3.1.9 Wildlife and Wildlife Habitat

This section of the document focuses on terrestrial mammals likely to be found within the local and regional study area and is based on a review of background information and traditional knowledge as well as the results of field studies.

As defined under the IFA, "wildlife" means all fauna in a wild state other than reindeer. Section 3.1.9 considers terrestrial mammals and Section 3.1.10 considers birds.

3.1.9.1 Terrestrial Mammals

There are 34 species of terrestrial mammals potentially occurring in the Regional Study Area for the proposed Highway (Table 3.1.9-1). The local and regional abundance and distribution of these species varies considerably depending on habitat availability and access to terrain suitable for various life history phases, such as calving and denning. No terrestrial mammal species were assessed as "at risk" under the NWT General Status Ranking Program (GNWT ENR 2011a).

TABLE 3.1.9-1 TERRESTRIAL MAMMALS POTENTIALLY OCCURRING WITHIN THE REGIONAL STUDY AREA

Common Name	Scientific Name	NWT General Status Rank
Cinereus Shrew (Masked Shrew)	*Sorex cinereus*	Secure
Dusky Shrew	*Sorex monticolus*	Secure
Arctic Shrew	*Sorex arcticus*	Secure
Tundra Shrew	*Sorex tundrensis*	Undetermined
Barren-ground Shrew	*Sorex ugyunak*	Undetermined
Snowshoe Hare	*Lepus americanus*	Secure
Arctic Hare	*Lepus arcticus*	Secure
Arctic Ground Squirrel	*Spermophilus parryii*	Secure
Red Squirrel	*Tamiasciurus hudsonicus*	Secure
Beaver	*Castor canadensis*	Secure
Northern Red-backed Vole	*Myodes rutilus (Clethrionomys rutilus)*	Secure
Meadow Vole	*Microtus pennsylvanicus*	Secure
Root Vole (Tundra Vole)	*Microtus oeconomus*	Secure
Taiga Vole (Chestnut-cheeked vole)	*Microtus xanthognathus*	Secure
Common Muskrat	*Ondatra zibethicus*	Secure
Nearctic Brown Lemming	*Lemmus trimucronatus (sibiricus)*	Secure
Nearctic Collared Lemming	*Dicrostonyx groenlandicus*	Secure
Coyote	*Canis latrans*	Secure
Gray Wolf	*Canis lupus*	Secure
Arctic Fox	*Vulpes lagopus (Alopex lagopus)*	Secure
Red Fox	*Vulpes vulpes*	Secure
American Black Bear	*Ursus americanus*	Secure
Grizzly Bear	*Ursus arctos*	Sensitive

TABLE 3.1.9-1 TERRESTRIAL MAMMALS POTENTIALLY OCCURRING WITHIN THE REGIONAL STUDY AREA		
Common Name	**Scientific Name**	**NWT General Status Rank**
Polar Bear	*Ursus maritimus*	Sensitive
American Marten	*Martes americana*	Secure
Ermine (Stoat)	*Mustela erminea*	Secure
Least Weasel	*Mustela nivalis*	Secure
American Mink	*Neovison vison (Mustela vison)*	Secure
Wolverine	*Gulo gulo*	Sensitive
North American River Otter	*Lontra canadensis (Lutra canadensis)*	Secure
Canadian Lynx	*Lynx canadensis*	Secure
Moose	*Alces americanus (Alces alces)*	Secure
Barren-ground Caribou	*Rangifer tarandus groenlandicus*	Sensitive
Woodland Caribou (Boreal)	*Rangifer tarandus caribou*	Sensitive

Sources: Banfield (1974), Hayssen (2011), and Working Group on General Status of NWT Species (2011a).

3.1.9.2 Non-native Species

All terrestrial mammal species are indigenous to the RSA except for reindeer and domestic animals.

In addition to the herds of indigenous barren-ground caribou, a privately owned reindeer herd has historically used portions of the upper Tuktoyaktuk Peninsula and Richards Island. According to Lloyd Binder, the custodian of the herd, the current population of the herd is around 3,000 animals. The herd typically summers in the Richards Island area from about April to late November. During the over-wintering period, the herd is moved south to an area of Crown Land extending from Jimmy and Noell Lake area to north of Parsons Lake.

3.1.9.3 Species at Risk

The federal *Species at Risk Act* (SARA) was adopted in 2002 and the territorial *Species at Risk (NWT) Act* came into effect in 2010. The purpose of these Acts is to: prevent wildlife species from being extirpated or becoming extinct; to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity; and, to manage species of special concern to prevent them from being endangered or threatened.

Schedule 1 of the federal SARA provides lists of wildlife species at risk that include mammals, birds, reptiles, amphibians, fish, lepidopterans, plants, lichens, mosses and molluscs. Species listed as Threatened under Schedule 1 must have recovery strategies prepared for the conservation of the species and its habitat within three years of listing while species of Special Concern must have management plans prepared.

Within the RSA, Boreal Woodland Caribou are currently listed under SARA as Threatened; however, grizzly bear and wolverine have been assessed by the COSEWIC as Special Concern (COSEWIC 2009). These species are discussed further in Sections 3.1.9.10, 3.1.9.7, and 3.1.9.8, respectively.

3.1.9.4 Valued Components

Valued Components (VCs) are typically selected to represent the range of important biological conservation values existing within the RSA. Beanlands and Duinker (1983) have stated that it is impossible for an analysis to address all potential environmental components. Therefore, an essential step in selection and analysis of issues is the identification of important VCs. This process requires selecting indicator species to serve as VCs.

VCs can be defined as "the environmental attributes or components identified as a result of a social scoping exercise as having legal, scientific, cultural, economic or aesthetic value" (Sadar 1994).

Selection of wildlife species as VCs in this EIS was based on the following criteria:

- Species listed on Schedule 1 of SARA;
- Species assessed by Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- Species rated as high importance subsistence for country foods;
- Species rated as moderate to high value as furbearers; and/or
- Species rated as high importance to outfitters or tourism guides.

The VCs identified in Table 3.1.9-2 form the basis of the wildlife baseline discussion. Additional species of interest or importance to the region are also included.

Table 3.1.9-2 identifies the mammal VCs selected for this EIS. For each VC, the risk status is stated, as listed on Schedule 1 of the SARA or assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (GNWT ENR 2010f). Table 3.1.9-2 also includes species identified as important to subsistence harvesters, guiding or outfitting industries.

TABLE 3.1.9-2: SELECTION OF TERRESTRIAL MAMMALS AS VALUED COMPONENTS

Common Name	SARA (Schedule 1)	COSEWIC Status	Importance to Subsistence Harvesters	Importance to Guides or Outfitters
Barren-ground Caribou	n/a	n/a	High	Moderate
Moose	n/a	n/a	High	Low
Grizzly Bear	No Status	Special Concern	High	High
Wolverine	No Status	Special Concern	Moderate	Moderate
Furbearer (Arctic Fox/ Red Fox)	n/a	n/a	High/ Moderate	Low

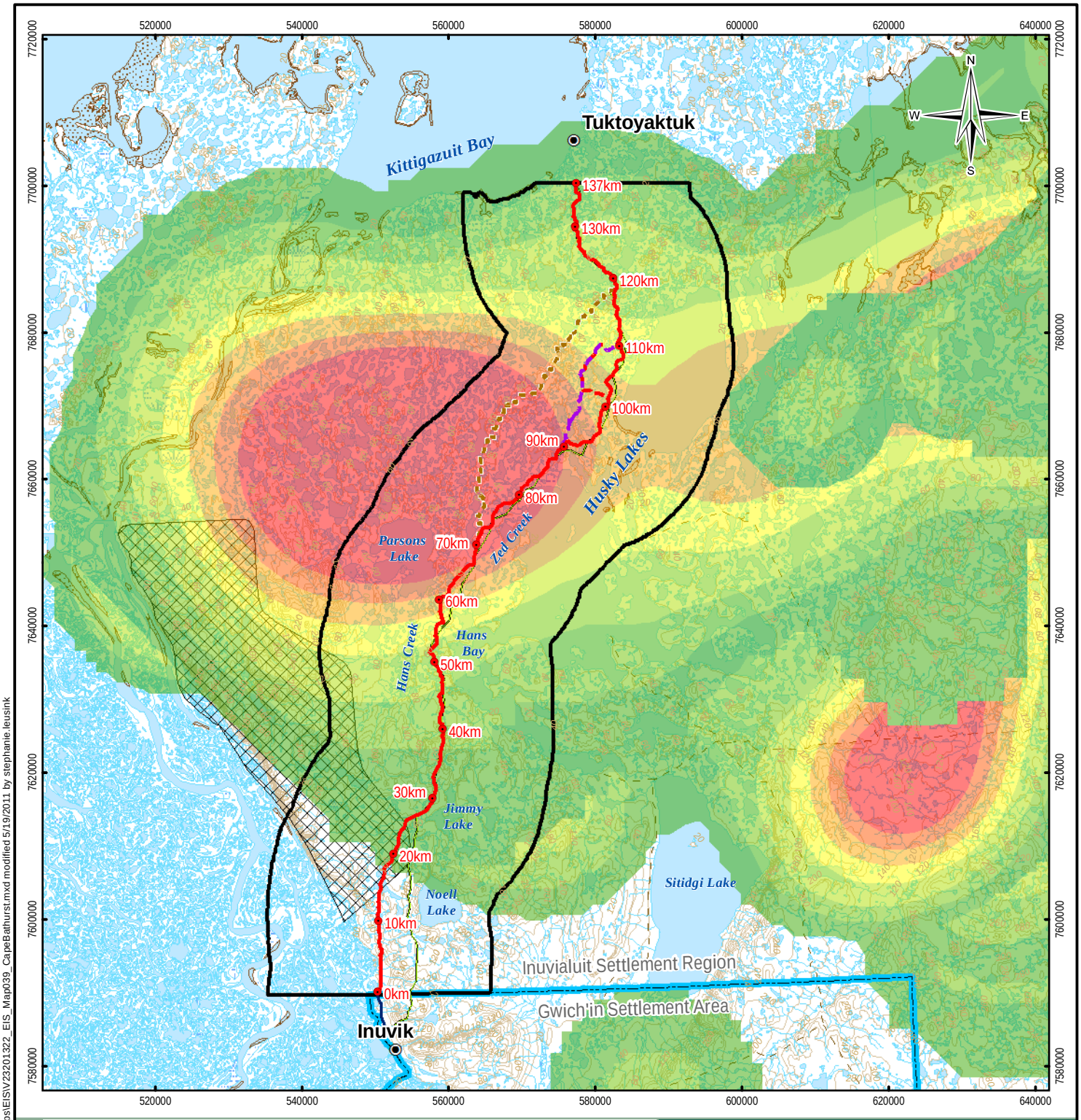
3.1.9.5 Barren-ground Caribou

Population Status and Distribution

Barren-ground caribou herds within the NWT are identified by the location of their calving grounds (Thomas 1969; Gunn and Miller 1986). Barren-ground caribou are migratory and occupy different habitats during different seasons. Part of the annual range of the Cape Bathurst and Bluenose-West barren-ground caribou herds overlap with the proposed Project area (Nagy et al. 2005a). Recent evidence shows the upper part of the Project area is also used by a herd of caribou called the Tuktoyaktuk Peninsula Herd.

The Cape Bathurst barren-ground caribou (Photo 3.1.9-1) herd utilizes the Cape Bathurst and Tuktoyaktuk peninsulas and the range extends into the regional study area (Figure 3.1.9-1). The Cape Bathurst herd was first identified as a distinct herd in 2000. Data obtained during photocensus surveys in 1987, 1998, and 2000 on the "Bluenose" herd were re-analyzed to estimate population trends. The population in 1992 was estimated at approximately 17,500 animals. A photocensus conducted during the summer of 2005 showed the herd had declined to an estimate of 2,400 animals and, by July 2006, had declined further to an estimated 1,800 animals. A July 2009 survey indicated a stable trend from 2006 to 2009 (Adamczewski et al. 2009). Table 3.1.9-3 describes the annual population estimates and ranges.

Photo 3.1.9-1
Caribou were periodically seen during the aerial reconnaissance survey along the proposed Highway alignment. Three bull caribou were seen grazing on sedges.



LEGEND

Probability Distribution of the Cape Bathurst Caribou Herd

- 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 95
- 96 - 99

- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road

- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000

Probability Distribution: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Cape Bathurst Caribou Herd Ranges

PROJECTION	UTM Zone 8
DATUM	NAD83
Scale:	1:750,000
	10 5 0 10 20 Kilometres
FILE NO.	V23201322_EIS_Map039_CapeBathurst.mxd
PROJECT NO.	V23201322
DWN	SL
CKD	TS
REV	0
OFFICE	EBA-VANC
DATE	May 19, 2011

Figure 3.1.9-1

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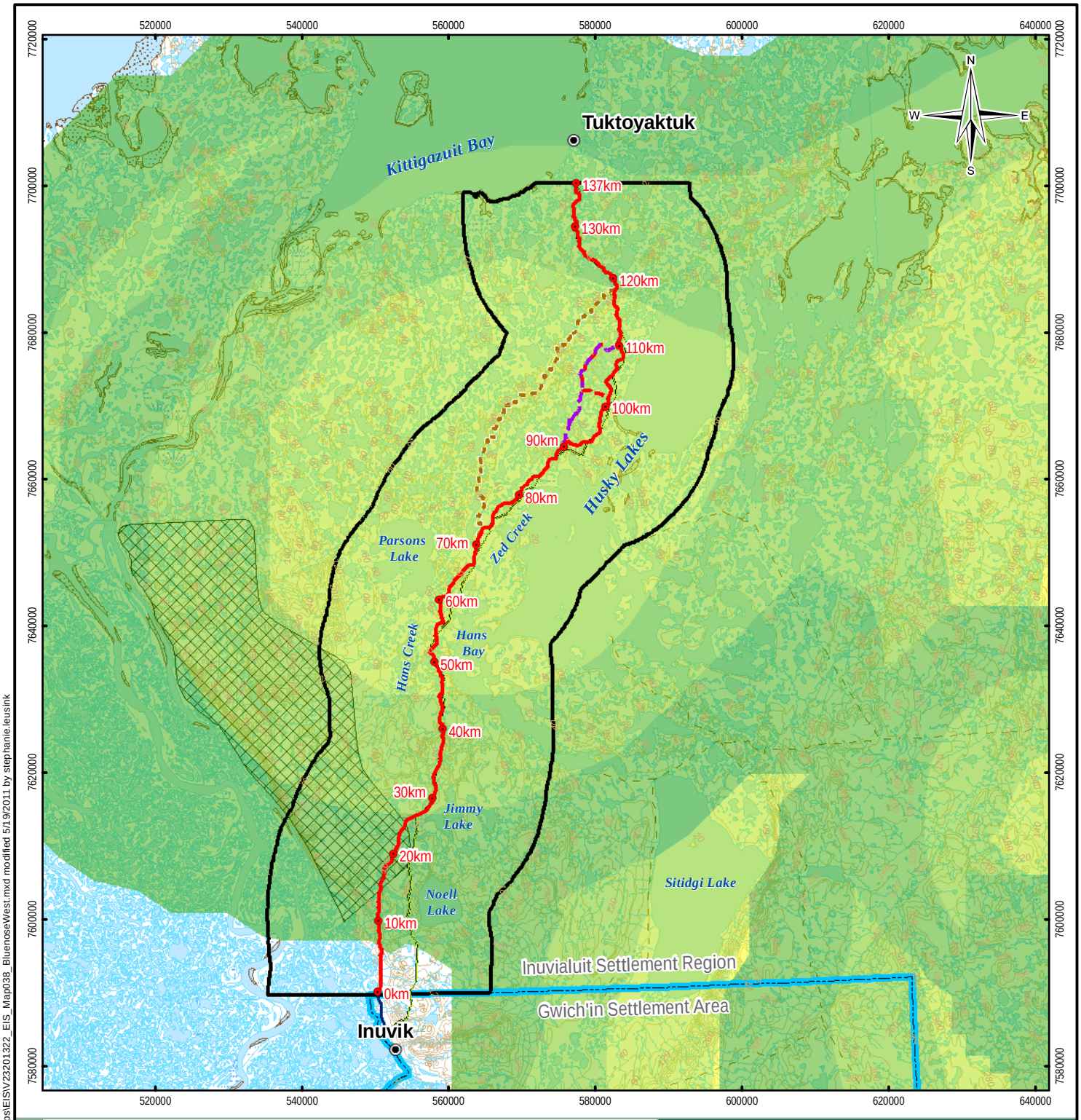
TABLE 3.1.9-3: CAPE BATHURST HERD CENSUS		
Year	**Population Estimate (non calf)**	**Range (95% CI)**
1987	12,512	9,012 - 16,020
1992	19,278	13,881 - 24,675
2000	11,089	9,333 - 12,845
2005	2,434	2,178 - 2,691
2006	1,821	1,672 - 1,971
2009	1,934	1,585 - 2,283

Source: GNWT ENR (2011a)

Based on comments during community consultations on the 2005 survey, ENR deployed collars on caribou on the lower Tuktoyaktuk peninsula in March and these animals used calving grounds on the upper part of the Tuktoyaktuk Peninsula in June 2006 (Nagy and Johnson 2006). This herd, the Tuktoyaktuk Peninsula herd, was surveyed for the first time in July 2006 and estimated at 3,078 non-calf animals (Nagy and Johnson 2006). A portion of this herd is considered to be feral reindeer that escaped from a semi-domestic reindeer herd and, at the request of the Inuvialuit Game Council and the Wildlife Management Advisory Council (NWT), is managed separate from the Cape Bathurst herd. The movements of this herd have been monitored using collared animals since March 2006 and a new population estimate of 2,752 + 276 (95% CI) non-calf caribou was obtained in July 2009. The range of this herd, based on collared bulls and cows between 2006 and 2010, overlapped with the local and regional study area between October and May (ENR Unpublished Data).

The Bluenose-West herd is the largest herd which overlaps the proposed Highway (Figure 3.1.9-2). The herd was estimated at 112,360 in 1992 but declined by 84% to 18,050 by 2006 (Table 3.1.9-4). A July 2009 survey indicated a stable trend from 2006 to 2009 (17,897) (GNWT ENR 2011a).

The patterns of decline in the Bluenose-West herd in the early 2000s were similar to the patterns of decline in the Cape Bathurst herd during the same period. Late calving and low calf: cow ratios on the calving ground indicated that the caribou were nutritionally limited and likely would have been declining naturally without hunting (Nesbitt and Adamczewski 2009).



LEGEND

Probability Distribution of the Bluenose West Caribou Herd

- 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 95
- 96 - 99

- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000

Probability Distribution: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Bluenose West Caribou Herd Ranges

PROJECTION: UTM Zone 8		DATUM: NAD83	
Scale: 1:750,000 (10 5 0 10 20 Kilometres)			
FILE NO.: V23201322_EIS_Map038_BluenoseWest.mxd			
PROJECT NO.: V23201322	DWN: SL	CKD: TS	REV: 0
OFFICE: EBA-VANC	DATE: May 19, 2011		

Figure 3.1.9-2

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TABLE 3.1.9-4: BLUENOSE-WEST HERD CENSUS		
Year	**Population Estimate (non calf)**	**Range (95% CI)**
1987	106,887	102,233 - 111,542
1992	112,360	86,794 - 137,926
2000	76,376	62,029 - 90,723
2005	20,800	18,760 - 22,840
2006	18,050	17,523 - 18,578
2009	17,897	16,587 - 19,207

Source: GNWT ENR (2011a)

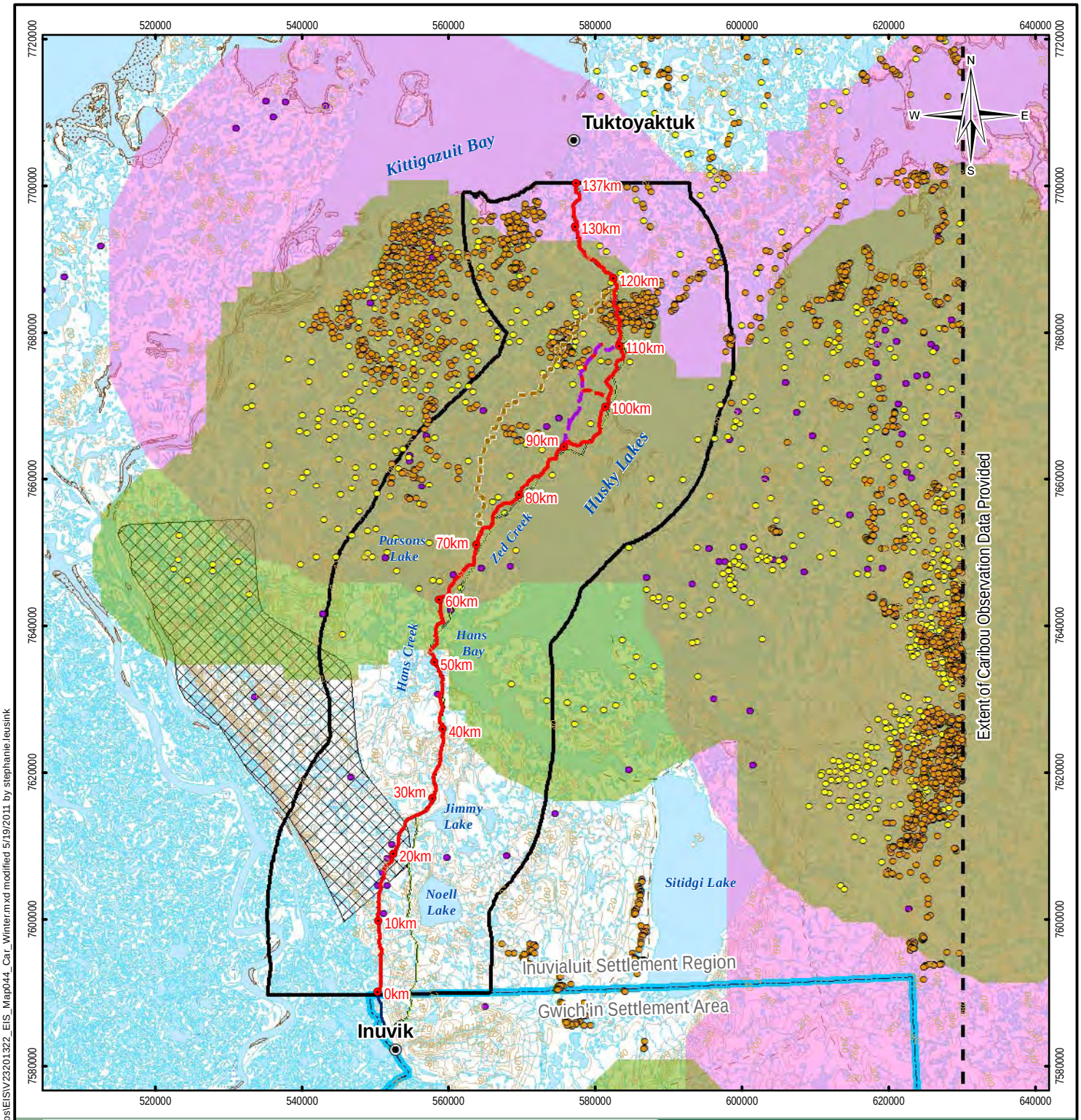
Important Habitat and Habitat Requirements

Barren-ground caribou typically overwinter in forested areas, within the treeline east, northeast and southeast of Inuvik (Figure 3.1.9-3; GNWT ENR 2011a; Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008). Wind-swept areas that provide feeding opportunities in winter or relief from insects in summer are also important.

Caribou migrate to the north in spring towards calving grounds (Figure 3.1.9-4). Calving areas are non-forested and characteristic of high, rocky areas where there is little shelter from wind and driving snow. The Cape Bathurst herd calves and spends early summer on the Bathurst and Nicolson Peninsula. The Bluenose-west herd calves and spends early summer in the Brock, Hornaday and Horton River area (Figures 3.1.9-5 and 3.1.9-6; Community of Tuktoyaktuk et al. 2008). The Tuktoyaktuk Peninsula herd calves and spends early summer on the northern end of the Tuktoyaktuk Peninsula. Early to late summer caribou herd ranges are east of the Husky Lakes (Figures 3.1.9-6 to 3.1.9-9). The distance between calving and overwintering areas can be as great as 700 km. Fall rut and post rut ranges are shown on Figures 3.1.9-9 and 3.1.9-10.

Important habitat for barren-ground caribou occurring in the region include:

- Bluenose-West herd - Hornaday, Brock and Horton Rivers area for calving (Tuktut Nogait National Park);
- Cape Bathurst herd – Bathurst peninsula for calving and insect relief; winter habitat northeast of Inuvik; and
- Tuktoyaktuk Peninsula herd – north end of Tuktoyaktuk peninsula for calving and insect relief (Community of Tuktoyaktuk et al. 2008l; Community of Inuvik et al. 2008).



LEGEND

- Bluenose West Herd
- Cape Bathurst Herd
- Both Herds

Barren-ground Caribou Observations

- GPS Telemetry
- Satellite Telemetry
- Spring Composition Surveys
- Extent of Caribou Observation Data
- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Regional Study Area (15km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Trail
- Watercourse
- Contour
- Sand
- Wetland
- Waterbody

NOTES

Base data source: NTS 1:250,000

Caribou Observations: GNWT ENR 2011. NWT Wildlife Management Information System (Projects 02, 44, & 46).

Caribou Herd Ranges: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Winter Caribou Observations and Herd Ranges (December 1 to March 31)

PROJECTION: UTM Zone 8	DATUM: NAD83
Scale: 1:750,000 (10 5 0 10 20 Kilometres)	
FILE NO.: V23201322_EIS_Map044_Car_Winter.mxd	
PROJECT NO.: V23201322	DWN: SL / CKD: TS / REV: 0
OFFICE: EBA-VANC	DATE: May 19, 2011

Figure 3.1.9-3

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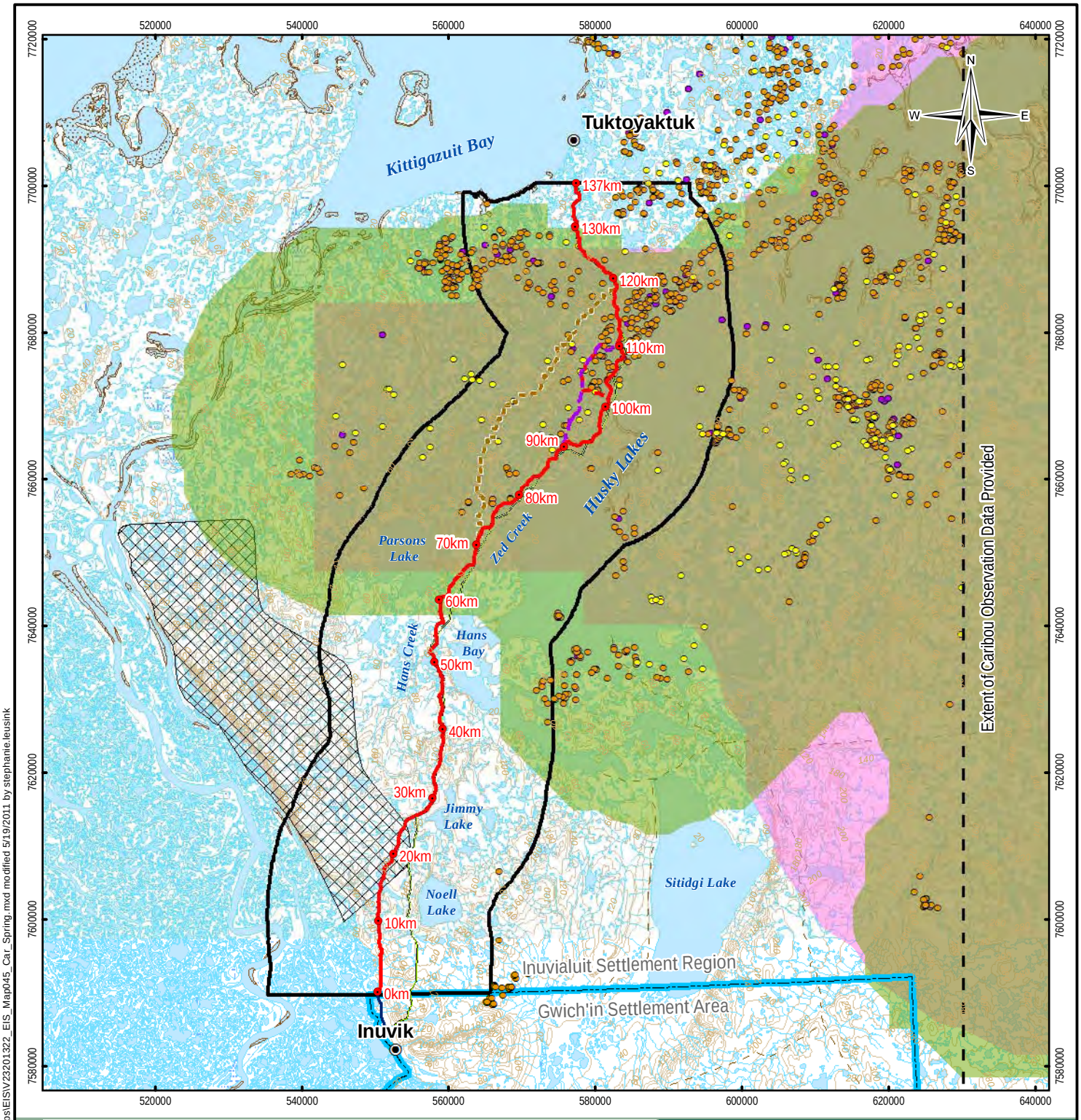

LEGEND

- Bluenose West Herd
- Cape Bathurst Herd
- Both Herds

Barren-ground Caribou Observations

- GPS Telemetry
- Satellite Telemetry
- Spring Composition Surveys
- Extent of Caribou Observation Data
- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000
Caribou Observations: GNWT ENR 2011. NWT Wildlife Management Information System (Projects 44, 46, 133, & 191).
Caribou Herd Ranges: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Spring, Spring Migration and Pre-Calving Caribou Observations and Herd Ranges (April 1 to May 31)

PROJECTION	DATUM
UTM Zone 8	NAD83

Scale: 1:750,000
10 5 0 10 20
Kilometres

FILE NO. V23201322_EIS_Map045_Car_Spring.mxd

PROJECT NO.	DWN	CKD	REV
V23201322	SL	TS	0

OFFICE	DATE
EBA-VANC	May 19, 2011

Town of Inuvik
Northwest Territories
KIGGIAK - EBA

Figure 3.1.9-4

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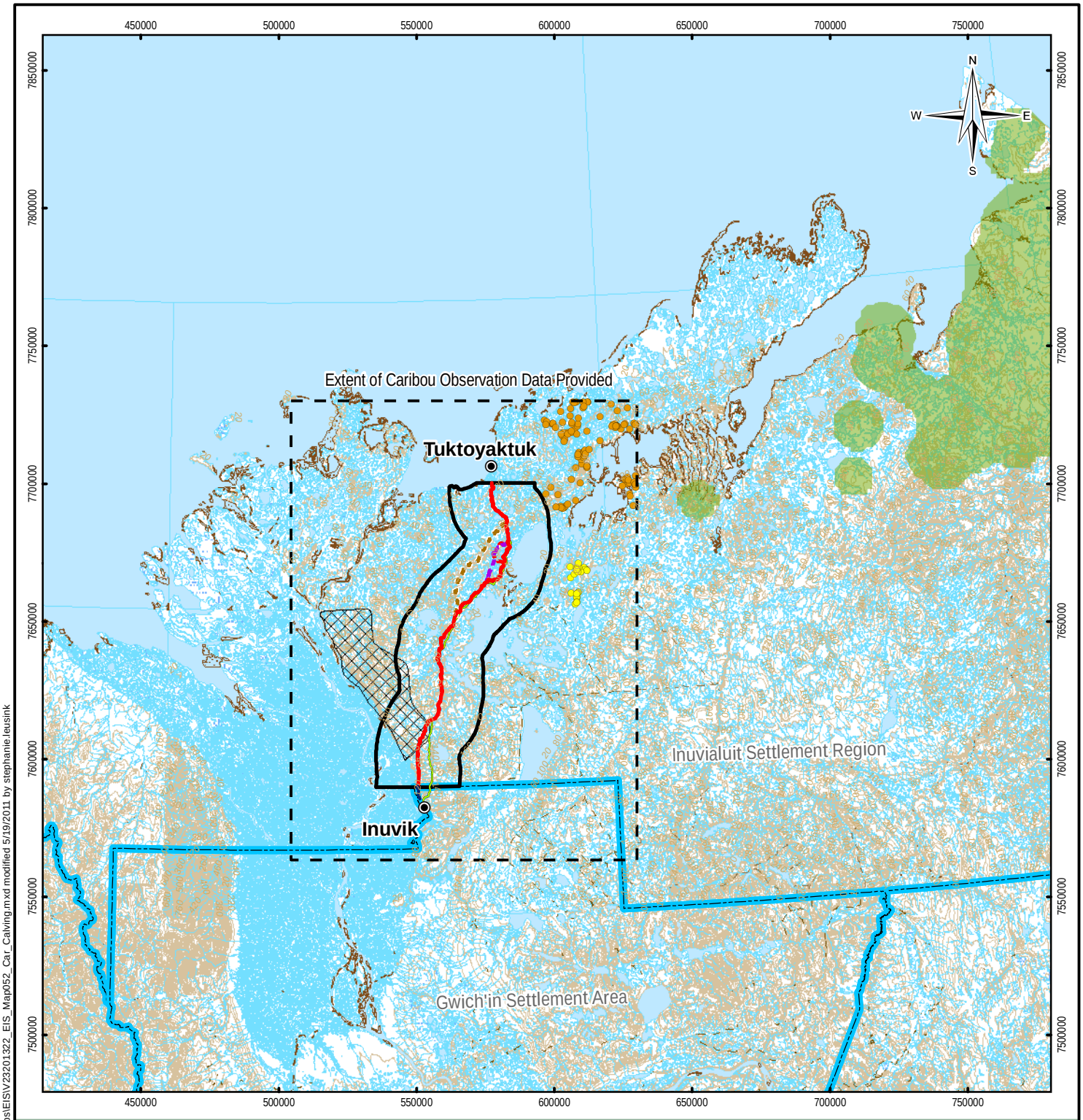

LEGEND

- Cape Bathurst Herd
- Barren-ground Caribou Observations
  - GPS Telemetry
  - Satellite Telemetry
- Extent of Caribou Observation Data
- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000
Caribou Observations: GNWT ENR 2011. NWT Wildlife Management Information System (Projects 44 & 46).
Caribou Herd Ranges: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Calving/Post Calving Caribou Observations and Herd Ranges (June 1 to 25)

PROJECTION: UTM Zone 8	DATUM: NAD83

Scale: 1:2,000,000

25 12.5 0 25 50

Kilometres

FILE NO.: V23201322_EIS_Map052_Car_Calving.mxd

PROJECT NO.	DWN	CKD	REV
V23201322	SL	TS	0

OFFICE	DATE
EBA-VANC	May 19, 2011

Figure 3.1.9-5

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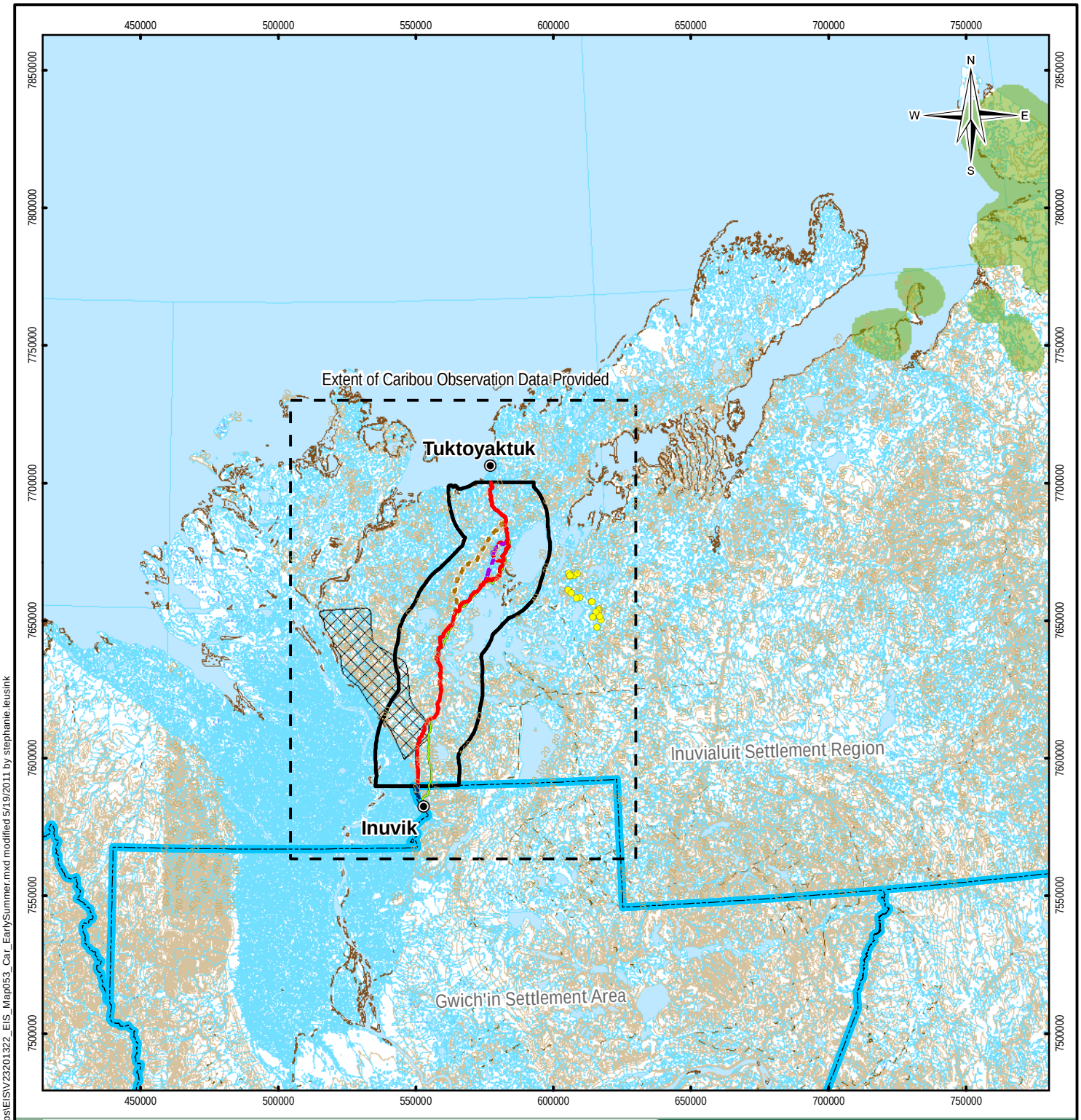

