could result in a research gap. Focus groups and web based feedback were not and should not be considered standalone representation of the hunter population.

Systemic sampling is not as accurate as a stratified sample, however in this case sampling interval was not related to period ordering of the population. Results of the survey and analysis was conducted and organized at a very basic level to accommodate the target audience. It allows easy understanding but does not allow the consultant to scrutinize the data to demonstrate more significant relationships and variance in the data.

## **Chapter 4 Findings**

### ***4.1 Focus Groups***

Attendance varied greatly in each city. There were a total of 328 attendants who participated in the focus groups. Findings from the focus groups were intended only to be used as criteria for survey design.

#### **4.1.1 Hunter Motivations and Satisfaction when selecting an LEH Hunt**

Generally, hunters choose an area they know, have been hunting for several years, has easy access, opportunity for multiple species and potential for success. Some younger hunters indicated they chose hunts which had lower odds and were more difficult to access. Satisfaction was tied solely to whether or not hunters were successful in the draw, more commonly termed 'luck'.

#### **4.1.2 Why Hunters do not purchase a species license or participate in the hunt**

Participants were shown pie charts which demonstrated LEH authorizations dispersed and hunters who actually purchased the species license for the LEH authorization. Participants generally believed that authorizations went unused because of anti-hunters, uncontrollable factors, lack of knowledge of the MU before applying, lack of a hunting partner, timing of the LEH draw date and receiving a low odds draw. Lower demand draws were often used as a 'backup' with the idea that success in the draw is easy.

#### **4.1.3 Encouraging hunters to purchase tags and participate in the hunt**

The most prevalent solution discussed was to require participants to purchase a species license when successfully drawn, to have purchased a basic hunting license beforehand, or both. Other solutions included punishing hunters the following year by not allowing them to participate in the draw, advertising hunts with limited access in the synopsis and having the ability to return the authorization. Hunters also believed many of the draws were received by anti-hunters.

#### **4.1.4 LEH vs GOS**

Meeting conservation goals, hunters prefer a lengthy unrestricted GOS. However, when long GOSs were not possible, hunters differed in opinion. Some hunters expressed concerns relating to ethics and over-crowding issues in short general open seasons. Other hunters simply wanted the opportunity to hunt. The majority of discussion focused on moose. Hunters seemed to concur that hunter recruitment and LEH were diametrically opposed.

#### **4.1.5 Increasing utilization, success and satisfaction**

With regards to increasing utilization, success, and satisfaction, participants were again shown pie charts that included number of LEH authorizations, participation and success, coupled with resident allocation. Participants indicated better access, GOS to keep hunting parties together and hunter education for species with low utilization (Grizzly Bear, Sheep, Goat) would increase hunter success (harvest). Satisfaction was again tied directly to being drawn for an LEH hunt.

#### **4.1.6 Shared Hunts**

Shared hunt application and potential were explained using line charts demonstrating change in odds for several species. Discussion was initiated and all participants were allowed to select the number of hunters per LEH authorization they believed they would apply for. Groups were instructed to place a checkmark for each group member. Not all participants completed feedback forms. Where only one check mark was placed, the number of group members was extrapolated based on the number of members who completed the section on which LEH system participants preferred. The results of focus groups illustrate the number of valid responses, responses missing and mean number of hunters per LEH authorization with regards to moose, elk, bison and antlerless deer focus group participants believed they would apply for in a shared hunt (Table 4.1).

	Moose	Elk	Bison	Antlerless Deer
Valid	234	213	213	168
Missing	0	21	21	66
Mean Hunters per LEH	2.69	2.62	3.33	1.62

Table 4.1: Focus group results mean number of hunters per LEH authorization through shared hunt.

### 4.1.7 Lottery Style Systems

In addition to BC's lottery system, three other lottery systems were introduced. Alberta's Priority System, Saskatchewan's Pool System and Washington State's Points System were reviewed and discussed. The systems were explained including pros and cons with a focus on how these systems would work in BC. Of 237 tracked responses preferred systems were: Random (31.6%), Pool (5.1%), Points (54.4%) and Priority (8.9%). Other responses included No LEH, and combinations of pool, priority and points systems based on species and odds. It should be noted that hunters who reside in regions with relatively lower odds, such as WMR 6, were more prone to support the current LEH System as opposed to hunters who resided in regions with higher odds or lived in areas without GOSs, notably moose.

Participants indicated the current system was unfair, that they were not drawn as often as they should be and that others were drawn repeatedly. It was difficult to discern whether not being drawn or others being drawn repeatedly was more frustrating.

Some participants also believed that hunters' applying for draws within their region of residence and certain age groups be given priority when determining the allocation of LEH opportunities.

## 4.2 Email Feedback

Email respondents who had feedback specifically regarding the LEH system totaled 142. Responses varied between individuals. The majority of comments were similar to the focus

groups. Respondents believe hunters should have to purchase a hunting license prior to the draw and/or automatically have to purchase the species license when successful. Respondents also believe a system should be implemented whereby applicants' chances of being drawn increase annually or those who are successful have reduced odds, or eliminated from the draw the following year. Respondents also indicated there should be a portion of authorizations set aside for local hunters. Overall, the most cited system is the Alberta Priority System. Respondents indicated they either participated, or knew someone who participated in the draw and was guaranteed an authorization every X number of years. Respondents also believed others were always drawn and that they should have been drawn more often, suggesting that the draw is somehow unfair or corrupt. Respondents also indicated they supported moving away from LEH where possible and that they did not support LEH for political reasons.

### ***4.3 Mail-out survey***

The mail-out survey was sent to 2500 addresses of individuals who purchased a basic resident hunting license in 2006. Each mail-out had a 5 page survey and cover letter, which were pre-tested by MoE employees and members of the LEH Review Committee. At the time of compilation, there were a total of 687 responses from hunters yielding an allowable error of 3.75% (Appendix 4).

Demographics of respondents were reflective of the current hunter population. 85% of respondents indicated they applied to the LEH system annually while 4% indicated they didn't, 6% applied in the past 5 years, 4% in the past 10 years, and there was no response from 1% (Appendix 5). Those who did not apply to the system were strictly waterfowl/upland game bird hunters (17.9%), waterfowl/upland game bird was their favorite species to hunt (25.0%), resided in region 7B (21.4%) and did not appear to hunt (10.7%). The remainder lived in different regions or indicated they had given up on the LEH system prior to the past 10-year period. Hunters who applied in the past 5- or 10-year period were predominantly waterfowl/game bird hunters (25.7%), resided in region 7B (20.0%), and the remainder expressing dissatisfaction with the draw. Response from WMR was representative of the proportion within the Province (Appendix 6).

Respondents identified themselves as meat hunters (35.8%), meat, then selective, (43.5%), selective (18.8%) and trophy (1.9%) (Figure 4.1).



Figure 4.1: Type of hunter as indicated by survey respondents.

#### ***4.4 Why do hunters apply for a particular LEH hunt?***

The majority of hunters apply for a particular hunt because they have the ability to hunt other species on GOS at the same time, know the area, traditionally hunt the area, feel they have potential for success and believe few others hunt the area. Overall, hunters look for areas with plenty of access more often than limited access and do not apply to areas for the potential to harvest a trophy or because they heard about it from a friend. (Figure 4.2)

# Why Hunters Apply for an LEH Hunt

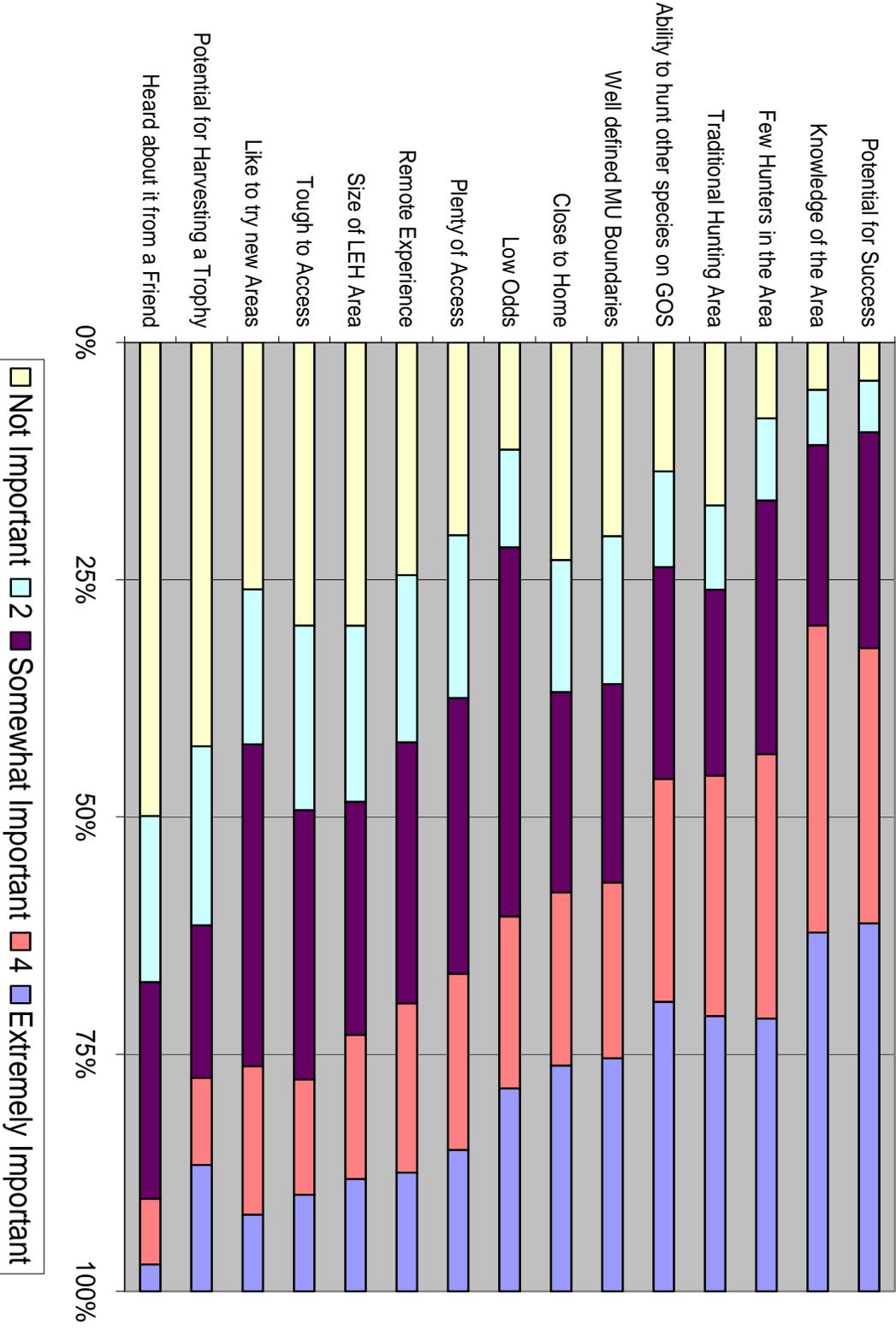


Figure 4.2 Why Hunters Apply for an LEH Hunt

#### ***4.5 Why do authorizations go unused?***

Majorities of hunters believe successful applicants do not utilize their LEH draws because applicants do not know the area before applying, the area has a lack of access, anti-hunters apply for the LEH, have no one to go hunting with, can't get time off, and uncontrollable factors. The number of non-responses in this section averaged in excess of 20%. (Figure 4.3)

