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Review and Analysis of Canadian Trade in Polar Bears from 2005–2014

March 31, 2015

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ACRONYMS

CAD	Canadian dollars
CBC	Canadian Broadcasting Corporation
CEPS	CITES Electronic Permit System
CoP	Conference of the Parties to CITES
CoP15	Fifteenth meeting of the CITES Conference of the Parties
CoP16	Sixteenth meeting of the CITES Conference of the Parties
CWS	Canadian Wildlife Service
CITES	*Convention on International Trade in Endangered Species of Wild Fauna and Flora*
ESA	*Endangered Species Act of 1973* (USA)
FHA	Fur Harvesters Auction Inc.
HSI	Humane Society International
HTC	Hunters and Trappers Committee
HTO	Hunters and Trappers Organization
ICC	Inuit Circumpolar Council
IFAW	International Fund for Animal Welfare
IGC	Inuvialuit Game Council
ITK	Inuit Tapiriit Kanatami
ISR	Inuvialuit Settlement Region
KRG	Kativik Regional Government
MA	CITES Management Authority
MMC	Marine Mammal Commission (USA)
MMPA	*Marine Mammal Protection Act* (USA)
NAFA	North America Fur Auction
NDF	Non-Detriment Finding (CITES)
NEMISIS	National Enforcement Management Information System and Intelligence System
Nfld.	Newfoundland
NL	Newfoundland and Labrador
NMRWB	Nunavik Marine Region Wildlife Board
NRDC	Natural Resources Defense Council
NTI	Nunavut Tunngavik Incorporated
NWMB	Nunavut Wildlife Management Board
NWT	Northwest Territories
PBAC	Polar Bear Administrative Committee
PBTC	Polar Bear Technical Committee
PBI	Polar Bears International
SA	CITES Scientific Authority
SSN	Species Survival Network
TAH	Total allowable harvest
TWPCB	Torngat Wildlife and Plants Co-Management Board
USA	United States of America
USD	United States of America dollars
USFWS	United States Fish and Wildlife Service
UNEP-WCMC	United Nations Environment Programme-World Conservation Monitoring Centre
WAFWA	Western Association of Fish and Wildlife Agencies
WED	Wildlife Enforcement Directorate
WMAC	Wildlife Management Advisory Council
WWF	World Wildlife Fund/Worldwide Fund for Nature

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EXECUTIVE SUMMARY

The purpose of this study was to improve the understanding of polar bear trade dynamics by examining the Canadian exports of polar bear hides and skulls in recent years. The specific goals were as follows:

- To update the analysis of polar bear trade data provided in Shadbolt et al. (2012).
- To review the prices paid for polar bear hides at auction and assess the impact of high prices on polar bear conservation.
- To map the Canadian domestic trade chain for polar bear products.

Shadbolt et al. (2012) reviewed the international trade in polar bear products, including exports from Canada, for the years 2005–2009. Data for Canadian exports in 2010–2014 were provided by the Canadian CITES Scientific Authority (SA) and were compiled from three different sources: the 2010 CITES annual report; the National Enforcement Management Information System and Intelligence System (NEMISIS); and the CITES Electronic Permitting System (CEPS). Some additional data were taken from the United Nations Environment Programme-World Conservation Monitoring Centre (UNEP-WCMC) CITES Trade Database.

Hunting quotas and the numbers of bears killed in each province and territory for the years 2007/08 to 2013/14 were provided by the jurisdictional authorities. Data on polar bear hide auction results for the years 2008–2014 were provided by the Government of Nunavut. The domestic trade chain and associated regulatory requirements were documented using the information compiled for other parts of this report.

All parts of this report were completed in consultation with relevant literature and experts.

The results and conclusions of this study are summarized below:

Analysis of Canadian trade data

- During the years 2005–2013 the total number of hides annually exported from Canada gradually increased from 266 to 400; and then dropped to 217 in 2014. More hides were exported in the years 2010–2014 than in 2005–2009.
- The numbers of skulls annually exported from Canada peaked at a high of 168 (in 2007) and then dropped to 98 (in 2008). In the subsequent years the number of skulls exported ranged from 37–57 except in 2011, when the number jumped anomalously to 83 due to a commercial export of 23 skulls to a French importer.
- Between 2005 and 2014 the main purpose of export shifted from hunting trophies (hides and skulls) going to the United States, to hides exported to China for commercial purposes. This shift was the result of the United States listing the polar bear on the ESA in 2008 and prohibiting the importation of all polar bear products, concurrent with the Chinese market opening up.
- Prior to 2008 there was strong financial incentive for communities in the Northwest Territories and Nunavut to reallocate subsistence hunting tags to sport hunting. The loss of most of the sport hunting market meant a drop in income and increased incentive for selling polar bear hides commercially.
- The loss of the United States sport hunter market, financial need, growing Chinese market for hides, and rising auction prices paid for polar bear hides all helped trigger increased polar bear hunting in 2011–2013.

- In 2005–2007, more polar bear hides were exported to the United States than to any other single country. The number of hides exported to the United States peaked sharply in 2007 and then dropped significantly in 2008 due to the US ESA importation prohibition. No polar bear hides were exported from Canada to the United States after 2009.
- In 2005 China only imported 12 polar bear hides from Canada. The number of hides exported to China steadily rose each subsequent year (except 2014) and in 2009 China overtook the United States as the single biggest importer of polar bear hides. China has remained the primary destination for Canadian polar bear hides since then.
- Germany, Norway and Russia were key destination countries for polar bear hides in 2005–2009. In 2010–2014 these three countries each imported fewer hides than in the previous five years and became far less significant as destination countries in comparison to China.
- In 2005–2008 more skulls were exported to the United States than to any other single country. The number exported to the United States peaked sharply in 2007 and then dropped in 2008. As the US market for skulls diminished, no other country took its place as the dominant importer of skulls. Fewer skulls were exported from Canada in 2010–2014 than in 2005–2008.
- In the years 2005–2010 Canada annually exported approximately 300 polar bears as hides and/or skulls. The number exported rose to approximately 400 bears in 2012 and 2013 before dropping to 233 in 2014. The number of bears exported in 2014 was the lowest of any year studied.
- The number of bears represented by skulls and hides exported in each year, on average, was 58% of the number of bears hunted in that same year.
- A review of the hunting tag data for 2013 and 2014 found that the polar bear hides exported in those years came from bears killed in many different previous hunting seasons, dating as far back as 1985/86. Only 25% of the hides exported in each year came from bears killed in the most recent hunting season.

Analysis of auction prices

- The top price paid for hides at fur auctions fell after May 2008 and the average price paid slowly dropped in subsequent years to a low in January 2010. In May 2010 the prices paid for polar bear hides at auction increased dramatically. Both the top and the average prices for polar bear hides increased annually until January 2013 when they dropped slightly. Both prices jumped in May 2013. In 2014 the top and average prices dropped back to values consistent with January 2013. The average price paid for a polar bear hide in 2014 was approximately twice that paid in 2008.
- The increased prices paid for polar bear hides at auction beginning in the spring of 2010 correlated with an increased number of polar bears reported killed in Canada starting in the 2010/11 hunting season. The higher prices may have stimulated increased hunting in the Northwest Territories and Québec. However, the higher numbers reported killed in Québec since the 2010/11 season were at least partially due to better reporting and not only an increase in kills. The number of bears killed in Canada dropped significantly in 2014 correlated with a drop in the total Canadian hunting quota, despite prices for hides remaining high.
- The total Canadian hunting quota has decreased steadily since the 2007/08 hunting season. There is no indication that the prices paid for polar bear hides at auction had any impact on the setting of hunting quotas.

- The prices paid for polar bear hides jumped significantly at the fur auctions held immediately after CoP15 and CoP16, when the proposals to list the polar bear on CITES Appendix I were debated. Suggestions that price increases were due to buyers wanting to get a hide before commercial trade was prohibited by a CITES Appendix I listing were unfounded as the prices increased after, not prior to the CoPs. It appears that publicity about the proposals may have influenced prices both after each CoP (when prices jumped) and immediately before CoP16, when prices dropped slightly due to reduced demand. However, the increased prices paid for polar bear hides in those years also correlate to a sharp jump in the Chinese fur market that was not exclusive to polar bear hides. Exactly how much influence the publicity surrounding the proposals to list the polar bear on CITES Appendix I had on hide prices is unclear.

Canadian chain of custody for polar bear parts and products

- There is some variation between jurisdictions, but the differences are minimal. In the Northwest Territories and Nunavut subsistence hunting tags may be reallocated to sport hunting. But the results of all hunts are required to be properly reported and the tag cancelled. In Québec, the Northwest Territories and Nunavut, hunters may sell polar bear hides via government programs that provide an advance to the hunter. Otherwise, the movement of hides, the process of applying for CITES Export Permits, and export of the hides is the same for each jurisdiction. Sport hunters must complete a different CITES permit application form than that required for commercial or personal exports. The number of bears exported from each province and territory in 2014 (the only year these data were available for) was proportional to the number of bears killed in each jurisdiction. China was the primary destination country for hides from every jurisdiction.

INTRODUCTION

The purpose of this study was to fill existing gaps in the understanding of polar bear trade dynamics. The report focusses entirely on Canadian exports of polar bear hides and skulls, and on three specific issues:

- Updating the analysis of polar bear trade data provided in Shadbolt et al. (2012).
- Reviewing polar bear hide prices and the potential impact of high prices on polar bear conservation.
- Mapping the Canadian domestic trade chain for polar bear products.

This report is divided into seven parts. This introduction concludes Part 1. Part 2 provides pertinent background materials and Part 3 describes the methodology used to complete the study.

Part 4 provides a review of the polar bear hunting quotas and numbers of bears killed annually. This information is important baseline data for the discussions of trade and auction prices in the following sections.

Part 5 updates the polar bear trade data that were originally published in Shadbolt et al. (2012) with the goal of answering the following questions:

- How many polar bear hides and skulls were exported from Canada from 2010–2014, and how do those numbers compare with the years 2005–2009?
- Did the purpose of export for polar bear hides and skulls exported from Canada in the years 2010–2014 vary; and how do these data compare with the years 2005–2009? What can be inferred from these variances?
- What were the main destination countries for exports of polar bear hides and skulls from Canada in the years 2010–2014; and how do they compare with the years 2005–2009?
- How many individual bears are represented by Canadian exports of polar bear hides and skulls in the years 2010–2014; and how do these numbers compare with the years 2005–2009?

Part 6 reviews auction prices for polar bear hides from the years 2008–2014 and compares these data to the numbers of bears hunted in each of those years. The key questions this section of the study sought to answer were:

- Have the auction prices for polar bear hides increased significantly since 2008/2009 (pre-CITES CoP15)?
- If the prices for polar bear hides have increased significantly, has this influenced a corresponding increase in the number of bears hunted?
- If the prices for polar bear hides have increased significantly, has this influenced an increase in hunting quotas?
- Have the auction prices for polar bear hides fluctuated significantly in response to the possibility of an Appendix I CITES listing?

Part 7 summarizes the Canadian chain of custody for polar bear parts and products to answer the following questions:

- What is the chain of custody for Canadian polar bear hides from the initial kill to export?
- Does this chain vary between jurisdictions, and if so, how?

Part 8 discusses the results compiled in Parts 4–7 and offers conclusions based on those analyses.

BACKGROUND

Polar bears and the United States Endangered Species Act

In December 2006, the United States Fish and Wildlife Service (USFWS) published a status assessment of the polar bear that supported listing the species on the US Endangered Species Act (ESA) (Schliebe et al., 2006). In May 15, 2008, the USFWS published a Final Rule[1] in the Federal Register listing the polar bear as a threatened species under the ESA (USFWS, 2008a). This listing automatically designated the polar bear as a depleted species under the Marine Mammal Protection Act (MMPA) which meant that as of May 15, 2008 the importation of sport hunted polar bear trophies into the United States of America (USA) was prohibited (USFWS, 2008b).

Polar bears and CITES

The polar bear was originally listed on Appendix II of *Convention on International Trade in Endangered Species of Wild Fauna and Flora* in 1975 (CITES, 2015). Canada initially submitted a reservation[2] on the listing and treated the species as if listed in Appendix III. Canada withdrew its reservation in 1977 (CITES, 2015). An Appendix II listing requires that an export permit or re-export certificate be issued by an exporting country prior to the export or re-export of any polar bears, or their parts or derivatives (Anon., 1973).

In October 2009 the USA submitted a proposal for consideration at the fifteenth meeting of the CITES Conference of the Parties (CoP15) to transfer the polar bear from CITES Appendix II onto Appendix I (USFWS, 2009). Listing on Appendix I would mean that the species could not be traded for primarily commercial purposes (Anon., 1973). Transferring the polar bear to CITES Appendix I would not have prevented subsistence hunting by indigenous peoples, but would have prevented international commercial trade in the products of hunting, such as hides and skulls. International trade in hunting trophies and polar bear items for personal purposes would still have been permitted, but more closely regulated (Shadbolt, et al., 2012) . The USA proposal was defeated at CoP15 in Doha, Qatar (CITES, 2010a).

In October 2012, the USA again submitted a proposal to transfer the polar bear onto Appendix I, for consideration at the sixteenth meeting of the CITES Conference of the Parties (CoP16) (USFWS, 2012). This proposal was defeated at CoP16 in Bangkok, Thailand (CITES, 2013d).

Icon on Ice report

In 2012, TRAFFIC and World Wildlife Fund (WWF) published a report on the international trade and management of polar bears entitled *Icon on Ice* (Shadbolt, et al., 2012). This report offered background information on the significance of polar bear trade to Arctic communities; a synopsis of the status of the global polar bear population; the relevant legislation, regulations and policy responsible for management of the species in each of the five polar bear range States[3]; and an analysis of the international trade in polar bear parts and products from 1987 to 2009. In addition, the report provided a brief discussion of the

[1]Once a US federal agency determines that a regulatory action is required to address some concern, it develops and publishes a proposed rule in the Federal Register and solicits comments from the public. After the agency considers the public feedback received, any appropriate changes will be made and then the "final rule" is again published in the Federal Register along with a specific date upon which the rule becomes effective and enforceable (OIRA, 2015).

[2]Any Party to CITES may make a reservation with respect to an amendment to Appendix I or II. Until the reservation is withdrawn the Party is to be treated as if it was not a Party to the Convention with respect to trade in the species concerned (Anon., 1973).

[3] Canada, Greenland (Kingdom of Denmark), Kingdom of Norway, the Russian Federation and the United States of America.

predicted impact of climate change on the conservation of polar bears. Summaries of relevant agreements, legislation and regulations (both domestic and international) were included in a series of Appendices (Shadbolt, et al., 2012).

The overarching conclusion of Shadbolt et al. (2012) was that international trade did not constitute a significant threat to the conservation of polar bears. The report noted that the major threat to the species was habitat loss due to the melting of their preferred sea ice habitat, not regulated subsistence harvest or subsequent international trade. As of March 2015, Shadbolt et al. (2012) is more than two years old and does not include international trade data for 2010–2014. These data need to be updated and analysed to determine whether international commercial trade in polar bear products is still not a significant conservation threat to the species.

Shadbolt et al. (2012) reviewed international trade of all polar bear products exported from all of the polar bear range States. However, the vast majority of the polar bear products in trade consist of items like teeth, hair, claws, carvings and specimens (Shadbolt, et al., 2012). The numbers of individual bears represented by these items can't be determined. And some of these products (e.g. "specimens") may refer to blood or tissue samples taken from living bears during research activities, and that were subsequently released. On the other hand, a whole skin, body or skull can only represent a single bear. Therefore, the numbers of hides, bodies and skulls in trade provide a minimum estimate of the numbers of polar bears killed and provide some insight into the conservation impact of the trade.

Canada is the only polar bear range State that currently permits the export of hides, bodies and skulls for commercial purposes. This study therefore focuses exclusively on updating the Canadian export data for these commodities.

Shadbolt et al. (2012) offered a number of recommendations for improvements for polar bear management and trade monitoring. One of the recommendations was as follows:

> *"TRAFFIC encourages interested stakeholders and/or range States to develop a study on the supply chain and consumer demand dynamics for polar bear parts and derivatives with analysis on key consumer markets such as China or the Commonwealth of Independent States. Such a study could help determine market drivers, evidence of illegal trade and indications of poaching activities in range States."*

International Forum on the Conservation of Polar Bears

This author repeated the above recommendation along with four other recommendations from Shadbolt et al. (2012) in a presentation on illegal hunting and illegal trade in polar bears, made during the International Forum on the Conservation of Polar Bears held December 4, 2013 in Moscow, Russia.

During the Moscow forum the Responsible Ministers of the Polar Bear Range States issued a declaration concerning the conservation of polar bears which included a commitment to a number of actions, including the following resolutions:

> "*Explore mechanisms to counter the threat of poaching and illegal trade in polar bears and polar bear parts, including enhanced cooperation among law enforcement agencies at the national, regional and global levels.*"
> "*Strengthen international cooperation to improve the clarity of legal trade data through the adoption of more effective reporting and monitoring practices and help address illegal trade through the adoption of procedures to better identify legally traded specimens and to verify the authenticity of trade documents.*" (Anon., 2013a).

The polar bear range States met for the two days following the International Forum (December 5–6, 2013) in the biennial meeting of the parties to the 1973 Agreement on the Conservation of Polar Bears. During this meeting the range States agreed to identify a working group to address the above resolutions from the Declaration (Anon., 2013b).

Following the Moscow meetings, the range States working group drafted a project plan for actions to be completed before the next biennial meeting of the parties to the 1973 Agreement on the Conservation of Polar Bears. This project plan included completion of a study on polar bear supply chain and consumer demand dynamics of trade in polar bear parts and products (as was recommended by TRAFFIC). This study on Canadian commercial trade in polar bears was subsequently commissioned by Environment Canada on behalf of the polar bear range States working group.

Concern over polar bear hide prices

In recent years there have been numerous mainstream media stories reporting on the increasing demand and escalating prices paid for polar bear hides sold at auction. For example, in 2011 the Canadian Broadcasting Corporation (CBC) reported: "*One of Canada's largest fur auction houses says it cannot meet the soaring demand for polar bear hides, provoking concerns about overhunting in southern Hudson Bay*" (CBC, 2011). Also in 2011, MacLean's magazine wrote that, "*High prices leave the polar bear population at risk*" (Köhler, 2011). Both sources reported that one polar bear hide sold for a record high of CAD 11,000 (USD 11,480).

In 2012 MacLean's magazine published again on the topic, noting that prices had gone up by over 200% in the past two years and that one hide sold for a new record high of CAD 12,400 (USD 12,941) (Köhler, 2012). Both MacLean's and Northern News Services reported that the high prices were due mainly to increasing demand for polar bear hides in Russia and China (Anon., 2012; Köhler, 2012). MacLean's also suggested that the demand for polar bear hides was increasing in anticipation of the sixteenth meeting of the CITES Conference of the Parties (CoP16), where the USA proposal to transfer the polar bear onto CITES Appendix I would be debated (USFWS, 2012). A CITES Appendix I listing would prohibit trade of the species for primarily commercial purposes (Anon., 1973) and MacLean's suggested that the potential end of commercial trade in polar bear products was stimulating buyers who wanted to acquire these products while they still could.

A number of prominent environmental organisations supported the USA proposal, including the Humane Society International (HSI, 2013), International Fund for Animal Welfare (IFAW, 2013), Natural Resources Defense Council (NRDC, 2012) and Species Survival Network (NRDC, 2013)[4].

At CITES CoP16 these groups circulated a document entitled "*On the Precipice: Why International Commercial Trade in Polar Bears Must Be Eliminated*," which summarized their collective position (NRDC, 2013). This document included the following text:

"*There is evidence that the spike in polar bear hide prices has contributed to overharvesting in at least one other jurisdiction*[5]*—Québec, a province that until this year had no hunting quota. Before 2011, the*

[4] Other groups, including the CITES Secretariat, Inuit Circumpolar Council (ICC), Inuit Tapiriit Kanatami (ITK), Nunavut Tunngavik Incorporated (NTI), TRAFFIC, Western Association of Fish and Wildlife Agencies (WAFWA), Polar Bears International (PBI), and World Wildlife Fund (WWF) did not agree that the polar bear met the criteria for a CITES Appendix-I listing (Audla & Smith, 2012; CITES, 2013a; TRAFFIC, 2013; WWF, 2013).

