14.0 HARVESTING

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Harvesting in Hudson Bay and James Bay began millennia ago with the arrival of Indian and Inuit immigrants, and is still vitally important to their culture and well-being. Europeans began fishing and hunting in the area when Henry Hudson first visited, in 1610, and later developed commercial whaling and sealing industries that flourished. This section examines current harvest management practices and harvesting efforts in the Hudson Bay marine ecosystem by species and location, and discusses the effects of harvesting on populations, species, and habitats.

The quality of quantitative harvest data depends upon the type of harvest (subsistence, commercial, sport), the species harvested, interest on the part of the compiler, and the community. Subsistence harvests are not well documented for fish, bird, and seal species because these harvests are not limited; sport harvests are not well documented for fish and birds because they are harvested for personal use. Notable exceptions are studies in the late 1970's to establish guaranteed harvest levels under the James Bay and Northern Quebec Agreement (JBNQNHRC 1982, 1988); in the early 1980's to examine wildife harvests in the Kivalliq (Gamble 1984, 1987a+b, 1988); and of aboriginal land use in northern Ontario in the mid-1970's and in 1990 (Prevett et al. 1983; Berkes et al. 1992, 1995). The imputed value of these subsistence harvests, on a per capita basis, to Cree and Inuit living around Hudson Bay and James Bay is substantial (see Quigley and McBride 1987; Gamble 1988, and Berkes et al. 1995 for more information). A new study of subsistence harvesting in Nunavut was not available at writing but should provide updated information on subsistence harvests in the Kivalliq (western Hudson Bay) region (M. Wheatley, NWMB, Iqaluit, pers. comm. 2004).

Better records are available for the larger marine mammal species that are harvested for subsistence, and occasionally for sport. Concern over the ability of beluga, narwhal, bowhead, polar bear, and walrus populations to support current rates of removal has resulted in regulation, and harvest monitoring. Monitoring measures range from reports on licenced harvests or quotas to informal observations of how many animals are landed. The communities are required to report their harvest for whales and walrus, and sport hunt for walrus is tightly controlled (P. Hall, DFO Winnipeg, pers. comm.). Because these species are large, their harvest is an event and they are more likely to be seen and recorded by resource managers. Licensing requirements for the sale and/or export of products from these animals also create a secondary record of the harvest.

Records from the commercial sale of marine invertebrates, anadromous fishes, and seal pelts can provide good data on the number of animals harvested each year for export. These records are often available from the local fish plant, retail outlets, or hotels. They tend to underestimate local sales, particularly direct sales by the harvester to the consumer.

14.1 HARVEST MANAGEMENT

Harvest management within the region is complicated by the migratory habits of many of the harvested species, which make them vulnerable to harvest in other jurisdictions. Coastal Arctic charr quotas in western Hudson Bay that specify the fishing area can, for example, target fish from several stocks as they move along the coast. While the migratory marine mammals of the Hudson Bay marine ecosystem are vulnerable to harvest in other areas, such as Hudson Strait and Davis Strait, few range outside the coastal waters of Nunavut and Nunavik. This limits their vulnerability in jurisdictions other than those that also border on Hudson Bay, and thereby the difficulties in co-operatively managing hunts to ensure that they are sustainable. Harp and hooded seals, which winter in the North Atlantic, are perhaps the most notable exceptions.

In contrast, waterfowl and seabirds are long distance migrants that may be vulnerable to harvest from the High Arctic to the southern United States. Every territory, province, state, and country on the annual migration route of these birds has a vested interest in ensuring that the population can sustain the levels of harvest, but their citizens also want their fair share of that harvest. This makes management of these transboundary migrants very complex. The problem is usually one of how to avoid overharvesting shared resources. However, lesser snow

goose populations, which have increased dramatically in response to changing agricultural practices in the southern United States and to effective conservation programs, present the opposite and unusual problem of overabundance (Abraham et al. 1996; Johnson 1996a; Abraham and Jefferies 1997; Rockwell et al. 1997). This has led to cooperative hunt management among the various jurisdictions to reduce the populations to a level that can be sustained by the environment and thereby avoid a catastrophic decline in the populations (Johnson 1996b, 1997; Batt 1997). These birds make up a substantial portion of the diet of the Cree living around James Bay and southern Hudson Bay, and a smaller but still important contribution to the diet of Inuit living around Hudson Bay. So, the effects of any large decline in their numbers would have strong adverse impacts on subsistence harvesters and could increase harvesting pressure on other species.

Harvest management in Nunavut, which includes the islands in Hudson Bay and James Bay, changed with signing of the Nunavut Land Claim Agreement (NLCA) in 1992 (TFN and DIAND 1992). The NLCA established the Nunavut Wildife Management Board (NWMB) an institution of public government, which consists of four Inuit appointees and four government apointees plus a chairperson. This co-management board is responsible for wildlife management decisions for Nunavut, including setting quotas and non-quota limitations (e.g., fishing and hunting seasons, methods of harvest), approving management plans, and approving the designation of endangered species. The NWMB also has two alternate members from Makivik Corporation who represent the Inuit of Nunavik when the Board discusses issues relating to the Areas of Equal Use and Occupancy that are shared by Nunavut and Nunavik. Harvest management decisions were formerly the responsibility of various government departments, including GNWT Department of Renewable Resources (terrestrial mammals including polar bear), DFO (fish and marine mammals), and Environment Canada (EC; migratory birds and endangered species). Ultimate approval of the NWMB decisions rests with Nunavut's Minister of Sustainable Development and the Federal Government's Minister of Fisheries and Oceans and Minister of the Environment. However, Inuit harvesting may only be limited if there is a conservation concern, or a concern about public health or public safety. The NWMB relies on the government departments for scientific research and advice, and for regulatory support and enforcement. NWMB decisions are implemented under legislation enacted by the approporiate government departments, such as the Nunavut Wildlife Act or the Fisheries Act. Harvest restrictions or quotas that were in force on the date immediately prior to ratification of the NLCA (Sec. 5.6.4), remain in effect until removed or otherwise modified by the Board.

Priority is given to Inuit and Cree subsistence harvesters when resources in Hudson Bay and James Bay are allocated (JBNQNHRC 1982; Yaremchuk and Wong 1989a+b; TFN and DIAND 1992). Where animal populations harvested by Nunavut and/or Nunavik are considered at risk of overharvesting, the total allowable harvest they can sustain and the basic needs level for native subsistence is determined. Under the Nunavut Land Claim Agreement (NLCA)(TFN and DIAND 1992), if the basic needs level falls below the total allowable harvest for a given stock, the surplus in the allowable harvest may be allocated, in order of preference, to non-native residents or their dependents for personal consumption, to sustain existing sport and commercial ventures, to provide for economic ventures sponsored by native organizations, and to other users (see NLCA Section 5.6.32-5.6.40 for details).

People wishing to remove animal parts from Nunavut require either a Wildlife Export Permit from the Department of Sustainable Development (http://www.cambridgebay.info/wildlife_exp.htm) or a Marine Mammal Transportation License from Fisheriies and Oceans Canada (DFO). The Wildlife Export requirement applies to birds and terrestrial mammals, including polar bears, and includes legally killed game, gifts of meat from a hunter, legally purchased meat, ducks or geese, and any other animal parts. Unless they were killed under the authority of a licence, birds of prey, polar bears, grizzly bears, muskoxen, and their parts also require Certification. Wildife parts used in manufactured products, such as parkas or antler carvings, do not require a Wildlife Export Permit. A separate licence is required to export live wildlife.

A Marine Mammal Transportation Licence is required under the *Fisheries Act* to move marine mammal (whale, seal, walrus) parts across provincial and territorial boundaries. However, this requirement does not apply

to Indians or Inuks who harvest animals in one jurisdiction, and are returning to their home in another jurisdiction. Both raw products, such as meat and pelts, and manufactured products, such as ivory carvings, require this licence. Permits are not required to export fish from Nunavut, but proof that they were obtained legally may be required.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) controls the international movement of species that are considered to be at risk from commercial trade (see www.cites.gc.ca , www.cites.org for more information). A Canadian CITES Export Permit is required before shipping the parts, products and derivatives of many species found in the Hudson Bay marine ecosystem, such as beluga, narwhal, killer whale, walrus, polar bears, and some birds of prey. International commercial trade is forbidden for species listed on CITES Appendix I, such as the large whales (e.g., bowhead, minke, and sperm), Eskimo curlew, gyrfalcon, whooping crane, peregrine falcon, and bald eagle.

International trade in species that are considered to be endangered or threatened, or potentially so, is controlled under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Some species found in the Hudson Bay marine ecosystem that generally cannot be exported from Canada include: bowhead whale, Eskimo curlew, gyrfalcon, humpback whale, whooping crane, peregrine falcon, and bald eagle. Species that may be exported from Canada with a CITES permit, provided they were obtained legally, include: beluga, narwhal, killer whale, polar bears, birds of prey (except the species noted above), and Atlantic walrus. CITES permits are required for all parts of these species, including manufactured products.

Harvest management along the Nunavik coast and its estuaries changed with signing of the James Bay and Northern Quebec Agreement in 1976 (Quebec 1976). Under this agreement, Inuit and Cree beneficiaries of the agreement are guaranteed certain levels of harvest. These levels were established on the basis of harvest levels observed during the period 1975-6 to 1978-9 for the Cree (JBNQNHRC 1982) and 1976 to 1980 for the Inuit (JBNQNHRC 1988). They are to be maintained unless their continuation is contrary to the principles of conservation. Decisions related to marine fish and mammals are still the responsibility of DFO, but the department makes them in cooperation with Anguvigak Wildlife Management Inc. and the Makivik Corporation. The interests of Inuit hunters, fishermen and trappers in Nunavik are formally represented by Anguvigak: The Nunavik Hunting, Fishing and Trapping Association (Nunavimmi Umajulirijiit Katutjiqatigiininga) (see http://www.hfta.ca/). Anguvigak consists of locally elected representatives and interacts with the responsible government departments on all wildlife-related activites in Nunavik, including resource management, research, and harvesting. The Makivik Offshore Claim, which is under negotiation, will cover the coastal areas around western and northern Quebec. If approved, it may alter the management of fish and wildlife offshore the Nunavik coast in a fashion similar to the Nunavut agreement.

The responsible department of the Federal or Provincial Government manages fish and wildlife hunts along the Ontario and Manitoba coasts.

Quotas and other harvest management provisions for various species are discussed further below.

14.2 MARINE PLANTS

Inuit in the Belcher Islands harvest seaweed (*Rhodymenia* spp.) and kelp (*Laminaria* spp.) for food in October (Wein et al. 1996; McDonald et al. 1997), but otherwise the subsistence harvests of marine plants from Hudson Bay are poorly documented (Figure 14-1). This practice may be widespread but irregular in Arctic Canada, as Inuit from Qikiktarjuaq also harvest kelp for food (Stewart 1994).

Kivalliq Land and Sea Resources Ltd. has been working to develop a viable commercial harvest of kelp in the vicinity of Whale Cove since the mid-1990s (Aurora Research Institute 1996; Koppel 1997; DFO 1997, 1999b). Options under consideration have included processing kelp for health food, and composting it to produce methane

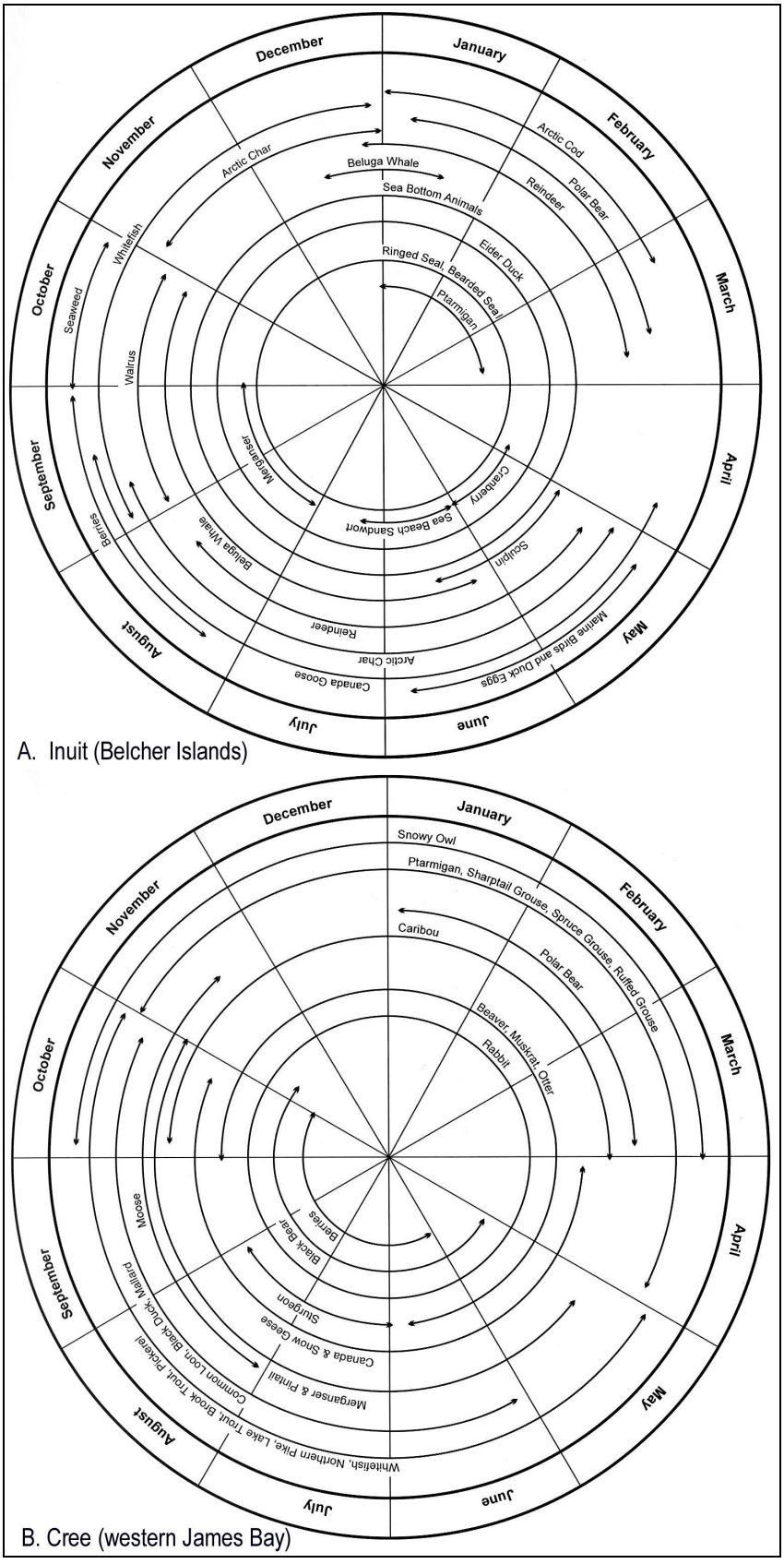

Figure 14-1. Seasonal foods of: A) Belcher Islands Inuit and B) western James Bay Cree (from McDonald et al. 1997).

gas and fertilizer. In 2000 the company harvested 35 MT of kelp from the vicinity of Whale Cove (Minutes of NWMB Regular Meeting #27: 8.K). The NWMB approved a quota increase to 320 MT of dulse, kelp, and rockweed for the 2001 season (NWMB Resolution 2000-224). It was contingent on a number of conditions; in particular that a monitoring plan be in place before harvesting commences and that there be community support. No license was issued for this fishery in 2003 (G. Reid, DFO Iqaluit, pers comm. 2004). In September 2001, the NWMB approved requests by the Arviat and Chesterfield Inlet HTO's for small harvest quotas on rockweed (1MT) and on dulse and kelp (4 MT) (NWMB Resolution 2001-076). Similar quotas requested by the Ingnirq Development Corporation for the Whale Cove area were to be harvested under the 320 MT quota approved earlier.