LEGEND

- Cape Bathurst Herd
- Barren-ground Caribou Observations
  - Satellite Telemetry
  - Extent of Caribou Observation Data
  - Gwich'in / Inuvialuit Boundary
  - Caribou Hills
- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000
Caribou Observations: GNWT ENR 2011. NWT Wildlife Management Information System (Project 44).
Caribou Herd Ranges: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Early Summer Caribou Observations and Herd Ranges (June 26 to July 15)

PROJECTION	DATUM
UTM Zone 8	NAD83

Scale: 1:2,000,000

25 12.5 0 25 50

Kilometres

FILE NO. V23201322_EIS_Map053_Car_EarlySummer.mxd

PROJECT NO.	DWN	CKD	REV
V23201322	SL	TS	0

OFFICE	DATE
EBA-VANC	May 19, 2011

Town of Inuvik

Northwest Territories

KIGGIAK - EBA

Figure 3.1.9-6

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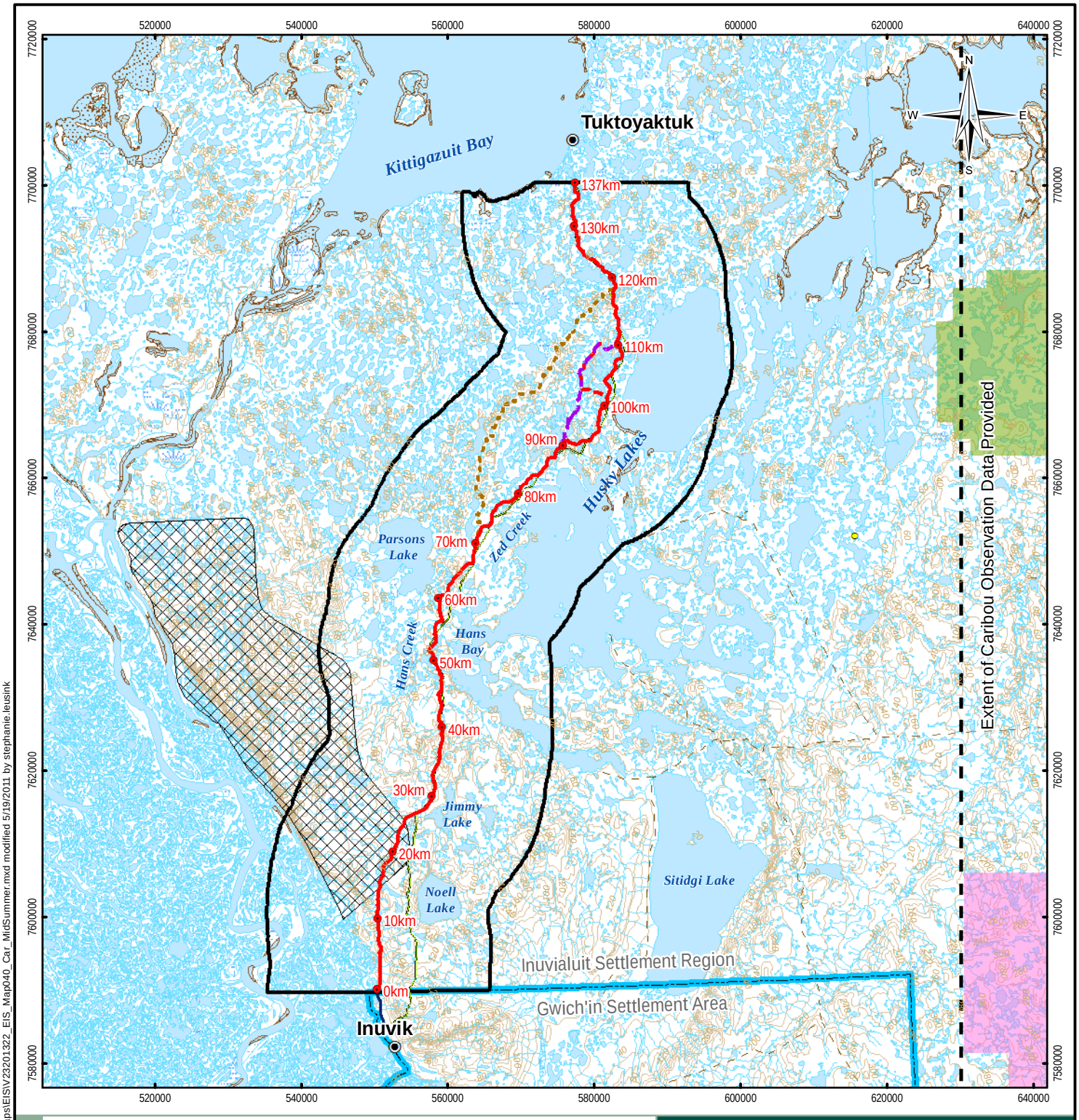

LEGEND

- Bluenose West Herd
- Cape Bathurst Herd

Barren-ground Caribou Observations

- Satellite Telemetry
- Extent of Caribou Observation Data
- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000
Caribou Observations: GNWT ENR 2011. NWT Wildlife Management Information System (Project 44).
Caribou Herd Ranges: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Mid Summer Caribou Observations and Herd Ranges (July 16 to August 7)

PROJECTION	DATUM
UTM Zone 8	NAD83

Scale: 1:750,000

10 5 0 10 20

Kilometres

FILE NO. V23201322_EIS_Map040_Car_MidSummer.mxd

PROJECT NO.	DWN	CKD	REV
V23201322	SL	TS	0

OFFICE	DATE
EBA-VANC	May 19, 2011

Figure 3.1.9-7

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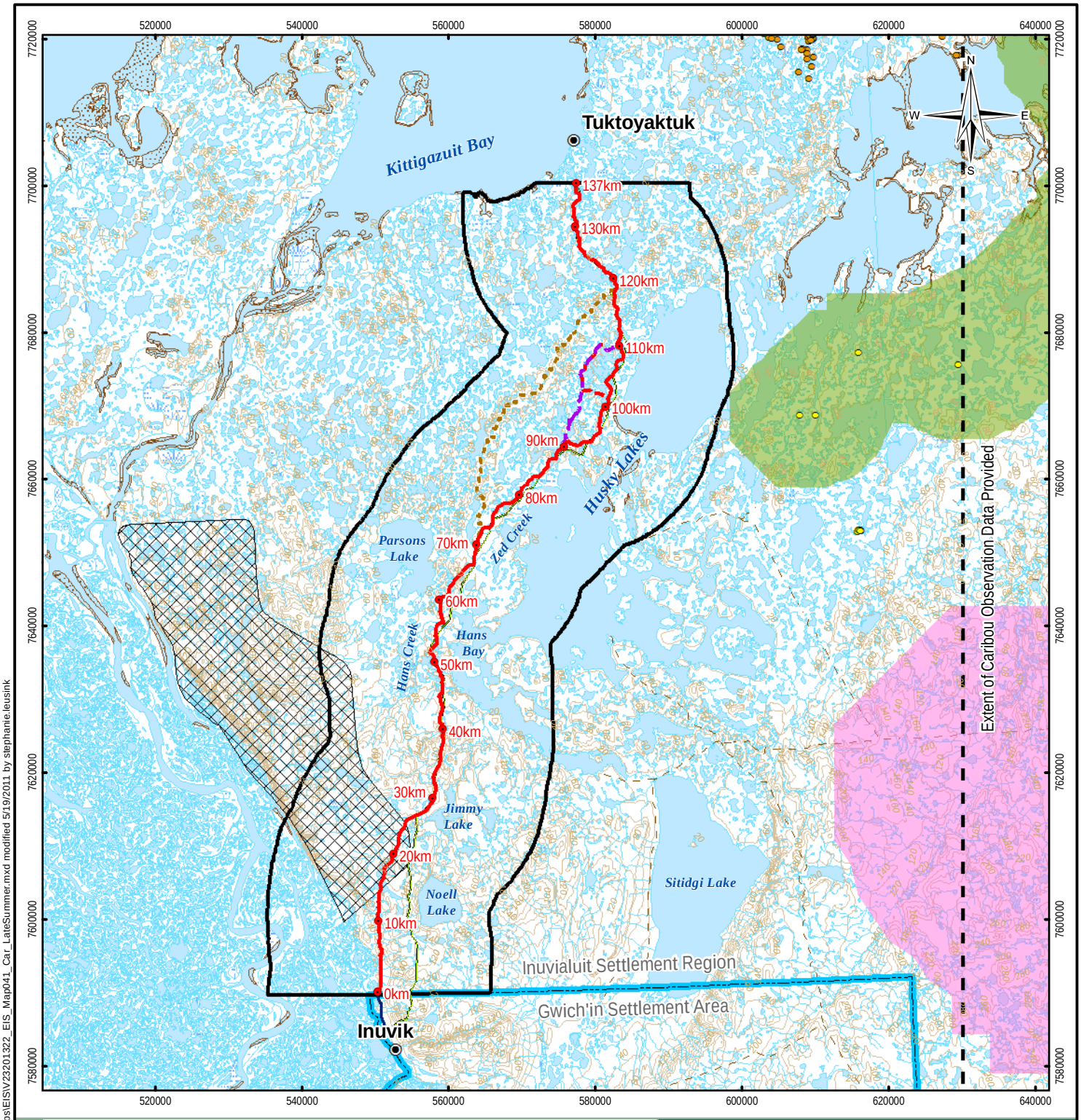

LEGEND

- Bluenose West Herd
- Cape Bathurst Herd

Barren-ground Caribou Observations

- GPS Telemetry
- Satellite Telemetry
- Extent of Caribou Observation Data
- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000
Caribou Observations: GNWT ENR 2011. NWT Widlife Management Information System (Projects 44 & 46).
Caribou Herd Ranges: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Late Summer Caribou Observations and Herd Ranges (August 8 to October 7)

PROJECTION	UTM Zone 8
DATUM	NAD83
Scale:	1:750,000
	10 5 0 10 20 Kilometres
FILE NO.	V23201322_EIS_Map041_Car_LateSummer.mxd
PROJECT NO.	V23201322
DWN	SL
CKD	TS
REV	0
OFFICE	EBA-VANC
DATE	May 19, 2011

Town of Inuvik
Northwest Territories
KIGGIAK - EBA

Figure 3.1.9-8

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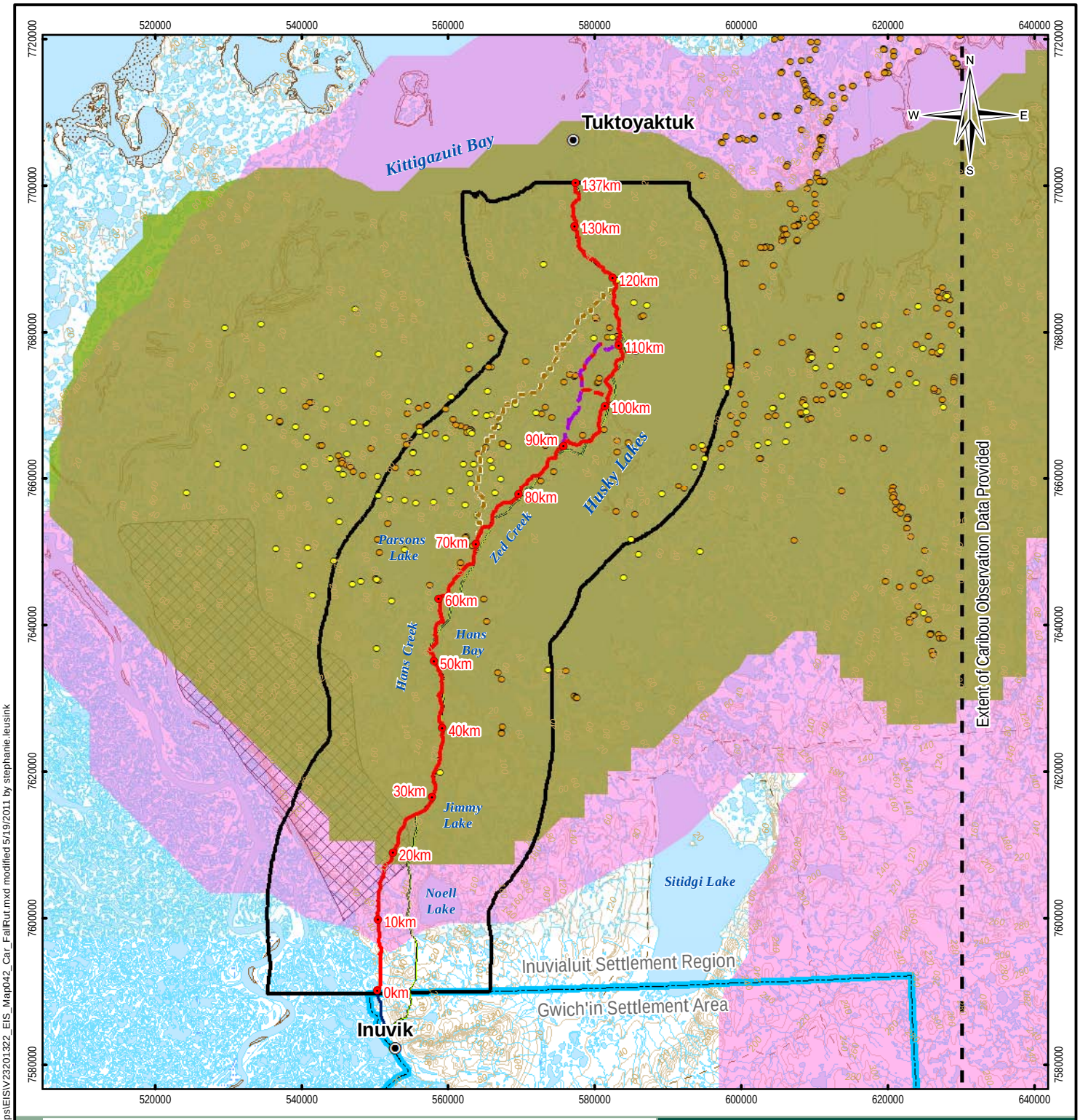

LEGEND

- Bluenose West Herd
- Cape Bathurst Herd
- Both Herds

Barren-ground Caribou Observations

- GPS Telemetry
- Satellite Telemetry
- Extent of Caribou Observation Data
- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000
Caribou Observations: GNWT ENR 2011. NWT Wildlife Management Information System (Projects 44 & 46).
Caribou Herd Ranges: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Fall/Rut Caribou Observations and Herd Ranges (October 8 to 31)

PROJECTION: UTM Zone 8	DATUM: NAD83
Scale: 1:750,000 (10 5 0 10 20 Kilometres)	
FILE NO.: V23201322_EIS_Map042_Car_FallRut.mxd	
PROJECT NO.: V23201322	DWN: SL / CKD: TS / REV: 0
OFFICE: EBA-VANC	DATE: May 19, 2011

Figure 3.1.9-9

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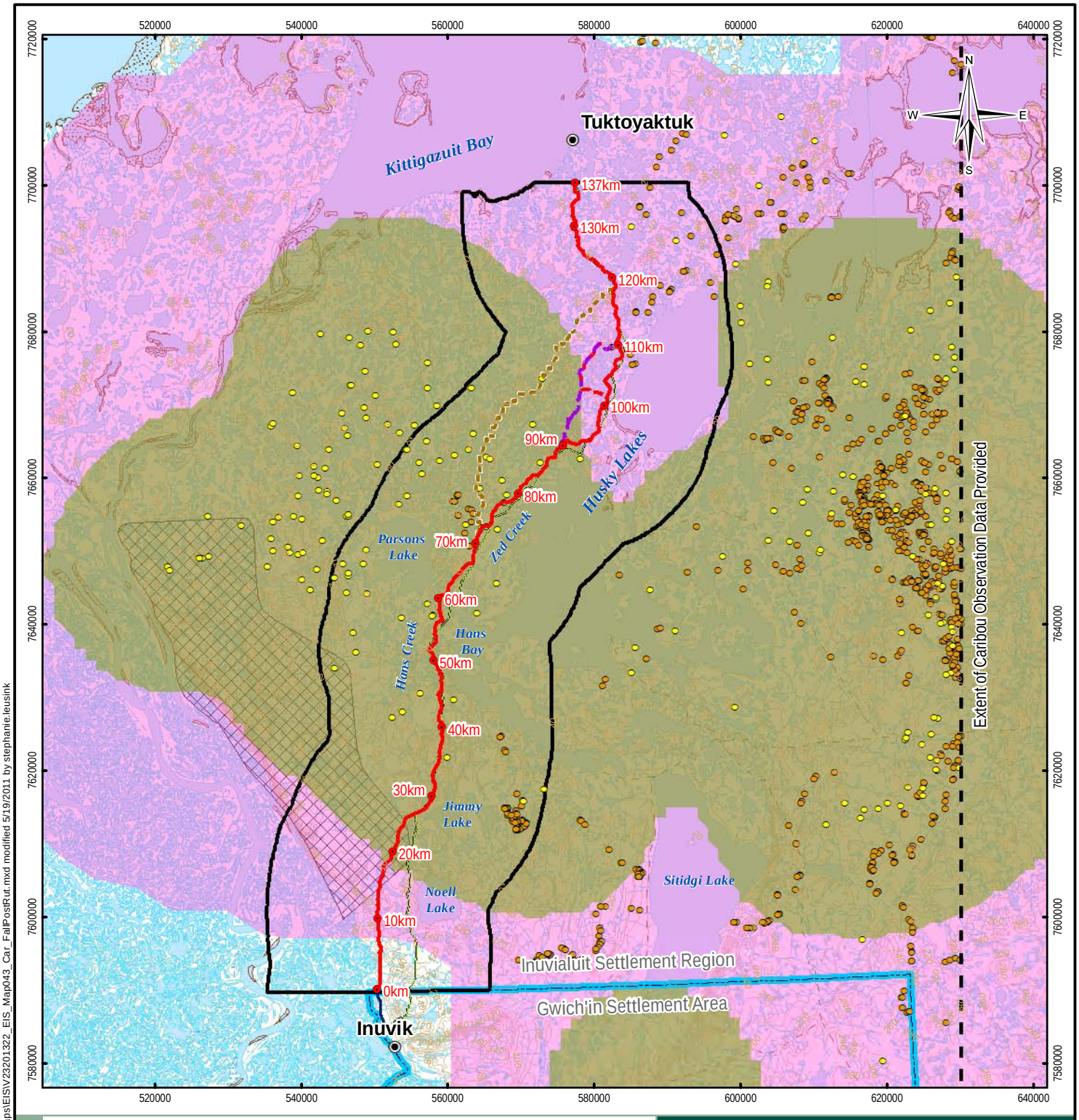

LEGEND

- Bluenose West Herd
- Cape Bathurst Herd
- Both Herds

Barren-ground Caribou Observations

- GPS Telemetry
- Satellite Telemetry
- Extent of Caribou Observation Data
- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000

Caribou Observations: GNWT ENR 2011. NWT Wildlife Management Information System (Projects 44 & 46).

Caribou Herd Ranges: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Fall/Post Rut Caribou Observations and Herd Ranges (November 1 to 30)

PROJECTION	DATUM
UTM Zone 8	NAD83

Scale: 1:750,000

10 5 0 10 20

Kilometres

FILE NO. V23201322_EIS_Map043_Car_FallPostRut.mxd

PROJECT NO.	DWN	CKD	REV
V23201322	SL	TS	0

OFFICE	DATE
EBA-VANC	May 19, 2011

Figure 3.1.9-10

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Seasonal Movements

Figures 3.1.9-11 to 3.1.9-12 show the seasonal distribution of the Cape Bathurst and Bluenose-west herds during the fall (rut and post rut) and winter.

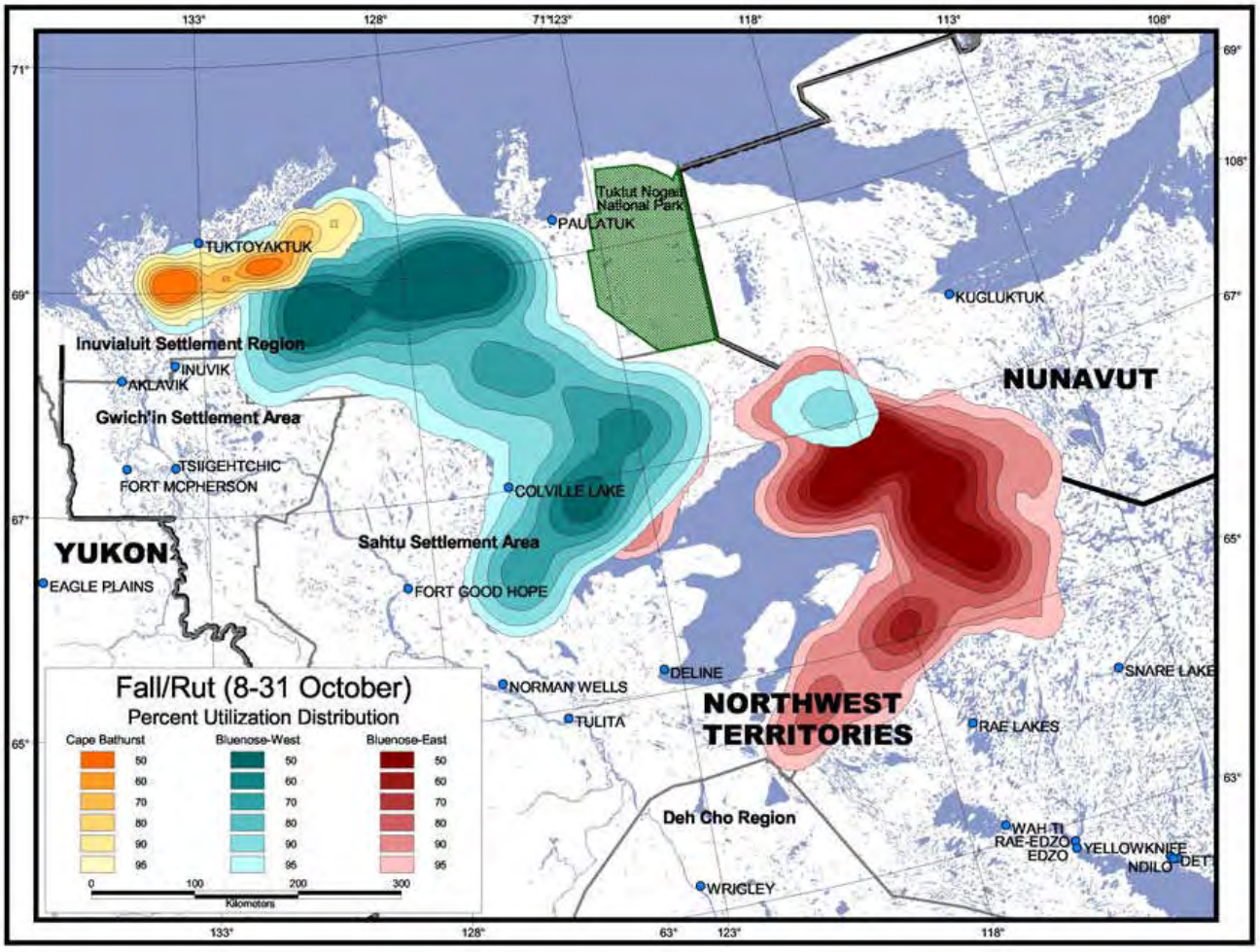
Satellite tracking data obtained for female barren-ground caribou (Cape Bathurst herd) from March 1996 to May 2004 provide an estimate of the seasonal and cumulative ranges (Nagy et al. 2005b). The herd calves (June 1 to 25) and summers (June 26 to August 7) in the Cape Bathurst area. During late summer (August 8 to October 7), the herd moves southwest along Cape Bathurst but remains east of the Husky Lakes. The rutting/early fall range (October 8 to 31) occurs in concentrated areas east and west of Husky Lakes, while the post rut and late/fall ranges (November 1 to 30) increases the separation with a portion of the herd moving west of the southern Husky Lakes in the area of the proposed Project. The herd's winter range (December 1 to March 31) stretches from the Tuktoyaktuk Peninsula to the Mackenzie River in the west and the Husky Lakes in the south (Figure 3.1.9-13). Barren-ground caribou spring migration to calving grounds in Cape Bathurst (April 1 to May 31) results in the herd moving out of the proposed Project area typically by early April.

In comparison to the Cape Bathurst herd, the annual range of the Bluenose-West herd is very large. The calving grounds are located in the western Melville Hills in Tuktut Nogait National Park, with high calving densities in the area west of the Hornaday River south to the Little Hornaday River.

The post calving range of Bluenose-West herd includes the Melville Hills from the coastal areas near Paulatuk, east to Bluenose Lake, south to the Little Hornaday River, and in the areas east of the Hornaday River. Rutting occurs in this area and as far west as the Kugaluk River and south to the Simpson and Horton lakes areas. The winter range of this herd includes the area from Husky Lakes and the Anderson River to the north and Colville and Great Bear lakes and Fort Good Hope to the south.

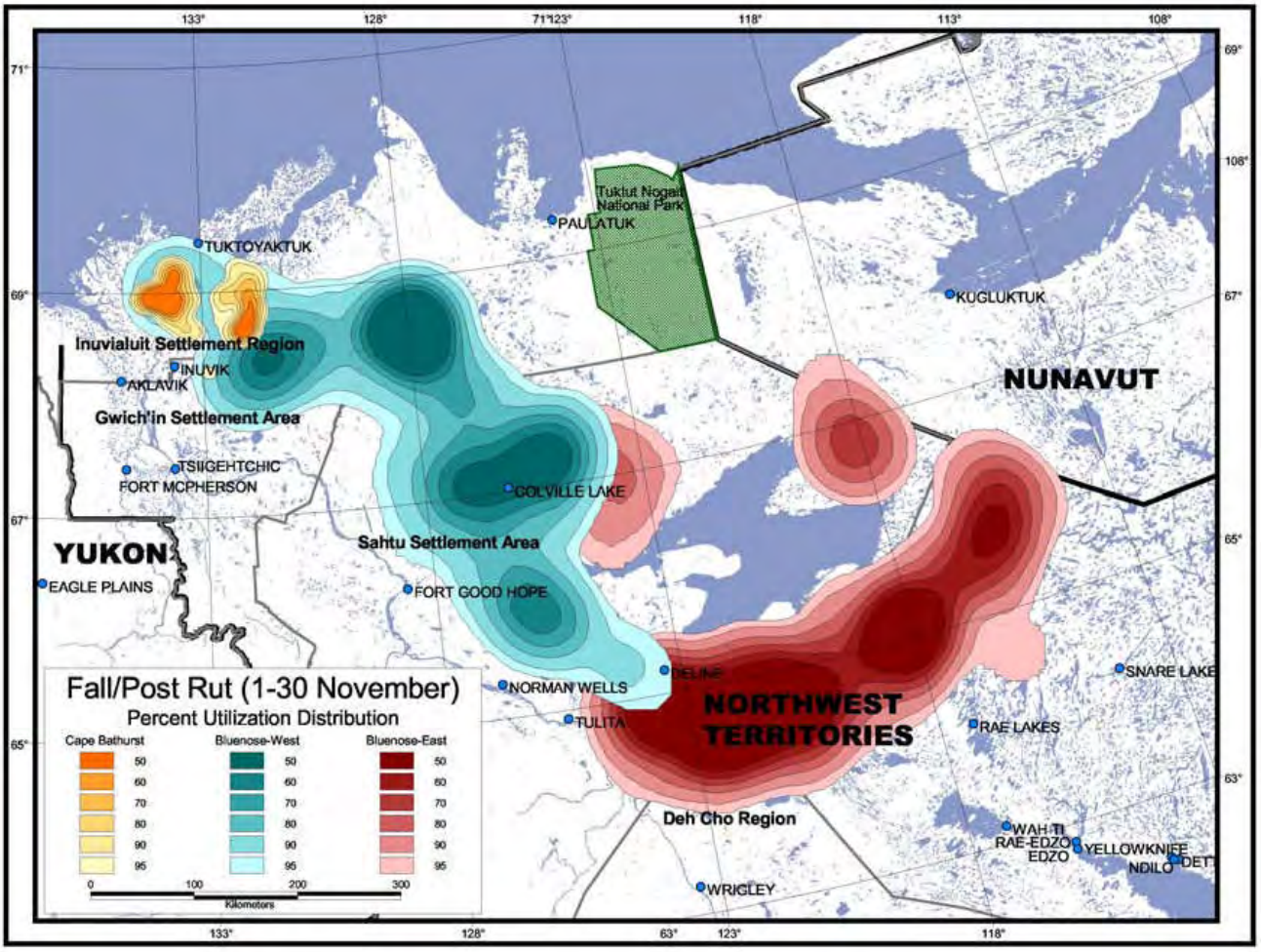
Sensitive Time Periods

There are three time periods where specific guidelines may be required: typically May 15 to October 15 (spring migration, calving, post calving), the winter periods, and year-round (INAC 2011c). Different mitigations will apply for specific sensitive time periods, year-round and winter sensitivity.



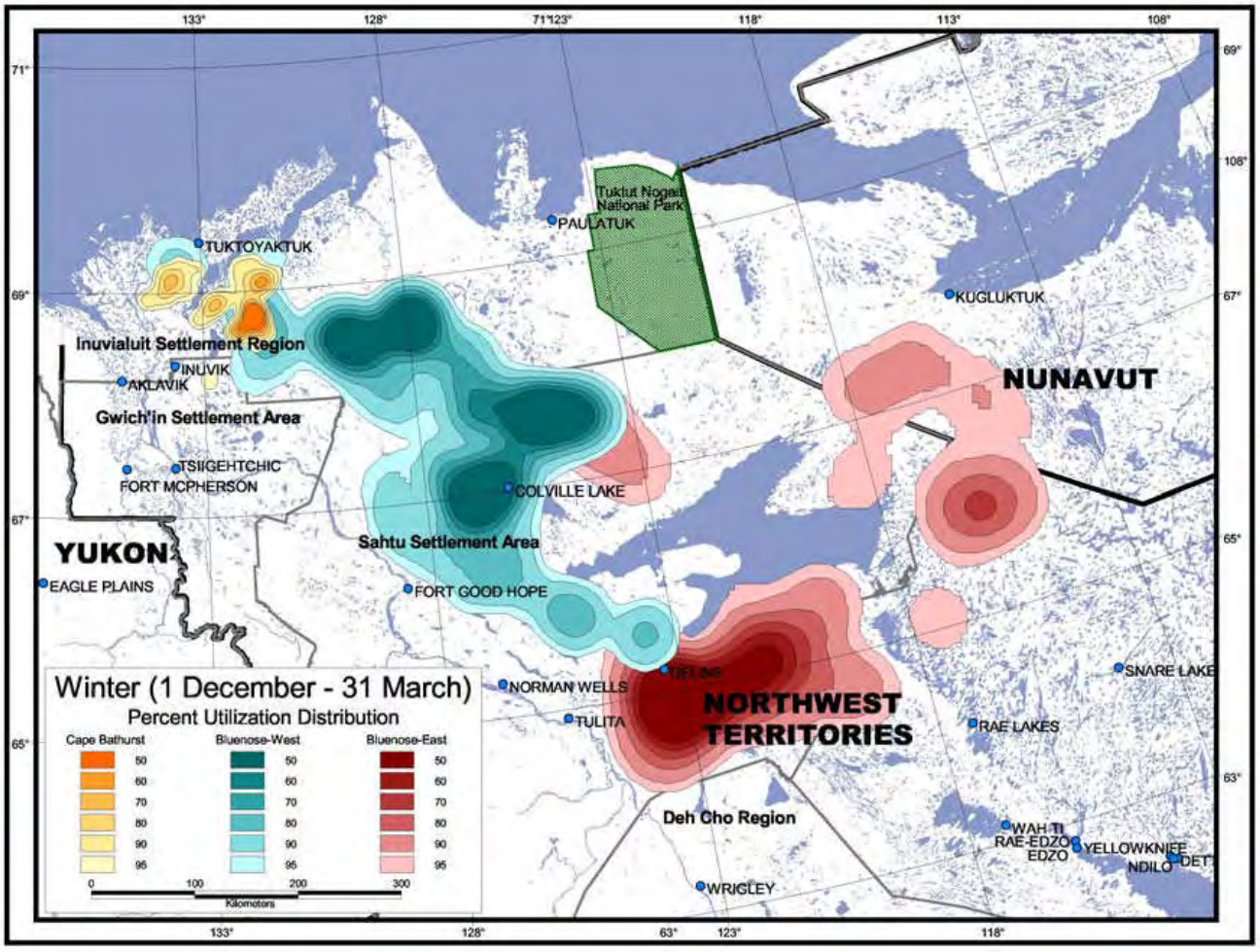
Source: Nagy et al. (2005b)

Figure 3.1.9-11
Percent Utilization and Distribution of Cape Bathurst, Bluenose-West, and Bluenose-East Caribou in NWT during the Fall (Rut)



Source: Nagy et al. (2005b)

Figure 3.1.9-12
Percent Utilization and Distribution of Cape Bathurst, Bluenose-West, and Bluenose-East Caribou in NWT during the Fall (Post Rut)



Source: Nagy et al. (2005b)

Figure 3.1.9-13
Percent Utilization and Distribution of Cape Bathurst, Bluenose-West, and Bluenose-East Caribou in NWT during the Winter

Harvest Pressures

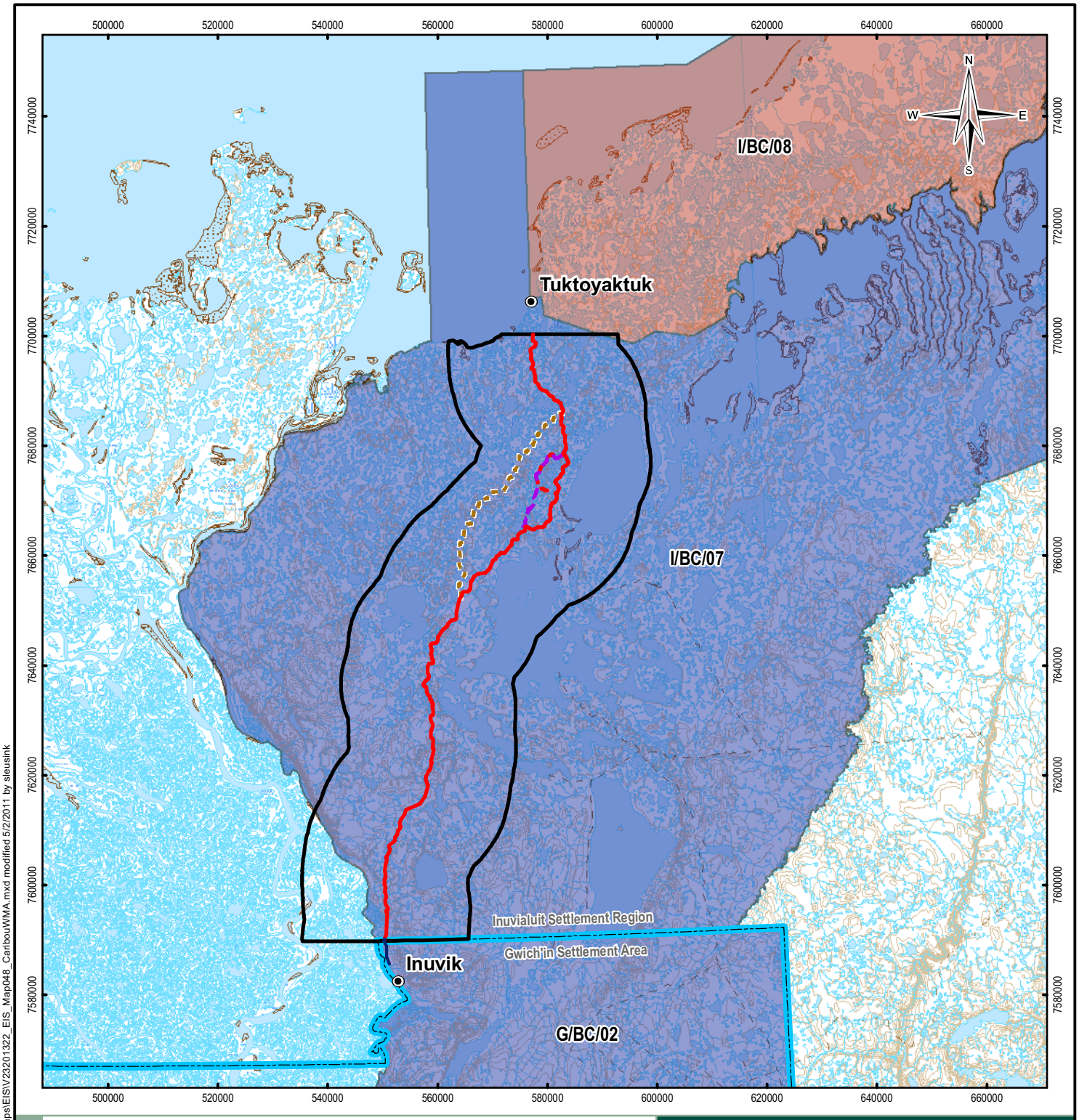
A review of past surveys by GNWT ENR indicates that the Cape Bathurst herd declined at about 4% per year from 1992 to 2000, then at a rate of 14% per year from 2000 to 2006 (Nesbit and Adamczewski 2009). In the early 2000s, late calving and low calf:cow ratios were recorded on the calving grounds (Nagy ND, as cited in Adamczewski et al. 2009). These observations indicated that the caribou were nutritionally limited and the population would likely have been declining even without hunting (Nesbit and Adamczewski 2009).