[5] It is unclear as to which other jurisdiction the text refers to. The previous paragraph discusses increased quotas for polar bear hunting in Nunavut, and does not mention any impact of increasing prices for hides.

average harvest was four polar bears per year. But that year, hunters from the northern Québec community of Inukjuak killed as many as 70 polar bears—an enormous jump over past years and an unsustainable harvest rate for the Southern Hudson Bay polar bear population, which may already be under pressure from climate change. In response, a voluntary quota was established but is not considered to be sustainable."

The document continued, under the heading: "*The Correlation between Polar Bear Harvest and Demand for Polar Bear Hides is Strengthening*."

"*Rising and unsustainable hunting quotas and harvest levels are likely motivated in part by the growing international demand for polar bear hides. In the last five years, the number of hides offered at auction has more than tripled, from 40 to 150. During the same period, the average hide price achieved at auction doubled from USD$2,097 to USD$5,211 and the maximum hide price achieved at auction doubled from USD$6,100 to USD$12,514. In particular, the spike in harvest around Inukjuak is thought to have begun when a buyer arrived in the region and announced that he would pay significant money in advance for furs*."

The document included a sidebar heading that stated: "*375% increase in the number of polar bear skins offered at auction in just one Canadian auction house*".

In addition to the "*On the Precipice*" publication, HSI, IFAW and NRDC also submitted an Information Document (CoP16 Inf. 15) regarding the proposal to the CITES Secretariat for distribution to the Parties (CITES, 2013b). This document included the following text:

"*International demand for polar bear parts has soared in recent years, contributing to skyrocketing prices and increased quotas and harvest. For example, in 2012, polar bear hides sold at Canada's Fur Harvesters Auction Inc. for more than double the prices obtained in 2007, with maximum hide prices increasing from USD 6,100 to USD 12,514 and average hide prices increasing from USD 2,079 in 2007 to USD 5,211 in 2012. And the number of polar bear hides offered at auctions tripled between 2007 and 2012. This is a common phenomenon in the international wildlife trade—the rarer the species gets, the greater the market demand becomes*." [6]

The document by HSI, IFAW and NRDC went on to state the following:

"*Demand for Polar Bear Skins Has Increased - Since 2009, the market demand for polar bear skins has strengthened significantly. Quotas are set against a backdrop of soaring demand for polar bear skins. Polar bear hides sold at Fur Harvesters Auction Inc. in Canada in 2012 for more than double the prices obtained in 2007, with maximum hide prices increasing from USD 6,100 to USD 12,514 and average hide prices increasing from USD 2,079 in 2007 to USD 5,211 in 2012. The number of polar bear hides offered at auctions in Canada also skyrocketed – tripling between 2007 and 2012, from 40 to 150 hides offered.*

Harvest Has Increased in Correlation with Demand - During the same period in which demand and prices for polar bear skins have risen, quotas and harvest have increased to unsustainable levels, as described in the various examples above."

[6] The last sentence of this text cited Gross (2006) which was a review and synopsis of a different publication by Courchamp et al. (2006), which presented a simple mathematical model and empirical examples to show how the value attributed to rarity in some human activities could result in the extinction of rare species. The authors termed this concept "*the anthropogenic Allee effect*".

Increasing prices for polar bear hides continued to be news in 2013 when the National Post reported that another record was set when a polar bear hide sold for CAD 22,000 (USD 20,926). The National Post story, entitled "*Canada's fur trade is booming again — thanks to demand from China's new capitalists*" further reported that in China a polar bear rug could fetch CAD 80,000 (USD 76,096) and a "stuffed bear" could command as much as CAD 100,000 (USD 95,120) (O'Connor, 2013).

In summary, there have been numerous accounts published about the "soaring" price of polar bear hides at auction in recent years, and some authors have suggested that high prices have stimulated increased numbers of bears being killed, either within existing hunting quotas or via new increased hunting quotas. And at least one publication suggested that the increased prices resulted from anticipation that commercial trade in polar bear products would be prohibited because the species would be transferred to CITES Appendix I.

But to date, the concern about polar bear hide prices and the link to increased hunting pressure is based primarily on anecdotal reporting. There has not been a systematic analysis of annual polar bear hide auction prices compared and contrasted to the numbers of bears hunted, and established hunting quotas.

Canadian polar bear hunting quotas

Polar bear hunting quotas are established by each provincial and territorial authority and include all human-caused mortalities: subsistence harvest, non-resident hunting, known illegal take, and take in defense of life and property (CITES SA office, Environment Canada, *in litt.* to E. Cooper, March 9, 2015).

Nunavut uses a flexible quota system for polar bears, which is based on the sex ratio of harvested polar bears and the estimated sustainable yield of polar bears. Each community receives its share of the maximum sustainable harvest of males and females as an annual baseline allocation. The maximum harvest that can be sustained is two males for every female. Not every community will hunt the full allocation every year. In other years, the kill may exceed the annual base allocation of males or females. The flexible quota calculation takes into account any "credits" from previous years when not all the bears were harvested and the total number of males and females killed (Nunavut, 2014a).

Canadian domestic trade

Shadbolt et al. (2012) dealt primarily with international trade in polar bears and by design described Canadian domestic trade in general terms.

Under Canada's Constitution, the responsibility for wildlife management is shared between the federal, provincial and territorial governments. The provinces and territories have jurisdiction over wildlife within their borders, while the federal government has jurisdiction over coastal and inland fisheries, migratory birds, marine mammals and wildlife on federal land (such as national parks). The federal government also has jurisdiction over international and interprovincial trade (Anon., 1867).

Polar bears are not designated as marine mammals under the Canadian Fisheries Act (Anon., 1985) and therefore the provinces and territories have the authority, and responsibility, for polar bear management in Canada. The federal government, however, is responsible for regulating exports (and imports) of polar bears and their products via implementation of CITES.

Therefore, the hunting of a polar bear and the export of the products of that hunt are subject to both provincial/territorial and federal regulations. A polar bear hide that is destined to be exported may be sold and moved from the province or territory in which the animal was killed to multiple individuals and/or businesses in other jurisdictions before CITES export documents are issued and the hide leaves the country.

Canadian CITES Permit issuance and Databases

Between 2005 and 2014, many changes took place in the way that Canadian CITES permits are issued and the data are stored. In 2005, most of the provinces and territories issued CITES permits for polar bear exports, although Environment Canada issued permits for exports from Alberta, Saskatchewan and Quebec. By July 2011 the issuance of all permits for the export of polar bears was centralized to the headquarters of Environment Canada in Ottawa (CITES SA office, Environment Canada, *in litt.* to E. Cooper, March 9, 2015).

In 2005, all CITES permits in Canada were issued manually. In January 2007, Environment Canada launched the CITES Electronic Permitting System (CEPS), which allowed permits at the Environment Canada permit office to be issued electronically. In January 2013, a second version of CEPS was launched, which inherited all the permit information that was previously stored in the first version and featured improvements including streamlined processes, formalized reviewing, and better tracking. Scanned copies of CITES export permits that have been validated at time of export by the Canada Border Services Agency (CBSA) are stored in the database. This allows the permitting office to know when exports actually occur and which goods specifically have been exported (e.g. if a permit authorized two polar bear hides to be exported, and only one was actually shipped, then the second hide is still exportable). Environment Canada's Wildlife Enforcement Directorate (WED) officers also have access to CEPS and can review all the permit information (CITES SA office, Environment Canada, *in litt.* to E. Cooper, March 9, 2015).

METHODS

Sources

The information in this report was compiled via analysis of international polar bear trade data; compilation of polar bear hide auction prices; literature review; interviews with relevant experts and authorities; and review of Internet websites.

Currency

The prices and values of polar bear items have been recorded in both Canadian dollars (CAD) and US dollars (USD). All currency conversions used the exchange rate for the year a cited work was published as provided from the Bank of Canada website (BOC, 2015). Values were not adjusted for inflation.

Definitions

Different sources may use a variety of terms to describe the skin of a polar bear once it has been removed from the carcass; including skin, hide, rug, mount—depending on the source and how the item has been processed and for what purpose. For consistency and clarity this report uses the term "hide" throughout for any reference to the whole, detached skin of a bear, whether it is raw, tanned, or used to create a product such as a rug or a mounted specimen. "Hide" was chosen rather than "skin" to avoid confusion with smaller pieces of skin that are also in trade (Shadbolt, et al., 2012); and because "hide" is a more precisely defined term[7].

The data provided by Environment Canada included the numbers of "skins" and "bodies" (fully mounted bears) that had been exported from Canada. These numbers were combined and reported as "hides."

Quotas and numbers of bears killed by hunting season

Hunting statistics are compiled based on hunting seasons that may overlap two calendar years, while the trade data are compiled according to the calendar year. So in this report, hunting seasons are referred to using the years that are overlapped by the season. For example: 2007/08 would refer to the hunting season that began in 2007 and ended in 2008.

For consistency, when comparing trade data to hunting season data, this report follows the same approach as taken by Canada in preparing the information document about polar bear trade distributed at CoP16 (CITES, 2013c). Using the previous example, data for the 2007/08 hunting season would be compared to 2008 trade data. This provides only crude comparison of hunting and trade because polar bear hides and skulls may be exported years after the animal was actually hunted.

[7] Merriam-Webster defines "hide" as "*the skin of an animal whether raw or dressed —used especially of large heavy skins*"(Merriam-Webster, 2014).

The polar bear hunting quotas established by each provincial and territorial authority and the actual numbers of bears killed in the hunting seasons 2007/08 to 2013/14 were provided by each jurisdiction, facilitated by the co-Chair of the Polar Bear Technical Committee (PBTC)[8]; and the CITES Scientific Authority (SA) of Canada (Environment Canada). The total Canadian hunting quotas and kill numbers for 2005/06 and 2006/07 were provided by the Scientific Authority, and were not broken down by province and territory.

Analysis of Canadian trade data

This report utilizes data on international trade in polar bear parts and derivatives for 2005–2009 that were originally published in Shadbolt et al. (2012). These data were originally compiled though analysis of CITES export data from the United Nations Environment Programme-World Conservation Monitoring Centre (UNEP-WCMC). Additional data on polar bear hides and skulls exported from Canada in the years 2005–2009 were compiled from the same database using the option for comparative tabulation reports.

Polar bear trade data for the years 2010–2014 were obtained directly from Environment Canada. This is because UNEP-WCMC reports submitted by Canada for 2010-2014 were either inaccurate (2010-2011 data, which have since been corrected with UNEP-WCMC) or were not yet submitted to UNEP-WCMC at the time of writing this report.

The data for Canadian exports of polar bear hides and skulls for 2010–2014 were therefore compiled from three different sources:

- 2010 data were sourced from corrected information that had been compiled for a revised Canadian 2010 annual report (CITES SA office, Environment Canada, *in litt.* to E. Cooper, Nov. 14, 2014).
- 2011 data were compiled from two separate databases: the CEPS and older database called the National Enforcement Management Information System and Intelligence System (NEMISIS).
- 2012–2014 data were sourced from the CEPS.

These data were sorted and tabulated to summarize the following results:

- The numbers of hides exported from Canada, by purpose, for the years 2005 to 2014.
- The numbers of skulls exported from Canada, by purpose, for the years 2005 to 2014.
- The main destination countries for hides exported from Canada, and purpose of export, for the years 2005 to 2009.
- The main destination countries for hides exported from Canada, and purpose of export, for the years 2010 to 2014.
- The main destination countries for skulls exported from Canada, and purpose of export, for the years 2010 to 2014.
- The numbers of polar bears exported from Canada in the years 2005 to 2014, calculated from numbers of hides and skulls; and by cross-referencing hunting tag numbers (for 2012–2014) (see below for more details).

[8] The PBTC is a sub-committee of the Polar Bear Administrative Committee (PBAC). PBAC includes representatives from each of the Provinces and Territories that have management authority for polar bears (Manitoba, Newfoundland and Labrador, Northwest Territories, Nunavut, Ontario, Québec, and Yukon); Environment Canada; Parks Canada Agency; the Chair of the PBTC; Wildlife Management Advisory Councils (WMAC Northwest Territories and WMAC North Slope (Yukon)); Inuvialuit Game Council (IGC); Nunavut Wildlife Management Board (NWMB); Nunavut Tunngavik Incorporated (NTI); Makivik Corporation; Torngat Wildlife and Plants Co-Management Board (TWPCB); Nunatsiavut Government and the Nunavik Marine Region Wildlife Board (NMRWB) (Environment Canada, 2009a, 2011b; Lunn et al., 2006).

These data were further plotted to offer insight regarding the following:

- Trends in the purpose of export for Canadian polar bear hides and skulls (combined) for the years 2005 to 2014.
- The numbers of hides exported from Canada to China vs. those exported to other countries.
- The numbers of polar bears exported from Canada for the years 2005 to 2014, calculated from numbers of hides and skulls exported.

In all cases, data for pre-convention items were excluded from the analysis.

Destination countries for Canadian exports

Shadbolt et al. (2012) summarized the destination countries for polar bear hides and skulls in the years 2005–2009. However, these data included exports from all of the range States and not just Canada, and therefore could not be used for this study. Therefore the destination countries for Canadian polar bear hides and skulls exported in 2005–2009 were compiled from the UNEP-WCMC CITES database. Data for exports in 2010–2014 were compiled from the revised Canadian 2010 CITES annual report; CEPS and NEMISIS.

Shadbolt et al. (2012) identified China, Germany, Norway, Russia and the United States as "key destination countries" for polar bear hides and provided the numbers of hides and purpose of export for each of these five countries. Data for all other countries were compiled together as "other countries". This report followed that same methodology.

Shadbolt et al. (2012) also identified Denmark, Spain and the United States as "key destination countries" for polar bear skulls in the years 2005–2009. However, after reviewing the data for the ten years subject to this study (2005–2014), the author decided to specify the numbers of skulls and purpose of export to France and the United States, and to compile the data for Denmark and Spain with all other countries as "other countries".

Complete lists of the destination countries for Canadian hides and skulls in the years 2005–2014 may be found in Appendices A and B.

Numbers of bears exported from Canada

A reasonably accurate, if not precise estimate of the number of polar bears exported in a given year can be calculated from the total number of hides and skulls exported. Each hide or skull exported represents one bear. One hide and one skull together could represent either one or two animals. There are many more hides exported each year than there are skulls. Therefore, in any given year, the number of hides exported represents the **minimum** number of bears exported that year; and the number of hides plus the number of skulls represents the **maximum** number of bears exported. Given that some (or all) of the skulls would have come from the same bears as some of the hides, the actual number of bears exported will be somewhere between the minimum and maximum. The maximum number of bears exported could be further sharpened by excluding the numbers of skulls exported as hunting trophies. The assumption is that sport hunters would typically export both the hide and skull of a bear. Although this calculation does not include data for other exported polar bear products (e.g. hairs, claws, teeth, etc.), these are not likely to represent significant numbers of animals whose hide and/or skull are not also in trade.

In the years 2012–2014, the information collected in the CEPS databases included the hunting tag number associated with each hide and skull exported[9]. This allowed for a more precise calculation of the numbers of bears exported through deletion of duplicate tag numbers (where a hide and skull of the same bear were traded in the same year). The minimum and maximum numbers of bears exported from Canada in the years 2012–2014, corrected via a comparison of the hunting tag numbers, were calculated using the following formula:

$A + (B - C) = SUM \pm D$

A = the total number of hides exported.
B = the total number of skulls exported.
C = the number of skulls with tag numbers that match tag numbers for hides.
SUM = the calculated number of bears exported.
D = the number of hides and skulls that had no tag number recorded.

The minimum number of bears exported = SUM – D.
The maximum number of bears exported = SUM + D.

For example, in 2012, 395 hides and 45 skulls were exported. The hunting tag numbers for 35 skulls matched tag numbers for hides; and six hides had no tag number recorded. Therefore, the number of polar bears represented by these data was calculated as 395 + (45-35) = 405 ± 6. The minimum number of bears exported in 2012 was 399, and the maximum was 411.

Numbers of bears exported from Canada, by hunting season

Starting in 2013, Environment Canada began to record electronically the year in which the animal was killed, for exported polar bear products (CITES SA office, Environment Canada, *in litt.* to E. Cooper, Dec. 31, 2014). These data were used to summarize the actual year the bear was killed for every hide and skull exported in 2013 and 2014.

Analysis of auction prices

The majority of polar bear hides that are sold by auction in Canada are sold via Fur Harvesters Auction Inc. (FHA). Each year the company holds two fur auctions in Canada, one in the spring (in May or June) and one in the winter (in December or January). Historically, FHA published reports on their website that provided the results of each auction, including the prices and numbers of polar bear hides sold. The company still publishes these reports, but as of 2010 no longer includes the results of polar bear sales.

A request for information about the sale of polar bear hides at auction in the years 2008 to 2014 was submitted to FHA. Unfortunately, they were unable to provide the requested data. A company representative responded that FHA communicates the details of auction sales directly to the jurisdictions where polar bear harvests occur. These jurisdictions are then able to compile the auction data with other data, including harvest, and to accurately assess such statistics as they may require for their polar bear management programs (FHA, *in litt.* to E. Cooper, November 28, 2014). It was suggested that the relevant jurisdictions should be contacted directly.

[9] Hunting tag numbers were also included in the 2011 CEPS and NEMISIS databases, but tag numbers were not recorded for enough items (54 hides and 53 skulls) for the data to be usable.

Each of the provinces and territories that permit polar bear hunting—Newfoundland and Labrador; Québec; Northwest Territories; Nunavut; and Yukon—were subsequently contacted directly. For data from Newfoundland and Labrador, both the provincial government and the Nunatsiavut Government[10] were contacted. For data from Québec, requests were sent to both the provincial government and the Makivik Corporation.[11] The Inuvialuit Game Council (IGC) was contacted for data from Northwest Territories and Yukon[12].

The data requested included the number of polar bear hides offered for sale; the number sold; the highest price; and the average price for auctions held in 2008–2014. Additional comments were also solicited. The data received were tabulated and plotted against the numbers of bears killed for each of those years.

Data were received from the Nunavut government but Québec and Newfoundland and Labrador do not track the prices or sales of polar bear hides in their jurisdictions (J. Goudie, Wildlife Manager, Nunatsiavut Government, *in litt.* to E. Cooper, Dec. 18, 2014; G. Gilbert, Resource Management Coordinator, Makivik Corporation, *in litt.* to E. Cooper, Dec. 17, 2014; V. Brodeur, Biologiste - Grande faune, Direction de la gestion de la faune du Nord-du-Québec, pers. comm. To E. Cooper, Jan. 20, 2015).

Given that the majority of polar bears hunted in Canada are taken in Nunavut, the auction data for sales of hides from Nunavut provide a good representative sample of the prices paid for Canadian hides. The analysis of auction prices is therefore based solely on these data.

Canadian domestic trade chain

For the 2013–2014 hunting season, Environment Canada began to record in the CEPS database the province or territory in which each polar bear was killed (CITES SA office, Environment Canada, *in litt.* to E. Cooper, Dec. 31, 2014). These data were used to summarize Canadian polar bear hunting and exporting activities in 2014, sorted by provincial and territorial jurisdictions.

A diagram detailing the trade chain for exporting Canadian polar bear hides, from hunter to final destination, was prepared using a simplified trade chain provided by WED (*in litt*. to E. Cooper, Nov. 3, 2014), then modified and expanded upon based on information gleaned during this study. A second diagram detailing the trade chain for exporting Canadian polar bear hides, from hunter to final destination, was prepared using information compiled for this study and the personal observations and experience of the author.