# Why Hunters Believe Successful Applicants do not use LEH Authorizations

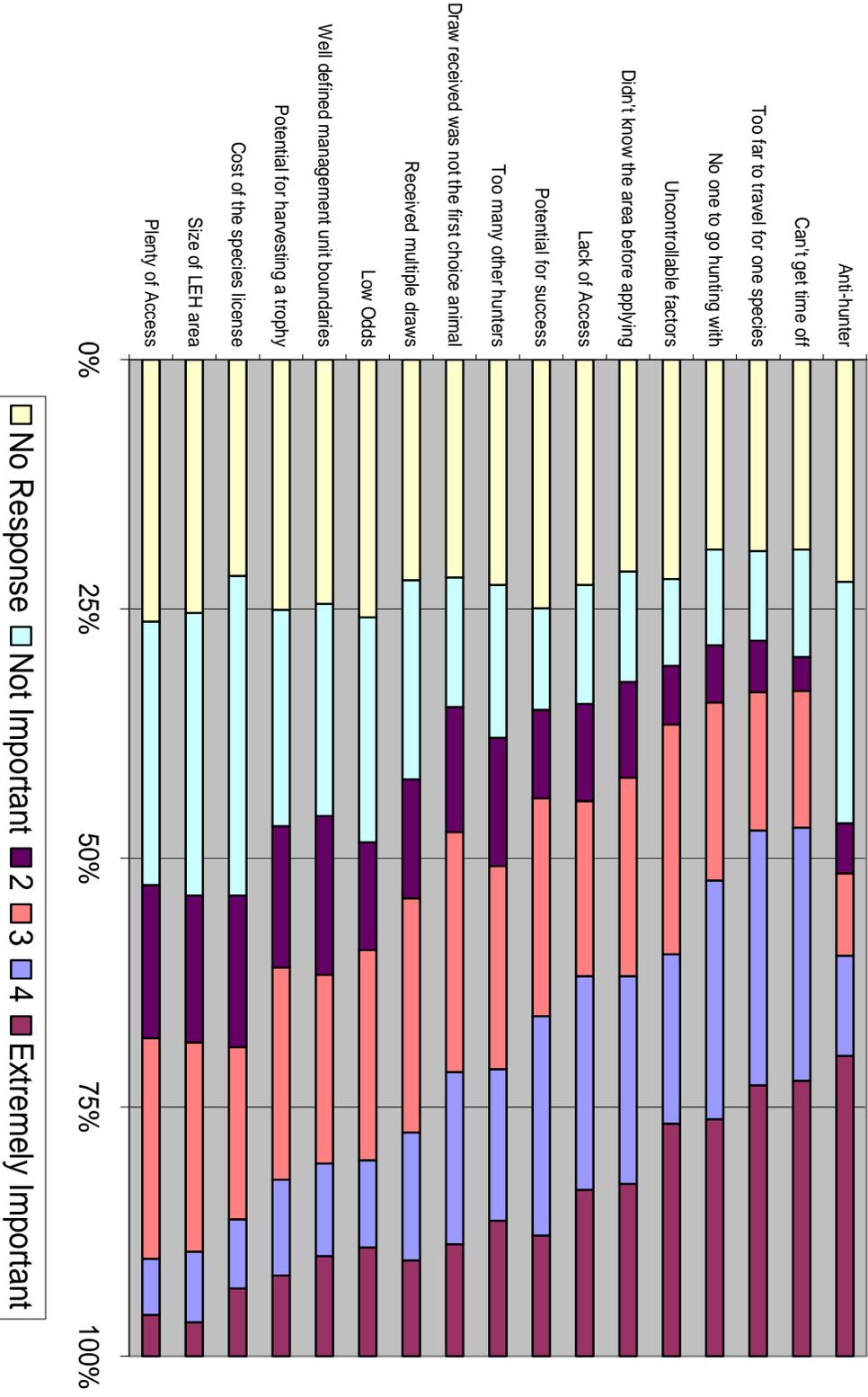


Figure 4.3 Why Hunters Believe Successful Applicants do not use LEH Authorizations

#### ***4.6 Which factors affect the hunting experience?***

The majority of respondents indicate the opportunity to go hunting annually, spending time with friends/family, opportunity to harvest a legal animal and getting out in the wilderness are extremely important. From most important to least important the majority also believe physical activity (75.8%), returning to traditional hunting areas (65.0%), ability to hunt multiple species (61.9%), improve hunting abilities (59.9%) and few hunters afield (55.1%) as very or extremely important factors which affect the hunting experience. (Figure 4.4)

# Factors Affecting the Hunting Experience

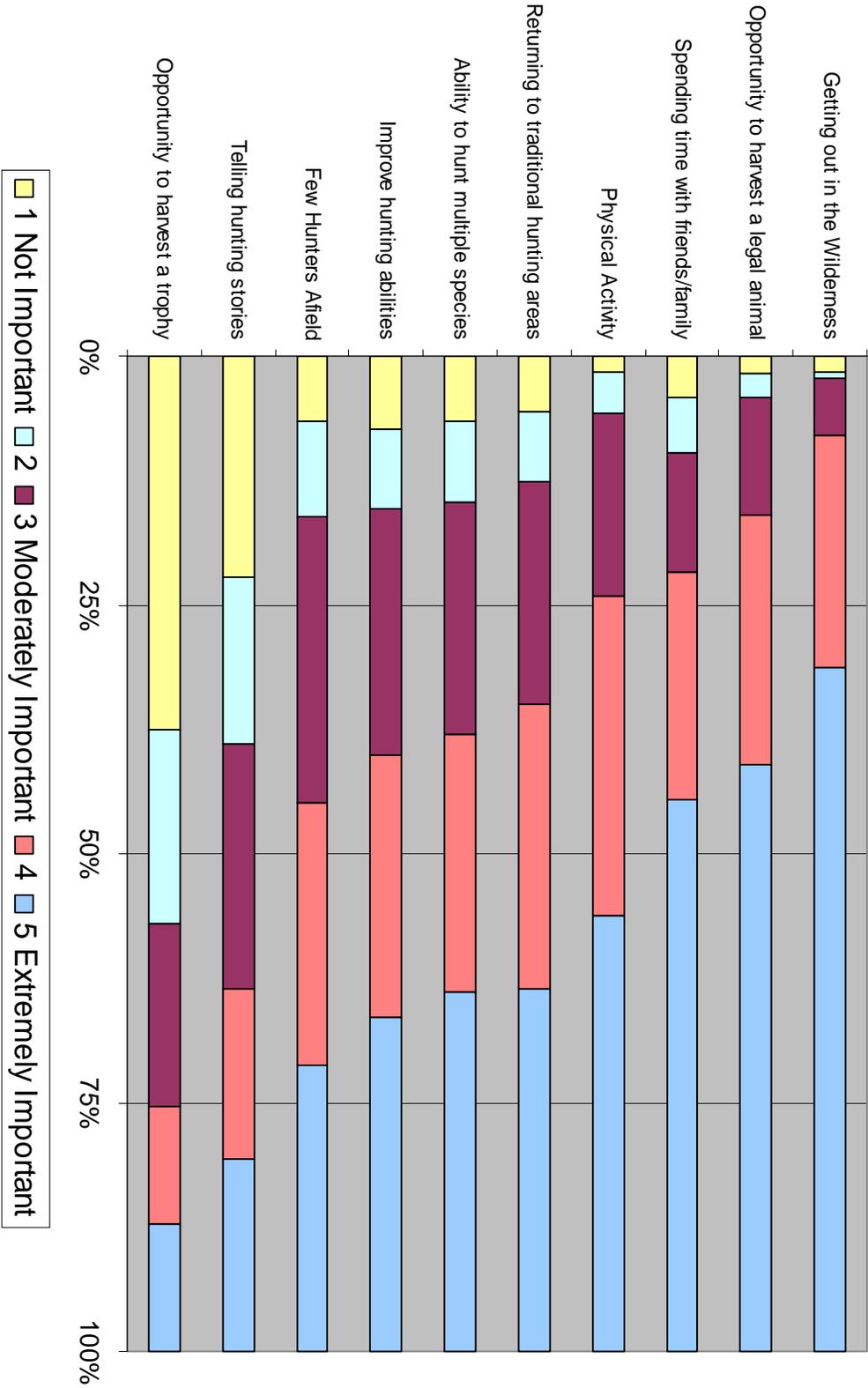


Figure 4.4 Factors Affecting the Hunting Experience

#### 4.7 Which Seasons do Hunters Prefer?

Given the choices of a shorter GOS, antler/horn restricted hunt for longer time periods or to apply for a limited entry hunt, respondents equally preferred a longer antler/horn restricted hunt or to apply for a limited entry hunt. Comments regarding shorter GOSs often revolved around crowding issues and a relationship between poor ethics and shorter GOSs. Longer antler/horn restricted hunts were least preferred by 23.5% of respondents as opposed to 25.5% of hunters who believed applying for a limited entry hunt was the least preferred type of hunting season. (Figure 4.5)

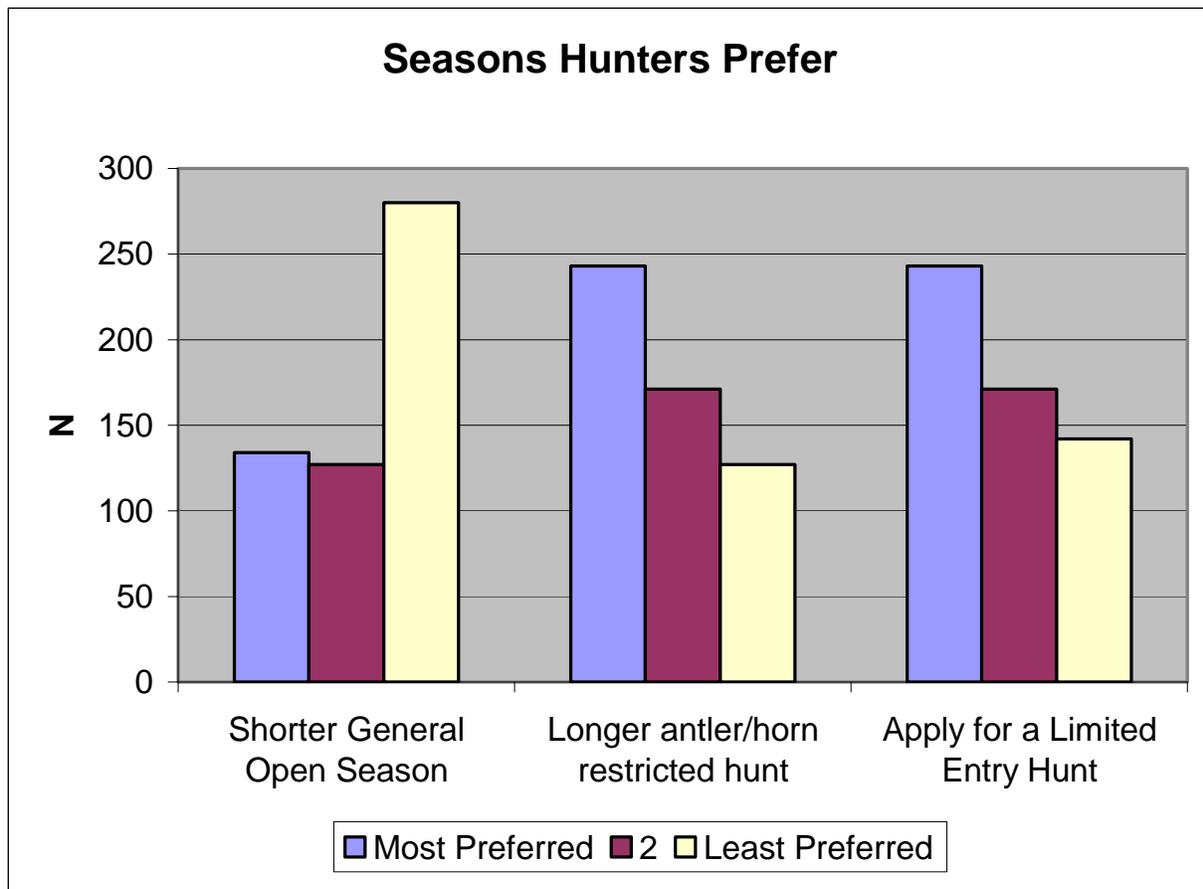


Figure 4.5 Seasons Hunters Prefer

Respondents did believe the woods would be busier with more GOSs (Appendix 7).

Respondents believed their chances of success would not decrease with more GOSs (Appendix 8).

#### ***4.8 Are hunters satisfied with the LEH system?***

Overall, resident hunters are not satisfied with the LEH system. Of 568 responses, 59.8% indicated they were not satisfied with the system; 40.2% indicated they were satisfied with the system. Results indicate 62.6% of hunters like shared hunts, 54.0% of hunters like group hunts, 43.9% of hunters like enhanced odds and 71% believe LEH is not complex (Figure 4.6).

47 respondents who completed their perception of the LEH system did not indicate whether they were satisfied or dissatisfied with the LEH draw system. A majority of respondents believe the draw isn't fair, others are drawn repeatedly, they never get drawn, and their chances of being drawn should increase every year. Respondents believe others are drawn repeatedly and that their chances of being drawn should increase every year.

Hunters who are dissatisfied with the LEH system are far more prone to believe the draw isn't fair, they never get drawn, others get drawn repeatedly, LEH is too costly, hunting seasons are too short, their chances of being drawn annually should increase, not enough authorizations, unused authorizations should be re-drawn, and the LEH system is too complex. Hunters who are dissatisfied with the LEH system are less likely to support shared hunts or group hunts compared to hunters who are satisfied with the current system.