The last estimated harvest, based on modelling, for the Cape Bathurst herd was around 730 caribou (primarily cows) in 2005 (Nesbitt and Adamczewski 2009). The 2006 survey confirmed that the population was still declining. As this harvest would have accelerated the herd's downward trend (i.e. greater than the decline from natural factors), the Wildlife Management Advisory Council (NWT) and Gwich'in Renewable Resource Board made recommendations that GNWT ENR implemented in 2006 and 2007.

In 2006, all resident, non-resident, and commercial hunting was stopped. In 2007, the barren-ground caribou management area (I/BC/06) in the Inuvialuit Settlement Region (ISR) that covered the major portion of the range of these herds was divided to better reflect the current herd movements and allow management actions to be implemented by herd (Figure 3.1.9-14).

As a result, a new management area (I/BC/07) covering the core area of the Cape Bathurst range was created. Wildlife Management Areas I/BC/07 and G/BC/02 have remained closed to all hunting of barren-ground caribou hunting since September 2007. Hunting for the Tuktoyaktuk Peninsula Herd is still permitted between June 16 and March 31 in Area I/BC/08 located to the north and east of Tuktoyaktuk on the Tuktoyaktuk Peninsula. However, I/BC/08 is closed from April 1 to June 15 of each year to allow the Cape Bathurst Herd to migrate back to its calving grounds undisturbed.

Hunters require a tag to hunt in I/BC/06, the core area for the Bluenose-west herd in the ISR and 345 tags are given to the Inuvialuit Game Council and 22 to the Gwich'in Renewable Resources Board to be distributed annually. The Bluenose-West herd harvest is shared with users from the Inuvialuit, Gwich'in, and Sahtu Regions. The estimated hunter harvest for this herd was around 1,900 animals in 2003 (primarily cows) (Sahtu Harvest Study and ENR data). Currently the harvest of the Bluenose-West and East herds is restricted to subsistence harvesters for the Wildlife Management Areas I/BC/06, S/BC/01 and S/BC/03. By recommendation of the Wildlife Management Advisory Council (NWT) and the Gwich'in and Sahtu Renewable Resource Boards, GNWT ENR set a Total Allowable Harvest at 720 caribou (4% of the herd), with a target of at least 80% bulls.



LEGEND

Restricted Management Areas with Respect to Hunting

- Closed all year
- Closed April 1 to June 15

- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- Navy Road
- Gwich'in / Inuvialuit Boundary
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES

Base data source: NTS 1:250,000
Wildlife Management Area: NWT Centre for Geomatics, February 2011

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PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Wildlife Management Areas with Hunting Restrictions for the Barren-ground Caribou

PROJECTION: UTM Zone 8	DATUM: NAD83
Scale: 1:1,000,000	10 5 0 10 20 30 Kilometres
FILE NO.: V23201322_EIS_Map048_CaribouWMA.mxd	
PROJECT NO.: V23201322	DWN: SL / CKD: TS / REV: 0
OFFICE: EBA-VANC	DATE: May 2, 2011

Town of Inuvik
Northwest Territories
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Figure 3.1.9-14

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A five year management plan, created in 1998, is currently being updated. The process is led by the Advisory Committee for Co-operation on Wildlife Management, which consists of the co-management boards established under the Inuvialuit, Gwich'in, Sahtu, Tlicho and Nunavut land claims agreements.

Health of Harvested Species and Potential Contaminants

Metals can accumulate in the livers of caribou. There is some concern that high metal levels in the organs of caribou could lead to disease (INAC 2003).

In a study conducted by Lambden et al. (2007) of Inuit, Dene/Metis and Yukon groups, between 10% and 38% of participants noticed recent changes in the quality or health of traditional food species, with physical changes and decreasing availability reported most often. However, caribou were among the foods considered particularly healthier and held special value to the population.

Contaminant levels have been measured in all major barren-ground caribou herds in the NWT and most contaminants are present at low levels that are not considered to be a health risk for human consumption or for the caribou themselves. The Bathurst herd has been monitored by the GNWT and community partners under the CircumArctic Rangifer Monitoring and Assessment Network and the Northern Contaminants Program (GNWT ENR NDa).

Mercury

The level of mercury in the kidneys of NWT caribou is very low and does not pose a health risk to either caribou or people who eat caribou. Both the meat and organs of NWT caribou are safe to eat. There are naturally occurring sources of mercury in the Arctic environment, and the levels of mercury found in caribou often reflect exposure to these background levels. The primary source of mercury exposure from human activities results from long-range atmospheric transport of mercury from other parts of the world. Mercury is a toxic element that accumulates in brain and kidney tissue, and can affect neurological functions and cause poor growth, and kidney damage (GNWT ENR NDa).

Cadmium

Cadmium is found naturally in the environment. Wildlife exposure to cadmium reflects regional and local differences the type of rocks and soil in the area. In some areas, human activity may also be a source of cadmium. Long-range atmospheric transport can distribute this cadmium to other places in the environment. Lichens absorb cadmium directly from the air and pass it on to the animals that feed on the lichen (GNWT ENR NDa). Caribou foraging on lichen, may have cadmium build up in the liver and kidneys, rather than the muscles (or "meat") itself.

The levels of cadmium in NWT caribou vary considerably with age (increasing levels in older animals), season (higher in spring than in fall), and sex (higher in female vs. male caribou) but the levels of cadmium in NWT caribou kidneys are generally low and not considered a concern for caribou health (GNWT ENR NDa).

According to INAC (2007a), caribou have less opportunity to build up elevated levels of contaminants because their diet consists of lichen and plant sources. As a result, caribou avoid building up elevated levels of contaminants. However, people in the NWT are advised to not consume more than one caribou kidney per week to reduce potential health risks from cadmium (INAC 2007a).

Further discussion on potential wildlife contamination is found in Section 3.1.9.13.

Distribution and Timing in Relation to Project Alternatives, Construction Activities and Operation

The temporal overlap of Highway construction with caribou is limited to October 1 to May 31 (Figure 3.1.9-3 to 3.1.9-10). As the majority of the Bluenose-West and Cape Bathurst herds overwinter over a wide range east and south of the Husky Lakes, only a small portion of the herd that crosses to the west of the Husky Lakes will potentially encounter the construction activities. It is also important to note that these caribou herds are not present in the RSA during the critical calving/ post-calving periods (Figure 3.1.9-5).

The location of construction activities and borrow sites will change between years. Construction activities will overlap with caribou overwintering areas during the first year only in the northern portion of the Project, near Tuktoyaktuk. As construction proceeds in subsequent years, closer to the Husky Lakes area, more of the construction will occur within caribou overwintering areas. All alignment alternatives overlap with the known caribou overwintering areas. Potentially overlapping activities include borrow site activities, temporary haul roads, Highway construction activities and Highway operations.

The Bluenose-West caribou herd marginally overlaps with the proposed Highway alignment along the northwest corner of their annual range and a few individuals can be expected to be present from October to April (Nagy et al. 2005a). As herd numbers decline, the range contracts and in recent years a lower proportion of collared animals have been migrating into the regional study area. As herd size increases there will be the potential for more effects on this herd.

The proposed Highway alignment is located south of the summer and fall caribou harvesting areas, sites 306C and 309C respectively (Community of Tuktoyaktuk et al. 2008). The northern portion of the proposed Highway corridor is located within the spring and winter caribou harvesting areas, sites 302C and 315C respectively (Figure 3.2.8-1; Community of Tuktoyaktuk et al. 2008). As well, the proposed Highway alignment occurs within the western part of Bluenose-West winter range management area, site 701E (Figure 3.2.9-5; Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008).

The portion of the Highway that is within the areas potentially used by caribou harvesters varies by season. For example, the spring and winter caribou harvest areas overlap with KM 40 to KM 137 of the proposed Highway. Whereas, during summer and fall, most (if not all) of the proposed Highway is not located within the summer and fall caribou harvest areas. During the construction phase, access to these areas by harvesters would only occur by traditional routes.

Infrequent disturbance will continue to occur along the Highway right-of-way during Highway operations, when caribou are in the vicinity of the Highway. The potential effects to caribou and caribou habitat from the Project are discussed further in the Wildlife and Wildlife Habitat effects section (Section 4.2.7).

3.1.9.6 Moose

Population Status and Distribution

Moose occur in the Mackenzie Delta, but their distribution is restricted to patches of suitable habitat (ICC et al. 2006), which occur along the proposed Highway corridor. On the tundra, north of the treeline, moose are typically associated with areas where forage is available.

South of the treeline (near Inuvik), moose are widely distributed and are generally found at low densities, compared to the densities found in other parts of the boreal forest (GNWT ENR 2005a). Studies suggest that population density ranges between 0.03 to 0.17 moose/km² (IOL et al. 2004) or 0.05 to 0.15 moose/km² (GNWT ENR 2011c).

The population of moose in the northern Delta area has reportedly declined since 1948 and is believed to still be in decline (Community of Inuvik et al. 2008). Table 3.1.9-5 includes population data derived from the Inuvik Inuvialuit Community Conservation Plan (Community of Inuvik et al. 2008).

TABLE 3.1.9-5 MOOSE POPULATION ESTIMATES IN THE INUVIK AREA

Location	Population Estimate (moose/100 km²)	Year
Arctic Red River	5.5	1999
	none surveyed	2006
Northern Richardson Mountains	4.8	2000
	3.5	2006
Fort McPherson – Peel River	3 – 13	1980
	0.84	2006
Inuvik-Tsiigehtchic	0.09	1996
	6.0	1998
	1.62	2006

Source: Community of Inuvik et al. (2008)

In September 2009, during an aerial reconnaissance along the proposed Highway alignment, a total of 16 moose were observed including seven bulls, five cows, three yearlings and one calf (Photo 3.1.9-2). In addition, two observations of moose tracks were documented. Moose or moose sign was present throughout the length of the proposed Highway alignment; however, 55% of the observations were below the treeline, near Inuvik, while 36% were near the southwest end of Husky Lakes, and finally, 9% were closer to Tuktoyaktuk, near Granular Source 177. Above the treeline, moose observations were associated with tall shrubs that typically occur along rivers or creeks.

Photo 3.1.9-2
Several moose were observed along the proposed Highway alignment, in association with lush willow growth along rivers

Important Habitat and Habitat Requirements

The best habitats for moose are characterized by semi-open forest cover, an abundance of willow and aspen stands, and are located close to lakes, river valleys, and stream banks. They prefer deciduous shrubs for fall and winter food and thick conifers for winter cover. In the summer they can be found close to river valleys and lakes where they feed on aquatic vegetation. Moose tend to favour areas previously disturbed (15-30 years prior) by forest fires, as the natural regeneration meets their habitat requirements (GNWT ENR 2011c).

According to the Inuvik Inuvialuit Community Conservation Plan (Community of Inuvik et al. 2008), important habitat areas include valleys and creeks with willow. In particular, moose are known to use the Husky Lakes, Sitidgi River, Miner River, Richardson Mountains, Bell River, Babbage River, Yukon North Slope and the northern Mackenzie River Delta (Community of Inuvik et al. 2008; Community of Tuktoyaktuk et al. 2008).

Seasonal Movements

Moose are in the regional study area year-round. Spring moose harvesting areas are identified as Site No. 303B in the Tuktoyaktuk Community Conservation Plan (see Figure 3.2.8-4). This harvesting area is located at the south boundary of Sitidgi Lake, north to the southern end of Husky Lakes and east to Kugaluk River, south of the treeline. The proposed Highway crosses through a portion of the western edge of the harvesting area.

Sensitive Time Periods

Breeding typically occurs in the third week of September and calving occurs in May or early June.

Harvest Pressures

Moose in the NWT are harvested by resident and non-resident hunters, with a limit of one moose per hunter (GNWT ENR 2011c). According to the Inuvialuit Harvest Study, 10 or fewer moose were harvested in Tuktoyaktuk annually between 1988 and 1997. Whereas in Inuvik, between 8 and 42 moose were harvested annually between 1988 and 1997. Section 3.2.8 provides detailed information regarding moose harvests in the ISR. Due to recent restrictions to caribou harvesting, the pressure on moose has likely increased (GNWT ENR, pers. comm., March 17, 2011).

Health of Harvested Species and Potential Contaminants

Metals can accumulate in the livers of moose. There is some concern that high metal levels in the organs of these mammals could lead to disease (INAC 2003). Further discussion on potential wildlife contamination is found in Section 3.1.9.13.

Distribution and Timing in Relation to Project Alternatives, Construction Activities and Operation

There are likely no major differences in local habitats between the Project route alternatives; however, Alternative 2 (Upland Route) likely crosses less preferential habitat as moose tend to seek riparian and willow habitat. The Primary 2009 Route, the route closest to the Husky Lakes, is located just within the Spring Moose Harvesting Area (Site No. 303B).

Minimal disturbance to moose is anticipated to occur during the construction and operations phases of the Project. The potential effects to moose and moose habitat from the Project are discussed in the Wildlife and Wildlife Habitat effects section (Section 4.2.7).

3.1.9.7 Grizzly Bear

Population Status and Distribution

Grizzly bear occur throughout the regional study area. For the Tuktoyaktuk-West Grizzly Bear Management Area, there was an estimated 214 bears over the age of two, occurring at a density of six bears per 1,000 km^2, compared to a density of seven to eight bears per 1,000 km^2 in the rest of the Inuvialuit Settlement Region (Nagy and Branigan 1998). In the Northwest Territories grizzly bear population levels are believed to have remained stable since 1991 (COSEWIC 2002). However, because of increased industrial development related to resource exploration and extraction activities and their low population densities, the northern populations of grizzly bears are considered vulnerable (COSEWIC 2002).

In the Mackenzie Delta, Edwards (2010) identified four subpopulations of grizzly bears which were identified as the Richards Island, Storm Hills, Eskimo Lakes, and the Tuktoyaktuk Peninsula subpopulations (Figure 3.1.9.-15). Edwards (2010) found that these four grizzly bear subpopulations were segregated based on seasonal geographical locations. Paetkau et al. (1998 in Edwards 2010) suggested that landscape components such as the parallel orientation of mountains and valleys, low-level wetlands, rivers, and deltas, may limit bear movements across the landscape. Within the Mackenzie Delta overall bear movement did not appear to be influenced by landscape components but landscape variability likely influenced the observed subpopulation structure (Edwards 2010). These features included the Beaufort Sea to the north and possibly the boreal forest to the south, Sitidgi and Eskimo Lakes, the Mackenzie channels, and the Delta.

Arctic grizzly bear populations are characterised by low density and large home range size, which may be an adaptation to the low primary productivity, high seasonality, and lower predictability of the ecosystem (Nagy and Haroldson 1990; Ferguson and McLoughlin 2000). Grizzly bears are highly mobile and able to move across large expanses creating a continuous distribution over broad geographic areas (Noss et al. 1996).

According to Edwards et al. (2009), the home ranges of 36 grizzly bears studied from April 1 to November 30 between 2003 and 2006 indicate that the annual home range estimate for males and females was 1,215 km^2 (range: 1,475 km^2 to 6,735 km^2) and 680 km^2 (range: 80 km^2 to 4,965 km^2), respectively. The location of the arithmetic mean centre of 54 annual home ranges for 36 bears is shown on Figure 3.1.9-16. The study identified the actual distances between mean daily locations, 12-months apart, and grouped into spring, summer, and fall seasons, but found no significant difference in fidelity among the seasons.

Edwards et al. (2009) also found that grizzly bears in the Mackenzie Delta did not exhibit fidelity to annual or seasonal home range areas although they did find that actual distances between home range centers for consecutive years were small for both male and female bears, at 7.7 km and 8.4 km, respectively. Edwards et al. (2009) calculated a 24.2% overlap for annual home ranges in consecutive years. Home range position and configuration had changed although the distance between arithmetic mean home range centers and the percent overlap between years were small (Edwards et al. 2009). Overall, the observed patterns of fidelity reflect the productivity of the habitat and the spatiotemporal variability of available resources.

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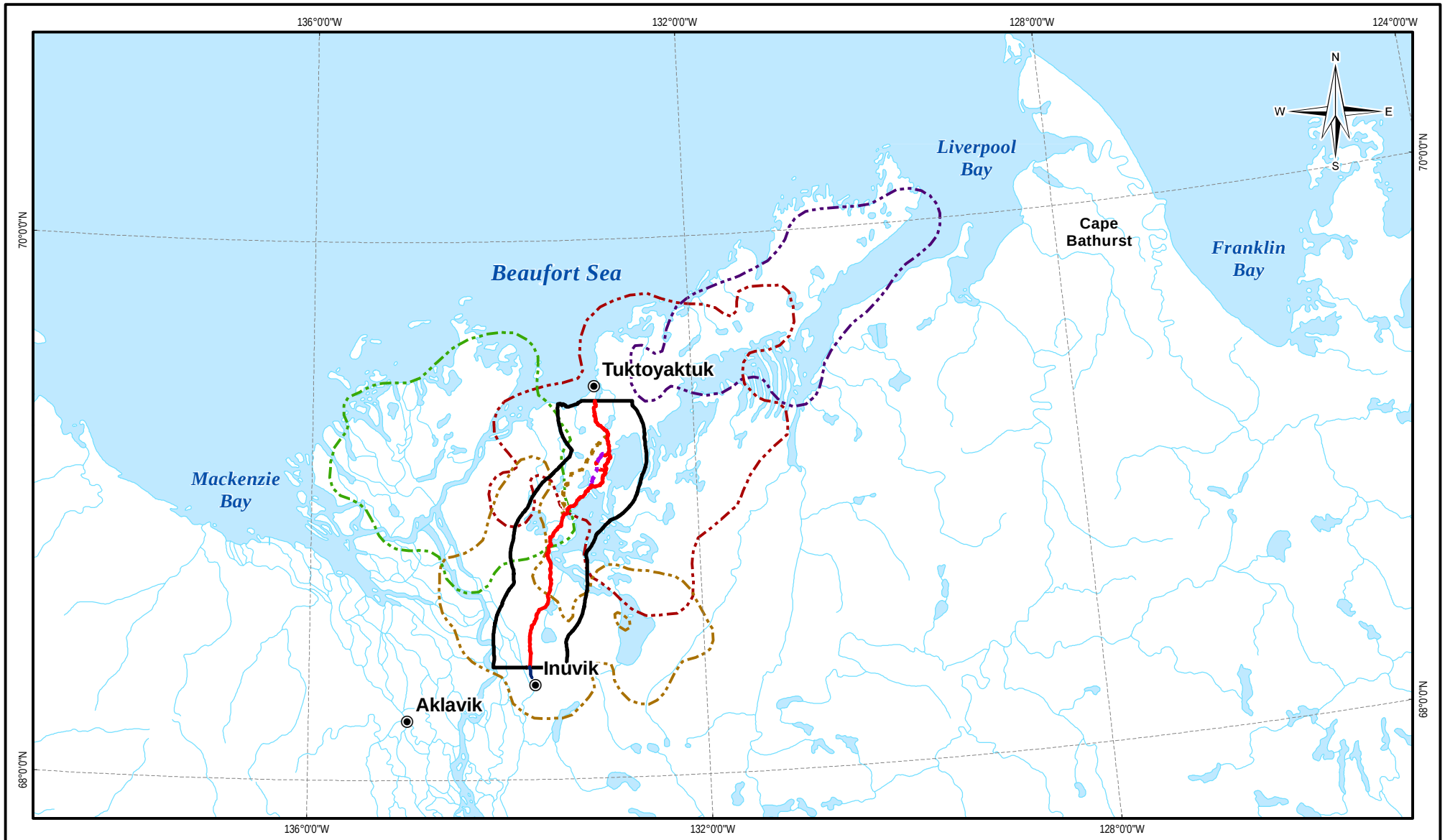


LEGEND

Grizzly Subpopulation
- Tuktoyaktuk Peninsula
- Eskimo Lakes
- Storm Hills
- Richards Islands

- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- Navy Road

- Watercourse
- Waterbody

NOTES

Base data source: National Atlas

Grizzly Subpopulations: Utilization distribution (95% fixed kernal contours) from Edwards, 2009

ISSUED FOR USE

Scale: 1:2,250,000

20 10 0 20 40 60 80

Kilometres

PROJECTION	DATUM
UTM Zone 8	NAD83

FILE NO. V23201322_EIS_Map055_GrizzlyHabitat.mxd

Town of Inuvik · Northwest Territories · KIGGIAK - EBA

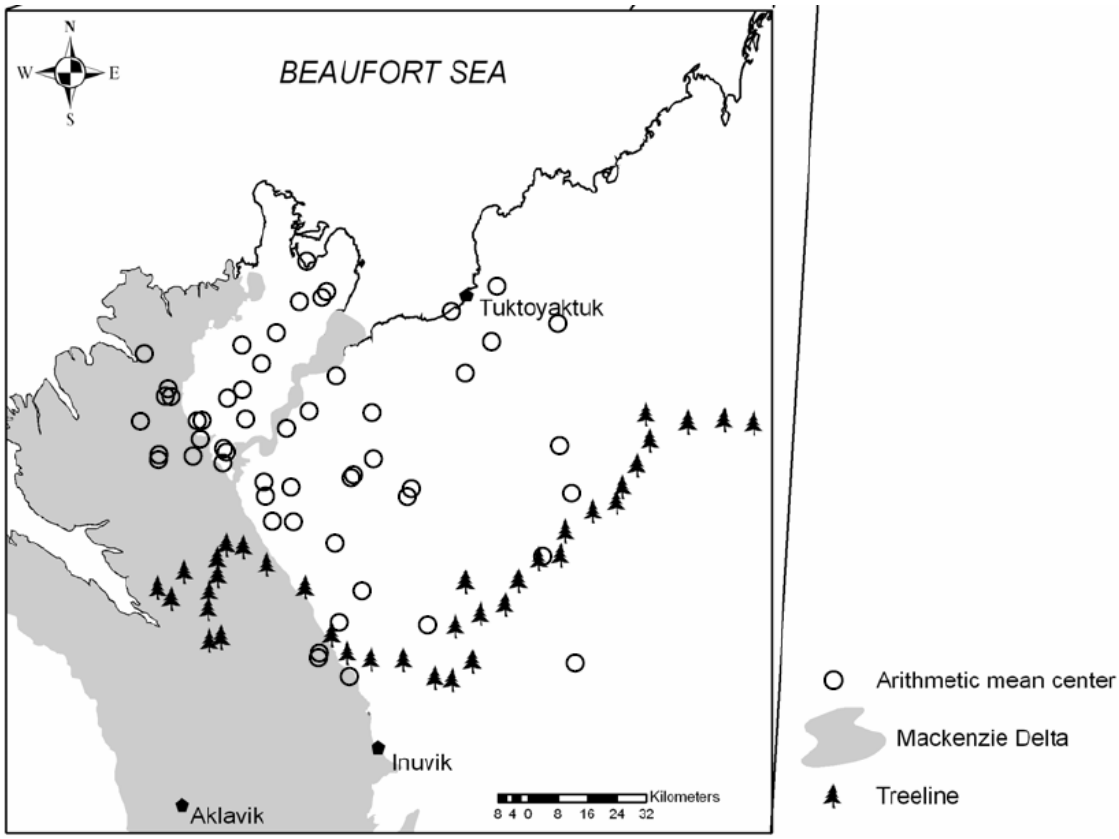
PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Grizzly Bear Subpopulations in the Mackenzie Delta

PROJECT NO.	DWN	CKD	REV
V23201322	SL	JM	0

OFFICE	DATE
EBA-VANC	May 9, 2011

Figure 3.1.9-15



Source: Edwards (2009)

Figure 3.1.9-16
Arithmetic Mean Centers for Annual Grizzly Bear Ranges in the Mackenzie Delta

The northern barren-ground grizzly bears have recruitment rates that are among the lowest known for terrestrial mammals (Edwards et al. 2009). Females do not typically reproduce until 6 to 10 years of age, litter sizes average 2 cubs/litter and the reproductive interval average is 3 years (GNWT 2011). McLoughlin and Messier (2001) found that grizzlies in the Northwest Territories and Nunavut had an average of 74% survival rate in their first year.

Habitat Requirements

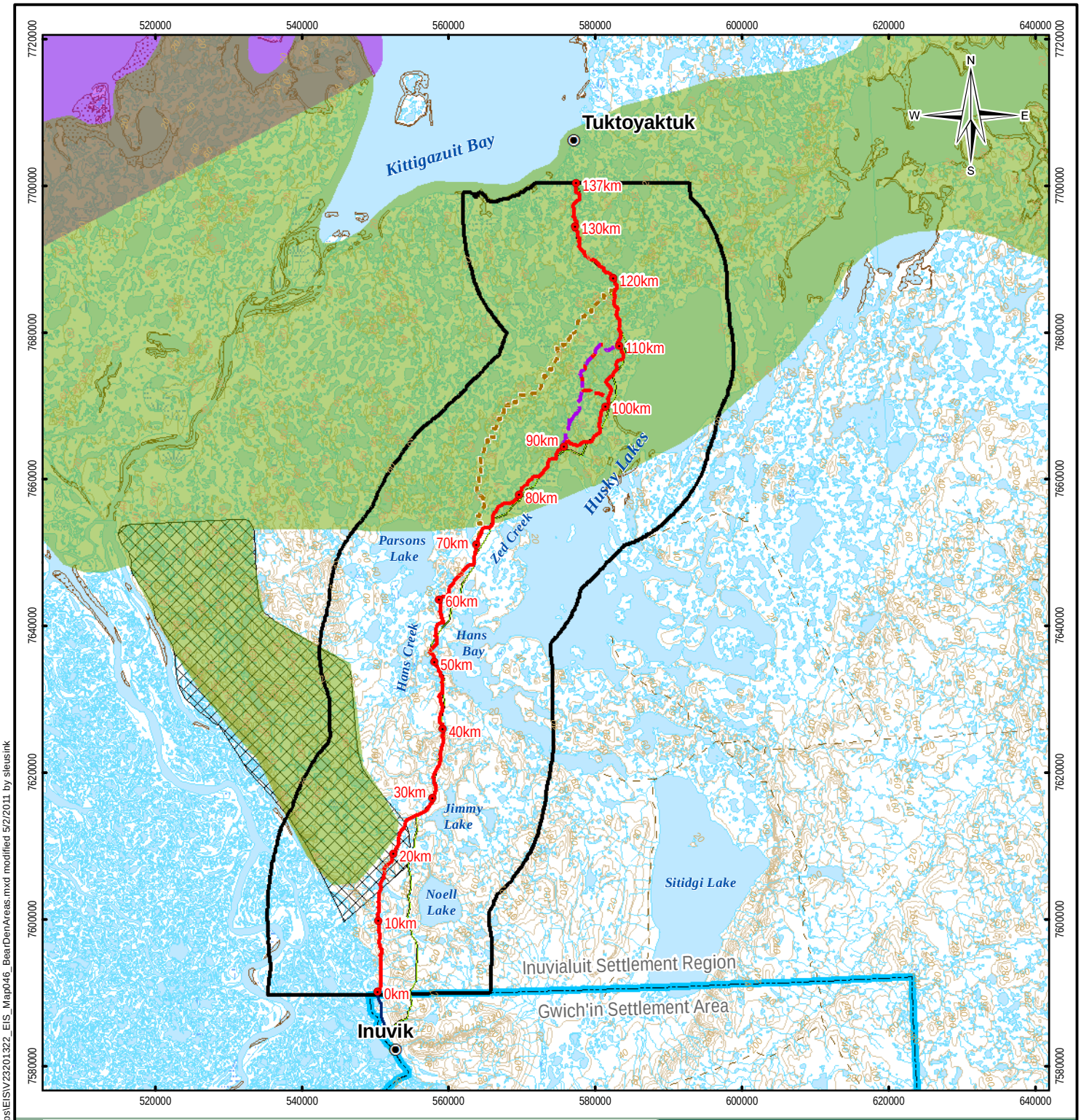
The proposed Highway alignment occurs within the Grizzly Bear Denning Areas, site 322C (see Figure 3.1.9-17; Community of Tuktoyaktuk et al. 2008). Critical Grizzly bear denning areas are also shown on Figure 3.1.9-17. Important habitat areas for denning are major river drainages, eskers, and southerly slopes. Previous studies identified eskers as extremely important grizzly bear denning habitat in the central Arctic (Mueller 1995; Banci and Moore 1997). However, McLoughlin et al. (2002) found that of 56 grizzly den sites they surveyed

in the central Arctic only seven of 56 den sites were situated in eskers. Heath tundra (23/56) and heath-boulder habitats with >30% boulder content (11/56) formed the majority (60%) of den sites. The remaining dens were in birch seep habitats (5/56), spruce forest (5/56) riparian tall shrub (3/56), and heath tundra habitat with >30% bedrock content (1/56). In addition, one den was situated in a non-vegetated sand embankment adjacent to a river.

Although McLoughlin et al. (2002) did not find eskers to be critical grizzly denning sites, this habitat type was selected more than expected by chance, given the low availability of eskers in the central Arctic. Of the dens surveyed most were on south-facing slopes and were constructed under cover of tall shrubs (McLoughlin et al. 2002). Steep slopes (>25%) with well-drained soils were favoured. Well-developed patches of dwarfbirch (*Betula nana*) and berry-producing shrubs were often observed at den sites on steep southerly-facing slopes (McLoughlin et al. 2002). McLoughlin et al. (2002) found dwarf birch and crowberry had the highest percent coverage of any plant species around den entrances. It is suspected that the roots of these shrubs may add to the structural integrity of den cavity ceilings.

During an aerial reconnaissance flight in mid-September 2009, EBA identified three freshly dug grizzly bear dens in the vicinity of KM 36 to 38 (Photo 3.1.9-3, see Map 08 of the Inuvik to Tuktoyaktuk 1:25,000 Map Book, Appendix D) and a number of old dens along the proposed Highway alignment.

Photo 3.1.9-3
Several freshly dug grizzly bear dens were documented, such as this one found on a south facing slope hidden amongst shrubs



LEGEND

- Critical Grizzly Bear Denning Areas
- Mainland Coastal Polar Bear Denning Areas
- Regional Study Area (15 km buffer)
- Gwich'in / Inuvialuit Boundary
- Caribou Hills
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- PWC 1977
- Navy Road
- Trail
- Contour
- Watercourse
- Waterbody
- Wetland
- Sand

NOTES
Base data source: NTS 1:250,000
Bear Denning Areas: GNWT ENR, February 2011

ISSUED FOR USE

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Grizzly and Polar Bear Denning Areas

PROJECTION	UTM Zone 8
DATUM	NAD83
Scale:	1:750,000
	10 5 0 10 20 Kilometres
FILE NO.	V23201322_EIS_Map046_BearDenAreas.mxd
PROJECT NO.	V23201322
DWN	SL
CKD	TS
REV	0
OFFICE	EBA-VANC
DATE	May 19, 2011

Figure 3.1.9-17

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According to the Community of Tuktoyaktuk et al. (2008) and the Community of Inuvik et al. (2008), some foods and areas may be more important than others from season to season, and from year to year. Within the Mackenzie Delta region the grizzly bear is considered a food-limited species as it occupies a region where the availability of quality protein-rich foods is low (Edwards 2010). Grizzly bears within the Delta benefit from a flexible foraging behaviour that allows them to switch to prey that provide greater energy return for search and handling efforts (Edwards et al 2010). In the central barrens, important parts of the grizzly bear diet include caribou, various berry and herbaceous plant species. Edwards et al. (2010) found that the primary diet of grizzly bears in the Mackenzie Delta consisted of horsetail (*Equisetum* spp.), grass, sedge (*Carex* spp.), sweetvetch (*Hedysarum* spp.) and all available berry species as well as caribou, moose and beaver.

Grizzly bears within the study area and in the central Arctic have also been observed hunting reindeer, muskrat, Arctic hare lemmings, voles, ground squirrels, which they excavate from burrows, and fish such as whitefish (*Coregonus* spp.) and longnose sucker (*Catostomus catostomus*) (Edwards et al. 2010 and Gau et al. 2001). Grizzlies are opportunistic predators and will kill moose or caribou if the occasion arises. Grizzlies are also carrion eaters and the carcasses of winter-killed animals may also provide a source of food in spring before vegetation is available. Mowat and Heard (2006) found that grizzly bears in Arctic regions that supported barren-ground caribou consistently showed the highest terrestrial meat consumption compared to other populations in North America. Population densities of two western Arctic grizzly bear populations with access to abundant caribou were reported to be greater than in a population with no such access (Reynolds and Garner 1987 in Mowat and Heard 2006).

At northern latitudes the grizzly bears must store enough energy reserves to last the six to seven months of winter dormancy. The long dormant period, delayed and short growing season of the region makes it difficult for grizzly bears to meet their requisite resource needs during the five to six month active period from May/June to October/November (Edwards 2006).

Seasonal Movements

Grizzly bear seasonal ranges are defined as an area utilized during spring, summer or fall but excludes the den site (Craighead 1974). Edwards (2010) identified three grizzly bear seasonal breaks based on changing habitat use within the Mackenzie Delta (Table 3.1.9-6). The following table summarizes grizzly bear seasonal EOSD habitat uses within the RSA. These habitats are based on habitats described by Edwards (2010) and were then translated to equivalent EOSD habitats.

TABLE 3.1.9-6 GRIZZLY BEAR SEASONAL EOSD HABITAT USES BY GENDER

Season	Female Habitat Use	Male Habitat Use
Season 1 (Den emergence – August 4)	• Exposed/barren land, bryoids • Shrub tall, mixedwood and broadleaf classes • Coniferous dense • Shrub low • Wetland herb	• Wetland herb, wetland shrub, wetland treed • Shrub tall, mixedwoord and broadleaf classes
Season 2 (August 5 – September 29)	• Exposed/ barren land, bryoids • Wetland herb, wetland shrub, wetland treed	• Wetland herb, wetland shrub, wetland treed • Exposed/ barren land, bryoids • Wetland herb • Coniferous dense
Season 3 (September 20 – Den entry)	• Exposed/ barren land, bryoids • Wetland herb, wetland shrub, wetland treed • Coniferous dense • Shrub tall, mixedwood and broadleaf classes	• Shrub tall, mixedwood and broadleaf classes • Wetland herb, wetland shrub, wetland treed

Source: Adapted from Edwards 2009

Based on empirical analysis of telemetry and historical data, Edwards (2010) produced a seasonal habitat selection model for both female and male grizzly bears within the Mackenzie Delta region. The model suggested that upon den emergence to August 4, preferred habitat for female grizzly bears could be found throughout the landscape including the low shrub upland habitats of the LSA while for the remaining two seasonal breaks preferred habitats for female grizzlies were more likely to occur along the Mackenzie River and Delta. The model also suggested that preferred habitats for male grizzlies were more likely to occur along the Mackenzie River and Delta during all three seasons identified.

Sensitive Time Periods

Four seasons identify the key annual life periods:

- Season 1 (den emergence – August 4);
- Season 2 (August 5 – September 29);
- Season 3 (September 20 – den entry); and
- Season 4 (denning).

These seasons are based on the phenology of food plants and the foraging and movement behaviour of grizzly bears within the Mackenzie Delta (Edwards 2010).

Den digging happens over an extended time period, when the land and lakes are not generally frozen. The actual time it takes for a bear to dig a den is not known but is likely relatively short in duration. Grizzly bears in the ISR typically den from October to May (Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008). In the Central Arctic, den entrance occurs primarily in the last two weeks of October with the majority of bears emerging from dens in the 1st week of May (McLoughlin et al. 2002). Dens generally collapse in the summer and are not reused.

Grizzly bears breed in June-July (Bamfield 1974). Due to delayed implantation, grizzly bear cubs are typically born between mid-January and early March while the female is still in her den (Bamfield 1974).

Harvest Pressures

The Mackenzie Delta is located within the Inuvialuit Settlement Region (ISR) and the Gwich'in Settlement Area (GSA). The ISR and GSA are divided into Grizzly Bear Management Areas where an allowable harvest is set for each area.

The grizzly bear hunt is controlled by a tag-issuing system where a target of 33% of the harvested bears should be female (GNWT ENR 2010h). After recent quota increases, the Inuvialuit Settlement Region has a quota of 56 bears per year that is distributed to local Hunter and Trapper Committees. The quota is implemented by the requirement for a tag to hunt grizzly bears. There is a total allowable harvest of 13 bears per year in the Tuktoyaktuk-West hunting area (I/GB/04) and nine bears per year in the Inuvik hunting area (I/GB/03). ENR annually provides a report on species under quota, including grizzly bears (GNWT ENR 2010h). Harvesting occurs within the RSA, mainly subsistence harvesting, but sport hunting is conducted out of Tuktoyaktuk. Harvest totals reported in 2005-2010 are 1 and 37 bears for Inuvik and Tuktoyaktuk-West (I/GB/04) respectively (GNWT ENR 2010h). Access to hunting areas is currently by snowmachine only.

Figure 3.1.9-18 shows the number of bears harvested by Tuktoyaktuk hunters between 2003 and 2008 based on the type of harvest and the sex of the bear and Figure 3.1.9-19 shows the grizzly bear harvest locations in the Tuktoyaktuk-West are (I/GB/04) for the same period.