14.3 INVERTEBRATES

Many invertebrate species are vital links in the food chain between the primary producers and larger fish and marine mammals, but few are harvested from the Hudson Bay marine ecosystem for human consumption. No commercially attractive invertebrate species has been located in sufficient abundance to justify the establishment of an offshore commercial fishery. The commercially attractive species are also small and slow growing relative to their southern counterparts (Squires 1967; Lambert and Prefontaine 1995; Doidge et al. 1995), and fishing is relatively expensive due to the short open water season and high costs of remote operation.

Inuit from the Belcher Islands harvest green sea urchin (*Strongylocentrotus droebachiensis*), brown sea cucumber (*Cucumaria japonica*), six-rayed starfish (*Leptasterias polaris*), and blue mussel

(*Mytilus edulis*) for food yearround (Figure 14-1) and there has been interest in commercially harvesting these species (Jamieson 1986; Topolniski et al. 1987; Crawford 1989; Giroux 1989; Wein et al. 1996; McDonald et al. 1997). These urchins and mussels are significantly smaller than those harvested by competing southern fisheries (Kramer 1980; Lubinsky 1980). Preliminary studies of the commercial potential indicate that these invertebrates are not sufficiently abundant to support more than a small fishery to supply the local market in Sanikiluaq and the coastal villages of eastern Hudson Bay (Jamieson 1986; Giroux 1989). There is also recent interest in the harvesting of scallops by divers (G. Reid, DFO Iqaluit, pers. comm. 2004).

In 1989, Makavik Corporation surveyed northern Hudson Bay for shrimp using the offshore trawler "Kinguk"—few were caught (M. Allard, Makivik Corp., Lachine, QC pers. comm.). In August and September 1990, an exploratory cruise for Iceland scallops (Chlamys islandica) sampled a number of small scallop beds near the Quebec coast from Ivujivik to south of Inukjuak (Morin 1991; Dalcourt 1992; Lambert and Prefontaine 1995). These beds were too small to justify commercial development. Field programs were carried out at Akulivik in 1994-96 to assess the harvest potential of blue mussels (Doidge 1995; Doidge and Prefontaine 1997).

Small commercial harvest quotas have been approved for exploratory clam, scallop, amphipod, shrimp, and blue mussel fisheries in Kivalliq since the early 1990's (Stewart 1994; DFO 1995, 1996, 1997, 1999b; NWMB Resolution 2001-076). Most recent interest has been centred at Whale Cove, but in the past there was interest on the part of Arctic Cooperatives Ltd. in harvesting blue mussels near Arviat for sale in Winnipeg (J. McMillan, Arctic Coop. Ltd., Winnipeg, pers. comm. 1990). Since April 2003, DFO has only issued Scientific Licences for shellfish in Nunavut, scallops excepted, since there is no Canadian Shellfish Safety Program inspection available to ensure the safety of shellfish harvested for commercial sale under exploratory or commercial licences (G. Reid, DFO Iqaluit, pers. comm. 2004). In 1994, 3000 kg of amphipods were harvested in the Whale Cove area (DFO 1996). In 2000, the NWMB approved the request by Canadian Sea Urchin Harvesting Limited for a quota of 50,000 kg of green sea urchins (or 5,000 kg of sea urchin eggs) to be taken in the Whale Cove area (NWMB Resolution 2000-177). This quota was approved too late for fishing to be undertaken in 2000. It was approved again for 2001 (NWMB Resolution 2000-225) and this approval was extended for a further 5 years (NWMB Resolution 2001-040), subject to a number of conditions and annual approval.

To our knowledge, blue mussels are the only marine invertebrates harvested on a regular basis for subsistence by residents of western Hudson Bay. They are readily available at extreme low tides at many locations along the coasts and make a tasty meal. In the east, Inuit from Inukjuak, Umiujaq and Kuujjuarapik harvest blue mussels at many sites in the Hopewell, Nastapoka, Manitounuk, and Long islands areas and along the southeast coast of Hudson Bay for domestic consumption (Doidge 1992a,b; see also Saladin d'Anglure 1984). Most mussels are harvested from the intertidal zone, but residents of Akulivik also harvest them from the subtidal zone, using drags in summer and long-handled scoops in winter (Mesher and Doidge 1995; Doidge and Prefontaine 1997).

The impacts of marine plant and invertebrate harvests on the target species, their habitats, and other species that eat them or use the affected habitat have not been studied. The ability of plant and invertebrates to sustain harvests, and the rate of recovery of bottom habitats damaged by dragging or other methods of harvest, is unknown. The selective harvest of invertebrates in the Belcher Islands by divers is an exception, as it causes little damage to other species or habitats.

14.4 FISH

14.4.1 Subsistence Fishing

Inuit and Cree food fisheries catch most of the fish harvested from James Bay and southeast Hudson Bay, and a substantial percentage of those harvested elsewhere in Hudson Bay. There is no tradition of offshore marine fishing but there are well-developed estuarine and coastal fisheries during the open water season. These

subsistence fisheries have considerable economic value (Quigley and McBride 1987; Berkes et al. 1992; Fast and Berkes 1994; Wein et al. 1996). Fish are harvested for the food they provide, and as a traditional social and cultural activity. The cultural influence of the fishery even extends to children's games. Edwards (1961) described a game played by Inuit children in Richmond Gulf (Lac Guillaume Delisle) wherein a live sea tadpole (*Careproctus reinhardti*) "*is placed on the bare arm to which it fastens with its sucker. The child then runs around with it, and the other children attempt to snatch it away*." Unlike commercial and sport fisheries, subsistence fisheries by registered native peoples in Canada are not subject to government regulation.

Anadromous Arctic charr are the fishes most sought after for subsistence by Inuit in Nunavut (Brack 1962; Brack and McIntosh 1963; Schwartz 1976; Welland 1976; Gamble 1984, 1987a+b, 1988) and Nunavik (Berkes and Freeman 1986; JBNQNHRC 1988)(Table 14-1). These fish are available at predictable times and locations each year. They are easy to catch using gillnets, grow relatively quickly and to a good size, and are relatively free of parasites that infect people. Subsistence fisheries for anadromous Arctic charr begin in coastal regions in late May and continue until late September (Figure 14-1) --earlier than the commercial harvests, which avoid recent downstream migrants that are often in poor condition after winter starvation. Anadromous charr are also taken at inland lakes where they winter. Most harvesting takes place near the communities either along the coasts or at river mouths. In Kivalliq, anadromous Arctic charr are harvested along the coast from the Thlewiaza River north to Daly Bay and into Chesterfield Inlet, in the Repulse Bay area, and at the Thomsen River in northwest Southampton Island. Many of the same sites are fished commercially, sometimes at the same time and often with the same gear, but the subsistence fishery is not restricted in terms of the fishing area, season, or harvest (Yaremchuk and Wong 1989b). There are small harvests of Arctic charr at Churchill, where the species is less common but a welcome treat (McRae and Remnant 1997). There are substantial subsistence harvests of anadromous Arctic charr along the Quebec coast from Kuujjuarapik northward, and in the Belcher Islands. The charr are eaten fresh or preserved for future use by drying, freezing or, rarely, smoking. Species caught incidentally, such as cod or sculpin are also eaten on occasion. Dogs are sometimes fed fish, usually freshwater coregonids but sometimes Arctic charr. Anadromous whitefish and brook trout dominate the catches by residents of Kuujjuarapik and Chisasibi (Schwartz 1976; Berkes and Freeman 1986; JBNQNHRC 1988) (Table 14-1).

Greenland cod (*Gadus ogac*), Arctic cod (*Boreogadus saida*), and sculpins (*Myoxocephalus* spp.) are the only marine species commonly harvested by Inuit. Richmond Gulf Inuit understand the winter movements of Greenland cod, as was demonstrated to Edwards (1961) by three women who caught about 300 lbs (133 kg) of cod through the ice one morning! Capelins are also harvested when they spawn at the shoreline in the Belchers (Hunter 1968; Fleming and Newton 2003). Subsistence harvests of cod and sculpin are much greater in eastern than in western Hudson Bay. Quebec Inuit also harvest Atlantic salmon (ouananiche) either from fresh water or brackish coastal waters.

Inuit catch most fish in gill nets but some by angling, jigging, spearing with leisters, or trapping in stone weirs (Berkes and Freeman 1986). Inuit from Kuujjuarapik traditionally used these weirs to harvest Arctic charr at rivers entering Richmond Gulf (Berkes 1979), and weirs may still be used on occasion at some rivers in Kivalliq.

The Cree coastal subsistence fisheries depend largely on four anadromous species: cisco, whitefish, longnose sucker, and brook trout (Berkes 1979; JBNQNHRC 1982; OMNR 1985; Thompson and Hutchison 1989; Berkes et al. 1992) (Table 14-1). Most fish are caught using gillnets; some fish are caught using jigs, rod and reel, set lines, beach seine type hand-held sweep nets, or stone fish weirs. The stone weirs, which may represent Inuit influence, have been used on the Rupert River to trap whitefish, and south of Chisasibi. Fishing effort is dispersed over a large area, with family groups each having their own traditional fishing areas (Berkes 1979). Most stocks appear to be lightly utilized but the subsistence harvesters overfish some stocks in the vicinity of the communities:

> *"The major management problem is how to harvest the sparse production of a large area, where the stocks consist of old fish, available in large and conveniently fishable units, but where the rate of renewability of the resource is very low."--Berkes and Freeman (1986).*

Table 14-1. Estimated mean annual subsistence harvests of fishes by communities around Hudson and James Bays. Sources listed below.

Community	Period	Source	Hunters	Human Population[1]	Marine		Anadromous		
					cod	sculpin	Arctic charr	Atlantic salmon	brook trout[2]
QUEBEC									
Waskaganish	1975-6 to 1978-9	1	Cree	999					800
Eastmain	1975-6 to 1978-9	1	Cree	319					2667
Wemindji	1975-6 to 1978-9	1	Cree	665			26		3357
Chisasibi	1975-6 to 1978-9	1	Cree	1603			512		21615
	1976-80	2	Inuit	42	104	82	15		194
Kuujjuarapik	1975-6 to 1978-9	1	Cree	373			103		3921
	1976-80	2	Inuit	558	2481	4444	866	61	4294
Umiujaq	no data		Inuit	-[4]	-	-	-	-	-
Inukjuak	1976-80	2	Inuit	530	3152	456	14251	160	1289
Puvirnituq	no data		Inuit	-	-	-	-	-	-
Akulivik	1976-80	2	Inuit	140	293	220	13597	29	5
Ivijivik	no data		Inuit	-	-	-	-	-	-
ONTARIO									
Moose Factory/ Moosonee	1990	3	Cree	3000					3092
Fort Albany	1990	3	Cree	625					
Kashechewan	1990	3	Cree	1000					3
Attawapiskat	1990	3	Cree	1214					11
Peawanuck	1990	3	Cree	227					4278
Fort Severn	1990	3	Cree	332					4115
MANITOBA									
Churchill[5]	May 1995-Apr. 1996	5	not stated				55		
NUNAVUT									
Arviat	1983-85	4	Inuit	1022	53	2	2643		
Whale cove	1982, 1984-5	4	Inuit	188			3327		
Rankin Inlet	1982-85	4	Inuit	1109	12	13	7361		
Chesterfield Inlet	1983-85	4	Inuit	249			237		
Coral Harbour	1984-85	4	Inuit	429	170	5	4503		
Repulse Bay	1982-85	4	Inuit	352			1935		
Sanikiluaq	1980-84	5	Inuit	383	817	1133	9398	-	-
TOTALS					7082	6355	58829	250	49641

Sources: 1 = JBNQNHRC 1982, 2 = JBNQNHRC 1988, 3 = Berkes et al. 1992, 4 = Gamble 1988, McRae and Remnant 1997; 5 = Pattimore pers. comm.

1 Populations are for the Aboriginal communities except in Nunavut, where the community populations ca. 1985 are listed from the 1985 Explorers Guide. The Quebec Cree populations are 5-year means 1974-5 to 1978-79 (JBNHRC 1988); the Quebec Inuit populations are from 1976 (JBNQNHRC 1982); Ontario Cree populations are from 1990, except Attawapiskat (1989) (Berkes et al. 1995).

Table 14-1. continued

Mixed andromous and freshwater						Freshwater	
burbot	lake trout	northern pike	suckers	sturgeon	whitefish[3]	Arctic charr	walleye
89	82	685	3350	229	13928		1939
201	124	566	487	94	11293		385
1581	290	1388	2649	155	23937		985
3355	5310	4942	15009	615	48807		1936
	99				1091		
273	3807	1028	4270		11781		
	818				4064		
-	-	-	-	-	-	-	-
	10756				8063		
-	-	-	-	-	-	-	-
	1300				2146		
-	-	-	-	-	-	-	-
290		6049	2344	3174	20583		8933
0		304	53	68	727		162
829		2937	1454	300	5307		3283
3377		11956	5294	1223	21670		9694
44		1801	1353	3	5237		142
666		796	162		4032		95
		438	163	1	672		1
	733	29			265		
	301	2			76		
	354				8		
	212						
	303						
-	-	-	-	-	-	1576	-
10705	24488	32921	36588	5862	183687	1576	27555

[2] brook trout = speckled trout. [3]whitefish includes whitefish and ciscos, mostly lake whitefish and lake cisco.
[4] Dashes indicate no data; blank cells indicate no harvest reported.
[5] Churchill data are reported rather than estimated harvests from 67 of 182 people identified as domestic harvesters; 12 Arctic grayling were also harvested.

