



*REPORT NO. 1: 2010*

# **ECONOMIC POTENTIAL OF HUNTING TOURISM IN ICELAND**

## **MAIN RESULTS OF A SURVEY**

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**Northern  
Periphery  
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## **INTRODUCTION**

There is scarce information of the economic impact of hunting tourism in Iceland. In East Iceland hunting tourism mainly revolves around reindeer hunting. The hunting is felt to provide considerable income for the local economies in this area during the hunting season.

In this report results are presented from a survey among Icelandic hunters. The aim of this survey was to gather information from hunters regarding their hunting habits, focusing on their spending patterns and how they impact local tourism businesses. This was done since actual data for leisure hunting trends are fragmented and dated, although some indicators can be identified. Therefore it was vital to gain more thorough information on the economic impact of hunting tourism. Hunters, that went hunting reindeer in 2009, were asked several questions regarding the hunting trip and then hunters were asked questions regarding their hunting in general.

In the former part of this report the main findings of the survey are discussed and in the latter part these findings are used to estimate the economical effects on the hunting areas, first hunting in general and then the economical effects of the reindeer hunt.

### ***The aim of the survey***

The results, presented in this report, are a part of the North Hunt project. North Hunt is an international project that has been awarded funding by the European Regional Development Fund within the Northern Periphery Programme. North Hunt involves a partnership of ten organisations from Finland, Sweden, Iceland, Scotland and Canada. These are governmental agencies, research bodies and industry related organisations along with entrepreneurs in each of the countries. The institutions in Iceland that participate in the North Hunt project are: The University of Akureyri Research Centre, The Icelandic Tourism Research Centre and Department of Business at the University of Akureyri. The overall objective of the North Hunt project is to support the development of sustainable hunting tourism that will diversify the economic activity of peripheral regions in Northern Europe.

The results in this report were developed as a part of work package 3, Task 3 entitled: *The economical potential of hunting tourism*. To estimate this potential for hunting tourism there was a need to produce some basic figures.

The information obtained will be used to estimate the economical effect of hunters on the hunting areas. The aim of the survey is that the information obtained, can be exploited by those who are in the hunting tourism.

### ***Older data***

In 2009 The Icelandic Hunting and Shooting Association (SKOTVÍS) did some notation of the economical impacts of reindeer hunting in East Iceland, the only part of the country where reindeer are to be found. The income for

hunting licences in 2008 was 106.4 M.ISK and indirect income was estimated about 100 MISK (Skotvís, 2009).

Jóhannesdóttir et al. (2006) calculated landowners' revenue for hunting permits. In the last few years it's getting more and more common that landowners charge hunters for licence to hunt on their land. In table 1 the premises and calculations can be seen. The calculations are based on 2 permits pr. day hunting geese and ptarmigan and 1 permit hunting ducks. The number of days varies.

**Table 1. Calculations of net revenue landowners for hunting permits.**

	No. of hunting permits pr. day	No. of days	Price pr. pers.	Revenue
Goose hunting permits	2	7	7.000	98.000
Ptarmigan hunting permits	2	20	5.000	200.000
Ducks	1	5	5.000	25.000
<b>Total revenue</b>				<b>323.000</b>

(Source: Jóhannesdóttir et al., 2006)

The total revenue of 323.000 ISK can be updated to 452.000 ISK.<sup>1</sup> using the change in Consumer Price Index (CPI) from the average of 2006 to May 2010.

In 2001 SKOTVÍS published results from a survey preformed among members of SKOTVÍS. The results were that the average amount spent on hunting by the respondents was 69.000 ISK (SKOTVÍS, 2001). This amount extrapolated to date is 125.000 ISK<sup>2</sup> and was found by using the change in CPI from the average of August till December 2000 to May 2010.

### ***Hunting in Iceland through the time***

Formerly, hunting both birds and mammals was an inevitable part of surviving in Iceland. Either the hunting was a profession, to provide food for the household or to eliminate vermin who put livestock in danger. The population hunted everything that could be eaten or sold and as much as they could with the rude hunting techniques they had. Most of the time, the hunters didn't care nor had knowledge if the hunt could destroy entire population of some species of fauna. This led inevitable to that many species of fauna were exterminated or almost exterminated in some parts of Iceland. The most famous example thereof is the killing of the world's last great auk in Edey island in the year 1844. But there is no reason to blame those who in the olden times tried to survive in the rugged nature of Iceland. The only way to do so was to exploit everything the nature offered. In some locations of the country the hunting was so significant that without it, it would have been impossible to survive. Especially hunting seabirds and seals was important but

<sup>1</sup> See Statistics Iceland's website [www.hagstofa.is](http://www.hagstofa.is)

<sup>2</sup> See Statistics Iceland's website [www.hagstofa.is](http://www.hagstofa.is)

in most places in the country the catch was an important factor to get by in Iceland in those times (Friðriksson, 1996, pp. 154 -157).

Hunting and the use of game was an important a source of livelihood in Iceland and in some cases vital in order for the Icelanders to survive the country's unforgiving climate and harsh environment. Although this is the case Icelandic hunting traditions don't have deep historical roots in the culture. Ownership of firearms was close to nonexistence in the 17th century but poverty was probably one of the major factors for the slow development in the ownership of firearms (Guðmann, 2007). Earlier documentations exist of hunting by trapping arctic foxes, some birds and harpooning seals (Friðriksson, 1996). Hunting with firearms in mid 18th century was documented, but it was only after mid 19th century that hunting with firearms became more common (Friðriksson, 1996). Hunting, as it is known today as a leisure activity, didn't become common until mid 20th century. At the same time Europeans had already established a long tradition for hunting which in some cases could be dated back to the middle ages where hunting was a leisure of the aristocrats (Friðriksson, 1996). Friðriksson claims that the reason for the lack of strong hunting traditions in Icelandic leisure hunting can be explained by that there weren't any aristocrats who limited the possibilities of the common people to hunt or made strict regulations of how hunting should be conducted.

### ***The game***

Table 2 shows the hunting period of game in Iceland in 2009. Some species are looked on as vermin and therefore hunting of them is allowed the whole year. But the hunting period of other game is much shorter, as can be seen in the table 2.

**Table 2. The hunting period of game in Iceland. Source: UST, 2009.**

	January	February	March	April	May	June	July	August	Septemb	October	November	December	Season
Mink													All year
Arctic fox													All year
Seals													All year
Great Black-backed Gull													All year
Lesser Black-backed Gull													All year
Herring Gull													All year
Common Raven													All year
Greylag Goose													20.08-15.03
Pink-footed Goose													20.08-15.03
Barnacle Goose*													01.09-15.03
Greater White-fronted Goose													Hunting ban
Northern Fulmar													01.09-15.03
Great Cormorant													01.09-15.03
European Shag													01.09-15.03
Mallard													01.09-15.03
Eurasian Teal													01.09-15.03
Eurasian Wigeon													01.09-15.03
Greater Scaup													01.09-15.03
Lesser Scaup													01.09-15.03
Long-tailed Duck													01.09-15.03
Red-breasted Merganser													01.09-15.03
Glaucous Gull													01.09-15.03
Black-headed Gull													01.09-15.03
Black-legged Kittiwake													01.09-15.03
Razorbill													01.09-15.03
Common Guillemot													01.09-10.05
Brünnich's Guillemot													01.09-10.05
Black Guillemot													01.09-10.05
Atlantic Puffin**													01.09-10.05
Rock Ptarmigan***													Advertised ea
Arctic Skua****													15.04-14.07
Reindeer*****													01.08-15.09

\*Is protected until 25.september in A-Skaftafellssýslu and V-Skaftafellssýslu

\*\*Hunting with nets is allowed in special benefits areas from 01.07-15.08

\*\*\*29th of October to 5th of December and only on fridays, Saturdays and Sundays.

\*\*\*\*Only allowed to hunt in and around Common Eider protected areas

\*\*\*\*\*Special license needs to be bought to hunt reindeer

Table 3 below shows the numbers of hunted mammals and birds in 2008 but the number of hunted seal is not available. According to Icelandic law 39 species can be hunted but the number depends on the legislation at any time. Birds are about  $\frac{3}{4}$  of this but beside 6 species of seals, the arctic fox, mink and reindeer can be hunted. If only the species that are hunted for utility are looked at then the number of species of birds is reduced to about  $\frac{1}{3}$  of species hunted. The most common caught bird 2008 was the puffin. Great majority of the hunting of puffin takes places close to its nesting area where it is caught in nets. Number two is the ptarmigan and in third place is the graylag goose. There is no quota on game in Iceland except on reindeer hunting. Each year a new quota is issued based on the size of the reindeer population. Last years the hunters have been asked to be moderate when hunting the ptarmigan because of condition of the ptarmigan population.

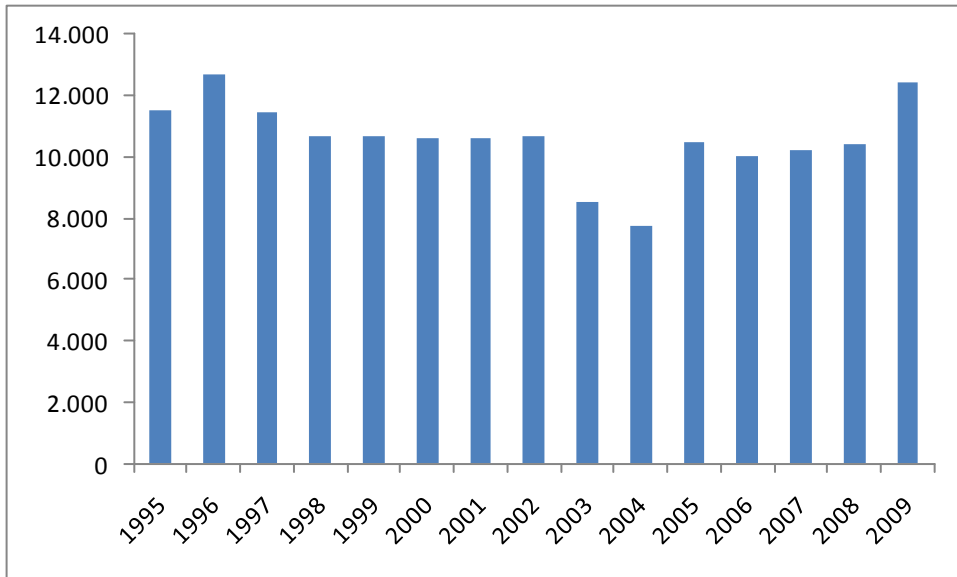
**Table 3. The numbers of hunt in 2008. Source: UST, 2010.**

Puffin	58.487
Rock Ptarmigan	52.050
Greylag Goose	45.414
Lesser Black-backed Gull	27.744
Common Guillemot	27.526
Razorbill	15.553
Pink-footed Goose	15.020
Great Black-backed Gull	12.056
Mallard	11.165
Artic Fox	7.914
Brunnich's Guillemot	7.903
Mink	6.641
Fulmar	4.068
Herring Gull	3.804
Common Raven	3.275
Black Guillemot	3.136
Shag	2.399
Cormorant	2.300
Glaucous Gull	1.688
Barnacle Goose	1.533
Reindeer	1.529
Teal	1.508
Wigeon	1.180
Long-tailed Duck	1.153
Black-headed Gull	1.008
Artic Skua	758
Kittiwake	732
Read-breasted Merganser	627
White-fronted Goose	266
Scaup	146
Tufted Duck	126

### ***Hunting in Iceland in the present***

The current controlling system of hunting demands that all hunters in Iceland, who intend to hunt birds and mammals, are required to obtain a firearms license and a hunting card issued by the Department of Natural Resources (DNR) at the Icelandic Environment Agency. To get a firearms licence and a hunting licence one must be 20 years old and has to attend two courses and take tests. One is for the firearms licence and the other is for the hunting licence. The latter is only valid for one year at a time. If the hunter wishes to renew the hunting licence then (s)he must issue a bag report for all hunted species. It can be done online. In 2009 DNR issued 12.227 hunting card to

hunters with Icelandic residency. The below figure 1 shows the numbers of issued hunting licences since 1995.



**Figure 1. Number of issued hunting licences.** Source: USTa, 2010.

The reason for a slight downswing in issued hunting licences in 2003 and 2004 are most likely because these years the hunting of ptarmigan was banned but as can be seen in table 3 the ptarmigan is a very popular game.