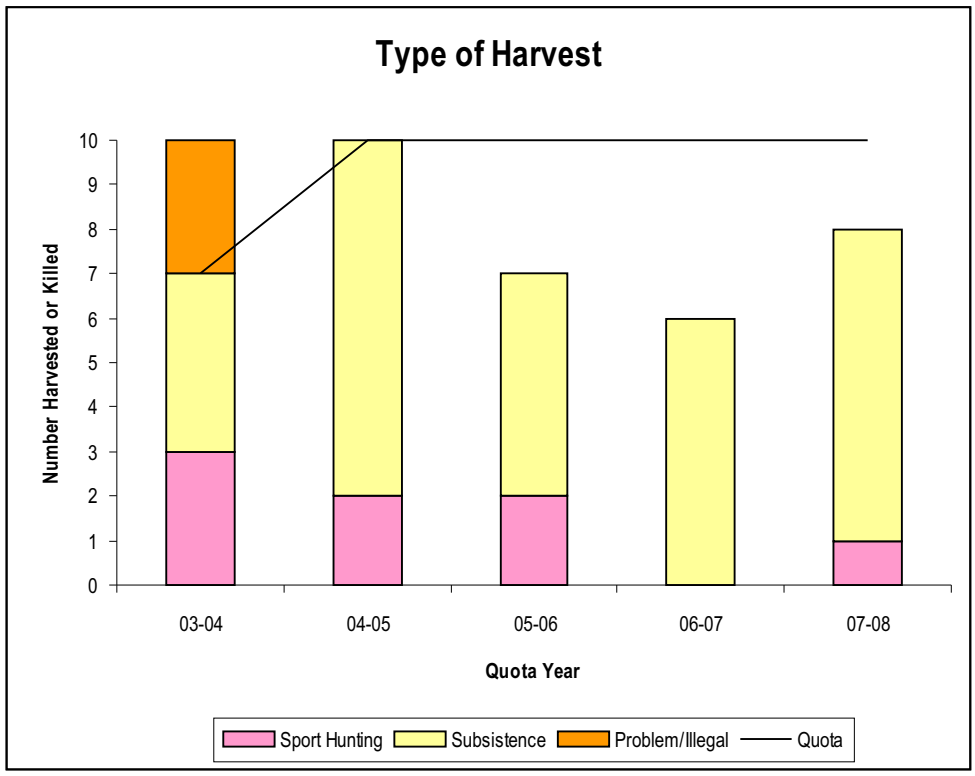
The Hunters and Trappers Committee by-laws that are written into the NWT *Wildlife Act* regulations provide a mechanism for ensuring industry-induced bear mortalities come off the quota. It is illegal for anyone to kill denning bears or bears with cubs.

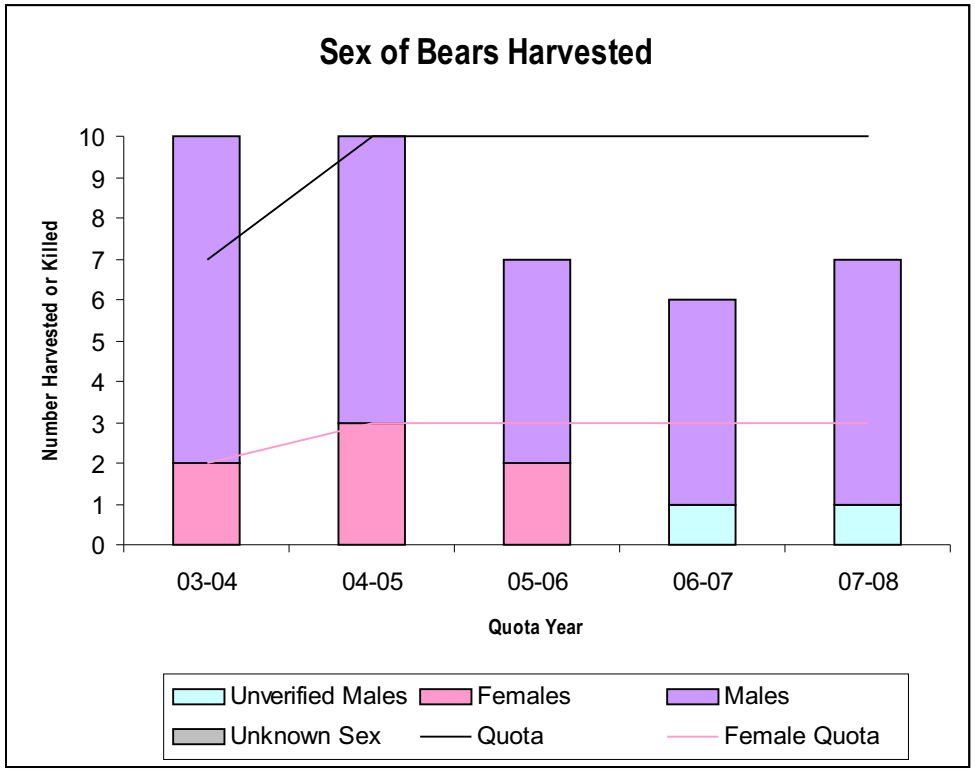
Grizzly bears in the ISR are co-managed under the *Inuvialuit Final Agreement* (IFA) by the following agencies and land claim organizations:

- Wildlife Management Advisory Council (NWT) (WMAC (NWT));
- Wildlife Management Advisory Council (North Slope) (WMAC (North Slope));
- Inuvialuit Game Council (IGC);
- Aklavik, Inuvik, Paulatuk, and Tuktoyaktuk Hunters and Trappers Committees (HTCs);
- GNWT, Department of Environment and Natural Resources (GNWT ENR);
- Government of the Yukon, Department of Environment (YTG DOE); and,
- Parks Canada.

Health of Harvested Species and Potential Contaminants

Further discussion on potential wildlife contamination is found in Section 5.1.9.11.





NOTES
Source: GNWT ENR

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Town of Inuvik

Northwest Territories

KIGGIAK - EBA

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENFVIRONMENTAL IMPACT STATEMENT

Grizzly Bear Harvest by Type and Sex July 2003 to June 2008

PROJECT NO.	DWN	CKD	REV
V23201322	SL	TS	0
OFFICE: EBA-VANC	DATE: May 19, 2011		

Figure 3.1.9-18

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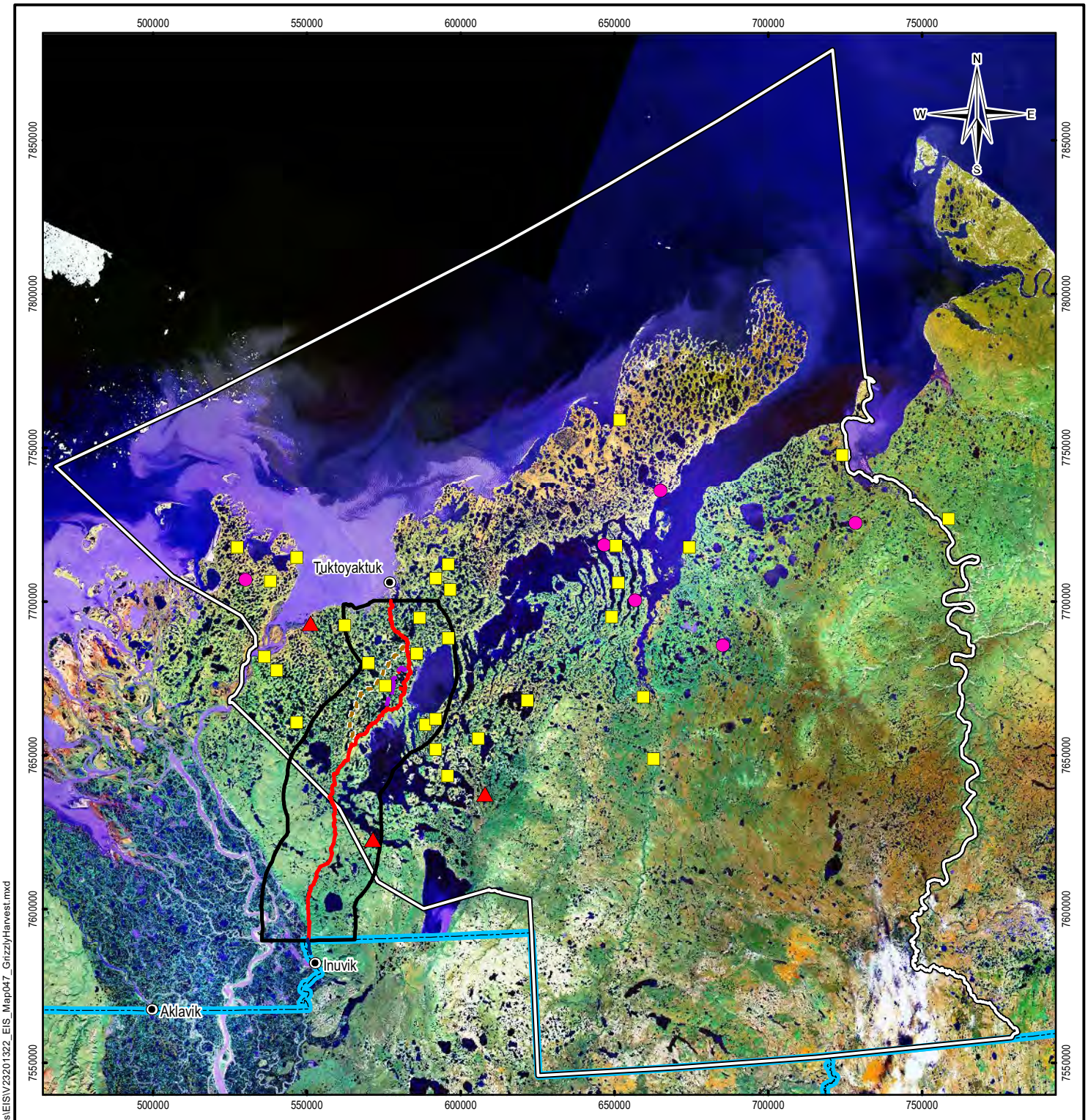

LEGEND

- Community
- Tuktoyaktuk West (I/GB/04)

Harvest Locations (approximate)

- Problem
- Sport
- Subsistence

- Gwich'in / Inuvialuit Boundary
- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- Navy Road

NOTES

Base data source: EarthSat Imagery
I/GB/04: NWT Centre for Geomatics, February 2011

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PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Tuktoyaktuk West (I/GB/04) Grizzly Bear Harvest Locations July 2003 to June 2008

PROJECTION	DATUM
UTM Zone 8	NAD83

Scale: 1:1,800,000

20 10 0 20 40

Kilometres

FILE NO.
V23201322_EIS_Map047_GrizzlyHarvest.mxd

PROJECT NO.	DWN	CKD	REV
V23201322	SL	TS	0

OFFICE	DATE
EBA-VANC	May 2, 2011

Town of Inuvik
Northwest Territories
KIGGIAK - EBA

Figure 3.1.9-19

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Distribution and Timing in Relation to Project Alternatives, Construction Activities and Operation

According to Figure 3.1.9-15, the majority of grizzly bears occur west of the proposed Highway, within the Mackenzie Delta area; however, there is potential denning habitat throughout the length of the proposed Highway. Winter denning season is the time of greatest sensitivity of grizzly bears to disturbance, particularly for females with cubs. In winter, construction activities could disturb denning bears. Since bears do not use dens in the summer, summer construction activities will not affect denning.

Following the four winter seasons of construction, disturbance may occur at borrow sources that remain open for Highway maintenance work. Otherwise, den disturbance is not expected to occur during Highway operations.

The potential effects to grizzly bears and grizzly bear habitat from the Project are discussed in the Wildlife and Wildlife Habitat effects section (Section 4.2.7).

3.1.9.8 Wolverine

Population Status and Distribution

According to Community of Tuktoyaktuk et al. (2008), relatively few wolverine are present in the Mackenzie Delta region. The population estimate for wolverines in the Northwest Territories is unknown; however, GNWT ENR estimates that there are 1.6 to 3.7 per 1,000 km^2 for males and lower for females (GNWT ENR 2011c). Estimates suggest there is a stable but sparsely distributed population numbering in the thousands.

Home range sizes in the central Arctic vary between 126 km^2 (females) and 404 km^2 (males). Dispersal distances by females average 133 km (range 69-255 km) and males 231 km (range 73-326 km) (Community of Tuktoyaktuk et al. 2008). They live at low densities even under optimal conditions (Banci 1994). Reproductive rates are low and sexual maturity is delayed, in comparison with some (or most) other carnivores.

The proposed Highway is located within the Winter Wolverine Harvesting Area, Site 314C (Figure 3.2.8-11; Community of Tuktoyaktuk et al. 2008).

Important Habitat and Habitat Requirements

Wolverines are scavengers and predators of birds and small mammals, relying on a diversity of foods to offset the uncertainty of availability in the harsh northern environment. There appears to be a correlation between wolverine numbers, ungulate populations, and the presence of more (successful) efficient predators such as wolves (Van Zyll de Jong 1975).

Wolverine feed on dead animals, eggs, small and large mammals (lemmings, caribou and sheep). Most large mammal food sources are obtained as carrion from wolf or bear kill. Wolverines feed mainly on large game animals like caribou. However, the wolverine is more a scavenger than a hunter and will travel long distances in search of carrion or food caches. They also feed on small animals, ptarmigan, fish, roots and berries (GNWT ENR 2011a). The population is sensitive to fluctuations in large game populations.

Wolverines do not hibernate but they do construct dens. Dens are used to escape predators and for raising kits (GNWT ENR 2011a). Reportedly wolverine dens can vary from simple rest beds to complex natal dens with extensive tunnel networks (Pullianinen 1986 and Magoun 1985, as cited in Mulders 2000) and are frequently associated with rock scree slopes and large snowdrifts (Magoun 1985 and Bevanger 1992, as cited in Mulders 2000). Caves, rock crevices, fallen logs and holes in the snow and burrows are often used for shelter (Community of Inuvik et al. 2008).

According to Community of Tuktoyaktuk et al. (2008), the Husky Lakes and Finger Lakes areas are considered important habitat for wolverine.

Seasonal Movements

Wolverines are non-migratory (Government of Canada 2010).

Sensitive Time Periods

Wolverine breed in March to May and young emerge from June to July (Community of Tuktoyaktuk et al. 2008).

Harvest Pressures

Harvest pressures on wolverines have been increasing and are influenced by factors such as increased pelt prices and easier access into areas where hunting and trapping can occur (GNWT ENR 2011a). The Inuvialuit have exclusive rights to harvest wolverine and in recent years have allowed guided sport hunts of wolverines. Hunters have been providing carcasses from harvested animals for a number of years. Information and samples are being analyzed.

Health of Harvested Species and Potential Contaminants

Wolverines are important to northern communities, even though they are not consumed for food. In a study of contaminants in the Canadian Arctic, persistent organic pollutants were not of concern for wolverine from Kugluktuk, Nunavut. The PCB levels documented in wolverines were also documented as low (INAC 2003).

Further discussion on potential wildlife contamination is found in Section 5.1.9.11.

Distribution and Timing in Relation to Project Alternatives, Construction Activities and Operation

Home-range sizes are extensive, and vary between males and females. The proposed Highway is within the wolverine winter harvesting area (Figure 3.2.8-11). Construction and operation of the Highway itself is not expected to affect wolverine populations directly; however, improving access for hunting and trapping may have an indirect effect on wolverine populations. As well, there is potential that wolverines may also be attracted to the camps or scavenging along the Highway.

The potential effects to furbearers, including wolverine, from the Project are discussed in the Wildlife and Wildlife Habitat effects section (Section 4.2.7).

3.1.9.9 Red and Arctic Fox

Population Status and Distribution

Foxes are important furbearers in the region. The population status of Arctic and Red foxes can be highly variable from year to year (Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008).

Red fox habitat is typically considered widespread below the treeline (Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008) with higher densities located there. Red foxes also occur sparsely on the southern tundra (GNWT ENR 2011b). Four red foxes and one old den site were observed during the aerial reconnaissance in mid-September 2009 (Photo 3.1.9-4).

Normal home ranges of Red fox vary between 5 and 35 km². Foxes may undertake long migrations in search of food, especially in years of low prey density and high fox numbers. The wide distribution of red foxes indicates that it is able to survive in a variety of habitats. Red foxes are most often found in semi-open country, such as natural clearings, river valleys, tundra and agricultural areas (GNWT ENR 2011b).

Arctic fox habitat is typically considered widespread above the treeline and throughout the arctic tundra; they inhabit both inland and coastal terrain (Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008; GNWT ENR 2011b). The natural southern limit of its distribution is the treeline, but some Arctic foxes venture into the boreal forest, especially when their food decreases on the tundra. They also move extensively over the polar ice cap (GNWT ENR 2011b).

Each Arctic fox has its own home range, which varies in size from 3 to 25 km². However, Arctic foxes are very mobile and can travel great distances over land or sea ice. Movement by individuals of over 2,000 km has been recorded (GNWT ENR 2011b).

Photo 3.1.9-4
Red foxes commonly occur along the proposed Highway alignment

Important Habitat and Habitat Requirements

Foxes have a range of habitats including natural clearings, river valleys, tundra and agricultural areas (GNWT ENR 2011b). Habitat requirements are linked to food sources, such as carrion, birds and small mammals.

Denning habitat consist of well-drained, stable soils (Martell et al. 1984). Arctic fox den sites include areas that are gently sloping with sandy soil near rivers or lakes or on elevated areas free from permafrost. They typically are complex with multiple tunnels and entrances and are occupied in successive years (GNWT ENR 2011b).

Red fox prefer den sites in sandy soil along riverbanks and can use the same den more than once. The dens used by Red fox are not as complex as those used by Arctic fox.

Arctic fox feed on lemmings and voles which they find in tunnels or while travelling across the tundra. Arctic fox population is closely tied to the availability and population fluctuations of lemming. Other food sources include arctic hares, ptarmigan and carrion (i.e. scavenge for remains of wolf or polar bear kills). In summer Arctic fox add ground squirrels, hares, eggs and fish to their diet. Limited food resources can have a profound effect on Arctic fox numbers (GNWT ENR 2011b).

Red foxes are omnivorous, feeding on whatever is available, but chiefly mice. In the winter, their diet also includes muskrats, squirrels, hares and grouse. During the summer, they expand this diet to include birds' eggs, beetles and vegetable matter, such as grass and berries. Red foxes are also scavengers, eating garbage and carrion. Such versatility in

switching to different food items is another factor which has enabled red foxes to be so widely distributed (GNWT ENR 2011b).

Seasonal Movements

Foxes typically have normal home ranges between 3 km² and 35 km²; however, as stated previously, both the arctic and the red foxes may undertake long migrations in search of food.

Sensitive Time Periods

Arctic fox breed in March, den in April and pups are active in May. Pups tend to stay near their den until October (Community of Tuktoyaktuk et al. 2008).

Red fox breed from February to April (Community of Inuvik et al. 2008), and pups are born between March and May (GNWT ENR 2011b). During mating, a den is dug or an existing burrow is found and prepared for habitation. Red fox families stay together until fall (Community of Tuktoyaktuk et al. 2008).

Harvest Pressures

Fox in NWT are harvested for their pelts and harvest records given are based on fur auction records. For Arctic fox, average harvest data from 1991 to 2009 was 706 foxes per year (with a low value of 37 animals harvested in 1994/1995 to a high value of 2,291 animals harvested in 1991/1992) (GNWT ENR NDb). For Red fox, average harvest data from 1991 to 2009 was 706 foxes per year (with a low value of 139 animals harvested in 2003/2004 to a high value of 1,171 animals harvested in 1997/1998) (GNWT ENR NDc).

Health of Harvested Species and Potential Contaminants

According to Community of Tuktoyaktuk et al. (2008), the population can be highly variable from year to year. There are potential concerns related to rabies. Rabies is the most common disease that affects foxes. Encephalitis and distemper are also fatal diseases, which are more prevalent during years with high numbers of foxes. Most foxes are infected with a variety of internal and external parasites (GNWT ENR 2011b).

Further discussion on potential wildlife contamination is found in Section 3.1.9.13.

Distribution and Timing in Relation to Project Alternatives, Construction Activities and Operation

According to Community of Tuktoyaktuk et al. (2008), Arctic fox are known to move great distances (e.g., Alaska to Banks Island). Both the Arctic fox and Red fox have widespread habitats, are very mobile, and have home ranges between 3-25 km² (Arctic fox) or 5-35 km² (Red fox). Given the adaptability of Red and Arctic fox and the range of habitats used by each, the conflicts anticipated from construction and operation are expected to be limited.

The potential effects to furbearers, including red and Arctic fox, from the Project are discussed in the Wildlife and Wildlife Habitat effects section (Section 4.2.7).

3.1.9.10 Other Mammals

The following section includes mammals that were not identified as VCs in this study but that are considered important wildlife species in NWT. As such, a brief discussion of each mammal has been included here.

Boreal Woodland Caribou

Boreal woodland caribou are listed by COSEWIC and SARA as Threatened, and by the NWT General Status Rank as Sensitive.

Boreal woodland caribou are dispersed over a large area throughout the boreal forest (GNWT ENR 2011), occurring along the Mackenzie Valley from the Northwest Territories/Alberta border north to the Mackenzie Delta (Olsen et al. 2001). Based on traditional knowledge and scientific studies, there are an estimated 6,000 to 7,000 boreal caribou in the NWT, which still occupy much of their historic range (GNWT ENR NDe). They occur throughout their range in low numbers. In the Inuvialuit region, GNWT ENR reported an estimated density of about 1 per 100 km^2 based on radio-collared caribou data during the period of 2005 and 2006 (GNWT ENR NDf).

The Town of Inuvik and the Husky Lakes are located on the northern edge of their distribution. Boreal woodland caribou typically prefer mature or old growth coniferous forests associated with bogs, lakes and rivers. GNWT ENR has collared boreal woodland caribou that have shown annual movements from south of the Highway to Husky Lakes verifying that some Boreal woodland caribou do live in the area, though this would not be considered year-round habitat.

Boreal caribou have been shown to be affected by linear development (GNWT ENR NDg); however, the density of linear development in the RSA is less than the threshold predicted to impact populations (Canadian Boreal Initiative 2007).

Black Bear

Black bears occupy much of the NWT, predominantly in forested habitats, including the forested area around Inuvik. The size of the NWT black bear population is unknown, but is estimated conservatively to be 10,000 (GNWT ENR 2011a). Black bear distribution is generally linked to treed environments, which provide security from predators such as grizzly bears, wolves, and other black bears as trees provide security, as visual cover for hiding, and escape for climbing (Herrero 1978). Dense shrub communities are also important for security, and are also used for bedding (Jonkel 1978).

Black bear habitat quality is also primarily related to the abundance and availability of seasonally important food items. Their diet consists mainly of vegetation; however, meat (particularly winter-killed ungulates), insects and possibly fish during the summer, may also be important.

After den emergence, bears favour areas with early-emerging vegetation such as wetlands dominated by sedges and cotton-grass. Grasses and horsetails are also important, and black bears may be found on sites such as meadows. Black bears typically dig dens in till material

available on eskers, stream banks, or in natural cavities such as an upturned tree roots, crevices or caves.

Black bear denning habitat is limited to the forested area that occurs along the southernmost portion of the proposed Highway near Inuvik. Therefore, there may be some temporal overlap during the first season of construction and during the long-term operation of the Highway.

Wolf

Wolves are found in the vicinity of the proposed Highway. They are ecologically important predators and economically important furbearers. Wolf habitat and density is closely related to that of their prey, such as caribou and reindeer. They are often observed in association with barren-ground caribou, especially in the winter (Carruthers et al. 1986; McLean 1992; McLean and Jackson 1992). The wolf population appeared to decline in the 1950s, but recovered in the mid 1970s (Community of Tuktoyaktuk et al. 2008).

Habitat requirements include den sites, typically on steep slopes with stable soils, and as such, are susceptible to habitat displacement. In contrast to grizzly bears, roads may not cause wolves to avoid the area. Winter travel routes include game trails, ridges, seismic lines and frozen waterways. In deep fluffy snow, wolves find traveling difficult and any easier route, including roads or snowmachine trails are preferred (GNWT ENR NDd).

Wolves may occur in the area of the proposed Project however, it is not expected that the construction will affect wolves during the winter construction periods.

3.1.9.11 Species and Areas Subject to Exclusive or Preferential Rights Granted by Land Claims

The *Inuvialuit Final Agreement* (IFA) provides the Inuvialuit with certain harvesting rights to wildlife in the Western Arctic Region. The exercise of the Inuvialuit rights to harvest is subject to laws of general application respecting public safety and conservation. The IFA defines exclusive right to harvest as "the sole right to harvest the wildlife referred to in paragraphs Yukon - 12(24)(b) and (c) and Western Arctic Region - 14(6)(b) to (d), to be allocated the total allowable harvest and to permit non-Inuvialuit to harvest any such wildlife."

Section 14(6)(b), subject to the qualifications set out in subsections (15) to (18) of the Agreement, sets out the harvesting rights as:

(a) the preferential right to harvest all species of wildlife, except migratory non-game birds and migratory insectivorous birds, for subsistence usage throughout the Western Arctic Region;

(b) the exclusive right to harvest furbearers, including black and grizzly bears, throughout the Western Arctic Region;

(c) the exclusive right to harvest polar bear and muskox throughout the Western Arctic Region; and

(d) the exclusive right to harvest game on Inuvialuit lands and, if agreed on, other areas.

Under Section 14.(7), where harvesting rights are extended to other native peoples pursuant to subsections (15) to (18), their requirements as to subsistence usage shall be taken into account when setting subsistence quotas and the subsistence quotas and subsistence requirements of all the native peoples shall be accommodated within conservation limits. Where, in the exercise of their exclusive right to harvest referred to in paragraphs (6)(b), (c) and (d), the Inuvialuit permit persons other than natives to harvest, harvesting by those persons shall be subject to the laws of general application.

As well, the *Gwich'in Comprehensive Land Claim Agreement* (1992) provides the Gwich'in with certain harvesting rights to wildlife in the Western Arctic Region. In particular, according to Sections:

27.2.3 The Gwich'in have the right to harvest those species of wildlife which they have traditionally harvested within those areas of the Western Arctic Region which have been traditionally used by the Gwich'in to harvest wildlife.

27.2.4 The rights of the Gwich'in to harvest wildlife pursuant to 27.2.3 are subject to legislation applicable to Inuvialuit harvesters pursuant to the *Inuvialuit Final Agreement*.

3.1.9.12 Habitat Fragmentation

The total length of semi-permanent or permanent linear features within an area provides information on the extent of fragmentation or disturbance to a landscape. Some wildlife species may alter their behavior based on openings in forest canopy or ground cover and linear features on the landscape may affect wildlife movements. Some animals use linear features as transportation corridors. Other species avoid the openings. Once an area is opened, there is increased chance that people will use the linear feature as a new access point into previously inaccessible areas, increasing human presence for hunting and recreation (GNWT and NWT Biodiversity Team 2010).

The proposed Highway is primarily located in the tundra, and does not involve the creation of openings in forest canopy. The extent of linear disturbance in the NWT (less than 1 km/100 km²) is much less than in other areas in Canada. For example, road density in the British Columbia portion of the Taiga Plains is 52 km/100 km². The average road density in Alaska is 1.5 km/100 km².

Fragmentation density levels are measured in km^2 by km^2. Human features included are communities, mines, oil-gas wells, pipelines (all below ground), seismic lines, all-weather roads, winter roads, power stations, power lines, and the Canol Trail. A level of 0.6 km^2/km^2 means that in an Ecoregion, an animal, such as a caribou, has a 60% chance of being within a buffer zone near a human feature.

Historic human-caused disturbances to vegetation in the Regional Study Area were limited to small sites or resulted in minimal impacts. The level of fragmentation and connectivity are considered to be insignificant. Human-caused disturbances in the RSA include:

Ikhil Gas Development and Pipeline – The gas production facility is located 50 km north of Inuvik in the Caribou Hills. The pipeline is a 6 inch buried pipeline. The buried

pipeline approaches the proposed Highway alignment at KM 5 and parallels the alignment to the ISR boundary.

Tuktoyaktuk Source 177 Access Road – is a 19 gravel road from Tuktoyaktuk to a community borrow source. The road was completed in the summer of 2010.

Winter Access Trails – Several routes are established every winter from Tuktoyaktuk to the Husky Lakes area and from Inuvik to the Husky Lakes area. These trails do not result in vegetation changes and are partially over frozen water.

Former Northern Canada Power Commission Power Line – a 144 km wooden pole power line ran from Inuvik to Tuktoyaktuk from 1972 until the late 1980s. The power line was salvaged and little evidence of the line remains.

Oil and Gas Exploration Drilling – Gulf Oil drilled several exploratory wells in the early 1970s.

Oil and Gas Geophysical Activities – Seismic exploration has occurred since the 1960s across the ISR. In the Parsons Lake area about 1.5% of the 41,105 ha was subjected to seismic lines and associated activities. As these activities were conducted in the winter on frozen ground and water, limited change to vegetation occurred. The vegetation along seismic lines appears to have a different colour from the air but little physical evidence remains on the ground.

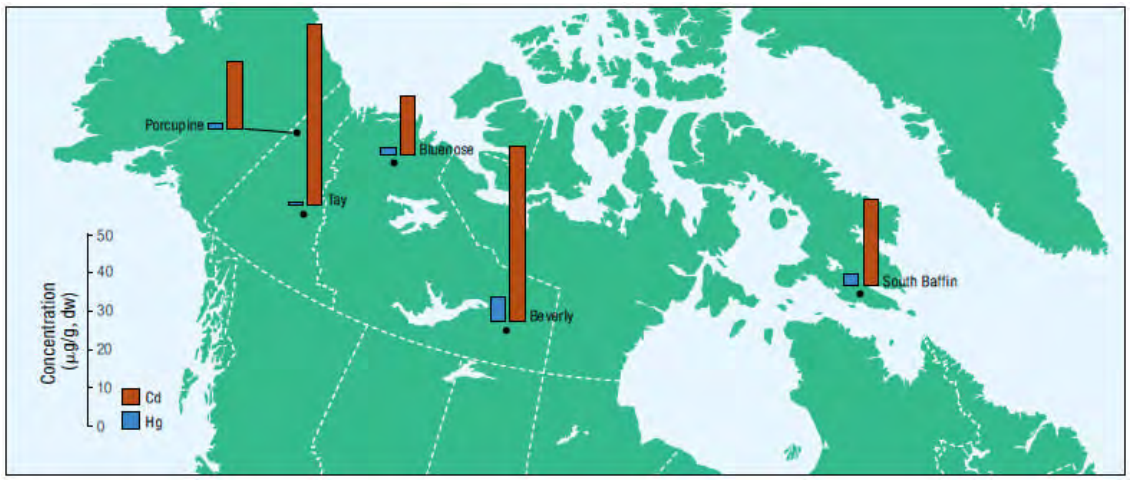
3.1.9.13 Contaminants and Wildlife

The Northern Contaminants Program is a national monitoring program that tracks contaminants in the air, water, wildlife and environment. The program was established in 1991 in response to concerns about potential elevated levels of contaminants in fish and wildlife species that are important to the traditional diets of northern Aboriginal peoples, and their possible exposure (INAC 2003). Modern day contaminant products and by-products are detected in the Arctic, often far from the source of the pollution. Once in the Arctic, contaminants accumulate in the plants and animals of the region, which are used by Aboriginal peoples for nourishment (Lambden et al. 2007).

Levels of organochlorines (OCs), metals and radionuclides are described in the Canadian Arctic Contaminants and Health Assessment Report (INAC 2003). Since that report, there has been very little data generated for terrestrial mammals as the levels of contaminants were considered very low (INAC 2003).

During the 1990s metal data samples were taken from the kidneys and livers of caribou from a total of 15 herds across the Canadian Arctic. A multi-element analysis was conducted, the concentration of Arsenic (As), Barium (Ba), Beryllium (Be), Boron (B), Cobalt (Co), Molybdenum (Mo), Nickel (Ni), Selenium (Se), Silicon (Si), Strontium (Sr), Tellurium (Te), Thorium (Th), Tin (Sn), Thallium (TI), Uranium (U) and Vanadium (V) were all below detection limits. Of the major elements Aluminum (Al), Cadmium (Cd), Copper (Cu), Chromium (Cr), Iron (Fe), Lead (Pb), Manganese (Mn), total Mercury (Hg) and Zinc (Zn), only cadmium, total mercury and zinc increase significantly with age (INAC 2003). The cadmium and mercury concentrations can be observed in Figure 3.1.9-20. From

Figure 3.1.9-20 it can be observed that the Bluenose caribou herd, located closest to the proposed Highway, has lower levels of mercury and cadmium compared to other Canadian Arctic locations.



Source: INAC (2003)

Figure 3.1.9-20
Concentration of Mercury and Cadmium in the Liver of Caribou from the Canadian Arctic

Specific levels of contaminants for other mammals occupying the region surrounding the proposed Highway were not available. In general, terrestrial mammals in the NWT are generally found to have lower concentrations of pollutants than animals from more southern species or marine species (GNWT ENR NDa).

3.1.10 Birds and Habitat

This section of the document focuses on avian (bird) species likely to be found within the Local and Regional Study Area and is based on a review of background information and traditional knowledge, and the results of field studies.

There are potentially 108 species of birds occurring within the Regional Study Area (Table 3.1.10-1). The local and regional abundance and distribution of these species varies considerably depending on habitat availability. Some may only rarely occur and do not routinely breed in the area. The majority of these species migrate to southern wintering areas.

TABLE 3.1.10-1 BIRD SPECIES POTENTIALLY OCCURRING WITHIN THE REGIONAL STUDY AREA[1]

Common Name[2]	Scientific Name	COSEWIC Status	NWT General Status Rank[3]
Red-throated Loon	*Gavia stellata*	Not Listed	Secure
Common Loon	*Gavia immer*	Not at Risk	Secure
Yellow-billed Loon	*Gavia adamsii*	Not at Risk	Undetermined
Pacific Loon	*Gavia pacifica*	Not Listed	Secure
Horned Grebe	*Podiceps auritus*	Special Concern	Sensitive
Red-necked Grebe	*Podiceps grisegena*	Not at Risk	Secure
Tundra Swan	*Cygnus columbianus*	Not Listed	Secure
Greater White-fronted Goose	*Anser albifrons*	Not Listed	Secure
Snow Goose	*Chen caerulescens*	Not Listed	Secure
Canada Goose	*Branta canadensis*	Not Listed	Secure
Brant	*Branta bernicla*	Not Listed	Sensitive
Mallard	*Anas platyrhynchos*	Not Listed	Secure
Northern Pintail	*Anas acuta*	Not Listed	Sensitive
Gadwall	*Anas strepera*	Not Listed	Undetermined
American Wigeon	*Anas americana*	Not Listed	Secure
Northern Shoveler	*Anas clypeata*	Not Listed	Secure
Green-winged Teal	*Anas crecca*	Not Listed	Secure
Lesser Scaup	*Aythya affinis*	Not Listed	Sensitive
Greater Scaup	*Aythya marila*	Not Listed	Secure
Canvasback	*Aythya valisineria*	Not Listed	Secure
Long-tailed Duck	*Clangula hyemalis*	Not Listed	Sensitive
King Eider	*Somateria spectabilis*	Not Listed	Sensitive
Common Eider	*Somateria mollissima*	Not Listed	Sensitive
Surf Scoter	*Melanitta perspicillata*	Not Listed	Sensitive
White-winged Scoter	*Melanitta fusca*	Not Listed	Sensitive
Common Goldeneye	*Bucephala clangula*	Not Listed	Secure
Red-breasted Merganser	*Mergus serrator*	Not Listed	Secure
Northern Harrier	*Circus cyaneus*	Not at Risk	Secure
Northern Goshawk	*Accipiter gentilis*	Not Listed	Secure
Rough-legged Hawk	*Buteo lagopus*	Not at Risk	Secure

TABLE 3.1.10-1 BIRD SPECIES POTENTIALLY OCCURRING WITHIN THE REGIONAL STUDY AREA[1]

Common Name[2]	Scientific Name	COSEWIC Status	NWT General Status Rank[3]
Golden Eagle	*Aquila chrysaetos*	Not at Risk	Secure
Bald Eagle	*Haliaeetus leucocephalus*	Not at Risk	Secure
Merlin	*Falco columbarius*	Not at Risk	Secure
Tundra/ Anatum Peregrine Falcon	*Falco peregrinus anatum/ tundrius complex*	Special Concern	Sensitive
Gyrfalcon	*Falco rusticolus*	Not at Risk	Secure
Sharp-tailed Grouse	*Tympanuchus phasianellus*	Not Listed	Secure
Spruce Grouse	*Falcipennis canadensis*	Not Listed	Secure
Rock Ptarmigan	*Lagopus muta*	Not Listed	Secure
Willow Ptarmigan	*Lagopus lagopus*	Not Listed	Secure
Sandhill Crane	*Grus canadensis*	Not at Risk	Secure
Black-bellied Plover	*Pluvialis squatarola*	Not Listed	Sensitive
American Golden-Plover	*Pluvialis dominica*	Not Listed	Sensitive
Semipalmated Plover	*Charadrius semipalmatus*	Not Listed	Secure
Lesser Yellowlegs	*Tringa flavipes*	Not Listed	Sensitive
Spotted Sandpiper	*Actitis macularius*	Not Listed	Secure
Whimbrel	*Numenius phaeopus*	Not Listed	Sensitive
Hudsonian Godwit	*Limosa haemastica*	Not Listed	Sensitive
Ruddy Turnstone	*Arenaria interpres*	Not Listed	Sensitive
Sanderling	*Calidris alba*	Not Listed	Sensitive
Dunlin	*Calidris alpina*	Not Listed	Sensitive
White-rumped Sandpiper	*Calidris fuscicollis*	Not Listed	Secure
Baird's Sandpiper	*Calidris bairdii*	Not Listed	Secure
Semipalmated Sandpiper	*Calidris pusilla*	Not Listed	Sensitive
Least Sandpiper	*Calidris minutilla*	Not Listed	Sensitive
Pectoral Sandpiper	*Calidris melanotos*	Not Listed	Secure
Long-billed Dowitcher	*Limnodromus scolopaceus*	Not Listed	Sensitive
Short-billed Dowitcher	*Limnodromus griseus*	Not Listed	Undetermined
Wilson's Snipe	*Gallinago delicata*	Not Listed	Undetermined
Red-necked Phalarope	*Phalaropus lobatus*	Not Listed	Sensitive
Red Phalarope	*Phalaropus fulicaria*	Not Listed	Sensitive

TABLE 3.1.10-1 BIRD SPECIES POTENTIALLY OCCURRING WITHIN THE REGIONAL STUDY AREA[1]

Common Name[2]	Scientific Name	COSEWIC Status	NWT General Status Rank[3]
Pomarine Jaeger	*Stercorarius pomarinus*	Not Listed	Undetermined
Parasitic Jaeger	*Stercorarius parasiticus*	Not Listed	Undetermined
Long-tailed Jaeger	*Stercorarius longicaudus*	Not Listed	Undetermined
Sabine's Gull	*Xema sabini*	Not Listed	Secure
Bonaparte's Gull	*Larus philadelphia*	Not Listed	Secure
Mew Gull	*Larus canus*	Not Listed	Secure
Herring Gull	*Larus argentatus*	Not Listed	Secure
Thayer's Gull	*Larus thayeri*	Not Listed	Secure
Glaucous Gull	*Larus hyperboreus*	Not Listed	Secure
Arctic Tern	*Sterna paradisaea*	Not Listed	Secure
Short-eared Owl	*Asio flammeus*	Special Concern	Sensitive
Northern Hawk Owl	*Surnia ulula*	Not at Risk	Secure
Great Horned Owl	*Bubo virginianus*	Not Listed	Secure
Snowy Owl	*Bubo scandiacus*	Not at Risk	Secure
Northern Flicker	*Colaptes auratus*	Not Listed	Secure
Alder Flycatcher	*Empidonax alnorum*	Not Listed	Secure
Northern Shrike	*Lanius excubitor*	Not Listed	Secure
Gray Jay	*Perisoreus canadensis*	Not Listed	Secure
Common Raven	*Corvus corax*	Not Listed	Secure
Tree Swallow	*Tachycineta bicolor*	Not Listed	Secure
Bank Swallow	*Riparia riparia*	Not Listed	Secure
Cliff Swallow	*Petrochelidon (Hirundo) phyrrhonota*	Not Listed	Secure
Black-capped Chickadee	*Poecile atricapillus*	Not Listed	Secure
Boreal Chickadee	*Poecile hudsonica*	Not Listed	Sensitive
Gray-headed Chickadee	*Poecile cincta*	Not Listed	May Be At Risk
American Robin	*Turdus migratorius*	Not Listed	Secure
Gray-cheeked Thrush	*Catharus minimus*	Not Listed	Secure
American Pipit (Water Pipit)	*Anthus rubescens*	Not Listed	Sensitive
Bohemian Waxwing	*Bombycilla garrulus*	Not Listed	Secure
Orange-crowned Warbler	*Vermivora celata*	Not Listed	Secure

TABLE 3.1.10-1 BIRD SPECIES POTENTIALLY OCCURRING WITHIN THE REGIONAL STUDY AREA[1]			
Common Name[2]	**Scientific Name**	**COSEWIC Status**	**NWT General Status Rank[3]**
Yellow Warbler	*Dendroica petechia*	Not Listed	Secure
Yellow-rumped Warbler	*Dendroica coronata*	Not Listed	Secure
Blackpoll Warbler	*Dendroica striata*	Not Listed	Sensitive
Northern Waterthrush	*Seiurus noveboracensis*	Not Listed	Secure
Wilson's Warbler	*Wilsonia pusilla*	Not Listed	Secure
American Tree Sparrow	*Spizella arborea*	Not Listed	Sensitive
Chipping Sparrow	*Spizella passerina*	Not Listed	Secure
Savannah Sparrow	*Passerculus sandwichensis*	Not Listed	Secure
Fox Sparrow	*Passerella iliaca*	Not Listed	Secure
White-crowned Sparrow	*Zonotrichia leucophrys*	Not Listed	Secure
Dark-eyed Junco	*Junco hyemalis*	Not Listed	Secure
Lapland Longspur	*Calcarius lapponicus*	Not Listed	Secure
Smith's Longspur	*Calcarius pictus*	Not Listed	Undetermined
Snow Bunting	*Plectrophenax nivalis*	Not Listed	Secure
Rusty Blackbird	*Euphagus carolinus*	Special Concern	Sensitive
White-winged Crossbill	*Loxia leucoptera*	Not Listed	Secure
Common Redpoll	*Carduelis flammea*	Not Listed	Secure
Hoary Redpoll	*Carduelis hornemanni*	Not Listed	Undetermined

[1] This species list is based on range maps from Birds of North America (Cornell Lab of Ornithology 2011) and Sibley Guild to Birds (Sibley 2003).

