Reindeer Markets in the Circumpolar North: 
*An Economic Outlook*

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The commercial production of caribou and reindeer meat is relatively small; it is estimated that less than 175,000 animals are harvested annually.\(^1\) Reindeer husbandry or commercial caribou hunts occur in seven circumpolar countries: Canada, Finland, Greenland, Norway, Russia, Sweden, and the United States yet total production is still very low. Properly processed reindeer meat is seen as a high-end luxury or specialty meat in all those countries except Russia. In addition to hide, both male and female reindeer produce horns, which are valuable and can be sold for between 4 and 14 dollars per pound.\(^2\) Overall, reindeer herding and caribou hunting has had wildly varying levels of success, although they seem to be struggling across the globe.

This paper provides an economic analysis of the reindeer industry, so we can better understand its challenges, successes, and structure, examine the total size and production of the market, and evaluate the socio-economic tradeoffs between subsistence and commercial harvests. This paper examines the reindeer markets in Canada, Finland, Greenland, Norway, Sweden, and Alaska, though most emphasis is placed on North America. Russia has been left out of this analysis, due to the scale and complexity of reindeer herding in Russia and the difficulty of obtaining information on the subject.

The first part of this paper will estimate total global production and will examine international trade and price discrepancies. Then three forms of herding and two forms of hunting in commercial operations will be reviewed. The current market structures in North American countries will be examined next. The fourth part of this paper will examine the state of the industry and the factors that affect its production choices on a global level. Finally, the choice between subsistence and commercial production will be examined from an economic viewpoint.

I. Global Production and Trade

The reindeer industry is rather small, especially in the world of global agriculture, yet it uses vast amounts of arctic lands, and occurs in almost all countries with arctic regions. Producers face many challenges in herding reindeer in remote and northern locations, yet there is high demand and competition between buyers to acquire the little that is being produced. To better understand an analysis of the industry, aggregate data such as the number of reindeer in each country, pricing, and exports are examined. Overall demand is very high, and if supply were to be greater, many more countries would import reindeer meat than are currently. The tables below are meant to be used as estimates. They were constructed from information collected from statistical and research agencies, along with industry insiders, and herders.

As would be expected, the flow of goods seems to correspond relatively well to the estimated carcass weight price. There has been trade from Greenland to Iceland, Greenland to Denmark,

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\(^1\) Total world production estimate constructed as part of the research for this paper, see appendix page 17.  
\(^2\) Doug Drum, Interview, 7/2006.
Canada to Germany, Norway to Italy, Canada to The United States, and Finland to Germany. Demand differences between locations are probably the greatest influence on price. In Norway, a rich country with a history of reindeer consumption, prices are high and reindeer is perceived as a delicacy and holiday staple. Canada and the U.S., on the other hand, do not have a strong conventional market but have found markets in New England, high-end restaurants, ski resorts, and with reindeer sausage. The price difference between the U.S. and Canada appears to be due to the existence of a strong market for “trim” and other low end meat that is used in reindeer sausage, which increases the total value of the animal. Canada does not have this strong tourist-driven market for reindeer sausage, so its trim is not as valuable. High-end products must be very closely priced, because USDA and CFIA certifications are equivalent, and there is a lack of trade barriers between the two countries. Transportation costs from Northern Canada and Alaska to the lower 48 are about equal, so high end cuts could be bought with equal ease from Canada or Alaska from distributors in California or Colorado. Finland and Sweden are expected to have similar pricing because of their proximity and their membership in the European Union and the European Market Place. Norway may have small discrepancies, as it is not part of the E.U.

Table 1. Net Exports by Country

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Canada*</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Finland</td>
<td>-130</td>
<td>-170</td>
</tr>
<tr>
<td>Greenland (reindeer)</td>
<td>34</td>
<td>0.43</td>
</tr>
<tr>
<td>Norway</td>
<td>-7.3</td>
<td>-52</td>
</tr>
<tr>
<td>Sweden</td>
<td>325</td>
<td>313</td>
</tr>
<tr>
<td>United States*</td>
<td>-1</td>
<td>-1</td>
</tr>
</tbody>
</table>

*Canada and U.S. are both rough estimates

Table 2. Carcass Weight Pricing by Country

<table>
<thead>
<tr>
<th>Country</th>
<th>Carcass Weight Price 2005</th>
<th>Carcass Weight Price 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>-</td>
<td>$3.85</td>
</tr>
<tr>
<td>Finland</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Greenland (reindeer)</td>
<td>-</td>
<td>$4.90</td>
</tr>
<tr>
<td>Greenland (caribou)</td>
<td>-</td>
<td>$2.00</td>
</tr>
<tr>
<td>Norway</td>
<td>$3.65</td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>$4.53</td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>$3.25</td>
<td>$4.50</td>
</tr>
</tbody>
</table>

*These are estimated carcass weight prices per pound in U.S. dollars.

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3 Stefan Magnusson, Phone Interview, 8/7/2007.
Lyle Renecker, Phone Interview, 7/30/2007 & Email Correspondence on 8/24/2007.
### Table 3. Total Global Production