# Hunters Perception of the LEH System

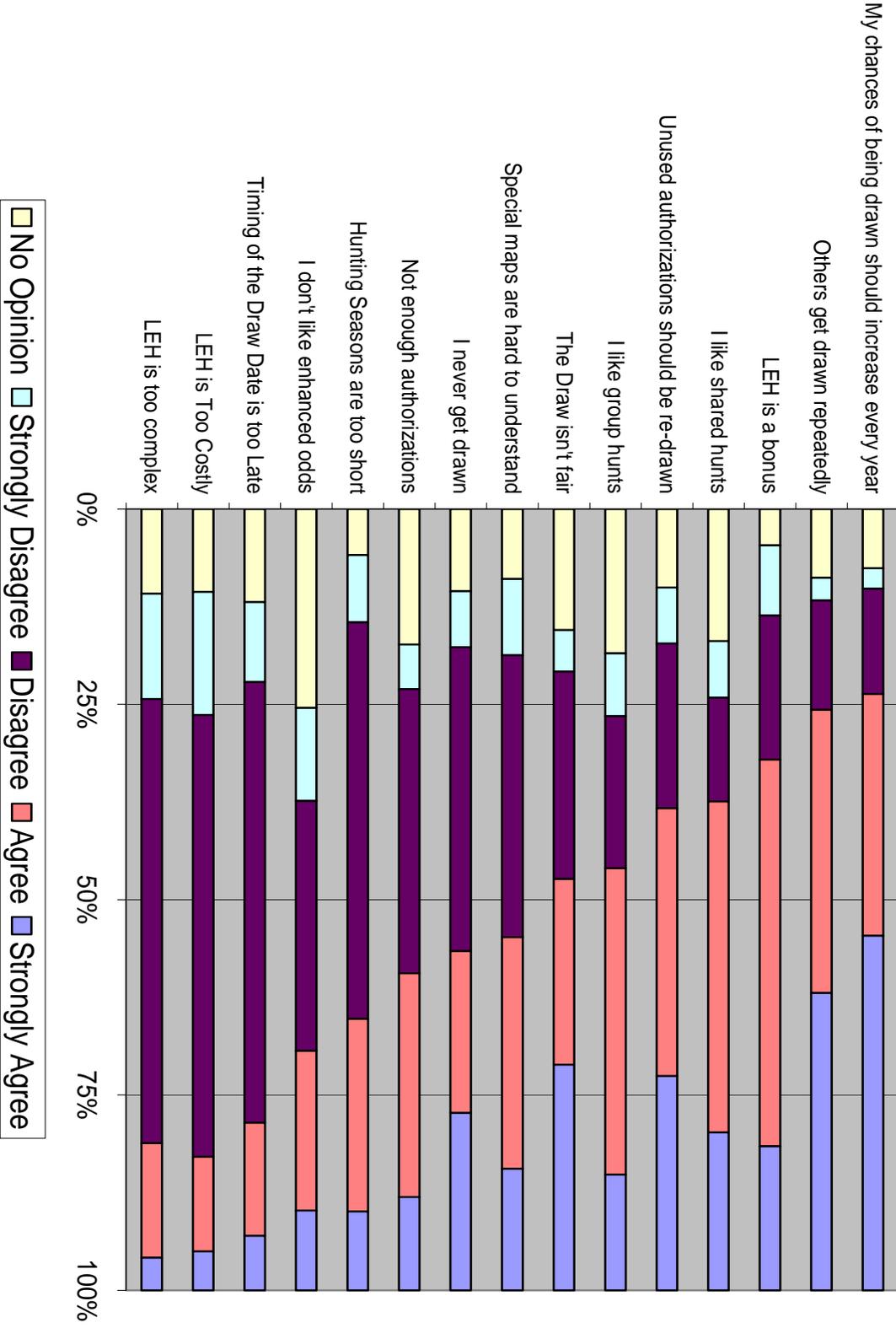


Figure 4.6 Hunters Perception of the LEH System

## ***4.9 How would other lottery-style systems apply in BC?***

### **4.9.1 Priority System**

In BC the Priority system and the potential for hunter participation would vary depending on region, MU and species. Factors associated with demand tend to be access and proximity to high hunter populations. Analysis assumes success rates remain static once a priority system is adopted. Many hunts with relatively low demand such as antlerless draws would allow hunters to participate approximately every third year based on 2006 demand and 2007 tentative authorization figures (BC MoE, 2007, June; BC MoE, 2007). Conversely average odds for Bull Elk LEH hunts were 68.0:1, which, in a mature Priority system, translates into being drawn once every 68 years (BC MoE, 2007, June; BC MoE, 2007). Demand for both bull and cow moose authorizations would result in a required priority score of 5. Moose odds fluctuate between regions; the southern portion of the province has much higher demand. In a mature Priority system 2007 odds would suggest a regional average required priority score of 8 in WMR 3, 16 in WMR 4, 4 in WMR 5, 4 in WMR 6, 4 in WMR 7A and 20 in WMR 8 (BC MoE, 2007, June). These are only average required priority scores and include outliers in regions where authorizations are numerous, and odds, participation and success rates are low. Grizzly bear and sheep also vary significantly depending on MU and the ensuing required priority would vary from being drawn every year to waiting several lifetimes.

In the Priority system, the only shared hunt options occur post success in the draw. In Alberta, successful applicants have the ability to designate another hunter who may harvest the animal. Group hunt applicants are assigned the lowest priority score of the group.

### **4.9.2 Pool System**

Saskatchewan's Pool system would act as a buffer to remove past successful participants. Saskatchewan originally had a 3 pool system, but had to move to a 4 pool system due to demand, hence the Super A pool. Table 4.2 demonstrates the Pool system as it would work with a BC draw that is 5:1 with 10 authorizations annually.

Year	Pool	Chances of Being Drawn
1	C	None
2	B	None
3	A	None
4	Super A	2:1

Table 4.2: Example of a Pool system with 50 applicants and 10 authorizations annually.

Once the applicant reaches year 4 they will be in a random draw annually at odds of 2:1 until they are drawn. In a hunt with odds of 10:1 and 10 authorizations the applicant will be in a random draw in year 4 at odds of 7:1. If the applicant is drawn he returns to year 1 or the bottom of the ladder.

As with the Priority system, shared hunts would only be applicable post-draw, and groups are assigned to the lowest pool of applicants.

#### **4.9.3 Points System**

A Points system would allow hunters to increase their chances of being successfully drawn each year. The system would minimize, but not eliminate, the likelihood of being drawn repeatedly, particularly for higher demand hunts. A points system would allow shared hunts, and points for group hunts would be averaged across the group.

#### ***4.10 Is resident hunter opportunity through the LEH system being maximized?***

Provincially, resident hunter opportunity is not being maximized and will be lost in 2012 due to under-utilization per the *Harvest Allocation Policy*. Averaging the numbers of LEH authorizations, participation rates and success rates, resident hunters will not achieve annual allowable harvest goals for the allocation period from 2007-2012.

Annual allowable harvest data was extremely difficult to retrieve, and most species/draws could not be included in the calculation. Of regional data which allowed analysis, only 6 of the 17 (35.3%) hunts will likely result in maximum utilization (Appendix 9). For maximum utilization

of these 11 hunts ~1,844 additional LEH authorizations are required. Regional data does not account for rounding error or success rates in all hunts within a given region. Data, where available, will be examined to explore hunt success per MU to understand whether resident allocation will be met.

#### **4.10.1 Range of Authorizations**

Provincially, there are many MUs, often with limited access, which are chronically under-utilized. The Range of Authorizations (RoA) allows managers flexibility in the number of LEH authorizations which are released. The RoA varies depending on species, harvest rate and size of the area. This could be a limiting factor; however, there are very few MUs where the full RoA is being exercised. For example, resident utilization from 2000-04 for goats in WMR 4 is 6, a harvest of approximately 60% of resident hunter allocation (BC MoE, 2007e). Of 74 goat hunts within WMR 4 the recommended number of authorizations in 2006 does not meet the maximum RoA for any hunts (BC MoE, 2007e). During the same period, of 49 goat hunts in WMR 6 there were only 6 hunts where the full RoA was exercised. Most spreadsheets and calculators did not show an RoA.

#### **4.10.2 Use of Assumed Success Rates**

Regional spreadsheets for calculating LEH authorizations also used assumed success rates. Assumed success rates are a safety which is used when historical success rates are low. The rates vary anywhere from 5%-30% depending upon region and species, and contribute to inefficiencies in the calculation of the number of LEH authorizations. As a result, calculators will show harvest when none is likely to happen. In 2006, goat hunts in WMR 3 use an assumed success rate of 30% if the 3-year average success rate is below 30%. Of 27 hunts, all used the assumed success rate. In WMR 4, 56 of 74 goat LEH hunts used the assumed success rate of 10%.

LEH bighorn sheep in WMR 4 uses a 25% assumed success rate if the 3 year average harvest is below 25%. Table 4.3 demonstrates the average LEH authorizations, harvest and success rates for Bighorn Sheep in MUs 4-02A, 4-08, 4-25F. The resident allocated harvest for these hunts from 2000-2006 was 19, LEH authorizations 54, and a harvest of 8, resulting in an average success rate of 15%. Average odds for the same period were 299:1. In MU 4-25F from 1997-

2006 20 authorizations were released and only one ram was harvested. In 2007, MUs 4-02A, 4-08, 4-25F were divided into 5 hunts, only 2 of which had an actual success rate greater than the assumed success rate. In 2007, the resident allocation was 1 sheep per MU and the number of LEH authorizations declined relative to the 6 year average. Using success rates from 2000-2006 the 2007 harvest will be 1.03 sheep of an allocated harvest of 3 sheep. These are high demand draws that neither maximize resident hunter opportunity and participation nor achieve resident allocation.

2000-2006 Average WMR 4 Bighorn Ram LEH						
Zone	LEH Auth	Harvest	Success	Resident Allocation 2007	2007 LEH	Potential Harvest
4-02A	2	0.57	29%	1	2	0.57
4-08	3.7	0.57	15%	1	3	0.46
4-25F	2	0	0%	1	2	0

Table 4.3: WMR 4 LEH Bighorn sheep hunts, authorizations, success, allocation and potential harvest.

In the Skeena (WMR 6), there are 9 LEH Thinhorn Sheep hunts. In 2007, the resident allocation for these hunts is 44 thinhorn sheep. Throughout the entire region, including GOSs, the total harvest from 2000-04 averaged only 29 sheep. The harvest in the LEH hunts totaled 52 sheep or 10.4 animals annually, only 23.6% of the resident allocation in 2007 for those hunts. Adoption of the new *Harvest Allocation Policy* has not occurred, as resident opportunity or the potential to increase success did not change in 2007. The average LEH authorizations from 2000-04 was 269.8; in 2007 the number of authorizations was 277, an increase of 2.7%.

Region 8 uses assumed success rates and lack of authorizations in the allocation of moose hunts (Appendix 10). The moose allocation for 2007 was analyzed to interpret the potential for resident hunters to achieve allocated harvest. The use of assumed success rates has artificially restricted opportunity and will artificially restrict success, resulting in fewer opportunities from 2007-12 and a lower allocation in 2012 due to under-utilization. Using the spreadsheet designed by the MoE, residents will likely only harvest 67 of an allocated 84 resident bull moose.

## Chapter 5 Conclusions and Recommendations

### 5.1 Lottery Style Systems

#### 5.1.1 Priority System

A Priority System, such as Alberta's, results in a stratification of authorizations. In Alberta, the system has worked well due to comparatively low demand for hunts and several species which are not available through GOS.

The advantages of the system include a guaranteed draw after a certain number of years as well as the ability to plan hunts in advance. The disadvantages are required priority increases with an increase of hunters or a decrease in authorizations. Winter kill, overharvest, predation and disease also create significant fluctuations in required priority for a given hunt. A move to more GOSs would result in a much higher required priority score for the remaining areas under the priority system.

Alberta's trophy sheep draws demonstrate a worst case scenario. When the Priority System was implemented, several high demand hunts were considered too high for the Priority System and a random draw was instituted, while some trophy sheep hunts demand was considered reasonable for the Priority System. In 2007, there were two hunts in wildlife management unit (WMU) 437, with 8 authorizations. Between these two hunts there were 2583 total applicants, including 1131 in zone 999, the virtual zone which allows hunters to accrue priority without being drawn (Alberta Fish & Wildlife, 2007). Of those 2583 applicants there are 157 applicants at priority 11 and have been applying since 1996. At a current rate of 8 authorizations per year, a total of 31 years will have passed before all the applicants in this cohort are drawn, assuming all are still alive. The following cohort, who began applying in 1997, currently has 148 applicants resulting in complete participation by 2046. Becoming a licensed hunter at an early age and longevity are the only two factors which enable a hunter to participate in this hunt. This hunt would be a prime candidate for a random draw; however, hunters with a priority score of 11 will likely be disappointed after applying for so long. Other Trophy Sheep hunts in Alberta also have

relatively high demand and those with priority would move into other hunts, creating a vicious circle whereby only the young and long-lived will be able to hunt Trophy Sheep under a Priority system.

### **5.1.2 Pool System**

A pool system in British Columbia will serve to eliminate successful applicants from the draw in following years. Applicants at the top of the pool will still be placed in a random draw. This system does not address the dissatisfaction associated with the results of the survey.

### **5.1.3 Points System**

A points system will mediate many of the frustrations associated with the current LEH System, but not all. A points system will increase hunters' chances of being drawn when unsuccessful and minimize the potential of being drawn repeatedly. However, there will be no guarantee as is with a priority system.

### **5.1.4 BC's Lottery System**

The frustrations expressed through the survey are essentially two-fold. Respondents are dissatisfied with the manner in which the LEH draw is carried out. There is a perception of inequity due to the randomness of the draw; this is relatively easy to mediate, however 47.12% of respondents indicated they agree or strongly agree they are never drawn. Changes to the type of draw should mediate the perception of inequity. It will not allow hunters to hunt more often and hunters will still be required to apply for several years before receiving an authorization and the ability to hunt. Respondents indicate applying for a limited entry hunt and longer antler/horn restricted hunts are similar in preference; however, they are not satisfied with the LEH draw system. Hunters may believe changes to the LEH draw system will allow them to be drawn more often; that is simply not the case. Changes to the type of draw will not increase resident hunter opportunity, participation, recruitment or retention.