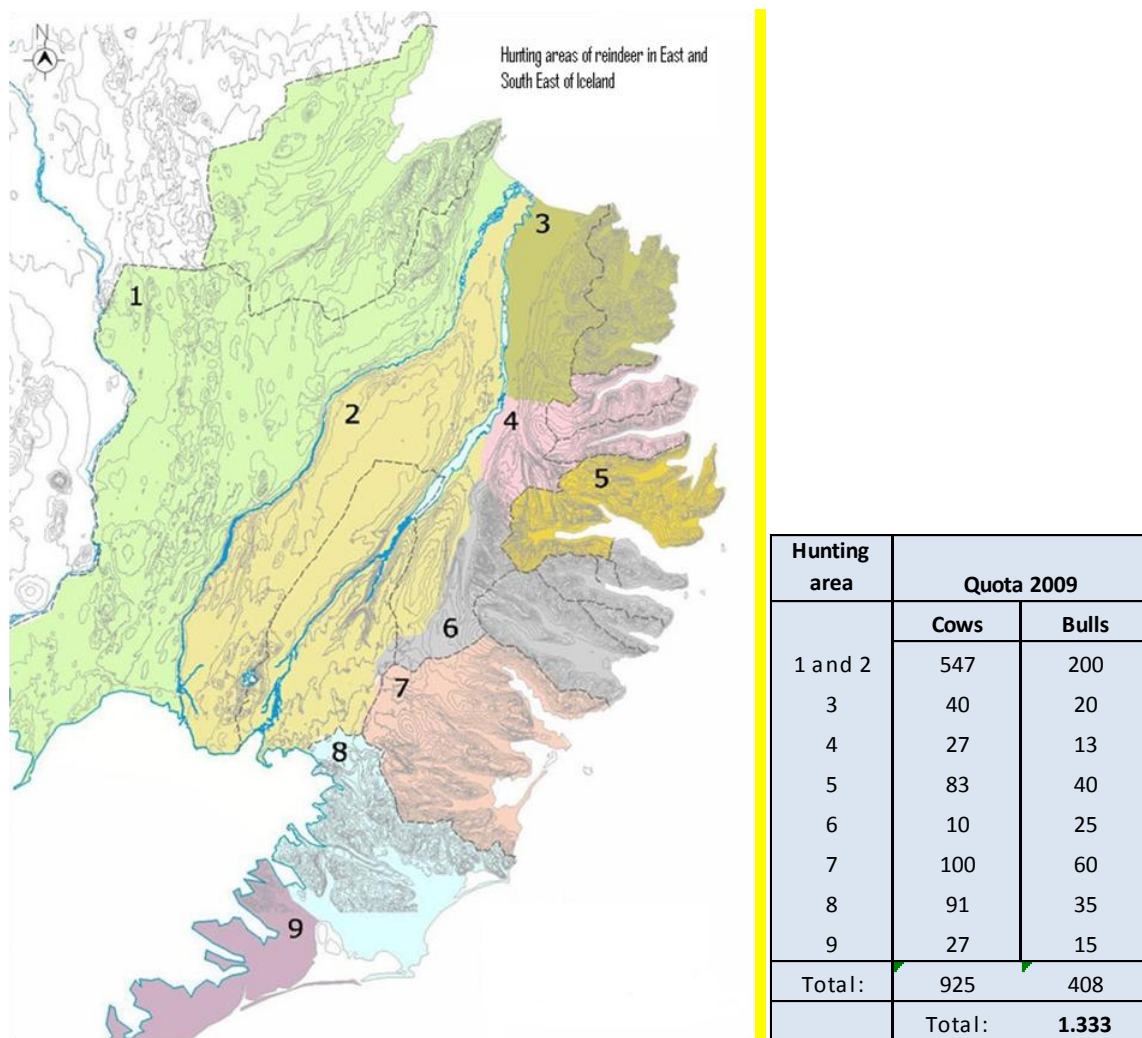
Today hunting can more or less be defined as sport or leisure hunting. In Iceland hunting is generally seen as a common right, available to everyone interested in hunting and are holders of the relevant permits. Hunting takes place both on private land, where the landowner’s permission is needed, and in commons where all Icelandic residents are allowed to hunt. For hunting birds and small mammals only a valid hunting card is needed, but for reindeer hunting a reindeer hunting license for each bagged animal is required. Icelandic landowners are obliged to follow Icelandic law in the same manner as hunters. They have no special hunting rights in terms of quantity, only when it comes to use of their own land for hunting aims. To hunt reindeer, they must apply for a reindeer hunting license like other hunters. Foreign hunters can have Icelandic hunting licence that is valid for less than one year and are allowed to hunt in private hunting grounds. They must have comparable rights to hunt in their homeland as in Iceland (Law 64/1994).

### **Reindeer hunting**

The story of reindeers in Iceland is not so old. The first reindeers were brought from Finmark in Norway in 1771. In the next two decades several small groups of 30 – 35 animals were sent to Iceland. The animals were distributed in several locations in south, north and north east of the country. These animals were half – tamed and the idea was to teach Icelandic farmers to raise them as domestic animals. But it seems as there was no interest among locals

to try this kind of farming. The animals therefore soon came wild. As the numbers of the reindeers increased by degree, the farmers began to look on them as rivals of their livestock for grassing. This led to that the number of the animals decreased and in 1939 it was estimated that the number of the reindeers was only about 100 animals and their location was in the highland interior of East Iceland (Valtýsson, 1945).

Today the reindeers live only in East and South East Iceland, mostly at higher elevations in summer but seek lower grasslands in winter. Figure 2 below shows the territory where they are located. It is from Vopnafjordur in the north to Sudursveit in the south east. The numbers on the figure shows how the area is divided into 9 hunting areas. The reason for this is that the reindeer population is divided roughly in 9 main hordes and the hunting area is divided according to that (Náttúrufræðistofa Austurlands, 2010).



**Figure 2. The hunting area of reindeer. Source: UST, 2010b. Modifications made by the author of the survey.**

Reindeer hunting is the only game in Iceland that has hunting quota as has been mention earlier. Each autumn the animals are counted from the air and

this information is used to decide the quota. The last year the quota was about 20% of the stock, but the decided factor is an estimate of the carrying capacity of the land.

**Table 4. The quota and number of applications.**

**References:UST, 2010b.**

Hunting area	Quota 2009		Number of applications		Hunting area	Quota 2008		Number of applications	
	Cows	Bulls	Cows	Bulls		Cows	Bulls	Cows	Bulls
1 and 2	547 (11)	200 (66)	1014	631	1 and 2	491 (5)	319 (94)	912	749
3	40	20	115	77	3	35	10	79	43
4	27	13	37	44	4	23	19	50	49
5	83	40	240	160	5	68	55	201	151
6	10	25	43	106	6	0	35	0	117
7	100	60	264	263	7	60	70	162	250
8	91	35	107	58	8	38	53	83	76
9	27	15	65	36	9	35	25	73	43
Total:	925	408	1885	1375	Total:	750	583	1560	1478
	Total:	<b>1.333</b>	Total:	<b>3.260</b>		Total:	<b>1.333</b>	Total:	<b>3.038</b>

In table 4 the quota and the number of applications for the last 2 years can be seen. The number of applications per hunting licence was in 2009 about 2,4. The distribution of the licences is in a form of lottery. The price of the licence for a reindeer bull in 2009 was for hunting area 1 and 2, 120.000 ISK and for other areas 80.000 ISK. The price for the licence for a cow in area 1 and 2 was 70.000 ISK and for other areas 50.000 ISK. The reindeer hunt is the only hunt in Iceland that require assistant of a professional guide. The indirect economical effects on the hunting area are also felt to be considerable. In this survey the economical effects on the hunting area will be estimated.

## METHODOLOGY

The research method used in this case is of an exploratory character. But exploratory research means that hardly anything is known at the outset of the research. The aim of this type of study is to look for patterns, ideas or hypotheses instead of testing or confirming a hypothesis (Collins & Hussey, (2003 p. 10). The questionnaire was a so called self-administrated questionnaire, but that means that the respondent has two choices, answering the questionnaire or not.

This research was conducted through an online survey. Hunters were asked to participate in the survey when they returned their bag reports online and renewed their hunting licences. Thus, all hunters who applied for a new hunting licence online had an opportunity to participate in the survey. By using this method a great majority of hunters could be reached. The web link at DNR opened 19<sup>th</sup> of January 2010 and the link to the survey opened at the same time. The link to the survey was open until 1<sup>st</sup> of April. In the beginning of March 2010, an email was sent to two hunting clubs and they were asked to distribute the email among their members, to attract hunters' to participate in the survey. The email was also distributed to individual hunters and they were asked to send the email to their hunting partners. This was done to try to increase the number of participants in the survey.

In 2009 DNR issued 12.227 hunting licences to hunters with Icelandic residence and a great majority of the hunters, or about 81%, used the internet to turn in a bag report for the year 2008 and to apply for a new hunting licence for 2009. The population in this research was therefore considered to be these hunters. The size of the population is calculated as about 81% hunters with valid hunting licence 2009 and residency in Iceland. The size compared to these preconditions is therefore about 9.800 hunters. This was the population in this survey. The number of respondents was 491. According to this, the answer rate in the survey was 5%. DNR issued 198 hunting licences to hunters with foreign residence. These hunters didn't participate in the survey (the survey was in Icelandic) but the economical effects of them are without doubt greater as they have to travel to Iceland, use accommodation and travel domestically.

The survey was designed by the Icelandic North Hunt team. The aim of this survey was to gather information on the potential economic impact of hunting tourism on small scale rural tourism entrepreneurs. Therefore a great number of the questions was related to monetary information such as cost, how much was spent, where it was spent, what kind of service was used, where, and so on. Also questions like where and what was mostly hunted, how often, how long the hunting trips were, what kind of accommodation was used when staying overnight, with whom was hunted and so on. Also, as in most surveys, background questions were asked in order to socio-economically profile the hunters surveyed.

## **Statistic**

To analyse and interpret information obtained by this survey a PASW version 18 software package was used. Descriptive statistics was used to decide the results. Comparing means between 2 groups a t test was used. ANOVA test was used to compare means among groups and Bonferoni test as *post hoc*.

## **Pros and cons of an online survey**

There are both pros and cons when using an online survey. Among the pros is the cost. There is no postage and printing cost and no involvement of interviewers. Large scale surveys do not require greater financial resources than small surveys. There is instant access to a wide audience, irrespective of their geographical location. An online survey is appropriate for a wide audience, where all the visitors to the website have an equal chance to enter the survey. Short response time is one of the advantages of online surveys. Such surveys allow messages to be delivered instantly to the recipient. The respective questionnaire can be programmed so that responses can feed automatically into the data analysis software. It means time saving advantages and also avoids all the data input and associated transcription errors. The cons among other things, are the respondents representatives of the population, in this case it is so, but then another problem arises; an online survey can be answered over and over again (Ilieva et al., 2002).

There were some limitations to the survey, but from the author's point of view, they were minor and didn't have any significant impacts on the survey.

One is the lag in time. The web link at DNR opened 19<sup>th</sup> of January 2010 and the link to the survey opened at the same time. The link was open until 1<sup>st</sup> of April. This time frame was therefore considered to be long enough for the survey. The hunting season of reindeer started 15<sup>th</sup> of July and the ptarmigan hunting season ended 6<sup>th</sup> of December. Therefore it was a chance that when a respondent answered the questionnaire that figures related to cost and other important information would not be precise and even forgotten.

Two, anyone could go the web link <http://www.north-hunt.org/is/page/konnun> and answer the questionnaire. But it was considered that this risk was minimal and did not have any significant impact on the survey. Why should anyone who is not a hunter be interested in answering this questionnaire?

Three, when the respondent was assigned a username when he/she signed in for the first time to the survey, the survey could be answered over and over again.

Four, when hunters were assigned a username but didn't answer the survey it was impossible to send them an email to encourage them to do that as they were anonymous. It was also impossible to know who had answered the questionnaire and who had not.

Five, the respondents are very similar to the holders of hunting licence with regard to residency, age and sex according to information from DNR. But it is

impossible to know if those who answered the survey are typical for the population of Icelandic hunters.

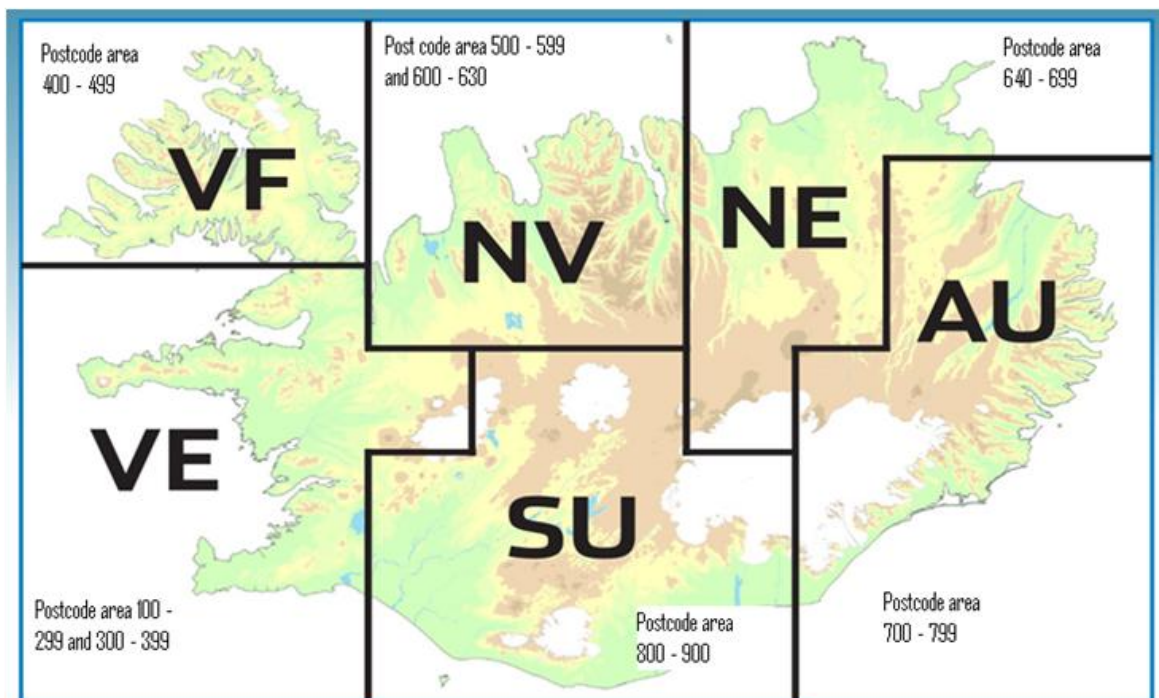
## RESULTS OF THE SURVEY

In this chapter the main results of the survey are presented. The chapter is divided into three subchapters depending on the theme from the survey. These are:

- Basic information
- Information regarding hunting in general, reindeer hunting excluded
- Information from hunters that went reindeer hunting 2009

### Basic information

Since 1995, when hunters for the first time had to turn in bag report when applying for a new hunting licence, they had to report in which area the game had been caught. Iceland is divided into six hunting areas, as can be seen on the figure 3 below i.e. VE, VF, NV, NE, AU and SU. On the figure postcodes in Iceland can also be seen. Rough locations of postcodes in the hunting areas are as follows: 100 – 299 and 300 – 399 are in area VE. 400 - 499 are in area VF, 500 – 599 is in area NV and also 600 – 630. In area NA are 640 – 699. In area AU is 700 – 799 and in area SU is 800 – 900. The reason for this is that in this report, respondent’s residence is often divided according to postcode areas. Reykjavík, the capital city of Iceland and the most populated municipalities, except Akureyri, are in postcode area 100-299. Akureyri is located in postcode area 600-699. The reindeer hunting area is in postcode area 700-799.