Data sources and data variability

The trade and hunting data used in this report were accessed from different databases and sources. These databases are not static and the information compiled in them may change over time for various reasons, including errors in recording/reporting that are later corrected, or export permits that were issued but not used, or delays in transfer of information from remote communities. Therefore, the data reported in this

[10] Nunatsiavut is an autonomous Inuit area in Newfoundland and Labrador.The Nunatsiavut Government is an Inuit regional government that remains part of Newfoundland and Labrador but has authority over many central governance obligations including application of the Labrador Inuit Land Claims Agreement concerning natural resources (e.g. polar bear hunting) (Nunatsiavut, 2015).

[11] The Makivik Corporation is the legal representative of Québec's Inuit people, established under the terms of the James Bay and Northern Québec Agreement (Makivik, 2014).

[12] The Inuvialuit Game Council (IGC) represents the collective Inuvialuit interest in all matters pertaining to the management of wildlife and wildlife habitat in the Inuvialuit Settlement Region (ISR). This responsibility gives the IGC authority for matters related to harvesting rights, renewable resource management, and conservation (IGC, 2015).

document may differ slightly from previous or future reports drafted using the same databases. Any differences in the data will be minor and will not significantly affect the results of any analysis.

Table 1. Descriptions of the trade and hunting data used in this report, the source and the dates that the data were received.

Description	Source	Date Received
Data for all hides and skulls exported from Canada in 2010–2013 as compiled in the Canadian 2010 CITES Annual Report, NEMISIS, and CEPS (except 2011 NEMISIS data for skulls).	CITES SA, Environment Canada	Nov. 14, 2014
Data for all hides and skulls exported from Canada in 2014 as compiled in the CEPS.	CITES SA, Environment Canada	Jan. 12, 2015
Data for skulls exported from Canada in 2011 as compiled in NEMISIS.	CITES SA, Environment Canada	Jan. 13, 2014
Harvest quotas and numbers of bears killed in all provinces and territories in harvest years 2005/06–2010/11.	CITES SA, Environment Canada	Jan. 15, 2015
Harvest quotas and numbers of bears killed in provinces and territories in 2012/13–2013/14.	CITES SA, Environment Canada	Jan. 15, 2015
Harvest quotas and numbers of bears killed in Newfoundland and Labrador in harvest years 2006/07–2013/14.	Environment and Natural Resources, Government of Newfoundland & Labrador	Jan. 19, 2015
Harvest quotas and numbers of bears killed in Nunavut in harvest years 2006/07–2013/14.	Department of Environment, Government of Nunavut	Jan. 19, 2015
Harvest quotas and numbers of bears killed in Yukon and Northwest Territories in harvest years 2006/07–2013/14.	Dept. of Environment and Conservation, Government of Northwest Territories	Jan. 19, 2015
Harvest quotas and numbers of bears killed in Québec in harvest years 2007/08–2013/14.	Direction de la gestion de la faune du Nord-du-Québec, Québec	Feb. 4, 2015

QUOTAS AND NUMBERS OF BEARS TAKEN BY HUNTING SEASON

A reasonable estimate of the conservation impact of trade in polar bear products can be made through comparison of the numbers traded to the numbers of bears hunted. Therefore, although the hunting quotas set by Canadian jurisdictions and the numbers of bears killed annually are not specific topics of analysis for this study, a short discussion of the hunting quotas and kill numbers is warranted.

Each Canadian jurisdiction that is responsible for polar bear management sets a separate hunting quota. These jurisdictional hunting quotas can be added together to provide a total Canadian national hunting quota. However, the Inuit of Québec are not limited in the number of bears they may hunt (see below) and so the total Canadian hunting quota may be considered a minimum quota, but not necessarily a maximum quota.

The total Canadian polar bear hunting quota has been slowly decreasing during the period under review, from a high of 720 (in 2006/07) to a low of 609 (in 2013/14). The majority of polar bears hunted in Canada come from Nunavut, so the changes in the total Canadian hunting quota is largely a reflection of the slowly decreasing annual hunting quota set by that territory (Table 2).

Manitoba does not permit polar bear hunting, but a hunting quota of eight animals (Table 2) is set to account for possible self-defence and/or accidental human-caused mortalities (Shadbolt, et al., 2012).

Prior to 2011, Ontario and Québec did not have established hunting quotas because these jurisdictions had guaranteed harvest levels which were set through historical agreements with Aboriginal peoples (CITES, 2010b; Shadbolt, et al., 2012). In Ontario, up to 30 polar bears per hunting season may be hunted by Treaty 9 First Nations members that reside along the James Bay and Hudson Bay coast. This is based on an informal agreement established in 1976 (OMNR, 2008; Tonge & Pulfer, 2011). Nunavik (Québec)[13] has a guaranteed minimum harvest level of 62 polar bears as established by the *James Bay and Northern Québec Agreement* (Environment Canada, 2011b; Obbard, Thiemann, Peacock, & DeBruyn, 2010; Shadbolt, et al., 2012) (Table 2). These bears are harvested from three polar bear subpopulations: Davis Strait, Foxe Basin and Southern Hudson Bay. The Southern Hudson Bay subpopulation overlaps northern Québec, Ontario and southern Nunavut and involves two Inuit land claim areas, and Cree Treaty established hunting rights (Nunatsiaq News, 2014).

In 2011, a voluntary agreement between these three jurisdictions established a hunting quota for the Southern Hudson Bay subpopulation in response to concern over the sharp increase in bears killed in Nunavik (Québec) during the 2010/11 harvest year (NTI, 2011; Nunatsiaq News, 2014; Shadbolt, et al., 2012). Under the agreement, a total of 60 bears could be hunted from the Southern Hudson Bay subpopulation with 26 allocated to Nunavik; 25 to Nunavut; 5 to Cree communities in Ontario; and 4 to the Cree in Québec (Nunatsiaq News, 2014; Shadbolt, et al., 2012) (Table 2). In late 2014 the total harvest of polar bears from Southern Hudson Bay subpopulation was voluntarily reduced to 45 animals (CBC, 2014; Environment Canada, 2014a; Nunatsiaq News, 2014). Under the new agreement, which is to remain in place until 2016, 22 bears were allocated to Nunavik; 20 to Nunavut, and 3 for Ontario and

[13] Nunavik is the homeland of the Inuit in Québec and covers approximately the northernmost third of the province.

Québec Cree (Nunatsiaq News, 2014). But, there is no limit to the number of bears that may be hunted in Nunavik from the Davis Strait and Foxe Basin subpopulations.

The total number of polar bears killed in Canada decreased from 579 in the 2006/07 hunting season, to 501 in the 2009/10 season; and then increased to 633 bears in 2010/11. This was largely due to the aforementioned increased numbers of bears reported hunted in Nunavik (Québec), although the numbers killed in Nunavut, Yukon and Northwest Territories also rose in 2010/11. The numbers of bears killed in Canada remained at more than 600 per hunting season until the 2013/14 hunting season, when the number dropped to 548 (Table 2).

The total number of bears killed in each of the hunting seasons from 2006/07 to 2009/10 fell short of the total Canadian hunting quota by an average of 148 animals (Table 2). That changed in 2010/11 when the number of bears killed in Canada increased and was closer to the total Canadian hunting quota than previous years (Table 2; Figure 1). The difference between the number of bears killed and the total Canadian hunting quota remained small in subsequent years. The two numbers came closest in the 2011/12 hunting season when a total of 637 bears were killed out of a total hunting quota of 639 (Table 2; Figure 1). However, as noted previously, under the *James Bay and Northern Québec Agreement* the number of bears that may be hunted in Québec is not limited except for those taken from the Southern Hudson Bay subpopulation.

Table 2. Polar bear hunting quotas and numbers of polar bears killed in each Canadian province and territory, sorted by hunting seasons from 2007/08 to 2013/14. The Inuvialuit Settlement Region (ISR) includes both the Northwest Territories and Yukon. The quotas and numbers killed from 2004/05 and 2005/06 were not compiled by separate jurisdiction. 545 bears were killed in 2004/05; and 514 were killed in 2005/06.

	2006/07		2007/08		2008/09		2009/10		2010/11		2011/12		2012/13		2013/14	
	Quota	Killed	Quota	Killed	Quota	Killed	Quota	Killed	Quota	Killed	Quota	Killed	Quota	Killed	Quota	Killed
ISR	103	45	103	33	103	43	103	20	103	77	103	83	103	63	96	47
Manitoba	8	3	8	1	8	6	8	0	8	0	8	0	8	8	8	8
Nfld. & Labrador	6	4	6	6	6	8	6	2	11	13	12	9	12	9	12	12
Nunavut	511	498	486	446	458	463	434	418	442	442	449	465	453	458	426	397
Ontario	30	3	30	5	30	3	30	1	30	0	5	3	5	5	5	5
Québec	62+	26	62+	20	62+	31	62+	60	62+	101	62+	77	62+	84	62+	79
TOTAL	**720**	**579**	**695**	**511**	**667**	**554**	**643**	**501**	**656**	**633**	**639**	**637**	**643**	**627**	**609**	**548**

Sources: Direction de la gestion de la faune du Nord-du-Québec, Québec; Government of Nunavut, Department of Environment; Government of Northwest Territories, Environment and Natural Resources; Government of Newfoundland and Labrador, Dept. of Environment and Conservation; Government of Canada, Environment Canada. All *in litt.* to E. Cooper. See *Methods* for dates the data were accessed.

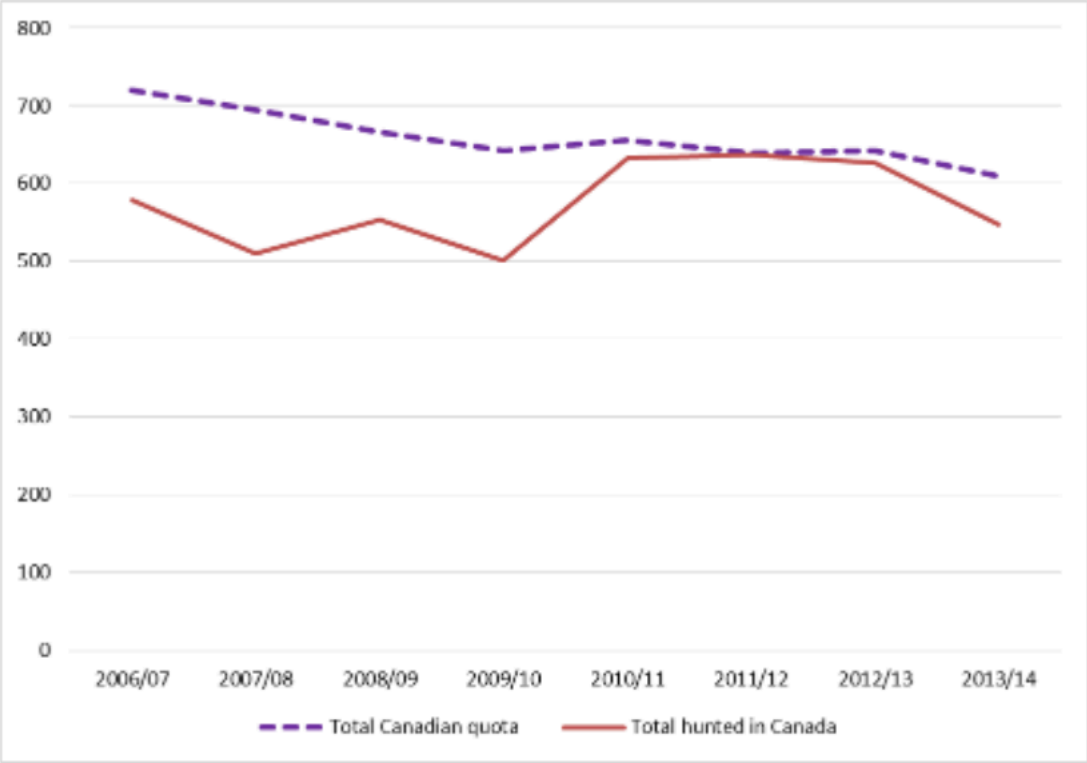

Figure 1: Total annual Canadian polar bear hunting quotas and total numbers of bears hunted in Canada per hunting season, from 2007/08 to 2013/14. The hunting season overlaps the calendar year. The total Canadian hunting quota is not a fixed number as not all provincial and territorial jurisdictions have maximum quotas, as explained further in the text. Nunavut has a flexible quota system and aboriginals in Québec are guaranteed a minimum harvest (not a maximum) under the *James Bay and Northern Québec Agreement*.

ANALYSIS OF CANADIAN TRADE DATA

Hides and skulls exported, and purpose of trade

During the years 2005–2013 the total number of hides annually exported from Canada gradually increased from 266 (in 2005) to a high of 400 (in 2013); and then dropped to a low of 217 hides in 2014. The number exported for commercial purposes had risen consistently from a low of 71 (in 2007) to a high of 357 (in 2013) before dropping to 168 in 2014. The drop in polar bear hide exports in 2014 was primarily due to a reduction in the number of hides exported for commercial purposes (Table 3; Fig. 2).

In contrast, the number of hides exported for personal purposes was reasonably consistent from 2006–2012, dropped in 2013, and increased slightly in 2014. The number of hides exported as hunting trophies peaked at 201 in 2007 and then dropped significantly in subsequent years, reaching a low of 21 in 2011. During the years 2011–2014 there were 20–30 hides exported as hunting trophies per year (Table 3).

Overall, the total number of skulls exported annually presents a different pattern than that for hides. The annual numbers of skulls exported from Canada peaked at 168 (in 2007) and then dropped significantly to 98 in 2008. The numbers exported in subsequent years did not increase as did the numbers of hides. Since 2009, the total number of skulls exported has ranged from 37–57 except for 2011 when the number jumped anomalously to 83 (Table 4; Fig. 2). The jump in numbers of skulls exported in 2011 was due entirely to an increase in the number of skulls exported for commercial purposes in that year (Table 4).

The number of skulls exported for commercial purposes was consistently low for the first six years of the study period (2005–2010), ranging from a low of 1 (in 2006) to a high of only 9 (in 2005). The number of skulls exported jumped to 54 in 2011 (as noted above) and then dropped again in subsequent years—although they remained slightly higher than in the years 2005–2010 (Table 4).

The annual number of skulls exported as hunting trophies followed a pattern similar to that shown by exported hides. The number of skulls exported as hunting trophies peaked at 144 (in 2007) and then dropped significantly in 2008, reaching a low of 17 in 2013 (Table 4).

From 2005–2014 the annual number of skulls exported for personal purposes was comparatively low, ranging from 5 (in 2013) to a high of 20 (in 2007). In the years 2009–2013 the numbers exported for personal purposes each year was a very consistent five or six skulls (Table 4).

In 2005–2007, more hides and skulls were exported each year as hunting trophies than were exported for commercial purposes. In 2005, 192 hunting trophies were exported vs 103 hides and skulls exported for commercial purposes. In 2006, there were 187 hunting trophies vs 149 commercial exports. In 2007, the number of hides and skulls exported as hunting trophies spiked sharply at 345 vs only 75 exported for commercial purposes. The combined numbers of hides and skulls exported from Canada as hunting trophies dropped noticeably in the following years; whereas the numbers of hides and skulls exported for commercial purposes rose consistently after 2007. The rate at which exports of hunting trophies dropped is very similar to the rate that commercial exports rose (Fig. 3).

By 2010, hides and skulls exported for commercial purposes completely dominated Canadian trade. As a result of the simultaneous drop in numbers of hunting trophies and rise in numbers of commercial exports, the total number of polar bear hides and skulls exported per year has been relatively consistent. The total number of polar bear hides and skulls exported per year ranged from 377 (in 2005) to 438 (in 2013). 2007 was the notable exception, when 483 hides and skulls were exported. This spike in exports was due to a sharp increase in exports of hunting trophies in that year (both hides and skulls) (Fig. 3).

Between 2005 and 2014 an average of 405 hides and skulls were exported from Canada per year. The average drops to 395 if the anomalous 2007 data are excluded.

Table 3. Numbers of polar bear hides exported from Canada in the years 2005 to 2014, sorted by the purpose of export. These data include mounted bears.

Year	Purpose of export				Total
	Hunting trophies	Personal	Commercial	Educational	
2005	105	67	94	-	**266**
2006	97	49	148	-	**294**
2007	201	43	71	-	**315**
2008	78	59	141	-	**278**
2009	61	41	195	2	**299**
2010	34	42	240	-	**316**
2011	21	43	273	-	**337**
2012	28	40	327	-	**395**
2013	22	21	357	-	**400**
2014	20	29	168	-	**217**
Total	**667**	**435**	**2019**	**2**	**3123**

Sources: 2005–2009: Shadbolt et al. (2012); 2010 Canadian CITES Annual report (amended); 2011: CEPS and NEMISIS; 2012–2014: CEPS.

Table 4. Numbers of polar bear skulls exported from Canada in the years 2005 to 2014, sorted by the purpose of export.

Year	Hunting trophies	Personal	Commercial	Educational	Total
2005	87	15	9	-	**111**
2006	90	11	1	-	**102**
2007	144	20	4	-	**168**
2008	77	13	8	-	**98**
2009	49	6	2	-	**57**
2010	31	6	2	-	**39**
2011	23	6	54	-	**83**
2012	28	6	11	-	**45**
2013	17	5	16	-	**38**
2014	18	11	11	-	**40**
TOTAL	**564**	**99**	**118**	-	**781**

Sources: 2005–2009: Shadbolt et al. (2012); 2010 Canadian CITES Annual report (amended); 2011: CEPS and NEMISIS; 2012–2014: CEPS.

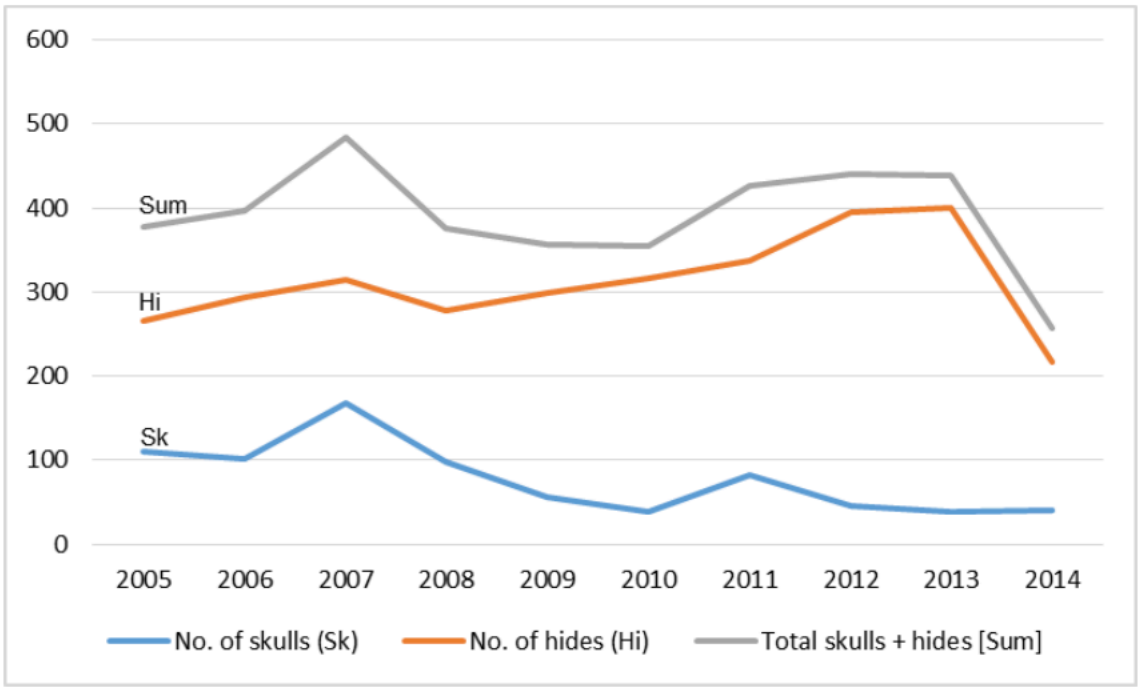

Figure 2. Numbers of polar bear hides and skulls exported from Canada in the years 2005–2014.