## **5.2 BC's Hunter**

From 1981-2006, the resident hunter population declined by almost 50% while LEH authorizations increased 165%. Despite this, more wildlife populations are managed on LEH, and GOSs are shorter with more antler/horn restrictions, many of which are not required for wildlife population conservation. Resident hunters need the opportunity to hunt and harvest wildlife on an annual basis.

Survey results indicate 79% of resident hunters are either “meat” or “meat, then selective” hunters. “Selective” hunters constitute 18.7% and “trophy” hunters make up <2.0% of the resident hunter population. The intent of antler or horn restrictions is to reduce harvest; restrictions reduce the harvest per hunter, but also participation from 25->60% (Zeman, 2006, p.24). While hunters support conservation, unnecessary antler restrictions discourage hunters. LEH fragments hunting groups and destroys the social support network which is fundamental to the recruitment and retention of resident hunters. LEH is not a recruitment tool; a hunter is not recruited on the possibility of being drawn to be able to go hunting. It is unlikely that resident hunters are retained by the possibility of being drawn.

The move to regulations that restrict harvest to large male animal classes has and will change the resident hunter population and motivations in BC, resulting in a fragmented user group where consensus is extremely difficult if not impossible to achieve. This hunter will be groomed to pursue trophy-type, or at least perceived trophy-type hunting opportunities. Discussions with MoE employees regarding proposed hunting seasons suggest this may already be occurring. Currently “selective” and “trophy hunters” spend more time afield than “meat” or “meat then selective” hunters ( Figure 5.1) and are more likely to find legal animals (Zeman, 2006).

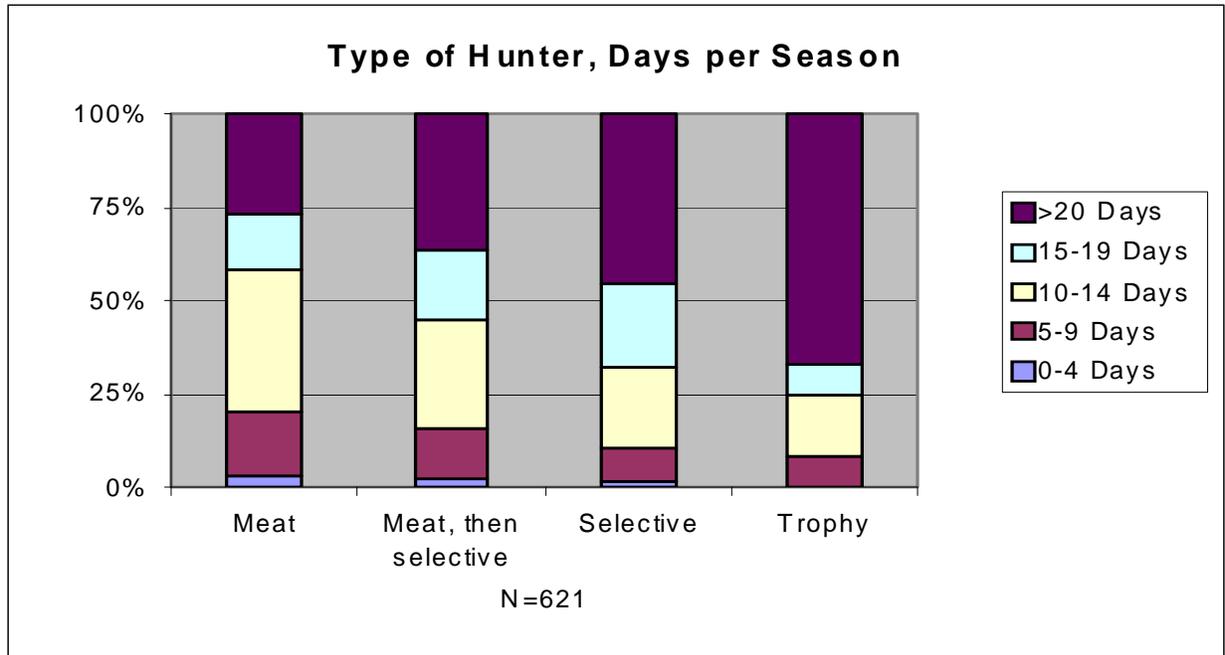


Figure 5.1: Type of hunter, days per season as indicated by survey respondents.

The group of hunters who have been alienated by regulations and LEH are meat hunters who hunt less and are likely less successful. While hunters support conservation, unnecessary antler restrictions discourage hunters participation and reduce harvest. Trophy hunters are likely far more avid than meat hunters and will not quit when populations are managed for maximum sustainable harvest; the same cannot be said for meat hunters and trophy-style management seasons.

Hunters who have dropped out of hunting are likely meat hunters who are not looking to extend their hunting season or pursue a trophy animal, but only the opportunity to hunt annually for a limited number of days and potentially harvest a legal animal. LEH and GOS regulations are not reflective of the current and likely the past resident hunter population (Figure 4.1) and do not maximize hunter opportunity, participation or harvest.

### ***5.3 LEH, Resident Hunter Opportunity, Participation and Satisfaction as it relates to BC's Hunter***

In terms of LEH resident hunter opportunity and participation are dictated by wildlife allocation through the *Allocation Policy*. Findings through this project regarding inconsistent application and implementation of the *Allocation Policy* also revealed inconsistencies regarding wildlife management and perhaps consultation which is not representative of the resident hunter population. Wildlife management and consultation were not discussed in secondary research; however, they have both become pertinent to the issues of opportunity, participation and satisfaction. Opportunity, participation and satisfaction are all impacted by various provincial policies, procedures and strategies; the interpretation, and adoption of these policies and procedures at the regional level; and public consultation and/or decision making at both the regional and provincial levels.

#### **5.3.1 Allocation Policy**

Resident hunter opportunity is not maximized through the *Allocation Policy*; there is immense potential to allow more hunters to hunt more simply by applying the policy, as it was intended on a consistent basis. There are several hunts which are chronically under-utilized, often restricted solely by number of authorizations. Goats, grizzly bears and sheep are chronically under-utilized by resident hunters even in high demand hunts. The analysis of 11 under-utilized hunts demonstrates the opportunity to award ~1,844 more LEH authorizations without changes the LEH system or draw.

Micro-management and disbursement of LEH opportunity for species which are sensitive to harvest seldom meet requirements to achieve resident allocation. Over the short-term this results in a loss of opportunity due to a lack of LEH authorizations. Over the long-term, this results in an even more significant loss of hunter opportunity due to under-utilization. According to the *Allocation Policy* under-utilization will result in the transfer of allocated share from resident to non-resident.

Grizzly bears, goats and sheep are three species chronically under-utilized in most parts of the province. As indicated in the literature search, from 1997-2006, close to half of successful LEH applicants for sheep, goat, caribou and grizzly bear did not purchase a species license (Table 2.1). Managers should be aware that increased LEH authorization and increased participation does not necessarily equate to an over-harvest.

For the *Allocation Policy* to function correctly and not systematically reduce resident hunter opportunity, risk must be managed rather than avoided. Risk assessment allows practitioners to build a framework which identifies threats, safeguards, best and worst case scenarios. A tool could be created to assess risk as it relates to wildlife population dynamics, hunter participation and success.

Allocation spreadsheets are poorly designed and extremely difficult if not impossible to retrieve. Spreadsheets for several hunts were simply not provided from regions and were not available at the provincial level. Some spreadsheets have success rates incorporated, but many have no information aside from recommended number of LEH authorizations. LEH procedure manual stipulates the calculation for LEH authorizations is  $\text{harvest/success rate} = \text{LEH authorizations}$  (BC MoE 1990). This calculation is seldom used. Allocation spreadsheets fall back on assumed success rates which result in under-harvest. The RoA is not a barrier to achieving resident allocation and is not used by managers as a tool which allows flexibility in authorization numbers. It is not possible to assess and ensure resident allocation is met without past harvest and success rates for each hunt. Some regions which had success rates often assigned LEH authorizations contrary to the numbers calculated, frequently without justification. There is a lack of transparency and accountability at the regional level.

Managers micro-manage harvest on an annual basis as opposed to a mean harvest over the allocation period and have no tool to properly manage risk. Spreadsheets are supposed to be reviewed at the provincial level as well and this does not occur. Based on the utilization tables, compliance with the *Provincial Allocation Policy* is inconsistent and will result in a decline in resident hunter share of wildlife in 2012. A standardized spreadsheet should be created at the Provincial level and adopted at the regional level. Calculators should include: resident and non-

resident allocation, annual and 5 year harvest targets, current results, past LEH authorizations, number of hunters who purchased species licenses, success rates, harvest rates and justification for any deviation from recommended LEH authorizations. Implementation and execution of the *Allocation Policy* need to be assured at the Provincial Level.

### **5.3.2 Controlling the Harvest: LEH System, Policy and Procedure**

Managers have several tools to control harvest. These tools include: temporal and spatial, sex, horn/antler, access restrictions, and LEH. The *LEH Policy* states it is the policy of the MoE: “(1) to control resident harvest in a given area for a given population through limited entry hunting where it is deemed that other methods of regulation are inadequate for maintaining or increasing hunting opportunity to meet management objectives for hunting and non-hunting uses.” The policy and its application are inconsistent.

Several hunts have multiple layers of restrictions and little to no harvest. These hunts neither maintain hunting opportunity nor meet management objectives for hunting and non-hunting uses per the *LEH Policy*; in fact the opposite occurs. For example, LEH sheep hunts in WMR 6 have horn, temporal, spatial, access restrictions, and LEH. Historically <25% of the AAH is achieved in these hunts. LEH sheep hunts in WMR 4 are similar and the odds often exceed 200:1. Data indicates this has occurred for several years and even decades where data is available; there has been no attempt to remedy this problem. This is not consistent with the *LEH Policy* or intent.

*LEH Policy* and procedure also discusses control of hunter numbers, high quality hunting recreation along with LEH as the last remaining solution to control hunter harvest. The policy seems to contradict itself and there appears to be no method to quantify the metrics of high quality hunting recreation.

There is no framework to evaluate or test the necessity of an LEH hunt. There are several hunts that moved to LEH when over-harvest occurred or when wildlife populations were too small to sustain a GOS; since then resident hunter numbers have declined and wildlife populations have often rebounded, yet status-quo has persisted. Since LEH was instituted other wildlife

management options have become available and been employed (ie selective harvest strategy for moose), yet use is limited. A few examples of species and hunts on LEH which should be reviewed and considered for GOS include: bull elk WMR 4 west, elk in the Liard sub region of WMR 7B, goats in low access areas of WMRs 3, 4, 5, 6, 7A, 7B, antlerless white-tailed deer, antlerless mule deer, moose selective harvest strategy provincially, full curl Thinhorn sheep WMR 6, Grizzly bear WMR 6 and full curl Bighorn sheep WMR 8. These are all seasons that are low risk, have been used in other regions or are accepted management practices in other jurisdictions. Some of these opportunities have been identified by wildlife managers and have been rejected through the consultation process. The *LEH Policy* and procedure must be adhered to and a test to examine the suitability of an LEH hunt should be developed.

## **5.4 Tools to increase participation**

Tools to limit opportunity, harvest and decrease participation have been used extensively. Harvest strategies and hunting regulations have reduced hunter participation and harvest to levels much lower than those required for conservation. There are also tools which will allow increased participation where maximum utilization occurs.

### **5.4.1 Balancing Odds and Participation**

Where high odds draws occur on what are considered trophy species with high demand, managers should attempt to balance the ability to participate in draws with the potential for success. For example, any ram Californian Bighorn Sheep hunts in Region 8 averaged 131.3:1 in 2007 while  $\frac{3}{4}$  curl ram hunts in region 8 averaged 15.8:1 (MoE, 2007, June). There are issues which affect demand when comparing these hunts, mainly access. However, any ram hunts offer extremely high success rates, generally 100% for those who participate in the hunt. While management of any ram hunts is straightforward, the odds are so high it is unrealistic for any hunter to expect to be awarded an authorization. By instituting horn restrictions, success rates decline, resulting in greater participation.

Moose is the single most demanded species affected by LEH. Given the choice, hunters will hunt the end of September through the beginning of October during the rut to maximize the potential for success. To increase opportunity and participation, splitting rut and non-rut hunts or

removing hunts from the rut should be investigated. With some exceptions Region 3 currently divides LEH authorizations ~33% and 67% respectively between October and November LEH hunts (D. Jury, pers. comm., 2008). This decreases success but increases participation and gives hunters the choice between the ability to seldom hunt during the rut or more often outside the rut.

#### **5.4.2 Encouraging hunters to participate in the hunt**

To encourage hunters to apply for and participate in hunts historic population estimates, allocation, harvest, LEH authorizations, participation and success statistics for each hunt should be made available to the public. Areas which have chronically low success rates and/or limited access should be clearly identified for hunters in the LEH synopsis.