<table>
<thead>
<tr>
<th>Country</th>
<th>Herd</th>
<th>Location</th>
<th>Region</th>
<th>Number of Reindeer 2005</th>
<th>Commercial Slaughters 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>Nenana</td>
<td>Rail Belt</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>Delta</td>
<td>Rail Belt</td>
<td>110</td>
<td>15</td>
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<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>Fairbanks</td>
<td>Rail Belt</td>
<td>85</td>
<td>5</td>
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<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>Palmer</td>
<td>Rail Belt</td>
<td>150</td>
<td>10</td>
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<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>St. George Island</td>
<td>Alaska Islands</td>
<td>270</td>
<td>-</td>
</tr>
<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>St. Paul Island</td>
<td>Alaska Islands</td>
<td>600</td>
<td>-</td>
</tr>
<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>St. Lawrence</td>
<td>Alaska Islands</td>
<td>3,000</td>
<td>150*</td>
</tr>
<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>Atka Island</td>
<td>Alaska Islands</td>
<td>2,500</td>
<td>-</td>
</tr>
<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>Umnak Island</td>
<td>Alaska Islands</td>
<td>3,200</td>
<td>-</td>
</tr>
<tr>
<td>Alaska</td>
<td>Domestic</td>
<td>Seward Peninsula</td>
<td>Seward Peninsula</td>
<td>7,000</td>
<td>350*</td>
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<td>Domestic</td>
<td>Nunivak Island</td>
<td>Nunivak Island</td>
<td>4,000</td>
<td>1,000</td>
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<td>USA</td>
<td>Domestic</td>
<td>Lower 48</td>
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<td>80</td>
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<tr>
<td>Canada</td>
<td>Domestic</td>
<td>All Reindeer Herds</td>
<td>Road System</td>
<td>6,000</td>
<td>800</td>
</tr>
<tr>
<td>Canada</td>
<td>Southampton Is.</td>
<td>Coral Harbor</td>
<td>Nunavut</td>
<td>15,000</td>
<td>1,500</td>
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<td>Canada</td>
<td>Domestic</td>
<td>McKenzie Delta</td>
<td>McKenzie Delta</td>
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<td>?</td>
</tr>
<tr>
<td>Greenland</td>
<td>Domestic</td>
<td>Southern Greenland</td>
<td>Southern Greenland</td>
<td>3,800</td>
<td>900</td>
</tr>
<tr>
<td>Greenland</td>
<td>All Wild Herds</td>
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<td>Greenland</td>
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<td>Sweden</td>
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<td>Norbotten</td>
<td>Norbotten</td>
<td>261,404</td>
<td>32,464</td>
</tr>
<tr>
<td>Sweden</td>
<td>Domestic</td>
<td>Vasterbotten</td>
<td>Vasterbotten</td>
<td>total above</td>
<td>17,038</td>
</tr>
<tr>
<td>Sweden</td>
<td>Domestic</td>
<td>Jamtland</td>
<td>Jamtland</td>
<td>total above</td>
<td>22,131</td>
</tr>
<tr>
<td>Finland</td>
<td>Domestic</td>
<td>Finland</td>
<td>Finland</td>
<td>207,000</td>
<td>51,750</td>
</tr>
<tr>
<td>Norway</td>
<td>Domestic</td>
<td>Norway</td>
<td>Norway</td>
<td>129,552</td>
<td>32,388</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>644,771</strong></td>
<td><strong>174,097</strong></td>
</tr>
</tbody>
</table>

* Numbers from Finland, Norway Sweden, and Greenland come from their respected statistics bureau. Numbers for Alaska and Canada came directly from herders or companies if possible, followed by estimates from industry insiders.
II. Forms of Herding.
Looking at different models of reindeer herding and caribou hunting allows for a better understanding of the industry and its challenges. Understanding the different forms of production is the first step to understanding the industry. We will look at the three dominant styles of reindeer herding and the two different forms of commercial caribou hunting.

Reindeer herding varies greatly from operation to operation but can generally be broken down into three unique structures, which, for this paper, will classified as: tight herding, loose herding, and paddocks herding.

- **Tight herding** is only regularly practiced in Russia and parts of Scandinavia. This typically consists of large herds of 1,000 or more animals that remain in close contact with human herders throughout the year. The herders would be able to walk through the herd and even ride or harness reindeer for transportation. This type of herding has traditionally been successful, but there are modern day challenges. First, large herds require a large amount of land for grazing. Second, people must be with the herd at all times to keep the reindeer docile and comfortable with the herders’ presence. The necessity for a constant presence means that herders must move and camp with the herd. Historically, whole communities would migrate with the herd, but this is no longer common. Now herders, assisted by snowmobiles or other transportation, will stay with the animals in shifts. It is a great challenge to use tight herding while still maintaining a home away from the herd. The benefits are the economies of scale along with keeping animals docile and easy to control. There is talk about establishing tight herding practices on potential commercial Aleutian Island herds, which suggests that people in the industry still see this as a potent profitable method, even though it is not currently heavily used.

- **Loose herding** also consists of large herds of 1,000 or more reindeer, but the herd is allowed to wander relatively unrestrained during most of the year. The animals are commonly less domesticated and are nearly feral at times. Loose herding involves allowing the reindeer to roam in a naturally determined area, with yearly roundups of the herd for medical attention and harvesting. This is more traditional in Scandinavia and is still practiced there. Loose herding is also practiced in Canada, Alaska, and Greenland. Depending on the size of the herd and the location, natural land barriers may be used to retain the herd, while in other locations some man-made fencing may be used to keep the herd in a set area. Loose herding often involves the combination of many smaller herds, tagged by owners to create a larger, more stable herd, which will be separated and harvested once a year. Other loose harvesters have large, nearly feral reindeer herds that are not rounded up but instead shot on location and brought to the slaughtering facility by snowmobile or truck. Land formations such as peninsulas, valleys, and islands especially

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4 Doug Drum, Interview, 7/2006.
have proven successful for loose herding operations. The challenges with this form of herding are the expense of transport involved in finding and moving the herd, the lack of herd management, and the risks of predation and runoff.