[2] Species are listed in phylogenetic order (Sibley 2003).

[3] GNWT ENR's General Status Ranks (Working Group on General Status of NWT Species 2011).

3.1.10.1 Species at Risk

The federal *Species at Risk Act* (SARA) was adopted in 2002 and the territorial *Species at Risk (NWT) Act* came into effect in 2010. The purpose of these Acts is to: prevent wildlife species from being extirpated or becoming extinct; to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity; and, to manage species of special concern to prevent them from being endangered or threatened.

Schedule 1 of the federal SARA provides lists of wildlife species at risk that include mammals, birds, reptiles, amphibians, fish, lepidopterans, plants, lichens, mosses and molluscs. Species listed as Threatened under Schedule 1 must have recovery strategies prepared for the conservation of the species and its habitat within three years of listing while species of Special Concern must have management plans prepared.

Species whose known ranges overlap the Project corridor that are protected by SARA include the Eskimo curlew (Schedule 1 Endangered), the anatum subspecies of Peregrine Falcon (Schedule 1 Threatened) and the Rusty Blackbird (Schedule 1 Special Concern)(Government of Canada 2011). In 2007, COSEWIC re-assessed the Peregrine Falcon and recommended that *Falco pereginus anatum* and *Falco pereginus tundrius* subspecies be listed as Special Concern on SARA. An extended public consultation is underway but no formal decision has been made. The short eared owl and horned grebe have been assessed by COSEWIC and Special Concern.

3.1.10.2 Valued Components

Valued Components (VCs) are typically selected to represent the range of important biological conservation values existing within the RSA. This process requires selecting indicator species to serve as VCs.

Selection of avian VC species in this EIS is based on species, or species groups, that are considered important to stakeholders and researchers. VCs were selected from Table 3.1.10-1 using the following categories:

- Species listed on Schedule 1 of SARA;
- Species assessed by Committee on the Status of Endangered Wildlife in Canada (COSEWIC), other than those assessed as not at risk;
- Species assessed with an NWT General Status Rank other than Secure; and
- Species that are likely of high importance for subsistence/country foods.

The VCs that will form the list for the baseline are summarized below in Table 3.1.10-2.

TABLE 3.1.10-2: BIRD SPECIES CATEGORIZED AS VALUED COMPONENTS

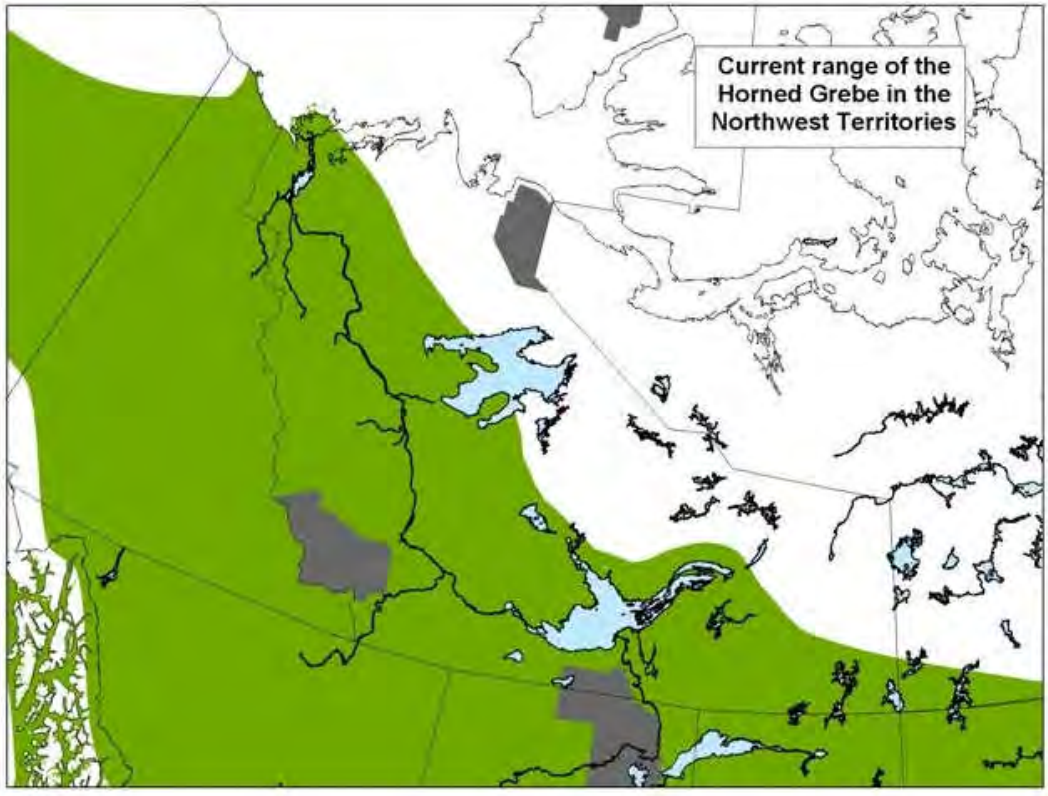
Common Name	Scientific Name	SARA (Schedule 1)	COSEWIC Status	NWT General Status Rank
Horned Grebe	*Podiceps auritus*	--	Special Concern	Sensitive
Tundra Swan	*Cygnus columbianus*	--	Not Listed	Secure
Greater White-fronted Goose	*Anser albifrons*	--	Not Listed	Secure
Snow Goose	*Chen caerulescens*	--	Not Listed	Secure
Canada Goose	*Branta canadensis*	--	Not Listed	Secure
Mallard	*Anas platyrhynchos*	--	Not Listed	Secure
Northern Pintail	*Anas acuta*	--	Not Listed	Sensitive
Peregrine Falcon	*Falco peregrinus tundrius/anatum*	Threatened	Special Concern	Sensitive
Rock Ptarmigan	*Lagopus muta*	--	Not Listed	Secure
Willow Ptarmigan	*Lagopus lagopus*	--	Not Listed	Secure
Short-eared Owl	*Asio flammeus*	--	Special Concern	Sensitive
Rusty Blackbird	*Euphagus carolinus*	Special Concern	Special Concern	Sensitive

3.1.10.3 Horned Grebe

Population Status and Trends, Distribution, Abundance,

Horned grebe primarily breeds in the Prairie region, but is also known to breed in British Columbia, Yukon, the Mackenzie River Valley in the NWT, southern Nunavut, northwestern Ontario, and the Magdalen Islands (Government of Canada 2009). According to a 2009 COSEWIC report for trends from 1966 and 2005 (GNWT ENR 2009a), horned grebe populations have declined by 66%.

Main threats to the population are uncertain; however, wetland loss is suspected to be a threat. Climate change may be linked to wetland loss through drought or changes in water quality. Other potential threats include increases in nest predation by crows, ravens, magpies, gulls, mink and foxes; as well as chick predation by northern pike and gulls (GNWT ENR 2011a). Horned grebe populations have decreased in their wintering areas but similar decreases are not evident in the NWT. The current range of horned grebe in the NWT is shown in Figure 3.1.10-1.



Source: GNWT ENR (2011a)

Figure 3.1.10-1
Current Range of the Horned Grebe in the NWT

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

Horned grebes are associated with aquatic habitat during all of their life stages and are therefore thought to be a good indicator of wetland ecosystem health (GNWT ENR 2011a). Horned grebes migrate to the NWT in May; their eggs hatch in mid-June and July. Adults leave NWT by mid-August and their young leave by early September and winter along the Pacific and Atlantic Coasts of North America (GNWT ENR 2011a). Horned grebes eat aquatic insects, small fish and crustaceans.

Known Issues with Respect to Health of Harvested Species (e.g. parasites, diseases, condition)

As horned grebes are not a species that is typically harvested for subsistence, information related to the health of harvested species could not be found.

Harvest Pressures

Horned grebes are not described as a species that is harvested for country food or subsistence (Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008).

3.1.10.4 Tundra Swan

Population Status and Trends, Distribution, Abundance

The timing of Tundra Swan migration to and from the NWT is related to the availability of open water and freeze up (Community of Inuvik et al. 2008). Swans winter along the east coast of the United States and arrive in the NWT in May. Swans lay their eggs in June but remain on the nest until mid-August. Swans will stay near nesting areas until migration in fall (September).

The Tundra Swan is the most common swan in Canada and the size of the population is estimated at 140,000 individuals (Environment Canada 1998). Mean annual density of swans on the Mackenzie Delta between 1989 and 1996 was 0.83/km², with a range of 0.57 to 1.13 swans/km² (IOL et al. 2004). The tundra swan population has reportedly been increasing or stable in recent years (IOL et al. 2004; Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008).

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

Breeding habitat consists of tundra lakes, ponds and pools in coastal deltas (IOL et al. 2004). Swans occur less frequently inland and rarely breed in forested areas in the Mackenzie Delta (Martell et al. 1984, as cited in IOL et al. 2004). Swans prefer marshy areas with a supply of aquatic plants. Tundra Swan are solitary nesters and defend a large territory that can be greater than 2 km². Suitable nesting habitat is often located close to a tundra pond or lake large enough to provide a food source for young swans but not too large to defend against other breeding pairs (Environment Canada 1998). Adults start to moult in late summer after the eggs hatch and leave moulting areas in late September to early October to begin migration (IOL et al. 2004).

Known Issues with Respect to Health of Harvested Species (e.g. Parasites, Diseases, Condition)

There are records of tundra swan deaths in Ontario related to an infection with a trematode parasite, *Sphaeridiotrema globulus* (Canadian Cooperative Wildlife Health Centre 1996). Information on the potential presence of this infection in NWT swan populations was not available.

No health issues were identified by Community of Tuktoyaktuk et al. (2008) and Community of Inuvik et al. (2008).

Harvest Pressures

Swans are harvested as an important food source in spring and the down is used for pillows and blankets. In the 1980s, tundra swan hunting was banned or restricted to protect the species for conservation purposes (Environment Canada 1998; ICC et al. 2006).

According to Inuvik Community Corporation et al. (2006), residents reportedly prefer to harvest ducks or geese instead of swans. Swans are harvested when there are no ducks available or when geese change their migration routes away from the area.

Detailed information regarding harvest levels is found in Section 3.2.8.

3.1.10.5 Greater White-fronted Goose ("Yellow legs")

Population Status and Trends, Distribution, Abundance,

White-fronted geese overwinter in coastal Texas and Mexico. They occur along the Mackenzie Valley during spring and fall migration (IOL et al. 2004). They leave their wintering grounds in early February to March and arrive in the Mackenzie Delta between May and June (Community of Inuvik et al. 2008).

The mid-continent population size of greater white-fronted geese is 700,000 or more and the most populated area is the Beaufort Sea area between the Mackenzie River and Anderson River deltas. The mid-continent population appears to be either stable or increasing and density estimates for the Mackenzie Delta between 1989 and 1993 average 1.54 geese/km² and 0.28 breeding pairs/km².

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

White-fronted geese nest in coastal and upland areas and feed on seeds and grass (Community of Inuvik et al. 2008). The main habitats of geese are the Kendall Island Bird Sanctuary, the Mackenzie River, and anywhere along the coast or Mackenzie River Delta – from the Yukon in the west to past Paulatuk in the east (ICC et al. 2006).

Flocks arrive on the Mackenzie Delta in mid to late May and birds disperse along the coast. Greater white-fronted geese begin laying their eggs in June and eggs hatch 30 days after clutch initiation (IOL et al. 2004). The young fledge five to six weeks after hatching. Adult moulting occurs in late August to early September, and likely in late June for non-breeding

adults (IOL et al. 2004). Migration occurs from late August until early October with the majority of birds migrating in early to mid-September.

The greater white-fronted goose feeds on grasses, berries, bulbils, tubers and rhizomes of grasses and sedges. They forage on the mudflats and hummocks within nesting rounds before snowmelt occurs and after snowmelt they forage along the margins of ponds in water up to 1 m deep (IOL et al. 2004).

White-fronted geese use a variety of habitats such as stream deltas, sedge-cotton-grass moss meadows, tussock lowlands, tundra ponds, areas with emergent vegetation, taiga forest and bogs, hummocky ground, inland tributary stream edges, dwarf and tall shrub tundra of birch and willow, heath tundra, rock fields, eskers and hill slopes with grasses and lichens (IOL et al. 2004).

Nesting areas typically are on the ground near streams, small ponds, shallow lakes and tidal pools (Martell et al. 1984; Ely and Dzubin 1994, as cited in IOL et al. 2004). Geese nest on tidal flats and near lakes or rivers (Koski and Tull 1981, as cited in IOL et al. 2004) as well as dry hummocks in lowlands or tundra beside wetlands (Sirois and Dickson 1989, as cited in IOL et al. 2004).

Brood rearing has been documented in wetland complexes where goslings can seek cover in sedges. Grazing areas can include meadows, tidal marshes, sheltered bays, lagoons and beaches (Sirois and Dickson 1989; Ely and Dzubin 1994, as cited in IOL et al. 2004). Moulting often occurs in coastal locations and inland lakes. The Mackenzie Delta is an important staging area for fall migration (IOL et al. 2004).

Known Issues with Respect to Health of Harvested Species (e.g. Parasites, Diseases, Condition)

Predation by eagles, foxes and wolves are potential causes of mortality for both adults and juveniles. Egg and gosling predation by gulls, jaegers, arctic foxes and grizzly bears are also a threat (IOL et al. 2004). Some participants in a traditional knowledge study prepared by the Inuvik Community Corporation et al. (2006) reported that spring geese were "fat and appear in good health as they first come from the south".

Harvest Pressures

Geese are hunted in spring and fall although there were periods when spring hunting was prohibited. Detailed information regarding harvest levels is found in Section 3.2.8.

3.1.10.6 Snow Goose

Population Status and Trends, Distribution, Abundance

Snow geese overwinter in California and Mexico and arrive in the NWT in mid-May. Egg laying occurs typically in the first week of June and incubation occurs until the first week in July. Snow geese feed on terrestrial and aquatic vegetation and migration occurs in early September with staging occurring in both the outer Mackenzie Delta and the north

Yukon coast (Community of Inuvik et al. 2008). There are sites along the Mackenzie River where snow geese gather during spring migration (IOL et al. 2004).

Snow geese populations are considered secure in the NWT. The number of snow geese in North America in 1997 was estimated to be 6.7 million, including 5 million breeding birds (Mowbray et. al. 2000, as cited in IOL et al. 2004). In the ISR, the Lesser Snow Goose is estimated at 486,000 in 1995, compared to 169,600 in 1976 (Community of Tuktoyaktuk et al. 2008). The North American population is reportedly increasing and growing at a rate of 5% per year (IOL et al. 2004).

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

Important regional habitat includes Kendall Island, Anderson River Delta, Egg River and Thomsen River (Community of Inuvik et al. 2008). Adult snow geese arrive at Kendall Island at the end of May or shortly thereafter and clutch initiation occurs in the first or second week of June. Eggs hatch in late June/ early July and movement to brooding areas occurs within a few days. Most young leave brooding areas by mid to late August. Adults moult in mid-July, two weeks after eggs hatch. Staging occurs from mid-August to early September with migration occurring in mid to late September (IOL et al. 2004).

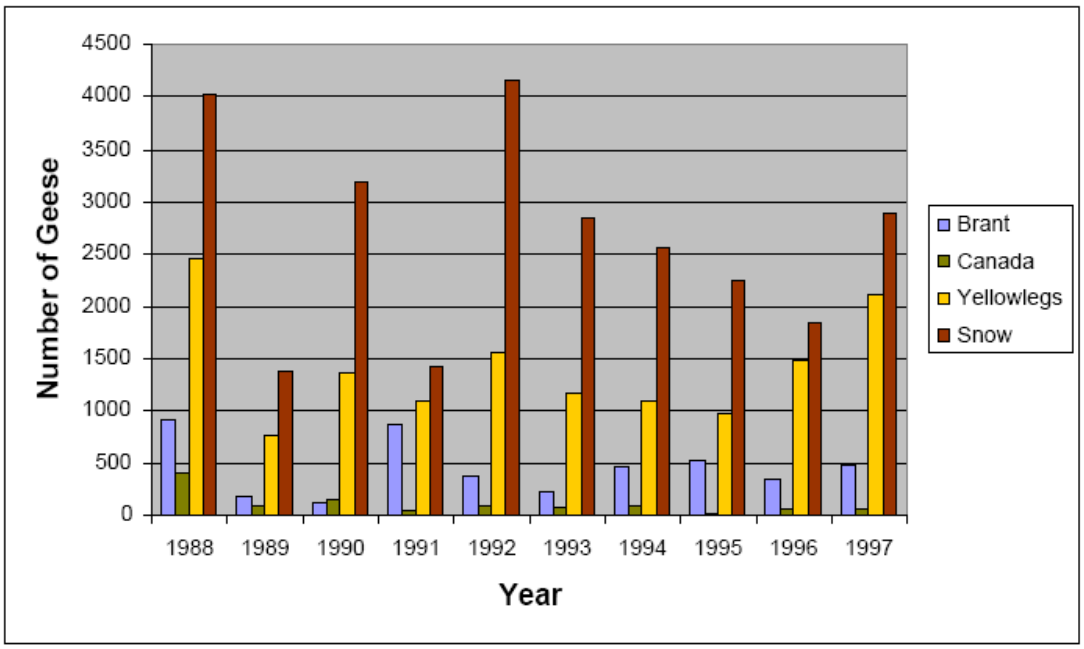
Breeding occurs near ponds, shallow lakes, streams or braided streams. Nesting occurs inland near coastal salt marshes and vegetation that is typically associated with nest sites includes dwarf willow and sea-lyme grass (IOL et al. 2004). Rearing and moulting habitat includes inland meadows, edges of shallow ponds and lakes and upland tundra where forage is abundant. Staging areas vary and can include low lying areas, wet meadows, and tundra with drainage tracks (IOL et al. 2004).

Known Issues with Respect to Health of Harvested Species (e.g. Parasites, Diseases, Condition)

No health issues were identified by Community of Tuktoyaktuk et al. (2008), Community of Inuvik et al. (2008), or Inuvik Community Corporation et al. (2006).

Harvest Pressures

As indicted in Figure 3.1.10-2, snow geese make up the majority of harvested geese species in the NWT. Further information regarding harvest levels is found in Section 3.2.8.



Source: ICC et al. (2006)

Figure 3.1.10-2
Total Estimated Annual Goose Harvests for Aklavik, Inuvik and Tuktoyaktuk, 1988-1997

3.1.10.7 Canada Goose

Population Status and Trends, Distribution, Abundance

Canada geese winter in the central United States, between Colorado and Texas. Reportedly Canada geese arrive in the arctic in May and leave in early September (Community of Inuvik et al. 2008).

There are believed to be 11 "races" of Canada geese in Canada (Environment Canada 2003). Canada geese populations are stable or increasing and the species as a whole has "flourished" in the last 50 years (Environment Canada 2003). Management programs, including refuge creation and regulation of hunting, as well as agricultural practices have contributed to the success of Canada Geese populations.

According to Community of Tuktoyaktuk et al. (2008) and Community of Inuvik et al. (2008), approximately 500,000[3] Canada geese are in North America., with an increasing population trend.

[3] No date is associated with this population estimate.

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

Canada geese use a wide variety of nest sites and reportedly feed on grasses, sedges, berries, seeds and cereal grains (Community of Inuvik et al. 2008). Feeding areas are mainly associated with aquatic environments (Environment Canada 2003). Breeding areas can include wet grassy meadows associated with ponds and lakes that serve as a refuge from Predators. In the NWT, Canada geese breed on the tundra above the treeline. Below the treeline, Canada geese nest in open boreal forest (Environment Canada 2003).

Canada geese breed throughout North America except in the high arctic and in the extreme southern parts of the United States and Mexico. Breeding typically occurs in April or early May. Some species winter in Southern Canada from British Columbia to Ontario.

Spring migration for northern breeding geese occurs in late winter and can take several weeks. Fall migration begins when freezing occurs on breeding grounds. Canada geese sometimes travel to moult or complete a moult following migration. This moulting typically occurs in open water where birds can seek refuge from predators while growing feathers and where food is present. Non breeding geese usually initiate a migration moult between late May and early June while breeding geese moult later in the season (Environment Canada 2003).

Known Issues with Respect to Health of Harvested Species (e.g. Parasites, Diseases, Condition)

Avian malaria is a potential health concern in Canada geese and other waterfowl species although mortality from this disease is reportedly low in waterfowl (Wildlife Information Network 2011). No health issues were identified by Community of Tuktoyaktuk et al. (2008), Community of Inuvik et al. (2008), or Inuvik Community Corporation et al. (2006).

Harvest Pressures

Please refer to Figure 3.1.10-2 under the Harvest Pressures heading for information on Canada geese harvest levels in the NWT between 1988 and 1997. Canada geese populations have thrived in many parts of Canada and hunters are encouraged to harvest Canada Geese. Further information regarding harvest levels is found in Section 3.2.8.

3.1.10.8 Mallard

Population Status and Trends, Distribution, Abundance

Mallards are found throughout North America, Europe and Asia and have been introduced into other parts of the world. Mallards are hardy and some regularly overwinter in southern Ontario and British Columbia although the majority migrate to the central and southern United States (Environment Canada 1996). The population trend for mallards is reportedly decreasing (Community of Inuvik et al. 2008).

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

Mallards leave wintering areas in early February through to early April. They arrive on breeding grounds in early to mid-May. They usually nest within 100 m of open water but may nest up to 500 m or more away. Mallards may re-nest up to three or four times if nests are destroyed (Environment Canada 1996). Mallards prefer aquatic and shoreline plants as food although they will eat some invertebrates (Community of Inuvik et al. 2008).

Known Issues with Respect to Health of Harvested Species (e.g. Parasites, Diseases, Condition)

A study completed in 1977 stated that 67% of mallards in the Mackenzie Delta were infected with blood parasites (Williams et al. 1977).

Harvest Pressures

Ducks are a traditional food consumed in many Inuvialuit households. In particular, mallards are among the ducks most often discussed for harvesting. Ducks are harvested in spring and fall. Further information regarding harvest levels is found in Section 3.2.8.

3.1.10.9 Northern Pintail

Population Status and Trends, Distribution, Abundance

The largest number of breeding pintails in the Arctic is in the Mackenzie Delta (Community of Inuvik et al. 2008). Northern Pintail range over more of the earth than any other waterfowl. Northern pintail populations are estimated at 2.9 million in North America (Community of Tuktoyaktuk et al. 2008, Community of Inuvik et al. 2008); the population has decreased from its peak population of greater than 9 million in 1955 and 1956. Biologists believe reduced and degraded habitat is the cause of the decline of the population (Ducks Unlimited 2011).

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

Northern pintail winter in Texas, California, the Mississippi Delta, and Mexico. They leave wintering grounds beginning in early January through to March and arrive in the Mackenzie Delta by mid-May. Fall migration begins in mid-August (Community of Inuvik et al. 2008).

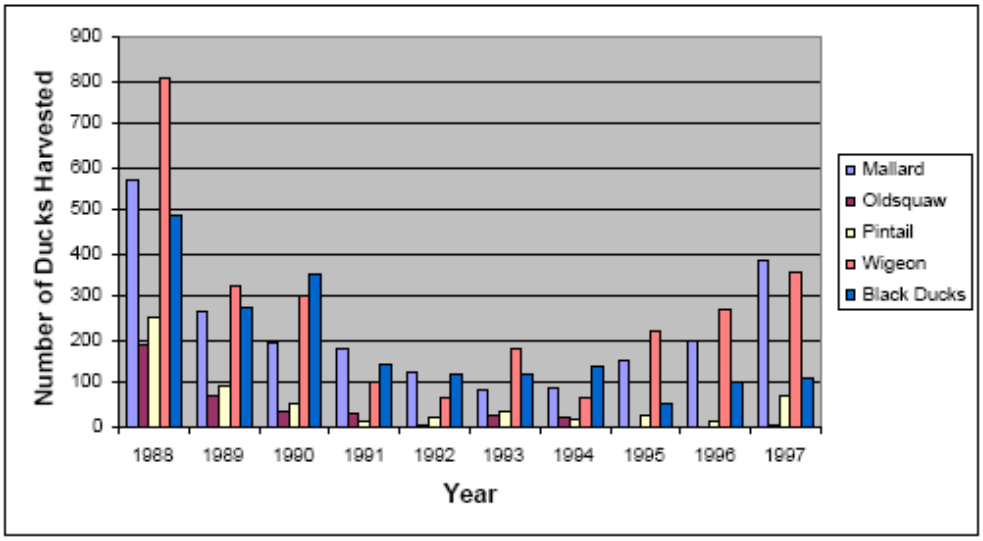
Suitable habitat includes fast-warming seasonal or permanent wetlands and prairie (Ducks Unlimited 2011). Northern pintail are common in freshwater ponds and marshes. They nest on the ground in sparse grassy vegetation and feed on seeds found in the water (Sibley 2003).

Known Issues with Respect to Health of Harvested Species (e.g. Parasites, Diseases, Condition)

A study completed in 1977 stated that 27% of Northern pintails were infected with a blood parasite (Williams et al. 1977).

Harvest Pressures

Northern pintail are one of the most common types of ducks harvested in the Inuvialuit Settlement Region. Figure 3.1.10-3 shows the mean pintail harvest for Aklavik, Inuvik and Tuktoyaktuk between 1988 and 1997 (ICC et al. 2006).



Source: ICC et al. (2006)

Figure 3.1.10-3
Total Estimated Annual Duck Harvests for Aklavik, Inuvik and Tuktoyaktuk, 1988-1997

3.1.10.10 Peregrine Falcon

Population Status and Trends, Distribution, Abundance

In 2007, COSEWIC re-assessed Peregrine Falcon and recommended the species to be downlisted from Threatened to Special Concern under SARA. An extended public consultation is underway but no formal decision has been made. Two subspecies of Peregrine falcons nest in the NWT. The anatum subspecies (*Falco peregrinus anatum*) nests in forested regions and the tundrius subspecies (*Falco peregrinus tundrius*) nests in tundra regions. Both subspecies could be affected by the proposed Highway and borrow source activities. The NWT Peregrine Falcons winter from Mexico south to southern South America.

The GNWT ENR is responsible for managing bird of prey species and their habitat. ENR participates in the development of species Recovery Plans, sits as a member of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and conducts monitoring programs. As part of the Peregrine Falcon recovery planning, ENR works cooperatively with the Canadian Wildlife Service to conduct Peregrine Falcon population monitoring.

Population surveys have been completed for the Peregrine falcon in the Mackenzie Valley since the 1960s. Peregrine numbers have been increasing since the mid-1970s due to the North American ban on organochloride pesticides. A survey in 2010 from Tulita to Inuvik re-surveyed all known nest sites. Preliminary data shows that of 191 sites surveyed (S. Carriere and S. Matthews, GNWT ENR, pers. comm. 2010), 106 were occupied and productivity was average. Parks Canada has collected similar survey data in tundra areas such as the Tuktut Nogait National Park (Parks Canada 2009a). In the NWT, there are more than 1,000 known breeders (COSEWIC 2007).

GNWT ENR reviewed raptor maps for the different proposed Highway alignments and searched the NWT/Nunavut Raptor database for known nesting sites. This review indicated there are no known Peregrine falcon nest sites within 1.5 km of these routes (S. Matthews, GNWT ENR, pers. comm., 2010).

Peregrine falcons prey on other birds. Other food sources include mammals and insects (IOL et al. 2004). Food availability affects the annual reproductive success of this species and fluctuates between years (Matthews et al. 2006).

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

The habitat requirements of the Peregrine Falcon can be divided into three components:

1) The nest site: nests are usually scrapes made on cliff ledges on steep cliffs, usually near wetlands -- including artificial cliffs such as quarries and buildings;

2) The nesting territory: the area defended around the nest prevents other pairs from nesting within 1 km or more, ensuring adequate food for all nesting pairs and their young; the density of nests tends to be related to food availability;

3) The home range: the extended, non-defended area in which the peregrines hunt for additional food and which can extend to 27 km from the nest; peregrines prefer open habitats such as wetlands, tundra, savanna, sea coasts and mountain meadows, but will also hunt over open forest (GNWT ENR 2006d).

Peregrine falcons arrive in the NWT in mid-April. They start defending territories in mid-May and lay their egg the first week of June, every year like clockwork. The eggs hatch the second week of July and young birds can fly around 21 August, again like clockwork. All Peregrines fly back south by the end of September.

The age at which reproduction starts depends on the availability of a nesting territory as nesting territories can be very limited. Peregrine falcons use the same territory each year, with some minor changes in the actual location of the nest. This behaviour is key to monitoring population levels and productivity since known and historic nesting sites can be monitored. Peregrine falcons have very specific nesting requirements. Nesting pairs are susceptible to disturbance.

The most consistent nesting habitat sites are "waterfront properties". The nests themselves are simple. They are a scrape or space on a ledge. The nesting habitat is usually high cliffs within hunting distance of wetlands or ponds or lakes, as the Peregrine's food are mostly

waterbirds. The area defended around the nest prevents other pairs from nesting within 1 km or more, ensuring adequate food for all nesting pairs and their young; the density of nests tends to be related to food availability.

Peregrine falcon pairs may use other "less standard" nesting sites where optimal habitat is rare or taken. Such sites used along the Mackenzie Valley include mud banks, rock outcrops or stick nests built by other raptors. Elsewhere some pairs use human-made structures.

The home range for Peregrine falcons can be >15 km from the nest as Peregrines use a large non-defended area foraging area to hunt for additional food beyond the defended nest territory. Peregrines prefer open habitats for hunting.

Known Issues with Respect to Health of Harvested Species (e.g. Parasites, Diseases, Condition) and Harvest Pressures

Peregrine falcons are not harvested in the Inuvialuit Settlement Region (Joint Secretariat 2003). According to Inuvik Community Corporation et al. (2006), Peregrine falcons have been used as spirit animals in the past by shamans.

3.1.10.11 Rock Ptarmigan and Willow Ptarmigan

Population Status and Trends, Distribution, Abundance

Ptarmigan populations are cyclical and based on a 2006 traditional use study, may have been at the low end of the population cycle in 2006 (ICC et al. 2006). Study participants, when interviewed, suggested that there was a lack of ptarmigan in the Inuvialuit Settlement Region but that the population would likely rebound, as is typical. Some hunters believe the population is declining.

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

Ptarmigan are found throughout the Inuvialuit Settlement Region, with Willow Ptarmigan occurring throughout and Rock Ptarmigan occurring primarily along the coastline. Ptarmigan stay in the north all year and live in the tundra, foothills, and the Mackenzie River Delta, among the willows. Ptarmigan feed in the willow and nest in the foothills of the mountains (ICC et al. 2006). They eat willow buds, pebbles and berries.

Ptarmigan migrate from the west around the end of April and moult when they have their young. Their feathers are often used for nests. They mate in May and nest in June. Eggs hatch in June. Their predators include eagles, crows, hawks, falcons, lynx and fox (ICC et al. 2006).

Known Issues with Respect to Health of Harvested Species (e.g. Parasites, Diseases, Condition)

Ptarmigan and grouse are low on the food chain and eat plants and insects. Contaminants become more concentrated when animals (predators) eat other animals (prey). This process is called biomagnification. Since ptarmigan and grouse do not eat other animals, this helps

them avoid building up elevated levels of contaminants. As a result Ptarmigan and grouse have extremely low levels of most contaminants (INAC 2004d).

Harvest Pressures

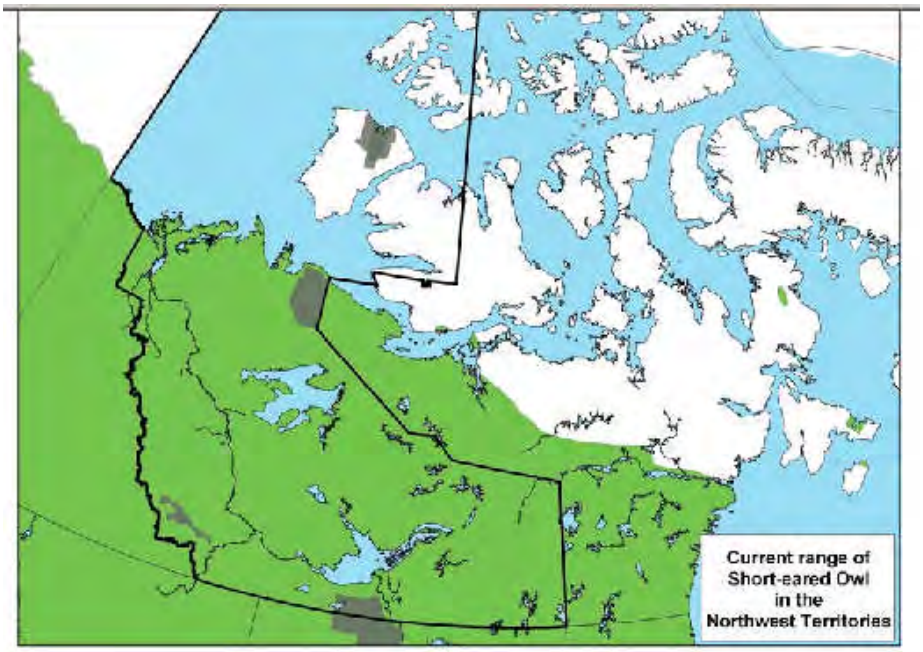
Ptarmigan are widely recognized as an important food source. Harvesting often occurs in winter when Ptarmigan have more fat, but they are also hunted in spring (Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008). Further information regarding harvest levels is found in Section 3.2.8.