#### **5.4.3 Timing of the Draw**

Timing of the draw was not a major factor in the questionnaire but it should also be considered a priority. Receiving notification of the draw in the middle of July for a hunt which begins August 1<sup>st</sup> is unrealistic. Issues affecting participation regarding draw date include booking holidays, transportation, and equity (perceived and real) between residency groups. 5.1 of the LEH Procedure states: “Results of the draw are provided to applicants at least one month prior to the opening date of the first limited entry hunt where possible.” According to Bill Otway the LEH draw was supposed to allow successful applicants to make plans in advance with flexibility (Otway, 2007, April). Procedure and application is not always consistent.

Discussions with charter operations who service LEH only areas varied significantly. Operators stated they were booked up as early as March or April through early July. Operators also stated that the majority bookings for non-residents were generally completed by the end of February.

The timeframe between quota allocation and resident LEH draw dates also vary significantly and creates a perception of inequity.

#### **5.4.4 Shared Hunts**

There are only two ways to allow hunters the ability to participate more often where maximum utilization occurs. The preferred solution is to create more animals; the second is to increase the number of hunters per kill. Habitat enhancement and predator control programs in the past

demonstrated enormous return on investment for wildlife user groups. As participation relates to the LEH system, shared hunts are currently employed only for moose. Success rates increase; however, shared hunts promote the social factors associated with hunting and will allow hunters and hunting parties to participate more regularly. While some hunters are solitary, for most, hunting is a social activity. Shared hunts should not preclude the solitary hunter from applying, but encourage and allow groups of hunters to hunt more often. The concept of shared hunts should be expanded to all species to allow hunters the ability to participate more often.

Shared hunts for species such as elk, buffalo and deer should be created and the number of hunters per authorization expanded. Shared hunts encourage the social factors associated with hunting and will legitimize ‘party hunting’, which may or may not be an issue in BC. For moose hunts in several areas across the central and northern parts of the province this will likely allow bi or tri-annual participation (BC MoE, 2006). Moving to four hunters per authorization could increase LEH participation by 80% assuming a 100% success rate (Figure 5.1) (BC MoE, 2007b, June).

Year	Authorizations		Participation	Est Kills	Success Rate	4 Hunters per Authorization
	Available	Est Hunters				
2001	10340	8442	82%	3949	47%	15796
2002	10165	8393.4	83%	3851.2	46%	15404.8
2003	10374	8485.4	82%	4394.9	52%	17579.6
2004	10769	10078.1	94%	4421.4	44%	17685.6
2005	10528	10061.5	96%	3829.7	38%	15318.8
5 yr ave	10435.2	9092.08	87%	4089.24	45%	16356.96

Table 5.1: Number of participants who could hunt moose on LEH based on full participation, 100% success and 4 hunters per kill.

#### 5.4.5 Guaranteed Group Size

Guaranteed group size is a form of a shared hunt whereby the number of applying hunters is compared to the number of authorizations to give a guaranteed group size. If a hunting group meets the group size, the group is able to hunt. This allows increased rates of participation and managers to control harvest down to the MU level possibly through GOS. The use of guaranteed group sizes and their suitability for GOS and/or LEH hunting opportunities for elk, moose and bison should be researched.

#### **5.4.6 Split Seasons**

Split seasons are another method to control harvest and hunter crowding issues. Different seasons can be created whereby hunters or groups of hunters can choose one specific hunt whether spatially, temporally or both. While temporal limitations do not always reduce harvest, split seasons will reduce hunter crowding.

### ***5.5 Wildlife Management, Policies and Hunting Regulations***

Deer, moose and Rocky Mountain elk are the most sought after species and likely the most influential in regards to recruitment, retention, participation and satisfaction of resident hunters. Wildlife harvest policies and procedures provide guidance in regards to stakeholder values and uses, population dynamics and measurable targets for sex ratios. The sex ratios identified in harvest strategies for deer and elk greatly exceed the ratios required for population conservation. Male:female ratios greater than those required for population conservation limit hunter opportunity and harvest through GOSs.

Policies and/or execution of these policies may not be reflective of BC's resident hunter population. The execution of policy in relation to regional hunting regulations is not consistent. Hunting opportunities through both GOS and LEH vary considerably at the MU level, between WMRs and across the Province. Harmonization and simplification has been highlighted in numerous F&W branch documents as far back as 1996 in the Wildlife Harvest Strategy (MoE, 1999). Ironically, since 1996 hunting regulations have become more restrictive, complex and have also reduced participation.

#### **5.5.1 Elk Harvest Strategy and Practice**

The minimum sex ratio identified for elk management in British Columbia is 20 bulls:100 cows. Research indicates a post hunt bull:cow ratio of 10:100 will have little effect on fecundity and thus population conservation (Hatter, 2008). Until 1998 GOS elk hunting opportunities in WMR 4 were either 3 pts or greater or a combination of 3 pts or greater and 6 pts or greater bull seasons. In WMR 8 GOS elk hunting opportunities were 3 pts or greater bull seasons. In 1998 WMR 4 changed to a 6 pts or greater restriction and in 1999 WMR 8 also changed to 6 pts seasons seemingly due to winter kill and high antlerless harvest in the case of WMR 4. Both

changes resulted in drastic declines in resident hunter numbers and days. As of 2008 there has been no change in GOS bull elk management regimes in either WMR. Maintaining the bull:cow near the 20 bulls:100 cows minimum with a 6 pt or better restriction is virtually impossible even in heavily hunted, easily accessed populations. The minimum sex ratio identified in the harvest strategy may not be reflective of the resident hunter population; the hunting regulations are not reflective of the harvest strategy.

### **5.5.2 Moose Harvest Strategy and Practice**

Moose is the most demanded and most controlled species through LEH. Moose was the most sought after animal. Over 47% of respondents who hunted moose indicated it was their favorite animal to hunt (N=579) (Appendix 11 & Appendix 12). Moose was the most applied for species in the survey; 568 of respondents indicated they applied for Moose, while the second most applied for species was antlerless deer at 350 (Appendix 13).

Large cities with high density hunter populations, high access, long seasons and perceived opportunity also often dictate participation and resulting harvest. Spike-fork seasons have increased participation while minimizing harvest; this allows hunters to hunt but actual and perceived success are limiting and can be frustrating for hunters but it allows hunters to hunt. Hunter migration and demand throughout the province reflects this.

Today, hunters look forward to applying to the LEH draw and receiving an LEH to go hunting as opposed to going hunting. Survey respondents who did not support a short GOS often linked the negative perception to crowding and ethics issues. This is in part due to the spatial and temporal orientation of GOS moose hunting opportunities across the Province (Table 2.1).

WMR	Class	Season Dates
3	Spike-fork	Sept 20-Oct 31
4		No GOS
5		No GOS
6 South	Any Bull	Oct 20-Oct 26
7 North	Any Bull	Aug 15-Nov 15
7A	Spike-fork	Sept 10-Nov 5 Or Aug 15-Nov 5
7A	Calf	Oct 10- Oct 26
7B	Any Bull	Aug15-Aug 31 Or Aug 15-Sept 5
7B	Tri-palm/10 point/Spike-fork	Sept 1-Sept 30 & Oct 16-Oct 31 Or Sept 10-Oct 31 Or Sept 6-Oct 31
8	Spike-fork	Sept 20-Oct 31

Table 5.2: Moose GOS region, type, date.

Crowding in shorter Moose GOSs is in part due to the opportunity to hunt and perceived opportunity of success. The migration of hunters is further encouraged by inconsistent season dates. Any bull seasons in WMR 6 and 7B and calf GOSs 7A have far more access than areas farther north and are closer to the majority of the hunting population; as a result they receive an influx of hunters. Any bull GOS in WMR 7B occurs from Aug 15-31, and any bull in WMR 6 from Oct 20-26. The calf season in WMR 7A occurs from Oct 10-Oct 25. In regards to moose management Provincial Wildlife Harvest Strategy (1999) states: “Wherever possible, moose hunting regulations will be kept simple, uniform within ecosystem units, and consistent over time (p.27).” There is little co-ordination between regions and it appears most regions employ different harvest strategies. GOS hunter participation is high due to high success rates or the perception thereof. Spreadsheets from WMR 6S moose management indicate population objectives for bull:cow ratios of >35:100; this is 5 bulls:100 cows greater than the Provincial

harvest strategy states. The strategy and application of moose hunting opportunities are not consistent and do not maximize resident hunter opportunity.

### **5.5.3 Hunter Participation and Harvest Strategies**

While hunters indicate issues with crowding and ethics associated with shorter GOSs, secondary data demonstrates where the perception of success is high so is participation. Any buck mule deer seasons, 3pt bull elk seasons and moose GOSs demonstrate immense participation and demand. While crowding is a qualitative metric for satisfaction, it is secondary to the opportunity to hunt, a quantitative metric. Strictly measuring participation rates, areas with GOSs demonstrate significant demand despite some hunter complaints. Recommendations to encourage the quantity over quality approach to wildlife management have been provided in the MoE's hunter recruitment and retention strategy, however there has been no adoption of this strategy to date (MoE, 2007f). Hunter participation measured through secondary data is not consistent with harvest strategies.

### **5.5.4 GOS to LEH**

Once a hunt goes from GOS to LEH it rarely goes back. Region 4 is one example as moose hunting moved from GOS to LEH in 1991 (Figure 5.2). Resident hunters who pursued moose in Region 4 plummeted 82% in one year and have not recovered. Currently, there is no moose GOS in Region 4 despite inventory work conducted by Poole et al. 2008, in the Lodgepole, Upper Flathead and Lower Elk in part to assess the viability of a spike-fork season. The survey indicates stable to increasing populations as compared to 2000 estimates and estimated bull:cow ratios between 40:100 and as high as 84:100, well above the minimum management guidelines of 30:100. A harvestable surplus of bull moose was predicted by Poole et al. prior to conducting the surveys. There is no upper bull:cow threshold identified in the provincial harvest strategy. Bull moose have been stockpiled in Region 4 with no change in resident hunter opportunity.

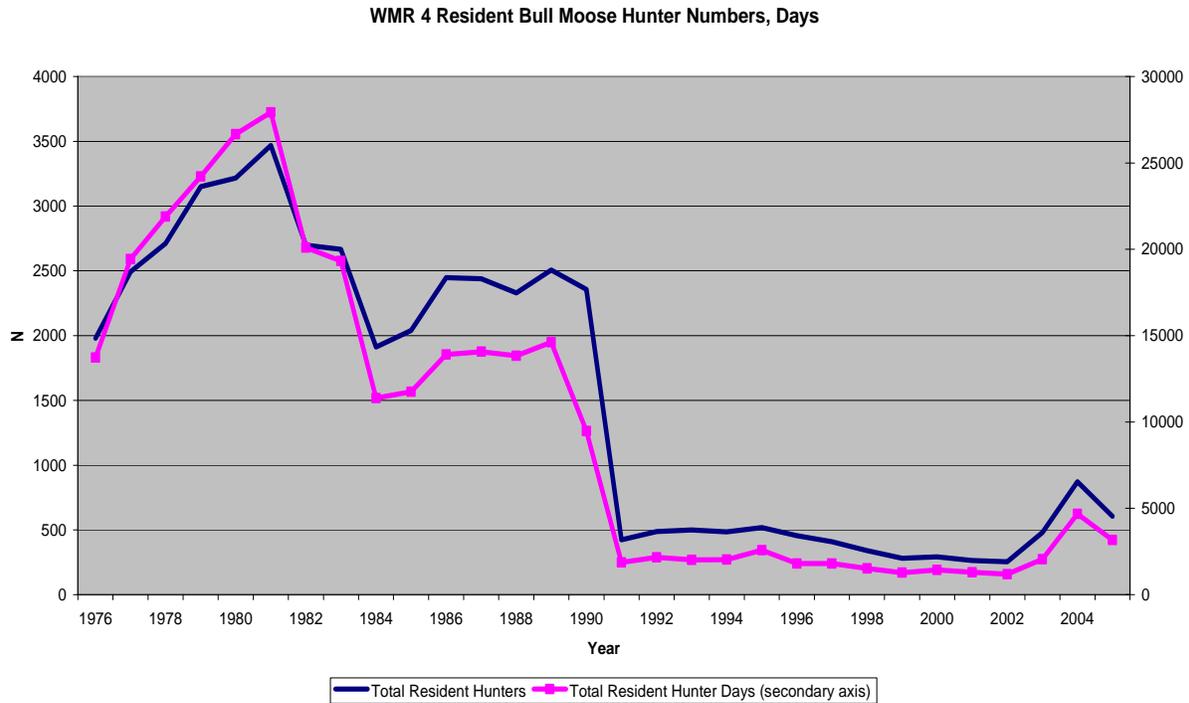


Figure 5.2 WMR 4 Resident bull moose hunter numbers, days, bull moose harvest

### 5.5.5 Wildlife Populations Managed for Maximum Sustainable Yield

Hunters look for the opportunity to hunt, and harvest wildlife with family and friends; this should be reflected in policy and regulations particularly for deer, moose and Rocky Mountain elk.