- The last common type of reindeer herding is the small farm or ranch that keeps reindeer in paddocks. These are usually herds of less than 1,000 and oftentimes less than 100 reindeer. These farms seem to be successful based on their small footprint and their locations. Reindeer in paddocks are often fed grain to supplement their grazing diet, and the plots of land they live on are typically much smaller than those of loosely and tightly herded reindeer. This smaller size allows them to be located on the road system and near larger population centers. These smaller farms commonly do not focus on meat production but rather use of the animals while alive and soft velvet horn harvests. Live use for animals includes sled pulling, advertisement, tourism, and holiday use. The challenges facing paddocks herding seem to be generating enough money to make such small herds profitable.

Commercial caribou harvests, in total, are much less common than reindeer herding, but there are still two unique structures to be examined. Commercial caribou hunts can be broken down into government regulated hunts and non-regulated hunting

- Government regulated hunts occur primarily in Canada. In the past, the government actually conducted hunts itself, but this is no longer true. Now there are government co-management boards that set the number of caribou that can be taken from each herd and then determine the number to be allowed for subsistence, sport, and commercial purposes. Currently, almost all of the herds have no commercial use under government regulations. Kivalliq Arctic Foods is the only company that currently harvests caribou in Canada commercially, although there was another company that left the industry in 2005 due to cost overruns. In Alaska, commercial caribou hunts are illegal, so they are killed only for subsistence and sports hunting.

- Greenland is the only country where there is a relatively unregulated commercial harvest of caribou. The government sets a limit on the number that can be harvested per year, along with the number of caribou a hunter is allowed to kill annually, but, beyond this, the harvest is a free market enterprise. Any hunter is free to sell his or her caribou to whomever is interested in buying it. This market structure is interesting in that it changes what is a subsistence culture in Alaska and Canada into a cash economy. This

7 Monika Hoegger, Email Correspondence, 9/5/2007.
http://www.woodlandfarmsalaska.com/four_tracks.html
Williams Farm, Phone Interview, 8/2007.
8 http://www.albertaireindeer.com/index.html
http://www.woodlandfarmsalaska.com/four_tracks.html
John Verhoven, Email Correspondence, 9/11/2007.
9 For more information on co-management see, “Co-management: Concepts and Methodological Implications” by Carlsson & Berkes.
http://inuit.pail.ca/nunavik-arctic-foods.htm
12 Stefan Magnusson, Phone Interview, 8/7/2007.
Kirsten Birch Håkansson, Email Correspondence, Statistics Greenland, 8/1/2007.
may have developed due to the lack of a predominant subsistence culture and should not be seen as being something that evolved from a subsistence model.

It is important to note that while, historically, loose herding was common in Scandinavia and tight herding was common in Russia, now all three forms of reindeer husbandry exist throughout the circumpolar north. Each form seems to have its own set of challenges and benefits.

III. Market Structures
Understanding the layout of each market will allow for a better understanding of its structure, and how profit and risk are shared throughout the production chain and the implications this has on the industry. It also allows for comparison between countries, and how differences in market structure may be explained, or help explain different levels of success between countries. Special emphasis will be placed on North America due to the different market structures in Alaska, Canada, and Greenland.

Alaska
Alaska’s reindeer market consists of three stages: herders, meat processors, and distributors. There are exceptions to this structure, but, in general reindeer, meat passes through these three stages.

Reindeer herders are the first tier in the Alaskan market. They consist of small rail belt paddocks herders, the Nunivak Island herd, the Seward Peninsula herd, and other island herds, such as on Umnak Island. These herders use a couple different herding techniques. On the road system,
small farms focus on raising reindeer in paddocks. Off the road system, they focus on larger, wilder herds with loose herding practices.\textsuperscript{13} Islands have proven specially suited for loose herding due to the natural limits of their migrations and the lack of predators.\textsuperscript{14}

Nearly all of the meat sold by reindeer herders is sold to meat packersprocessors, such as Indian Valley meats or Alaska Seafood and Sausage. The exception to this would be the Seward Peninsula, which sells to local Seward Peninsula stores and residents due to lack of USDA and state certification.\textsuperscript{15} Small farmers will bring live animals to be slaughtered at the meat processors, while Nunivak will ship whole or halved carcasses.\textsuperscript{16} (Nunivak Island has recently expanded their employee training to develop a value-added product line that can be sold directly to distributors, consumers, or restaurants, making them a partial exception to this structure.)\textsuperscript{17} The meat processing plants will process the animal into select cuts: steaks, rounds, loins, shoulder, and trim. The steaks, rounds, and loins are typically sold to distributors who sell the cuts to restaurants and butchers in Alaska and the lower 48, where they command a high price. The shoulders and trim typically go to make reindeer sausage.\textsuperscript{18} Reindeer sausage is a uniquely successful product in Alaska, with nearly a million pounds produced each year. Reindeer sausage is typically only 10\% reindeer with the remaining 90\% being beef and pork. This low-end meat market has become very successful, and many of the meat processors sell directly to tourists and locals from their business locations or to stores that wish to carry reindeer sausage.\textsuperscript{19}

Many of the small farms on the road system focus on alternative niche markets for their reindeer. These include tourism, commercial use, and live animal sale. These have proven profitable for a few local road system farmers but probably cannot be developed much further. These niche markets also depend on being close to major business centers, tourists, and easy transportation.\textsuperscript{20}

Herders typically sell their animals’ "carcass weight," meaning a per pound weight for the slaughtered animals. Prices in 2005 were roughly $3.00 to $3.50 per pound carcass weight but have increased to $4.00 to $5.50 per pound in the last two years. The average carcass weighs about 100 pounds, which made a reindeer worth $325 in 2005 and around $500 today.