**Figure 3. Division of Iceland in hunting areas. Source: UST, 2010d. Modifications made by the author of the survey.**

Table 5 below shows the basic information about the respondents.

**Table 5. Background information of the respondents.**

		Number	Rate
<b>Gender</b>	Male	461	96,2%
	Female	18	3,8%
<b>Age</b>	20-29	64	13,1%
	30-39	150	30,7%
	40-49	160	32,8%
	50-59	85	17,4%
	? 60	29	5,9%
<b>Marital status</b>	Single/divorced   widow/widower	62	13,0%
	Wedded	414	87,0%
<b>Education</b>	Secondary education	83	17,3%
	Vocational education	121	25,2%
	Grammar school	31	6,5%
	University degree	199	41,5%
	Other	46	9,6%
<b>Residence</b>	Postc. 100-299	302	61,9%
	Postc. 300-399	25	5,7%
	Postc. 400-499	12	2,5%
	Postc. 500-599	16	3,3%
	Postc. 600-699	63	12,9%
	Postc. 700-799	46	9,4%
	Postc. 800-900	24	4,9%

96.2% of respondents were male and 3.8% were female. This rate is similar to the rate of those who had valid hunting licence 2009 according to information from DNR. The oldest respondent was 91 years old. The number of respondents in the intervals 30 – 39 and 40 – 49 are similar. The average age is 41.9 years. 414 or 87% are married. The most common education is a University education or 41.5%. Residence according to postcode is used because residence is used for comparison in the survey. The postcode area 100 – 299 is the capital city (Reykjavík) and the neighbouring municipalities. In this area about 70%<sup>3</sup> of Icelanders live and the number of respondents is according to this. In the postcode area 600 – 699 is Akureyri, the most populated municipality outside the Reykjavik area. The postcode area 700 – 799 is in the hunting area for reindeer. About 62% or 302 of the respondents

<sup>3</sup> See Statistics Iceland's website [www.hagstofa.is](http://www.hagstofa.is)

live in area 100-299, 12.9% or 63 live in area 600-699 and 9.4% or 46 live in area 700-799. The area 400-499 has the smallest population. This proportion is very similar to the proportion of holders of hunting licences according to DNR.

### Information regarding hunting in general

In this part, the main findings regarding the questions about hunting in general (reindeer hunting excluded) are discussed.

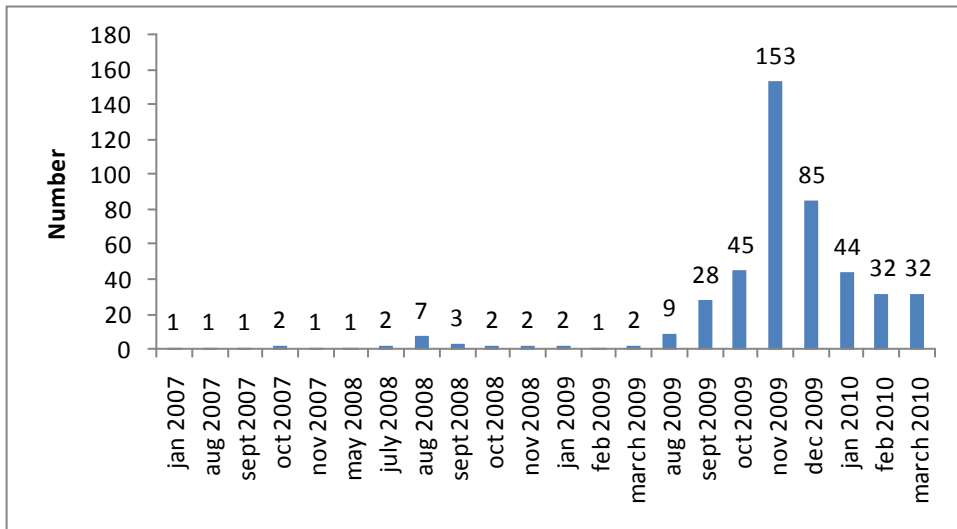


Figure 4. When was your last hunting trip? n = 456

As can be seen in figure 4 about 94% of respondents went hunting in the period August 2009 till March 2010. The largest group went last time in November and December or 48%. But the ptarmigan season started 30<sup>th</sup> of October and ended 6<sup>th</sup> of December 2009.

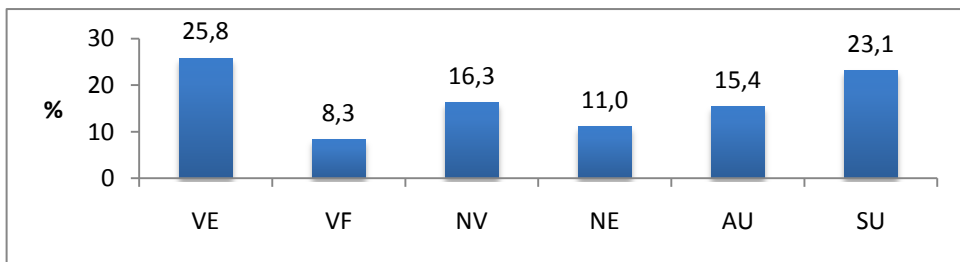
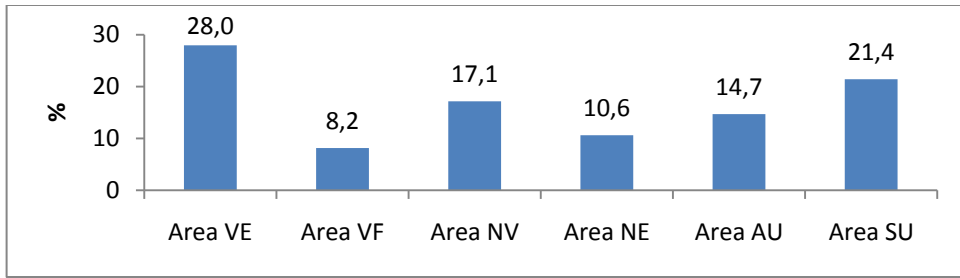


Figure 5. Where did you go to last time hunting domestically? n = 480

In figure 5 about 26% went hunting in hunting area VE and 23% in hunting area SU or about 50% of all hunters. The capital city Reykjavík and several of the largest municipalities are located in area VE and are also closest to area SU. Fewest hunters went hunting in area VF or about 8%.



**Figure 6. In which area do you most often hunt? n = 490**

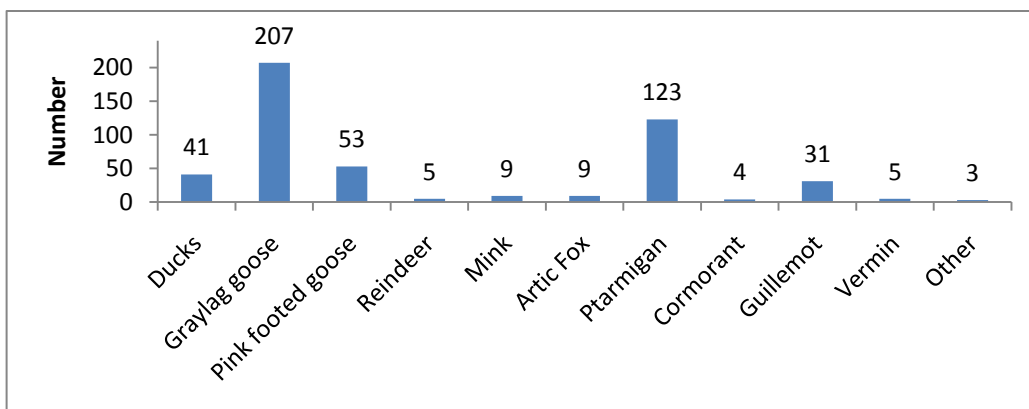
Figure 6 reveals that most hunters hunt in area VE or 28%, then in area SU or about 21% and fewest hunt in area VF or about 8%.

Table 6 below shows the residence of the respondents and the most common hunting area. To get a clear overview of this table, figure 3, that shows the division into hunting areas and also postcode, should be looked at.

**Table 6. Residence and most common hunting areas.**

Residence	Hunting area					
	Area - VE	Area - VF	Area - NV	Area - NE	Area - AU	Area - SU
Postcode area 100-299	34,8%	8,9%	15,6%	4,6%	7,6%	28,5%
Postcode area 300-399	83,3%	4,2%	4,2%	4,2%	0,0%	4,2%
Postcode area 400-499	8,3%	91,7%	0,0%	0,0%	0,0%	0,0%
Postcode area 500-599	6,3%	6,3%	87,5%	0,0%	0,0%	0,0%
Postcode area 600-699	6,3%	0,0%	28,6%	57,1%	6,3%	1,6%
Postcode area 700-799	4,3%	0,0%	4,3%	0,0%	91,3%	0,0%
Postcode area 800-900	12,5%	0,0%	8,3%	4,2%	4,2%	70,8%

As can be expected the hunters hunt most often in the area where they live. Table 6 shows that hunters living in area 100 – 299 hunt most often in area VE where they live. The second most hunted area is SU but that area is closest to their homes. But these hunters travel also all over Iceland to hunt as can be seen in table 6 and they are the only hunters that do that. Those that live in other postcode areas do most of their hunting in their area where they live. The exception is hunters in area 600 – 699. This postcode area is both in area NV and NE.



**Figure 7. Which species do you hunt most? n = 490**

When asked which species were most hunted, graylag geese were number 1, ptarmigan number 2 and in third place, pink footed geese (figure 7).

When asked: "Please itemize truthfully how much you spent last hunting season on following items? (reindeer hunting excluded)" table 7 emerged.

**Table 7. Expenses last hunting season ISK. (reindeer hunting excluded)?**

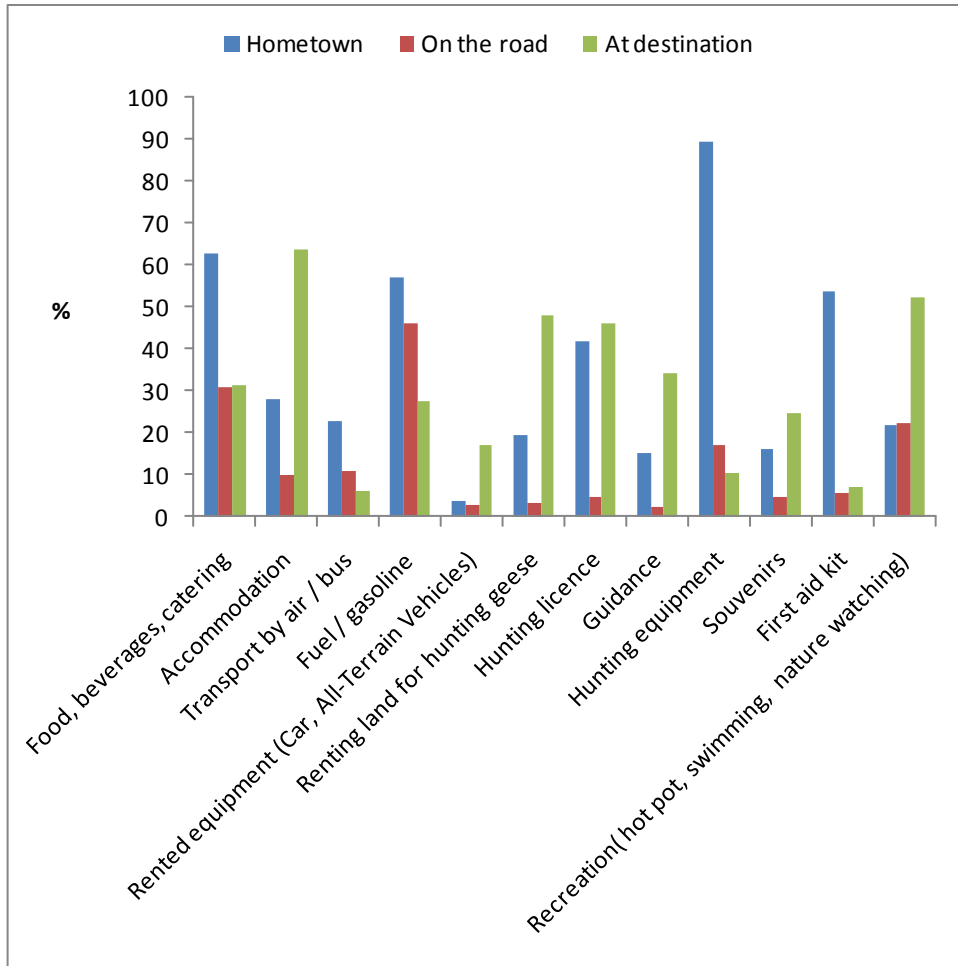
	Paid			
	% spent 0 ikr	Mean	St. Dev.	Total n
Food, beverages, catering	4,9%	26.897	27.754	449
Accommodation	59,4%	22.126	15.915	411
Transport by air / bus	87,4%	34.783	11.967	364
Fuel / gasoline	2,3%	43.141	35.643	435
Rented equipm. (Car, All-Terrain Vehicles)	93,3%	33.300	9.799	372
Renting land for hunting geese	76,8%	45.687	20.747	393
Hunting licence	58,0%	21.467	20.991	398
Guidance	86,9%	32.700	10.856	383
Hunting equipment	6,7%	29.936	31.934	419
Clothing	20,7%	19.662	19.413	401
Souvenirs	88,4%	12.733	7.054	372
First aid kit	70,8%	5.091	6.559	377
Recreation( hot pot, swimming, nature watching)	59,3%	7.846	7.634	391
Renting land for hunting ptarmigan	89,3%	15.793	5.489	382

The question was posed with a price interval. The lowest amount was zero and then 1 – 5.000, 5.001 – 10.000, 10.001 – 15.000, 15.001 – 20.000, 20.001 – 30.000, 30.001 – 40.000, 41.001 – 50.000, 50.001 – 75.000, 75.0001 – 100.000 and > 100.000. Because of this large price interval and the fact that in many cases 0 ISK was paid the standard deviation is large as can be seen in third column.