While Maximum Sustainable Yield (MSY) is a conceptual theory, the fact that a surplus of wildlife exists must be acknowledged and communicated to resident hunters. Managing wildlife as close to MSY as is possible, given budgetary constraints, should be pursued. Provincial harvest strategies greatly exceed required sex ratios for population conservation; sex ratios and hunting regulations from wildlife inventory often exceed provincial minimums. This may not be conducive to the needs of the resident hunter population and does not maximize hunter opportunity, participation and harvest. Harvest strategies and hunting regulations should be reflective of the resident hunter population.

### 5.6 Consultation, Education and Decision Making

According to the MoE's hunting regulations Flow Chart (2009), consultation generally originates at the regional level. First Nations, local fish and game clubs, guide-outfitters, trappers and

hunter advisory committees are requested to provide feedback and are asked whether they support proposed regulations. In some regions resident hunters are requested to submit feedback via the Internet; however, the response rate is low.

If the proposed regulation is accepted at the WMR level, it is elevated to the Provincial level where it is discussed at the Provincial Hunting Regulations and Allocations Advisory Committee (PHRAAC) and then submitted to the Assistant Deputy Minister, Deputy Minister and finally the Minister of Environment. The weighting that is given to stakeholders is unknown.

This method of consultation is problematic for several reasons. Firstly, hunters providing feedback may or may not be reflective of the resident hunter population. Those providing feedback are not a representative sample of the hunter population; consultation is limited to those who actively participate in the consultation process and live in the WMR. Those who live out of region are often excluded from the consultation process. In 2006, 37.27% of basic resident hunting license holders lived in WMRs 1 & 2, both regions which require migration to other WMRs to hunt species such as moose, elk, white-tailed deer and most of the province's mule deer (BC MoE, 2008). Their interests are not addressed in the consultation process.

Secondly, hunters are requested to provide judgment on specific hunting regulations. Managing wildlife through an outcome based exercise eliminates the quantitative base of wildlife management in favour of hunter management. Hunter education in regards to wildlife management is limited. There were negative comments relating to calf moose seasons. Respondents believe that each male calf harvested during hunting seasons translates into one less harvestable bull moose the following year. If hunting opportunities are to be managed based on hunter management, hunters should be properly informed and educated before making decisions.

Third, there is no measurable weighting for decision making at the regional or provincial level. In 2007, a proposal to create a spike-fork moose season in Region 4 was rejected at the provincial level after receiving support from resident hunter representatives at the regional and the provincial level at PHRAAC. Decision making throughout the consultation process is qualitative.

Fourth, regulation proposals often originate and are supported by hunting seasons, not by wildlife management goals. Wildlife managers training and expertise is in managing wildlife, not achieving consensus or attempting to measure or balance qualitative desires of stakeholders. Managers should be given specific goals on wildlife management (a management plan) and give stakeholders options on how to achieve those goals.

Wildlife management goals and policies should be reflective of the resident hunter population. Hunter consultation on wildlife management should be broad based. If hunters are to be decision makers, they should be properly informed and educated on proposed regulation changes before making decisions. Web based and public forum based consultation are not effective forms of consultation; decision making should be based on quantifiable data.

### ***5.7 The Big Picture***

Between 1981 and 2006 the resident hunter population fell close to 50%, hunting regulations became far more restrictive, LEH authorizations increased 165% - something fundamental is missing. Required for population conservation at times, unnecessary LEH and antler restrictions reduce participation and fragment hunting groups, negatively affecting recruitment and retention.

BC's decline of resident hunters is extreme as compared to other jurisdictions across North America; most of that decline can be clearly identified and is often self-induced. LEH and GOS hunting regulations are not reflective of the resident hunter population and do not appear to reflect harvest strategies in some cases. Wildlife management, policy execution, consultation and a lack of hunter education have all contributed to the decline of resident hunters in BC.

While this project adds statistical significance to hunter motivations and factors that affect satisfaction, recruitment and retention, most of the results are intuitive and demonstrated through secondary data. The results regarding factors that affect the hunting experience and secondary data parallel the recommendations provided, although not adopted, in the MoE's hunter recruitment and retention strategy (MoE, 2007f).

Changes to the type of lottery system will only address the perception of inequities in the draw; changes to the type of lottery system will not increase participation, recruitment or retention. Changes will not allow hunters to hunt more often. The future of hunting lies in hunters' ability to participate annually with a reasonable chance of success. LEH should be used only as a last resort.

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## Appendix 1: Cover Letter and Survey

### Limited Entry Hunting System Review

The following survey is part of a review of the Limited Entry Hunting (LEH) system in British Columbia for the Ministry of Environment. The goal of the review is to understand issues that affect resident hunter recruitment, retention, participation and satisfaction regarding the LEH system. Once the review has been completed recommendations will be made to the Ministry of Environment regarding the Limited Entry Hunting system.

You have been randomly selected and identified as someone who is a resident hunter of British Columbia and purchased a basic hunting license in 2006. If you are not, please discard this form. By completing and submitting this survey it is assumed that you have read the following letter and have given consent to this survey.

The review is being conducted by Jesse Zeman through the British Columbia Conservation Foundation (BCCF) and has been funded by the Fish and Wildlife Branch of the Ministry of Environment. Your name and address appear only on the envelope that contained this questionnaire; the questionnaire itself does not reveal any personal information specifically about you. Mr. Zeman will receive the completed questionnaires for analysis, but he will not know who provided them.

Please note you do not have to fill out this form. You have the right to stop completing this form at anytime. Your responses are not tracked: only the project manager, Jesse Zeman, will ever see your form. There will be no future contact/consequence as a result of completing this form. Once the form has been completed please put it in the postage-paid envelope and deposit at the nearest mailbox.

If you have any questions about the form or project, please contact Jesse Zeman at [jessezeman@shaw.ca](mailto:jessezeman@shaw.ca) or (250) 878-3799. If you have any questions about the project you can also contact John Thornton, Manager of Data and Licensing with the Ministry of Environment at [john.thornton@gov.bc.ca](mailto:john.thornton@gov.bc.ca) or (250) 387-9776.

The form should take about 5 to 10 minutes to complete.

Thank you for your participation,

Jesse Zeman

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### Limited Entry Hunting System Review

1. Which Fish and Wildlife management region do you live in (1,2,3,4,5,6,7A,7B,8)?

\_\_\_\_\_

2. Have you applied for LEH hunts in the past (check box)?

No  Yes, every year  Yes, in the past 5 years  Yes, in the past 10 years

If you do not apply or have not applied to the LEH draw recently you may continue to complete the form.

3. In order of importance please rank your favorite animals to hunt. Put a 1 (one) beside the animal you like to hunt the most, a 2 (two) beside the animal you like to hunt the second most and so on. If you do not hunt an animal do not insert a number.

- |                         |                    |
|-------------------------|--------------------|
| _____ Mule Deer         | _____ Elk          |
| _____ Caribou           | _____ Sheep        |
| _____ White-tailed Deer | _____ Black Bear   |
| _____ Moose             | _____ Grizzly Bear |
| _____ Black-tailed Deer | _____ Bison        |
| _____ Cougar            | _____ Goat         |
| _____ Upland Game Birds | _____ Waterfowl    |

4. If you apply to the LEH system, which species do you apply for (check boxes)?

Moose <input type="checkbox"/>	Mountain Goat <input type="checkbox"/>	Roosevelt Elk <input type="checkbox"/>	Rocky Mountain Bull Elk <input type="checkbox"/>
Bison <input type="checkbox"/>	Antlerless Deer <input type="checkbox"/>	Caribou <input type="checkbox"/>	Rocky Mountain Cow Elk <input type="checkbox"/>
Bighorn Sheep <input type="checkbox"/>	Thinhorn Sheep <input type="checkbox"/>	Grizzly Bear <input type="checkbox"/>	

5. From 1 to 5 (1 being not important, 5 being extremely important) rate the reasons why you do or would apply for a particular LEH hunt. Circle the number which represents your opinion.

<u>Reason for Applying for a particular LEH hunt</u>	<u>Not important</u>			<u>Extremely important</u>	
	1	2	3	4	5
Low Odds	1	2	3	4	5
Ability to hunt other species on general open season at the same time	1	2	3	4	5
Tough to Access	1	2	3	4	5
Plenty of Access	1	2	3	4	5
Knowledge of the area	1	2	3	4	5
Traditional hunting area	1	2	3	4	5
Close to home	1	2	3	4	5
Size of LEH area	1	2	3	4	5
Potential for success	1	2	3	4	5
Potential for harvesting a trophy	1	2	3	4	5
Well defined management unit boundaries	1	2	3	4	5
Heard about it from a friend	1	2	3	4	5
Like to try new areas	1	2	3	4	5
Remote experience	1	2	3	4	5
Few hunters in the area	1	2	3	4	5

Other factors why you apply for a given management unit or area:

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6. Many people that are successfully drawn for LEH hunts decide not to use their opportunity. Why do you believe that is?

<u>Reason why LEH authorizations go unused</u>	<u>Not important</u>					<u>Extremely important</u>				
	1	2	3	4	5	1	2	3	4	5
Low Odds	1	2	3	4	5					
Draw received was not the first choice animal	1	2	3	4	5					
Lack of Access	1	2	3	4	5					
Plenty of Access	1	2	3	4	5					
Didn't know the area before applying	1	2	3	4	5					
Too far to travel for one species	1	2	3	4	5					
Anti-hunter	1	2	3	4	5					
Size of LEH area	1	2	3	4	5					
Potential for success	1	2	3	4	5					
Potential for harvesting a trophy	1	2	3	4	5					
Well defined management unit boundaries	1	2	3	4	5					
No one to go hunting with	1	2	3	4	5					
Can't get the time off	1	2	3	4	5					
Cost of the species license	1	2	3	4	5					
Uncontrollable factors	1	2	3	4	5					
Received multiple draws	1	2	3	4	5					
Too many other hunters	1	2	3	4	5					

Other factors why hunters don't purchase species license or go hunting once receiving an LEH:

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7. In order of preference, would you rather have the opportunity to hunt every year on a shorter general open season, a longer antler/horn restricted season or apply to hunt during a Limited Entry Hunting season (1 being most preferred, 3 least preferred)?

Shorter general open season \_\_\_      Longer antler/horn restricted hunt \_\_\_      Apply for a Limited Entry Hunt \_\_\_

8. Do you believe your chance of success would decrease with more general open seasons?

Yes  \_\_\_\_\_ No  \_\_\_\_\_

9. Do you believe the woods would be busier with more general open seasons?

Yes  \_\_\_\_\_ No  \_\_\_\_\_

Comments:

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10. Rate the importance of factors that affect your hunting experience.

<b><u>Factors affecting hunting experience</u></b>	<b><u>Not Important</u></b>					<b><u>Extremely important</u></b>				
	1	2	3	4	5	1	2	3	4	5
The opportunity to go hunting annually	1	2	3	4	5	1	2	3	4	5
Spending time with friends/family	1	2	3	4	5	1	2	3	4	5
Returning to traditional hunting areas	1	2	3	4	5	1	2	3	4	5
Telling hunting stories	1	2	3	4	5	1	2	3	4	5
The opportunity to harvest a legal animal	1	2	3	4	5	1	2	3	4	5
The opportunity to harvest a trophy	1	2	3	4	5	1	2	3	4	5
Getting out in the wilderness	1	2	3	4	5	1	2	3	4	5
Physical activity	1	2	3	4	5	1	2	3	4	5
Improve hunting abilities	1	2	3	4	5	1	2	3	4	5
Opportunity to hunt multiple species	1	2	3	4	5	1	2	3	4	5
Few hunters afield	1	2	3	4	5	1	2	3	4	5

11. Are you satisfied with the LEH draw system?

Yes

No

12. Select the criteria which best represent your views of the LEH system.

<b><u>Aspect of the LEH System</u></b>	<b><u>Strongly Agree</u></b>	<b><u>Agree</u></b>	<b><u>Disagree</u></b>	<b><u>Strongly Disagree</u></b>	<b><u>No Opinion</u></b>
LEH is too costly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timing of the draw date is too late	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hunting seasons are too short	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The draw isn't fair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I never get drawn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others get drawn repeatedly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My chances of being drawn should increase every year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special maps are hard to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LEH is a bonus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not enough authorizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unused authorizations should be re-drawn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't like enhanced odds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LEH is too complex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like shared hunts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like group hunts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. What kind of a hunter do you consider yourself? (circle one)

Meat Hunter                      Meat, then selective                      Selective                      Trophy

14. How many days do you hunt per season (check box)?

0-4 <input type="checkbox"/>	5-9 <input type="checkbox"/>	10-14 <input type="checkbox"/>	15-19 <input type="checkbox"/>	>20 <input type="checkbox"/>
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15. How would you describe your abilities as a hunter (check one)?

Beginner                       Intermediate                       Avid

**Demographics**

**The following information is collected for statistical analysis. No individual information will be distributed.**

Gender

Male                       Female

Age Group

19-24                       25-35                       36-50                       51-64                       > 65

What age did you first go hunting?