Wholesalers buy the carcass and process the reindeer into a wide array of products. Once

\textsuperscript{13} Rose Fosgate, Phone interview, 9/2007.
Greg Finstad, Phone Interview, 8/2007
\textsuperscript{14} Victor Muculief, Interview, 8/17/2007.
\textsuperscript{15} Greg Finstad, Phone Interview, 8/2007.
\textsuperscript{16} Doug Drum, Interview, 7/2007
Cameron Vivian, Interview, 7/17/2007.
\textsuperscript{17} State Training and Employment Program (STEP), Annual Report, July 1, 2003, through June 30, 2004. \url{http://146.63.75.50/research/pub/stepfin0304.pdf}.
\textsuperscript{18} Doug Drum, Interview, 7/2007.
Cameron Vivian, Interview, 7/17/2007.
Delta Meats, Phone Interview, 7/2007.
North Star Quality Meats, Phone Interview, 7/2007.
\textsuperscript{19} Doug Drum, Interview, 7/2007.
Cameron Vivian, Interview, 7/17/2007.
\textsuperscript{20} Phone Interview, Williams Farm, 8/2007.
processed, prices vary greatly depending on the type of cut. Reindeer tenderloin or high-end steaks can sell up to $30 per pound.\textsuperscript{21} Rounds were sold wholesale for $5.75 per pound in 2005 and have probably increased in price in the last 2 years.\textsuperscript{22} One meat processor broke down the pricing for reindeer sausage. (10% reindeer) They sold sausage to stores for $4.99 per pound, which was then marked up by the retail stores to $6.50 to $7.00 a pound.\textsuperscript{23} Seeing as retailers used a 40% markup, meat processors are probably making a 20% to 40% markup on the reindeer meat once they sell it as sausage. Under the current structure, a great amount of risk is taken on by the herders, who harvest with predetermined price agreements and number allotments from buyers, although these are usually not legally binding contracts.\textsuperscript{24} Once the reindeer are killed, the herders must quickly distribute their product to maintain freshness and avoid the high costs of keeping the product adequately frozen, which puts them in a position of vulnerability. That being said, the lack of supply allows herders to choose whom they sell to, allowing them to maximize price and encouraging the buyers to be useful and helpful business partners. Very few of the herders are heavily involved in other herding products or similar industries, so, if the reindeer market were ever to collapse or even lapse for more than one or two years, it would be possibly fatal to the reindeer herding industry in Alaska. The second tier meat processors and wholesalers, on the other hand, would be able to sustain such a market shock due to their diversified role as meatpackers and their ability to cheaply switch to producing other products if necessary.\textsuperscript{25}

Canada

The two largest producers in Canada in 2007 are Kivalliq Artic Foods and Hillside Palace Elk Farms. Kivalliq Arctic Foods is a commercial caribou hunting operation on Southampton Island. Hillside Palace Elk Farms is the largest reindeer ranch in Canada, and the reindeer are kept in paddocks there. While these operations are wildly different in their structuring, they have both been profitable.

Hillside Palace Elk Farms (HPEF) focuses mostly on selling high-end steaks and cuts into the local market in Quebec. HPEF slaughters roughly 600 reindeer a year, with more than 80% of the product consumed in Quebec, where reindeer is perceived as a high-quality meat, and demand is high. This has proven to be a successful market, and meat is sold to restaurants, to distributors, and directly to customers at farmers' markets. Costs are kept low due to easy transportation on the road system to the nearby city. Unlike most reindeer farms in Alaska, HPEF slaughters and processes its own meat in house with certification so that it can be sold directly to distributors, restaurants, or retail buyers. HPEF also functions as a meat processor and now is also importing slaughtered reindeer carcasses from Greenland.\textsuperscript{26}

Kivalliq Arctic Foods (KAF) is the largest producer in Canada, harvesting out of Coral Harbor and processing out of Rankin Inlet. They harvest wild caribou in the winter months, then process

\textsuperscript{21} Doug Drum, Interview, 7/2007.
\textsuperscript{22} Doug Drum, Interview, 7/2007, Phone Interview, 8/2007.
\textsuperscript{23} Delta Meats, Phone Interview, 7/2007.
\textsuperscript{24} Doug Drum, Interview, 7/2007.
\textsuperscript{25} Delta Meats, Phone Interview, 7/2007.
\textsuperscript{26} Lyle Renecker, Phone Interview, 7/30/2007.
and ship the product to retail distributors over the remainder of the year. KAF slaughters, processes, and commercially packages its products in-house for retail or wholesale use. They transport their product via 737 cargo planes that land at Rankin Inlet. KAF sells product into Quebec, Ontario, British Columbia, Colorado, California, Nevada, and Germany. They also have sold directly to Bamf resort in Alberta and Vail, Colorado. It is believed that KAF receives a government subsidy to help pay aborers during the harvest season; although the amount is not known. Further investigation was attempted to verify this subsidy, but KAF did not reply to inquiries. If they do receive a subsidy, it should be taken into account when evaluating KAF’s profitability.

Canada, at one point, conducted commercial based government hunts of caribou herds. The Canadian government would drive a mobile slaughterhouse onto a frozen lake, round up as many as 10,000 animals, and slaughter them. That changed when caribou legally became a Native resource, and Canada entered the age of co-management. Co-management involves the government determining total harvest allotment, with secondary management boards by province that decide how their allotment will be allocated across subsistence use, sports use, trapping, and commercial hunting in a complicated bureaucratic process. This greatly reduced the number of caribou being for commercial harvest. Now, it is estimated that only 2,000 reindeer and caribou

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are harvested a year, although this may not be due entirely to the reindeer management restructuring.\(^{28}\)

In 2004-2005, the reindeer/caribou market was a much larger place with the addition of two other large suppliers. Nunavik Arctic Foods, based out of Kuujjuaq, was making yearly commercial harvests of roughly 3,000 caribou a year off the Green and Leaf River Herds in northern Quebec.\(^{29}\) The other addition, Lloyd Binder, was harvesting from his free range reindeer herd in Mackenzie Delta, which is harvested on a regular basis until 2005.\(^{30}\)

The Mackenzie herd is still in existence, but regulations and legal conflicts have made harvesting from the herd expensive, and they have suffered losses to caribou herds, which reduces profitability.\(^{31}\)

Nunavik Arctic Foods (NAF) was very similar to the Kivalliq operation in scope and marketing. They marketed high-end, fully processed, and commercially packaged products that sold well and commanded a high price. Neil Greig, CEO of NAF, said that they had well-developed markets, but that transportation costs and cost of labor kept the business from turning a profit and NAF left the industry in 2005. They ended up closing down when the Leaf River and Green River caribou herds began to change migration and drift further away from each other and the processing facility, which raised the transportation and hunting costs. When it was in business, NAF exported to Colorado, California, and Quebec.