3.1.10.12 Short-eared Owl

Population Status and Trends, Distribution, Abundance

The short-eared owl has been assessed as Special Concern by COSEWIC and ranked as Sensitive by GNWT ENR. The size of the Canadian short-eared owl population is unknown but changes in local populations suggest that overall population is decreasing at a rate of 1.8% per year (GNWT ENR 2011a). The Canadian short-eared owl population reportedly declined by 43% between 1966 and 1989. The size of the NWT population is unknown but is assumed to be decreasing in number similar to the Canadian population overall (GNWT ENR 2011a).

Short-eared owls were historically found in all of Canada's unforested areas with the exception of the High Arctic Islands (Figure 3.1.10-4; GNWT ENR 2011a). In summer, short-eared owls are present on the Arctic and alpine tundra from Alaska to Hudson Bay, along the northern coast from Manitoba to Labrador and down the coastline of the Maritimes. They reportedly breed in some areas of the taiga and boreal forest as well as the tundra and migrate to the southern portion of their range in winter (GNWT ENR 2011a).



Source: GNWT ENR (2011a)

Figure 3.1.10-4
Current Range of the Short-eared Owl in the NWT

Habitat Requirements (Breeding, Moulting, Staging, Feeding) and Sensitive Periods

Short-eared owls hunt in open areas and require large ranges. They prey on small rodents and small birds. They are found in summer in open grasslands, prairies and tundra. They typically roost in grassy areas and roost and hunt in abandoned pastures, fields, airports, hay meadows and marshes during winter. They nest on the ground. Breeding occurs anytime from April to August (GNWT ENR 2011a). Loss of coastal marshes and grasslands on wintering grounds is most likely a threat; the loss of habitat has reduced the short-eared owl's food supply and is a key factor in their decline. Human activities such as hunting can also cause mortality in ground-dwelling chicks (GNWT ENR 2011a).

Known Issues with Respect to Health of Harvested Species (e.g. Parasites, Diseases, Condition) and Harvest Pressures

Some owls are used for food and their claws are used for fishing hooks as fishing (ICC et al. 2006).

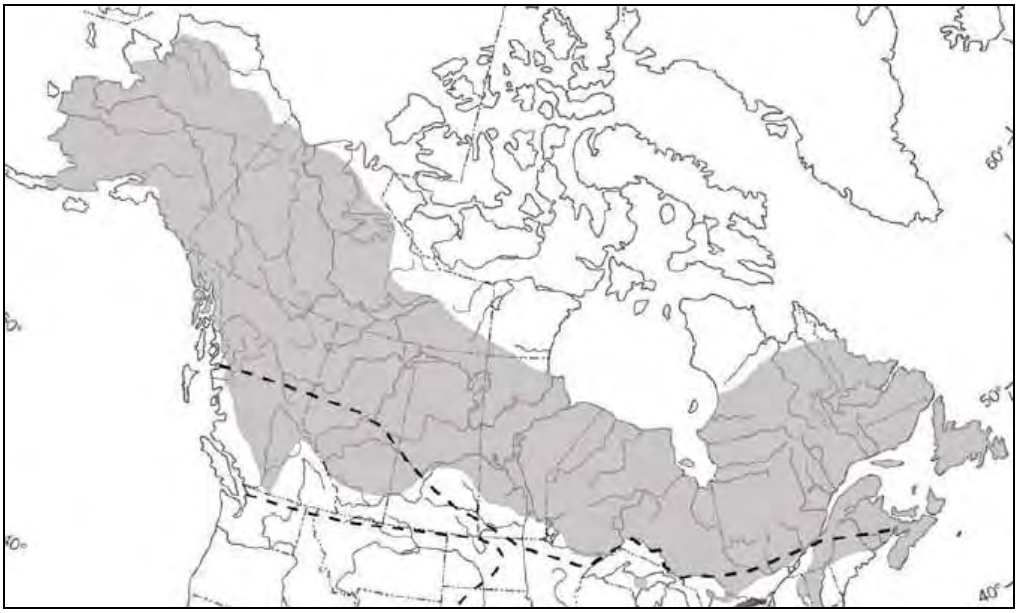
3.1.10.13 Rusty Blackbird

Population Status and Trends, Distribution, Abundance

The northern limit of the Rusty Blackbird's breeding range in Canada is delineated by the Old Crow region in northern Yukon; the Mackenzie River delta, Great Bear Lake and Great Slave Lake in the NWT; the Thelon and Arviat rivers in Nunavut (COSEWIC 2006). The breeding range of the Rusty Blackbird corresponds closely to the boreal forest and taiga

terrestrial ecozones. The Rusty Blackbird is generally absent from wetlands in regions about the treeline, such as the alpine tundra and Arctic tundra, and it is not abundant in high mountain wetlands (COSEWIC 2006).

Rusty blackbirds are listed as a species of Special Concern under SARA by COSEWIC. There has been a 90% reduction in their population size in the last 30 years; however, their numbers do not appear to have declined in the NWT. Figure 3.1.10-5 shows the range of the rusty blackbird in the NWT.



Source: COSEWIC (2006)

Figure 3.1.10-5
Current Range of Rusty Blackbirds in the NWT

Habitat Requirements (breeding, moulting, staging, feeding) and Sensitive Periods

The breeding range of the Rusty Blackbird is closely linked to the both the boreal forest and taiga terrestrial ecozones. In Canada, the northern limit to their breeding range is defined by the Old Crow region in northern Yukon; the Mackenzie River delta, Great Bear Lake and Great Slave Lake in the Northwest Territories; and the Thelon and Arviat rivers in Nunavut. The Rusty Blackbird is typically absent from wetland regions above the treeline including the alpine tundra and Arctic tundra, in high mountain wetlands the Rusty Blackbird is not abundant (COSEWIC 2006).They nest in trees near bogs within boreal forests and forage for insects and seeds on the ground in wooded swamps (Sibley 2003). Threats to the rusty blackbird include changes to wetland or prey (i.e., changes to wetland chemistry and water levels resulting from climate change (GNWT ENR 2011a).

Known Issues with Respect to Health of Harvested Species (e.g. parasites, diseases, condition) and Harvest Pressures and Harvest Pressures

No evidence could be found suggesting that rusty blackbirds are harvested for subsistence.

3.1.10.14 Species or Areas Subject to Preferential Rights Granted by Land Claims

The *Inuvialuit Final Agreement* (IFA) provides the Inuvialuit with certain harvesting rights to wildlife in the Western Arctic Region. The exercise of the Inuvialuit rights to harvest is subject to laws of general application respecting public safety and conservation. The IFA defines exclusive right to harvest as "the sole right to harvest the wildlife referred to in paragraphs Yukon - 12(24)(b) and (c) and Western Arctic Region - 14(6)(b) to (d), to be allocated the total allowable harvest and to permit non-Inuvialuit to harvest any such wildlife."

Only those sections that specifically apply to birds will be noted here.

Section 14(6)(b), subject to the qualifications set out in subsections (15) to (18) of the Agreement, sets out the harvesting rights as:

(a) the preferential right to harvest all species of wildlife, except migratory non-game birds and migratory insectivorous birds, for subsistence usage throughout the Western Arctic Region;

(d) the exclusive right to harvest game on Inuvialuit lands and, if agreed on, other areas.

Under Section 14.(7), where harvesting rights are extended to other native peoples pursuant to subsections (15) to (18), their requirements as to subsistence usage shall be taken into account when setting subsistence quotas and the subsistence quotas and subsistence requirements of all the native peoples shall be accommodated within conservation limits. Where, in the exercise of their exclusive right to harvest referred to in paragraphs (6)(b), (c) and (d), the Inuvialuit permit persons other than natives to harvest, harvesting by those persons shall be subject to the laws of general application.

3.1.10.15 Baseline Contaminant Concentrations In Harvested Species

The following excerpt is from a fact sheet produced by INAC (2004b):

Contaminant levels have been measured in waterfowl because they are an important traditional food. Studies have found that most contaminants are present at such low levels that they are not considered health risks to waterfowl or to the people who eat them. The only contaminants found in slightly higher levels were certain heavy metals which can concentrate in the organs of some ducks. There have never been any health advisories issued in the Northwest Territories due to contaminants in birds. Contaminant levels in ducks and geese are so low that they pose no health risks, as long as they are cleaned very carefully if killed using lead shot.

Spatial trends of contaminants in waterfowl and game birds were documented in Arctic communities; however, none of these communities were near the region of the proposed Highway. Populations of certain bird species are declining (specifically eider ducks) and it is suspected that contaminants are one of several risk factors (INAC 2003).

3.2 HUMAN ENVIRONMENT

The following sections describe the conditions and resources of the human environment as it exists in the Inuvik to Tuktoyaktuk area. This background information is subsequently considered in Section 4.0 of this Environmental Impact Statement to identify potential human environmental effects and proposed mitigation measures to avoid or minimize potential negative effects.

3.2.1 Background

3.2.1.1 Tuktoyaktuk

The Hamlet of Tuktoyaktuk is located on the Tuktoyaktuk Peninsula at 69°27'N and 133°02'W, and the peninsula is located on the shores of Kugmallit Bay (part of the Beaufort Sea). The community is located approximately 126 km northeast of Inuvik and 1,130 km northwest of Yellowknife. Tuktoyaktuk is accessible by air, winter ice road, and water during the ice-free summer months.

3.2.1.2 Inuvik

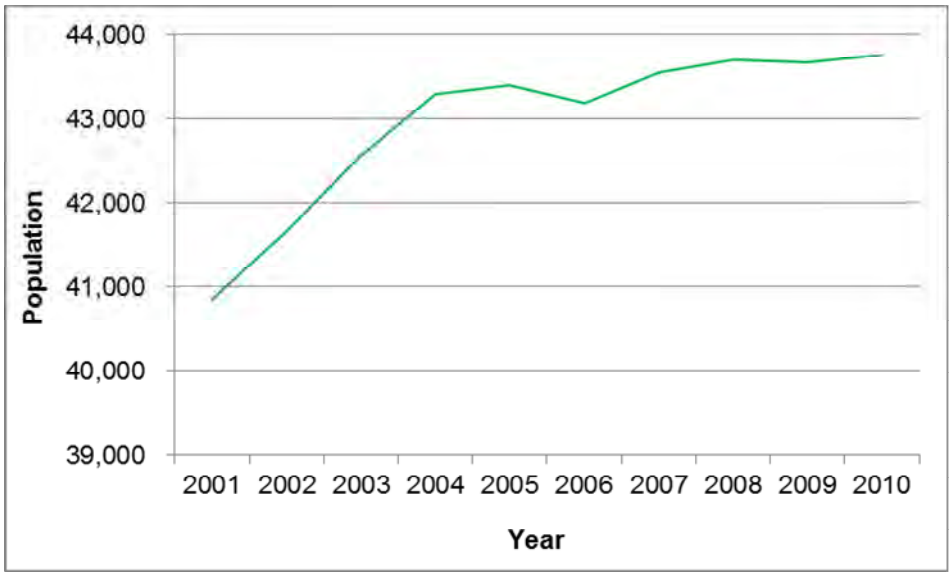
The Town of Inuvik is located on the Mackenzie River Delta at 68°21'N and 133°43'W. The community is located approximately 1,086 km northwest of Yellowknife. Inuvik is accessible year-round by air, all-weather road (Dempster Highway), and water (Mackenzie River) during the ice-free summer months.

Inuvik is the regional government centre, and transportation and recreation hub for the Canadian Western Arctic. Due to its strategic location, Inuvik is also a center for the oil and gas industry operating in the Beaufort Sea/Mackenzie Delta (Town of Inuvik 2009). The airport, government services, recreational programs, retail outlets and the hospitality industry attract residents from neighbouring communities and tourists to the region.

3.2.2 Demographics

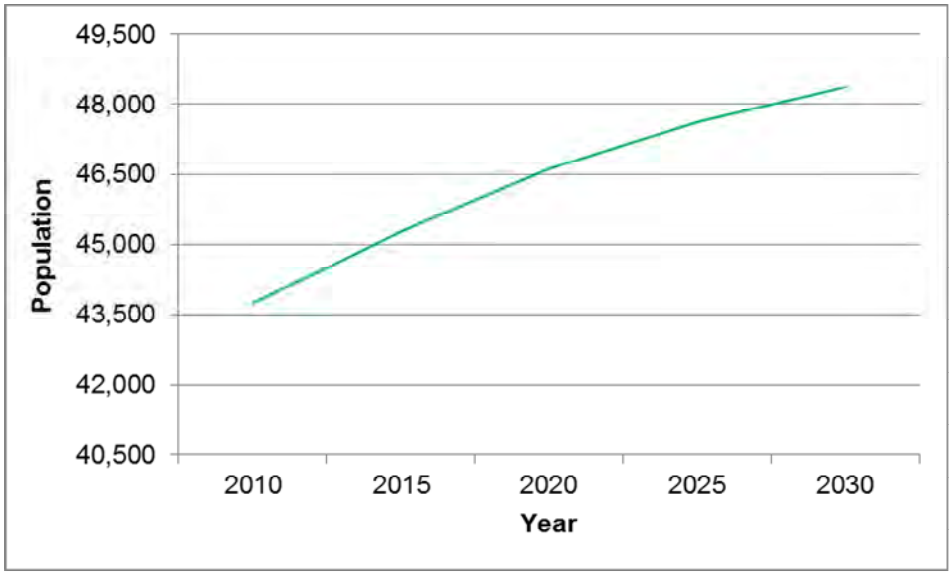
3.2.2.1 Population and Population Trends

The total population for the Northwest Territories has increased from 40,844 in 2001 to 43,759 in 2010 (Figure 3.2.2-1). The GNWT Bureau of Statistics expects the population to continue to increase, reaching a projected 46,616 in 2020 and 48,365 in 2030 (Figure 3.2.2-2) (GNWT Bureau of Statistics 2010k, 2010l).



Source: GNWT Bureau of Statistics (2010k)

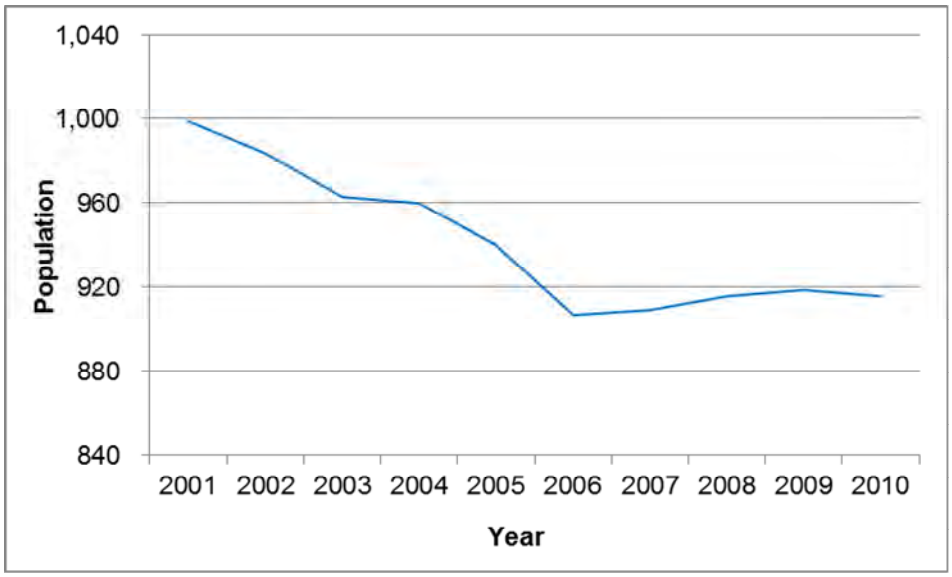
Figure 3.2.2-1
Northwest Territories Estimated Population, 2001-2010



Source: GNWT Bureau of Statistics (2010l)

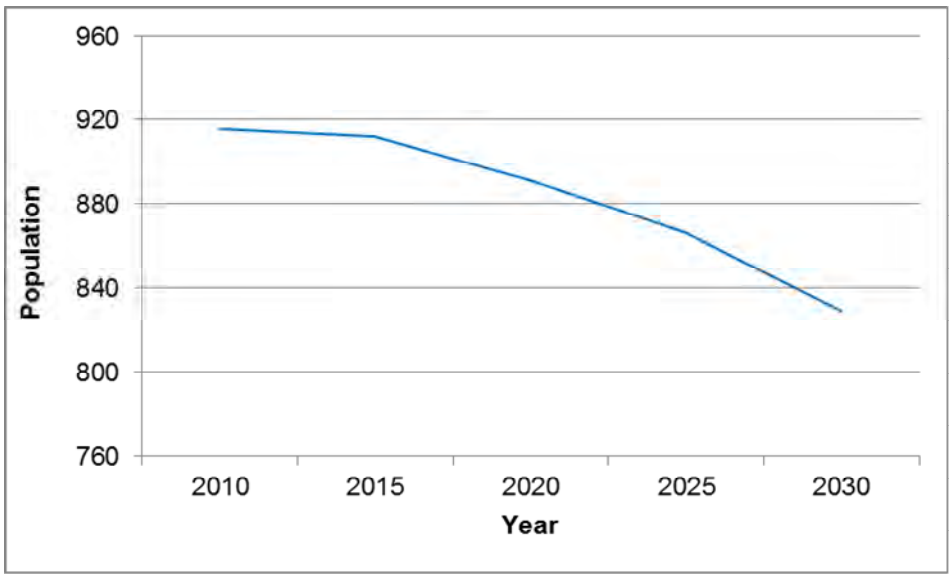
Figure 3.2.2-2
Northwest Territories Projected Population, 2010-2030

The population of Tuktoyaktuk has decreased from 999 in 2001 to 916 in 2010 (Figure 3.2.2-3). The GNWT Bureau of Statistics anticipates that the population of Tuktoyaktuk will continue to decrease in the future with a projected population of 891 in 2020 and 829 in 2030 (Figure 3.2.2-4) (GNWT Bureau of Statistics 2010k, 2010l).



Source: GNWT Bureau of Statistics (2010k)

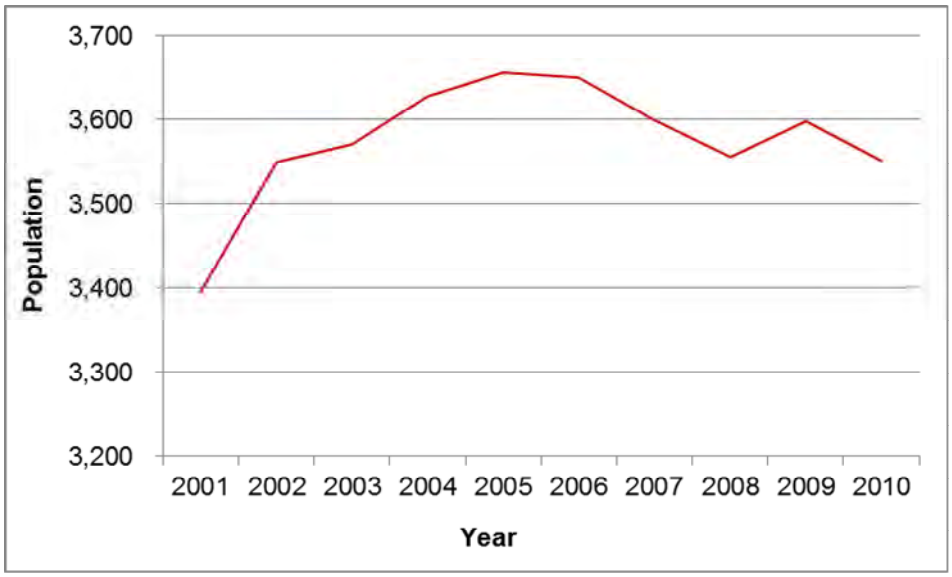
Figure 3.2.2-3
Tuktoyaktuk Estimated Population, 2001 – 2010



Source: GNWT Bureau of Statistics (2010l)

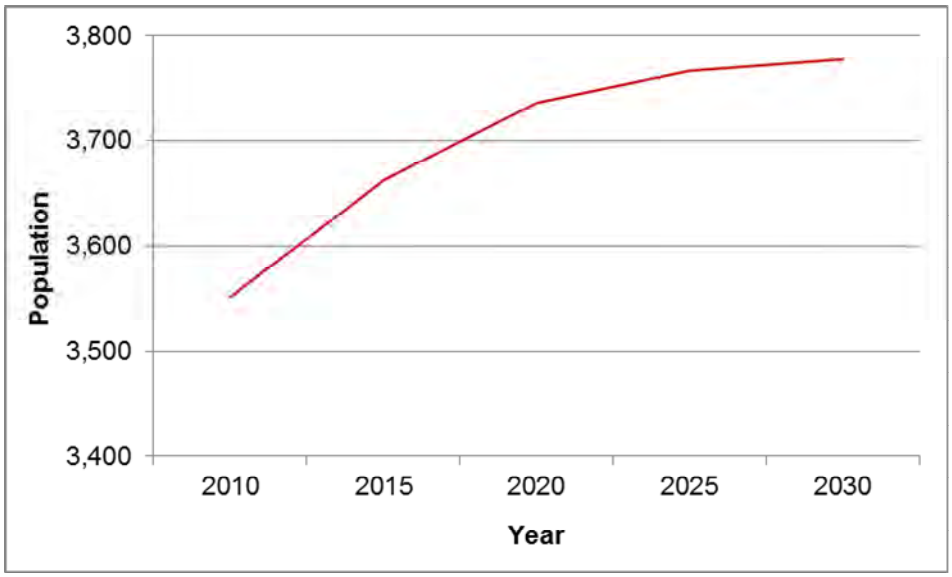
Figure 3.2.2-4
Tuktoyaktuk Projected Population, 2010 – 2030

Similar to the NWT population, the Inuvik population is increasing. The Inuvik population rose from 3,395 in 2001 to 3,552 in 2010 (Figure 3.2.2-5). The GNWT Bureau of Statistics anticipates that the population of Inuvik will continue to increase in the future with a projected population of 3,737 in 2020 and 3,777 in 2030 (Figure 3.2.2-6) (GNWT Bureau of Statistics 2010k, 2010l).



Source: GNWT Bureau of Statistics (2010k)

Figure 3.2.2-5
Inuvik Estimated Population, 2001 – 2010

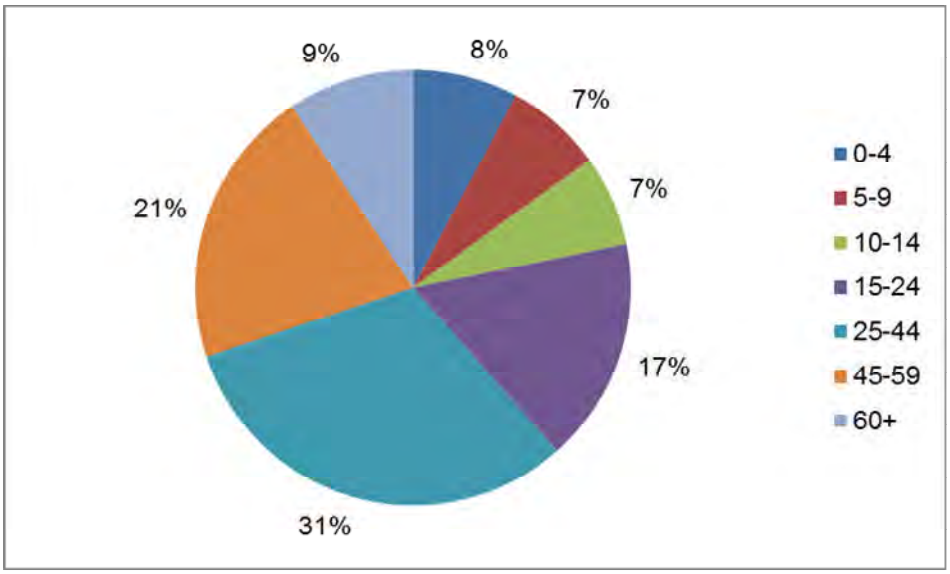


Source: GNWT Bureau of Statistics (2010l)

Figure 3.2.2-6
Inuvik Estimated Population, 2010 – 2030

3.2.2.2 Trends for Age, Gender and Ethnicity

In the NWT, 70% of the population are aged 44 or younger. The distribution between males and females and Aboriginal and non-Aboriginal people is almost equal. Figure 3.2.2-7 and Table 3.2.2-1 present the NWT population by age gender and ethnicity.



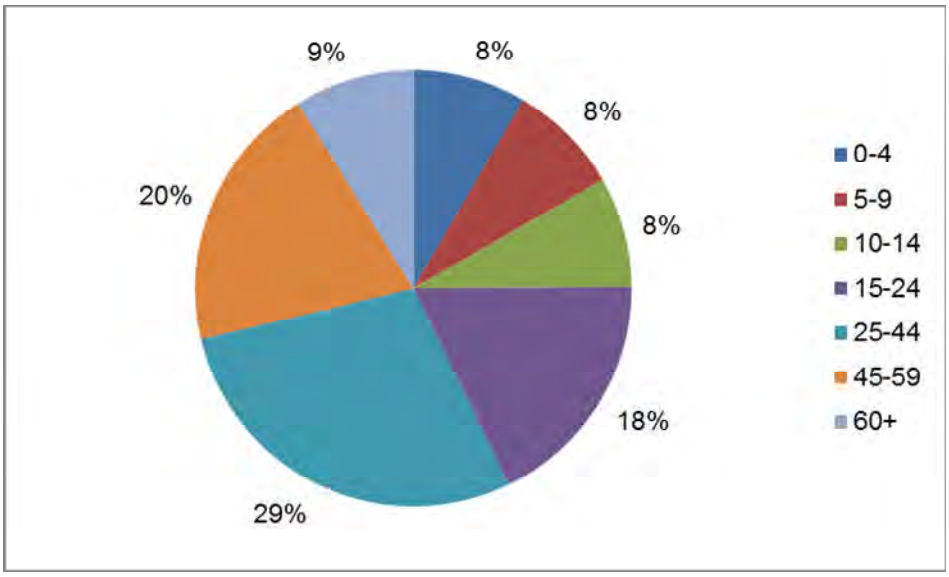
Source: GNWT Bureau of Statistics (2010k)

Figure 3.2.2-7
Northwest Territories Population by Age, 2009

TABLE 3.2.2-1: NORTHWEST TERRITORIES POPULATION BY GENDER AND ETHNICITY, 2009

Gender	Population	Percent
Male	22,627	52%
Female	21,132	48%
Aboriginal	22,123	51%
Non-Aboriginal	21,636	49%

Data collected by the GNWT Bureau of Statistics for Tuktoyaktuk indicates that 71% of the population is aged 44 or younger. There are more males than females in the community and the Aboriginal population makes up 84% of the total population (GNWT Bureau of Statistics 2010k). Tuktoyaktuk population by age, gender and ethnicity is described in Figure 3.2.2-8 and Table 3.2.2-2, respectively.



Source: GNWT Bureau of Statistics (2010k)

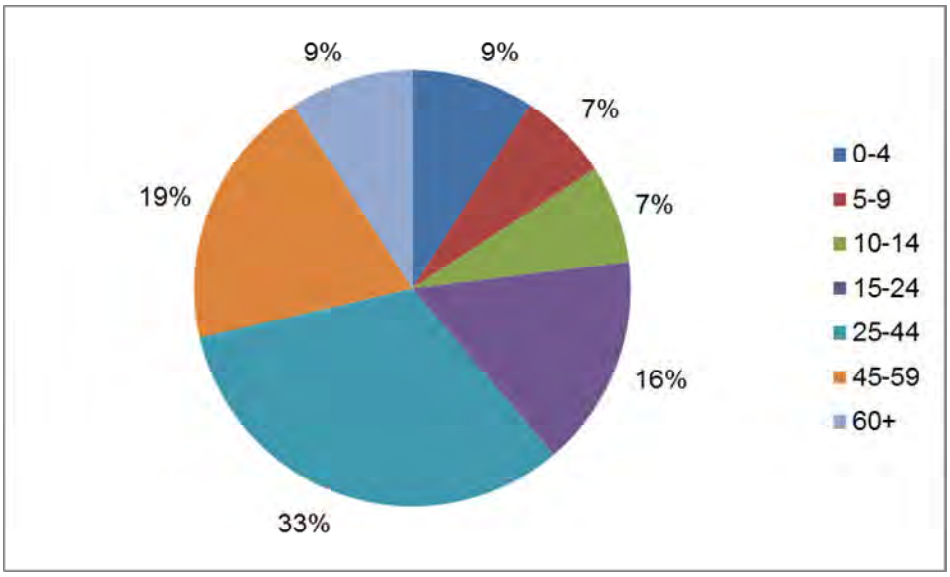
Figure 3.2.2-8
Tuktoyaktuk Population by Age Group, 2009

TABLE 3.2.2-2: TUKTOYAKTUK POPULATION BY GENDER AND ETHNICITY, 2009

Gender	Population	Percent
Male	497	54%
Female	419	46%
Aboriginal	765	84%
Non-Aboriginal	151	16%

Source: GNWT Bureau of Statistics (2010k)

Data collected by the GNWT Bureau of Statistics for Inuvik indicates that 72% of the population is aged 44 or younger. There are slightly more males than females in the community and the Aboriginal population makes up 64% of the total population (GNWT Bureau of Statistics 2010l). The population by age, gender and ethnicity is described in Figure 3.2.2-9 and Table 3.2.2-3, respectively.



Source: GNWT Bureau of Statistics (2010l)

Figure 3.2.2-9
Inuvik Population by Age Group, 2010

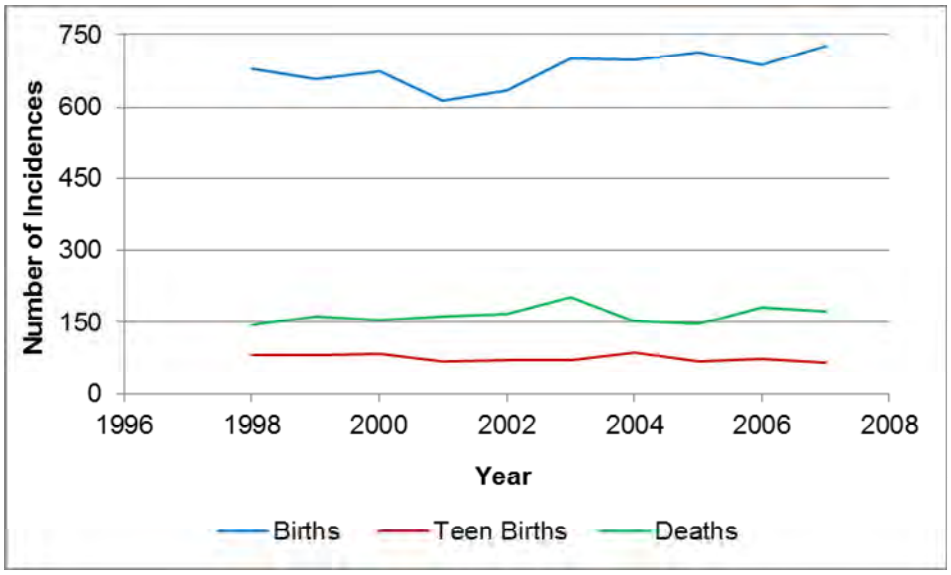
TABLE 3.2.2-3: INUVIK POPULATION BY GENDER AND ETHNICITY, 2009

Gender	Population	Percent
Male	1,806	51%
Female	1,746	49%
Aboriginal	2,271	64%
Non-Aboriginal	1,281	36%

Source: GNWT Bureau of Statistics (2010l)

3.2.2.3 Incidences of Births and Deaths

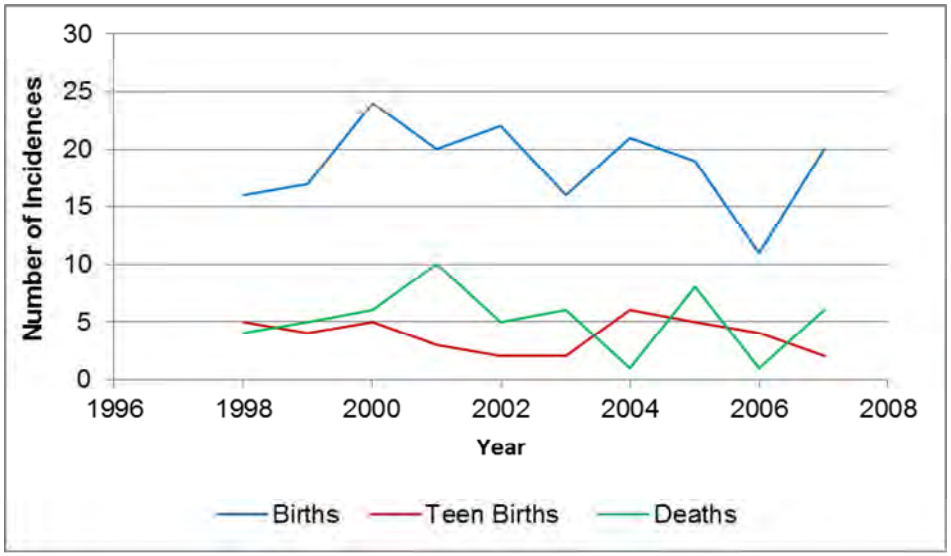
In the NWT, the number of births per year increased from 678 in 1998 to 725 in 2007. The number of teen births decreased during this period and the number of deaths increased (GNWT Bureau of Statistics 2010k). The number of births, teen births and deaths in the NWT are presented in Figure 3.2.2-10.



Source: GNWT Bureau of Statistics (2010k)

Figure 3.2.2-10
Incidences of Births, Teen Births and Deaths in the Northwest Territories, 1998-2007

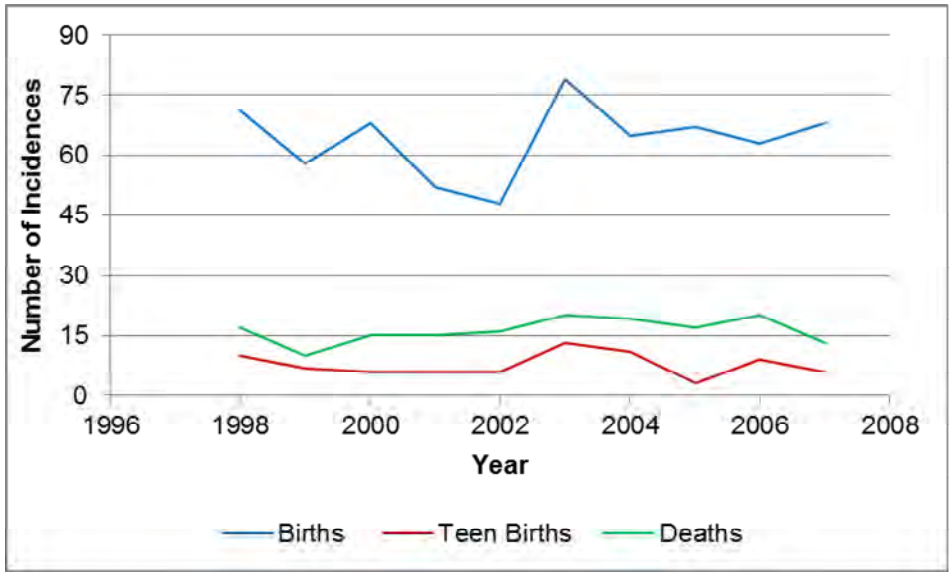
In Tuktoyaktuk, the number of births per year increased from 16 in 1998 to 20 in 2007. The number of teen births decreased during this period and the number of deaths increased. The trends for Tuktoyaktuk are presented in Figure 3.2.2-11(GNWT Bureau of Statistics 2010k).



Source: GNWT Bureau of Statistics (2010k)

Figure 3.2.2-11
Incidences of Births, Teen Births and Deaths in Tuktoyaktuk, 1998 - 2007

In Inuvik, the number of births per year decreased from 71 in 1998 to 68 in 2007. The number of teen births and deaths also decreased during this time period. The number of births, teen births and deaths in Inuvik are presented in Figure 3.2.2-12 (GNWT Bureau of Statistics 2010l).

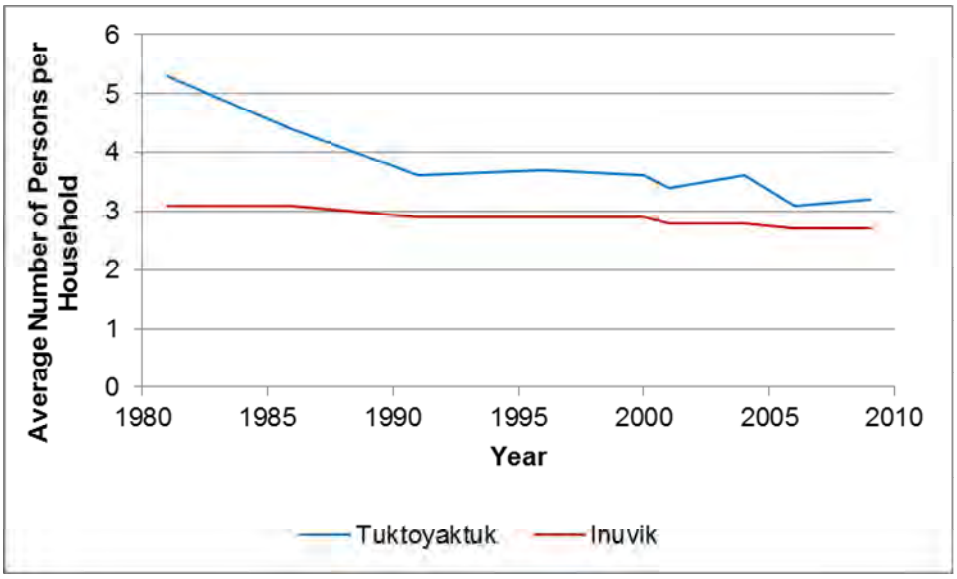


Source: GNWT Bureau of Statistics (2010l)

Figure 3.2.2-12
Inuvik Gross Births, Teen Births and Deaths, 1998 – 2007

3.2.2.4 Households

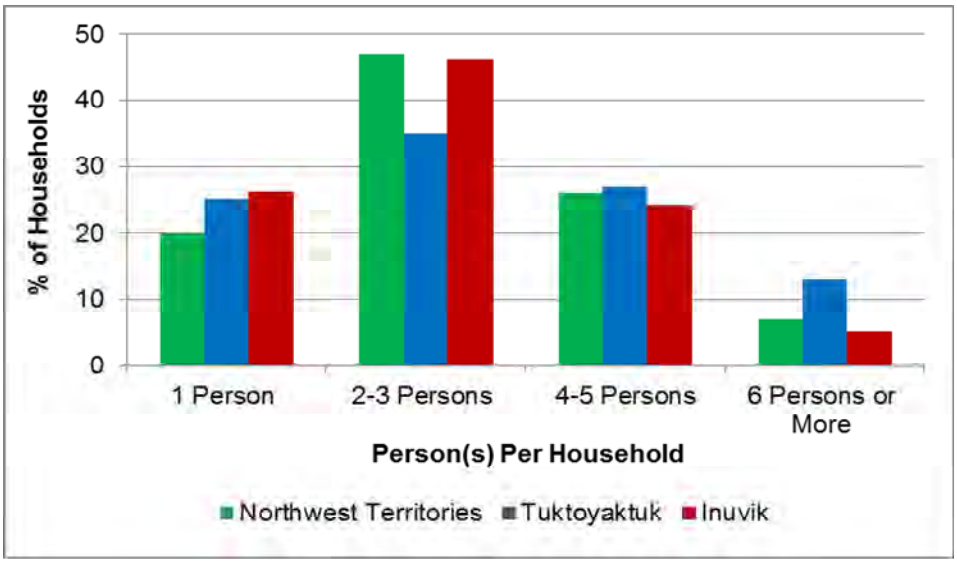
The average number of persons per household has varied in both Tuktoyaktuk and Inuvik from 1981 to 2009. In Tuktoyaktuk, the average number of persons per household has decreased from 5.3 in 1981 to 3.2 in 2009. The average number of persons per household in Inuvik has remained relatively stable, decreasing from 3.1 in 1981 to 2.7 in 2009. This can be observed in Figure 3.2.2-13 (GNWT Bureau of Statistics 2010e).