Under 10                       Under 18                       19-24                       25-35                       36-50                       51-64

Who got you started in hunting?

Father                       Friend                       Uncle                       Grandfather                       Sibling                       Other

How many different people do you hunt with?

1                       2                       3                       4                       5                       > 5

General Comments:

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## Appendix 2: Required Sample Size Guide

### Required Sample Size Guide

N= population size

B= allowable error

P= estimated population proportion

Q = 1-P

z= z-score

C.I.= confidence interval

n= sample size

n=

$$n = \frac{NPQ}{\frac{(N-1)B^2}{z^2} + PQ}$$

### Required Resident Hunter Sample Size

N= 89 532

B= 0.05

P= 0.5

Q= 1-0.5

z= 1.96

C.I.= 95%

$$n = \frac{89532(0.5)(1-0.5)}{\frac{(89532-1)0.05^2}{1.96^2} + (0.5)(1-0.5)}$$

n = 383

## Appendix 3: Required Mail-out

### Required Mail-out Guide

X=required sample

P= incidence x response rate

Q= 1-P

Z= z value

C.I.= confidence interval

Actual sample =

$$\frac{2X + Z [ ZQ + \sqrt{(ZQ)^2 + 4XQ} ]}{2P}$$

### Actual Mail-out Required

Z = 1.645 (one-tailed)

C.I.= 95%

X = 383

P = (0.95)(0.50) = 0.475

Q = 1-(0.95)(0.50) = 0.525

Actual mail-out =

$$\frac{2(383) + (1.645)[(1.645)(0.525) + \sqrt{(1.645 * 0.525)^2 + 4(383)(0.525)}]}{2(0.475)}$$

Surveys required= 857

Surveys being sent= 2500

## Appendix 4: Actual Sample Size

### Sample Size Guide

N= population size

B= allowable error

P= estimated population proportion

Q= 1-P

z= z-score

C.I.= confidence interval

n= sample size

$$B = \sqrt{\frac{z^2}{N-1} \left[ \frac{NPQ}{n} - PQ \right]}$$

### Actual Resident Hunter Sample Size

n= 677

N= 89 532

B= ?

P= 0.5

Q=1-0.5

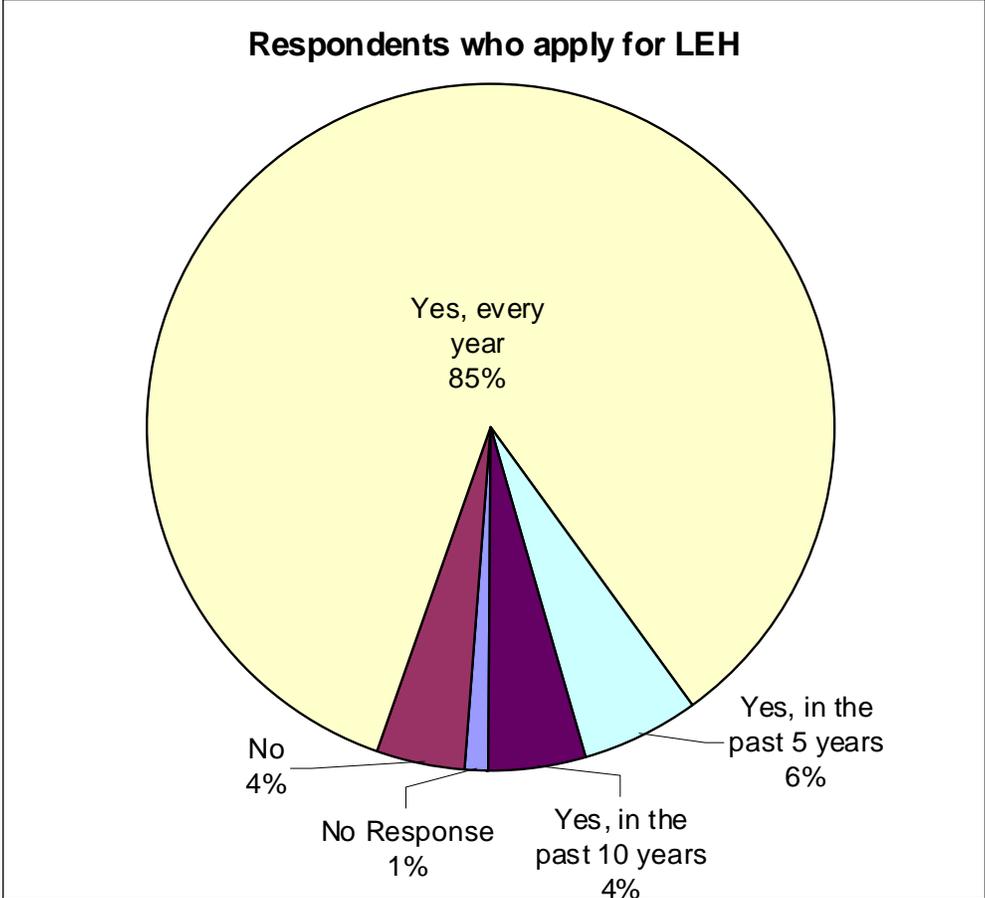
z= 1.96

C.I.= 95%

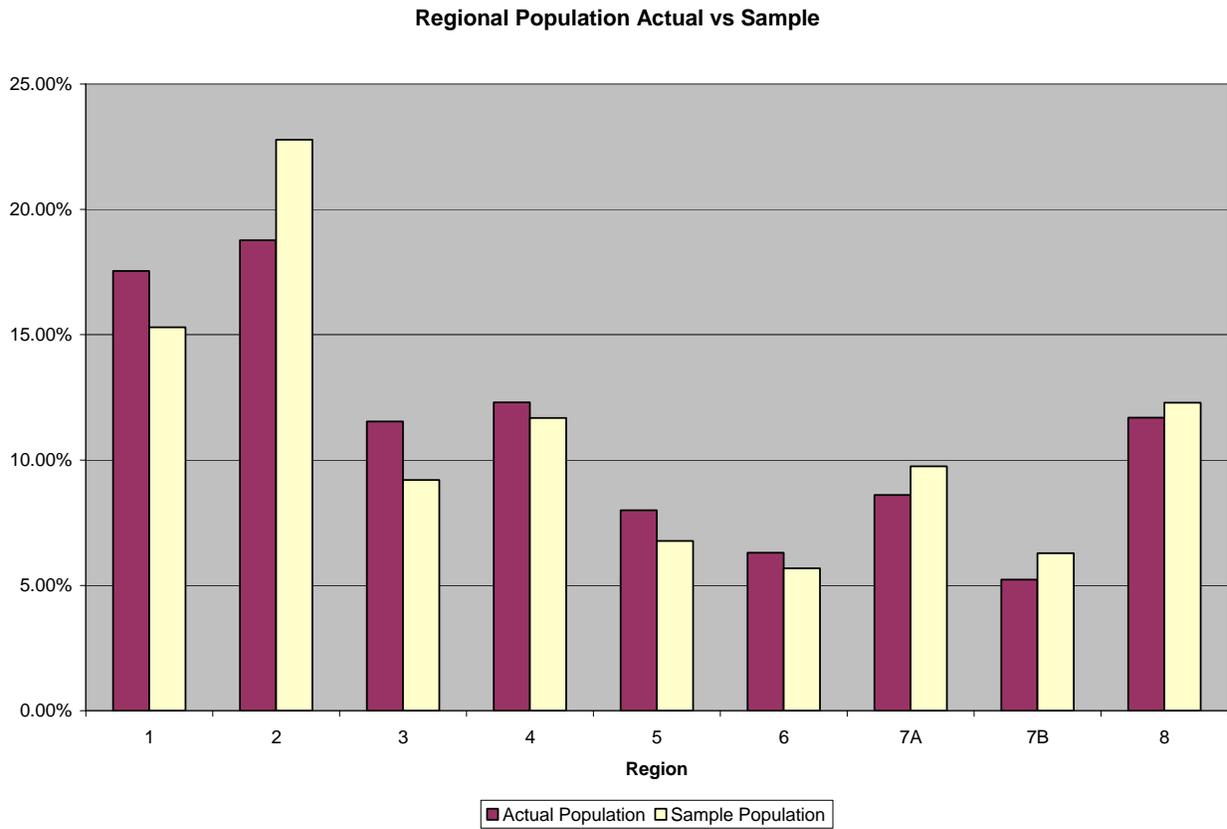
$$B = \sqrt{\frac{1.96^2}{89532-1} \left[ \frac{89532(0.5)(1-0.5)}{677} - (0.5)(1-0.5) \right]}$$

B= 3.75%

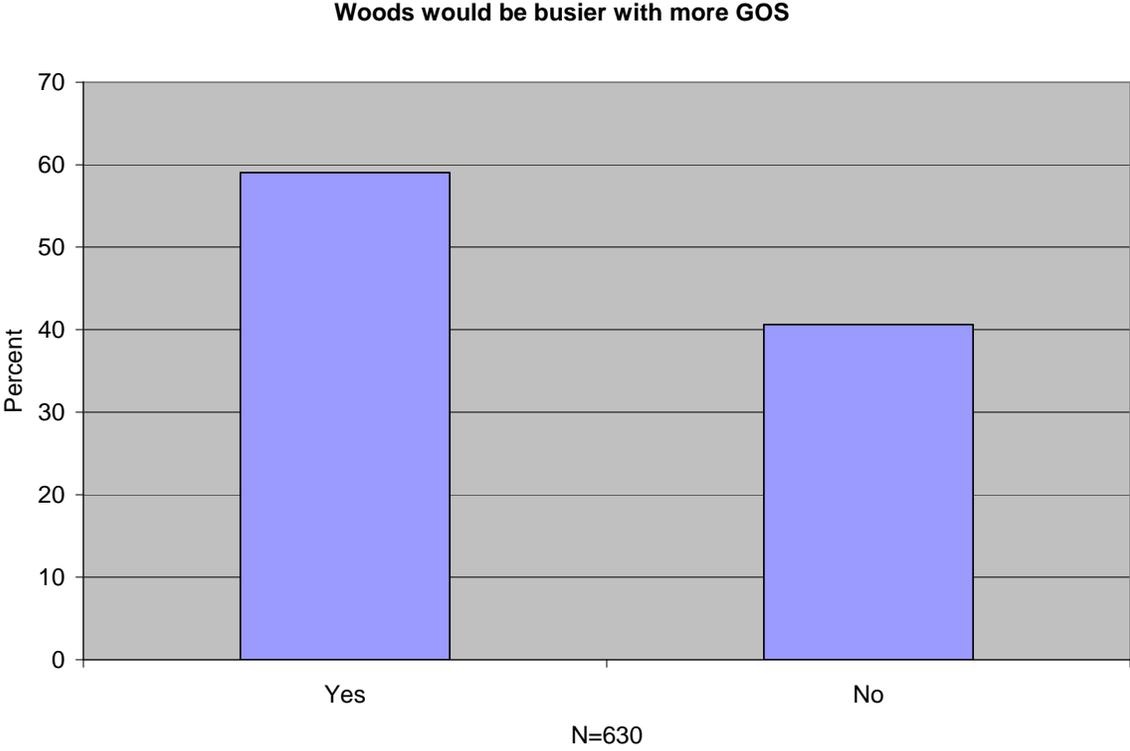
### Appendix 5: Respondents who apply for LEH



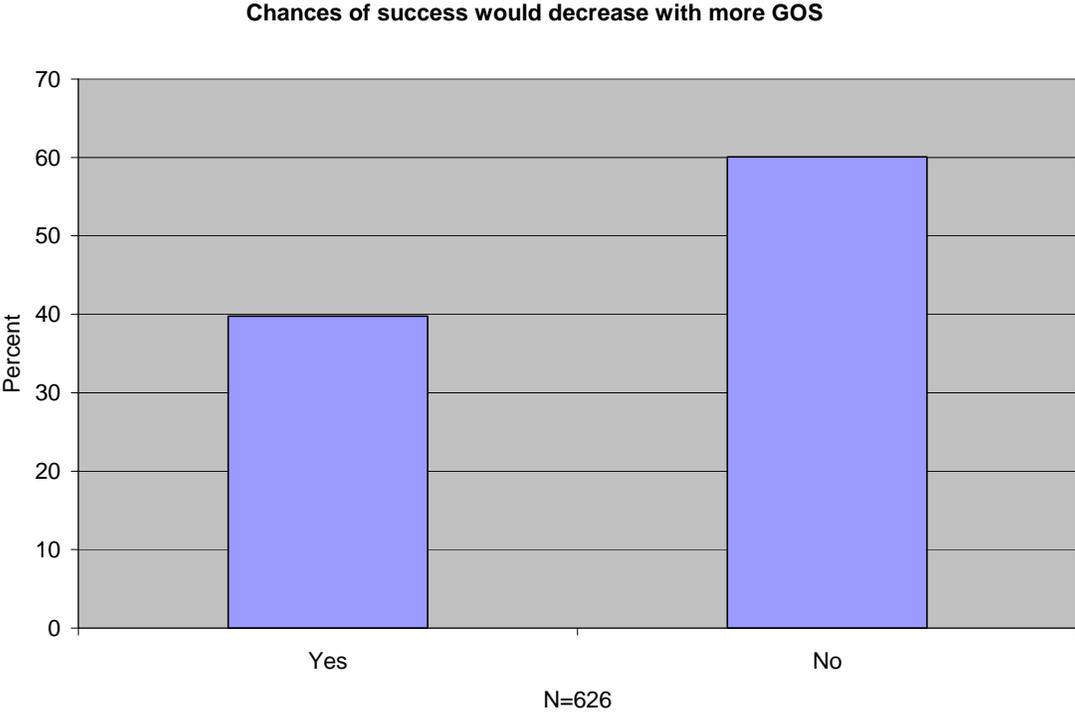
## Appendix 6: Comparison of regional resident hunter population to sample population