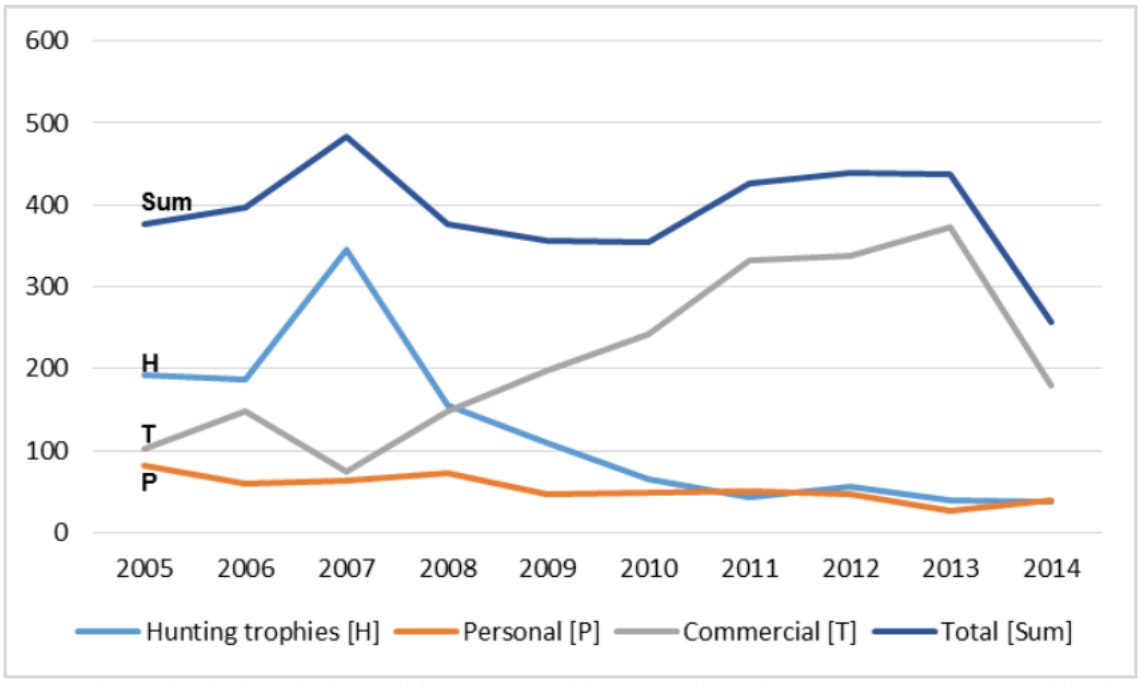

Figure 3: Numbers of polar bear hides and skulls exported from Canada in the years 2005–2014 sorted by the purpose of export. The total is the sum of both hides and skulls exported per year.

Destination countries for Canadian exports

In the years 2005–2014, polar bear hides were exported from Canada to a total of 63 countries (Tables 5 and 6; Appendix A). The numbers of destination countries for Canadian polar bear hides ranged from a high of 32 in 2007 and 2008, to a low of 17 in 2013. Overall, the trend since 2008 has been fewer countries per year importing polar bear hides from Canada (Fig. 4).

From 2005–2007, more polar bear hides were exported to the United States than to any other single country. And most of the hides exported to the United States were hunting trophies. The number of hides exported to the United States peaked sharply in 2007 (125 hides), and then dropped significantly in 2008 because of the ESA import prohibition. By 2009, only three hides were reported exported to the United States, and these exports might not actually have occurred (CITES SA office, Environment Canada, *in litt.* to E. Cooper, March 9, 2015). Canada issued the permits but that the hides may not have been shipped. No polar bear hides were exported from Canada to the United States in subsequent years (Tables 5 and 6).

From 2005–2009, Germany, Norway and Russia were consistent importers of polar bear hides. Norway and Russia imported numbers of hides each year in double digits, ranging from 18–50 (Norway) and 10–37 (Russia). Germany imported hides less consistently, ranging from 5–26 hides per year (Table 5).

In 2010–2014 these three countries each imported fewer hides than in the previous five years. The biggest change was shown by Norway, which imported 66 hides in 2010–2014 compared to 175 in the earlier years. Russia also showed a significant reduction in the number of hides imported in 2010–2014 at 50 compared to 98 in 2005–2007. The smallest reduction was in the numbers of hides exported to Germany, which imported 54 hides in 2010–2014, compared to 72 in 2005–2009 (Table 6).

The annual number of hides exported to Germany, Norway and Russia fluctuated considerably in 2010–2014, from 4–24 (Germany); 4–31 (Norway); and 1–25 (Russia). Annual exports to Russia remained in double digits until 2011, then dropped in subsequent years to a low of only one hide in 2014 (Table 6).

In 2008, China overtook the United States as the single biggest importer of polar bear hides. In 2009, the number exported to China more than doubled (from 46 in 2008 to 104 in 2009) while the number exported to the USA dropped to 3 (from 42 in 2008). In 2010 China imported more polar bear hides from Canada than all other countries combined. The number of hides exported to China steadily rose each year of the study period to a high of 300 in 2012 (compared to only 12 hides in 2005). In 2014, the number of hides exported to China dropped to 184, a significant change from the previous two years (300 and 297 hides in 2012 and 2013, respectively) (Tables 5 and 6; Fig. 5).

The majority of the hides exported to China in the years 2005–2014 were for commercial purposes. A small number of hides—ranging from 2–27—were exported for personal purposes, while exports of hunting trophies were comparatively rare (Tables 5 and 6).

In the years 2005–2014, the proportion of Canadian hide exports going to China increased from 5% of all hide exports in 2010, to 85% in 2014. Although the number of hides exported to China from Canada dropped sharply in 2014, the proportion of hide exports going to China actually increased. In 2013, 74% of all hides exported from Canada went to China; whereas in 2014, 85% went to China. So despite the large drop in numbers of hides exported to China in 2014, China actually took a bigger market share of the Canadian hides exported (Fig. 6).

Fewer polar bear skulls were exported from Canada in the years 2005–2014, and fewer countries were destinations for these skulls. During these years skulls were exported to a total of 42 different countries (Tables 7 and 8; Appendix B). The numbers of destination countries for Canadian polar bear skulls

ranged from a low of 11 in 2005 to high of 24 in 2009. Overall, except for the minor peak in 2009, the number of destination countries for skulls exported from Canada has been consistently in the teens (Tables 7 and 8).

For the first four years of the study period exports of polar bear skulls followed the same pattern as observed for hides:

- In 2005–2008 more skulls were exported to the United States than to any other single country.
- The vast majority of skulls exported to the United States were hunting trophies.
- The number of hunting trophies exported to the United States peaked sharply in 2007 (at 117 skulls).
- The number of skulls exported dropped in 2008 (Tables 7 and 8).

The difference between the export of Canadian hides and skulls was that as the US market for skulls diminished, no other country took its place as the dominant importer of skulls. Overall, much lower numbers of polar bear skulls have been exported from Canada. The one exception to this general observation took place in 2011 when 62 skulls were exported from Canada to France (Table 8). Most of these skulls (n=52) were exported for commercial purposes and were a one-off sale to a single buyer (CITES SA office, Environment Canada, pers. comm to E. Cooper).

If the numbers of skulls exported to the United States and the one-off commercial export to France in 2011 are excluded from the data, then the export of skulls from Canada was fairly consistent, ranging from 26 (in 2013) to 58 (in 2008), and averaging 38 skulls per year from 2005–2014.

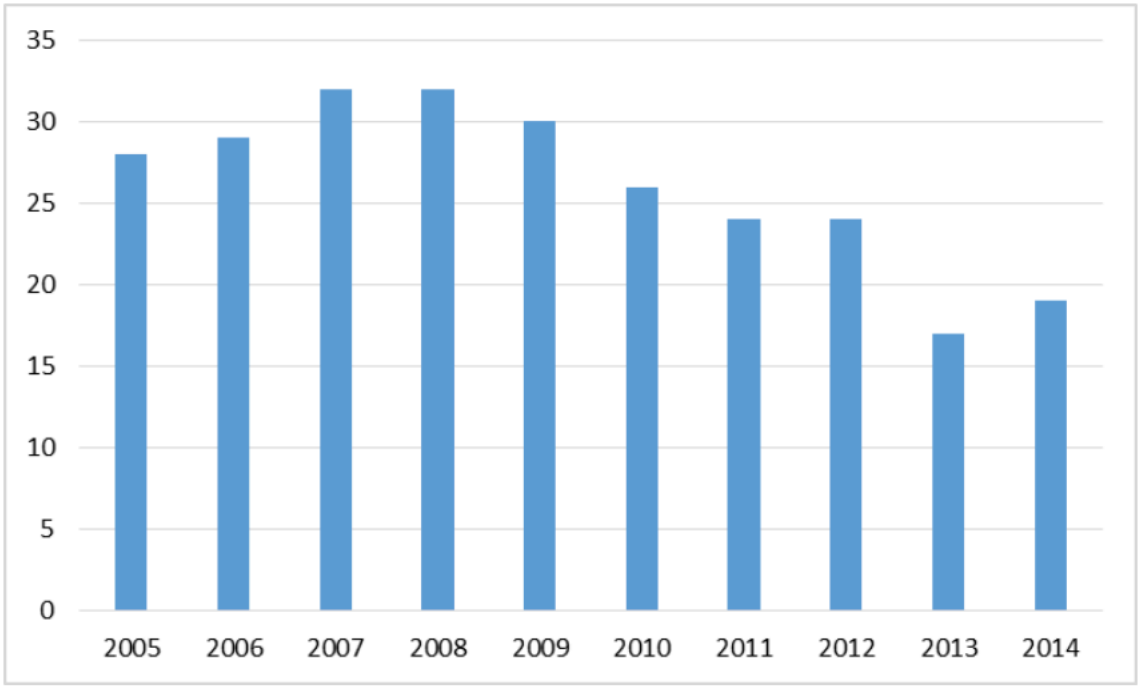

Figure 4. Numbers of destination countries for polar bear hides exported from Canada in the years 2005 to 2014. Hides were exported from Canada to a total of 63 different countries in these years.

Table 5. Destination countries for polar bear hides exported from Canada in the years 2005 to 2009, sorted by the purpose of export. These data include mounted bears. Hides exported for educational purposes (n=4) were excluded. The countries specified were referred to as "key destination countries" in Shadbolt et al. (2012) and so were included in this table. Numbers in parenthesis indicate the total number of different countries that imported hides in that particular year. A total of 57 different countries imported polar bear hides in the years 2005 to 2009 (Appendix A).

Destination Country	Purpose of export	Year					Total
		2005	2006	2007	2008	2009	
China	Hunting trophies	-	-	2	1	-	3
	Personal	9	3	6	9	12	39
	Commercial	3	27	34	36	92	192
	Subtotal	**12**	**30**	**42**	**46**	**104**	**234**
Germany	Hunting trophies	-	-	2	6	3	11
	Personal	4	3	1	2	-	10
	Commercial	10	13	8	18	2	51
	Subtotal	**14**	**16**	**11**	**26**	**5**	**72**
Norway	Hunting trophies	9	1	27	1	1	39
	Personal	3	2	5	8	3	21
	Commercial	29	47	3	22	14	115
	Subtotal	**41**	**50**	**35**	**31**	**18**	**175**
Russia	Hunting trophies	3	1	5	3	12	24
	Personal	6	4	-	3	4	17
	Commercial	7	15	5	9	21	57
	Subtotal	**16**	**20**	**10**	**15**	**37**	**98**
United States	Hunting trophies	64	66	115	39	2	286
	Personal	2	7	10	3	-	22
	Commercial	7	4	-	-	1	12
	Subtotal	**73**	**77**	**125**	**42**	**3**	**320**
Other countries	Hunting trophies	30	29	50	28	43	180
	Personal	46	29	21	34	22	152
	Commercial	32	42	21	56	65	216
	Subtotal	**108 (n=28)**	**100 (n=29)**	**92 (n=32)**	**118 (n=32)**	**130 (n=30)**	**548**
TOTAL		**264**	**293**	**315**	**278**	**297**	**1447**

Source: Comparative tabulation of export data extracted from the UNEP-WCMC CITES Trade Database.

Table 6. Destination countries for polar bear hides exported from Canada in the years 2010 to 2014, sorted by the purpose of export. These data include mounted bears. The countries specified were referred to as "key destination countries" in Shadbolt et al. (2012) and so were included in this table. Numbers in parenthesis indicate the total number of different countries that imported hides in that particular year. A total of 47 different countries imported polar bear hides in the years 2010 to 2014 (Appendix A).

Destination Country	Purpose of export	Year					Total
		2010	2011	2012	2013	2014	
China	Hunting trophies	-	-	-	1	2	3
	Personal	23	24	27	20	23	117
	Commercial	171	193	273	276	159	1072
	Subtotal	**194**	**217**	**300**	**297**	**184**	**1192**
Germany	Hunting trophies	3	2	1	1	2	9
	Personal	1	-	3	-	-	4
	Commercial	10	2	20	7	2	41
	Subtotal	**14**	**4**	**24**	**8**	**4**	**54**
Norway	Hunting trophies	-	-	1	2	2	5
	Personal	2	1	2	-	-	5
	Commercial	11	10	4	29	2	56
	Subtotal	**13**	**11**	**7**	**31**	**4**	**66**
Russia	Hunting trophies	1	6	6	4	1	18
	Personal	2	-	-	-	-	2
	Commercial	11	19	-	-	-	30
	Subtotal	**14**	**25**	**6**	**4**	**1**	**50**
United States	Hunting trophies	-	-	-	-	-	**0**
	Personal	-	-	-	-	-	**0**
	Commercial	-	-	-	-	-	**0**
	Subtotal	**0**	**0**	**0**	**0**	**0**	**0**
Other countries	Hunting trophies	29	13	20	14	12	88
	Personal	14	17	8	1	4	44
	Commercial	38	41	30	45	4	158
	Subtotal	81	71	58	60	20	290
TOTAL		**316 (n=26)**	**328 (n=24)**	**395 (n=24)**	**400 (n=17)**	**213 (n=19)**	**1652**

Sources: 2010 Canadian CITES Annual report (amended); 2011: CEPS and NEMISIS; 2012-2014: CEPS.

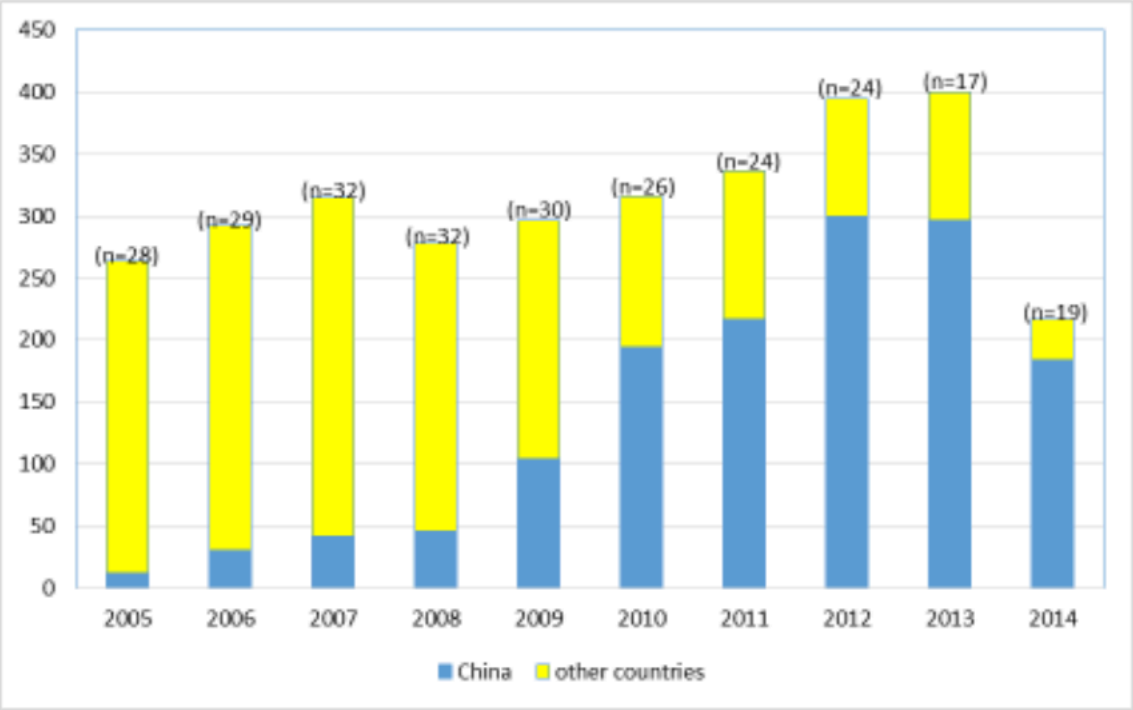

Figure 5. Numbers of polar bear hides exported from Canada to China in the years 2005 to 2014 compared to the total number of hides exported. Numbers in parenthesis indicate the total number of different countries that imported hides in each year.

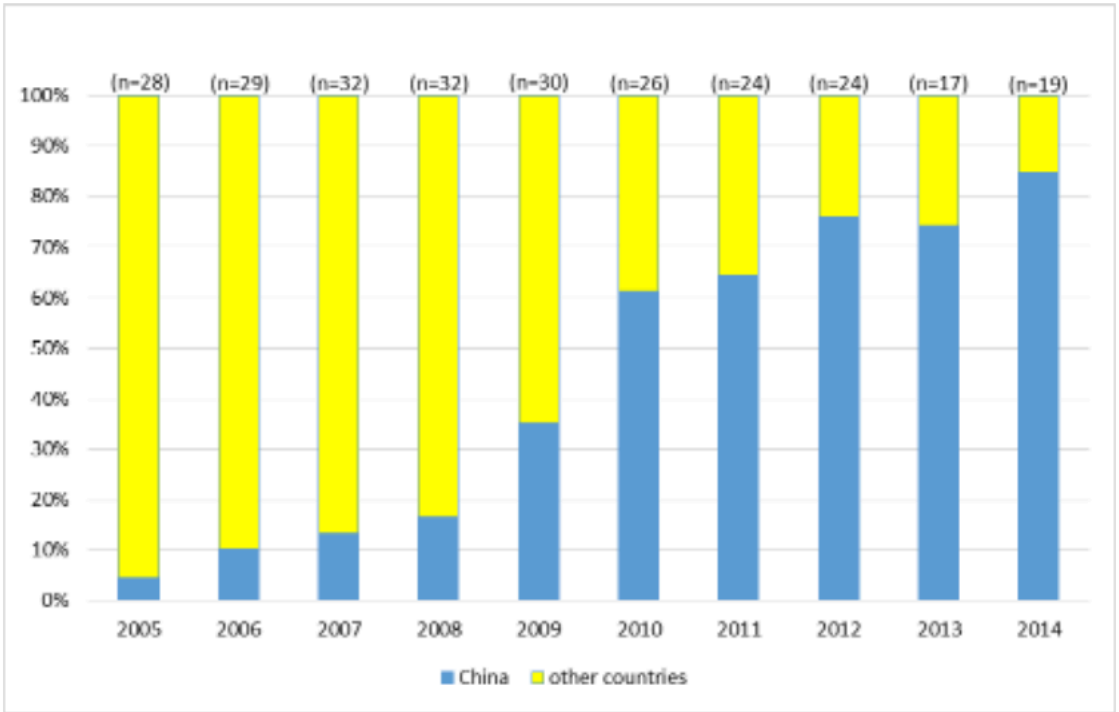

Figure 6. Numbers of polar bear hides exported from Canada to China in the years 2005 to 2014 expressed as a percentage of all hides exported. Numbers in parenthesis indicate the total number of different countries that imported hides in each year.

Table 7. Destination countries for polar bear skulls exported from Canada in the years 2005 to 2009, sorted by the purpose of their export. Skulls exported for scientific purposes were excluded. Numbers of exports to France and the United States are specified; all others are compiled together in "other countries." Numbers in parenthesis indicate the total number of different countries that imported skulls in that particular year. A total of 32 different countries imported polar bear hides in the years 2005 to 2009 (Appendix B).