Much of the catch is consumed immediately at the fishing camps; the rest may be sun-dried, smoked, or frozen whole. Year-to-year variations in the availability of other game and in environmental variables such as the water level, temperature, wind speed and date of freeze-up make it very difficult to estimate the total catch of the Cree subsistence fishery (Berkes 1979). Cree along the Ontario coast of James Bay rarely harvest any purely marine fish (Berkes et al. 1992).

14.4.2 Commercial Fishing

Commercially attractive marine fishes have not been found in sufficient quantity to support a viable marine fishery in Hudson Bay (Hachey 1931; Huntsman 1931; Hunter 1968; Dunbar 1970; Morin 1991) or James Bay (Brooke 1992; Dalcourt 1992). Huntsman (1931) quoted Pennant who wrote in 1784 concerning Hudson Bay:

> *"the Company have attempted to establish a fishery: and for that purpose procured experienced people from the Spitzbergen ships, and made considerable trials between lat. 61 and 69; but after expending twenty thousand pounds, and taking only three fish, were, in 1771, obliged to desist."*

In 1930, based on the results of the Loubyrne fishery, Hachey (1931) wrote:

> *"The "Loubyrne" was engaged in actual fishing operations in Hudson Bay for 22 days. During that time 200 miles of bottom representative of the whole region were efficiently dragged for commercial fish. Added to this, other methods of fishing were indulged in. Not a single commercial fish was taken. Hence it is quite easy to arrive at a definite conclusion that a deep-water fishery of commercial importance does not exist in Hudson Bay."*

This oft cited conclusion has effectively limited offshore fisheries research in Hudson Bay since 1932 and although it may be valid and apply equally to James Bay, it is based on very limited fishing effort. During the 22 days, hand lines were used for a total of 7.25 h, drift nets for 12 h, longlines for 2.92 h, and an otter trawl for 57.83 h. To make such a sweeping conclusion about the offshore fishery potential of all Hudson Bay may not have been reasonable (HBC Archives GR1600-94555 Letter from J.M. Davidson February 5, 1932). The limited fishing effort was not sufficient to test for the seasonal presence of large schools of capelin, which we now know to occur in Hudson Bay (Fleming and Newton 2003), or for Atlantic cod, which occur in Hudson Strait.

Lacking a proven offshore resource, and limited by the climate and technology, fisheries investigations in Hudson Bay and James Bay in the 20th century concentrated on exploring the commercial fishing potential of the coastal estuaries (Lower 1915; Melvill 1915; Halkett 1919; Vladykov 1933). Unfortunately, the fish populations proved to be relatively small and slow-growing (Hunter 1968; Roy 1989). They consisted mainly of old individuals, and were unable to support both commercial export fisheries and the vitally important subsistence harvest. Fisheries for anadromous Arctic charr along the Kivalliq coast offered perhaps the only exception.

Commercial fishing for anadromous Arctic charr along the Kivalliq coast began in 1931 when Mr. Ingebrigtsen of Churchill, Manitoba sailed 250 km up the coast and harvested about 2000 kg of charr, marketing them as "lightly salted sea trout" (Dalrymple 1932). Despite the success of this small fishery there was little interest in commercial fishing until 1962 when the Rankin Inlet nickel mine closed. To help shore up the area economy the Department of Northern Affairs and Natural Resources (DNANR), and later the GNWT, helped to develop a commercial fishery for fish and marine mammals in the area (Carder and Peet 1983).

In 1964, following a brief survey of fish resources along the Kivalliq coast (Brack and McIntosh 1963), the DNANR established a pilot cannery plant at Daly Bay, north of Chesterfield Inlet (Lantz 1965; Lantz and Iredale 1972). The cannery employed local Inuit to harvest and process Arctic charr, seals, whales, and walrus from the area. In 1966, after the fish resources of Daly Bay had proven to be insufficient and because the water supply, power, and housing facilities were limited, the cannery was dismantled and re-established at Rankin Inlet as the Issatik Food Plant (Iredale 1984).

Exploratory fisheries were undertaken in the Rankin Inlet area to find exploitable fish stocks to support the cannery and Arctic charr were marketed in the south as a gourmet product (Carder and Peet 1983). In 1970, with the discovery of high levels of mercury in the marine mammals and decreasing local demand for the products, the cannery stopped processing marine mammals. The fish canning operation continued until 1976, when high transportation costs to southern markets forced it to close (Thompson 1976; Carder and Peet 1983). The facility continued to process fresh and frozen Arctic charr for commercial sale in the community and to the Freshwater Fish Marketing Corporation (FFMC) in Winnipeg into the early 1990s when, as the Keewatin Meat and Fish Co. it also began processing caribou for sale within the Northwest Territories. The plant burnt down in 1997 (McGowan 1998) and was subsequently rebuilt. Today, operating as Kivalliq Arctic Meats it is a Federally Inspected meat processing plant with European Union Certification that processes fresh and frozen Arctic charr and caribou for sale directly to domestic and international markets (http://www.nnsl.com/ops/countryfood.html; K. Pelley, DFO Rankin Inlet, pers. comm. 2003). It serves as the central processing facility for caribou and fish harvested in the Kivalliq Region. In 2003, the plant employed 17 people year-round and handled 118,000 kg of caribou. Because the volume of fish taken in the area is lower, the plant cannot afford to suspend caribou production to process fresh fish in the summer, so the initial processing of fish from the Arviat-Whale Cover-Rankin Inlet area (cleaning and freezing) is now done at Whale Cove (B. Zawadski, Nunavut Dev. Corp., Rankin Inlet, pers. comm. 2004). Frozen charr purchased from Whale Cove and Chesterfield inlet, are cut into fillets and some are hot-smoked after caribou processing has been completed. In recent years the plant has purchased about 7,500 kg (dressed weight; dr. wt) of charr annually from Whale Cove and about 4,500 kg (dr. wt) from Chesterfield Inlet.

In the 1980's and 1990's there was also a small registered fish plant at Chesterfield Inlet where charr were cleaned, packed, and shipped fresh or frozen to the FFMC. There were small, unregistered packing stations at Arviat and Whale Cove that also shipped fresh charr to the FFMC, and freezer/packer vessels at Whale Cove and Coral Harbour (Stewart et al. 1993). Today, Arctic charr harvested by Whale Cove and Chesterfield Inlet are frozen locally and then shipped to Rankin Inlet for processing; some fish are shipped fresh (B. Zawadski, Nunavut Dev. Corp., Rankin Inlet, pers. comm. 2004). In 2003, the plant processed 7,766 kg (dr. wt) of Arctic charr purchased from 13 Whale Cove and 10 Arviat residents.

Historically, none of these fish processing operations has received enough fish to consistently meet operating expenses. Their operating losses were substantial and they did not produce a return on the initial capital investment (Ference and Associates Ltd. 1987; NWT Economic Strategy Panel 2000). Fishermen in the Kivalliq communities, with a few exceptions, participate in the commercial fishery not to earn a livelihood, but to supplement their incomes or subsidize subsistence harvests (Yonge 1988, 1989).

The main commercial fishery is conducted during August and early September when anadromous Arctic charr are netted at or near river mouths along the coast (Bond 1974; Carder 1983, 1988, 1993, 1995; Carder and Peet 1983; Carder and Low 1985; Carder and Stewart 1989; Yaremchuk et al. 1989; McGowan 1998). Long standing commercial harvest quotas at these locations are opened annually, as requested by the Hunters and Trappers Orgainzations, unless there is strong evidence of overharvesting. Nets are generally 45 or 90 m in length with 139 mm mesh, and 20 to 30 meshes deep. They are usually stretched out from shore on the surface where the water is 4 to 5 m deep and checked twice daily. Metal conduit fish weirs have also been used to harvest migrating anadromous charr at some rivers in the fall (McGowan 1987; Hollett 1993; DFO 1999b). The fish are dressed on site, packed in ice, and transported by boat to the fish plants for washing, fast freezing, and packing. They are then shipped to market on scheduled airlines. In 1988-9 Chesterfield Inlet, Rankin Inlet, Whale Cove, and Arviat together harvested 37,085 kg of dressed Arctic charr during the open water season (Carder and Stewart 1989). Most of these fish were sold to the FFMC, either fresh or frozen. The remainder were sold locally or in nearby communities, or culled. In 1996-7 the Kivalliq communities harvested 22,933 kg (rnd wt) of Arctic charr (DFO 1999b). There is a small commercial fishery for Arctic charr in the Belcher Islands (Read 2000) and a small, sporadic commercial fishery for Arctic charr at Churchill (Carder and Stewart 1989; DFO 1997).

Transportation poses a problem for the Kivalliq fisheries both in terms of logistics and cost (Stewart et al. 1993). Boat transportation from the rivers to the fish plants, and air transportation from the fish plants to southern markets are both hampered by inclement weather. Fishermen are often stranded at a site for days if there is a storm on Hudson Bay. Likewise, shipments of fresh fish are sometimes stranded in the communities and must be unpacked, frozen, and repacked, and shipments of frozen fish can be stranded in Rankin Inlet or Churchill -- increasing spoilage.

While commercial and sport fisheries are regulated, overharvesting can occur in areas that also support large subsistence fisheries. One such area is the Diana River near Rankin Inlet (McGowan 1987), where commercial fishing was stopped and sport fishing reduced to enable stocks to recover. In the early 1990's, subsistence fishermen also agreed to stop fishing the spring downstream run and to use only 139 mm (5.5") mesh gillnets throughout the season in the area of the river mouth to speed the rate of recovery (G. Weber, DFO, Rankin Inlet, pers. comm.). In the early 1990s, the Kivalliq communities expressed concern that charr were becoming less abundant and smaller in some areas (McGowan 1998). A study of the growth and movements of the fishes and of the catch per unit effort by the fisheries found that the average age of charr landed from various quotas by the communities declined from the 1980s to mid-1990s. This can occur in response to fishing pressure, so further monitoring was recommended. The movement studies demonstrated the extensive movements of these fish and that mixed stocks are being harvested under the coastal quotas.

Commercial harvesting of coastal marine and estuarine fish is conducted on a small local scale at many communities along the Quebec coast, and fish are often marketed through local cooperatives (Berkes 1979; M. Breton, DFO, Quebec, pers. comm). Richmond Gulf was the site of a commercial fishing venture from 1962 to 1964 for anadromous brook trout, whitefish, cisco, and Arctic charr (Hunter 1968; Power and Lejeune 1976; Gillis 1988). Declining catches and unfavourable economics led to the closure of this fishery. In 1989, the 50 m factory trawler "Kinguk" surveyed offshore waters of northern Hudson Bay for shrimp and Greenland halibut (turbot), with very poor catches (M. Allard and G. Fisk, Makivik Corp., Lachine, pers. comm.). A marine test fishery was conducted in the vicinity of Wemindji in 1987-88 and 1988-9 (Breton 1990; Brooke 1992; Dalcourt 1992). Its purpose was to assess the feasibility of harvesting marine fishes to feed fox and mink at local fur farms, and capelin for export to the Japanese market (F. Berkes, Univ. of Manitoba, Winnipeg, pers. comm.). Sculpins, Greenland cod, and anadromous whitefish were harvested in the greatest numbers, but not in sufficient numbers to justify commercial development (Dalcourt 1992).

There is also a small commercial fishery for anadromous Arctic charr at Puvirnituq (C. Choquette, Kativik Regional Government, Kuujjuaq, Quebec, pers. comm.). Fish are purchased by Fumoir à poisson Pitsituuq Inc., which in the early 1990s used about 8,500 kg (round weight; rnd wt) of charr annually to produce about 4,250 kg of smoked product. The smokery is a one-man operation that employs two helpers during peak periods. Plant production is limited by the local supply of charr and most of the product is sold locally. The sustainable harvest potential of the region was not assessed prior to plant construction and remains unknown. Small quantities of charr (700 kg) are occasionally imported from Ungava Bay.

14.4.3 Sport Fishing

The Provincial and Territorial governments share responsibilities with the Government of Canada for managing recreational fisheries along their coasts (Table 14-2).

There is no marine trophy fishery in Hudson Bay or James Bay. Tourists seeing trophy Arctic charr generally fish along the central Arctic coast or on the Arctic Islands. Sport anglers do catch anadromous Arctic charr in August and September at river mouths along the west coast of Hudson Bay, in the Belcher Islands, and likely along the Quebec coast, but most of these people are local residents. Tourists who visit Kivalliq to sportfish generally do so at inland lakes where they catch trophy lake trout or Arctic grayling.

Table 14-2. Provincial/Territorial responsibilities for the management of recreational fisheries (from DFO 2001).

Province/Territory	Management Responsibilities
Nunavut	The Nunavut Wildlife Management Board is responsible for fishery allocations and advises DFO on conservation, fishery management, and science activities. Nunavut administers sportfish licensing under an Order-in-Council.
Quebec	The Province manages and licenses freshwater, anadromous, and catadromous species. The Federal Government manages other marine species.
Ontario and Manitoba	The Federal Government manages marine species in Ontario and Manitoba. The Provinces manage and license freshwater species.

Note: Because the federal Government has legislative authority for inland fisheries, all recommendations for amendments to regulations under the *Fisheries Act* (e.g.,, quotas, seasons, closed times, gear, etc.) are forwarded to Fisheries and Oceans to obtain Governor-in-Council approval.

There is some resident and non-resident angling at rivers near communities or commercial goose hunting camps along the Ontario coast (OMNR 1985). Brook trout, northern pike, walleye, yellow perch, lake trout, and lake sturgeon are the main species sought (OMNR 1985; Brousseau and Goodchild 1989). The sport fishery along the northern Manitoba coast is similar, with northern pike, brook trout, Arctic grayling, and walleye being the main species sought (McRae and Remnant 1995). Estimates of the total harvest are not available, but the sport harvest of estuarine and marine fishes is likely small.

Non-native sport fishing in western Quebec is confined mainly to lakes, where the principal species caught are walleye and northern pike (Roy 1989). There is little non-aboriginal sport fishing along the Quebec coast of James Bay, since much of the area is reserved for aboriginal use (i.e., category 2 lands) and non-aboriginals require band council permission in order to fish legally (F. Berkes, Univ. of Manitoba, Winnipeg, pers. comm.).

14.5 MAMMALS

Traditional subsistence harvests of mammals that use the waters or ice of the Hudson Bay marine ecosystem are important to the Aboriginal cultures and regional economy. These animals include belugas, narwhals, walruses, seals, Arctic foxes, and polar bears. Commercial whaling, particularly for bowhead and belugas, was instrumental in the European exploration and development of the region and dates back to the late 1600's in northern Hudson Bay. Whales are no longer harvested commercially, but bowhead populations and the eastern Hudson Bay beluga stock have not recovered from past commercial harvests and remain depleted. The commercial harvest of seal pelts from the region was largely eliminated by the 1982 European embargo on their import. There is a limited sport hunt for polar bears and walruses.