Both HPEF and KAF identified the major competitor in the market as Broadleaf Venison, a company based out of New Zealand that sells red dear. Broadleaf Venison is a well-run company and can compete with North American raised elk and reindeer because of its low shipping costs. Doug Drum of Indian Valley Meats stated that Broadleaf Venison could ship freezer containers to Seattle for 13 cents per pound.\(^{32}\) Reindeer tends to command a price about 20% higher than red deer, but, as prices rise above that, more distributors and restaurants will carry the less expensive red deer instead.

Carcass weight prices are estimated to be slightly below $4.00 to $4.50 per pound currently, making them cheaper than Alaska’s.\(^{33}\) The difference in price is believed to be due mostly to the low-end market. Steaks and cuts sell at roughly the same price in Canada as in Alaska, but low-end cuts, such as shoulder and trim typically go into stew cubes and meat pies and are sold for very little.\(^{34}\) In Alaska trim and shoulder meat is turned into reindeer sausage and commands a very high price, making trim and shoulder much more valuable and pushing the carcass weight price of the animal up.

\(^{28}\) Lyle Renecker, Email Correspondence, 8/24/2007.
\(^{29}\) Neil Grieg, Phone Interview, 9/2007.
\(^{30}\) Lyle Renecker, Email Correspondence, 8/24/2007.
\(^{31}\) Lyle Renecker, Phone Interview, 7/30/2007.
\(^{32}\) Lyle Renecker, Phone Interview, 7/30/2007.
\(^{33}\) Lyle Renecker, Phone Interview, 7/30/2007. Email Correspondence, 8/24/2007.
\(^{34}\) Lyle Renecker, Phone Interview, 7/30/2007.
Greenland

Greenland has commercial caribou harvests and two reindeer farms, but their markets are not arranged similarly to Canada or Alaska. Caribou are not seen as a Native resource, so they are managed very differently. Also there are far fewer subsistence takes and less of the cultural tradition of sharing resources popular in rural Alaskan villages. This means that nearly their entire yearly slaughter can be measured as commercial off take. In Greenland, caribou and reindeer are not seen as near-perfect substitutes, as they are in most other countries. Only in Greenland does there appear to be such a large price and perception difference caribou and reindeer meat.

![Greenland Market Structure Diagram](image)

In 2005, 13,508 caribou were killed in Greenland, while 10,579 caribou were killed in 2006, making it by far the largest commercially viable harvest of caribou studied.\(^{35}\) Statistics Greenland does not track the uses of the product but does track the amount of “reindeer,” which includes both wild and domestic, purchased by meat processors. In 2006, 18 metric tons of reindeer were sold to meat processors for 506,000 Danish kroner, which works out to an average carcass weight of roughly $2.00 per pound based on exchange rates from January 1, 2006.\(^{36}\)

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The second reindeer market niche is the two reindeer farms that exist in southern Greenland. These two farms have, on average, around 3,000 animals and slaughter roughly 1,000 a year.37

These farms produce European Union and USDA certified equivalent meat, and focus primarily on export. It appears that the price in Greenland is not as high as in other countries. This may be due to the large amount of caribou in circulation, and consumer perceptions based on this meat.

Isotorq Reindeer Station, owned by Stefan Magnusson, makes up roughly 80-90% of the reindeer industry in Greenland and is the largest of the two reindeer farms. Isotorq Station slaughters its own animals with E.U. equivalent certification and then ships them primarily to Iceland for processing and sales.38 Iceland is a relatively rich country with a tradition of wild meat and has turned out to be the most profitable market for Isotorq. Prices are similar to Norway, but shipping costs are less.

Mr. Magnusson breaks down his product distribution as follows: 70% goes to Iceland as carcasses where it is processed and sold, 10% goes to Canada as carcasses where it is processed and sold, 10-15% goes to local Greenland market, and 5-10% a year is shipped to Denmark.

Prices in Iceland in 2007 were roughly US$10-12 per kilogram ($4.45 to $5.35 per pound) carcass weight.39 Mr. Magnusson says that Iceland and Norway have similar high prices due to an affluent population and a tradition of eating wild game. Prices are typically about 20% lower in North America, but he believes the North American market could match Norway and Iceland in certain markets.40

The average price of caribou is roughly $2.00 per pound carcass weight, and the price for reindeer is roughly $5.00 per pound carcass weight. This shows that these are truly different products with different markets. The price difference is also much greater than the estimated $1.00 difference in carcass weight price for inspected and not inspected reindeer meat in Alaska,41 making this extreme difference unique to Greenland alone.

Greenland’s market structure is very different from both Canada and Alaska’s, and the risk and benefits are also shared differently. The caribou market in Greenland is unique in that hunters share very little of the risk, they need to know roughly the value of the animal when they shoot it, without the large investments that herders must make, but they receive a much lower price than they would for reindeer. The reindeer farmers in Greenland have invested a fair amount of money into each reindeer but are paid well for their increased risk.