Destination Country	Purpose of export	Year					Total
		2005	2006	2007	2008	2009	
France	Hunting trophies	4	1	6	2	6	19
	Personal	-	-	-	-	-	0
	Subtotal	**4**	**1**	**6**	**2**	**6**	**19**
United States	Hunting trophies	57	63	110	38	1	269
	Personal	2	7	7	2	-	18
	Commercial	7	1	-	-	-	8
	Subtotal	**66**	**71**	**117**	**40**	**1**	**295**
Other countries	Hunting trophies	26	26	28	37	23	140
	Personal	13	4	13	11	2	43
	Commercial	2	-	4	8	-	14
	Subtotal	**41**	**30**	**45**	**56**	**25**	**197**
TOTAL		**111** (n=11)	**102** (n=12)	**168** (n=15)	**98** (n=16)	**32** (n=24)	**511**

Source: Comparative tabulation of export data extracted from the UNEP-WCMC CITES Trade Database.

Table 8. Destination countries for polar bear skulls exported from Canada in the years 2010 to 2014, sorted by the purpose of their export. Skulls exported for scientific purposes were excluded. Numbers of exports to France and the United States are specified; all others are compiled together in "other countries." Numbers in parenthesis indicate the total number of different countries that imported skulls in that particular year. A total of 34 different countries imported polar bear hides in the years 2010 to 2014 (Appendix B).

Destination Country	Purpose of export	Year					Total
		2010	2011	2012	2013	2014	
France	Hunting trophies	5	8	2	1	-	16
	Personal	-	2	-	1	2	5
	Commercial	-	52	1	10	3	66
	Subtotal	**5**	**62**	**3**	**12**	**5**	**87**
United States	Hunting trophies	-	-	-	-	-	0
	Personal	-	-	-	-	-	0
	Commercial	-	-	-	-	-	0
	Subtotal	**0**	**0**	**0**	**0**	**0**	**0**
Other countries	Hunting trophies	26	15	26	16	18	101
	Personal	6	4	6	4	9	29
	Commercial	2	2	10	6	8	28
	Subtotal	**34**	**21**	**42**	**26**	**35**	**158**
TOTAL		**39** (n=18)	**83** (n=14)	**45** (n=17)	**38** (n=14)	**40** (n=15)	**245**

Sources: 2010 data: 2010 Canadian CITES Annual report (amended); 2011 data: CEPS and NEMISIS; 2012–2014 data: CEPS.

Numbers of bears exported from Canada

Previously in this report (see *Methods*), it was suggested that successful sport hunters would typically export both the hide and skull from a polar bear. This assumption was tested by cross-referencing the hunting tag numbers in the CEPS data for 2012–2014[14]. In those years 100% of the skulls exported as hunting trophies could be matched to hides exported at the same time. Skulls exported as hunting trophies were therefore excluded from calculations to determine the number of bears exported from Canada each year.

In the years 2005–2010, Canada exported approximately 300 polar bears annually as hides and/or skulls. In 2011, the number of bears exported rose to 343–403. Approximately 400 bears were exported in 2012 and 2013 (Table 9). The large range between the calculated minimum and maximum number of bears exported in 2011 was due to the incongruous commercial export of 52 skulls to a single destination in that year (Table 8).

The smallest number of bears that could be represented by the data was 217–239 (in 2014). The maximum number that were exported in this year (239) was still fewer than the minimum number for any other year. The largest number of bears exported in one year was 400–421 (in 2013) (Table 9).

Cross-referencing the tag numbers in the CEPS data for 2012–2014 allowed for a more precise estimate of the numbers of bears that were exported in those years. In 2012, there were 399–411 polar bears exported from Canada as hides and/or skulls. In 2013, the number was 408–420 bears; and in 2014 there were 233 polar bears exported (Table 10).

In each year of the study (2005–2014), significantly more bears were killed in Canada than the maximum number of polar bears that were exported as hides and/or skulls. The closest that the maximum number of bears exported came to the total Canadian kill was in 2010, when the maximum number exported fell short of the bears killed by 177 (Fig. 7). In 2005–2014, the average number of bears exported in each year was 58% of the number of bears hunted. The highest proportion of bears exported to hunted was 67% in 2013. The lowest was 40% in 2014. It is important to note that all the bears exported in any given year were not necessarily killed in the same year.

[14] The hunting tag numbers associated with each hide and/or skull exported began to be included in the CEPS and NEMISIS databases starting in 2011. However, the NEMISIS data for 2011 was missing too many tag number entries to be useful.

Table 9. Minimum and maximum numbers of polar bears exported from Canada, calculated from numbers of hides and skulls exported in the years 2005 to 2014. The number of hides exported equalled the minimum number of bears exported. The maximum number of bears exported was calculated as the number of hides exported plus the number of skulls exported for commercial or personal purposes. Skulls exported as hunting trophies were assumed to have accompanied the hide from the same bear, and were excluded.

Year	Number of hides exported	Number of skulls exported (commercial or personal)	Minimum number of bears exported	Maximum number of bears exported
2005	266	24	266	290
2006	294	12	294	306
2007	315	24	315	339
2008	278	21	278	299
2009	299	8	299	307
2010	316	8	316	324
2011	343	60	343	403
2012	395	17	395	412
2013	400	21	400	421
2014	217	22	217	239

Sources: 2005–2009 data: Shadbolt et al. (2012); 2010 data: 2010 Canadian CITES Annual report (amended); 2011 data: CEPS and NEMISIS; 2012–2014 data: CEPS.

Table 10. Minimum and maximum numbers of polar bears exported from Canada in the years 2012 to 2014, refined via cross-referencing hunting tag numbers. The numbers of bears exported were calculated using the formula: A + (B – C) = SUM ± D. (A = the total number of hides exported; B = the total number of skulls exported; C = the number of skulls with tag numbers that match tag numbers for hides; D = the number of hides and skulls that had no tag number recorded). The minimum number of bears exported equalled SUM – D and the maximum number of bears exported equalled SUM + D.

Year	Hides exported (A)	Skulls exported (B)	Skulls with matching tag no. (C)*	A + (B – C)	Hides and/or skulls with no tag no. (D)	Minimum no. of bears exported	Maximum no. of bears exported
2012	395	45	35	405	6	399	411
2013	400	38	24	414	6	408	420
2014	217	40	24	233	0	233	233

Source: CEPS.
*The hunting tag numbers for exported skulls were cross-referenced to the hunting tag numbers for hides exported in the same year. This column provides the numbers of matching tag numbers, indicating that both items came from one bear.

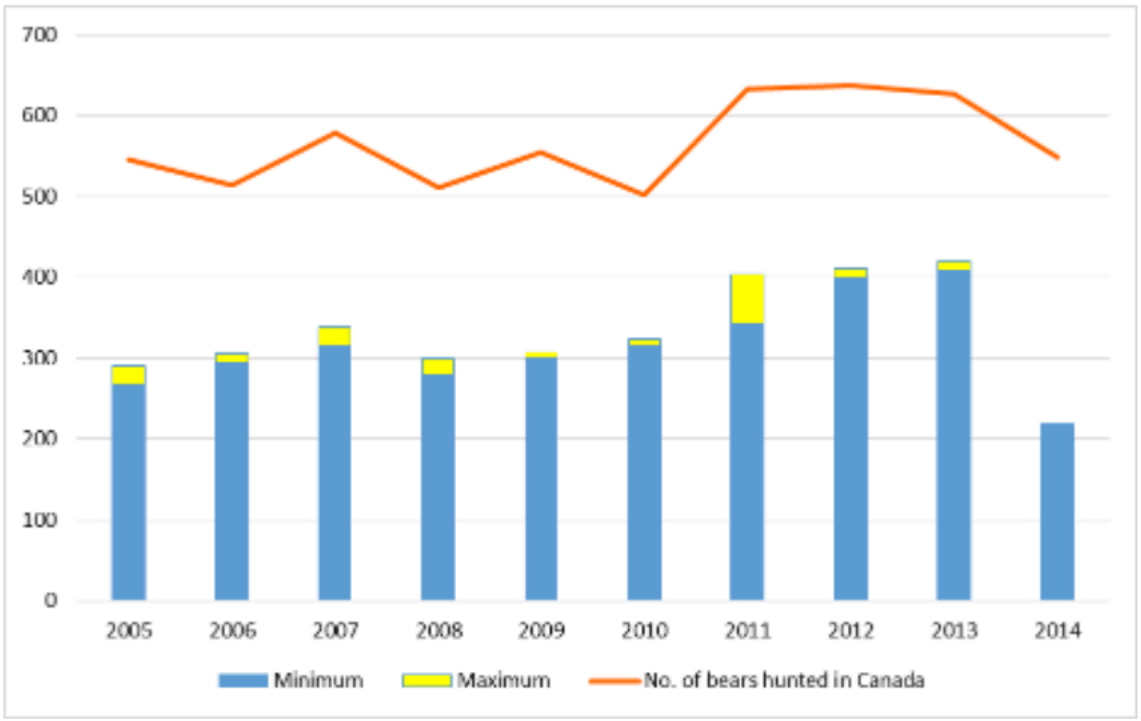

Figure 7. Numbers of polar bears exported from Canada, calculated from numbers of hides and skulls exported in 2005 to 2014; and compared to the number of polar bears hunted in Canada. The large range between the minimum and maximum in 2011 was due to an incongruous commercial export of 52 skulls in that year. The numbers of bears exported in 2012–2014 were refined through cross-referencing hunting tag numbers for hides and skulls.

Numbers of bears exported from Canada, by hunting season

The 400 polar bear hides exported from Canada in 2013 came from bears that were killed in 20 different hunting seasons, dating as far back as the 1985/86 season. Only 99 out of the 400 hides came from bears killed in the preceding hunting season of 2012/13 (Table 11). Similarly, the 217 hides exported in 2014 came from bears hunted in 14 different seasons, also dating as far back as the 1985/86 season. Of these 217 hides, 54 came from bears killed in the immediately preceding hunting season of 2013/14. To summarize, in both years, only 25% of the hides exported came from bears killed in the most recent hunting season (Table 11).

In contrast, the majority of the skulls exported in 2013 and 2014 were from bears harvested in the previous two hunting seasons for each year, respectively. The skulls exported in 2013 and 2014 came from bears killed no more than seven or eight years previously (Table 11).

It would be rare for a hide from a polar bear to be exported in the same calendar year that it was hunted; i.e. a bear killed in the 2013/14 season would not likely be exported in 2013. From the time a hunter takes a bear, the hide has to be cleaned, dried, sold, exported from the province or territory, sometimes tanned and processed, and a CITES export permit issued. For bears that go to Canadian fur auction houses the delay between hunting and export could be much longer, as hides may sit at auction houses for a year or two before being sold (D. Gissing, Director, Wildlife Management, Government of Nunavut *in litt.* to E. Cooper, Jan. 21, 2015).

Therefore, few, if any, hides from bears hunted in the 2012/13 hunting season were likely to have been exported from Canada prior to 2013. Exports from Canada in 2013 and 2014 should therefore include all of the skull and hide exports of bears hunted in the 2012/13 hunting season to date.

In 2013 and 2014 Canada exported a combined total of 617 polar bear hides and 78 skulls. Of these items, 187 hides and 36 skulls came from bears hunted in 2012/13 (Table 11). A comparison of the hunting tag numbers found that the hides and skulls exported in 2013 and 2014 represented 97 and 95 different bears in each year (respectively), for a total of 192 individual animals. Therefore, by the end of 2014, of the 627 polar bears killed in Canada during the 2012/13 hunting season (Table 2), 192, or 31% had been exported as a hide and/or a skull (Table 12).

Table 11. Numbers of polar bear hides and skulls exported from Canada in 2013–2014, sorted by the hunting season (years) in which the animals were killed.

Hunting season	Hides		Skulls		Total
	2013	2014	2013	2014	
Not recorded	45	5	3	-	**55**
1985-1986	1	1	-	-	**2**
1979-1980	-	1	-	-	**1**
1990-1991	1	-	-	-	**1**
1991-1992	1	-	-	-	**1**
1992-1993	2	-	-	-	**2**
1993-1994	1	1	-	-	**2**
1995-1996	1	-	-	-	**1**
1998-1999	2	-	-	-	**2**
1999-2000	1	-	-	-	**1**
2000-2001	1	-	-	-	**1**
2002-2003	3	1	-	-	**4**
2003-2004	1	-	-	-	**1**
2004-2005	1	-	-	-	**1**
2005-2006	2	1	1	-	**4**
2006-2007	4	-	-	-	**4**
2007-2008	2	4	1	5	**12**
2008-2009	7	12	-	-	**20**
2009-2010	11	2	-	-	**13**
2010-2011	66	12	1	2	**81**
2011-2012	148	34	14	7	**203**
2012-2013	99	88	18	18	**223**
2013-2014	-	54	-	8	**63**
2014-2015	-	1	-	-	**1**
TOTAL	**400**	**217**	**38**	**40**	**699**

Source: CEPS.

Table 12. Numbers of hides and skulls exported from Canada in 2013 and 2014 that came from bears killed in the 2012/13 hunting season; and the number of individual bears represented by those data. The numbers of individual bears were calculated via comparison of hunting tag numbers.

	Hides exported	Skulls exported	Hides + skulls	No. of individual bears
2013	96	20	116	97
2014	88	18	106	95
TOTAL	**187**	**36**	**223**	**192**

Source: CEPS.

ANALYSIS OF AUCTION PRICES

In the years 2010–2014, 89–142 polar bear hides from bears hunted in Nunavut were sold annually at the FHA auction. The numbers of hides offered for sale increased steadily from 133 hides in 2010 to 200 hides in 2014. This was an annual increase of 14–36 hides per year. The numbers of these hides that were actually sold did not increase at the same rate, remaining at 118–120 hides except for a spike in sales (to 142) in 2012. The greatest difference between the numbers of hides offered vs the numbers sold was in 2014, when 306 hides were offered but only 89 sold. This was an increase of 106 hides more than was offered for sale in 2013. Hides that do not sell at one auction may be offered again for sale at the following auction, which partially explains the rising number of hides offered for sale. However, this does not account for the increase of 106 hides offered for sale in 2014 (Table 13; Fig. 8).

The lowest prices paid for polar bear hides at the auction (both the average and the top prices) were in 2009; and the highest prices paid (average and top) were in 2013. The top prices paid in 2010 and 2011 were quite consistent at CAD 10,250 and 10,944 in each year respectively (USD 9,937 and 10,654). In 2012 the top price jumped to CAD 16,500 (USD 16,063).

The top price jumped again in 2013 to CAD 21,115 (USD 19,810) and then dropped in 2014 back to the 2012 price range at CAD 11,550 (USD 10,836). The top prices paid for hides in 2012 and 2013 were impressive, but the average price paid would be more indicative of the typical value of a hide at auction. The average price paid for hides each year was much less dynamic. The average price gradually rose from 2008–2013, gaining approximately CAD/USD 1,000 in value each year (slightly higher in 2013) and then dropped slightly (by approximately CAD 1,000 (USD 1,500) in 2014 (Table 13; Fig. 9).

Polar bear hides are sold at two separate FHA auctions each year; one in the winter (December or January) and one in the spring (May or June). In most years, hides sold at the spring auction commanded higher prices than those sold at the winter auction. The top prices of CAD 16,500 (USD 16,063) and CAD 21,115 (USD 19,810) in 2012 and 2013 were paid for hides sold at spring auctions (Table 14). Prices are generally higher at the spring sales because these are the best quality hides, hunted when the fur is at its prime in January, February or March. Also, since winter is when most bear hunting occurs, there are usually more hides offered on the spring sale as well, attracting more serious buyers. Conversely, hides offered in the winter sale include those that did not sell the previous spring, as well as bears taken in the fall when the fur is not yet prime and are therefore of a lower value (D. Imrie, Acting Director of Fisheries & Sealing, Dept. of Environment, Government of Nunavut, *in litt.* to E. Cooper Dec. 10, 2014).

A total of 192 Nunavut hides were offered for sale at the June 2014 auction—considerably more than at any other auction in 2010–2014. Conversely, the June 2014 auction also had the fewest hides sold (39) of any auction in that period. The numbers of hides offered for sale seemed to have little impact on the numbers actually sold (Table 14; Fig. 10).

The number of hides offered or sold at auction in 2010–2014 did not appear to be impacted by the proposals to list the polar bear on CITES Appendix I at CoP15 and CoP16. Interestingly, the numbers of hides sold fluctuated regularly; rising and falling over a two year (four auction) period from 2010 to 2014. The number of hides offered for sale did not increase appreciably after CITES CoP15, but did rise in June 2013 after CoP16. However, only 46 hides sold out of the 83 offered at the January 2013 auction. The 37 hides that were not sold, if sent back to the spring auction, could account for the increase in the number offered in June 2013 (Fig. 10).

The proposals to list the polar bear on CITES Appendix I at CoP15 and CoP16 did appear to correlate with increased prices paid for hides at auction. At the May 2010 auction, two months after CoP15, both the average and top prices paid for hides at auction increased substantially in comparison to previous years. The average and top prices paid for hides did not drop to pre-CoP15 levels in subsequent years and both had increased by the June 2012 auction. Both prices dropped in January 2013, two months before CoP16 took place in March of that year. However, both the average price and the top price paid in January 2013 were higher than those prior to CoP15. After CoP16 the prices paid for hides jumped again, with the top price hitting the aforementioned CAD 21,115 (USD 19,810). At both auctions in 2014, the prices dropped to pre-CoP16 levels, although the prices at the June 2014 auction were still higher than before CoP15 (Fig. 11).

The increased prices paid for hides at auction may also be linked to a growing Chinese market for hides from other wild species. According to data compiled from the UNEP-WCMC CITES Trade Database, Chinese imports of Canadian river otter (*Lontra canadensis*), bobcat (*Lynx rufus*) and Canadian lynx (*L. Canadensis*) hides increased dramatically in 2011 and 2012 (Fig. 12).

The increased prices paid for polar bear hides at auction after CoP15 correlated with an increased number of polar bears reported killed in Canada. The number of bears hunted per year rose significantly in 2011 after the prices paid increased in May 2010 (Fig. 11). Given the lag between hunting a bear and getting it to market (after processing) it would seem that the higher prices may have stimulated increased hunting rather than the other way around. The numbers of bears killed was close to the total Canadian hunting quota after 2011 and did not exceed quota despite the increasing prices paid for hides. The decrease in the number of bears killed in 2014 correlates with a drop in the total Canadian hunting quota in that year (Table 2; Fig. 1).

Table 13. Prices and numbers of Nunavut polar bear hides offered and sold at the FHA auction in the years 2008 to 2014, sorted by year.

Year	No. of hides offered	No. of hides sold	Average price		Top price	
			CAD	USD	CAD	USD
2008	n/a	n/a	2,765	2,383	7,400	7,410
2009	n/a	n/a	2,747	2,306	5,100	4,314
2010	133	118	3,597	3,466	10,252	9,937
2011	169	118	4,577	4,583	10,944	10,654
2012	183	142	5,711	5,560	16,500	16,063
2013	200	120	7,074	7,174	21,115	19,810
2014	306	89	6,063	5,688	11,550	10,836

Source: Nunavut (2014b). Number of hides offered provided by D. Imrie, Acting Director of Fisheries and Sealing, *in litt.* to E. Cooper, Dec. 10, 2014; n/a = data not available.

Table 14. Prices and numbers of Nunavut polar bear hides offered for sale and sold at the FHA fur auction in the years 2008 to 2014, sorted by auction month.

Year	FHA Sale (month)	Highest Price		Average Price		No. of hides offered	No. of hides sold
		CAD	USD	CAD	USD		
2008	December	n/a	n/a	2,131	2,120	n/a	n/a
	May	7,400	7,410	3,103	3,087	n/a	n/a
2009	December	n/a	n/a	2,867	2,406	n/a	n/a
	June	5,100	4,314	2,715	2,279	n/a	n/a
2010	January	5,355	5,190	2,307	2,236	64	55
	May	10,252	9,937	4,724	4,579	69	63
2011	January	8,400	8,463	4,587	4,622	71	68
	June	10,944	10,654	4,564	4,598	98	50
2012	January	12,400	12,072	5,164	5,027	102	69
	June	16,500	16,063	6,732	6,554	81	62
2013	January	11,760	11,927	5,147	5,220	83	46
	June	21,115	19,810	8,776	20,091	117	64
2014	January	11,550	10,836	6,060	5,575	114	50
	June	9,450	8,694	6,066	5,581	192	39

Source: D. Imrie, Acting Director of Fisheries and Sealing, *in litt.* to E. Cooper, Dec. 10, 2014; n/a = data not available.