14.5.1 Beluga

Hunting regulations for belugas are implemented by DFO under the Marine Mammal Protection Regulations of the *Fisheries Act* (http://laws.justice.gc.ca/en/F-14/SOR-93-56/122458.html#rid-122537). These regulations prohibit unnecessary disturbance of belugas, and the killing of calves or females with calves. Indians or Inuit who normally reside adjacent to the tidal waters of Hudson Bay or James Bay are permitted to hunt belugas without a licence; non-native residents require a licence and can only hunt belugas for food for themselves and their family--belugas cannot be used for dog food. In the past, licences were issued to non-native hunters at Churchill on a case-by-case basis. Killing belugas solely for scientific purposes is not permitted, but Scientific Permits may be issued to permit sampling of subsistence kills and the export of samples for analysis. Churchill is a particularly important area for the scientific study of belugas because the whales are so accessible. Belugas were live-captured at Churchill for aquaria, beginning in 1967 (Moshenko 1990; P. Hall, DFO Winnipeg,

pers. comm. 2004). Sixty-eight belugas were taken before the Minister of Fisheries and Oceans issued a moratorium on this practice in 1992.

Inuit, and to a much lesser extent Indians, have a tradition of harvesting belugas along the coasts of Hudson Bay and James Bay. Oil rendered from their blubber was burned in lamps, the nutritious fatty skin layer or muktuk was eaten, skin was sometimes used to make boots or tents, and the meat was eaten or used for dog food. The hunts had, and still have, important cultural and social value (e.g., Flaherty 1918; Degerbøl and Freuchen 1935; Doan and Douglas 1953; Johnson 1961; Brack and McIntosh 1963; Schwartz 1976; Welland 1976; Breton-Provencher 1979; Boulva 1981; Preston 1981; Finley et al. 1982; JBNQNHRC 1982, 1988; Gamble 1984, 1987a+b, 1988; Saladin d'Anglure 1984; Berkes and Freeman 1986; Reeves and Mitchell 1987a, 1989a+b; Strong 1989; Olpinski 1990; Baker et al. 1992; McDonald et al. 1997; Lesage et al. 2001; DFO 2002b).

There was no large-scale commercial whaling for belugas along the northern Hudson Bay coast of Quebec, but a sporadic, sometimes intensive and productive beluga fishery operated from the 1750's until about 1905 at estuaries along the southeast coast of Hudson Bay (Francis 1977; Finley et al. 1982; Reeves and Mitchell 1987a). It petered out before the Hudson Bay Company (HBC) established a post at Wolstenholme near Ivujivik in 1909, and posts at Inukjuak, Povungnituk, and Akulivik in the early 1920's. The main fisheries were conducted by the HBC at Grande rivière de la Baleine and Petite rivière de la Baleine, where the combined harvest was at least 8,294 whales in the 15 years between 1852 and 1868 (Reeves and Mitchell 1987a). Considering that the catch record is almost certainly incomplete, the "initial" (1853) population must have numbered at least 6,600 whales. There were also large, and perhaps separate, summer concentrations of belugas at the Nastapoka River and in Richmond Gulf (Finley et al. 1982; Reeves and Mitchell 1987a, 1989b). Small-scale whale fisheries were undertaken at all the posts until the late 1930s.

Most beluga harvesting in southeast Hudson Bay now takes place between June and October at the Nastapoka, Grande rivière de la Baleine, or Petite rivière de la Baleine estuaries, in Richmond Gulf, or near the communities (Figure 14-1;Table 14-3)(Schwartz 1976; Breton-Provencher 1979; Olpinski 1990; Lesage et al. 2001). Beginning in 1986, management plans were adopted by DFO in cooperation with Anguvigak for each of the Nunavik communities (Lesage et al. 2001; DFO 2002a). These plans are re-examined regularly. They include quotas for each community and seasonal closures (July) at the Nastapoka River (1991) and Petite rivière de la

Table 14-3. Beluga harvests from Hudson Bay and James Bay by communities in Nunavik and Kivalliq, 1990-2001. Sources listed below.

Community	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total	Average[1]
NUNAVIK (Quebec)														
Kuujjuarapik	8	12	16	12	22	14	15	11	14	14	8	15	**161**	**13**
Umiujaq	12	24	24	19	18	21	19	19	18	24	19	17	**234**	**20**
Inukjuak	11	20	16	13	19	20	22	21	18	19	35	25	**239**	**20**
Puvirnituk	22	50	22	23	23	36	38	33	36	27	29	50	**389**	**32**
Akulivik	9	18	16	16	20	18	15	24	17	22	12	33	**220**	**18**
Ivujivik	20	31	2	37	0	38	34	22	44	37	36	13	**314**	**26**
KIVALIQ (Nunavut)														
Arviat	70	25	nr[1]	23	32	3	100	100	nr	58	100	100	**611**	**61**
Chesterfield Inlet	20	20	nr	17	27	22	20	nr	nr	nr	1	25	**152**	**19**
Coral Harbour	67	125	nr	20	30	50	31	30	nr	50	35	25	**463**	**46**
Rankin Inlet	40	20	nr	14	29	88	48	48	nr	nr	45	35	**367**	**41**
Repulse Bay	20	13	9	12	28	35	20	nr	nr	4	0	10	**151**	**15**
Sanikiluaq	20	22	20	10	50	30	30	19	nr	32	21	0	**254**	**23**
Whale Cove	27	25	27	19	37	2	35	20	nr	nr	20	40	**252**	**25**

Sources: **Nunavut**: 1990 (DFO 1992b), 1991 (DFO 1993), 1992 (DFO 1994), 1993 (DFO 1995), 1994 (DFO 1996), 1995 (DFO 1997), 1996 (DFO 1999b), 1997-2001 (DFO unpubl. data); **Nunavik**: 1990-2000 (Lesage et al. 2001); 2001 (DFO 2002a).

[1] nr = no report, empty cell = no report to date. Averages do not consider either.

Baleine (1996). The hunters agreed to avoid killing mature females with calves and DFO further recommended that any hunt be directed toward adult males. The 1995-2000 management plans recommended an annual quota of 18 belugas for each for the eastern Hudson Bay communities in Nunavik (Akulivik, Puvirnituq, Inukjuak, Umiujaq, and Kuujjuarapik) and a quota of 25 belugas for Ivujivik, which harvests animals from Hudson Strait. During this period, the total harvests consistently exceeded the recommended quotas (Hammill 2001; Bourdages et al. 2002; DFO 2002a). The actual rate of removal of belugas from the populations may be substantially greater than the estimated harvests, due to under-reporting of the landed harvests and uncertainty about the rate of mortality among whales that are struck and lost (Hammill 2001; Bourdages et al. 2002; DFO 2002a).

A new management plan was implemented in 2001 (DFO 2002a). It recommended that the eastern Hudson Bay communities harvest no more than 30 animals from eastern Hudson Bay, 30 from James Bay and 65 from Hudson Strait. The intent was to shift some of the harvesting effort from the eastern Hudson Bay belugas into James Bay (DFO 2002b). The actual harvest of eastern Hudson Bay belugas may be greater, as they may also be vulnerable to harvest by Sanikiluaq and communities in Hudson Strait (de March and Postma 2003). Inuit hunters have been urged to avoid the river mouths concentrations. There is concern that continued harvesting and exposure to environmental modification threaten this region's beluga stock in its depleted state (Reeves and Mitchell 1989b; Woodley and Lavigne 1991; Bourdages et al. 2002; DFO 2002a). COSEWIC considers belugas in eastern Hudson Bay to be threatened (Reeves and Mitchell 1989b).

Historically, belugas in James Bay were harvested for subsistence and to supply the coastal HBC posts, but there was not the same intense commercial harvest as occurred in Hudson Bay (Gordon 1923; Schwartz 1976; Reeves and Mitchell 1987). Currently there is no regular harvesting of belugas in James Bay (Gosselin et al. 2002). Residents of Chisasibi and Wemindji on the Quebec coast of James Bay once harvested belugas on a regular basis (JBNQNHRC 1982). Recommended annual harvest levels, based on estimates of past harvests, are 2 and 1 belugas for these communities respectively.

Reeves and Mitchell (1989a) did not find references to commercial whaling for belugas along the Ontario coast of Hudson Bay in HBC journals from Winisk and Ft. Severn. The ready availability of fish for dog food and a regular supply of oil from the posts at York Factory and Churchill may have eliminated the need for whaling to supply the posts. The cost of maintaining the whaling boats and trained personnel--there being no Inuit, particularly if there were relatively few whales, may also have made whaling uneconomic.

Reeves and Mitchell (1989a: pages iv-v) summarized the exploitation of belugas in western Hudson Bay, which began in 1688 and ended in 1970, as follows:

> *"The whale fishery at York [Hayes and Nelson Rivers by the Hudson Bay Company] was never established on the same scale as the Churchill fishery. In spite of their abundance in the Nelson estuary, whales proved difficult to catch there. Boat whaling and netting were tried in both the Hayes and Nelson rivers, but the most popular method of obtaining whales at York was to purchase them from Indians who whaled from "stands" erected in the intertidal zone. Much of the catch was used to feed dogs, and relatively little oil was exported.*
>
> *Churchill was the focal point for the HBC's [Hudson Bay Company's] whaling activities in western Hudson Bay. Boat whaling in the Churchill River achieved only modest results during the eighteenth century, when the highest documented catch for any decade was about 400 whales (1770-79). At the beginning of the nineteenth century effort shifted to the Seal River, where Inuit whaled from kayaks in the company's behalf. Oil returns from the Seal River contributed significantly to Churchill's exports during much of the nineteenth century, but this contribution was severely limited by problems associated with transporting the blubber from the hunting site to the factory. More than 500 whales were taken at the Seal River in some decades (1820s, 1840s, 1850s). The heyday of HBC whaling in the Churchill River began in the early 1880s, by which time the Seal River hunt was no longer important. More than 1300 whales were taken at Churchill through the first two decades of the twentieth century.*

By the 1930's, the HBC had essentially abandoned its whaling efforts at Churchill and York. In the late 1940s a Manitoba company built a whaling plant at Churchill and began a commercial operation that lasted until 1968. The catch of more than 4500 whales in the first decade of this operation (see Sergeant 1981) was over three times higher than the documented HBC catch at Churchill and York, combined, in any previous decade.

A recent population estimate of at least 17,000 white whales [belugas] in western Hudson Bay suggests that HBC whaling at York and Churchill had no serious long-term consequences for the stock. The fishery from 1949 to 1968 was much more intensive, and the large current size of the population may be taken to indicate that the stock has recovered during the 20 years since the Churchill fishery closed, that the population in the 1940s was very large, or both. The population of white whales in western Hudson Bay appears not to have experienced the kind of depletion from overhunting that has been demonstrated for the populations in Cumberland Sound, Ungava Bay and (possibly) eastern Hudson Bay."

Small-scale commercial harvests for belugas were also conducted at Arviat and Whale Cove in the early 1960's (Brack and McIntosh 1963; Reeves and Mitchell 1989a; Baker et al. 1992). Their main aim was to provide a reliable local food supply for local Inuit. Some beluga meat was canned at various points along the coast during the summers of 1961-64, and maqtaq (muktuk) and meat were processed at a fish plant that was established at Daly Bay in 1964 and relocated to Rankin Inlet in 1966 (Lantz and Iredale 1972; Carder and Peet 1983). Belugas for the plant were harvested near Whale Cove, where they were butchered, frozen, and then towed in a freezer barge to Rankin Inlet. Product demand declined steadily and, in 1970, when mercury levels of 0.5 ppm (wet wt) were found in the whale meat the commercial harvest was stopped (Sergeant and Brodie 1975; Carder and Peet 1983).

Sport hunting of belugas was encouraged at Churchill and in the Whale Cove-Arviat area from the late 1940s through the 1960s (Frick 1968; Reeves and Mitchell 1989a). The hunts were banned in 1973 for humane reasons (Sergeant and Brodie 1975).

The Kivalliq communities have never had quotas on their beluga harvests and, to date, there is no Community Based Management of the harvest as there is for narwhals at Repulse Bay (P. Hall, DFO Winnipeg, pers. comm. 2004). Data on the harvests from 1990 through 2001 are provided in Table 14-3. Most beluga harvesting from western and northern Hudson Bay now takes place between July and September near the Kivalliq communities (Gamble 1984, 1987a+b, 1988). The species is hunted along the west coast of Hudson Bay and into Chesterfield Inlet as far as Ekatuvik Point from July through September (Brack and McIntosh 1963; Welland 1976). The greatest catches at Arviat are in July and August, at Whale Cove and Rankin Inlet in August, at Chesterfield Inlet and Repulse Bay in August and September, and at Coral Harbour in July through September (Sergeant 1973; Gamble 1984, 1987a+b, 1988). Hunters from Coral Harbour occasionally harvest belugas at the ice edge in June and from October through February.

In 2002, Quebec Inuit, unable to satisfy local demand under the harvest quotas, approached the Kivalliq Wildlife Board with a view to purchasing *maqtaq* (Tyrrell 2003). The Arviat Hunters and Trappers Organization purchased 2220 kg (5000 lbs) of *maqtaq* from local families and resold it to communities in Quebec. Concerns were expressed within Arviat regarding the ramifications of commercialising the harvests; in particular, whether the population might decline or a quota might be imposed. A similar request for *maqtaq* was received in 2003.

14.5.2 Narwhal

Narwhals historically provided important staples in the traditional subsistence economy of northwest Hudson Bay. Hunting and sharing of its proceeds continue to be of great social and cultural significance, particularly for Repulse Bay (Reeves 1992a+b, 1993a; Gonzalez 2001). Narwhals are harvested mainly for their *maqtaq* and ivory. The *maqtaq* is consumed locally or traded to other Inuit communities. It is a highly valued food

and demand often exceeds supply. The ivory is a byproduct of the hunt that commands high prices and is marketed internationally.

The ivory tusk of males is a valuable economic commodity and an important source of cash income for some coastal communities (Reeves 1992a+b; Gonzalez 2001). The international value of the tusk gives hunters a strong incentive to hunt males with large tusks. This can strongly influence the nature and intensity of the hunt. A ban on the importation of narwhal ivory by the European Economic Community (EEC) caused the price of narwhal ivory to plummet in 1983/84 but it has since recovered due to the strong demand for narwhal ivory in Japan. Market interventions and price instability have had serious ramifications for Inuit communities in the past and are likely to affect the cost and rewards of narwhal hunting in the future as well (Reeves 1992b).