Hunting licence is usually a payment per hunter for hunting one day. Renting land for hunting geese or ptarmigan means renting land for hunting for longer period of time.

In table 7 the mean and standard deviation are computed from those hunters that paid for these items. For the items, that most hunters paid for, i.e. fuel / gasoline, food, beverage, catering and hunting equipment, most was spent on fuel/gasoline, 43.141 ISK, then on hunting equipment, 29.936 ISK and then on food, beverages and catering 26.897 ISK. Only 23% of respondents rented land for geese hunting, and the mean amount was 45.687 ISK. The smallest amounts are spent on first aid kit and recreation. The minimum number of respondents who answered one of these questions was 364 and maximum number was 449.

When asked to: “Please itemize truthfully how much proportionally you spent last hunting season on following items at home, on the road, at destination” figure 8 emerged.



**Figure 8. Proportion spent last hunting season on following items.**

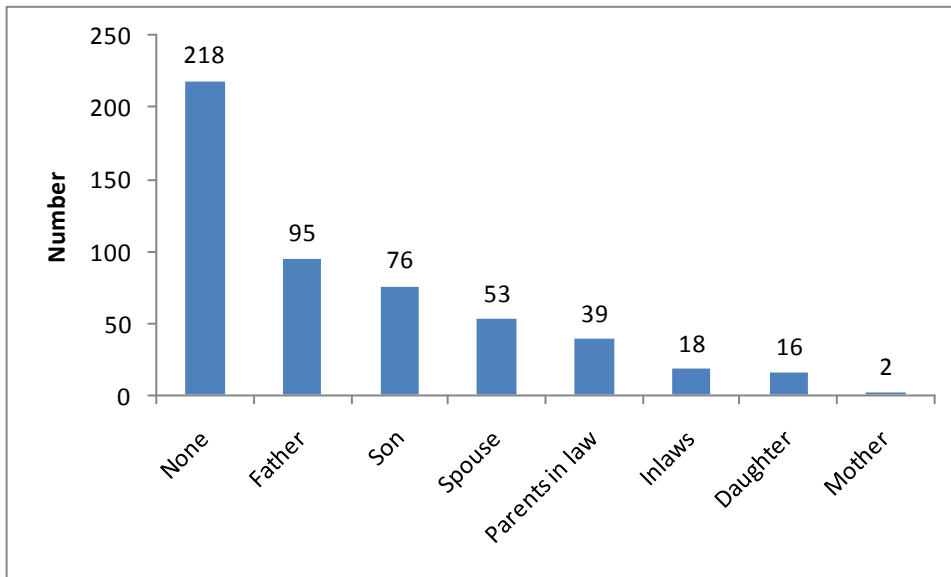
The greatest proportion spent at home is on hunting equipment, then on food, beverages and catering and on fuel/gasoline. On the road, most is spent on fuel/gasoline, then on food, beverages, catering and then on recreation. At destination, most is spent on accommodation, then on recreation and similar amounts are spent on renting land for hunting geese and hunting licences. The minimum number of respondents who answered one of these questions was 72 and maximum number was 282.

In table 8 below, the amounts from table 7 are used.

**Table 8. Amount spent at destination.**

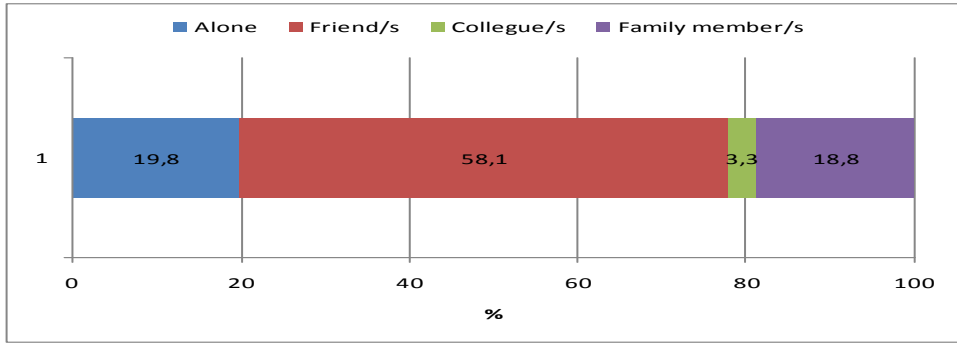
	Proportion	Mean	Amount at destination
Food, beverages, catering	31,2%	26.897	8.392
Accommodation	63,7%	22.126	14.094
Transport by air / bus	6,3%	34.783	2.191
Fuel / gasoline	27,4%	43.141	11.821
Rented equipment (Car, All-Terrain Vehicles)	17,0%	33.300	5.661
Renting land for hunting geese	47,9%	45.687	21.884
Hunting licence	46,2%	21.467	9.918
Guidance	34,2%	32.700	11.183
Hunting equipment	10,4%	29.936	3.113
Souvenirs	24,7%	12.733	3.145
First aid kit	7,2%	5.091	367
Recreation (hot tub, swimming, nature watching)	52,3%	7.846	4.103

Table 8 shows amount spent at a destination. Here is missing clothing and renting land for ptarmigan hunting. Most is spent on renting land for hunting geese, then on fuel, and in third place is rented equipment.



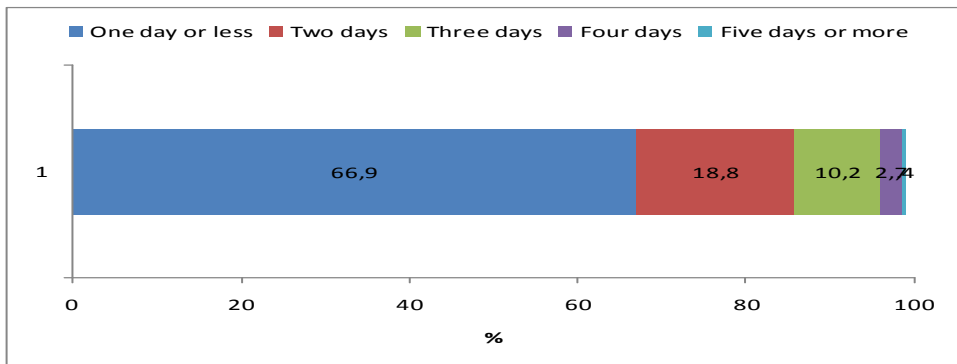
**Figure 9. Which of following members of your family practise hunting besides you? n = 517**

It's most common that the respondent is the only one in the family that practises hunting (figure 9). The second most common is the father and then a son. Only 2 respondents mention his/her mother as can be seen in figure 9.



**Figure 10. Who do you prefer to hunt with? State the most preferred hunting companions. n = 489**

Figure 10 shows that most respondents hunt with friends or 58%. If those who hunt alone and or with members of the family is combined the figure is almost the same.

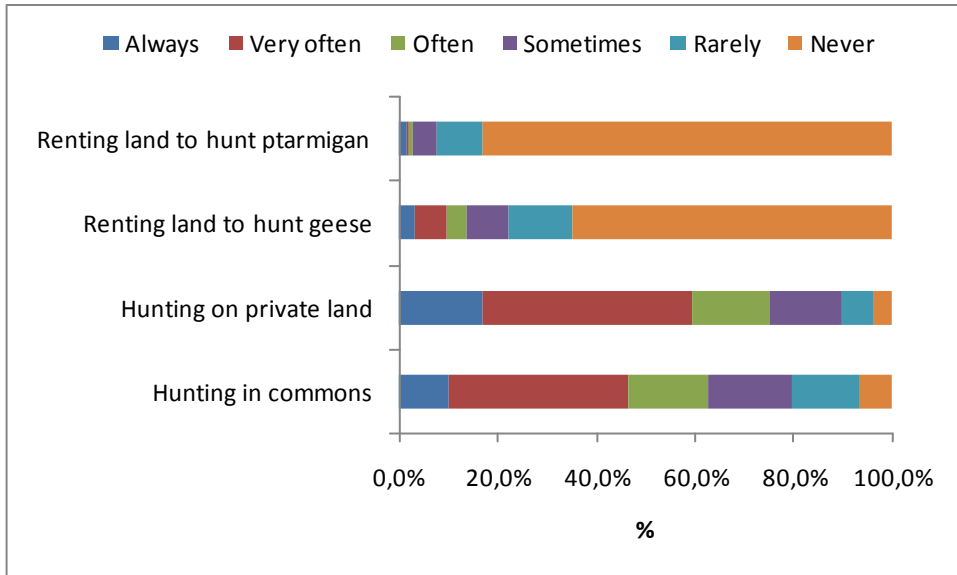


**Figure 11. Most common duration of hunting trip. n = 489**

Figure 11 deals with the duration of the hunting trip. The most common length is one day or less or 67%, then two days or 19% and then 3 days or 10%.

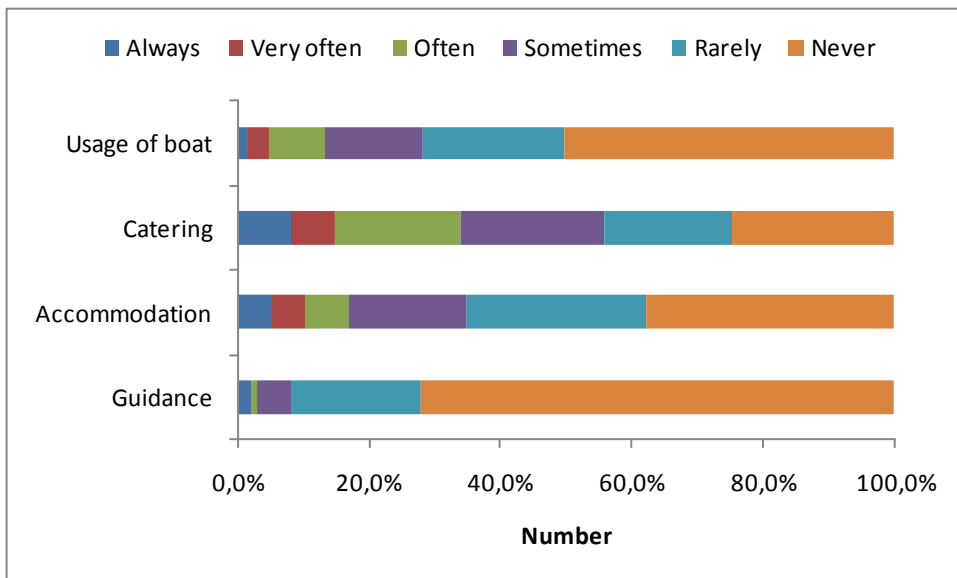
When queried: "In retrospect regarding your hunting trips how often did you use following service?" figure 12 emerged.

The results of this question can be seen on next 3 figures.



**Figure 12. Renting land to hunt ptarmigan and geese, and hunting on private land and in commons.**

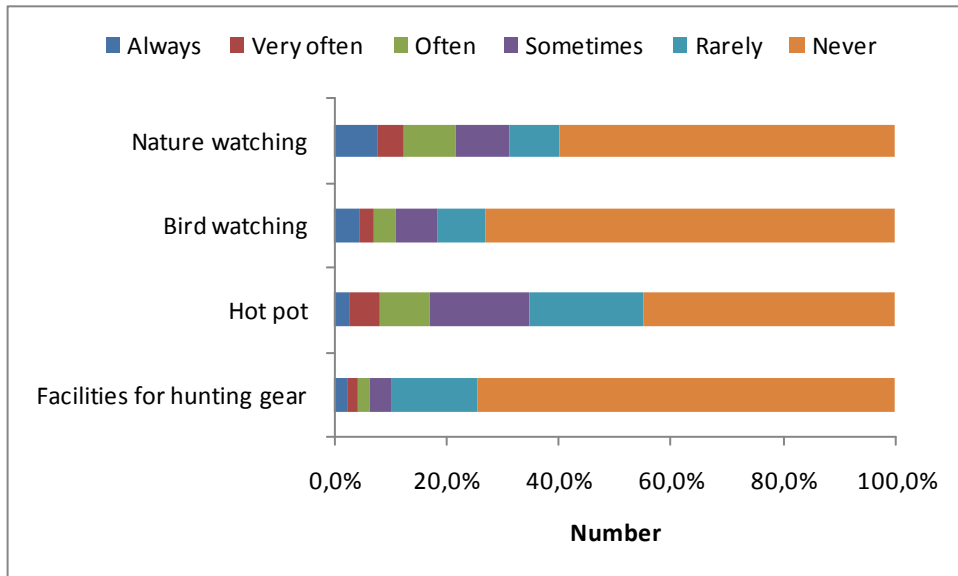
A great majority or 92,5% never or rarely rent land to hunt ptarmigan while only 2,1% always or very often do that. More than three quarters or 77,7% never or rarely never rent land to hunt geese and only 9,6% always or very often rent land to hunt geese. 59,5% hunt always or very often on private land and 10,3% hunt never or rarely on private land. 46,3% hunt always or very often in commons and 20,2% rarely or never hunt in commons.