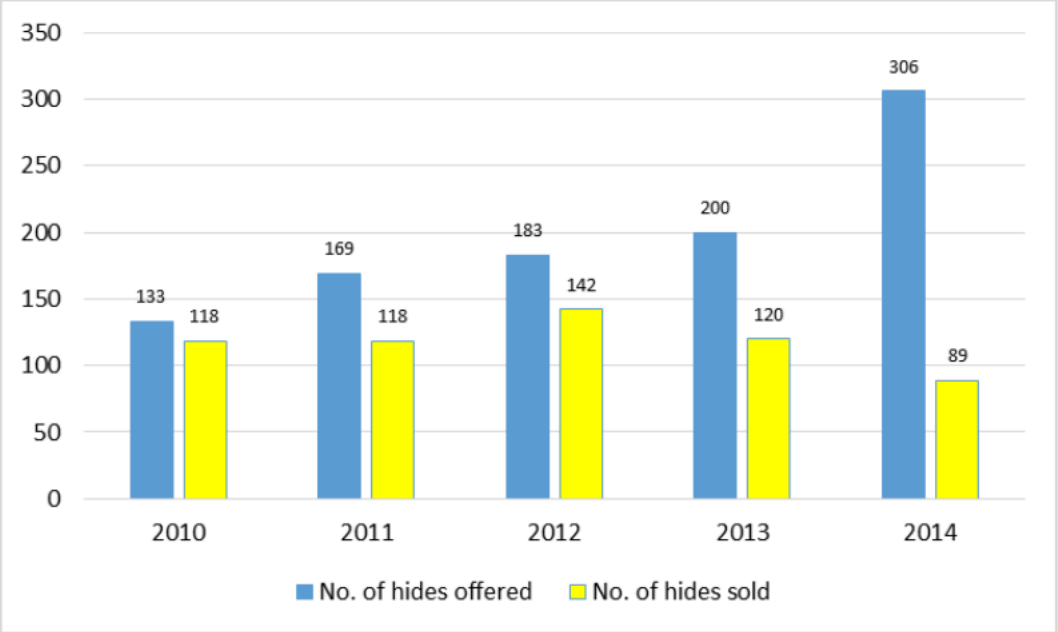

Figure 8. Numbers of Nunavut polar bear hides sold at the FHA auction in the years 2008–2014. The numbers of hides offered for sale in 2008 and 2009 were not available.

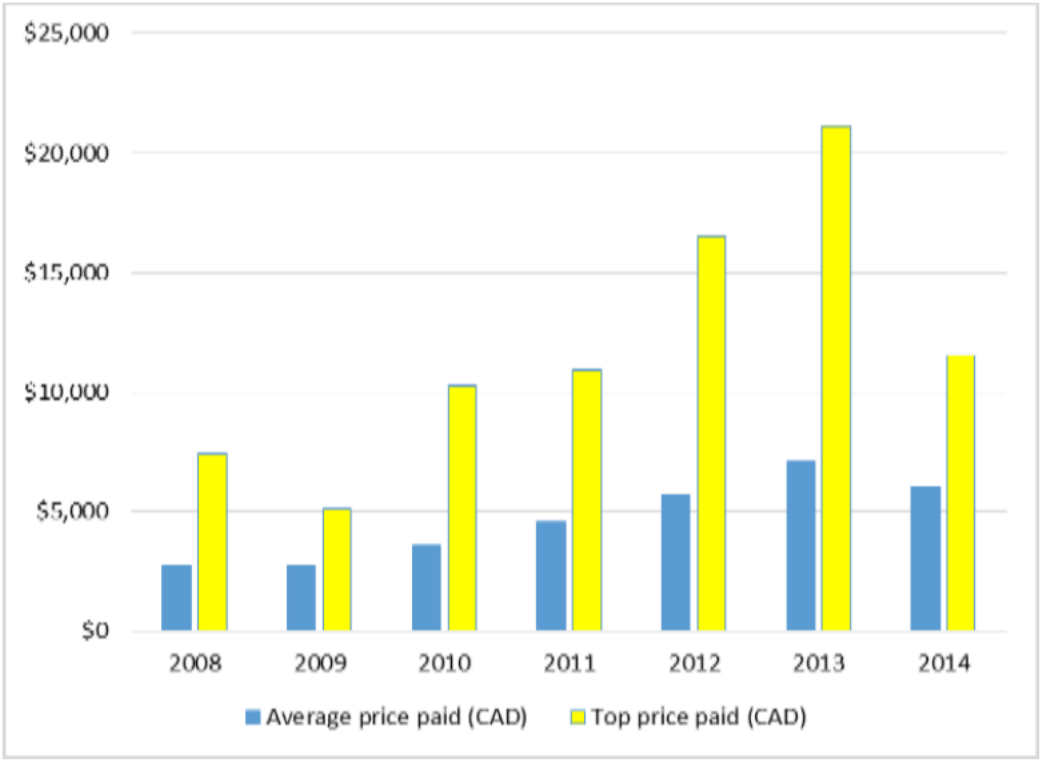

Figure 9. The average and top prices paid for Nunavut polar bear hides sold at the FHA auction in the years 2008–2014.

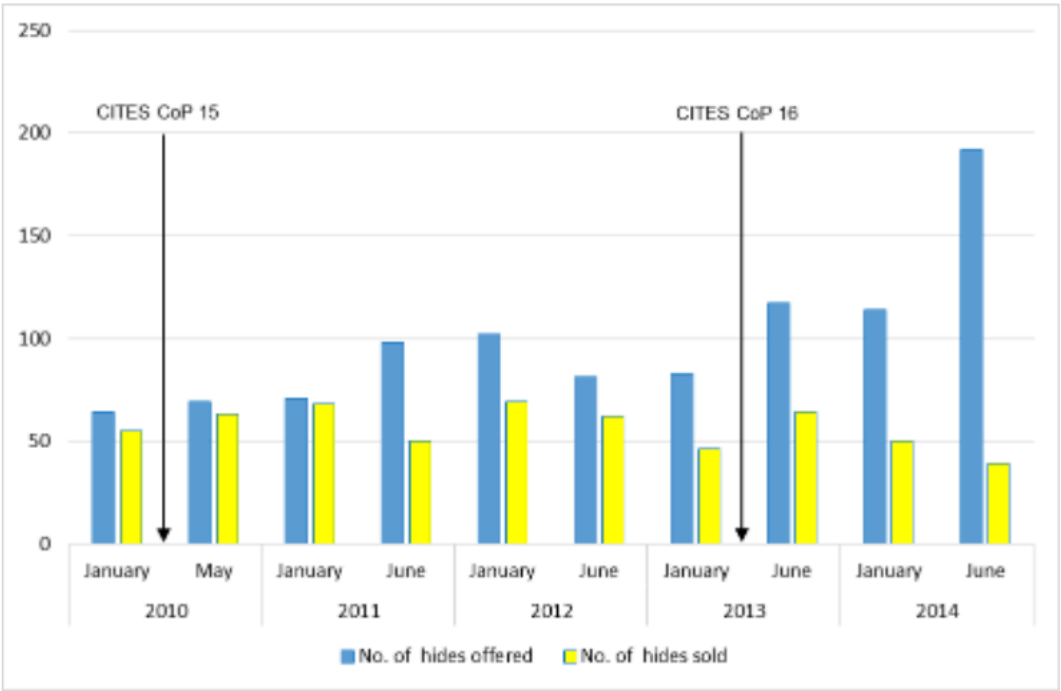

Figure 10. Numbers of Nunavut polar bear hides sold at the FHA auction in the years 2010–2014, sorted by the spring and fall auctions for each year. The polar bear was proposed for up-listing to CITES Appendix I at CoP15 (March 2010) and again at CoP16 (March 2013).

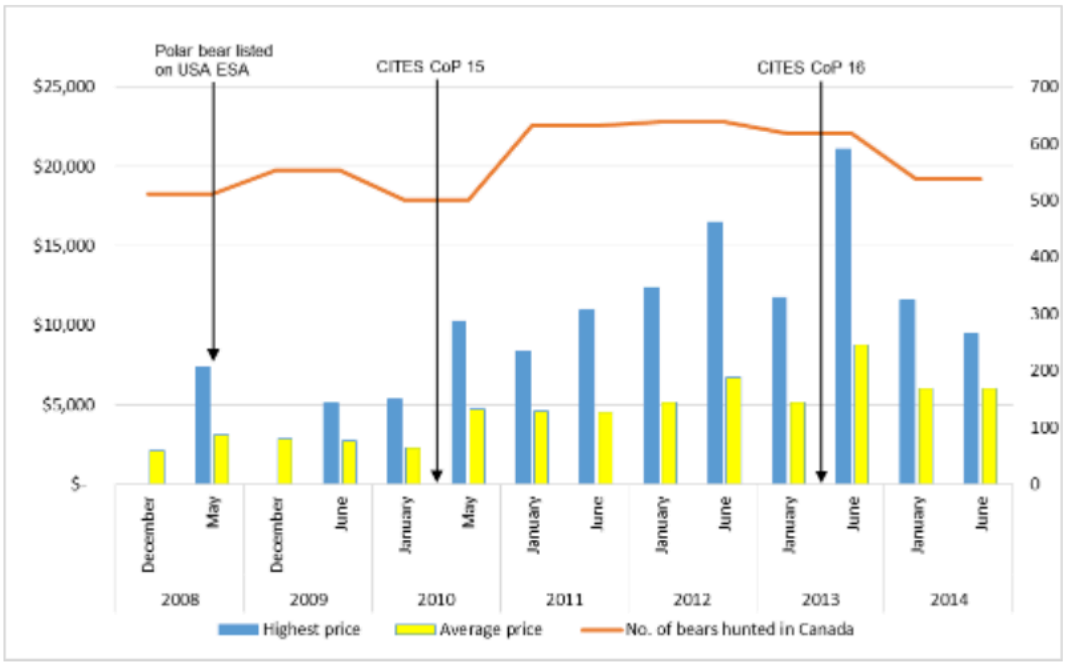

Figure 11. The average and top prices paid for Nunavut polar bear hides sold at the FHA auction in the years 2008–2014, sorted by the spring and fall auctions for each year. The polar bear was listed on the US Endangered Species Act in May 2008. The polar bear was proposed for up-listing to CITES Appendix I at CoP15 (March 2010) and again at CoP16 (March 2013). The total Canadian hunting quota is not a fixed number as not all provincial and territorial jurisdictions have maximum quotas, as explained further in the text. Nunavut has a flexible quota system and aboriginals in Québec are guaranteed a minimum harvest (not a maximum) under the *James Bay and Northern Québec Agreement*.

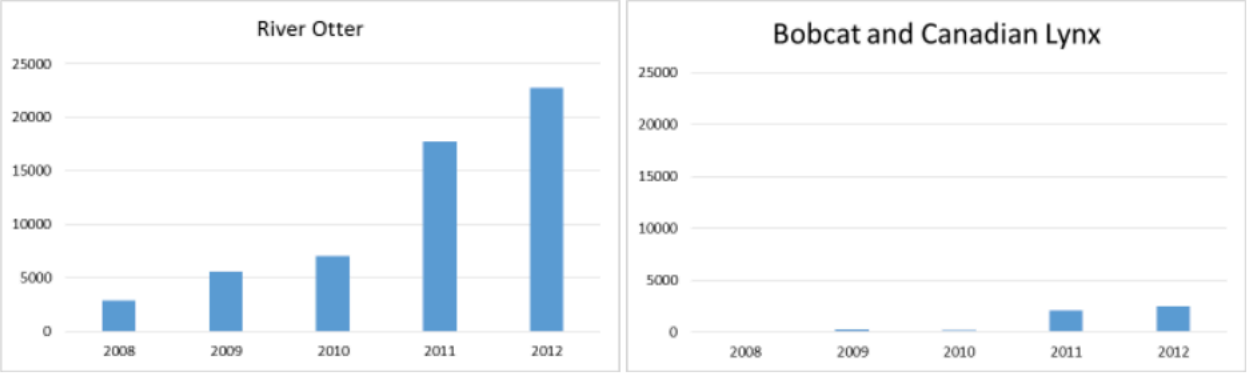

Figure 12. Trends in Canadian exports of river otter, bobcat and lynx skins to China in 2008–2012. These data were compiled from the import data reported in the UNEP-WCMC CITES Trade Database. The vertical axis provides the number of individual skins that were traded.

CANADIAN DOMESTIC TRADE CHAIN

2014 was the first year that the province or territory in which a polar bear was killed was included in the CEPS database. As might be expected, the numbers of bears exported as hides or skulls from each province or territory in 2014 was proportional to the number of bears killed in the jurisdiction. China was the primary destination country for hides from every jurisdiction (Fig. 13). Polar bears killed in Ontario and Manitoba may not be exported (CITES SA office, Environment Canada, *in litt.* to E. Cooper, Feb. 9, 2015).

The trade chain for polar bear hides destined for export from Canada are slightly different between jurisdictions (Figs. 14 & 15). Notably, in the Northwest Territories and Nunavut, subsistence hunting tags may be reallocated to sport hunting.

In Nunavut, once the Total Allowable Harvest (TAH) is established it is allocated to Inuit by the Nunavut Wildlife Management Board (NWMB). The regional TAH is given to Regional Wildlife Organizations (RWO), which allocate to the Hunters and Trappers Organizations (HTOs), which then allocate to their members in individual communities. The membership of the HTOs collectively decide how many of the community allocation will be offered to sports hunters (who must be guided by an Aboriginal person using traditional methods of hunting—on foot or by dogsled). The remaining tags are then allocated (in different ways by different communities) to individual Inuit hunters (G. Williams, Senior Wildlife and Environment Advisor, Dept. of Wildlife and Environment, NTI, *in litt.* to E. Cooper Feb. 3, 2015) (Shadbolt, et al., 2012).

In the Inuvialuit region (NWT and Yukon), it is the IGC that determines the allocations of the TAH among the communities; as recommended by the Wildlife Management Advisory Councils (WMACs) and accepted by the appropriate Minister. The Hunters and Trappers Committees (HTCs) are responsible for allocation within their own communities and they also determine how many of their community's tags will be allocated for sports hunting. The IGC, however, has established a rule that no more than 50% of a community's polar bear tags may be allocated for sports hunting—guaranteeing that there will always be subsistence tags available (S. Baryluk, Resource Management Coordinator, Joint Secretariat - Inuvialuit Settlement Region, *in litt*. to E. Cooper, Feb. 6, 2015). The details may differ between communities, but generally the HTCs accept applications from local licensed outfitters for hunting tags and make a determination on how many each applicant will get. They often then have a specific deadline to solicit hunters for the tags they have (e.g. March 31). If the outfitter cannot find a hunter for the sports hunt tag by that deadline, then it is returned to the HTC and made available for the subsistence hunting (S. Baryluk, Resource Management Coordinator, Joint Secretariat - Inuvialuit Settlement Region, *in litt*. to E. Cooper, Feb. 6, 2015).

After a successful polar bear hunt (sport or subsistence), the kill must be registered with the appropriate provincial or territorial authority. A sport hunter can then arrange to have the hide tanned and, if from a foreign country, exported to the final destination.

Aboriginal hunters may keep, trade or sell a hide. In Nunavut, the Government of Nunavut will measure and grade polar bear hides and give the Inuk hunter a 50% advance on the estimated value of the hide, which is then sent to the fur auction (G. Williams, Senior Wildlife and Environment Advisor, Dept. of Wildlife and Environment, NTI, *in litt.* to E. Cooper Feb. 3, 2015). Unsold hides get re-offered until they sell. If market demand is stable or decreasing, the hide might be re-offered at a lower price point, or, if the market is expected to be better on a subsequent sale, the hide will be reoffered at the same price point as the previous sale. That is the auction house's strategic call to make, depending on their assessment of the

market. Even badly damaged hides are eventually sold—mainly to the fly tying business (D. Imrie, Acting Director of Fisheries & Sealing, Dept. of Environment, Government of Nunavut, *in litt.* to E. Cooper March 13, 2015). Once the hide is sold, the balance is paid to the hunter by the auction house. In this way Inuit hunters get the highest value for large, top grade polar bear hides. But there is a delay in receiving the full payment, so some hunters will sell for 10-20% less to a dealer or taxidermist to receive full payment upon sale (G. Williams, Senior Wildlife and Environment Advisor, Dept. of Wildlife and Environment, NTI, *in litt.* to E. Cooper Feb. 3, 2015) (Shadbolt, et al., 2012) (Fig. 14).

Similarly, in the Northwest Territories hunters can sell to the territorial government, which provides an advance and transports the hide the auction house. However, many hunters sell hides directly to buyers in order to receive immediate full payment (M. Branigan, Manager Wildlife Management, Government of the Northwest Territories, *in litt*. to E. Cooper February 9, 2015).

In 2014, the Kativik Regional Government (KRG) [15] initiated a similar (trial) program with the FHA auction to buy hides from hunters, ensuring the hunters will receive a fairer price (G. Gilbert, Resource Management Coordinator, Makivik Corporation, *in litt.* to E. Cooper, Dec. 17, 2014). Some hunters continue to use the old process of selling to taxidermists or other buyers. Theoretically, there is nothing preventing a hunter from selling directly to the auction house (G. Gilbert, Resource Management Coordinator, Makivik Corporation, *in litt.* to E. Cooper, Feb. 10, 2015) (Fig. 14).

None of the other jurisdictions are involved with marketing hides for sale. Most hunters in Newfoundland and Labrador now sell their hides at auction, but this is a relatively new phenomenon, and some sell privately (J. Goudie, Wildlife Manager, Nunatsiavut Government, *in litt.* to E. Cooper, Dec. 18, 2014) (Fig. 14).

Once a hide has gone to the auction, or has been sold, the trade chain is identical for each jurisdiction (Fig. 14).

A CITES Export Permit must be issued before a hide may be legally exported (Fig. 15). Businesses or individuals wishing to export a polar bear hide for commercial or personal purposes may download the application from the Environment Canada website (Environment Canada, 2014b). Export of hunting trophies requires completion of a different application, also available from the Environment Canada website (Environment Canada, 2015). Once the application is completed it may be submitted to the CITES Permitting Office by mail, email, or fax.

Before a CITES Export Permit is issued the Management Authority (MA) must determine—with the assistance of the SA, the Wildlife Enforcement Directorate (WED), and the relevant authorities of the province or territory from which the hide originated—that a polar bear hide was legally acquired, and that its export will not be detrimental to the survival of the species (Fig. 15). These are commonly referred to as the Legal Acquisition Finding and Non-Detriment Finding (NDF) and are specific requirements of Article IV of the Convention (Anon., 1973). Canada has a standing NDF (Environment Canada, 2009b) but the MA and SA must confirm that any individual export conforms to the terms of that document.

Once the exporter has received the CITES Export Permit from Environment Canada, they can export the hide. Any terms and conditions specified in the permit must be adhered to. The hide must be exported before the expiry date listed, or the permit will be invalidated. Sometimes permits are cancelled because they are not used. The original permit must accompany the hide during shipping. Before leaving Canada, the permit must be presented to the CBSA at the border and validated (stamped) (Fig. 15). CITES Export

[15] Which encompasses most of Nunavik (Québec) (KRG, 2015).

Permits not validated by the CBSA at the time of export are invalid and should be rejected by the authorities in the importing country (Canada, 2014). Any hide exported without a validated permit may be seized by the importing country.