### Appendix 7: Woods would be busier with more GOS



# Appendix 8: Chances of success would decrease with more GOS



## Appendix 9: Estimated Utilization 2007

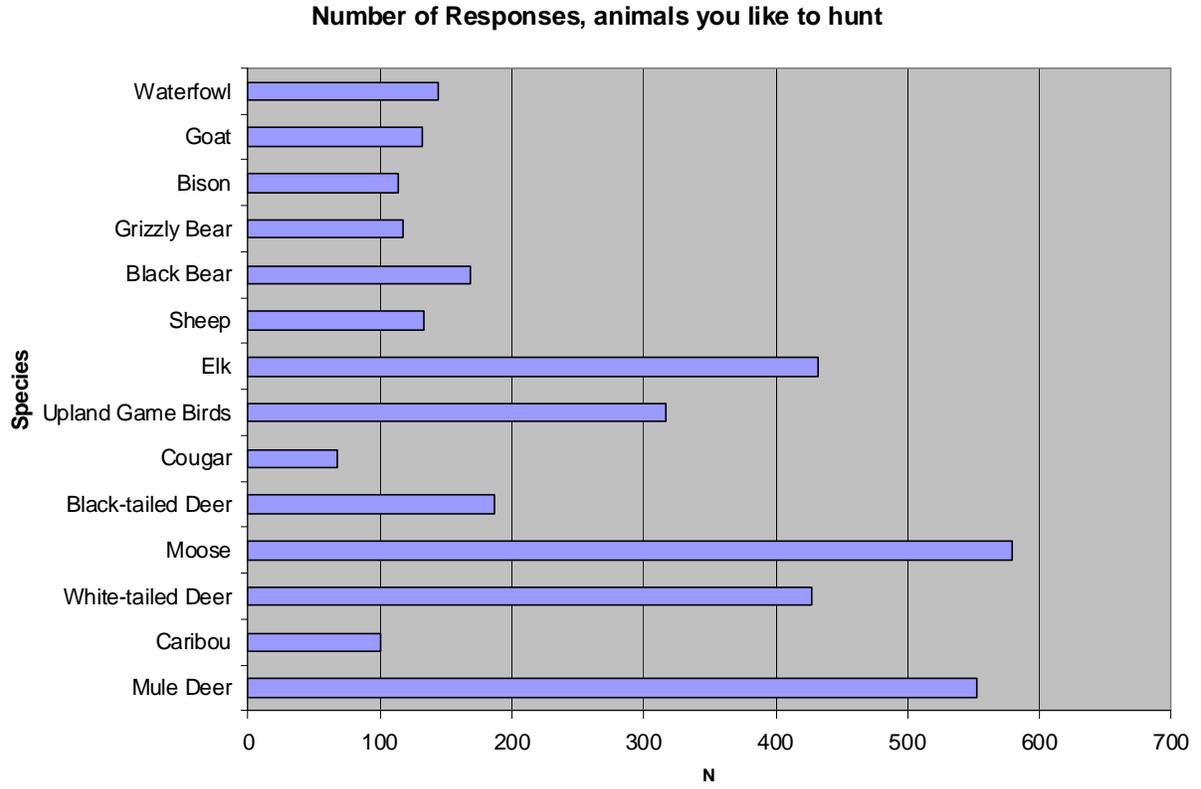
Region	Species	2007 Allocation %	2007 AAH	LEH Auth 2007	Estimated Participation 2007	Estimated Harvest 2007	Estimated Utilization 2007
1	Gr Bear	56%	7.9	55	24.88	6.55	8
1	Elk (bull)	88%	98.0	147	135.67	103.33	11
1	Elk (archery)	60%	2.7	21	17.27	3.32	12
2	Elk (bull)	81%	13.8	24	21.94	13.03	9
3	Gr Bear	88%	6.5	8	5.27	1.95	3
3	Moose (bull)	94%	312.1	940	1025.45	317.18	10
3	Goat	69%	37.9	213	99.21	15.11	4
4	Gr Bear	77%	56.7	311	235.74	63.90	11
4	Moose (bull)	77%	232.5	519	507.16	261.77	11
4	Goat	69%	232.5	2210	965.31	177.61	8
4	BH Sheep	71%	3.0	7	6.32	1.07	4
5	Gr Bear	70%	19.8	101	59.75	19.73	10
6	Gr Bear	60%	126.7	1002	565.28	102.04	8
7B	Gr Bear	60%	84.0	566	335.93	59.92	7
7B	Bison	84%	294.0	307	255.31	195.98	7
7B	Goat	70%	11.7	74	36.17	7.53	6
8	Moose (bull)	85%	79.0	191	183.81	64.00	8
8	Sheep	74%	13.5	70	48.51	12.36	9

## Appendix 10: Moose harvest analysis WMR 8

MU/Zone	Resident Allocation	2003		2004		2005		Ave. 03-05 Succ	2007		Harvest Rec. Season		
		LEH #	Harvest Success	LEH #	Harvest Success	LEH #	Harvest Success		Calculated LEH Permits	Diff. from Ave. 03-05 LEH Permits		Recommended LEH Permits	
8-01	3	4	3	4	3	4	0	0.50	6	2	4	2	Oc01/Nb30
8-01		4	0	4	1.3	4	2	0.28	0	-4	4	1	Nb01/Nb30
8-04	3	3	1.5	3	0	3	0	0.17	18	15	3	1	Oc01/Oc31
8-04		5	0	5	0	5	0	0.05	0	-5	5	0	Nb01/Nb30
8-05	6	8	4	8	4	8	2.3	0.43	14	6	6	3	Oc01/Oc31
8-05		17	3.1	17	6	17	1.2	0.20	0	-17	12	2	Nb01/Nb30
8-06	4	4	2.7	4	2	4	0	0.39	10	6	4	2	Oc01/Oc31
8-06		8	6	8	4	8	4	0.58	0	-8	6	4	Nb01/Nb30
8-07	5	4	2	4	3	4	1	0.50	10	6	4	2	Oc01/Oc31
8-07		8	5.3	8	5.2	8	4	0.60	0	-8	6	4	Nb01/Nb30
8-08	16	17	6.8	17	12.5	17	6.7	0.51	31	14	17	9	Oc01/Oc31
8-08		21	11.8	21	3.9	21	4	0.31	0	-21	21	7	Nb01/Nb30
8-09	4	6	3.2	8	3.5	8	4.2	0.50	8	1	8	4	Oc01/Oc31
8-09		16	2.7	16	0	16	2	0.10	0	-16	16	2	Nb01/Nb30
8-10	12	5	5	5	2.5	5	0	0.50	24	19	3	2	Oc01/Oc31
8-10		11	5.5	11	1	11	2	0.26	0	-11	5	1	Nb01/Nb30
8-11	6	7	2.8	7	4	7	1	0.37	16	9	5	2	Oc01/Oc31
8-11		11	3.7	11	3.5	11	2	0.28	0	-11	9	3	Nb01/Nb30
8-12	7	6	1.2	6	1.2	6	4.6	0.39	18	12	6	2	Oc01/Oc31
8-12		12	4.8	12	4.3	12	1.2	0.29	0	-12	12	3	Nb01/Nb30
8-14	4	3	1.5	3	3	3	1.5	0.67	6	3	3	2	Oc01/Oc31
8-14		7	4.2	7	1.7	7	3	0.42	0	-7	5	2	Nb01/Nb30
8-15	3	4	2.7	4	4	4	2	0.73	4	0	2	1	Oc01/Oc31
8-15		4	1	4	2	4	1	0.33	0	-4	4	1	Nb01/Nb30
8-23	8	5	2.5	5	1	5	1.5	0.33	24	19	5	2	Oc01/Oc31
8-23		6	4.8	6	2	6	2	0.49	0	-6	6	3	Nb01/Nb30
8-24	3	3	3	3	0	3	1	0.44	7	4	3	1	Oc01/Oc31
8-24		3	0	3	2	3	1.5	0.39	0	-3	3	1	Nb01/Nb30
<b>Total</b>	<b>84</b>	<b>212</b>	<b>92</b>	<b>214</b>	<b>81</b>	<b>214</b>	<b>56</b>	<b>0.36</b>	<b>197</b>	<b>-17</b>	<b>187</b>	<b>67</b>	

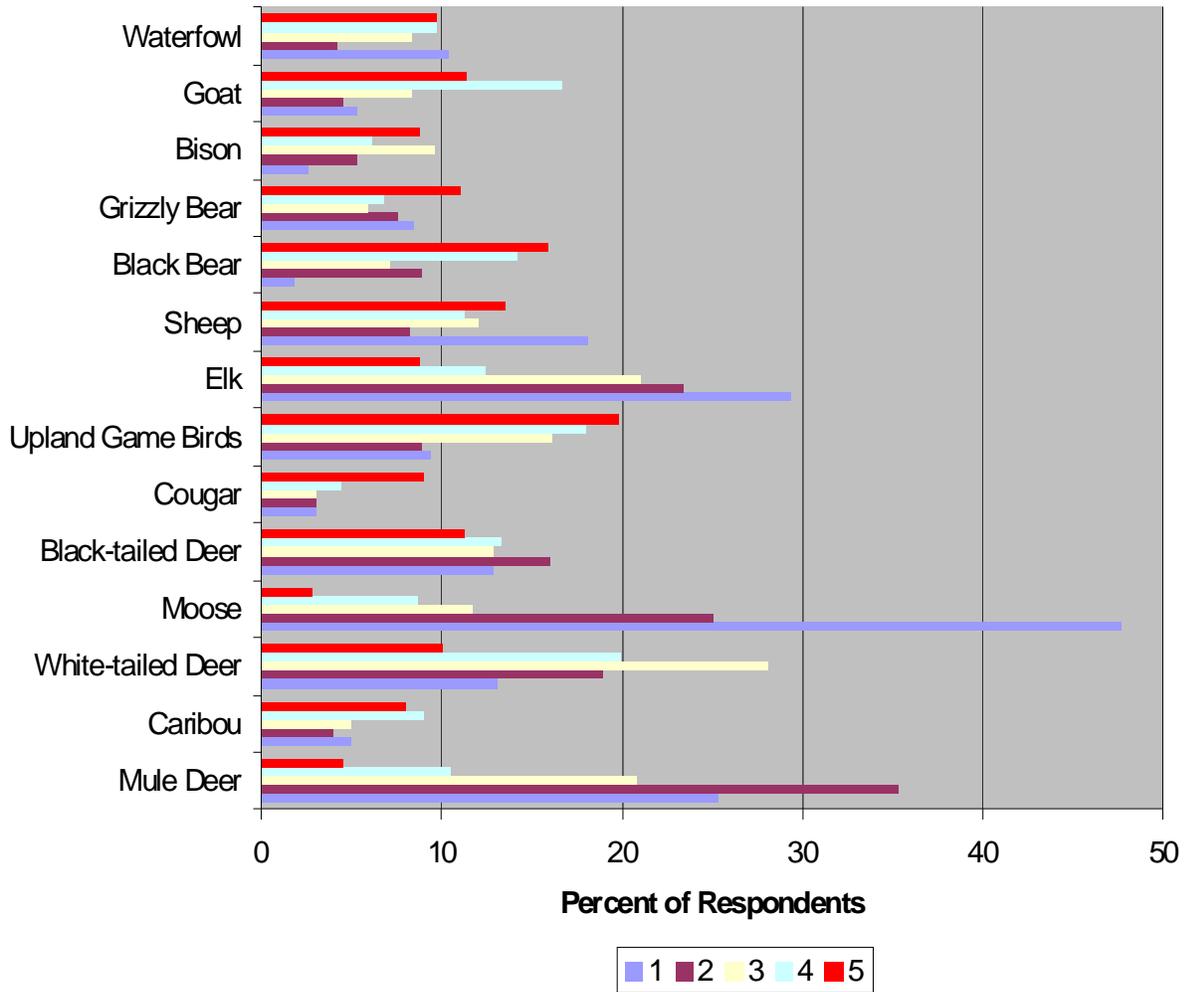
Calculation for Recommended LEH numbers - Moose 2007

## Appendix 11: Responses, animals you like to hunt



## Appendix 12: Favorite animals to hunt

In order of importance, rank your favorite animals to hunt



## Appendix 13: Which LEH species do you apply for?