Scandinavia
Finland, Norway, and Sweden produce substantially more reindeer than the U.S., Canada, and Greenland combined.42 Why they produce so much more reindeer meat will be part of the

Stefan Magnusson, Phone Interview, 8/7/2007.
38 Stefan Magnusson, Phone Interview, 8/7/2007.
39 Stefan Magnusson, Phone Interview, 8/7/2007.
40 Stefan Magnusson, Phone Interview, 8/7/2007.
41 Delta Meats, Phone Interview, 7/2007.
42 See total production table on page 17.
analysis of production factors in the next section but includes well-developed consumer demand, proximity to large metropolitan areas, lack of caribou, and cultural significance. In Sweden everybody is allowed to own reindeer if they live in a herding district and are part of a herding organization. The majority of herders are Sami people, who receive land and water rights when herding reindeer, though these are constantly in jeopardy.43 There is a large amount of loose herding or herding that falls in between loose and tight herding. Herders commonly combine their herds along family or village lines and allow their reindeer to intermingle. This allows for easier control of the animals and shared herding responsibilities.44 The structure beyond this is not yet well understood. In Sweden, which produced over two million kilograms of reindeer meat in 2005, 1.9 million pounds of that meat was consumed in Sweden with nearly half of that occurring within the Sami communities.45 The market is structured so that meat is first consumed within the herding community and is then sent to regional and national hubs. Sweden, Finland, and Norway also have strong national markets that account for nearly all of each country’s remaining production. In 2005, Finland consumed 100,000 pounds more reindeer meat than it produced, making it a net importer of reindeer.46 Overall a very small percent of reindeer meat is exported out of Scandinavia, but Germany, France, Austria, Denmark, and Switzerland all import small amounts of reindeer or have expressed interest in doing so. IKEA sells reindeer at their Swedish food stores located inside their furniture stores.47

IV. Barriers to Profitability
Now that a basic understanding of several of the markets has been reached and the forms of herding and hunting have been covered, the question remains as to why reindeer and caribou operations take such varying forms and why producers seem to be struggling when they are in such a high-demand market. This section will target key challenges the producers face and how they affect different operations. Through research and conversations with key industry players, the factors to be examined are: legal certification, shipping costs, technology expense, caribou migration, country regulation, and grants and subsidies.

- State or National Certification: Each country has its own national certification, such as USDA certification in the United States and EU certification for the European Union. The regulations and classifications around reindeer as a certified product have proven very difficult to several industry players. In Alaska, the necessity for state or national certification for sale in the state or to the rest of the nation has been the barrier to entry for many potential market players, such as the island herds that exist on Umnak, Atka, and Adak islands. The expense of building a USDA coded slaughtering facility in such remote locations is very high and limits market entry.48 Secondly, the USDA and Canadian equivalent CFIA classify reindeer as non-amenable and game meat, respectively, making it more expensive and difficult to process.49 In the U.S., amenable meat receives free USDA inspection during

46 Leo Kostiainen, Statistics Finland, Email Correspondence, 7/30/2007.
49 Rose Fosgate, Phone interview, 9/2007.
50 Bob Gerlach, Phone Interview, 8/2007.
slaughtering and processing, while non-amenable meat must pay a per-hour rate for inspection and cover travel costs.\textsuperscript{50} The structuring of Canadian CFIA certification also requires reindeer operations to pay inspectors.\textsuperscript{51} This added reoccurring expense necessary to maintain certification is very expensive for rural operations that must fly an inspector in at their own cost. The Seward Peninsula also does not have a certified slaughterhouse, even though they have certification to sell in their region, albeit with tight restrictions on the preparation and cuts they can sell.\textsuperscript{52} Lack of certification eliminates their ability to enter the strong market for reindeer from meat packers in Delta, Fairbanks, and Anchorage, along with companies in the lower 48 such as Polarica USA. The lack of these buyers, plus the inability to sell to restaurants, most likely keeps the Seward Peninsula selling price lower than if it were certified. One meat processor stated that, in Alaska, uncertified meat sold for roughly $1.00 less per pound carcass weight than certified meat.\textsuperscript{53} While certification is important in maintaining national and international standards, it has created an increased challenge for operations that are off the road system or far from population centers.

- **Shipping Costs:** The added expense of shipping meat into viable markets, such as population centers, has stifled the flow of goods. Shipping costs are understandable expenses, but the challenge facing many reindeer herders is the lack of infrastructure and the low priced shipping available to competitors. Broad Leaf Venison from New Zealand is an established red deer distributor, and they can deliver frozen carcasses to Seattle via ship for roughly 13 cents per pound shipping cost.\textsuperscript{54} This low shipping cost makes delivery of reindeer by ship from New Zealand to Anchorage substantially cheaper than delivery by plane or ship from Nunivak Island to Anchorage. This raises questions about why such cheap shipping rates are achievable for some but not others. It appears that Broad Leaf does not receive a subsidy for shipping costs, so it appears to be a question of infrastructure and quantity. Many of the major producers in North America (Nuniwarmiut Reindeer Seafood, Kivalliq Arctic Foods, and the Seward Peninsula) are not connected to the road system and, due to small size and lack of population centers, have small port facilities.\textsuperscript{55} Also, because of their remoteness, transport ships must go far from the main flow of goods and detour hundreds of miles solely for one port. Secondly, Broad Leaf produces thousands of elk a year, all of which leaves from a centralized port. This allows for hundreds or even thousands of red deer to be shipped at once in large freezer containers. The bulk shipping and preexisting and regularly visited port are probably the two variables that allow for such low shipping costs. Shipping costs in rural operations will continue to be a challenge that does not look as if it can be overcome except with very large and very expensive infrastructure investments to construct roads and port facilities.

- **Technology Expenses:** Almost all reindeer herders spoken to mentioned the expenses of technology as one of the major challenges they currently face. Technologies used in reindeer...