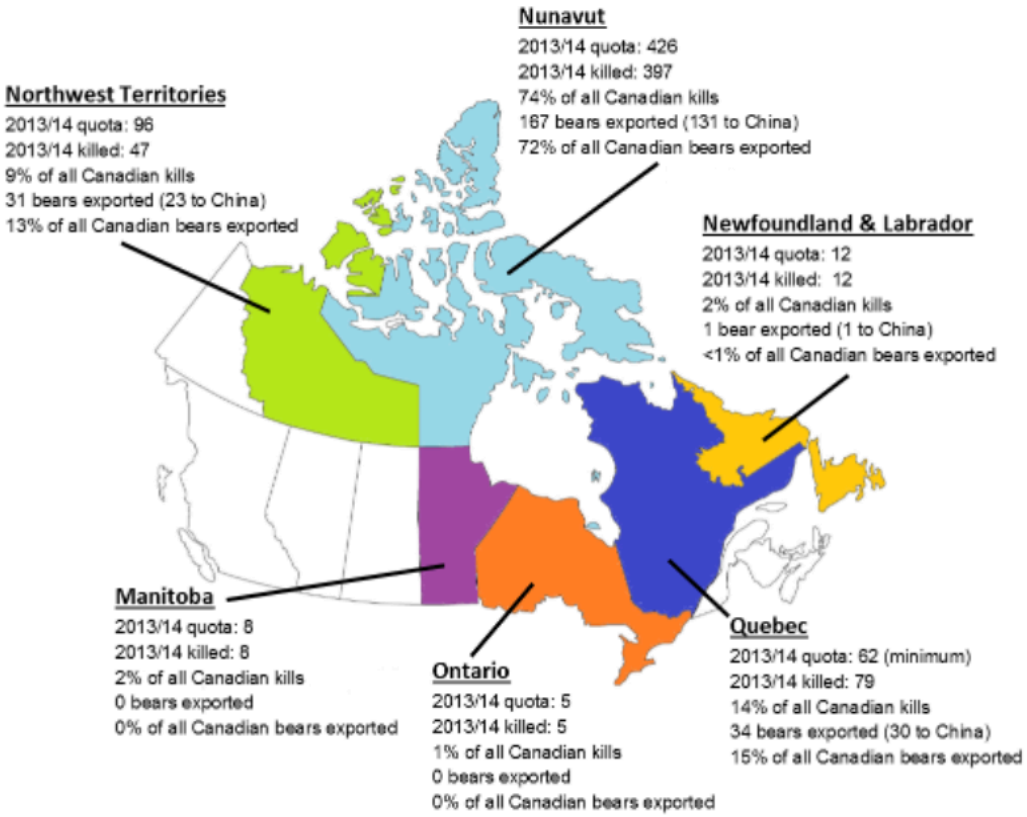

Figure 13. Summary of Canadian polar bear hunting in 2013-2014 and exporting activities in 2014 sorted by provincial and territorial jurisdictions. Hunting quotas and numbers of bears killed were for the 2013/14 hunting season. Export data were not available by jurisdiction for earlier years. Numbers of bears exported were calculated from hides and skulls exported cross-referenced via comparison of hunting tag numbers. The numbers of bears exported included all bears exported in 2014, and not just those hunted in 2013-2014. Sources: CEPS ; Direction de la gestion de la faune du Nord-du-Québec, Québec; Government of Nunavut, Department of Environment; Government of Northwest Territories, Environment and Natural Resources; Government of Newfoundland and Labrador, Dept. of Environment and Conservation; Government of Canada, Environment Canada. All *in litt.* to E. Cooper. See *Methods* for dates the data were accessed.

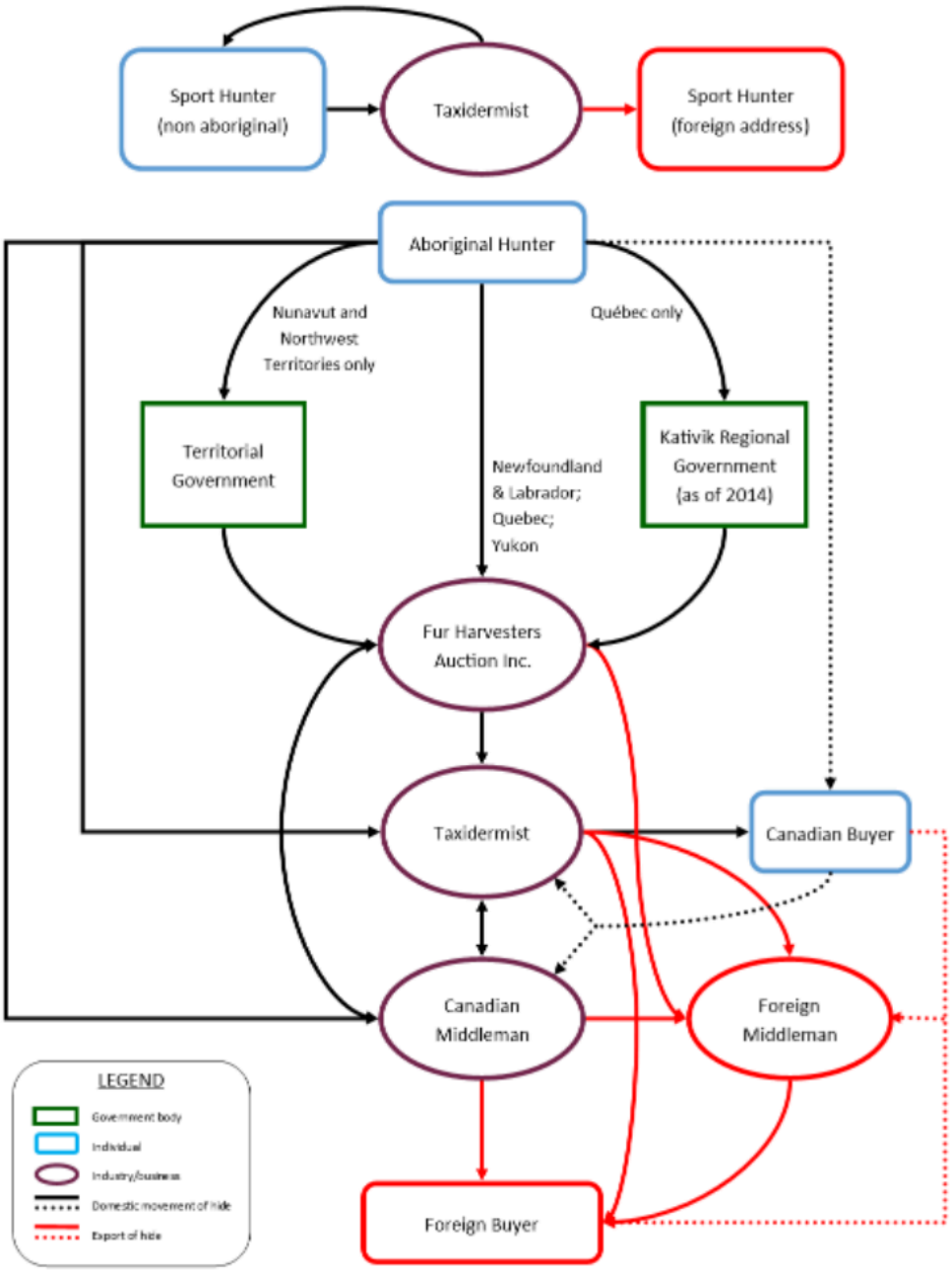

Figure 14. Trade chain diagram for exporting Canadian polar bear hides indicating possible movement of a hide from hunter to final destination. Hides from bears killed in Manitoba and Ontario are not shown as they may not be exported. Hides purchased at auction by one taxidermist may be sold to another, who will then will process it and sell it per the diagram. The trade chain illustrated above would also apply to the very small number of hides that may be sold at the North America Fur Auction (NAFA). Although Canadian individuals that purchase hides could in turn sell them to Canadian or Foreign buyers, this is not the typical progression, and so these movements are shown with dashed lines. Relevant regulatory requirements are shown in a separate diagram (Fig. 15).

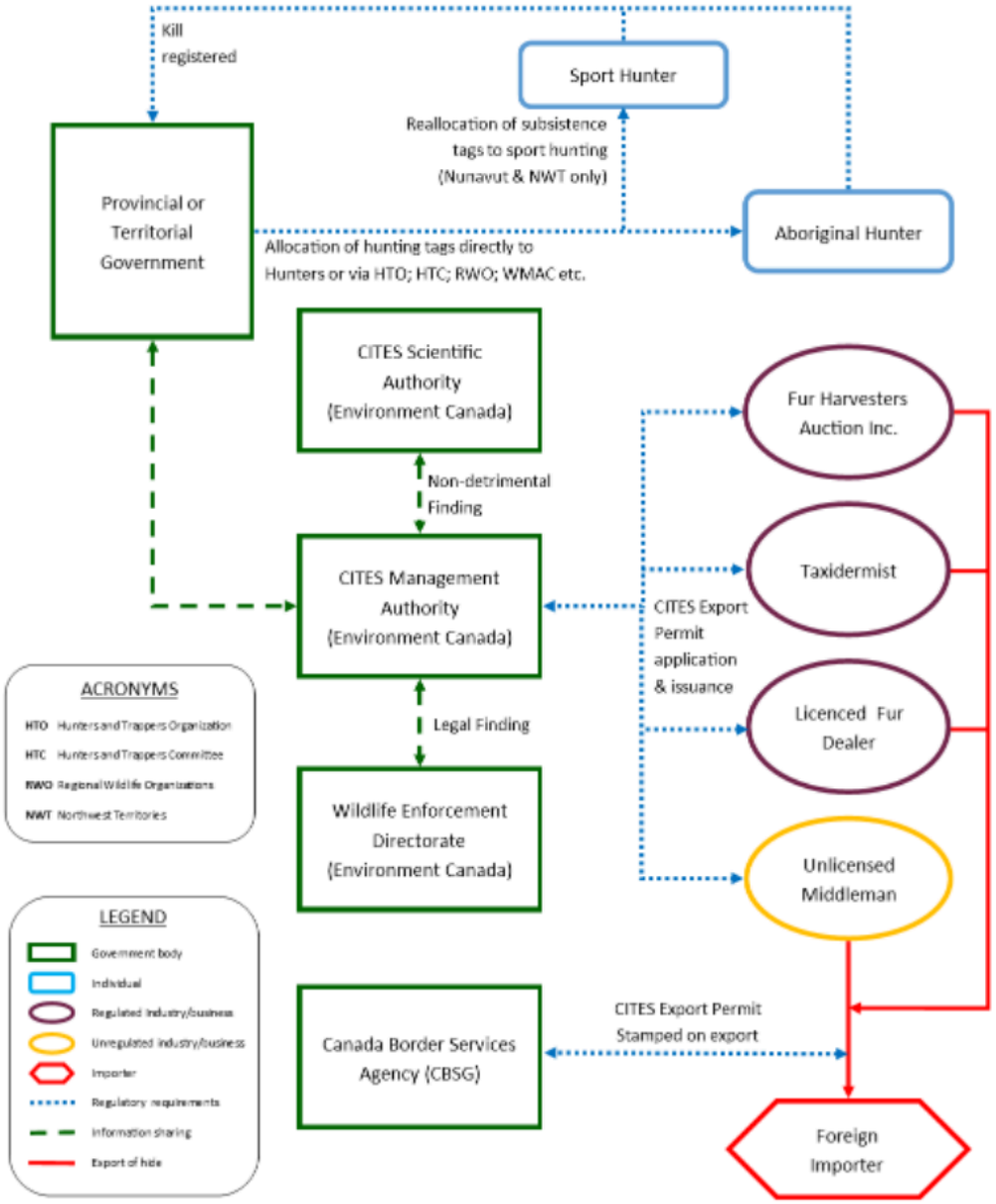

Figure 15. Trade chain diagram for exporting polar bear hides—from hunter to final destination. Hides may or may not go directly from the aboriginal hunter to the fur auction in Québec, Nunavut and the Northwest Territories. The trade chain diagram for movement of Canadian polar bear before export is shown in a separate diagram (Fig. 14).

DISCUSSION AND CONCLUSIONS

Conservation impact of Canadian polar bear trade

Shadbolt et al. (2012) reviewed the global polar bear trade and concluded that international trade in polar bear parts and derivatives was not a significant threat to the conservation of the species at that time.

This study focussed specifically on polar bear exports from Canada. Given that Canada is the only country that currently allows commercial exports of polar bear parts and products, and that Canada is home to the majority of the world's polar bears, if Canadian trade is well managed and controlled then trade is not a threat to the species as a whole.

The central questions are: How many polar bears does Canada export each year, and how do those numbers compare with the numbers killed?

Shadbolt, et al. (2012) noted that analysis of CITES trade data could not provide a precise estimate of the number of polar bears represented in trade and that only two commodities—hides and skulls, can be used to infer the impact of trade. Based on the numbers of hides in trade, Shadbolt, et al. (2012) estimated that in 2005–2009, an average of 341 polar bears were represented in international trade each year, with approximately 300 exported from Canada. The authors also noted there is no direct link between harvest and trade data, and so some of these skins could have been from polar bears killed in previous years and not from the most recent hunting season.

This review of Canadian trade data found that from 2005–2014 the numbers of hides exported slowly increased, while the numbers of skulls exported annually dropped substantially after 2008. Data for both hides and skulls exported from Canada were used to calculate the minimum and maximum numbers of bears exported. This analysis confirmed the findings of Shadbolt, et al. (2012) that in the years 2005–2010, the hides and/or skulls of approximately 300 polar bears were exported from Canada per year. The number of bears exported increased in 2013 and approximately 400 bears were exported in 2012 and 2013. In 2014 the number exported dropped substantially to 233.

More than 600 polar bears were killed in every hunting season reviewed for this study except for 2013/14, when the number dropped to 538. Therefore, since 2005 the number of polar bears exported as hides and skulls has always been significantly fewer than the number hunted in that year. The number of bears exported in each year, on average, was 58% of the number of bears hunted in that same year.

The hides and skulls exported in a given year do not likely come from animals killed in the same year (many may be from bears hunted years or decades before). But the fact that in every year of the study significantly more bears were killed than were exported, plus the fact that more hides are offered for sale at each fur auction each than are actually sold, supports the conclusion that trade still does not threaten the conservation of polar bears.

Changes in purpose for polar bear exports

Prior to 2008, the United States was the single biggest importer of polar bear hides and skulls, and most of these were hunting trophies. More hides and skulls were exported from Canada each year as hunting trophies than were traded for commercial purposes. In 2008, the United States listed the polar bear as a threatened species on the ESA and as a depleted species under the MMPA. As a result, the importation of polar bear products into the USA, including sport hunted trophies, was prohibited. The change in the market from hunting trophy trade to commercial trade corresponds with the prohibition of import of sport-hunted bears into the United States.

The impact of the MMPA prohibition appears to have started in 2007 when, presumably in anticipation of the impending import ban, exports of hunting trophies from Canada into the United States spiked sharply. Sport hunting of polar bears by United States hunters then dropped markedly in 2009 (Weber et al., 2015) and all exports of polar bear hides and skulls to the United States ceased by 2010. The decline in exports of hunting trophies and skulls for any purpose began as soon as the ESA listing was implemented.

Coincidental to the ESA listing, a new market for polar bear hides was opening up: China. In 2005, only 12 polar bear hides were exported to China from Canada, and only three of those had been exported for commercial purposes. By 2008, the year of the ESA listing, the number of hides exported to China had risen to 46, with 36 of these being for commercial purposes. In 2009, the year that polar bear exports to the United States effectively ended, Canadian exports of polar bear hides to China more than doubled, and almost all were for commercial purposes. The transition from trade dominated by exports of hunting trophies to the United States, to primarily commercial exports of hides to China, was underway. By 2010 commercial exports of hides to China dominated Canadian trade in polar bears with China importing more hides than all other countries combined. In the following years, China imported increasing numbers of hides, and took an increasingly large share of the market for hides. In 2014, when the overall number of hides exported from Canada dropped markedly, China's market share still rose to 85%.

Impact of the US ESA and CITES proposals on hide prices

Shadbolt et al. (2012) suggested that publicity surrounding the 2008 ESA listing of polar bears may have increased commercial demand for polar bear products.

The analysis for this report found that the top price paid for hides at fur auctions fell after May 2008 (when the ESA listing took effect), and the average price paid slowly dropped in subsequent years to a low in January 2010 despite the rapidly increasing Chinese market. Various factors will impact the price paid for polar bear hides sold at auction, such as the quality of the hides offered, and the global financial crisis was undoubtedly a factor in 2007–2008 (BBC, 2009). To what extent the ESA listing contributed to this price drop is difficult to say, but it apparently did not initially increase commercial demand or cause a rise in auction prices for hides.

Shadbolt et al. (2012) also suggested that publicity resulting from the 2010 proposal to transfer the polar bear to CITES Appendix I may have increased commercial demand, and therefore prices, for polar bear products. If this was the case, one would expect that prices for polar bear hides would have noticeably increased around the time of CoP15 (when the proposal was debate). One could also expect that prices would increase again in 2013 when the polar bear was proposed for inclusion in CITES Appendix I for the second time (at Co16).

Analysis of auction prices for polar bear hides found that in May 2010—two months after CITES CoP 15—the prices paid for polar bear hides at auction increased dramatically. The percentage of hides going to China also increased noticeably in 2010—this was the first year that China imported more hides than all other countries combined. However, the total number of hides exported from Canada did not jump in 2010, but instead increased at the same rate as in the preceding years. Similarly, after 2010, despite the rising prices for polar bear hides sold at auction, the numbers of hides sold was fairly consistent—rising and then falling routinely over a two year (four auction) period from 2010–2014. The real changes in 2010, therefore, were the jump in prices and the emerging dominance of China as an importer of Canadian polar bear hides.

An even more dramatic increase in prices paid for hides at auction occurred immediately after CITES CoP 16, when the second United States proposal to transfer the polar bear to Appendix I was debated[16]. The record top price paid for a hide in June 2013 would have been for an exceptional hide and/or destined for a very motivated buyer. More significant was the notable increase in the average price paid for polar bear hides. The average price is a more accurate representation of hide values.

Tyrrell and Clark (2014) reviewed media reports about polar bears in the months preceding CoP 16. They found that prior to January 15, 2013 (when the first fur auction of 2013 took place) only two news stories covered the proposed CITES up-listing. The CITES vote took place on March 7, 2013. Between January 15 and March 6, 2013, at least 347 news stories containing 'polar bear' in the title were published. Of these, 283 stories were directly linked to polar bears as a species. And 67 of the 283 stories focused on the impending CITES meeting. Of these 67 news stories, 32 were published outside of Canada and emphasised a large and lucrative commercial polar bear hunt in Canada, global commercial trade in polar bears, and supposed imminent polar bear extinction. The other 35 stories were published in Canada and offered a different perspective. Almost without exception, Canadian newspapers reported the proposed transfer to CITES Appendix I as a threat to Canadian autonomy and to Inuit culture and economy. The threat, in the Canadian media, was not to polar bears, but to polar bear hunters and to Canada's ability to manage its own natural resources (Tyrrell & Clark, 2014).

Tyrrell and Clark (2014) only reviewed the English language media. The level of coverage in China, the primary market for polar bear hides, isn't readily available. But it is possible that, given the tone of the Canadian news stories, that auction prices increased at least partially due to entrepreneurship of Canadian taxidermists and exporters capitalizing on this potential threat, and not just due to increasing Chinese demand.

Either way, there does appear to be a correlation between publicity over the CITES proposals and the significant increases in auction prices paid for polar bear hides in 2010 and 2013. However, exports of river otter, bobcat and Canadian lynx hides to China also increased substantially after 2010. The growing Chinese market for exotic skins was not exclusive to polar bears and was likely an important driver of the prices for polar bear hides. To what extent the CITES proposals may have contributed to the price increases after CoP 15 is not clear.