**Figure 13. Renting of boat, catering, accommodation and guidance.**

The frequency of purchase for other services is shown in figure 13. 71,8% never or rarely use a boat when hunting. Only 4,8% always or very often do that but hunting of guillemot takes place at sea. 44% never exploit catering

when on hunting trip while 14,8% always or very often do that. 65% never or rarely use accommodation, but 10,2% always or very often use some kind of accommodation. 92% never or rarely use the service of a guide while 2,1% always or very often do that.



**Figure 14. Nature and bird watching, hot tub and facilities for hunting gear.**

Figure 14 shows that 68,8% never or rarely do nature watching while 12,3% always or very often do that. 81,6% never or rarely do bird watching while 7,1% always or very often do that. 65,2% rarely or never use hot pots while 8,2% always or very often do that. Only 4,1% always or very often exploit facility for hunting gear while 9,6% rarely or never do that.

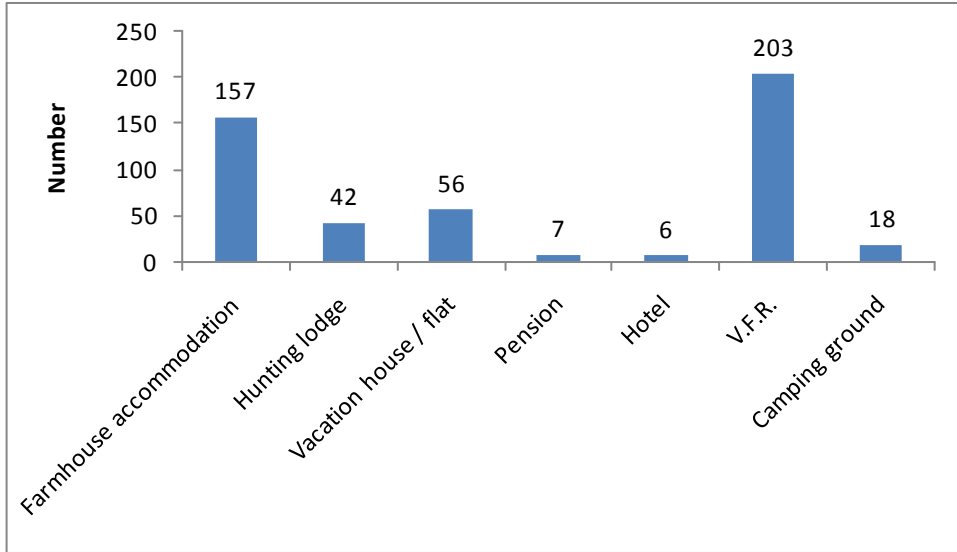
On table 9 is comparison between respondents living in postcode areas 100 – 299 (but according to information from DNR about 57% of hunters live there), 600 and 603 which is Akureyri (most populated municipality outside the capital city area) and then other postcode areas. This is done to see if there is a significant difference between these groups in expenditure on the items asked: *Please itemize truthfully how much you spent last hunting season (reindeer hunting excluded)*

The p – value for Anova shows significant difference in the means for 9 items and the p – value post hoc shows between which postcode areas the significant difference is. For example hunters in areas 100 – 299 and 600 and 603 pay significant more for food, beverage and catering than hunters in other postcode areas. Hunters living in areas 600 and 603 and 100 – 299 pay significant more for accommodation than hunters in other postcode areas. And hunters in 600 and 603 pay significant more for guidance than all other hunters.

**Table 9. Comparison.**

	Postcode 100-299		Postcode 600, 601		Other postcodes		p-value Anova	p-value post hoc		
	Mean(st.dev/n)	Mean(st.dev/n)	Mean(st.dev/n)	Mean(st.dev/n)	Between 100-299 and 600,601	Between 100-299 and Others		Between 600,601 and Others		
Food, beverages, catering	30399(30092/276)	21290(30324/31)	17148(21724/142)	0,000*	0,251	0,000**	1,000			
Accommodation	10827(20613/254)	10556(26002/27)	5077(13749/130)	0,019*	1,000	0,017**	0,530			
Transportation by air/bus	5392(19566/217)	7885(20355/26)	1860(7213/121)	0,094	1,000	0,184	0,281			
Fuel/gasoline	46914(37158/269)	36638(39671/29)	33960(32002/137)	0,002*	0,428	0,002**	1,000			
Rentet equipment	2314(12674/229)	8854(30503/24)	756(4361/119)	0,019*	0,053	0,844	0,015**			
Renting land for hunting geese	12083(30251/240)	14911(34221/28)	6720(22258/125)	0,161	1,000	0,259	0,500			
Hunting licences	10482(26040/244)	10345(25719/29)	5820(16667/125)	0,188	1,000	0,215	1,000			
Guidance	4748(15321/238)	12885(33939/26)	1429(5918/119)	0,002*	0,031**	0,161	0,002**			
hunting equipment	27639(31394/251)	29107(38737/28)	28232(34212/140)	0,967	1,000	1,000	1,000			
Clothing	16633(21446/245)	19904(33604/26)	12769(16224/130)	0,132	1,000	0,269	0,340			
Souvenirs	1604(6124/226)	6667(25746/24)	205(885/122)	0,002*	0,011**	0,365	0,001**			
First aid kit	1439(2996/231)	6800(25120/25)	475(1133/121)	0,000*	0,001**	0,624	0,000**			
Recreation	3693(6646/241)	7981(24980/26)	1210(3115/124)	0,000*	0,042**	0,023**	0,001**			
Renting land for hunting ptarmigan		1709(6601/234)	6000(17955/25)	793(4202/123)	0,005*	0,016**	0,775			

\* Significance difference between means. \*\* significance difference between groups.



**Figure 15. Which accommodation do you preferably use when you stay overnight on hunting trip? State the most preferred. n = 489**

When asked which accommodation hunters preferred to use, figure 15 emerged. Staying with friends and / or relatives (V.F.R.) is the most used accommodation when staying overnight on hunt, then is farmhouse accommodation and in third place is vacation house.

## REINDEER HUNTING

In this section of the survey, the main findings regarding questions about reindeer hunting are discussed. But several questions were put forth to hunters who went hunting reindeer in 2009. The reason for this is to estimate the economic effects of this kind of hunting on the area where these animals can be hunted.

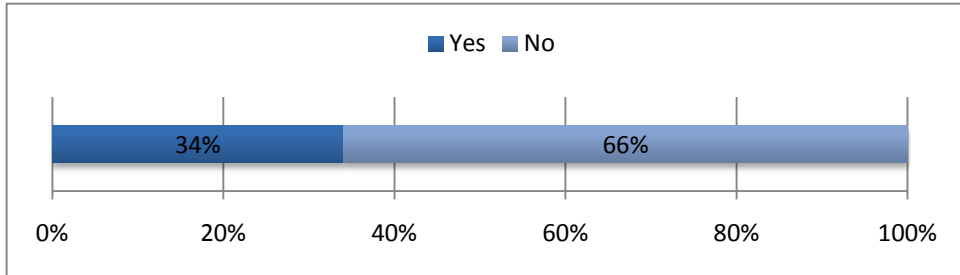
**Table 10. Background information of respondents of reindeer hunting.**

		Number	Rate
<b>Gender</b>			
	Male	155	98,1%
	Female	3	1,9%
<b>Age</b>			
	20-29	11	6,7%
	30-39	50	30,7%
	40-49	67	41,1%
	50-59	27	16,6%
	? 60	8	5,9%
<b>Marital status</b>			
	Single/divorced   widow/widower	20	12,6%
	Wedded	139	87,4%
<b>Education</b>			
	Secondary education	24	14,9%
	Vocational education	45	28,0%
	Grammar school	10	6,2%
	University degree	67	41,6%
	Other	15	9,3%
<b>Residence</b>			
	Postc. 100-299	106	65,0%
	Postc. 300-399	4	2,5%
	Postc. 400-499	1	0,6%
	Postc. 500-599	4	2,5%
	Postc. 600-699	21	12,9%
	Postc. 700-799	24	14,7%
	Postc. 800-900	3	1,8%

When comparing table 10 to table 5, which shows the background information of the respondents of the survey in general, it can be seen that this table is similar in most ways with only few exceptions. When the age of reindeer hunters is looked on, the rate in the age 20 – 29 is considerable lower and in the age 40 – 49 considerable higher. The reason for this could be, among other things that the latter group is wealthier and also has considerable more hunting experience. When the residence is looked on, the rate amongst

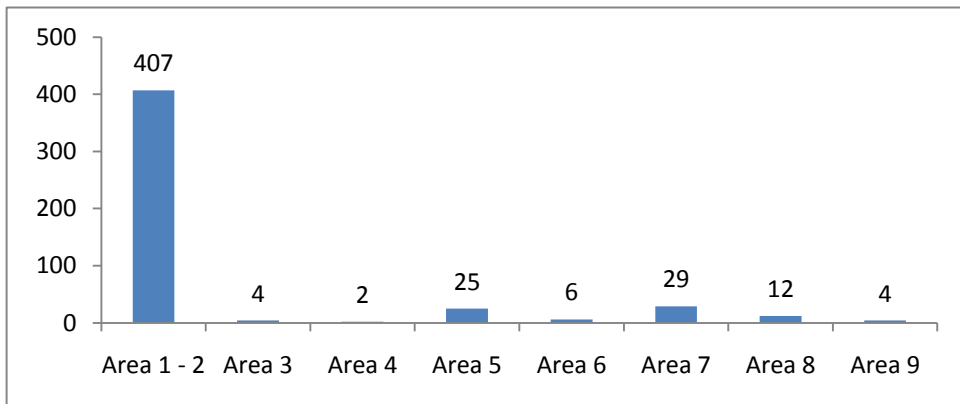
residence in postcode area 700 – 799 (the hunting area) is higher amongst reindeer hunters than the rate in table 5.

Hunting of reindeer takes place in East and South – East Iceland, i.e. postcode area 700 – 799. In 2009 the hunting quota was 1,333. Hunting licence is issued for either a bull or a cow.



**Figure 16. Did you go hunting for reindeer in 2009?** n = 478

Figure 16 shows that 34% of the survey respondents went hunting reindeer 2009 so 12.2% of them who went hunting for reindeer that year participated in the survey.



**Figure 17. On which hunting area was the licence issued?** n = 489

Figure 17 shows in which hunting areas licences were issued. 83.2% of respondents went hunting on area 1 -2. But 56% of the quota in 2009 was hunted in this area. Here the number of respondents is much higher than the number who answered question 5 positively. But only those who went hunting 2009 were asked to answer this question.

**Table 11. Please estimate truthfully how much you spent in relation for your hunting expedition.**

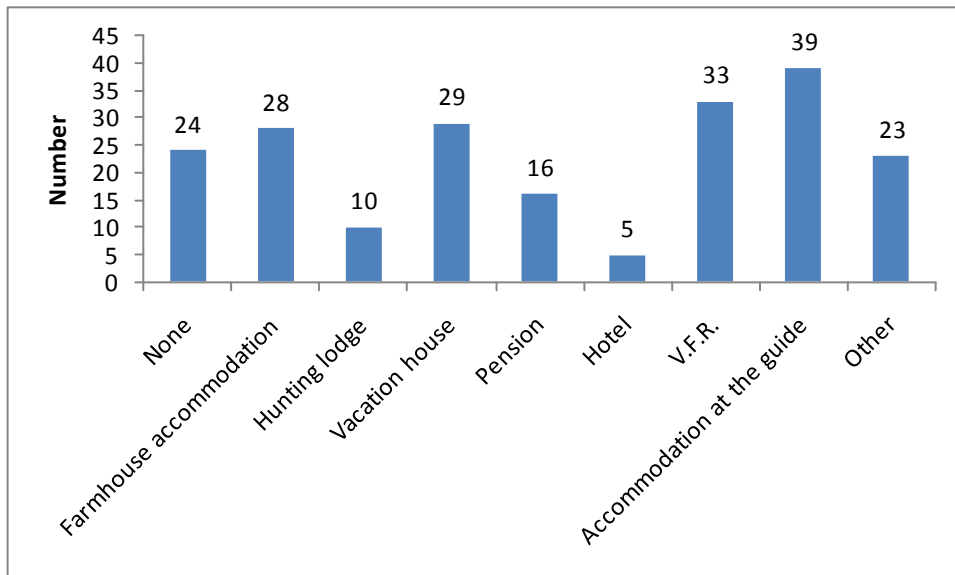
	% spent 0 ikr	Mean isk.	St. Dev. isk.	N
Food, beverages, catering	6,9	16.580	14.693	175
Accommodation	44,3	15.994	12.061	158
Fuel / gasoline	3,0	23.942	17.581	168
Transport by air / bus	81,5	28.864	25.351	119
Rented equipment (Car, All-Terrain Vehicles)	61,7	22.361	21.310	141
Hunting licence	2,8	69.404	30.289	177
Hunting equipment	22,5	45.040	50.089	160
Clothing	50,7	34.683	31.990	144
Guidance	10,1	26.431	15.308	169
Souvenirs	83,2	10.435	17.591	137
First aid kit	83,7	5.569	6.071	135
Recreation (hot tub, swimming, nature watching)	61,5	5.834	6.753	148
Other	51,4	16.232	12.040	142
<b>Total</b>		<b>321.368</b>		

Table 11 shows the average amount reindeer hunters spent on each listed item. Those who didn't pay were left out. The proportion of respondents that didn't pay can be seen in column 2. Most is spent on the reindeer hunting licence, 67.444 ISK. This amount is very similar to the average amount according to information from DNR which was 69.921 ISK. On hunting equipment the respondents spent 45.040 ISK, on guidance, 26.431 ISK, on fuel 23.942 ISK, on clothing 34.683 ISK, on food, beverages, catering 16.580 ISK, and lastly on accommodation 15.994 ISK. Least is spent on items like souvenirs, first aid kit and recreation. The minimum number of respondents who paid for items listed was 119 and maximum number was 177. The total amount spent in relation with the hunt is 321.368 ISK.