Source: GNWT Bureau of Statistics (2010e)

Figure 3.2.2-13
Average Number of Persons per Household in Tuktoyaktuk and Inuvik, 1981-2009

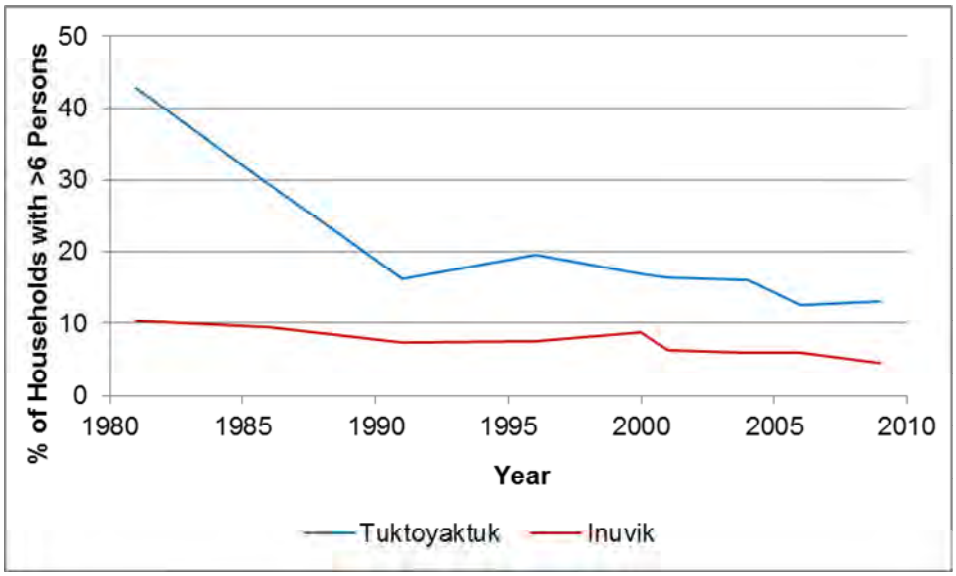
The majority of households in the region have three or fewer people, with the highest percentage being households with 2-3 people. Tuktoyaktuk had the highest percentage of households with 4-5 persons and 6 persons or more (GNWT Bureau of Statistics 2010e). Figure 3.2.2-14 shows the average number of people per household in the NWT, Tuktoyaktuk and Inuvik.



Source: GNWT Bureau of Statistics (2010e)

Figure 3.2.2-14
Households by Number of Residents, NWT, Tuktoyaktuk and Inuvik, 2009

In Tuktoyaktuk and Inuvik, the percentage of households with more than six people has decreased from 1981 to 2009, as shown in Figure 3.2.2-15. In Tuktoyaktuk, 42.9% of households had more than six people in 1981. By 2009, this percentage had decreased to 13.0%. Similarly, in Inuvik, 10.3% of households had more than six people in 1981; by 2009, this percentage had declined to 4.5% (GNWT Bureau of Statistics 2010e).

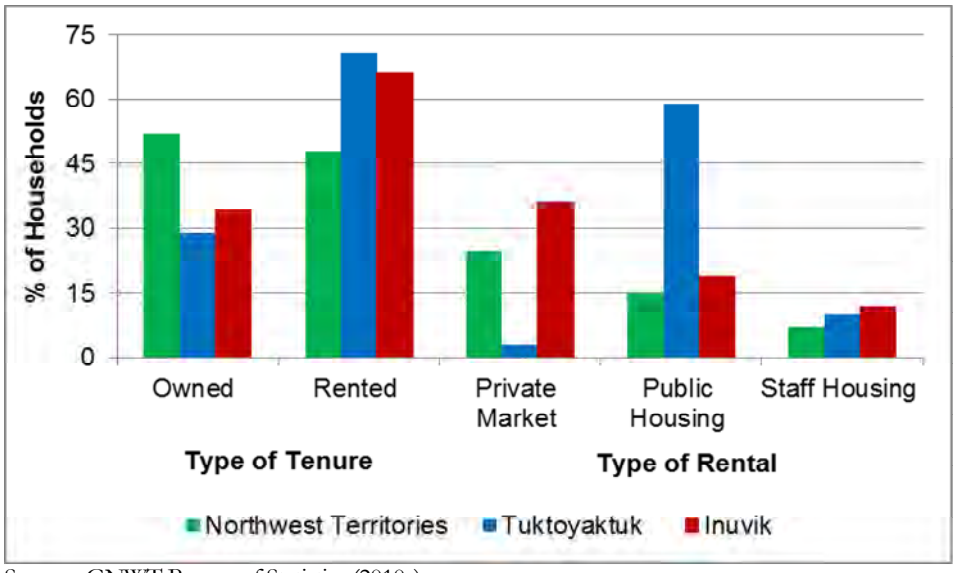


Source: GNWT Bureau of Statistics (2010e)

Figure 3.2.2-15
Percent of Households with 6 Persons or More in Tuktoyaktuk and Inuvik, 1981-2009

In 2009, there were 14,522 households in the NWT, 283 in Tuktoyaktuk and 1,280 in Inuvik. Of the total in the NWT, 7,623 (52%) are owned and 6,899 (48%) are rented. In Tuktoyaktuk, 81 (29%) are owned and 202 (71%) are rented, and in Inuvik, 432 (34%) are owned and 848 (66%) are rented. Figure 3.2.2-16 shows the percentage of households by tenure for the NWT, Tuktoyaktuk and Inuvik (GNWT Bureau of Statistics 2010e).

According to the GNWT Bureau of Statistics (2010e), there are three types of rental housing: private market, public housing, and staff housing. Private market housing includes housing that is owned privately and rented out. Public housing includes government subsidized housing geared towards low-income households. Staff housing includes facilities such as nurses' residences, RCMP residences or residences for those involved in various industrial activities in the region. There is a greater percentage of private market rental housing available in Inuvik, compared to Tuktoyaktuk, but there is a greater percentage of public housing in Tuktoyaktuk compared to Inuvik. Figure 3.2.2-16 identifies the percentage of rental housing by type in the NWT, Tuktoyaktuk and Inuvik (K. Odziemkowska, Labour Market Statistician, GNWT Bureau of Statistics, pers. comm., January 28, 2011).



Source: GNWT Bureau of Statistics (2010e)

Figure 3.2.2-16
NWT, Tuktoyaktuk and Inuvik Households by Tenure, 2009

3.2.2.5 Migration and Migration Patterns

In and out net migration data per community are not collected by the GNWT Bureau of Statistics or Statistics Canada. Rather, migration patterns are tracked based on individual project monitoring (C. Schalkwyk, Northern Workforce Residency Analyst, GNWT ITI, pers. comm., October 21, 2010).

The majority of in-migrants to the NWT are the result of interprovincial migration; for example, relocation from one province or territory in Canada to another, changing the usual place of residence (Statistics Canada 2009b). Neither interprovincial migration nor emigration numbers are recorded by Statistics Canada, so they are estimated using data from the Canada Child Tax Benefit collected by Canada Revenue Agency (Statistics Canada 2009b). The highest number of in-migrants to the NWT come from Alberta (32%), followed by British Columbia (18%), Ontario (15%), and Nunavut (8%).. Immigrants from outside of Canada make up a much smaller percentage (GNWT ENR 2010a).

In- and out-migration for the NWT, as reported by Statistics Canada, can be observed in Table 3.2.2-4. The net migration for each quarter in the NWT is calculated by subtracting the out-migration from the in-migration plus or minus the net change in non-permanent residents. A positive net migration value indicates there are more people entering than leaving the NWT, and a negative value indicates the opposite. Data from 2007 to 2010 indicate that there was a net out-migration of people from the NWT, except during Quarters 2 and 4 in 2007 and Quarter 1 in 2010 when there was an in-migration of people into the NWT (GNWT Bureau of Statistics 2010i). Annual totals for net migration during the years 1999 to 2009 show a net out-migration for 2001, 2002 and 2003 (GNWT Bureau of Statistics 2010i). This affects the NWT economy as it results in a loss of transfer

payments, skills, investment capital, economies of scale and business markets (GNWT ENR 2010a).

TABLE 3.2.2-4: MIGRATION ACTIVITY, NWT, 1999-2010

		Net Migration (TS951)	In-Migration		Out-Migration		Net change in Non-Permanent Residents (TS1073)
			Inter-Provincial (TS952)	Immigration (TS953)	Inter-Provincial (TS954)	Emigration (TS955)	
2010	Q2	-114	615	37	744	18	-4
	Q1	98	800	36	723	17	2
2009	Q4	-77	354	30	422	19	-20
	Q3	-374	572	22	929	31	-8
	Q2	-49	474	40	556	18	11
	Q1	-91	484	15	545	17	-28
2008	Q4	-258	352	16	632	19	25
	Q3	-181	553	38	707	30	-35
	Q2	-97	493	45	693	18	76
	Q1	-85	499	28	591	17	-4
2007	Q4	42	486	30	387	19	-68
	Q3	-260	606	29	833	31	-31
	Q2	172	667	13	573	14	79
Annual Totals							
2009		-591	1884	107	2452	85	-45
2008		-621	1897	127	2623	84	62
2007		-122	2230	68	2339	75	-26
2006		-718	2202	98	2954	53	-11
2005		-857	2068	84	2955	46	-8
2004		-434	2271	89	2766	42	14
2003		502	2538	94	2181	43	94
2002		178	2759	60	2577	45	-19
2001		6	2273	95	2361	39	38
2000		-415	2324	82	2838	36	53
1999		-410	2329	57	2784	35	23

Source: GNWT Bureau of Statistics (2010i)

The major factor influencing in- and out-migration of people in the NWT is the rise and fall of the NWT economy. Intra-territorial migration also occurs between regions of the NWT. For example, from 1996 to 2006, the population of the North Slave region (which includes Yellowknife) increased, while the population of the Beaufort-Delta region decreased, which may indicate an intra-territorial migration of people from more remote areas of the NWT to the Yellowknife area (GNWT ITI 2008).

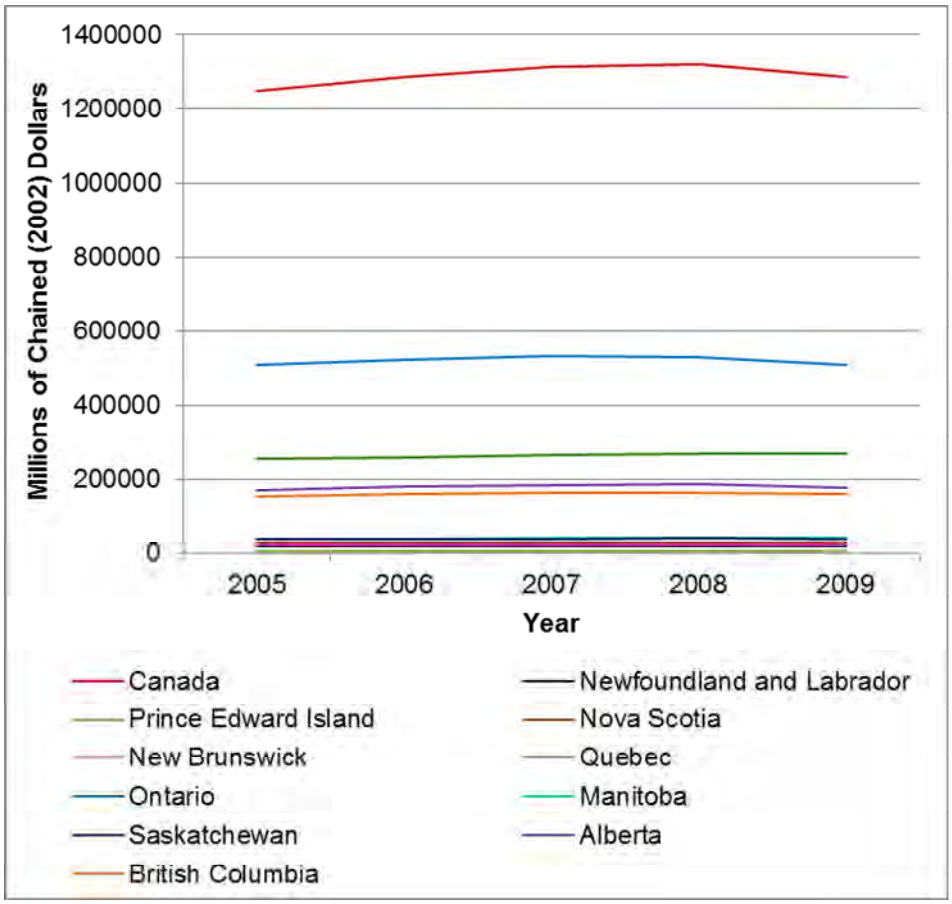
3.2.3 Regional and Local Economies

3.2.3.1 Gross Domestic Product

Gross Domestic Product (GDP) is defined by Statistics Canada as the complete unduplicated value of the goods and services produced in an economic territory of a country or region during a specific period of time (Statistics Canada 2009a). The GNWT Bureau of Statistics expresses their GDP in terms of Chained 2002 dollars. Chained (2002) GDP is a nominal GDP which does not take inflation into account, and expresses GDP over a period of time using the 2002 dollar (Investopedia 2010).

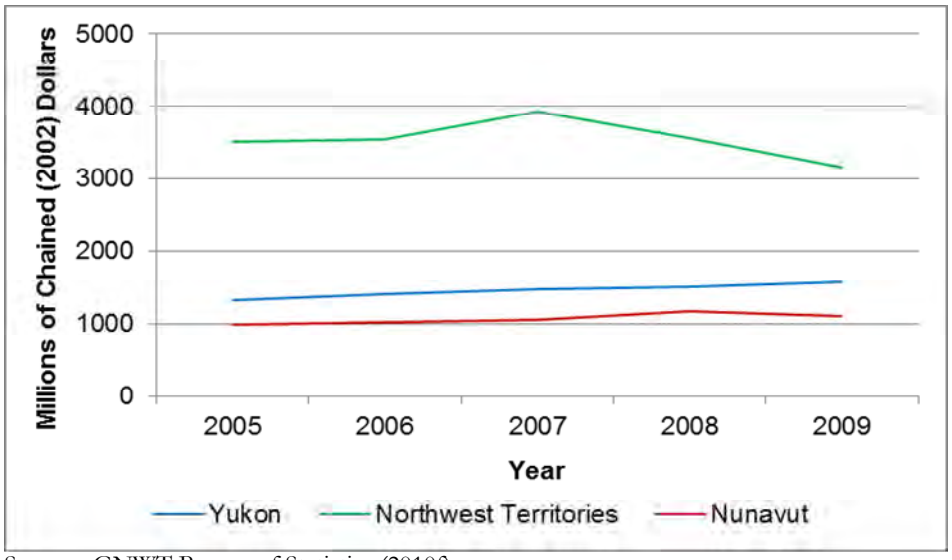
The Chained (2002) GDP for Canada peaked in 2008 then decreased significantly in 2009, demonstrating the effects of the global recession on the Canadian economy. The majority of the provinces showed a slight increase in Chained GDP from 2005 to 2009, with the exception of Ontario whose GDP increased from 2005 to 2007 then decreased from 2008 to 2009, as shown in Figure 3.2.3-1. GDP for Nunavut and the NWT follow a trend similar to the Canadian (2002) GDP; however, the NWT GDP peaked in 2007 compared to the Canadian GDP, which peaked in 2008 (Figure 3.2.3-2). The Chained GDP for the Yukon is steadily increasing (GNWT Bureau of Statistics 2010f).

The figures for the Federal, Provincial and Territorial GDPs are shown separately due to the differences in scale, as noted in Figures 3.2.3-1 and 3.2.3-2.



Source: GNWT Bureau of Statistics (2010f)

Figure 3.2.3-1
Chained (2002) GDP for Canada and Provinces, 2005 – 2009



Source: GNWT Bureau of Statistics (2010f)

Figure 3.2.3-2
Chained (2002) GDP for Territories, 2005 – 2009

3.2.3.2 Local and Regional Economic Development Goals and Objectives

The *Inuvialuit Final Agreement* (IFA) is a comprehensive land claim agreement providing the Inuvialuit people with guaranteed rights relating to land ownership and management, wildlife management and money from the Government of Canada. Sustainable development is the basis for the IFA. The IFA has set a series of basic goals which are as follows:

- Preserve the identity and values of the Inuvialuit culture within a changing northern society.
- Enable the Inuvialuit to be equal and meaningful participants in the northern and national economy and society.
- Preserve and protect the Arctic wildlife, environment and biological productivity (IRC 2007i).

Both Tuktoyaktuk and Inuvik have Community Conservation Plans (CCPs) established to protect the environment in the Beaufort-Delta region onshore and offshore, thereby ensuring the cultural survival of the Inuvialuit community. This will be done in accordance with the *Western Arctic (Inuvialuit) Claims Settlement Act* and the Inuvialuit Renewable Resource Conservation and Management Plan (Community of Tuktoyaktuk et al. 2008, Community of Inuvik et al. 2008).

Both Tuktoyaktuk and Inuvik have identified an overall strategy for conservation and resource management. This strategy is based on the following five goals:

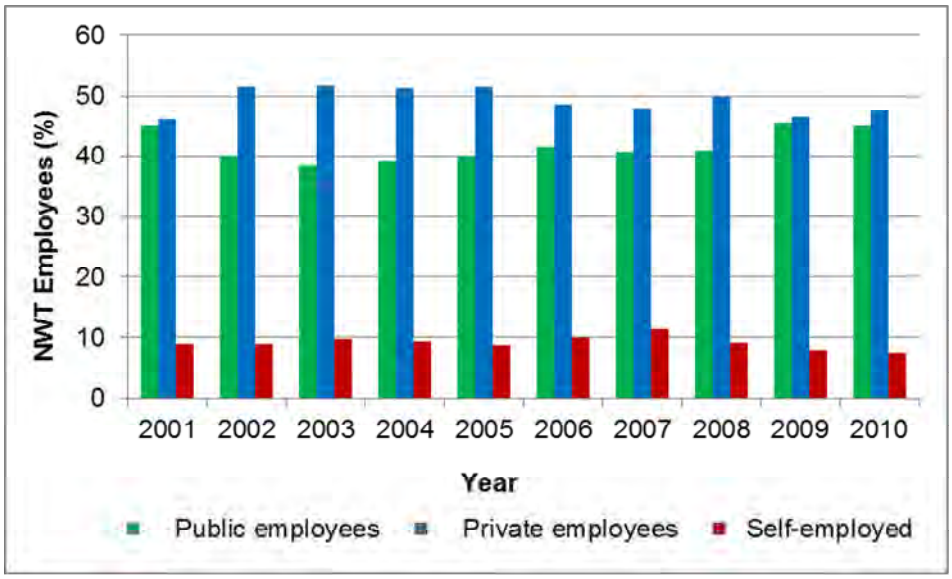
- Identify and protect important habitats and harvesting areas;
- Make land use decisions and managing cumulative impacts in order to help protect community values and conserve resources on which many lifestyles depend;

- Identify educational initiatives for the Inuvialuit of Tuktoyaktuk, Inuvik and others aimed at promoting conservation, understanding and appreciation;
- Define a system for wildlife management and conservation, and to identify population goals and conservation measures appropriate for each species of concern within a planning area; and
- Enhance the local economy by adopting a cooperative and consistent approach to community decision making and resource management (Community of Tuktoyaktuk et al. 2008, Community of Inuvik et al. 2008).

3.2.4 Employment

3.2.4.1 Employment Rate

Data for the number of public, private and self-employed employees are available annually at the territorial (NWT) level, but not at the regional (Beaufort–Delta) level. In the NWT, employment was relatively consistent from 2001 to 2009, with a slight increase overall (Figure 3.2.4-1). During this period, there were consistently more private employees than public employees, with the fewest number of people being self-employed (GNWT Bureau of Statistics 2010n).

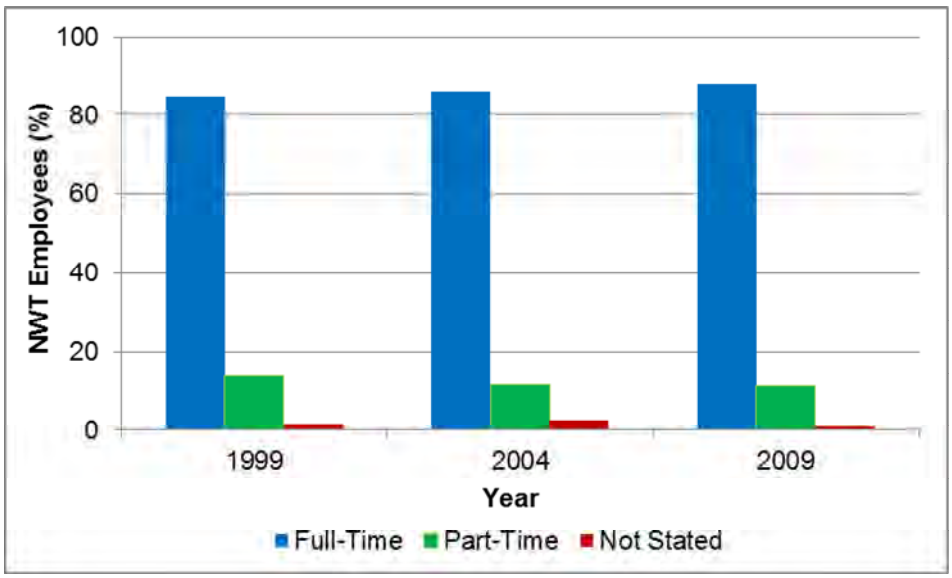


Source: GNWT Bureau of Statistics (2010n)

Figure 3.2.4-1
NWT Employment by Class of Worker, 2001 – 2009

According to GNWT Bureau of Statistics, full-time employment is defined as 30 or more paid hours worked per week. Part-time employment is defined as less than 30 paid hours worked per week (K. Odziemkowska, Labour Market Statistician, GNWT Bureau of Statistics, pers. comm., May 11, 2011).

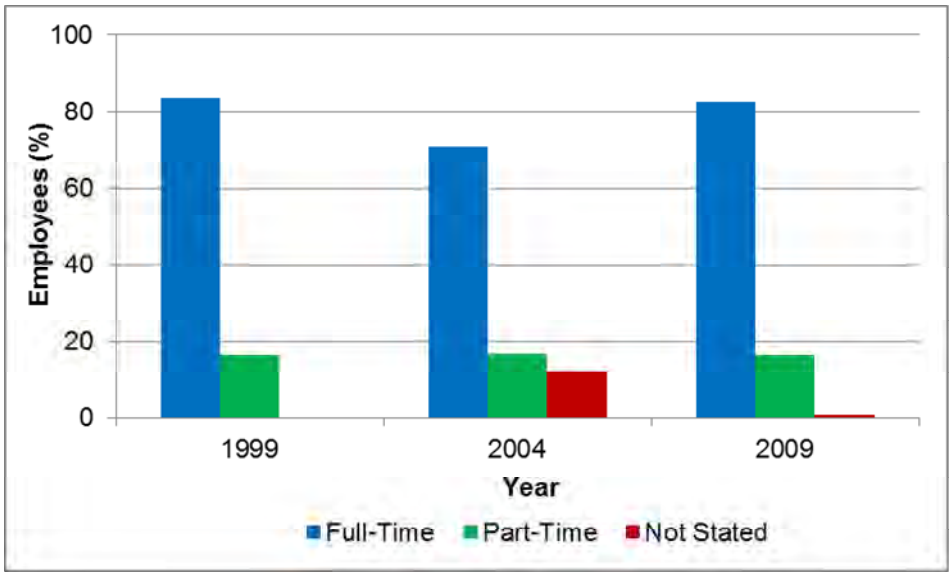
In the NWT, the majority of the population is employed full-time. Figure 3.2.4-2 presents the percent of NWT residents employed full-time, part-time and not stated.



Source: GNWT Bureau of Statistics (1999, 2004b, 2009c)

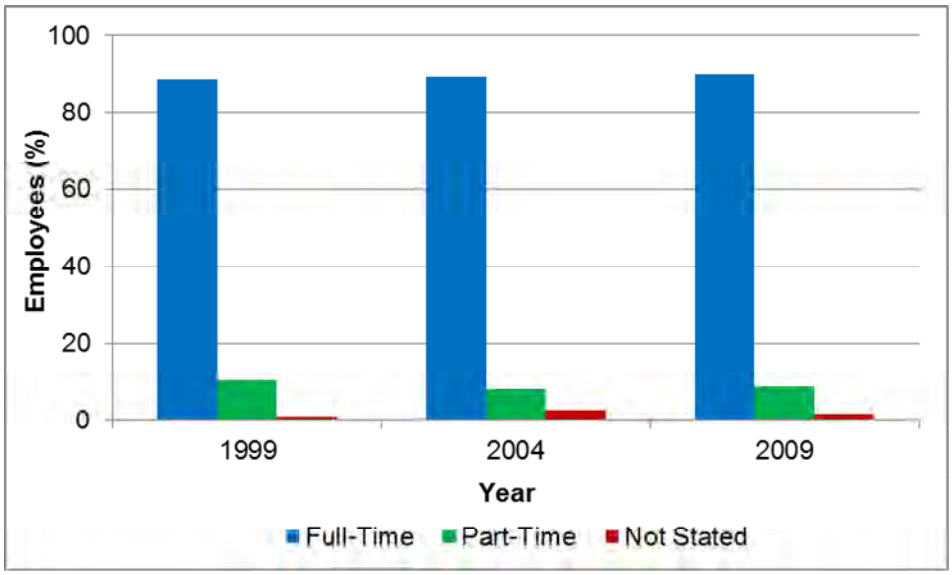
Figure 3.2.4-2
Percent of NWT Employees Working Full-Time and Part-Time, 1999-2009

The majority of the employees working in Tuktoyaktuk and Inuvik are employed full-time. However, there are a larger percentage of people working part-time in Tuktoyaktuk than in Inuvik (GNWT Bureau of Statistics 1999, 2004b, 2009c). These trends can be observed in Figure 3.2.4-3 and 3.2.4-4.



Source: GNWT Bureau of Statistics (1999, 2004b, 2009c)

Figure 3.2.4-3
Percent of Tuktoyaktuk Employees Working Full-Time and Part-Time, 1999-2009



Source: GNWT Bureau of Statistics (1999, 2004b, 2009c)

Figure 3.2.4-4
Percent of Inuvik Employees Working Full-Time and Part-Time, 1999-2009

Data from the GNWT Bureau of Statistics Data Portal were used to determine seasonal employment in the NWT. The GNWT Bureau of Statistics provided monthly employment rates at the territorial level, which were then categorized into seasonal employment rates as

per the EIRB's Terms of Reference. The months were categorized into the following seasons:

- Winter season included December, January and February;
- Spring season included March, April and May;
- Summer season included June, July and August; and
- Fall season included September, October and November.

The employment rate is expressed as a percent and includes all persons aged 15 and over who were employed during the specific reporting period (years 2001 to 2010). The average employment rate for the months within each season was calculated and used to express seasonal employment rates on an annual basis, this can be observed in Figures 3.2.4-5 and 3.2.4-6.

Figure 3.2.4-5 shows the seasonal employment from 2001 to 2010. Summer and fall have the highest employment rates; however, all seasons follow a similar trend over time. The employment rates peaked in 2006 and 2007, and decreased in 2008 and 2009. This trend likely demonstrates the effects of the economic recession.

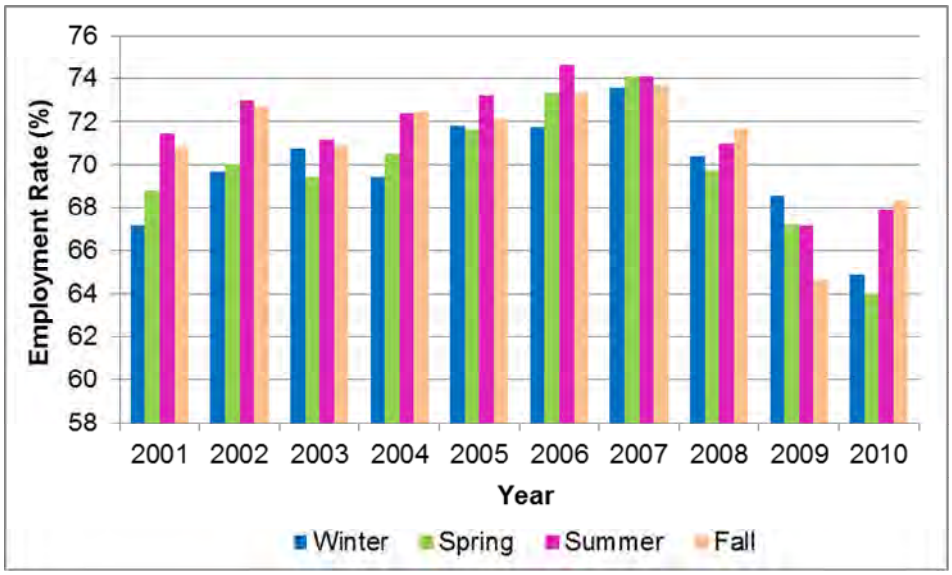


Figure 3.2.4-5
NWT Seasonal Employment Rates, 2001 - 2010

In comparison, Figure 3.2.4-6 shows the average employment rate between all the years (2000 to 2010) per season. This helped to further identify trends in employment rates among seasons. The employment rate for all seasons is relatively consistent ranging from 70-72%. Employment rates are generally higher in the summer and fall compared to winter and spring.

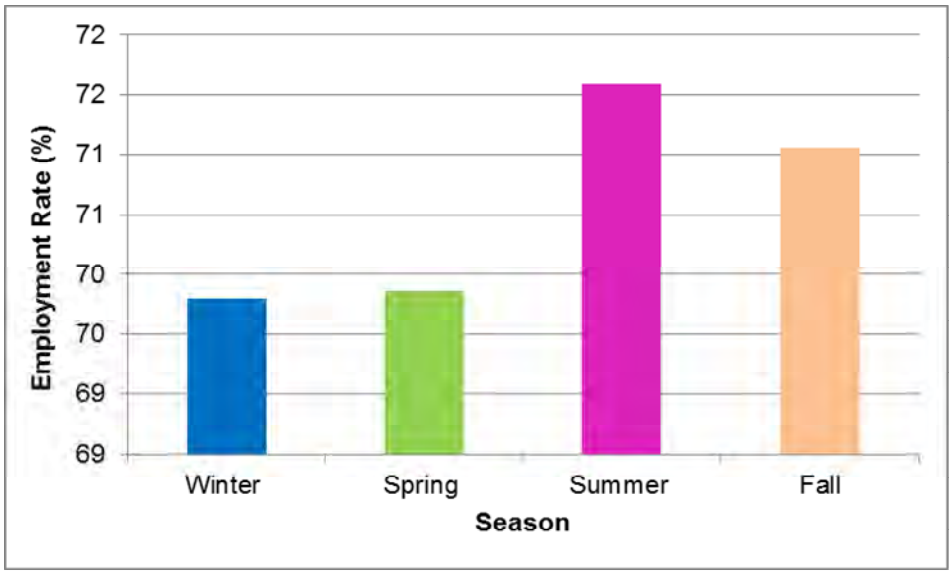


Figure 3.2.4-6
NWT Average Seasonal Employment Rates 2001 - 2010

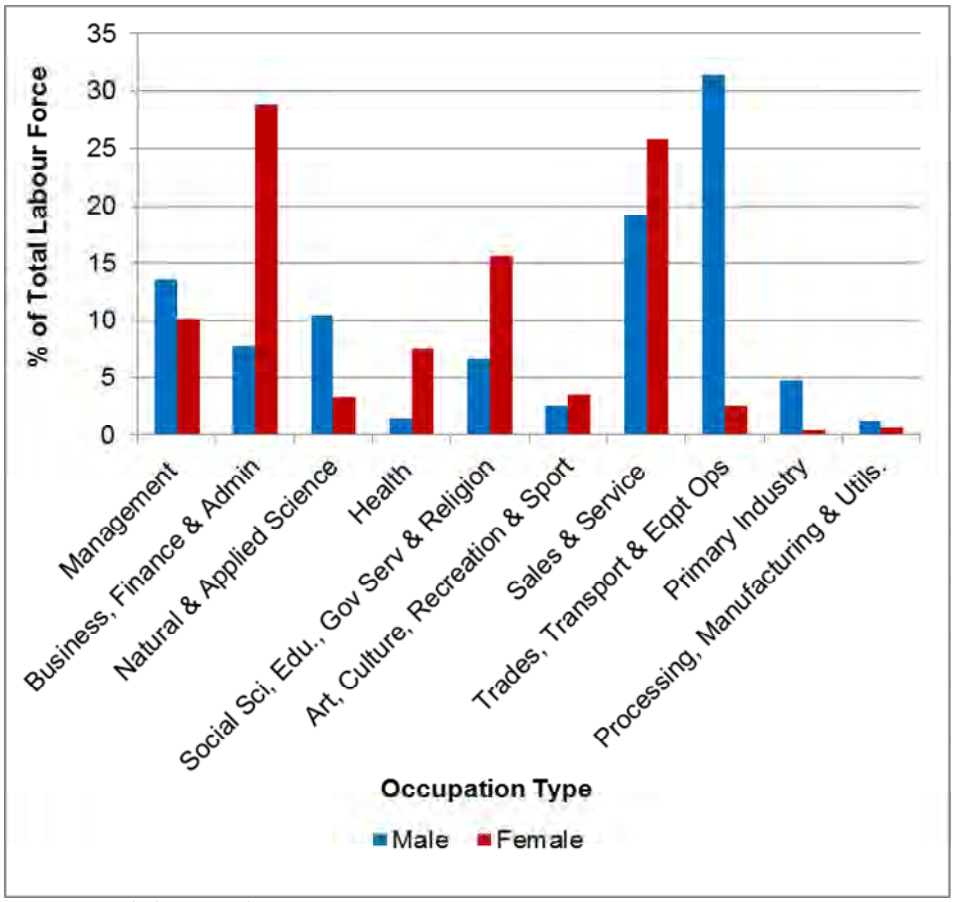
Employment by Occupation and Industry

The 2006 census conducted by Statistics Canada categorizes employment in the NWT by different parameters, including occupation and industry types.

The term "occupation" refers to the type of work that persons were doing during the census reference week, determined by both their job title and responsibilities (Statistics Canada 2006c).

Figure 3.2.4-7 shows the 2006 NWT total labour force categorized by occupation type and gender. Of the total female labour force, business, finance and administrative (28.9%); sales and services (25.8%); and social sciences, education, government services and religion (15.6%) were the three most commonly held occupation types. Of the total male labour force, trades, transport and equipment operators (31.3%), sales and services (19.2%), and management occupations[4] (13.6%) were the three most commonly held occupation types (Statistics Canada 2006a).