Hunting regulations for narwhals are implemented by DFO under the *Fisheries Act* by the Marine Mammal Regulations. Under these Regulations, only Inuit can hunt narwhals and there is a quota on the number of animals that can be harvested by each community (Table 14-4). These quotas were set initially through negotiation with the communities, and based on historic harvesting levels (Strong 1988). The community quotas are tracked through a tag system. Hunters are required to attach a Marine Mammal Tag to the tusk or carcass of landed narwhal. For many years, the hunters have requested changes to the management system for narwhals, with the result that a Community-Based Management (CBM) system is now being tried at Repulse Bay and other communities in Arctic Canada (DFO 1998a+b; Gonzalez 2001). This 3-year pilot program was reviewed in 2003 and extended for a further 5 years, and an integrated management plan is being developed (M. Wheatley, NWMB Iqaluit, pers. comm. 2003).

Table 14-4. Annual landed harvest of narwhals from the Hudson Bay population, 1990 to 2001. Sources listed below.

	Historical Quota	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total	Average
Cape Dorset	10	0	16	0	0	1	0	0	0	0	0	0	1	**18**	**1.5**
Chesterfield Inlet	5	0	0	0	0	0	0	0	0	3	5	3	2	**13**	**1.1**
Coral Harbour	10	0	0	0	1	0	10	10	9	4	0	0	0	**34**	**2.8**
Kimmirut (Lake Harbour)[1]	10	0	0	0	0	0	0	0	0	0	0	0		**0**	**0**
Repulse Bay	25[2]	17	3	20	13	5	4	10	35	18	156	49	100	**430**	**33.1**
Rankin Inlet	10	0	0	0	0	0	6	7	0			7	3	**23**	**2.3**
Whale Cove	5	0	0	0	0	0	0	0	1				2	**3**	**0.3**
HB TOTAL		**17**	**19**	**20**	**14**	**6**	**20**	**27**	**45**	**25**	**161**	**59**	**108**	**521**	**41.1**

Sources: 1990 (DFO 1992b), 1991 (DFO 1993), 1992 (DFO 1994), 1993 (DFO 1995), 1994 DFO1996), 1995 (DFO 1997), 1996 (DFO 1999b), 1997-2001 (DFO unpubl. data).

[1]Community names that were used in the past are enclosed in brackets.

[2] The Repulse Bay "quota" was replaced in 1999 by the community-based management program. In 2002 the community harvest limit was 72 narwhals.

nr = no report, blank space= report may be forthcomig.

To qualify for community-based management, local HTOs must first develop hunting rules or by-laws to address the conservation and management of the narwhal population, the reduction of waste, hunter education, and safety. Participating HTOs also agreed to collect and report the number of narwhals landed annually as well as information on the number of narwhals that were wounded and escaped, and the number killed but not landed. Communities that have qualified for CBM no longer hunt under their historic quota; however harvest limits are in place for each of the participating communities and the landed catch continues to be tracked by the tag system.

The Hudson Bay narwhals are hunted mainly by residents of Repulse Bay and sometimes by residents of 6 other communities Table 14-4). Most animals are harvested in July and August (Gamble 1988). The number of narwhals killed during these hunts is higher than the number landed. Information about seasonality of these loss

rates in Hudson Bay is lacking, but loss rates in the High Arctic are typically highest at the floe edge and lowest during the open water hunt (Roberge and Dunn 1990). Loss estimates from the community-based management hunts in 1999 through 2001 suggest that on average at least 17 (SD = 5; killed and lost only) and perhaps as many as 50 (SD = 15; killed and lost plus struck and escaped) animals are lost for every 100 landed (Table 14-5). The collection of struck and lost data is a key contribution of the community-based management program to improving estimates of hunting mortality.

Table 14-5. Landed harvest and loss and mortality estimates for the harvest of narwhals from the Hudson Bay population by Repulse Bay under community-based management in 1999 to 2001 (DFO unpubl. data).

Year	Narwhals landed	Loss estimate (# of animals)		Mortality estimate (# of animals)		Loss rate (% of landed harvest)	
	(#)	Killed and lost	Wounded and escaped	minimum	maximum	minimum	maximum
1999	156	30	68	186	254	19	63
2000	49	5	9	54	63	10	29
2001	100	21	38	121	159	21	59

There is strong economic pressure to land tusked males despite a preference for the *maqtaq* of juvenile narwhals (Reeves 1992a). This selection is more successful during on-ice hunts in the spring when the narwhals are shot at close range and the tusk is clearly visible, than during open-water hunts (Reeves 1976). Hunter preference for large-tusked males may lead to underestimates of numbers of females killed, given that hunters may expend more effort to retrieve male carcasses (Weaver and Walker 1988; Roberge and Dunn 1990).

Lack of reliable age data for narwhals prevents accurate prediction of reproductive and survival rates and thereby sustainable hunts. DFO (1998a) has recommended a precautionary hunting rate of 2% (DFO 1998a).

Landings from the Hudson Bay population increased from an average of 22 (SD = 9.7) whales per year over the period 1979-1998 to an average of 109 (SD = 51) whales per year over the period 1999-2001 (Table 14-4). Unusually large numbers killed by Repulse Bay hunters are responsible for this increase. Repulse Bay may have removed between 5.2 and 6.9% of the Hudson Bay narwhal population in 1999 based on the 2000 survey estimate of 1780 narwhals in the Hudson Bay population (P. Richard, DFO Winnipeg, pers. comm. 2002), assuming that up to 50% of the whales may have been submerged and therefore missed by the survey, assuming an annual rate of increase of 4%, and using the community-based mortality estimates (186-254 narwhals; Table 14-5). Indeed, population mortality in 1999 may have been higher due to predation by killer whales (Gonzalez 2001). The effects on population structure of this simultaneous removal by hunters, who prefer tusked males, and killer whales, that prefer non-tusked narwhals (Gonzalez 2001), are unknown. Hunters from the community may also have removed between 3.6 and 4.7% of the population in 2001, when they filled the community-based management limit of 100 narwhals.

The Hudson Bay narwhal population is unlikely to support the rates of removal seen in 1999 and 2001 over the long term, unless the natural rate of increase is greater than 5% per year (Stewart 2004a). In 2002, the community-based management program responded to this concern by reducing the annual harvest limit for Repulse Bay from 100 to 72 narwhals. If the population is smaller than the estimate derived in 2000 (i.e., including a correction for submerged animals) or the natural rate of increase is less than 4%, then the population would be at risk if communities that hunt narwhals from the Hudson Bay population approach their annual limits on a regular basis.

14.5.3 Bowhead

Hudson Bay Inuit have a long tradition of harvesting bowhead whales. Indeed, Ellis (1748 in Reeves et al. 1983) found a bowhead carcass with an Inuit harpoon in it floating between Cape Southampton and Mansel Island in 1746. The ancestors of present day Inuit developed specific tools and techniques to hunt bowheads and used all parts of the harvested animals (NWMB 2000). Later, after the arrival of European and American whalers, they participated in the commercial harvests until the whale populations were depleted (Ross 1974, 1975; 1979). Many Inuit still have a strong interest in harvesting bowheads for food and as part of their cultural heritage (NWMB 2000).

Whalers knew the bowhead as one of the "right" whales because of its enormous store of blubber, large quantity of baleen--the long horny plates used by the whale to filter food from the water, and tendency to float when dead (Mansfield 1985). Fine oil was rendered from the blubber before mineral oils became readily available, and a variety of products that required strength and flexibility were made from the baleen before the advent of spring steel and plastics (Leatherwood and Reeves 1983). The baleen was also known as whalebone or bone.

Commercial whaling for bowhead was initiated in 1765 by Churchill-based sloops of the Hudson Bay Company (Ross 1979). The fishery produced only 6 whales in 9 voyages and was abandoned in 1772. American vessels operating from ports in New England began the second, far more intensive period of whaling, in 1860. Between 1860 and 1915, American and British whalers killed an estimated 566 whales in northwest Hudson Bay, and very nearly extirpated bowheads from the region (Ross 1974, 1979; Mitchell and Reeves 1982; Reeves et al. 1983). There are no records of bowheads having been hunted in James Bay or southeast Hudson Bay but some whales were harvested in the Ottawa Islands (Flaherty 1918; Newspaper Clipping in PAC, MG 29, A58, Vol 8., File 5 in Reeves and Mitchell 1987).

While the large-scale whale fishery collapsed before 1916, some shore-based hunting for bowheads has continued. The hunts are usually by Inuit but sometimes with the involvement of local white residents (Mitchell and Reeves 1982; NWMB 2000). Between 1919 and 1979, about 32 bowheads from the Hudson Bay/Foxe Basin population were killed or struck and lost (i.e., 23 reported by Mitchell and Reeves 1982 in their Table 1; 9 reported by NWMB 2000:74). Since 1979, anyone hunting bowheads in Canada has required a licence from the Minister of Fisheries and Oceans (DFO 1999a). Strong arguments have been made against permitting the harvest of bowhead in the eastern Canadian Arctic until the populations are shown to have recovered to a high proportion of its initial level (Mitchell and Reeves 1982).

There were no licensed hunts between 1979 and 1996 but, in 1985, hunters at Arviat shot at a bowhead (R. Stewart, DFO, Winnipeg, pers. comm.). It is not known whether they killed the animal, but a carcass did wash ashore nearby soon afterward. In 1994, a female young-of-the-year calf from the Hudson Bay/Foxe Basin population was landed illegally near Iglulik (DFO 1999a).

A limited subsistence hunt for bowhead resumed in Nunavut in 1996 (DFO 1999a). The hunt is co-managed by the Nunavut Wildlife Management Board with advice and support from the Canada Department of Fisheries and Oceans (DFO). Hunting regulations are implemented by DFO under the *Fisheries Act* and its Marine Mammal Regulations. The sustainable harvest level for the Hudson Bay/Foxe Basin bowhead population has been estimated by DFO at about 1 whale every 2 years (i.e., potential biological removal = 0.6; DFO 1999a). However, this method of estimation may not be suitable for managing the direct exploitation of small populations (Finley 2001). In 1996, hunters from Repulse Bay were licensed to hunt a bowhead and killed an adult male, which was not secured and sank (Colbourne 1996; Kringayark 1996; van Rassel 1996). The carcass resurfaced 46 hours later, by which time the meat was unfit for human consumption. Some of the *maktaq* was eaten but much of the whale was left to rot on the shore. In 2000, Coral Harbour harvested a juvenile male bowhead from Hudson Bay, and in 2002 Igloolik/Hall Beach harvested a female from Foxe Basin (B. Dunn, DFO Winnipeg, pers.

comm.). The whales from both hunts were secured. The *maktaq* was eaten, the meat was fed to the dogs, and bone and baleen were used for carving.

14.5.4 Arctic Fox

Arctic foxes are harvested for their luxurious fur from November through April, mainly by Inuit but sometimes by Cree (Table 14-6) (JBNQNRC 1982, 1988; Gamble 1988; J. Pattimore, pers. comm.). The fur is used to make decorative clothing or sold. The proportion of the fox harvest that is taken on the sea ice is unknown.

Table 14-6. Estimated mean annual subsistence harvests of Arctic foxes by communities around Hudson Bay and James Bay. Sources listed below.

Community	Period	Source	Hunters	Human Population[1]	Arctic fox
QUEBEC					
Waskaganish	1975-6 to 1978-9	1	Cree	999	4
Eastmain	1975-6 to 1978-9	1	Cree	319	3
Wemindji	1975-6 to 1978-9	1	Cree	665	3
Chisasibi	1975-6 to 1978-9	1	Cree	1603	80
	1976-80	2	Inuit	42	2
Kuujjuarapik	1975-6 to 1978-9	1	Cree	373	10
	1976-80	2	Inuit	558	121
Umiujaq	1990	3	Inuit	-[4]	-
Inukjuak	1976-80	2	Inuit	530	1429
Puvirnituq	1941-72	4	Inuit	-	-
Akulivik	1976-80	2	Inuit	140	340
Ivijivik	No data		Inuit	-	-
ONTARIO					
Moose Factory/ Moosonee	1990	5	Cree	3000	9
Fort Albany	1990	5	Cree	625	0
Kashechewan	1990	5	Cree	1000	27
Attawapiskat	1990	5	Cree	1214	66
Peawanuck	1990	5	Cree	227	3
Fort Severn	1990	5	Cree	332	133
MANITOBA					
Churchill[2]	May 1995-Apr. 1996	7	not stated		
NUNAVUT[3]					
Arviat	1983-85	6	Inuit	1022	1190
Whale cove	1982, 1984-5	6	Inuit	188	102
Rankin Inlet	1982-85	6	Inuit	1109	
Chesterfield Inlet	1983-85	6	Inuit	249	128
Coral Harbour	1984-85	6	Inuit	429	488
Repulse Bay	1982-85	6	Inuit	352	296
Sanikiluaq	1980-84	8	Inuit	383	528
TOTAL					**4433**

Sources: 1 = JBNQNHRC 1982, 2 = JBNQNHRC 1988, 3 = INRS-Urbanisation 1990, 4 = Smith 1975, 5 = Berkes et al. 1992, 6 = Gamble 1988, 7 = McRae and Remnant 1997; 8 = J. Pattimore, pers. comm.

[1] Populations are for the Aboriginal communities except in Nunavut, where community populations ca. 1985 are listed from the 1985 Explorers Guide. The Quebec Cree populations are 5-year means 1974-5 to 1978-79 (JBNHRC 1988); the Quebec Inuit populations are from 1976 (JBNQNHRC 1982); Ontario Cree populations are from 1990, except Attawapiskat (1989) (Berkes et al. 1995).

[2] Churchill data are reported rather than estimated harvests from 67 of 182 people identified as domestic harvesters.

[3] Nunavut means based only on years with complete harvest records.

[4] Dashes indicate no data; blank cells indicate no harvest reported.

[5] 23 years of records

14.5.5 Polar Bear

Inuit and Cree hunt polar bears in Hudson Bay and James Bay (e.g., Johnston 1961; Jonkel et al. 1976; Manning 1976; Welland 1976; JBNQNHRC 1982, 1988; Gamble 1984, 1987a+b, 1988; OMNR 1985; Vandal 1987; Vandal and Adams 1988, 1989). Most of the bears are shot between September and May (Figure 14-1), when they have their thick winter pelage; females with cubs or in dens are avoided. The bears are hunted mainly

for their hides, which are sold for rugs or used to make winter clothing. The meat is eaten on occasion but must be properly cooked to avoid contracting trichinellosis (Urquhart and Schweinsburg 1984). Polar bear liver has very high vitamin A content and can be toxic to humans if eaten (Lewis and Lentfer 1967; Leighton et al. 1988). There is a strong demand for polar bear gall bladder in the Orient as an aphrodisiac.