Similar factors were at play around the time of CoP 16 in 2013. Prior to CoP16 the trade in all wild fur—not just polar bear hides—was on an upswing and prices were increasing. As the CoP approached, the international marketplace was nervous about the ability to move bears across borders given the potential transfer of polar bears to CITES Appendix I. So while fur prices were on an upswing, as CoP16 approached, the market demand for polar bear hides ground to a virtual halt (FHA, *in litt.* to E. Cooper, February 3, 2015). As a result, the prices paid at auction in January 2013 dropped. When the Appendix I proposal was defeated, the pent-up demand for polar bear hides in a wild fur market that was otherwise thriving translated into the best polar bear market ever seen at the FHA auction (FHA, *in litt.* to E. Cooper, February 3, 2015).

Publicity over CITES may have helped drive the high prices paid for polar bear hides in 2013, but once again, to what extent is impossible to say. In any case, suggestions that the dramatic price increases were due to buyers wanting to get a hide before commercial trade was prohibited by a CITES Appendix I

[16] The prices paid at auction in January 2013 dropped, perhaps because buyers were hesitant to invest in hides considering the possibility that commercial trade in polar bears could be prohibited at the impending CoP 16. They then rebounded after the CoP.

listing appear to be unfounded. Prices jumped significantly at the fur auction held immediately after the CoP, and not before.

Impact of hide prices on polar bear hunting

An important question to consider is how the changes in Canadian polar bear trade dynamics and the increasing prices have impacted polar bear hunting and the sustainability of Canadian trade. In Canada, sport hunting of polar bears is permitted in the Northwest Territories and Nunavut via the transfer of Aboriginal rights under existing subsistence hunting quotas (CITES, 2010b; Freeman & Wenzel, 2006). Sport hunting tags may be allocated by an Aboriginal person forfeiting his/her own subsistence tag, or by the local HTC or HTO (Freeman & Wenzel, 2006). In 2009, Environment Canada estimated the annual value of sport hunting in Canada at CAD 1.3 million per year (USD 1.1 million), while the sale of skins was valued at approximately CAD 600,000 (USD 489,000) (Environment Canada, 2011a). Hence, prior to 2008 there was a strong financial incentive in the Northwest Territories and Nunavut to reallocate subsistence hunting tags to sport hunting, especially since the financial benefit from sport hunting went to the community and not to an individual (G. Williams, Senior Wildlife and Environment Advisor, Dept. of Wildlife and Environment, NTI, *in litt.* to E. Cooper Feb. 3, 2015). But not all sport hunts were successful, and not all tags allocated to sport hunting in a given year were used. As a result, fewer polar bears were killed annually than allowed under the established hunting quotas (Lunn et al., 1998).

As noted previously, the 2008 ESA listing of polar bears, which took away the primary market for sport hunting (coincidental with the burgeoning Chinese market), caused a shift in Canadian trade away from hunting trophies to commercial exports of hides. The incentive to allocate subsistence hunting to sport hunting was greatly reduced in Nunavut, Northwest Territories and Yukon.

In 2011, the reduced allocation of hunting tags to sport hunting, plus the increased financial incentive of rising hide prices, contributed to increased hunting of polar bears and the much-reduced gap between the reported numbers of kills and the total Canadian hunting quota. The gap between the numbers of bears hunted in Canada and the total hunting quota widened in the 2012/13 hunting season, and widened further in 2013/14. The glut of hides offered for sale at auctions in those years shows clearly that supply currently exceeds demand and that may be influencing hunting rates in some regions.

The increased numbers of polar bears killed in Canada after 2010 was primarily due to increased hunting in the Northwest Territories and Québec. The numbers of bears hunted in Nunavut had already reached the territorial hunting quota, and there was little room for increase.

The 2011 increase in numbers of polar bears hunted in Nunavik was at least partially due to environmental factors. Most of the Southern Hudson Bay polar bears hunted in Nunavik are taken by the community of Inukjuak, and the ice conditions around Inukjuak in 2011 were very good. And, according to the Inuit, there were a great many bears around. So that year was a very good year to hunt polar bears, and offered an opportunity for younger hunters to kill their first bear (G. Gilbert, Resource Management Coordinator, Makivik Corporation, pers. comm. to E. Cooper, Jan. 30, 2015).

In 2011, Nunavik hunters were mainly selling their skins directly to taxidermists that visited their communities; thus, the increased prices paid for hides at auction were not passed on to the hunters and would not have been a direct influence on hunting (G. Gilbert, Resource Management Coordinator, Makivik Corporation, *in litt.* to E. Cooper, Dec. 17, 2014). However, the increased demand for hides, as a result of the higher prices, may have been an indirect incentive for hunting more bears (G. Gilbert, Resource Management Coordinator, Makivik Corporation, pers. comm. to E. Cooper, Jan. 30, 2015).

The increased numbers of polar bears killed in Nunavik (Québec) since the 2009/10 hunting season may also reflect better reporting and not just increased hunting effort. Before 2011, hunters in remote northern

Québec often did not report successful hunts. But hunters can't sell polar bear hides unless they are properly reported. So increased demand may have provided incentive for more hunters to report their kills (V. Brodeur, Biologiste - Grande faune, Direction de la gestion de la faune du Nord-du-Québec, pers. comm. to E. Cooper, Jan. 20, 2015). Since 2011, the Québec government and the Makivik Corporation have made a concerted effort to educate hunters on the need to report their successful hunts (G. Gilbert, Resource Management Coordinator, Makivik Corporation, pers. comm. to E. Cooper, Jan. 30, 2015). The total numbers of bears reported hunted in Québec since 2010/11 are therefore more accurate than numbers recorded in previous years. As a result of the trial program to buy hides from hunters initiated by the KRG in 2014, a more rigorous reporting system will be in place for future years (G. Gilbert, Resource Management Coordinator, Makivik Corporation, *in litt.* to E. Cooper, Dec. 17, 2014).

In summary, the high prices paid for hides at auction (and the increased demand as a result) was one of a number of factors, not the only factor, that resulted in increased numbers of polar bears reported killed in Canada after 2010.

The 2014 market decline for polar bear hides

In 2014, the Canadian trade in polar bears changed abruptly. The numbers of skulls exported remained constant, while the numbers of hides exported fell to almost half of the number exported in 2013. The numbers of hides sold at auction also dropped, despite a record number being offered for sale. The prices paid for hides at auction also decreased, but not dramatically, with prices similar to those paid before 2013.

A number of factors have been considered for the 2014 decline in polar bear exports. One suggestion was a decline in the Chinese demand for polar bear hides, at least partially due to the high prices (Leo Liu, Vice General Manager, Channel Ark Enterprises, Beijing, *in litt.* to E. Cooper, Jan. 27, 2015). But the downturn in Canadian exports was not just due to decreased trade to China. Fewer hides were exported to all countries in 2014 and although exports to China dropped by a third, the Chinese market share of Canadian polar bear hides still increased.

Another factor suggested was that it now takes longer for exporters to acquire Canadian export permits for polar bears. In 2012, it only took one or two months to get an export permit, now it takes six months or longer (Leo Liu, Vice General Manager, Channel Ark Enterprises, Beijing, *in litt.* to E. Cooper, Jan. 27, 2015). The Canadian MA confirmed that since 2012, all CITES export permits for polar bears have been issued by Environment Canada HQ, and they have been extremely vigilant in the verification and validation of all the information. They have made sure that they find all the required information for a NDF. Obtaining all the required information can take a long time, depending on the jurisdiction the polar bear was hunted in, and the responsiveness of the applicant to requests for more information (Head of Permitting Operations, Environment Canada, *in litt.* to E. Cooper, Jan 27, 2015). But given that permit issuance changed in 2012, it is difficult to see why it would impact exports so severely two years later.

The lack of consistent quality has been suggested as another issue that has impacted exports of polar bear hides. According to one experienced taxidermist, too many of the hides being offered for sale have yellow fur and/or are from small [adult] bears, which have little value as rugs or mounts. The same source suggested that too few hunters prepare polar bear hides in the field properly so as to ensure their value for taxidermy (E. Klein, Owner, Capilano Taxidermy Studios, pers. comm. to E. Cooper, Jan 27, 2015). It is always easiest to sell the best hides, so most of the carry-over from auction to auction will be of lower quality. Therefore, as of early 2015, FHA had a greater proportion of smaller, yellower, more poorly handled skins in their polar bear collection because they did not sell at the last auction. If the market does not improve in future years, the proportion of poorer skin types will continue to increase (FHA, *in litt.* to E. Cooper, February 3, 2015).

However, the most significant driver of the 2014 decline in Canadian exports of polar bear hides was a global decline in the wild fur market. In 2013, at the same time that the pent-up demand for polar bear hides was being satisfied, the international fur market was turning in the other direction. Prices for farmed mink hit record highs in 2013, but then declined by more than 50% in 2014. Wild fur prices—including polar bear hides—followed farmed mink prices downward (FHA, *in litt.* to E. Cooper, February 3, 2015).

A declining market places stress on fur businesses worldwide, and many stand in fear of losing their businesses. When there is this much stress in the international marketplace, businesses and their owners quickly start to separate the "nice to have" from the "must have", and polar bears hides fall into the category of "nice to have." Demand for "nice to have" is the first to decline and the last to recover (FHA, *in litt.* to E. Cooper, February 3, 2015).

Conclusions

The introduction to this report posed a series of questions to be answered by the study. In concluding this report it is appropriate to provide direct answers to those questions.

Analysis of Canadian trade data

Q: How many polar bear hides and skulls were exported from Canada from 2010–2014, and how do those numbers compare with the years 2005–2009?

- During the years 2005–2013, the total number of hides annually exported from Canada gradually increased from 266 to 400; and then dropped to 217 in 2014. More hides were exported in the years 2010–2014 than in 2005–2009.
- The numbers of skulls annually exported from Canada peaked at a high of 168 (in 2007) and then dropped to 98 (in 2008). In the subsequent years the number of skulls exported ranged from 37–57 except in 2011, when the number jumped anomalously to 83 due to a commercial export of 23 skulls to a French importer.

Q: Did the purpose of export for polar bear hides and skulls exported from Canada in the years 2010–2014 vary; and how do these data compare with the years 2005–2009? What can be inferred from these variances?

- Between 2005 and 2014, the main purpose of export shifted from hunting trophies (hides and skulls) going to the United States, to hides exported to China for commercial purposes. This shift was the result of the United States listing the polar bear on the ESA in 2008 and prohibiting the importation of all polar bear products, concurrent with the Chinese market opening up.
- Prior to 2008, there was strong financial incentive for communities in the Northwest Territories and Nunavut to reallocate subsistence hunting tags to sport hunting. The loss of most of the sport hunting market meant a drop in income and increased incentive for selling polar bear hides commercially.
- The loss of the United States sport hunter market; financial need; growing Chinese market for hides; and rising auction prices paid for polar bear hides all helped trigger increased polar bear hunting in 2011–2013.

Q: What were the main destination countries for exports of polar bear hides and skulls from Canada in the years 2010–2014; and how do they compare with the years 2005–2009?

- From 2005–2007, more polar bear hides were exported to the United States than to any other single country. The number of hides exported to the United States peaked sharply in 2007 and then dropped significantly in 2008 due to the US ESA importation prohibition. No polar bear hides were exported from Canada to the United States after 2009.
- In 2005, China only imported 12 polar bear hides from Canada. The number of hides exported to China steadily rose each subsequent year (except 2014) and in 2009 China overtook the United States as the single biggest importer of polar bear hides. China has remained the primary destination for Canadian polar bear hides since then.
- Germany, Norway and Russia were key destination countries for polar bear hides in 2005–2009. In 2010–2014, these three countries each imported fewer hides than in the previous five years and became far less significant as destination countries in comparison to China.
- In 2005–2008, more skulls were exported to the United States than to any other single country. The number exported to the United States peaked sharply in 2007 and then dropped in 2008. As the US market for skulls diminished, no other country took its place as the dominant importer of skulls. Fewer skulls were exported from Canada in 2010–2014 than in 2005–2008.

Q: How many individual bears are represented by Canadian exports polar bear hides and skulls in the years 2010–2014; and how do these numbers compare with the years 2005–2009?

- In the years 2005–2010 Canada annually exported approximately 300 polar bears as hides and/or skulls. The number exported rose to approximately 400 bears in 2012 and 2013 before dropping to 233 in 2014. The number of bears exported in 2014 was the lowest of any year studied.
- The number of bears exported in each year, on average, was 58% of the number of bears hunted in that same year.
- A review of the hunting tag data for 2013 and 2014 found that the polar bear hides exported in those years came from bears killed in many different previous hunting seasons, dating as far back as 1985/86. Only 25% of the hides exported in each year came from bears killed in the most recent hunting season.

Analysis of auction prices

Q: Have the auction prices for polar bear hides increased significantly since 2008/2009 (pre CITES CoP15)?

- The top price paid for hides at fur auctions fell after May 2008 and the average price paid slowly dropped in subsequent years to a low in January 2010. In May 2010, the prices paid for polar bear hides at auction increased dramatically. Both the top and the average prices for polar bear hides increased annually until January 2013 when they dropped slightly. Both prices jumped in May 2013. In 2014 the top and average prices dropped back to values consistent with January 2013. The average price paid for a polar bear hide in 2014 was still approximately twice that paid in 2008.

Q: If the prices for polar bear hides have increased significantly, has this influenced a corresponding increase in the number of bears hunted?

- The increased prices paid for polar bear hides at auction beginning in the spring of 2010 correlated with an increased number of polar bears reported killed in Canada starting in the 2010/11 hunting season. The higher prices may have stimulated increased hunting in the Northwest Territories and Québec. However, the higher numbers reported killed in Québec since the 2010/11 season were at least partially due to better reporting and not only an increase in kills. The number of bears killed in Canada dropped significantly in 2014 correlated with a drop in the total Canadian hunting quota, despite prices for hides remaining strong.

Q: If the prices for polar bear hides have increased significantly, has this influenced an increase in hunting quotas?

- The total Canadian hunting quota has decreased steadily since the 2007/08 hunting season. There is no indication that the prices paid for polar bear hides at auction had any impact on the setting of hunting quotas.

Q: Have the auction prices for polar bear hides fluctuated significantly in response to the threat of an Appendix I CITES listing?

- The prices paid for polar bear hides jumped significantly at the fur auctions held immediately after CoP15 and CoP16, when the proposals to list the polar bear on CITES Appendix I were debated. Suggestions that price increases were due to buyers wanting to get a hide before commercial trade was prohibited by a CITES Appendix I listing were unfounded as the prices increased after, not prior to the CoPs. It appears that publicity about the proposals may have influenced prices both after each CoP (when prices jumped) and immediately before CoP16, when prices dropped slightly due to reduced demand. However, the increased prices paid for polar bear hides in those years also correlate to a sharp jump in the Chinese fur market that was not exclusive to polar bear hides. How much influence the publicity surrounding the proposals to list the polar bear on CITES Appendix I had on hide prices is unclear.

Canadian chain of custody for polar bear parts and products

Q: What is the chain of custody for Canadian polar bear hides from the initial kill to export?

- The trade chains for the regulatory requirements and movement of hides destined for export from Canada are detailed in Figs. 13, 14 and 15.

Q: Does this chain vary between jurisdictions, and if so, how?

- There is some variation between jurisdictions, but the differences are minimal. In the Northwest Territories and Nunavut subsistence hunting tags may be reallocated to sport hunting. But the results of all hunts are required to be properly reported and the tag cancelled. In Québec, the Northwest Territories and Nunavut, hunters may sell polar bear hides via government programs that provide an advance to the hunter. Otherwise, the movement of hides, the process of applying for CITES Export Permits, and export of the hides is the same for each jurisdiction. Sport hunters must complete a different CITES permit application form than that required for commercial or personal exports. The number of bears exported from each province and territory in 2014 (the only year this data was available for) was proportional to the number of bears killed in each jurisdiction. And China was the primary destination country for hides from every jurisdiction.

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APPENDIX A: DESTINATION COUNTRIES FOR HIDES EXPORTED FROM CANADA

The following table provides a full list of the countries that imported polar bear hides from Canada in the years 2005 to 2014. An "X" indicates that at least one hide was exported to that country in that year. Note that this list is taken verbatim from the data available and does not mean to convey any opinion concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. For example, exports to Hong Kong were recorded separately from exports to China, and this is reflected in the table below.

Country	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Andorra				X		X	X			
Argentina										X
Australia	X	X	X	X		X	X	X	X	X
Austria	X	X	X	X	X	X	X	X	X	X
Azerbaijan			X	X			X			
Belize					X					
Belgium		X	X	X	X	X	X	X	X	X
Botswana					X					
Bulgaria		X		X	X		X		X	
Brazil				X						
China	X	X	X	X	X	X	X	X	X	X
Colombia	X					X				
Croatia							X			
Czech Republic			X	X	X	X		X		X
Denmark	X	X	X	X	X	X		X		
El Salvador		X								
Estonia			X					X		
Finland		X	X	X		X	X			
France	X	X	X	X	X	X	X	X	X	X
Germany	X	X	X	X	X	X	X	X	X	X
Greece					X					
Guatemala						X				
Greenland		X								
Hong Kong			X	X	X			X	X	
Hungary	X	X		X	X		X	X		X
Iceland	X	X								
Ireland					X					

Country	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Israel	X									
Italy	X	X	X	X	X		X	X		X
Japan	X	X	X							
Kuwait			X							
Latvia	X			X	X	X		X		
Lebanon		X		X	X	X				
Lithuania								X	X	
Luxembourg		X								X
Malaysia				X						
Mexico	X	X	X	X						X
Mongolia								X		
Netherlands	X	X	X	X	X				X	
New Zealand	X	X		X		X				
Norway	X	X	X	X	X	X	X	X	X	X
Philippines			X							
Poland	X	X	X		X	X	X	X	X	X
Portugal				X		X				
Republic of Korea		X						X		
Romania				X	X			X		X
Russian Federation	X	X	X	X	X	X	X	X	X	X
San Marino				X		X				
Saudi Arabia									X	
Republic of Slovenia										
Slovak Republic	X		X		X		X			
South Africa		X	X			X	X	X	X	
Spain	X	X	X	X	X	X	X	X	X	
Swaziland						X				
Sweden			X				X		X	X
Switzerland	X	X	X	X	X	X	X	X		X
Taiwan	X						X			
Thailand	X									X
Turkey			X	X						
Ukraine	X	X	X	X	X	X	X			
United Arab Emirates	X					X				
United Kingdom	X	X	X	X	X	X	X	X	X	
United States	X	X	X	X	X					

APPENDIX B: DESTINATION COUNTRIES FOR SKULLS EXPORTED FROM CANADA

The following table provides a full list of the countries that imported polar bear skulls from Canada in the years 2005 to 2014. An "X" indicates that at least one skull was exported to that country in that year. Note that this list is taken verbatim from the data provided and does not mean to convey any opinion concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. For example, exports to Hong Kong were recorded separately from exports to China, and this is reflected in the table.

Country	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Argentina										X
Australia			X	X					X	
Austria	X	X	X	X	X	X			X	
Belgium	X			X	X		X	X	X	X
Bulgaria		X		X	X		X		X	
China							X			X
Botswana					X					
Belize					X					
Czech Republic			X		X	X		X		X
Croatia							X			
Denmark			X		X	X		X		
El Salvador		X								
Estonia								X		
Finland						X	X			
France	X	X	X	X	X	X	X	X	X	X
Germany			X	X	X	X	X	X	X	X
Guatemala						X				
Greece					X					
Hungary				X	X		X	X		X
Italy	X	X		X	X		X	X	X	X
Israel					X					
Latvia	X			X	X	X		X		
Lithuania								X		
Mexico	X	X	X	X						X
Netherlands			X	X	X				X	
New Zealand						X				
Norway				X	X			X	X	X
Poland		X	X		X	X	X	X	X	X
Portugal						X				
Romania					X			X		X
Russian Federation	X	X		X	X	X	X	X	X	X

Slovak Republic	X				X		X		X	

Country	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Republic of Slovenia					X					
South Africa		X	X			X	X	X		
Spain	X	X	X	X	X	X	X	X		
Swaziland						X				
Sweden			X						X	X
Switzerland			X	X		X		X	X	X
Turkey			X							
Ukraine					X	X				
United Kingdom	X	X				X				
United States	X	X	X	X	X					

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