\textsuperscript{50} Bob Gerlach, Phone Interview, 8/2007.
\textsuperscript{51} Neil Grieg, Phone Interview, 9/2007.
\textsuperscript{52} Josh Greenberg, Phone Interview, 8/2007.
\textsuperscript{53} Delta Meats, Phone Interview, 7/2007.
\textsuperscript{54} Doug Drum, Interview, 7/2007.
\textsuperscript{55} Doug Drum, Interview 7/2007.
herding include snowmobiles, all-terrain vehicles, helicopters, and satellite tracking tags. These technologies allow the herd to be easily moved and located quickly and allow herders quick transportation between the herd and their homes. The question on the use of technology must be looked at through two lenses, an economic lens and a social lens. From an economic perspective, technology should be an investment that increases production volume or decreases production costs and thus creates greater revenue. These technologies, especially with the dramatic increase in fuel cost, do not achieve these goals. Snowmobiles and helicopters allow one person to move more quickly and to herd animals with greater ease, which should allow for more animals to be raised, economies of scale to be created, and greater revenue to offset the increased expenses. The problem faced by many of the reindeer and commercially harvested caribou herds, though, is the lack of ability to expand. Many herds are limited by their location, available food sources, and predation. It appears that in many cases, the size limits of a herd are below the herd size necessary to make such technology profitable. This has become especially pronounced with the recent increase in fuel costs. If fuel costs stay high, the reindeer industry may see a swing towards smaller herds kept in paddocks, which is far less technology and fuel intensive.

The second lens that must be considered is the social lens. Technology may have been introduced not to increase production but to allow for herders to live more modern lives with fixed homes. If the role of the introduced technology were to allow for more modern and stationary lifestyles, then the costs must be looked at. If reindeer farmers valued the stationary, more modern lifestyle enough to justify the decreased profit, it would be justifiable, but with the increases in fuel costs, the ability to make a profit period is in jeopardy for many herders. Continued high fuel costs may potentially force some herders to make choices between continued reindeer herding and modern, stationary lifestyle.

Caribou Migration: Changing caribou migration patterns have caused different challenges for both reindeer herders and caribou harvesters. The Seward Peninsula reindeer population has been devastated in the last several years due to an invasion of migrating caribou. In 1996, caribou began to visit the peninsula and have moved further into it every year. This has led to the loss of whole herds that have run off with wild caribou. It has also lead to increased expenses when owners try to monitor herds and keep them away from the caribou. The caribou brought in predators, and their migrations have increased the number of reindeer lost each year. There are now only around 8,000 reindeer on the Seward Peninsula, 2% percent of its historical maximum of the 1920s.

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58 Greg Finstad, Phone Interview, 8/2007.
Caribou harvesters face a different challenge from these changes. As caribou migration changes, herds may not approach the processing hubs, which requires harvesters to travel further to harvest, increasing the labor and fuel requirements. Kivalliq Arctic Foods has faced this challenge, but, due to the limited range of the island herd, it has been manageable. Nunavik Arctic Foods closed in 2005 due to the changed migration of the Leaf and Green River herds in Northern Ontario.

Regulation: Reindeer herding and caribou harvesting often varies greatly due to national regulation of the industry. Each country has a relatively different approach, and these regulations have a profound effect on the industry structure. In Alaska, caribou can only be harvested for subsistence and limited sports hunting. Caribou are categorized as a Native resource, and they subsistence harvests take priority. Reindeer in Alaska are also considered a Native resource, although court rulings have deemed reindeer farms started with imported reindeer as being exempt from this law.

Caribou herds in Canada are under a co-management system, and the government decides how many animals may be taken and then provincial boards decide how these animals are to be allotted. The most common use is Native subsistence, followed by sports hunting. Under this structure, it is incredibly difficult for a caribou harvester to get approved, and the number of allotted animals may not be enough to be commercially viable. In Norway, you can only own reindeer if you live in a herding zone and are a member of one of the reindeer herding organizations. There are no caribou harvests, so this is not an issue. Overall, Scandinavia still regulates entry into herding at some level and provides priority land use for reindeer herding, which will continue to effect how the animals are raised and the profitability of the industry.

Grants and Subsidies: When looking at an industry that seems to be struggling with some businesses just cutting it, while others are not, one must look at subsidies. Tracking subsidies or grants on an individual level is very difficult, and recipients often shy away from the subject. Very little documentation of grants or subsidies received was found while researching for this paper, but they were often mentioned in passing. It is believed that many of the currently operating reindeer herding operations have in the past received or are currently receiving subsidies or grants. While some of these may have only been start-up

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Lyle Renecker, Phone Interview, 7/30/2007. Email Correspondence, 8/24/2007.
63 Bob Gerlach, Phone Interview, 8/2007.
Greg Finstad, Phone Interview, 8/2007.
http://findarticles.com/p/articles/mi_qa3816/is_199904/ai_n8841901/pg_22.
64 Neil Greig, Phone Interview, 8/23/2007.
Steve Savagoe, Phone Interview, 8/2007.
Max Malavansky, Phone Interview, 8/2007.
grants from the federal or local government, they are still important. Grants and subsidies are not discussed further than this short brief in this paper due to time constraints on the research.

V. Commercial vs. Subsistence Production

Many rural arctic people are looking for ways to introduce cash economies into their subsistence based lifestyles, and many have expressed interest in reindeer herding as a cash economy to bring money into villages. This section will be an attempt to economically weigh the tradeoffs between commercial reindeer herding and caribou hunting versus subsistence reindeer and caribou harvests. If effectively measured, the numbers could model at what cost and revenue level producing commercially would bring in cash at a rate greater than the use value of a subsistence reindeer in the community. This is a rough estimate on the use-value a subsistence reindeer and is not intended to be all-encompassing. The goal of this section is to come up with rough estimates on the values of a subsistence reindeer and commercial reindeer, compute the differences in value, and then compare that difference with the additional cost of producing commercially in Alaska. The results will hopefully allow for a very rough numerical understanding of how a village or Native tribe may weigh its resource choices in Alaska or Canada, and explain why so many villages still function on a subsistence system from solely an economic basis.