**Table 12. Please estimate truthfully how much spent proportionally at the final destination.**

	Proportion spent at		
	Mean isk.	destination	Total
Food, beverages, catering	16.580	50,0%	8.286
Accommodation	15.994	81,7%	13.075
Fuel / gasoline	23.942	38,7%	9.274
Transport by air / bus	28.864	9,1%	2.630
Rented equipment (Car, All-Terrain Vehicles)	22.361	64,0%	14.321
Hunting licence	69.404	71,8%	49.858
Hunting equipment	45.040	8,2%	3.685
Clothing	34.683	3,9%	1.349
Guidance	26.431	86,6%	22.889
Souvenirs	10.435	47,4%	4.949
First aid kit	5.569	25,8%	1.435
Recreation( hot pot, swimming, nature watching)	5.834	62,6%	3.652
Other	16.232	NA	NA
<b>Total</b>	<b>321.368</b>		<b>135.402</b>

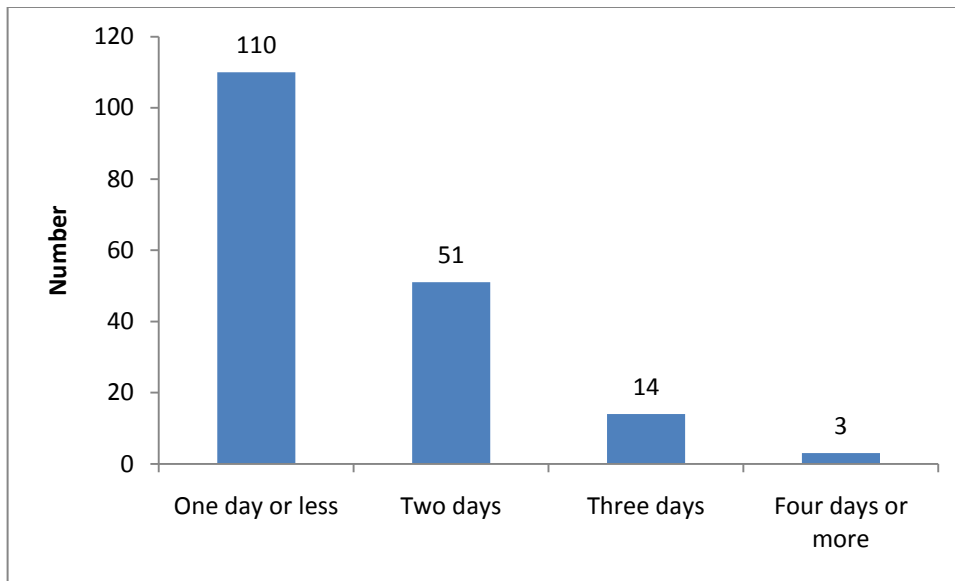
Table 12 above shows the proportion on expenditure at a destination and is built on table 11 above. The highest proportion is on guidance, then on accommodation. The total amount spent at destination is 135.402 ISK. The proportion on “other” was not available.



**Figure 18. What kind of accommodation did you use in connection with the reindeer hunting? n = 207**

Figure 18 shows the type of accommodation used when reindeer hunting. Most common is accommodation with the guide, secondly with friends and/or

relatives, thirdly, but similar to staying with friends or relatives, is staying at farmhouse accommodation and the usage of vacation house/flat. Other options are fewer.



**Figure 19. How long did you stay with the guide? n = 178**

But as figure 19 shows the most common length of stay with the guide was one day or less, and then two days, one stayed more than one week. In table 14 below is a comparison between those living in Reykjavík area, Akureyri and others.

**Table 13. Length of stay with the guide.**

Postcode	≤ 1 day	≥ 2 days	Total
100 - 299	67	49	116
600, 603	9	4	13
Others	34	15	49

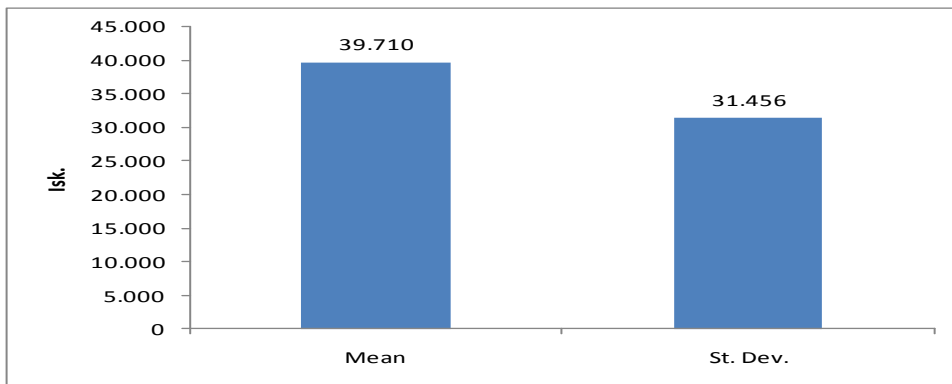
As can be seen in table 13, relatively most hunters that stayed 2 days or more were from Reykjavik area or 49 of 116 or 42%.

Table 14 below shows accommodation and residence. Here accommodation is broken up to four groups, i.e. none, at home, farmhouse accommodation, guesthouse, hotel, hunting lodge, and vacation flat and accommodation at guide. Group number two is accommodation with service, group number three is accommodation without service.

**Table 14. Accommodation and residence.**

	Postcode		Others
	100 -299	600 and 603	
None, at home	21	2	18
Farmhouse accommodation, guesthouse, hotel	17	4	3
Hunting lodge and vacation flat	12	1	3
Accommodation at guide	11	2	5

Most common is that hunters don't use any accommodation. Those hunters are probably living in the hunting area. But when they use accommodation, the most common is accommodation with service. There is no significant difference between these groups and what kind of accommodation they use.



**Figure 20. How much did you pay the guide in total? n = 181**

In the question reflected in figure 20 a price interval was set up. The lowest amount was zero and then 1 – 25.000, 25.001 – 50.000, 50.001 – 75.000, 75.001 – 100.000, 100.001 – 125.000, and > 150.000. Because of this large price interval the standard deviation is large. 9,4% didn't pay for the service of the guide. With regard to those hunters the average amount paid was 39.710 ISK, with std. dev. 31.456 ISK. The number of respondents was 181.

In the table below is a comparison between those hunters living in the hunting area (locals) and others (non-locals).

**Table 15. Comparison between locals and non-locals.**

	N	Mean isk.	Std. Dev. isk.	p - value
700-799	25	24.000	24.185	0.054
Others	156	37.901	34.472	

As can be seen in table 15 the mean amount for the hunters in 700 -799 is 24.000 ISK and for others the amount is 37.901 ISK. But significant difference is none as can be seen on p – value which is > 0.05.

Here the respondents were asked to itemize what they paid the guide for.

**Table 16. If possible can you itemize what you paid the guide for?**

	% spent 0 ikr	Mean	St. Dev.	N
Guidance	6,6	25.177	12.245	136
Driving to and fro hunting area	48,7	15.801	16.417	76
Usage of facilities while slaughtering reindeer	50,6	12.532	16.345	79
Usage of all terrain vehicle	51,3	15.000	15.504	76
Accommodation	66,2	17.443	13.744	65
Aid of professional butcher	78,1	24.821	16.712	64
Usage of trailer	80,0	14.750	10.090	60
Catering	81,4	15.114	16.293	59
<b>Total</b>		140.639		
Other*	92,6	37.500	59.187	28
Facilities for hunting equipment*	94,5	25.417	25.749	55
Hot tub*	96,2	34.375	46.845	54

As can be seen in table 16 the number of respondents varies and are also much lower than in the question reflected in figure 20. In the second column is the percentage of those that didn't pay for relevant item. Items marked with \* are excluded in the total amount. The reason is that the number of respondents that paid for these items is very low. The number of respondents i.e. that paid for a hot tub was only 2.

The highest amount was paid for guidance 25.177 ISK then for aid of a professional butcher 24.821 ISK and then for accommodation 17.433 ISK. For driving to and from the hunting area 15.801 ISK were paid. The total amount paid for these items is 140.639 ISK. But this amount was considerable higher than the amount paid according to the question above which was 39.710 ISK and should be interpreted with precaution. The number of respondents that answered the question above was 181 but as can be seen in the table 17 above, the number varies from 136 for guidance to 59 for catering.

Table 17 below shows a comparison between local hunters and non locals. But 24 or 14,7% of those that went reindeer hunting are locals. This question was set forth to see if there is any difference between locals and non – locals. Non – locals brings with them new money in to the economy of the hunting area.

**Table 17. How much paid to the guide, comparison between locals and non locals.**

	Residence	N	Mean isk.	Std. Dev.	
				Isk.	p - value
Guidance	Locals	20	18688	12718	0.669
	Non - locals	116	24343	13384	
Driving to and fro hunting area	Locals	14	2768	6108	0.031*
	Non - locals	62	9315	15154	
Usage of all terrain vehicle	Locals	14	357	1032	0.009*
	Non - locals	62	8690	14099	
Usage of trailer	Locals	13	385	1069	0.053
	Non - locals	47	3617	11233	
Usage of facilities while slaughtering reindeer	Locals	18	1667	2536	0.014*
	Non - locals	61	7520	14530	
Aid of a professional butcher	Locals	14	982	3332	0.005*
	Non - locals	50	6400	14162	
Facilities for hunting equipment	Locals	13	96	347	0.156
	Non - locals	42	1786	8735	
Accommodation	Locals	13	96	347	0.001*
	Non - locals	52	6274	12398	
Catering	Locals	13	96	347	0.020*
	Non - locals	46	3587	10082	
Hot pot	Locals	13	96	347	0.277
	Non - locals	40	1688	10673	
Other	Locals	13	0	0	0.191
	Non - locals	41	3659	19739	

\* Significant difference

There is a significant difference (marked \*) in expenditure between these groups where the p - value is  $\leq 0,05$ , i.e. in driving to and from the hunting area, usage of all terrain vehicles, usage of facilities while slaughtering the reindeer, aid of a professional butcher, accommodation and catering. The number of respondents on each item varies, from 13 up to 20 for locals and from 40 up to 116 for non-locals.

**Table 18. How satisfied or dissatisfied were you with the service offered by the guide?**

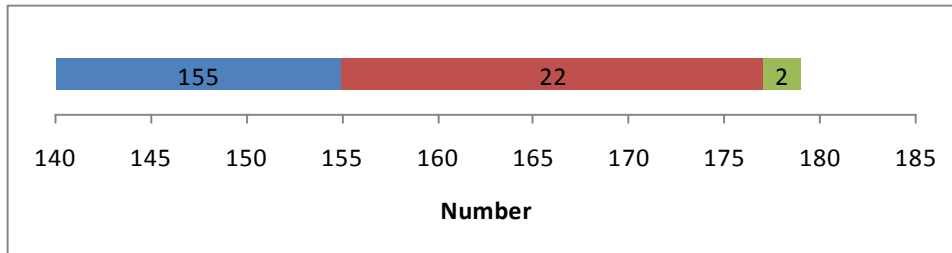
Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
67,6	16,8	10,6	2,8	2,8

Table 18 shows that 84,4% of the respondents were very satisfied or satisfied with the service offered by the guide while only 5,6% were dissatisfied or very dissatisfied.

**Table 19. How satisfied or dissatisfied were you with the performance (knowledge and know how) of the guide?**

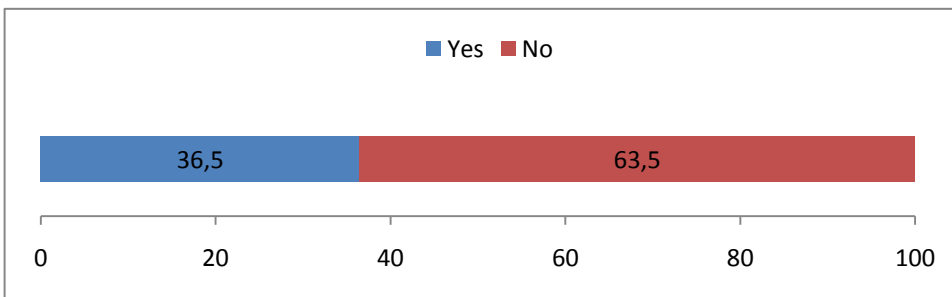
Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
76,7	13,9	4,4	2,2	2,8

Table 19 shows that 90,6% were very satisfied or satisfied with the performance of the guide while only 5% were very dissatisfied or dissatisfied.



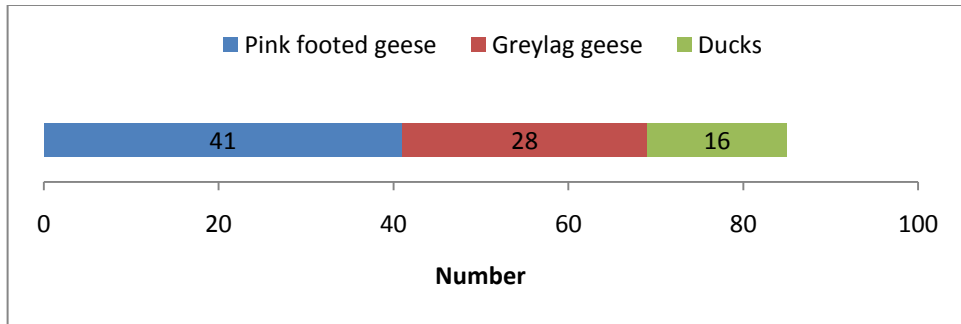
**Figure 21. Was the guide’s residence in East Iceland? n = 179**

Figure 21 shows that about 87% of the guides were located in the hunting area and 2 respondents didn’t know the guide’s residence. According to information regarding the residence of the guides on the website [www.hreindyr.is](http://www.hreindyr.is), the Environment Agency web portal for reindeer hunting information, this is the same rate.