Regulations governing polar bear harvests in the various jurisdictions around Hudson Bay and James Bay are summarized in (Table 14-7). Lunn et al. (2002a) described these regulations in detail. Boundaries of the Foxe Basin (FB), Western Hudson Bay (WH), and Southern Hudson Bay (SH) polar bear populations/management areas are shown in Figure 9-6

The current sustainable harvest of the Western Hudson Bay population is estimated to be 55 bears, which is divided between Nunavut (28) and Manitoba (27)(Calvert et al. 2002). There is no open season for hunting polar bears in Manitoba (Lunn et al. 2002a). Part of the Manitoba quota is used for bear control in and around Churchill (8 tags); the balance (19 tags) is loaned to and administered by the Government of Nunavut.

Memoranda of understanding that are based on a flexible quota system for polar bear harvests are in effect between the Government of Nunavut and the Nunaut communities that hunt polar bears in and around Hudson Bay. These documents specify quotas and other aspects of harvest management. The flexible quota system is designed to provide a “self directed” quota system that keeps the kill within the sustainable yield, while allowing each community the flexibility to harvest polar bears in a manner that suits their needs (see Appendix 1 of Lunn et al. 1998). To accrue the economic benefits of big game sport hunting some Kivalliq communities set aside a portion of their quota to be used by outside sport hunters.

Harvesting along the northern Ontario coast is restricted to hunting by Treaty Indians (Lunn et al. 2002a). Under the *Fish and Wildlife Conservation Act*, which replaced the *Game and Fish Act* on 1 January 1999, the polar bear is classified as a furbearer (Ont. Reg. 669/98). As such, there is no open season for polar bear hunting but authorization is given to some native trappers, who possess a valid trapping licence, to harvest limited numbers of bears. Authorization is required from Ontario Ministry of Natural Resources to sell any polar bear pelt. The permissible annual kill is limited to 30 bears that can be killed and sold legally in the Moosonee District, of which hunters from Fort Severn can harvest 12, hunters from Peawanuck (Winisk) 12, Attawapiskat 4, Kashechewan 1, and from Fort Albany 1 (OMNR 1985). Over the period 1970-71 to 1989-90, on average 20.8 bears were killed annually in Ontario; over the period 1990-91 to 2002-03, the average annual kill dropped to 8.5 bears (M. Obbard, OMNR pers. comm. 2004). While the current levels of harvest are believed to be sustainable, the Southern Hudson Bay population would be over harvested if Ontario hunters took the number of polar bears to which they are “entitled” (see Table 9-2).

Under the James Bay and Northern Quebec Agreement only Inuit and Cree can harvest polar bears along the Quebec coast (Lunn et al. 2002a). Guaranteed harvest levels were established under the Agreement based on the observed polar bear harvest between 1975 and 1980 (see JBNQNHRC 1982, 1988). These levels were agreed to by both Inuit and Cree and can be taken as long as the principle of conservation is respected. The current harvest levels appear to be sustainable. An agreement has been negotiated to implement a hunting season (September-May), protect females with cubs, and prohibit hunting of polar bears in their summer refuge. Polar bears that are harvested from the Quebec coast of James Bay and Hudson Bay are taken mostly from the Southern Hudson Bay population by Inuit residents of Inukjuak and Kuujjuarapik (Vandal 1987; JBNQNHRC 1988; Vandal and Adams 1988, 1989). Cree at Wemindji harvest a polar bear in some years, and those at Chisasibi harvest a few bears most years (JBNQNHRC 1982). Hunters from Sanikiluaq, in Nunavut, have historically harvested the greatest numbers of bears from the Southern Hudson Bay population (Figure 9-1)(Jonkel et al. 1976).

Table 14-7. Summary of regulations covering polar bear management in Canada as of 31 December 2000 (modified from Lunn et al. 2002a).

	JURISDICTION			
CATEGORY	**Manitoba**	**Nunavut**	**Ontario**	**Quebec**
Hunting	Closed	Season varies between Polar Bear Management Areas; longest 1 Aug-31 May; shortest 1 Jan-31 May	Closed	No sport hunting
Who can hunt	A person who posesses a ministerial permit	A person who possesses a tag. Tags are distributed by the HTOs	Permissible kill by Treaty Indians	Inuit and Indians
Quota	27 (19 on loan to Nunavut; 8 retained for Polar Bear Alert Program)	By settlement; 2000-2001 quota is 395	Permissible kill of 30 (by restricting sales over 30)	None
Females and cubs protected by law	Yes	Yes	No	Yes
Bears in dens protected by law	Yes	Yes. Also includes bears constructing dens.	No	Yes
Proof of origin of untanned bear	Documented proof	Tag on hide and export permit.	Seal on hide, proof of origin required on imported hides	Seal on hide
Export permit required and cost (out of province or territory of origin)	Required; no cost	Required; no cost. There is a $750.00 Trophy Fee for non-residents and non-resident aliens.	Required; no cost	Required; no cost
Export permit out of Canada	Required by CITES for all polar bears or parts thereof exported out of Canada; obtained in province or Territory exporting from.			
Scientific Licences	Discretion of Minister	Discretion of Superintendent of Wildlife	Discretion of District Manager	Discretion of Minister
Selling of hide by hunter	Subject to conditions of ministerial permit	Yes, must have tag attached	Must be sealed by Ministry staff	Must be sealed; fee 5% of average value of last 2 years
Basis of Regulation	The Wildlife Act; reclassified as a protected species in 1991	Wildlife Act and Regulations	Fish and Wildlife Conservation Act, 1997 (Statutes of Ontario, 1997, Chapter 41)	Wildlife Conservation and Management Act 1983; Order in Council 3234-1971; Bill 28-1978 (James Bay Agreement)
Fur Dealer Authority	$25.00 general; $25.00 travelling	$200.00 Fur Dealer's Licence for first year, $100.00 each year after	$28.00 licence	$335.00 licence
Taxidermy	$30.00 licence	$100.00 Taxidermist Licence for first year, $50.00 for each year after	See Tanner's Authority	See Tanner's Authority
Tanners Authority	$30.00 licence	$100.00 Tanner's Licence for first year, $50.00 for each year after	Fish and Wildlife Conservation Act 1997 ($28.00 licence)	$256.00 Tanner's Licence
Live Animal Capture	Ministerial Permit	$5.00 licence to capture live wildlife	Ministerial Permit	Ministerial Permit
Live Animal Export	Ministerial Permit	Licence to Export Live Wildlife, $3000/polar bear	Ministerial Permit	Ministerial Permit

Data on the mean annual kill from the three polar bear populations that inhabit Hudson Bay and James Bay are summarized over the 5-year period 1995-1996 to 1999-2000 in Table 9-2. Data are also presented on the proportion of females taken. The current harvest from each of the populations is believed to be sustainable (Lunn et al. 2002a).

14.5.6 Walrus

Walruses are an important part of the Inuit marine mammal harvest in Hudson Bay, but have rarely been harvested from James Bay since ca. 1934 (Fleming and Newton 2003). Inuit and Indian natives of Canada can kill up to four walruses per year without a licence, except where community quotas limit annual catches; non-natives require a licence under the Marine Mammal Regulations or Aboriginal Communal Fishing Licence Regulation of the *Fisheries Act* to hunt walruses (DFO 2003). Since 1980, Coral Harbour has had an annual harvest quota of 60 walruses and Sanikiluaq of 10 walruses (Strong 1989). The quota system is under review by the Nunavut Wildlife Management Board, which is considering new ways of managing the walrus hunt (Stewart 2002). There are two putative stocks of walruses in Hudson Bay, the Hudson Bay/Davis Strait Stock, and the South and East Hudson Bay Stock (see also Section 9.8).

Communities along the west coast of Hudson Bay harvest walruses from the northern Hudson Bay portion of the Hudson Bay/Davis Strait Stock (Figure 9-9). These harvests increase from south to north and hunters often have to travel north into the Coats Island area to find walrus herds (Table 14-8). There are no recent reports of walruses being harvested at Churchill, Manitoba; they are rarely harvested at Arviat, irregularly at Whale Cove, and more commonly further north (Gamble 1988, Strong 1989; Fleming and Newton 2003). Timing of the harvests varies between communities. All of the communities harvest animals at the ice edge but the largest harvests are typically taken during the open water season in the Repulse Bay (September-October) and Coral Harbour-Coats Island (July-September) areas (Gamble 1984, 1987a+b, 1988).

Table 14-8. Walrus landings from stocks in Hudson Bay, by community, from 1993 through 2002. Landings from sport hunts are included in these totals. Sources listed below.

Community	Quota	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
HUDSON BAY/DAVIS STRAIT STOCK											
Kivalliq											
Arviat	-	0	0	0	0	nd	0	2	1	nd	nd
Chesterfield Inlet	-	6	0	3	12	nd	0	nd	5	nd	nd
Coral Harbour	60	55	31	48	12	nd	9	8	1	nd	nd
Rankin Inlet	-	4	2	6	12	nd	12	nd	7	nd	0
Repulse Bay	-	25	8	0	2	0	0	2	1	nd	0
Whale Cove	-	2	0	0	0	nd	0	0	0	nd	1
Nunavik											
Ivujivik	-	33	nd	20	7	23	1	7	5	14	10
Akulivik	-	1	9	nd	3	9	10	3	3	6	14
Puvirnituq	-	12	3	nd	4	6	0	4	6	6	13
SOUTH and EAST HUDSON BAY STOCK											
Sanikiluaq	10	nd	0	nd	nd	4	nd	1	0	0	15
Kuujjuarapik	-	0	0	0	0	2	0	1	0	0	0
Umiujaq	-	1	0	0	0	0	0	0	0	0	0
Inukjuak	-	nd	5	10	11	5	8	0	0	0	0

Sources: Brooke 1997; DFO 1995, 1996, 1997, 1998; D. Baillargeon, DFO, pers. comm. 2003; I. Itorcheak, DFO pers comm. 2003.

While walruses are harvested year-round by hunters from Coral Harbour, with the largest harvests typically taken during the open water season (Gamble 1988), residents participating in the traditional knowledge study of Hudson Bay indicated that they eat walrus in January, February and April (Fleming and Newton 2003). This apparent discrepancy may be related to the consumption of aerobically fermented walrus meat, called *igunak* (R. Stewart, DFO Winnipeg, pers. comm.). This process involves sewing walrus meat into a walrus skin bag, burying it on the beach, and then recovering and eating the contents after they have fermented and aged. Care

must be taken to ensure that the meat does not ferment anaerobically, for example in sealed plastic bags, to avoid botulism (Proulx et al. 1997, 2002).

Residents of Puvirnituq, Akulivik, and Ivujivik regularly harvest walruses from the Hudson Strait portion of the Hudson Bay/Davis Strait Stock (JBNQNHRC 1988; Olpinski 1990; Brooke 1997). Most animals are killed during the open water season, often in September and October, near Nottingham and Salisbury islands (Olpinski 1990; Brooke 1997).

Hunters from Inukjuak, Kuujjuarapik, Umiujaq, and Sanikiluaq harvest walruses from the South and East Hudson Bay Stock (Table 14-8). Kuujjuarapik and Umiujaq harvest the occasional walrus in some years, typically along the Hudson Bay Arc coast, while Sanikiluaq and Inukjuak harvest a few walruses on average each year (JBNQNHRC 1988; Strong 1988; Olpinski 1990, 1993; Portnoff 1994). Historically, walruses in southeastern Hudson Bay and James Bay were hunted mainly during the open water season at their haulouts (Twomey 1939; May 1942; Manning 1946, 1976; Freeman 1964; Olpinski 1990; Reeves 1995a; Fleming and Newton 2003) (Figures 9-10 and 9-11). They were also killed in winter and spring at the floe edge or in spring as they slept on floating ice pans. Most recent hunting in this region has taken place in late summer and fall (September and October) at the Sleeper Islands ((Figure 14-1) (Manning 1976; Schwartz 1976; Olpinski 1990, 1993; Portnoff 1994; Brooke 1997; Fleming and Newton 2003). In 1992 and 1993, hunters from Inukjuak visited the Ottawa Islands where they failed to locate walruses, before travelling to the Sleepers for successful hunts (Olpinski 1993; Portnoff 1994). Cree living around James Bay and southern Hudson Bay seldom travel offshore to hunt walruses (Johnson 1961) but harvested them occasionally in the past (Fleming and Newton 2003).

NWMB approval is required to transfer individual hunting rights to non-beneficiaries wishing to hunt walruses for sport. Sport hunts for walruses have been approved annually since 1996 in the Coral Harbour area (P. Hall, DFO, Winnipeg, pers comm. 2003). These hunts harvested 1 animal in 1996/97, 5 in 1997/98, 2 in 2001/02, and 2 in 2002/03. Repulse Bay was approved to conduct sport hunts for walrus in 2002/03, but none were landed.

Walruses are harvested mainly for their ivory tusks, which are either sold or carved for sale, and for their meat, which is eaten or fed to the dogs (Freeman 1964; Schwartz 1976; Born et al. 1995). They are harvested and eaten on a seasonal basis depending upon availability, which varies among communities (Fleming and Newton 2003). For example, they are typically eaten in the fall in the Belcher Islands; during the boating, fall, and early winter seasons in Repulse Bay (i.e., mostly in September and October—see Gamble 1988); and yearround but mainly in late summer and early fall at Coral Harbour (i.e., July-September—see Gamble 1988).

In the past, Inuit used ivory to construct harpoons, make toggles and handles, shoe sledges, and for protective edges on kayak paddles. The thick skin was used to make summer tents. Molluscs in the walrus' stomach are considered a delicacy by area Inuit (H.E. Welch, DFO, Winnipeg, pers. comm. 1991). Indians occasionally harvested walruses in the past to feed dog teams, and made rope from the tough hide (Fleming and Newton 2003). They only ate walruses when there was no other food. Both Inuit and Cree participants in the Hudson Bay Programme traditional knowledge studies reported that they "*knew walrus better when they were still using dog teams*". This is indicative of changing harvest patterns.

Walrus meat must be well cooked as it sometimes contains the parasite, *Trichinella nativa*, which causes trichinellosis (Pozio et al. 1992; Serhir et al. 2001). This parasite has been identified in earlier literature as *T. spiralis* (e.g., Born et al. 1982). Walrus-related outbreaks of this disease were reported at Inukjuak in 1997, and in Repulse Bay in 2002, and the problem is widespread in the Canadian eastern Arctic (Serhir et al. 2001; Hill 2003). A program is in place in Nunavik to prevent further outbreaks, by screening samples from harvested walruses before each animal is eaten (Proulx 2002). Similar testing is planned for Nunavut at a laboratory in Rankin Inlet (Hill 2003). There is serological evidence that some walruses in the Igloolik area may have sporadically been infected with the bacterium *Brucella* sp., which can infect humans (Nielsen et al. 1996). Inuit recognize the livers of

seal-eating walruses by their “cooked appearance” and avoid eating them (Fleming and Newton 2003). The livers of these walruses are inedible, as they contain toxic concentrations of Vitamin A (Bruemmer 1977; Reeves 1995a).