The Aleutian Islands of Adak, Atka, and Umnak have reindeer populations that are currently used only for subsistence hunting. In Canada there are many herds that could be commercially viable, but harvests continue to be allocated toward subsistence and sports hunts. The question that must be asked is if the lack of increased commercial harvesting in Alaska and Canada is due to cultural or economic motives.

Based on averages from several meat processors, reindeer and caribou weigh an average of 80 to 120 pounds per carcass. For an estimate, we will use 100 pounds per carcass. Carcass weight prices have been quoted by processors as ranging from $3.50 to $5.50 per pound. Without further processing, this works out to be $350 to $550 per carcass. Next, using the estimates of $10 per pound for antler and six pounds of antler per animal, the horns have an estimated commercial value of $60 per reindeer. It should be noted that reindeer horn varies greatly in price depending on how the horn is processed and its freshness. Lastly, there is the hide, for which there is not a strong market unless there are large quantities of hides and they still will only fetch a high price if they are tanned before they are sold. An estimate of $5 will be used for the value of the hide, assuming it is being sold, unprocessed, in bulk. Based on these estimates, a slaughtered, unprocessed reindeer carcass should generate roughly $420 to $620 dollars of revenue.

A reindeer, weighing 100 pounds, killed for subsistence, on the other hand, will produce 80 pounds of meat, 6 pounds of antlers, and 1 hide after processing. Horn has some use-value in

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Steve Savagoe, Phone Interview, 8/2007.
Cameron Vivian, Interview, 7/17/2007.
Delta Meats, Phone Interview, 7/2007.
North Star Quality Meats, Phone Interview, 7/2007.
rural communities for village arts; this will be estimated at $5 per pound or $30 per reindeer. Next, based on estimates from stores in Selawik, Norvick, Kotzebue, and Unalakleet, ground beef costs roughly $3.50 per pound. If ground beef and reindeer are perfect substitutes, 80 pounds of reindeer meat has a use value of $280. Finally, the hide also holds some subsistence use-value to the hunter or community. This is difficult to estimate and varies between communities and hunters, but we will assume use-value of $5 per hide. Based on these estimates, the subsistence value of one reindeer or caribou is roughly $315.

Thus there is an estimated $315 of value on a subsistence harvest and estimated revenue of $420 to $620 for a commercial harvest. What remains to be measured are the costs associated with each method. If we assume that the actual time and basic equipment (snow machine, gun, and sled) required to harvest and slaughter the reindeer are the same, then we must compare the additional costs of processing reindeer for commercial and subsistence use. The only additional cost in subsistence harvesting is the time it takes to fully slaughter the animal and the energy it takes to keep the meat frozen. Additional commercial harvesting costs include building or renting time in a USDA or Alaska State certified slaughterhouse, shipping costs, marketing costs, business licensing fees, technology costs (such as the use of helicopters), and the opportunity cost involved in managing the business. If these expenses on a yearly basis are less than the $105-$305 difference in price per deer plus the time and energy taken to process a subsistence reindeer, then commercial production would contain more value than subsistence harvesting.

While these numbers are a rough estimate of the monetary value of both commercial and subsistence reindeer harvests, they still allow for insight into the industry. First off, shipping from many rural Alaskan locations could make up this price difference alone, and would explain why many would continue to choose subsistence harvesting. Secondly, it appears that an economy of scale is definitely present for commercial harvesting, as many of the additional expenses are fixed costs, and large harvests would dilute these costs over a larger number of animals again showing the economies of scale involved in reindeer herding.

If the legal and regulatory structures were to be changed in Alaska, this model could possibly have more room for mixed cash and subsistence economies. Such a model would involve a hunter shooting a caribou or reindeer, processing it, taking what is needed, and selling the remainder to a local store or straight to residents. This would be similar to how the caribou market functions in Greenland.

There also may be a market for subsistence herds that also feature special guided sports hunting expeditions. This is currently being looked into for the reindeer herd on St. Paul Island. This would be another way for make cash off a subsistence resource, though it is also logistically complicated and difficult to plan in towns that are not yet developed for outside tourism.

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69 Phone calls to Alaska Commercial and Rotman Stores and other grocery stores, 9/7/2007.
70 Here we are only assuming use-value and are not assigning any cultural value onto subsistence beyond its use-value.
71 Steve Savagoe, Phone Interview, 8/2007.
Conclusion:

Commercial reindeer production is a challenging industry with a promising high demand for the product, yet a very difficult and expensive industry to produce due to the location of production, and the other factors discussed above. Reindeer meat commands a high price across Europe and in North America, yet in many countries, national demand is described as unmet. The industry uses huge quantities of arctic land for herding across the circumpolar north, yet the remoteness of their operations seem to be the largest challenges. If demand continues to rise and increase price, then reindeer herding may become a stable industry for all the current players, but right now many are struggling. In the end, many communities may be better off continuing subsistence hunting, especially if looking to start a “small” operation in rural Alaska. Reindeer herding adheres to extreme economies of scale with a animals calmer when in large groups, and little added cost per animal. Overall, the three largest factors appear to be location, infrastructure, and regulation. If the reindeer industry was to stagnate, or demand and price were to decrease it may turn out to only be effective to herd reindeer when close to a large population center, or large operations occurring on large islands with preexisting infrastructure such as a dock, slaughter house, or towns.