**Figure 22. Did you do other hunting alongside the reindeer hunt? n= 178**

Figure 22 shows that 36.5% did other hunting alongside the reindeer hunt. 113 or 63.5% did other hunting alongside the reindeer hunt and the most common hunt can be seen in figure 23 below.



**Figure 23. If yes, what did you hunt?**

**n = 96**

The figure above shows 3 most common hunted game. Pink footed geese were most hunted, then graylag geese and ducks. The hunting season of reindeer began 15<sup>th</sup> of July and ended 15<sup>th</sup> of September. The hunting season for pink footed geese and greylag began 20<sup>th</sup> of August and 1<sup>st</sup> of September for ducks. Therefore is it convenient to combine these hunts. Other species were less hunted.

## ECONOMICAL EFFECTS OF HUNTING

In this part the monetary information in the above are used to estimate the flow of money and creation of jobs in the areas where the hunt takes place.

### About flow of money and creation of jobs

Money brought into a community has various effects. Money changes hands through varied transactions and all kinds of businesses sustaining economic linkages in the community. One decisive factor of money's worth to a community is the difference between a certain amount of money being delivered to a person in the community or if this amount is simply spent buying goods and services.

*Buying of goods and services.* When money is used to buy goods and services, part of the amount goes to the persons who have the job of selling it. That is, in all cases part of the income of companies selling goods and services goes as wages to their workers. Labour cost as ratio of income is about 20% in the service sector. It is possible to calculate a more accurate ratio if it is known what kind of goods and services are bought. This ratio (labour cost—/turnover) can be calculated from annual accounts of Icelandic companies published by Statistics Iceland. The last year available in this respect is 2007 but it is likely that the ratio has not changed much since then. If one million ISK is spent on goods and services in Iceland it is assumed that about 200 thousands ISK ends as labour cost in the companies where it is bought. About 90% of labour cost is direct payments to the workers. In this context it is therefore assumed, if not calculated specially, that 180 thousands ISK of each million ISK spent in goods and services ends as direct payments to workers delivering these goods and services.

*Delivered money.* If money is delivered directly to a person, for example in exchange for work, then this amount is divided into two parts. On one hand taxes and on the other hand the persons' pocket and then further in the persons' consumption. The taxes are of two kinds, taxes to the state (income tax) and taxes to the municipality (municipal income tax). These taxes are used in activity where labour cost is high like running schools, health care service and police. Big part of the money which is taken from persons in the form of taxes ends as wages for state- or municipal workers.

The part of the delivered money which ends in the persons pocket goes in the end mostly in consumption. This money is therefore used in buying of goods and services and about 18% of this money ends as direct wages to workers in the service sector as already explained. It is though no guarantee that the person's consumption will take place in the community where the person lives. For example it is certain that part of the consumption of people living in East Iceland will take place outside East Iceland, both in other parts of Iceland as well as in other countries. It is assumed that two thirds of East Icelanders' consumption will take place in East Iceland. And furthermore it is assumed

that a quarter of delivered money to a person living in East Iceland ends as wages to other people in East Iceland. See further explanation of this conclusion in Jón Þorvaldur Heiðarsson (2005: 14).

## HUNTING IN ICELAND EXCLUDING REINDEER

In this part the economical effects of hunting in general will be estimated.

### Buying of goods and services by hunters

Many other species of animal are hunted in Iceland apart from reindeer. The most common species are birds such as the graylag goose, ptarmigan, pink footed goose, ducks and guillemot as has been discussed above. This type of hunting holds economical importance in the regions where they take place. According to the survey on the economic potential of hunting tourism in Iceland the spending of hunters at a destination is on average 31,571 ISK (see table 20). In table 20 the estimated ratio which goes in labour cost when goods and services is bought is also to be seen. This ratio is calculated from annual accounts of firms in various businesses (Ísat grouping) which is published by Iceland Statistics.

**Table 20. Estimated spending of hunters in hunting region, excluding reindeer hunting**

Amounts in ISK	Percentage of hunters who pay for this factor	Average spending in hunting region of those who pay	Esti-mated labour cost ratio	Labour cost (ISK)
Food, beverages, catering	95,10%	8.392	0,22	1.756
Accommodation	40,60%	14.094	0,28	1.602
Transport by air / bus	12,60%	2.191	0,27	75
Fuel/gasoline	97,70%	11.821	0,04	462
Rented equipment (car, ATV)	6,70%	5.661	0,25	95
Renting land for hunting geese	23,20%	21.884		
Hunting licence	42,00%	9.918		
Guidance	13,10%	11.183		
Hunting equipment	93,30%	3.113	0,16	465
Clothing	79,30%	786	0,19	118
Souvenirs	11,40%	3.145	0,17	61
First aid kit	29,20%	367	0,16	17
Recreation (hot pot, swimming, nature watching)	40,70%	4.103	0,3	501
Renting land for hunting ptarmigan	10,70%	8		
<b>Total spent in hunting area excluding guidance, licence and renting</b>		<b>31.571</b>	<b>0,163</b>	<b>5.152</b>

Clothing and renting land for hunting ptarmigan are estimated numbers as the survey did not query about proportion spent at destination in these two cases by mistake.

In the year 2009 the number of those holding a hunting licence was 12,227. When the average amount for each hunter in table 21 is multiplied with this number the total amount for hunting in Iceland can be estimated. For renting land (for hunting geese and ptarmigan) and hunting licence (both paid to local

landowner) a total of 123 mISK was paid in 2009 ( $12.227 \cdot (0,232 \cdot 21.884 + 0,107 \cdot 7.900 + 0,42 \cdot 9.918)$ ). These payments are not in return of work. It is likely that this amount was mostly net income for the landowners. Some cost is though inevitable so therefore it is assumed that 90% of the amount was delivered money or 111 mISK and 10% or 12 mISK did go in buying of goods and services. As before it is assumed that 18% of the payments for goods and services did go in direct wages, that is 2.2 mISK. In this part: Direct wages following buying of goods and services 2.2 mISK, delivered money 111 mISK.

Payments for guidance are payments for work. It is estimated that 17.9 mISK were paid in total to local guides ( $12.227 \cdot 0,131 \cdot 11.183$ ). As in the case of reindeer guides it is assumed that 90% of the amount was delivered money or 16.1 mISK and 10% or 1.8 mISK did go in buying of goods and services and there of 18% in direct wages in the service sector or 0.32 mISK. In this part: Direct wages following buying of goods and services 0.32 mISK, delivered money 16.1 mISK.

All other spending for hunting in a given region for goods and services by hunters is summed up in the last line of table 7. It is estimated to have been 386 mISK in 2009 ( $12,227 \cdot 31,571$ ). There of in labour cost in the sector about 63 mISK or 16.3% as is stated in table 21. As before, it is assumed that 90% of that amount or 57 mISK did go in direct wages. In this part: Direct wages following buying of goods and services 57 mISK, delivered money 0.

## Number of jobs as a result of hunting

All the above mentioned effects of economic impacts of hunting are summarised in table 21.

**Table 21. Number of jobs as a result of hunting.**

The year 2009	Direct wages following buying of goods and services	
	Delivered money	Delivered money
Amounts in millions ISK		
Hunting licence and rent of land for hunting (to local landowners)	111	2,20
Payments to guide	16,10	0,32
Buying of goods and services by hunters	0	57,00
Total	127,1	59,52

Most of the hunting takes place outside the capital region. Below an estimation on how many jobs hunting sustains in Iceland outside the capital region is made, reindeer hunting excluded. This estimate is based on table 21 and other available information from the year 2009.

Here 307,000 ISK per month is assumed as the average full job wage in the service sector in East Iceland in 2009. The mean total salaries for full-time employees by occupational groups in Iceland are published by the Icelandic Statistics. It was 334.000 ISK per month in the service sector (service workers and shop and market sales workers). But if compared to the average income by regions it seems as the wages are 8% lower in East Iceland in the service sector than in Iceland as a whole, but that comparison is only available till 2005. It is regarded that this difference was still 8% in 2009 and out comes the number 307.000 ISK.

Jobs in guidance seem to be the only direct “jobs” resulting from hunting. The number of them is estimated 4,3 in 2009 (16,1/3,7). As in the case of reindeer hunting it is assumed that payments to landowners for licence and renting of land for hunting geese does not create direct jobs.

The indirect effects of the delivered money are similar to the case of reindeer hunting. As before it is assumed that a quarter of delivered money goes as direct wages to others in the haunting region. Quarter of 127.1 mISK is 31.8 mISK. Because of the multiplier effect the total amount which ends as direct wages to workers is 42.4 mISK (31.8+8+2+0.5....). The delivered money of 127.1 mISK should therefore cover about 11.5 indirect jobs (42,4/3,7).

In total delivered money because of hunting in Iceland excluding reindeer hunting is estimated to have covered for 15,8 (4,3+11,5) jobs in 2009.

As can be seen in table 24 it is estimated that 59,52 mISK in total went in direct wages following buying of goods and services in the hunting regions. Because of the multiplier effect the total amount ends in 79,4 mISK (59,5+14,9+3,7+0,9....). This amount should have sustained 21,5 jobs in 2009 (79,4/3,7).

In total it is estimated that hunting excluding reindeer hunting was the basis for 37-38 jobs in hunting regions of Iceland in 2009. This is shown in table 22.

**Table 22. Estimated number of jobs.**

Estimated number of jobs in Iceland 2009 outside the capital region as result of hunting	Number of jobs
Direct jobs in guidance	4,30
Indirect jobs because of delivered money	11,50
Indirect jobs because of buying of goods and services	21,50
Total	37,30

Inhabitants are on average about double the number of full-time jobs. If the jobs have been 37-38 then it is likely that about 75 inhabitants in the hunting regions did live on hunting. As the hunting mostly take place outside the capital region it is likely that these 37-38 jobs were there. In other words, if there were no hunting in Iceland except reindeer hunting, it is likely that the

inhabitants outside the capital region would be 75 fewer. If the reindeer hunting did not exist as well it is likely that the inhabitants would be about 130 fewer.

The question that remains is would these jobs cease to exist if there were no animals to be hunted or hunting totally prohibited? Where would hunters spend the money documented here above if hunting was not possible in Iceland? Would they spend it in the rural regions regardless? That has to be considered highly unlikely although there might be some merit to it. Those who need to slake their thirst for outdoor recreation with hunting might to some extent keep on doing so in the rural regions of Iceland and thus spend some money. The most likely scenario though is that this money would be spent in the capital region or abroad if hunting was impossible in Iceland, even for hunting trips abroad.

## REINDEER HUNTING

In this part the economical effects of reindeer hunting will be estimated.

### Buying of goods and services by reindeer hunters, guide excluded

According to the survey on the economic potential of hunting tourism in Iceland, the reindeer hunters' spending in East Iceland (EI), guidance excluded, was on average 39,847 ISK (see table 23). Estimated average ratio of the spending going into labour cost is 18,9%. If accommodation is taken as an example then an estimated 28 ISK of every 100 ISK spent in accommodation ends as labour cost by those who sell this kind of service (see table 24). Estimated labour cost ratio is calculated from annual accounts of firms in various businesses (Ísat grouping) which is published by Iceland Statistics.

**Table 23. Estimated spending of reindeer hunters in East Iceland.**

Amounts in ISK	Percentage of hunters who pay for this factor	Average spending in EI of those who pay	Estimated labour cost ratio	Labour cost (ISK)
Food, beverages, catering	93,10%	8.286	0,22	1.697
Accommodation	55,70%	13.075	0,28	2.039
Fuel/gasoline	97,00%	9.274	0,04	360
Transport by air / bus	18,50%	263	0,27	131
Rented equipment (car, ATV)	38,30%	14.321	0,25	1.371
Hunting equipment	77,50%	3.685	0,16	457
Clothing	49,30%	1.349	0,19	126
Guide and handling of meet	See next chapter			
Souvenirs	16,80%	4.949	0,17	141
First aid kit	16,30%	1	0,16	37
Recreation (hot pot, swimming, nature watching)	38,50%	3.652	0,3	422
Other	48,60%	8	0,19	739
<b>Total spent in East Iceland</b>		<b>39.847</b>	<b>0,189</b>	<b>7.520</b>

In 2009 1,333 reindeers were hunted in East Iceland. If every hunter did spend on average 39,847 ISK in East Iceland in the hunting trip (guidance excluded) then their total spending was 53 mISK (million ISK). Of this amount 18.9% or 10.0 mISK did probably go in labour cost and thereof 9.0 mISK in direct wages to workers. In this part: Direct wages following the buying of goods and services 9.0 mISK, delivered money 0.

### Payments for guidance, slaughtering facilities and butcher

According to the survey on the economic potential of hunting tourism in Iceland nine out of ten hunters (89,9%) paid for guide and on average this amount was 26,431 ISK. According to the survey it seems that 13.4% of the

guides were living outside East Iceland so on average local guides were getting 20,577 from each hunter. When 20,577 ISK multiplied with the 1.333 reindeers hunted it can be estimated that reindeer hunters spent 27.43 mISK on local guides. It is likely that this amount to the guides was mostly net income for them. Some cost is though inevitable so therefore it is assumed that 90% of the amount was delivered money or 24.69 mISK and 10% or 2.74 mISK did go in buying of goods and services. Part of this, 18% or 0.49 mISK is assumed to have been direct wages in the service sector.

About half of the hunters or 49,4% did pay for facilities while slaughtering reindeer. The average payment from these hunters was 12,532 ISK. The survey did not query what ratio of this spending was in East Iceland but here it is assumed that this ratio was 2/3. The total spending in East Iceland is then supposed to have been 5.5 mISK and this amount is treated as buying of goods and services. That is, 18% of 5.5 mISK went as direct wages to workers or 0.99 mISK.