COSEWIC currently is reassessing the status of the walrus populations in Hudson Bay (Stewart 2004b). Too few data are available to determine whether there are trends in the size of the Hudson Bay/Davis Strait or South and East Hudson Bay populations, or whether current harvests are sustainable. Observations that they have abandoned a number of haulouts in western Hudson Bay and James Bay since the early 1900’s suggest that harvesting or other human activities may be reducing these populations or causing them to move elsewhere, and that more information is required if sustainable hunts are to be assured.

14.5.7 Bearded Seal

Regulations governing the harvest and management of seals in Canada are implemented by DFO under the Marine Mammal Regulations of the *Fisheries Act*. These regulations permit Indians and Inuks to kill seals for food, or for social or ceremonial purposes without a licence. Beneficiaries of land claims agreements can also do so without a licence within the area covered by the agreement under which they are enrolled. Other residents of Hudson Bay and James Bay, which lie within Sealing Area 3, can hunt seals for food without a licence. Seals cannot be killed for sport. There are no restrictions on the sale or trade of seal pelts but a Marine Mammal Transportation Licence (export permit) is required to transport seal products across territorial/provincial boundaries.

Bearded seals are an important resource for Inuit (Smith 1981; Gamble 1984, 1987a+b, 1988; Stewart et al. 1986; JBNQNHRC 1988) and, to a lesser extent, Cree (Johnson 1961; JBNQNHRC 1982; Berkes and Freeman 1986) throughout coastal areas of Hudson and James bays. Hunting takes place mainly during the open water season but also at the floe edge or in pack ice (Figure 14-1) (Freeman 1964; Schwartz 1976). While bearded seals are harvested year-round, few are harvested between November and March when they are in the pack. Their meat is eaten or used to feed dogs and their skins are used to make tough, flexible rope and specialty items of clothing such as boot soles (Sutton and Hamilton 1932; Freeman 1967; Mansfield 1967a+b; Welland 1976; JBNQNHRC 1982; Saladin d'Anglure 1984; Stewart et al. 1986). Care must be taken in cooking the meat since it is occasionally infected with *Trichinella* sp., the parasite that causes trichinellosis (Mansfield 1967a). The liver can contain toxic levels of vitamin A.

There was interest in the late 1950's and early 1960's in increasing the availability of marine mammals, including belugas and bearded and ringed seals, to Belcher Islands Inuit--primarily as a means of ensuring against starvation and secondarily for regional economic development (McLaren and Mansfield 1960; McLaren 1962; Mansfield 1978; Freeman 1967). While the area supported a relatively large seal population the prevalence of bad weather in the open water season limited hunting. To circumvent this problem, harvesting experiments were conducted using nets. The netting was successful but there was little interest on the part of Inuit in using this technology to increase their harvests (Mansfield 1978). Subsequent decreases in the international price of seal pelts have meant that there is little commercial sealing for the species, so hunters harvest seals mostly for their own requirements (Berkes and Freeman 1986).

Few reliable harvest statistics are available for bearded seals, because they are taken for subsistence and in relatively small numbers (Cleator 1996). Data from several harvest studies in the 1980’s provide a general sense of the species’ importance, bearing in mind that a bearded seal can weigh 5 times more than a ringed seal (Table 14-9). A general decline in the harvest of bearded seals may have occurred since these studies were conducted (Cleator 1996), perhaps related to changes in lifestyle or in commercial demand for sealskins (Stewart et al. 1986).

14.5.8 Harbour Seal

Hunters harvest small numbers of harbour seals along the Quebec (JBNQNHRC 1988) and Nunavut coasts (Gamble 1984, 1987a+b, 1988) (Table 14-9). The relative numbers taken from coastal and fresh waters are not known. The skins of these seals are prized for making decorative boots and clothing and their meat and blubber are eaten or fed to the dogs (Freeman 1964; Mansfield 1967a; Welland 1976). In the Belcher Islands, most harbour seals are killed from a distance at their haulouts using high-powered rifles (Freeman 1964). They are very difficult to hunt in the water since they swim powerfully, are very timid, and sink immediately when killed. Before the widespread use of firearms on the Belcher Islands, they were hunted almost exclusively in summer along the Kasegalik River. Stone blinds were erected at certain rapids and the seals were ambushed as they ascended the rapids. They would also be clubbed as they came on land to by-pass a particular set of falls. Along the west coast of Hudson Bay, most harvesting takes place in summer at the heads of bays, where the water is freshest, but Inuit from Coral Harbour also hunt them at the floe edge in winter (Welland 1976).

The harbour seal's localized distribution in the Arctic makes its future somewhat precarious, since Inuit know exactly where to find it and it is an easy target when hauled out on land or swimming in a shallow stream (Mansfield 1967b; see Section 14.5.7 for sealing regulations). Some hunting occurs at the Churchill River and its estuary, and Manitoba Natural Resources has harvested seals on occasion from the area as bait for live-trapping polar bears (Remnant 1997). An active campaign to discourage harvesting of seals in the lower Churchill River was initiated in 1999 at the request of DFO (Bernhardt 2000).

14.5.9 Ringed Seal

Ringed seals are a very important natural resource for Inuit and Cree living along the coasts of Hudson Bay and James Bay (e.g., Johnson 1961; Smith 1975; Schwartz 1976; Welland 1976; Bauer 1980; Honigmann 1981; Preston 1981; JBNQNHRC 1982, 1988; Gamble 1984, 1987a+b, 1988; Saladin d'Anglure 1984; Berkes and Freeman 1986; Wein et al. 1996; McDonald et al. 1997; Cleator 2001; Reeves et al. 2001). Indeed, the site for Whale Cove was chosen because it is close to the floe edge and consequently a good area for seal hunting (Brack and McIntosh 1963). Ringed seals are harvested year-round, with most harvesting taking place from June through October (Figure 14-1) (Freeman 1964; Gamble 1988; McDonald et al. 1997; Cleator 2001). In general, the greatest subsistence harvests are taken from eastern Hudson Bay by Inuit from Sanikiluaq, Inukjuaq, and Kuujjuarapik (Table 14-9). Catches from James Bay generally are small, the largest of them coming from Chisasibi and Wemindji on the Quebec coast and Attawapiskat on the Ontario coast. This may reflect both the fact that Indians have not traditionally been hunters of sea mammals, and that seal densities may be lower and hunting conditions poorer due to the earlier breakup and later freeze-up.

The meat is eaten or used for dog food, and the skins are used to make clothing and crafts. The relatively low salinity of waters in James Bay and southeastern Hudson Bay makes seals more susceptible to sinking when they are shot, so care must be taken by the hunters to harpoon them before they are killed (McLaren and Mansfield 1960; Freeman 1964).

While ringed seals are still a vitally important resource for subsistence harvesters, the economic profit from commercial sealing has declined substantially with the advent of anti-sealing protests and the 1982 European trade embargoes. In 1980-81, immediately prior to the embargoes hunters in the Northwest Territories sold 42,120 pelts worth $890,298, while in 1983-84 they sold just 7,689 pelts worth only $76,581 (Stewart et al. 1986).

Seal meat, likely mainly ringed seal, was processed for commercial sale by the fish plant at Daly Bay and later Rankin Inlet between 1964 and 1970 (McConnell 1971; Lantz and Iredale 1972). Seal processing ended in 1970, with the discovery of high levels of mercury in marine mammal flesh and decreasing local demand for the products (Carder and Peet 1983).

Table 14-9. Estimated mean annual subsistence harvests of seals by communities around Hudson Bay and James Bay. Sources listed below.

Community	Period	Source	Hunters	Population[1]	ringed seals	bearded seals	harp seals	harbour seals	Seal spp.
QUEBEC									
Waskaganish	1975-6 to 1978-9	1	Cree	999					7
Eastmain	1975-6 to 1978-9	1	Cree	319					9
Wemindji	1975-6 to 1978-9	1	Cree	665					151
Chisasibi	1975-6 to 1978-9	1	Cree	1603					367
	1976-80	2	Inuit	42	14	1			
Kuujjuarapik	1975-6 to 1978-9	1	Cree	373					123
	1976-80	2	Inuit	558	1899	84	3	1	
Umiujaq	1990	3	Inuit	-[4]	762	-	-	-	-
Inukjuak	1976-80	2	Inuit	530	2081	190	7	6	
Puvirnituq	1941-72	4	Inuit	-	419[5]	-	-	-	-
Akulivik	1976-80	2	Inuit	140	675	94	4	1	
Ivijivik	No data		Inuit	-	-	-	-	-	-
ONTARIO									
Moose Factory/ Moosonee	1990	5	Cree	3000					
Fort Albany	1990	5	Cree	625					
Kashechewan	1990	5	Cree	1000					
Attawapiskat	1990	5	Cree	1214					
Peawanuck	1990	5	Cree	227					
Fort Severn	1990	5	Cree	332					
MANITOBA									
Churchill[2]	May 1995-Apr. 1996	7	not stated						29
NUNAVUT[3]									
Arviat	1983-85	6	Inuit	1022	328	28	4	2	
Whale cove	1982, 1984-5	6	Inuit	188	169	14	1	3	
Rankin Inlet	1982-85	6	Inuit	1109	454	23	2	3	
Chesterfield Inlet	1983-85	6	Inuit	249	66	2			
Coral Harbour	1984-85	6	Inuit	429	748	58	49	6	
Repulse Bay	1982-85	6	Inuit	352	605	20	18		
Sanikiluaq	1980-84	8	Inuit	383	2771	125	-	3	-
TOTAL					7801	513	88	22	686

Sources: 1 = JBNQNHRC 1982, 2 = JBNQNHRC 1988, 3 = INRS-Urbanisation 1990, 4 = Smith 1975, 5 = Berkes et al. 1992, 6 = Gamble 1988, 7 = McRae and Remnant 1997; 8 = J. Pattimore, pers. comm.

[1] Populations are for the Aboriginal communities except in Nunavut, where community populations ca. 1985 are listed from the 1985 Explorers Guide. The Quebec Cree populations are 5-year means 1974-5 to 1978-79 (JBNHRC 1988); the Quebec Inuit populations are from 1976 (JBNQNHRC 1982); Ontario Cree populations are from 1990, except Attawapiskat (1989) (Berkes et al. 1995).

[2] Churchill data are reported rather than estimated harvests from 67 of 182 people identified as domestic harvesters.

[3] Nunavut means based only on years with complete harvest records.

[4] Dashes indicate no data; blank cells indicate no harvest reported.

[5] 23 years of recordsHarp Seal

14.5.10 Harp Seal

Inuit from Nunavut and Nunavik harvest small numbers of harp seals from Hudson Bay (Sergeant 1976, 1986; Gamble 1984, 1987a+b, 1988; Stewart et al. 1986; JBNQNHRC 1988). The meat is used for dog food or eaten, and the skins are used to make clothing or handicrafts or are sold to southern fur markets (Welland 1976). European embargoes have nearly eliminated commercial sales of the skins (Stewart et al. 1986).

14.6 BIRDS

Under the *Migratory Birds Convention Act, 1994,* subject to their existing rights and the regulatory and conservation regimes in the relevant treaties and agreements, Cree and Inuit may harvest migratory birds and their eggs, down, and inedible products year-round. This applies to both game birds, such as geese and ducks, and non-game birds, such as loons and guillemots. The down and inedible products may be sold but the birds and eggs can only be offered for barter, exchange, trade, or sale within or between Aboriginal communities as provided in the relevant treaties and agreements.

Migratory waterfowl comprise a significant portion of the diet of Cree and Inuit living along the coasts of Hudson Bay and James Bay (Table 14-10). They are important in particular to the Cree and to Inuit in eastern Hudson Bay, culturally, nutritionally, and economically (Hanson and Currie 1957; Freeman 1970b; Quigley and McBride 1987; Gamble 1988; Berkes et al. 1995; McDonald et al. 1997). While the subsistence harvest is essentially unregulated, Cree have a socially-enforced, traditional system for regulation of the goose hunt, comprising territories and rules which are designed to minimize disturbance of goose populations (Berkes 1982b). Waterfowl are also harvested for sport and attract non-resident hunters to tourist camps, particularly along the Manitoba and Ontario coasts of Hudson Bay, and the James Bay coast of Ontario. Seabirds, in particular thick-billed murres and black guillemots, and resident waterfowl, such as the Hudson Bay eider duck, are also important but are harvested mostly in the Belcher Islands and along the northeast coast of Hudson Bay.

The subsistence harvest of waterfowl by Cree along the Ontario coast of James Bay and Hudson Bay consists predominately of Canada geese in the spring and lesser snow geese (blue and snow geese) in the fall (Figure 14-1) (Prevett et al. 1983; Berkes et al. 1992, 1995). There is considerable variation in the annual harvests. With the exception of Kashechewan, Cree hunters largely avoid Canada geese in the fall because they develop a somewhat “fishy” taste on account of their marine feeding habits. In the spring, lesser snow geese are more readily available in northern than southern James Bay. Ontario Cree take mostly black ducks and mallards in the south, and more pintails in the north. Cree along the Quebec coast take more brant and may take a greater variety of other migratory waterfowl.

Canada geese dominate the subsistence harvest of waterfowl by Cree and Inuit along the Quebec coast and in the Belcher Islands (JBNQNHRC 1982, 1988). The majority of these geese are taken in the spring, except at Chisasibi and Kuujjuarapik, where the fall harvests are a bit larger (Figure 14-1). The harvest of lesser snow geese is smaller but still substantial. The majority of the Inuit harvest occurs in the spring, except in the Belchers where the majority of these geese are taken in the fall. Cree harvest snow geese mainly in the fall. Hunters from Wemindji and Chisasibi harvest well over half of the brant and loons taken from James Bay and Hudson Bay. The loons, mainly red-throated and common, are taken mostly in the spring and the brant in the fall. While fewer brant than other geese are harvested, the harvest is very significant in relation to the stock size and harvests by other user groups (Berkes 1982b; Berkes et al. 1992). Eiders make up the lions share of the duck harvest by Quebec Inuit, who also harvest mergansers, scoters, thick-billed murres, black guillemots, and snowy owls for food (JBNQNHRC 1988). The murres may also be vulnerable to harvest in Labrador and Newfoundland (Gaston 2002).