Just over a fifth (21.9%) of the hunters did pay for aid of professional butcher. The average payment from these hunters to butcher was 24,821 ISK. The survey did not query what ratio of this spending was to butchers in East Iceland but here it is assumed that this ratio was 2/3. The total spending in East Iceland is then supposed to have been 4.83 mISK. Most of this amount must have been net income for the butchers but the rest some cost. It is assumed as in the case of guides that 90% of the amount was delivered money or 4.35 mISK and 10% buying of goods and services or 0.48 mISK. There of 18% or 0.09 mISK in direct wages. In this part: Direct wages following buying of goods and services 1.48 mISK (0.49+0.99+0.09), delivered money 29.04 mISK (24.69+4.35).

## **Hunting licence**

In year 2009 the total payments from reindeer hunters for hunting licence was 96.85 mISK. This amount was split in three parts.

### ***Hunting licence, the share of the Environment Agency of Iceland (UST)***

UST got 10.3 mISK of the amount to cover the costs of controlling and monitoring the hunting. At least 8 mISK of these 10.3 was spent in East Iceland and it is assumed that 7 mISK was the labour cost of 1.5 member of UST staff and the rest, 1 mISK was spent on goods and service. Of the 7 mISK 6.3 mISK was direct wages and 18% of the 1 mISK ended as direct wages in the service sector.

In this part: Direct wages following buying of goods and services 0.18 mISK, delivered money 6.3 mISK.

### ***Hunting licence, the share of East-Iceland Institute of Natural History (NA)***

NA got 3.957 mISK for research on reindeer which is the basis for the control of the hunting. This research entails an evaluation and monitoring of the

reindeer population, where the reindeers stay during the year, what they eat and more. The labour cost ratio in this institute is 68% so about 2.69 mISK was labour cost in the year 2009 and thereof 2.42 in direct wages. The remaining 32%, was probably spent in goods and service which amounts 1.267 mISK and there of 18% in direct wages.

In this part: Direct wages following buying of goods and services 0.228 mISK, delivered money 2.42 mISK.

### ***Hunting licence, the share of Landowners***

Landowners get the rest of payments for hunting licence or 82.6 mISK in 2009. These are the landowners who own the land where the reindeer are hunted. A few of these landowners do not live in East Iceland so payments to them have no economical meaning for East Iceland. It is not known how much of the payments go to this group but it is assumed to be 10-20 %. The bigger part, here assumed 85%, is people living in East Iceland and their share was then about 70,2 mISK. It seems like these payments are handled as other income in farming in the region. That is, income which bears taxes in the same way as normal wages. This amount is therefore delivered money. In this part: Direct wages following buying of goods and services 0, delivered money 70.2 mISK.

### **Government funding**

The share East-Iceland Institute of Natural History got of the hunting licence (3.957 mISK) was not enough to cover the cost of reindeer research. What was left was funded by the Icelandic government. In 2009 this amount from the state was about 6.7 mISK. This amount is divided as before. That is 68% in labour cost and 32% in goods and services. In this part: Direct wages following buying of goods and services 0.386 mISK, delivered money 4.1 mISK.

### **Forward linkage effects and Crowding out effects**

One effect which must be looked at when researching economic impact and the creation of jobs is if the products, be they goods or services, from company are handled further in the region as this handling also has an impact. If the company closes, other activity is stopped as well and jobs are lost. These effects are often called forward linkage effects.

It seems as forward linkage effects are rather little in East Iceland regarding reindeer hunting. The product which comes out of the hunting is mainly meat but as well skin, horn and even heads a taxidermist handles. Very limited activity of this kind is to be found in East Iceland and meat is not bought from hunters to be further processed. It is more common that a hunter will pay someone to process the meat before getting it. This will often be part of a service package offered by the guide. Horns and skin are being used in the

producing of handicrafts in the East of Iceland and somewhat in other regions but the turn-over of this is very limited. It is also possible that the crafts person will simply use other raw materials if the one's from reindeer is unavailable. One entrepreneur in East Iceland has offered taxidermy, then primarily heads. In light of this it is assumed that one person in the region is gainfully employed from the processing of raw materials from reindeer. But there seem to be growing opportunities.

The crowding out effect is when new economical activity pushes other older activity aside. The older one is then e.g. not competitive regarding payments to workers. The establishment of the new activity then leads to lost jobs in the older one. The crowding out effect of reindeer hunting seems to be next to nothing. It is regarded as being zero.

### Jobs in East Iceland as a result of reindeer hunting

All the above mentioned effects of economic linkages sustained by reindeer hunting are summarised in table 24 below.

**Table 24. Summarised results.**

The year 2009		
Amounts in millions ISK	Delivered money	Direct wages following buying of goods and services
Buying of goods and services by reindeer hunters, guide excluded	0	9,00
Payments to guide, butcher and slaughtering facilities	29,04	1,48
Hunting licence, the share of UST	6,30	0,18
Hunting licence, the share of NA	2,42	0,23
Hunting licence, the share of landowners	70,2	0,00
Government funding	4,10	0,39
<b>Total</b>	<b>112,06</b>	<b>11,28</b>

Below, an estimation is made as to how many jobs reindeer hunting creates in East Iceland. The estimate is based on table 25 and other available information from the year 2009.

Focusing first on the column "delivered money". According to UST and NA there are about 3.3 jobs in these institutes only because of the reindeers. So there is no need is to estimate the number of jobs in this case, the delivered money of 12.82 mISK seems to stand behind 3.3 jobs. In table 21 the numbers 6.3, 2.42 and 4.1 add up to 12.83 mISK.

It is regarded that delivered money of 29.04 mISK to guides and butchers is direct wages. As in the case of hunting in general it is assumed that average

yearly wages in the service sector is 3.7 mISK. When guides and butchers in the region were paid 29,04 mISK for their service it can be regarded as 7,8 jobs (29,04/3,7).

Delivered money of 70,2 mISK to landowners is more complicated. It is barley a job to accept dividends of properties, land in this case. Payments to landowners most probably do not create jobs directly in East Iceland. They could though make it easier for some farmers to have sufficient income on their farms and in that way sustains jobs in the region. In the long run this should though not be the case. If one buys a farm, the price of the farm should simply be higher than otherwise if that farm delivers payments to its owner because of reindeer hunting. The difference in price should be the present value of the likely payments. This perquisite should therefore be considered neutral in terms of the ease for the farmer to live of his land, but should be reflected in more value of the land for resale.

In total it is estimated that delivered money creates 11.1 jobs (3.3+7.8) directly in research, management, guidance and handling of meat. There are also indirect effects of the delivered money. It is assumed that a quarter of delivered money goes as direct wages to others in East Iceland as already explained. Quarter of 112.06 mISK is 28 mISK. This amount should cover about 7.6 jobs (28/3.7). But this is not all because of the indirect effects moving further in the economic chain. When 28 mISK are delivered as wages in East Iceland quarter of that amount ends as wages to somebody else or 7 mISK and then again and again. This is sometimes called the multiplier effect. The total amount which goes in this way in direct wages is about 37 mISK (28+7+1.75+0.44+....). The delivered money of 112 mISK should therefore cover about 10.0 jobs (37/3.7) instead of 7.6.

In total delivered money because of reindeer hunting is estimated to have covered for 21.1 (11.1+10.0) jobs in East Iceland in 2009.

As can be seen in table 24 it is estimated that 11.28 mISK went in direct wages following buying of goods and services in East Iceland because of reindeer hunting. As before that is not all. Quarter of the amount is likely to end as direct wages in some ones else's pocket and then further. The total amount which goes in this way in direct wages is about 15.0 mISK and should cover about 4.0 jobs (15.0/3.7). As mentioned before it is assumed that forward linkage effects create one job in East Iceland. That is in handling of materials like reindeer meat, skin and etc.

In total it is estimated that reindeer hunting was the basis for 26 jobs in East Iceland in 2009. This is summed in table 25.

**Table 25. Number of jobs in connection with reindeer hunting.**

Estimated number of jobs in East Iceland because of reindeer hunting	Number of jobs
Direct jobs because of research, management and guidance	11,1
Indirect jobs because of delivered money	10,0
Indirect jobs because of buying of goods and services	4,0
Forward linkage effects	1,0
<b>Total</b>	<b>26,1</b>

Inhabitants are on average about double the number of full-time jobs. If the jobs are 26 then it is likely that about 52 inhabitants in East Iceland did live on reindeer hunting. In other words, if there were no reindeers in East Iceland it is likely that the inhabitants there would be fewer by 52.

## THE EFFICIENCY OF REINDEER HUNTING

The hunting of reindeer in Iceland is not done in an efficient way according to natural resource economics. Efficient use of a resource implies that its use maximizes the present value of the net benefit (Tietenberg and Lewis, 2009). The source in this case is wild reindeer in East Iceland. The inefficiency of the reindeer hunting in East Iceland does not consist in the allocation. Overhunting is not the problem as sometimes is the case when hunting of wild animals. The inefficiency consists in the sale of each unit from the resource, which is the sale of each hunting licence. The hunting licence is sold at a lower price than is possible to get. No attempt is made to sell the licences at the highest price possible. Because of this the income from the resource is far lower and the economic impact on East Iceland is far less than it would be if the use of the resource would be efficient. Efficient use of this resource would create more jobs indirectly than it does now as has been explained in-depth in the preceding chapters. The jobs in East Iceland are therefore fewer now than they would be if the use of the source would be efficient.

It would be better to sell the hunting licence on the best price possible, selling it to those who are willing to pay the highest price. That would insure efficient price at least. This is the usual way whether the resource is fish, oil or something else.

Furthermore the system of allocation of hunting licences is not attractive to foreign hunters who often spend a lot of money on hunting trips and are therefore economically important customers. As the system is now it is simply a draw and luck determines whether these most precious hunters get a licence or not. Lottery allocation of hunting licence probably also has the effects that foreign hunters do not bother taking part. If hunting licences would be sold to those who were willing to pay the highest price then it would be easy for these hunters to place as high a bid as necessary to get a licence. Instead they just hunt elsewhere in the world where the system is more attractive for them. Therefore it can be stated that the Icelandic economy misses valuable revenue because of the inefficient use of this resource.

It should also be mentioned that there exists a certain danger of waste regarding the meat of the reindeer. It is to the benefit of all that values are not wasted. It is therefore to the benefit of the society as a whole that the reindeer meat is utilized and processed as much as possible. Factors that may cause waste regarding the meat is if bullets are used that damage the meat more than necessary and lack of knowledge by the guides how to handle the reindeer carcass after it has been shot.

## CONCLUSIONS

The main finding of the study is presented below. Monetary amounts are based on the tables presented above.

Based on the survey findings the average Icelandic hunter has the following characteristics:

- He is 41.9 years old, is married and has two children.
- He lives in the capital area or the surrounding municipalities.
- He has a university education and his profession is in the professional, scientific and technical activities.
- He hunts most often in area SV.
- The species he hunts most is gray lag goose.
- He prefers to hunt with friends.
- He doesn't rent land to hunt geese or ptarmigan.
- The most common duration of hunting trip is one day.
- If he stays over night his accommodation is with family.
- His last hunting trip was in November 2009.
- If he hunts reindeer is it on hunting area 2 and he kills a cow.
- The length of the hunting trip is 3 days.
- He is very pleased with the service and knowledge of his guide.

The average total expenditure (excluding reindeer hunting), during the hunting season 2009 was: 351.162 ISK. The average total expenditure on reindeer hunting in 2009 was: 321.328 ISK.

Hunting in Iceland (reindeer hunting excluded) does have considerable economical effects in the regions where it takes place.

It is estimated that in year 2009 each hunter did spend on average 31,571 ISK in hunting regions excluding hunting license, renting of land and guidance.

For the permission to hunt and renting of land to hunt each hunter did pay on average 10,088 ISK in the year 2009. For guidance each hunter paid on average 1,465 ISK.

Payment for guidance seems to be the only thing which did create direct jobs or 4.3 jobs.

Indirect jobs are estimated to have been about 33 in the hunting regions in 2009. They are created when landowners spend their payments for license and renting and as well when the hunters spend their money.

In total it is estimated that hunting in Iceland excluding reindeer hunting was the basis for 37.3 jobs in the hunting regions in 2009.

Hunting of reindeer has considerable economical effect in East Iceland.

Each reindeer hunter did spend on average 39,847 ISK in the region in the year 2009 excluding guidance and handling of meet.

Each reindeer hunter did spend on average 20,577 ISK in local guides in the year 2009 and furthermore it is estimated that each hunter did spend in the region on average about 4,127 ISK for slaughtering facilities and 3,624 ISK for butcher.

It is estimated that the reindeer hunting did create 11.1 direct jobs in East Iceland, on one hand in research and controlling and on the other hand in guidance and handling of meet.

It is estimated that indirect jobs were about 14. They are based on the spending of the landowners' dividend and also on the spending of the hunters the in goods and services.

Additionally it is estimated that there is one job in the processing of raw materials from reindeer.

In total it is estimated that reindeer hunting was the basis for 26.1 jobs in East Iceland in 2009.

The hunting of reindeer in Iceland is not done in an efficient way according to natural resource economics. The inefficiency consists in that the hunting licence is sold at a lower price than is possible to get. Because of this the income from the resource is far lower and the economic impact on East Iceland is far less than it would be if the use of the resource would be efficient.

These main findings should be interpreted with caution as the sample obviously cannot reflect the whole population. Nonetheless the basic information can be of use for hunting tourism operators as with them they can profile their customers and target potential product development better. As to the economic impact of these hunters the below presented summary of findings are merely indicative of basic facts, produced through the survey with its limitations. For a detailed study on economic impacts more *in situ* field work is needed, detailing e.g. regional economic input and output dynamics, industry linkages and interdependencies and the structure of industry investment and ownership.

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## **APPENDIX**