Table 14-10. Estimated mean annual subsistence harvests of key bird species by communities around Hudson Bay and James Bay. Sources listed below.

Community	Period	Source	Hunters	Population[1]	Canada geese	snow and blue geese	brant geese	ducks	waterfowl eggs	loons	murres	guillemots
QUEBEC												
Waskaganish	1975-6 to 1978-9	1	Cree	999	7509	9734	26	3322		25		
Eastmain	1975-6 to 1978-9	1	Cree	319	6154	1034	17	1900		81		
Wemindji	1975-6 to 1978-9	1	Cree	665	9069	1262	1892	4390		742		
Chisasibi	1975-6 to 1978-9	1	Cree	1603	29906	5683	4175	13632		1430		
	1976-80	2	Inuit	42	500	28	33	174	43	35	15	8
Kuujjuarapik	1975-6 to 1978-9	1	Cree	373	5040	2668	80	3356		426		
	1976-80	2	Inuit	558	4672	2926	478	2978	1604	440	37	79
Umiujaq	no data		Inuit	-[4]	-	-	-	-	-	-	-	-
Inukjuak	1976-80	2	Inuit	530	6603	1209	301	3988	3439	120	41	551
Puvirnituq	no data		Inuit	-	-	-	-	-	-	-	-	-
Akulivik	1976-80	2	Inuit	140	1170	453	15	800	2082	29	18	22
Ivijivik	no data		Inuit	-	-	-	-	-	-	-	-	-
ONTARIO												
Moose Factory/	1974-76	6	Cree	-	2639	8646	4	2837				
Moosonee	1990	5	Cree	3000	11369	10973	22	6940				
Fort Albany	1974-76	6	Cree	-	3608	6378	15	2155				
	1990	5	Cree	625	3229	1006		939				
Kashechewan	1974-76	6	Cree	-	5616	7383	48	3112				
	1990	5	Cree	1000	14769	14931	228	8197				
Attawapiskat	1974-76	6	Cree	-	7275	9204	105	3187				
	1990	5	Cree	1214	16853	13750	-	-				
Peawanuck	1974-76	6	Cree	-	1921	3839	14	1004				
	1990	5	Cree	227	3932	5228		870				
Fort Severn	1974-76	6	Cree	-	1675	2637	12	338				
	1990	5	Cree	332	6210	9329	366	456				
MANITOBA												
Churchill[2]	May 1995- Apr. 96	8	not stated	-	327	249		142				
NUNAVUT												
Arviat	1983-85	7	Inuit	1022	352	409		14	641			
Whale cove	1982, 1984-5	7	Inuit	188	76	258		10	375			
Rankin Inlet	1982-85	7	Inuit	1109	481	243	11	22	175			
Chesterfield Inlet	1983-85	7	Inuit	249	55	9		4	16			
Coral Harbour	1984-85	7	Inuit	429	96	4905	5	39				
Repulse Bay	1982-85	7	Inuit	352	11	16		12				9
Sanikiluaq	no data	9	Inuit	383	2260	1091	658	6856	-	-	20	384
TOTAL (includes Ontario harvests from 1990 but not 1974-76)					130643	87392	8307	59041	8374	3328	131	1053

Sources: 1 = JBNQNHRC 1982, 2 = JBNQNHRC 1988, 3 = INRS-Urbanisation 1990, 4 = Smith 1975, 5 = Berkes et al. 1992, 6 = Prevett et al. 1983, 7 = Gamble 1988, 8 = McRae and Remnant 1997, 9 = J. Pattimore, pers. comm..

[1] Populations are for the Aboriginal communities except in Nunavut, where community populations ca. 1985 are listed from the 1985 Explorers Guide. The Quebec Cree populations are 5-year means 1974-5 to 1978-79 (JBNHRC 1988); the Quebec Inuit populations are from 1976 (JBNQNHRC 1982); Ontario Cree populations are from 1990, except Attawapiskat (1989) (Berkes et al. 1995).

[2] Churchill data are reported rather than estimated harvests from 67 of 182 people identified as domestic harvesters.

[3] Nunavut means based only on years with complete harvest records. [4] Dashes indicate no data; blank cells indicate no harvest reported.

The common eider is the most important duck to Inuit living on the coast of Hudson Bay and is particularly important to people in the Belcher Islands (JBNQNHRC 1982; Quigley and McBride 1987; McDonald et al. 1997). The species is harvested year-round for meat, skin and feathers, and nests are raided for eggs and nest down (Reed 1986). Historically the skins have been used to make fine parkas and pants, and there has been a small export of eiderdown. In the Belchers, there is ongoing interest in the commercial harvest potential of eider down (G. Gilchrist, CWS pers. comm. 2003). The species' importance is reflected in the language of Belcher Island Inuit, which has a well-developed nomenclature to describe the stages of egg and bird development (Nakashima 1988). Inuit from Sanikiluaq may eat the meat, wings, feet, gizzard, liver and heart of waterfowl (Wein et al. 1996). The meat and gizzard may be eaten cooked or raw.

Inuit in Kivalliq are far less reliant on waterfowl for food than those in Quebec (Table 14-10)(Gamble 1988; JBNQNHRC 1988). Kivalliq Inuit take Canada geese for subsistence mainly in the spring, except in the Coral Harbour where most are harvested in the fall (Gamble 1988). Most snow geese are taken in the spring, the vast majority by hunters from Coral Harbour. Few brant, Ross's geese, ducks, or guillemots are harvested but the southernmost communities do collect modest numbers of goose and duck eggs in the spring.

Non-native residents and visitors hunt geese and ducks for sport in the fall, particularly along the south coast of Hudson Bay and west coast of James Bay. There are many commercial hunting camps located along the Manitoba and Ontario coasts (OMNR 1985; Travel Manitoba 2003), and the fall harvest by their clients is substantial. In 1979 through 1983, an average of 964 hunters visited goose camps along the Ontario coast of James Bay and Hudson Bay annually, killing an overall average of 8,598 geese and 1,927 ducks annually (OMNR 1985). Non-native resident hunters of Moosonee and Moose Factory harvested over 5,000 birds, mostly snow geese, in the fall of 1982 (~13 birds/hunter). Measures to increase the sport harvest of lesser snow geese, including spring hunts and the use of special methods such as electronic call and bait, were begun in selected areas of Manitoba and Quebec in 1999 and 2000, in the spring of 2001 in Nunavut (CWS Waterfowl Committee 2004). Non–residents wishing to hunt north of the 52nd parallel in Quebec must use the services of an outfitter.

14.7 SUMMARY

Renewable resource harvesting has been, and is, a significant stressor of the Hudson Bay marine ecosystem. Its longterm effects on some populations of whales, walruses, and Arctic charr have been relatively well documented but the effects on other species and on marine habitats are poorly known.

The Nunavut Wildife Management Board (NWMB) makes all decisions relating to fish and wildlife in Nunavut, including setting quotas and non-quota limitations (e.g., fishing and hunting seasons, methods of harvest), approving management plans, and approving the designation of endangered species. Harvest restrictions or quotas that were in force on the date immediately prior to ratification of the Nuanvut Land Claims Agreement (Sec. 5.6.4), remain in effect until removed or otherwise modified by the Board. While keeping many of the established harvest quotas in the Hudson Bay marine ecosystem, this co-management board has instituted a flexible quota system for polar bear hunts by Kivalliq communities and approved community-based management of the Repulse Bay narwhal hunt, to give communities greater responsibility and flexibility in the management of their renewable resources. Ultimate approval of the NWMB decisions rests with Ministers in the governments of Nunavut and Canada who can only reject or modify a NWMB decision if it interferes with Inuit harvesting rights, creates concern with respect to species conservation, or results in a public health or safety concern. The NWMB relies on the government departments for scientific research and advice, and for regulatory support and enforcement. Its decisions are implemented under legislation by the appropriate government department.

Harvest management along the Quebec coast and its estuaries changed with signing of the James Bay and Northern Quebec Agreement (1976). Under this agreement, Inuit and Cree beneficiaries of the agreement are guaranteed certain levels of harvest, which are to be maintained unless their continuation is contrary to the

principles of conservation. The Makivik Offshore Claim, which is under negotiation, will cover the coastal areas around western and northern Quebec. If approved, it may alter the management of fish and wildlife offshore the Nunavik coast in a fashion similar to the Nunavut agreement. The responsible department of the Federal or Provincial Government manages fish and wildlife hunts along the Ontario and Manitoba coasts.

Priority is given to Inuit and Cree subsistence harvesters when resources in Hudson Bay and James Bay are allocated. Where animal populations harvested by Nunavut and/or Nunavik are considered at risk of overharvesting, the total allowable harvest they can sustain and the basic needs level for native subsistence is determined. If there is a surplus in the allowable harvest it is allocated, in order of preference, to non-native residents for personal consumption, to sustain existing sport and commercial ventures, to provide for economic ventures sponsored by native organizations, and to other users.

Biota harvested from the coasts and waters of Hudson Bay and James Bay are vitally important to the Inuit and Cree. Locally, the mix of species taken and the timing of the harvests vary depending upon the animal's seasonal movement patterns, harvesting conditions, and cultural traditions. Traditionally, Inuit around Hudson Bay have harvested anadromous fishes, marine mammals, and waterfowl; some have also harvested marine plants and invertebrates. Cree along the coasts of James Bay and southern Hudson Bay harvest more migratory waterfowl but few marine mammals, and different species of anadromous fishes. Both cultures harvest some seabirds and neither has a tradition of offshore marine fishing. Most species are harvested near the coast during the open water season. But, some Arctic charr and migratory waterfowl are harvested during breakup, polar bears are harvested mostly on the winter sea ice, and seals and eider ducks are harvested year-round. Historically, marine plants and animals have provided both cultures with food, fuel, and materials to make clothing, shelter, and equipment. Today, the imputed value of these subsistence harvests on a per capita basis is substantial.

Harvesting has reduced the populations of several species in Hudson Bay. Between 1860 and 1915, American and British whalers killed an estimated 566 bowheads in northwest Hudson Bay, and nearly extirpated them from the region. Since then few bowheads have been harvested. They are considered endangered and a licence from the Minister of Fisheries and Oceans is required to hunt them. Commercial fisheries harvested a combined total of at least 8,294 belugas from Grande rivière de la Baleine and Petite rivière de la Baleine between 1852 and 1868. The eastern Hudson Bay beluga population was much reduced by these harvests and has not recovered. It is considered threatened and a quota has been placed on the subsistence harvest. Local demand for *maqtaq* has not been satisfied under these limits, so *maqtaq* has been imported from western Hudson Bay, shifting some harvesting pressure onto belugas summering in that area. Abandonment of haulouts by walruses in Hudson Bay and James Bay suggests that harvesting activities have also reduced walrus populations and/or caused them to relocate. While commercial and sport fisheries are regulated, overharvesting can occur in areas that also support large subsistence fisheries. One such area is the Diana River near Rankin Inlet, where commercial fishing has been stopped and sport and subsistence fishing reduced to facilitate population recovery.

Knowledge of the number of organisms harvested each year is limited by the quality of the harvest data, which depends upon the type of harvest (subsistence, commercial, sport), the species harvested, interest on the part of the compiler, and the community. Subsistence and sport harvest levels are not well documented for fish, bird, and seal species. These animals are killed for personal use and limits have not been placed on the subsistence harvest, so their removal is seldom monitored. This information gap seriously limits understanding of the impacts of harvesting on the Hudson Bay marine ecosystem, as most animals are harvested for subsistence. Better records are available for the larger marine mammal species that are harvested for subsistence, and occasionally for sport, and for commercial fisheries. Concern over the ability of beluga, narwhal, bowhead, polar bear, and walrus populations to support current rates of removal has resulted in regulation, and therefore monitoring, of at least some harvests of these species. There is no commercial whaling in the region and European embargoes that began in 1982 have nearly eliminated commercial sealing. Few trends in harvest patterns can be identified. A new study of subsistence harvesting in Nunavut, which may be useful for trend identification, was not available at writing.

The effects of current levels of harvest are seldom well understood, and the annual harvests vary widely. Often too little is known of the population sizes, movements, reproductive potential, natural mortality, and vulnerability to harvest in the region, and beyond, to clearly identify the impact of a particular harvest level on a population. Because sustainable harvest levels are often uncertain, managers must take an experimental approach to harvest management. Current harvest levels of eastern Hudson Bay belugas, and south and east Hudson Bay walruses may not be sustainable. Likewise, the Hudson Bay narwhal population is unlikely to support the rates of removal seen in 1999 and 2001 over the long term. In 2002, the community-based management program responded to this concern by reducing the annual harvest limit for Repulse Bay from 100 to 72 narwhals. Small groups of harbour seals are predictably available in confined areas of open water and at estuaries. This makes them very vulnerable to overharvesting. A public education program has been undertaken to reduce harvests from the Churchill River estuary. Harvests of other populations and species likely are sustainable at present, but the Southern Hudson Bay population would be over harvested if Ontario hunters took the number of polar bears to which they are “entitled”. James Bay may provide a refuge for belugas and walruses, as Cree around the bay do not have a well-developed tradition of harvesting these animals. Climate change may alter the growth, survival, and reproductive potential of some, perhaps many, species and their ability to sustain harvests.

Hunt management in the region is complicated by the migrations of many of the harvested species between jurisdictions. Coastal Arctic charr quotas in western Hudson Bay, for example, specify the fishing area and can target fish from several stocks as they move along the coast. Harp and hooded seals excepted, few of the migratory marine mammals are vulnerable to harvest outside the coastal waters of Nunavut and Nuanvik. Migratory waterfowl and seabirds however, may be vulnerable to harvest from the High Arctic to the southern United States. Lesser snow goose populations, which have increased dramatically in response to changing agricultural practices in the southern United States and to effective conservation programs, present a particular challenge. Hunt managers are working to reduce their populations to an environmentally sustainable level, to avoid a population crash that would have strong adverse impacts on subsistence harvesters and likely increase harvests of other species.

Exploratory fisheries have not located shrimps, scallops, clams or marine fishes in sufficient abundance to justify the establishment of an offshore commercial fishery. The shellfish are small and slow growing relative to their southern counterparts. Few commercially attractive species of marine fishes have been located but then relatively little effort offshore fishing effort has been expended. While there is interest in the commercial harvest of kelp and green sea urchins in the Whale Cove area, the impacts of these harvests on the target species, their habitats, and other species that eat them or use the affected habitat have not been studied. Their ability to sustain harvests, and the rate of recovery of bottom habitats damaged by dragging or other methods of harvest, is unknown. The selective harvest of invertebrates in the Belcher Islands by divers is an exception, as it causes little damage to other species or habitats.