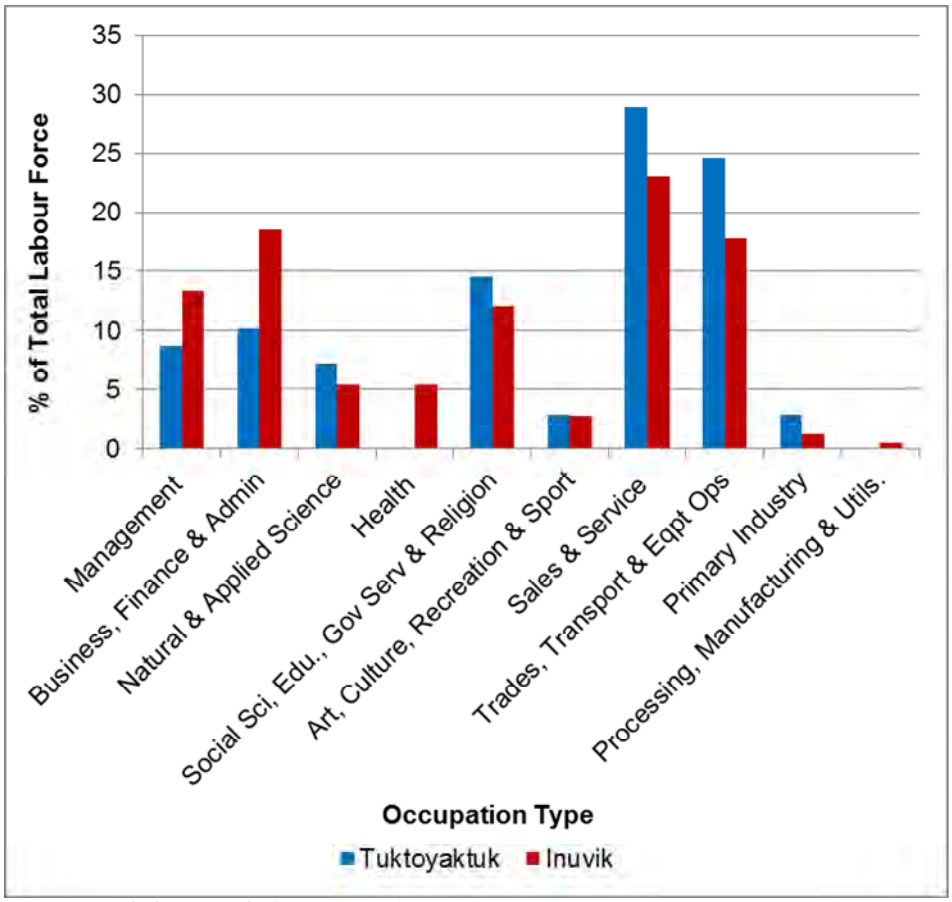
[4] Note: the category "management occupations" is broad and should be used with caution as there were coding errors that occurred when conducting the census. The appropriate level and area of specialization of management was not documented (Statistics Canada 2006d). Further, the census data have been rounded to the nearest tenth so statistics expressed for both occupation and industry are not exact (K. Odziemkowska, pers. comm., January 11, 2011).



Source: Statistics Canada 2006a

Figure 3.2.4-7
Occupation Participation by Gender, NWT, 2006

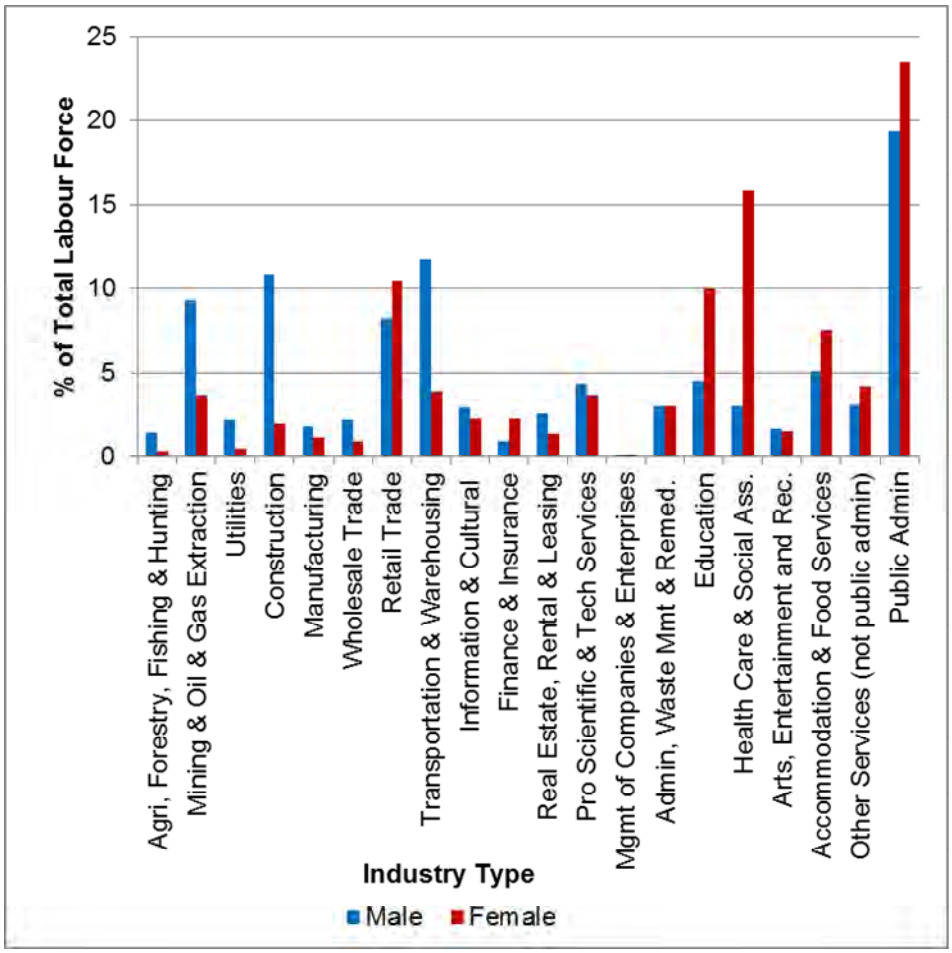
The total labour force in the Hamlet of Tuktoyaktuk is 345 persons, and the total labour force in the Town of Inuvik is 2,020 persons (Statistics Canada 2006a, 2006b). Figure 3.2.4-8 shows the 2006 NWT total labour force categorized by occupation type and community. Of the total Tuktoyaktuk labour force, sales and services (29.0%), trades transport and equipment operators (24.6%), and social science, education, government service and religion (14.5%) were the three most commonly held occupation types. Of the total Inuvik labour force, sales and services (23.0%), business finance and administration (18.6%), and trades transport and equipment operators (17.8%) were the three most commonly held occupation types (Statistics Canada 2006a, 2006b).



Source: Statistics Canada (2006a, 2006b)

Figure 3.2.4-8
Occupation Participation for Tuktoyaktuk and Inuvik, 2006

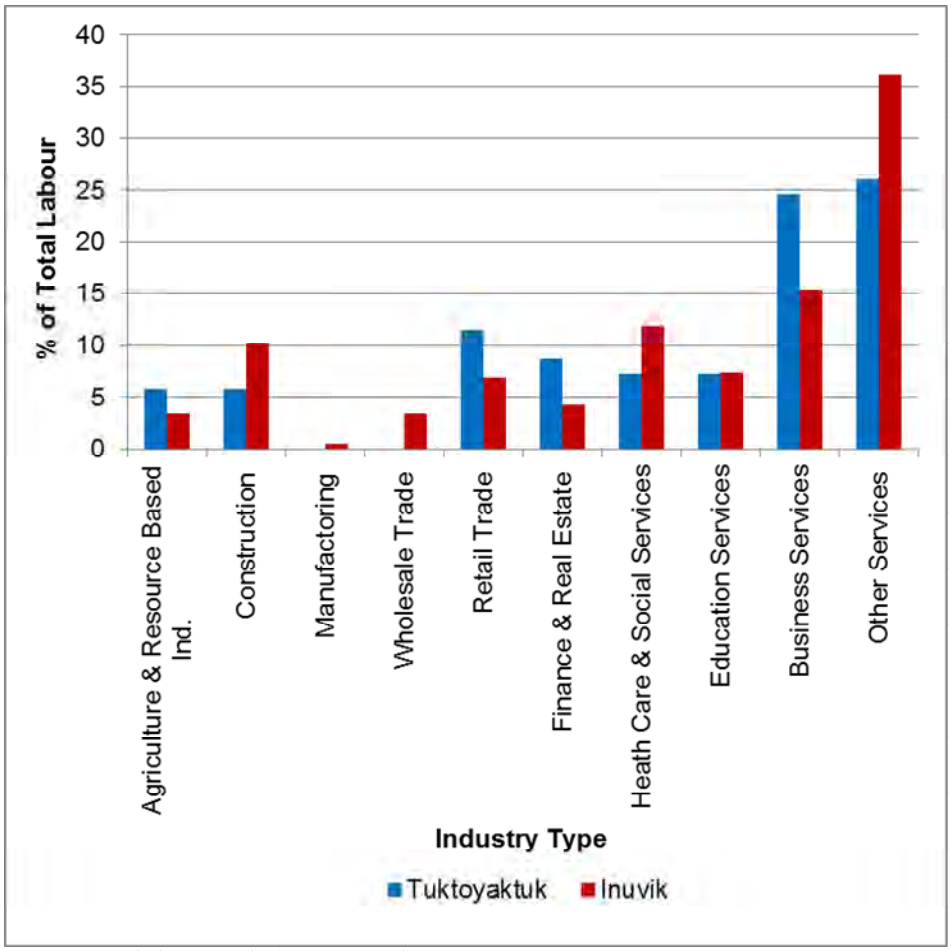
The term "industry" refers to the nature of the business being carried out at the establishment where the census participants worked (Statistics Canada 2006e). Figure 3.2.4-9 presents the 2006 NWT total labour force categorized by industry type and gender. Of the total female labour force, public administration (23.4%), health care and social assistance (15.9%), and retail trade (10.5%) were the industry types most commonly worked in. Of the total male labour force, public administration (19.4%), transportation and warehousing (11.8%), and construction (10.9%) were the industry types most commonly worked in (Statistics Canada 2006a).



Source: Statistics Canada (2006a)

Figure 3.2.4-9
NWT Industry Participation by Gender, 2006

Figure 3.2.4-10 shows the 2006 NWT labour force categorized by industry type and community. Of the total Tuktoyaktuk labour force, other services (26.1%), business services (24.6%), and retail trade (11.6%) were the three industry types most commonly worked in. Of the total Inuvik labour force, other services (36.1%), business services (15.3%), and health care and social services (11.9%) were the three industry types most commonly worked in (Statistics Canada 2006a, 2006b).



Source: Statistics Canada (2006a, 2006b)

Figure 3.2.4-10
Industry Participation for Tuktoyaktuk and Inuvik, 2006

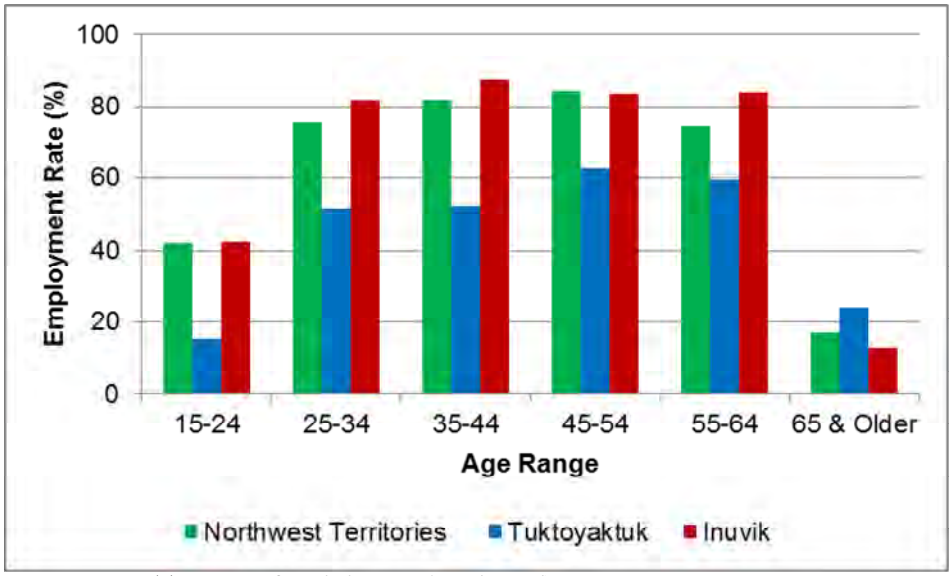
Employment Demographics

In 2009, the employment rates for the male and female residents of the NWT were 68.1% and 66.4%, respectively. The Aboriginal population had an employment rate of 49.8% and the non-Aboriginal population had an employment rate of 83.1% (GNWT Bureau of Statistics 2010k).

In 2009, the employment rates for the male and female residents of Tuktoyaktuk were 44.5% and 44.2%, respectively. The Aboriginal population had an employment rate of 31.5% and the non-Aboriginal population had an employment rate of 86.0% (GNWT Bureau of Statistics 2010k). Both genders and the Aboriginal population in Tuktoyaktuk have lower employment rates compared to the employment rates for the NWT.

In 2009, the employment rates for the male and female residents of Inuvik were 74.8% and 67.3%, respectively. The Aboriginal population had an employment rate of 57.3% and the non-Aboriginal population had an employment rate of 90.8% (GNWT Bureau of Statistics 2010l). Inuvik in general has higher employment rates than both Tuktoyaktuk and the NWT.

Figure 3.2.4-11 shows 2009 employment rates by age category for the NWT, Tuktoyaktuk and Inuvik. In both the NWT and Inuvik, the age group with the highest employment rate was 35-44. However, in Tuktoyaktuk, the age group with the highest employment rate was 45-54 (GNWT Bureau of Statistics 2010k, 2010l).



Source: GNWT Bureau of Statistics 2010k and 2010l)

Figure 3.2.4-11
NWT, Tuktoyaktuk and Inuvik Age Based Employment Rates, 2009

Unfilled Employment Positions

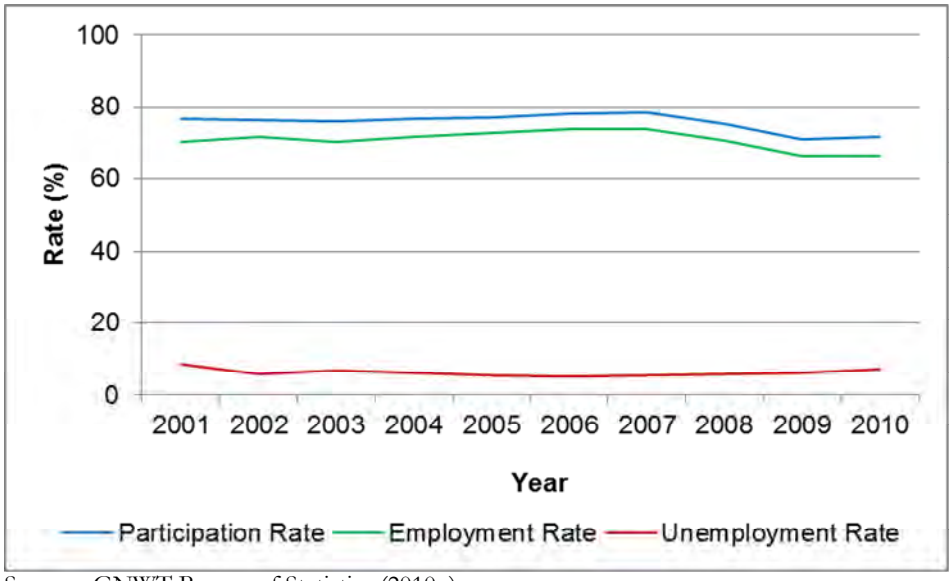
According to Jobs North, in December 2010 there were 112 job vacancies in the NWT in several employment sectors including the service industry, engineering, sciences, trades, administration, health care, and education. Of these 112 jobs, three were located in Inuvik and none were located in Tuktoyaktuk (GNWT ECE 2010a). There are likely other unfilled positions that are posted informally around the community.

Labour Force Participation & Growth

The labour force is defined by the GNWT Bureau of Statistics as persons who were either employed or unemployed during the week prior to the survey. Within the labour force, employed persons are persons who, during the week prior to the survey: (i) did any work at all, excluding housework, maintenance around the home and volunteer work; or (ii) were absent from their job or business because of vacation, illness, on strike or locked out, etc. Unemployed persons are those who, during the week prior to the survey: (i) were without

work, had actively looked for work in the previous four weeks and were available for work; or (ii) had been on temporary lay-off and expected to return to their job; or (iii) had definite arrangements to start a new job within the next four weeks. Persons who do not participate in the labour force are neither employed nor unemployed (GNWT Bureau of Statistics 2010k).

Labour force participation rate in the NWT increased from 2001 to 2007, and then decreased from 2008 to 2009, indicating that the NWT experienced labour force growth prior to the global economic recession in 2008. The employment rate followed a similar trend the participation rate and the unemployment rate remained relatively constant. The lower employment rate in 2009 is attributable to the number of persons not in the labour force, which increased by 1,300 persons (GNWT Bureau of Statistics 2010h, 2010o). The overall labour force activity in the NWT can be observed in Figure 3.2.4-12.



Source: GNWT Bureau of Statistics (2010o)

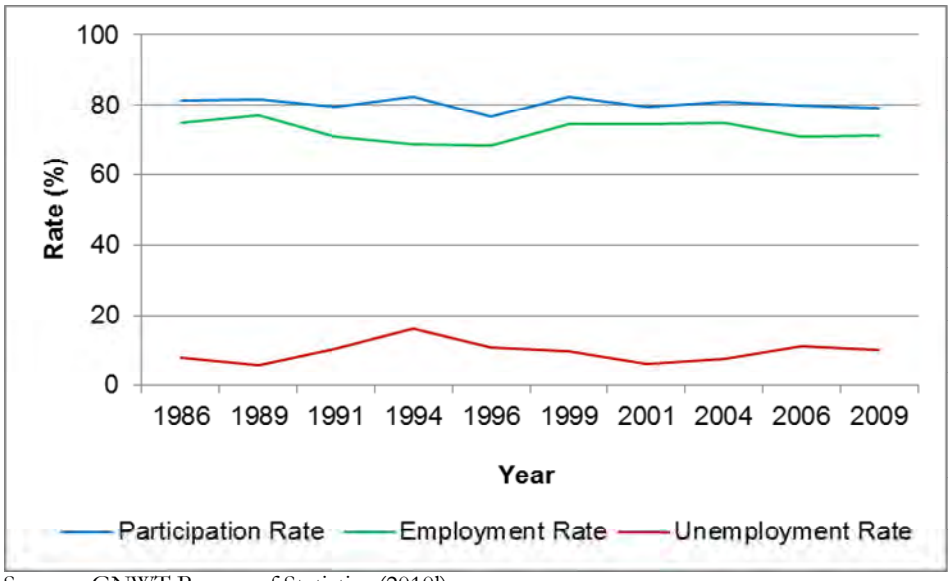
Figure 3.2.4-12
NWT Population (Aged 15 & Older) by Labour Force Activity, 2001-2009

Community employment data for Tuktoyaktuk are provided in Figure 3.2.4-13. In 2009, 726 residents were aged 15 years and older. Employment data indicate that of those aged 15 years and older, 322 residents were employed, 113 residents were unemployed, and 291 residents were not in the labour force. This translates into an employment rate of 44% and an unemployment rate of 26%. Both employment and unemployment rates have fluctuated between 1986 and 2009, particularly in 1994 when the unemployment rate was higher than the employment rate. Overall employment increased slightly, while unemployment decreased slightly (GNWT Bureau of Statistics 2010k).

Source: GNWT Bureau of Statistics (2010k)

Figure 3.2.4-13
Tuktoyaktuk Population (Aged 15 & Older) by Labour Force Activity, 1986 – 2009

Community employment data for Inuvik are provided in Figure 3.2.4-14. In 2009, 2,766 residents were aged 15 years and older. Employment data indicate that of the population aged 15 years and older, 1,969 residents were employed, 220 residents were unemployed, and 577 residents were not in the labour force. This translates into an employment rate of 71% and an unemployment rate of 10%. Both employment and unemployment rates have remained relatively stable between 1986 and 2009, with some fluctuations from 1994 to 2001 (GNWT Bureau of Statistics 2010l).

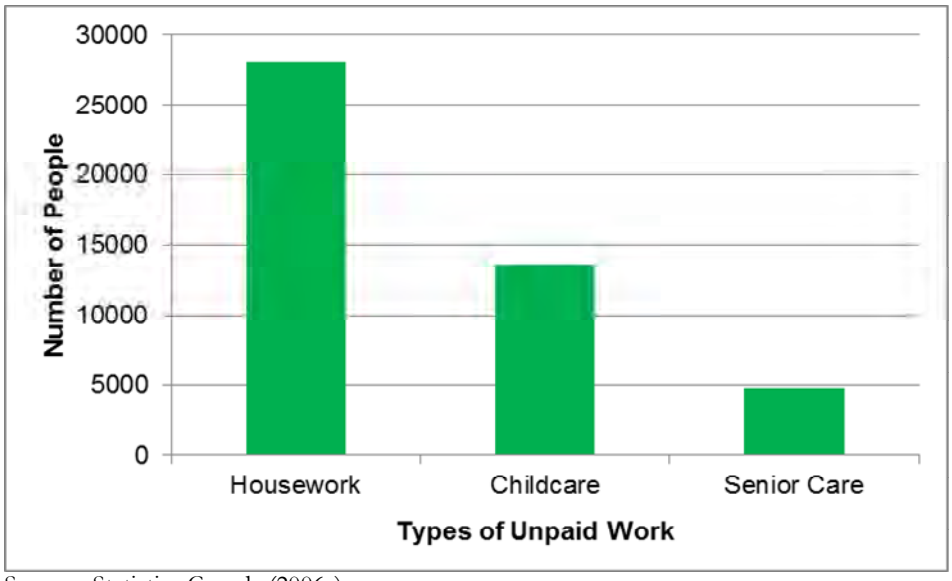


Source: GNWT Bureau of Statistics (2010l)

Figure 3.2.4-14
Inuvik Population (Aged 15 & Older) by Labour Force Activity, 1986 – 2009

The 2006 census conducted by Statistics Canada collected data for unpaid work. ThiS category includes: housework, childcare, and care of seniors. Unpaid services can either be provided to a worker's own household or to other family member households (Statistics Canada 2006a, 2006b).

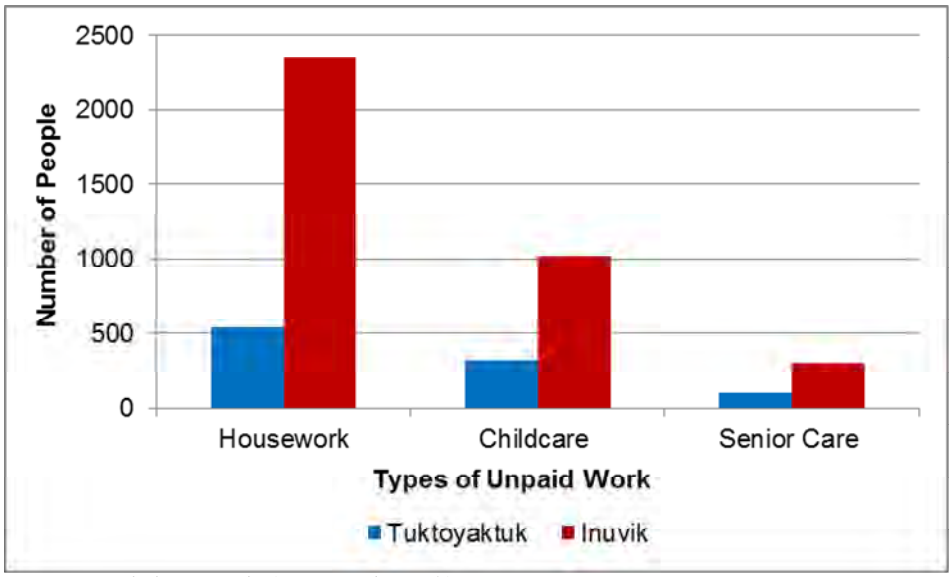
Figure 3.2.4-15 shows the categories of unpaid work for the NWT. The category of unpaid work with the greatest number of participants 15 years of age and older was housework with 27,980 participants. Senior care had the least number of participants, at 4,700 participants (Statistics Canada 2006).



Source: Statistics Canada (2006a)

Figure 3.2.4-15
NWT Population 15 Years and Older Reporting Unpaid Work, 2006

Figure 3.2.4-16 shows the categories of unpaid work for both Tuktoyaktuk and Inuvik. Housework was the category of unpaid work with the highest participation from people aged 15 years and older. In 2006, 540 people in Tuktoyaktuk (60% of the total population) and 2,345 people (64%) in Inuvik reported unpaid housework. Housework includes: general housework, yard work, and home maintenance (Statistics Canada 2006a, 2006b).



Source: Statistics Canada (2006a and 2006b)

Figure 3.2.4-16
Population 15 Years and Older Reporting Unpaid Work in Tuktoyaktuk and Inuvik, 2006

Based on the location, terrain, and environment in the region, there are limited renewable resource sector activities. In other parts of Canada, renewable resource sectors include forestry. The forests near Inuvik are relatively sparse, and no trees appear on the tundra. Traditional country foods harvesting is the primary renewable resource activity in the region and many households rely on this for subsistence. Detailed harvesting information is found in Section 3.2.8 (GNWT ENR ND).

Current and projected land or water based industrial operations, enterprises and economic activities in Tuktoyaktuk and Inuvik include:

- Oil and gas exploration and development;
- Tourism;
- Wildlife guiding/outfitting;
- Subsistence (unpaid) harvesting;
- Transporting goods by barge; and
- Recreational activities related to traditional use of the land.

Licensed Businesses

There are 133 licensed businesses on the Inuvialuit Business List (IBL) in the ISR. There is no maximum number of businesses on the IBL (A. Bourke, Cooperation and Benefits Agreement Manager, pers. comm., February 1, 2011).

In 2000, the Inuvialuit Regional Corporation (IRC) created a policy with criteria for including an Inuvialuit business on the IBL. Key criteria include:

- Inuvialuit ownership requirements;
- Physical presence; and
- Operational capacity (IRC 2007h).

Should a business fail to meet all criteria, it will not be included on the IBL. Therefore, 100% of businesses listed on the IBL are Inuvialuit-owned (IRC 2007h).

Inclusion on the IBL provides businesses with an opportunity to access:

- The contracting preferences as outlined in the *Inuvialuit Final Agreement*;
- Inuvialuit Land Administration permits;
- Co-operation, benefits and other economic agreements signed between IRC and both government and industry (Inuvialuit Regional Corporation 2007h).

Within the IBL, there is a special category of businesses listed in Schedule A of the IFA. Businesses listed in Schedule A include those that provide an essential service to Inuvialuit communities or those in which the Inuvialuit have made a significant investment. Companies on the Schedule A list include:

- Aklak Air Limited;
- Canadian Helicopters Limited;
- Northern Transportation Company Limited (NTCL);
- Canadian North Incorporated; and
- Akita Equtak Drilling Limited (IRC 2007h).

Priority is given to businesses listed in Schedule A. For example, a company requiring goods or services within the region should first try to acquire goods or services from businesses on the Schedule A list. If the Schedule A business cannot provide the good or service in an adequate amount of time or at a competitive rate, the company may contact any other Inuvialuit Businesses on the IBL (IRC 2007h).

Data regarding business ownership by gender are not available; however, based on the names of the company's primary contacts or principals, 77% of owners are males and 23% are females (IRC 2007h).

In Tuktoyaktuk, there were a total of 34 business licenses issued in 2010. Of those, 14 (41%) were listed on the IBL and 20 (59%) were not (C. Gordon, Economic Development Officer, Hamlet of Tuktoyaktuk, pers. comm., February 1, 2011).

In Inuvik, there were a total of 245 business licenses issued in 2010. Of those 245 licenses, 36 (15%) were listed on the IBL and 209 (85%) were not (P. Watters, Town of Inuvik, February 1, 2011).

Employment Related to Traditional Activities

Traditional activities range from the production of arts and crafts to harvesting country foods. The arts and crafts produced include: carvings, drawings or paintings, sewing or needlecraft, weaving or basket making, jewelry, performing arts, and writing books (GNWT Bureau of Statistics 2008d). Employment data related to traditional activities are generally not available since many of the traditional activities are produced for personal or cultural use, and are not paid employment. Available data related to employment and traditional activities are described in this section.

During 2008 there were a total of 2,948 people producing arts and crafts in the NWT; that is, 8.7% of the total number of persons aged 15 and older living in the NWT. In the Beaufort-Delta region, 727 (13%) of the 5,398 persons aged 15 and over produced arts and crafts in 2008, including 307 people or 42.2% selling their works (GNWT Bureau of Statistics 2008d).

Trapping is another traditional activity that generates revenue. Table 3.2.4-1 shows the average annual income received by trappers in 1987, 1993, 1999 and 2002. It is important to note that this income is solely from trapping and not from other employment (IOL et al. 2004).

TABLE 3.2.4-1: AVERAGE ANNUAL INCOME OF ACTIVE TRAPPERS IN INUVIK AND TUKTOYAKTUK				
Location	Average Annual Income ($)			
	1987	1993	1999	2002
Tuktoyaktuk	1,415	1,132	438	807
Inuvik	1,821	432	729	676

Source: IOL et al. (2004)

Data regarding the sale of country foods is not available. It is known that some residents do sell their country foods, but this is likely through an informal system. Although not specific to employment, the GNWT Bureau of Statistics (2010k) identifies the 2008 level of involvement of NWT residents in traditional activities:

- 39.4% of residents (15 years of age and older) hunted and fished;
- 6.2% of residents (15 years of age and older) trapped;
- 8.7% of residents (15 years of age and older) produced arts and crafts; and
- 28.1% of households obtained half or more of the meat and fish they consumed through hunting and fishing.

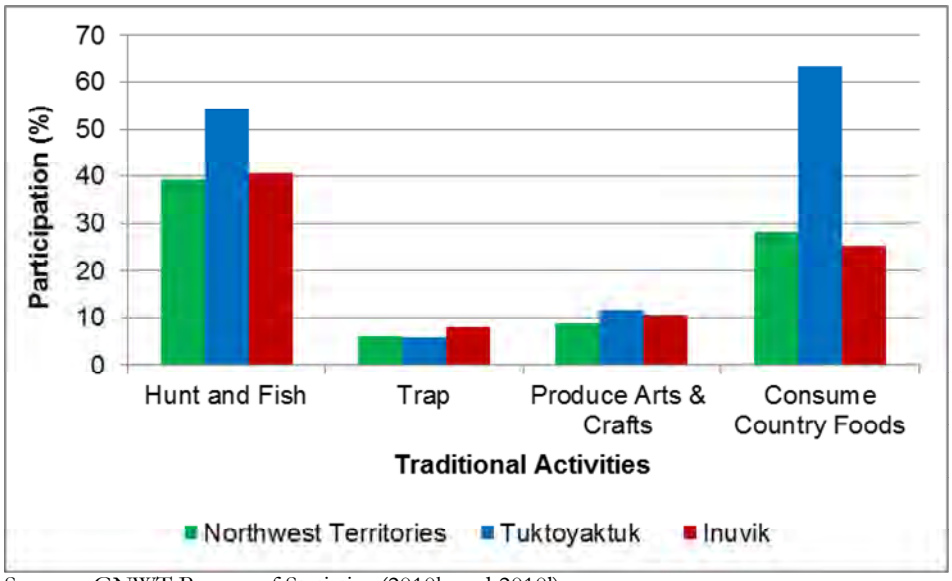
In Tuktoyaktuk, the 2008 level of involvement in traditional activities was generally higher than the NWT with the exception of trapping. Tuktoyaktuk levels of involvement in traditional activities are as follows:

- 54.4% of residents (15 years of age and older) hunted and fished;
- 5.8% of residents (15 years of age and older) trapped;
- 11.7% of residents (15 years of age and older) produced arts and crafts; and
- 63.3% of households obtained half or more of the meat and fish they consumed through hunting and fishing (GNWT Bureau of Statistics 2010k).

In Inuvik the 2008 level of involvement in traditional activities was also generally higher than the NWT with the exception of households obtaining half or more of the meat and fish they consumed through hunting or fishing. Inuvik levels of involvement in traditional activities are as follows:

- 40.8% of residents (15 years of age and older) hunted and fished;
- 7.9% of residents (15 years of age and older) trapped;
- 10.6% of residents (15 years of age and older) produced arts and crafts; and
- 25.2% of households obtained half or more of the meat and fish they consumed through hunting or fishing (GNWT Bureau of Statistics 2010l).

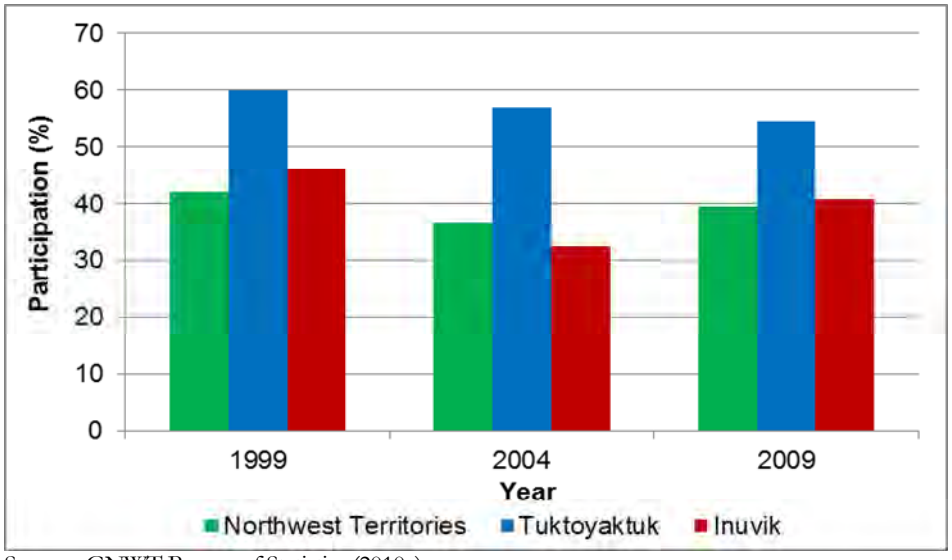
Figure 3.2.4-17 identifies the participation in traditional activities in Tuktoyaktuk and Inuvik in 2008 (GNWT Bureau of Statistics 2010k, 2010l).



Source: GNWT Bureau of Statistics (2010k and 2010l)

Figure 3.2.4-17
Participation in Traditional Activities, NWT, Tuktoyaktuk and Inuvik, 2008

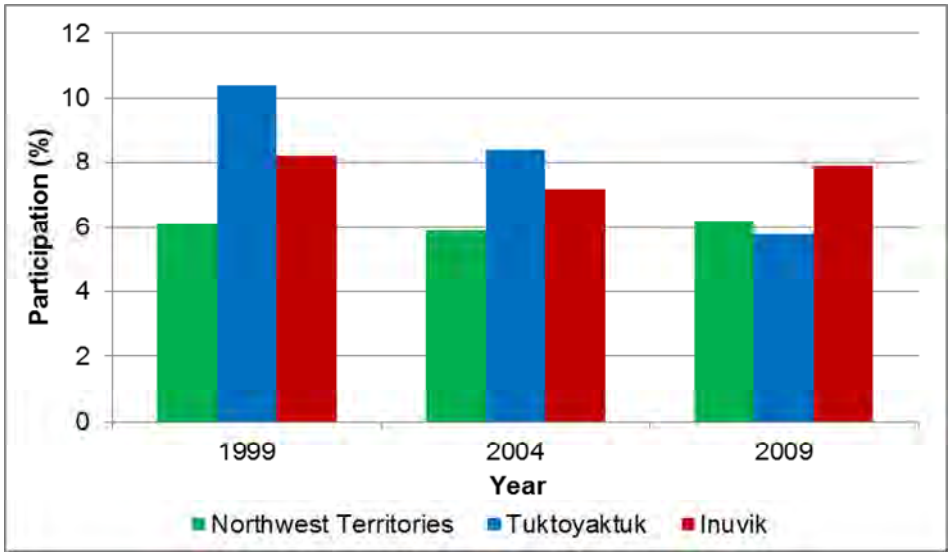
Figure 3.2.4-18 shows the percent participation of persons 15 years and over who hunted and fished. The participation rates for hunting and fishing activities in the NWT and Inuvik decreased from 1999 to 2004, and increased from 2004 to 2009. In Tuktoyaktuk, participation rates continuously decreased, but still maintained higher rates of participation than both the NWT and Inuvik (GNWT Bureau of Statistics 2010g).



Source: GNWT Bureau of Statistics (2010g)

Figure 3.2.4-18
Persons 15 and Over Who Hunted or Fished in Previous Years, 1999-2009

The NWT and Inuvik follow similar patterns for participation in trapping activities as they did for participation in hunting and fishing activities. Tuktoyaktuk also follows a similar pattern; however, in 2009 the Tuktoyaktuk participation rate drops below both the NWT and Inuvik. This can be observed in Figure 3.2.4-19 (GNWT Bureau of Statistics 2010g).



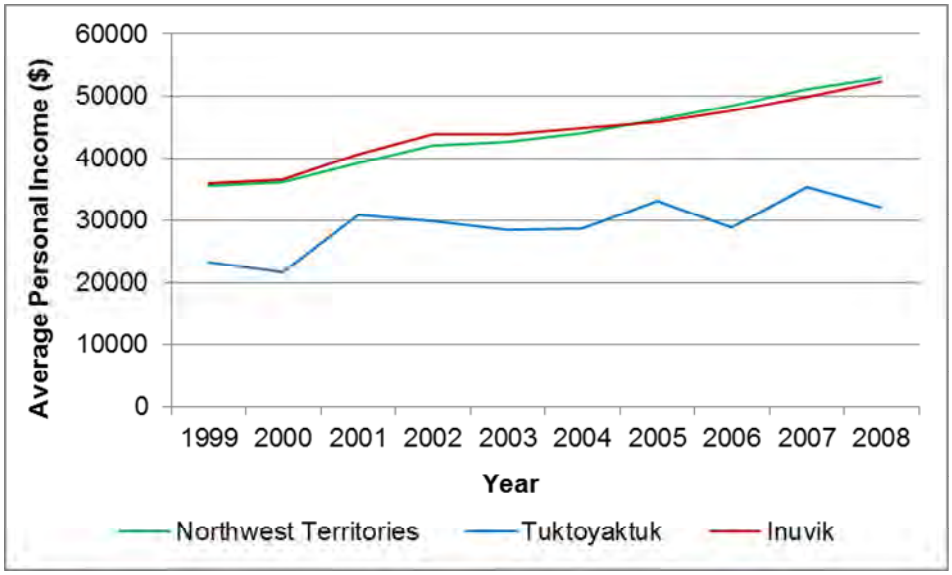
Source: GNWT Bureau of Statistics (2010g)

Figure 3.2.4-19
Persons 15 and Over Who Trapped in Previous Years, 1999-2009

3.2.4.2 Income

Income and Earnings Growth

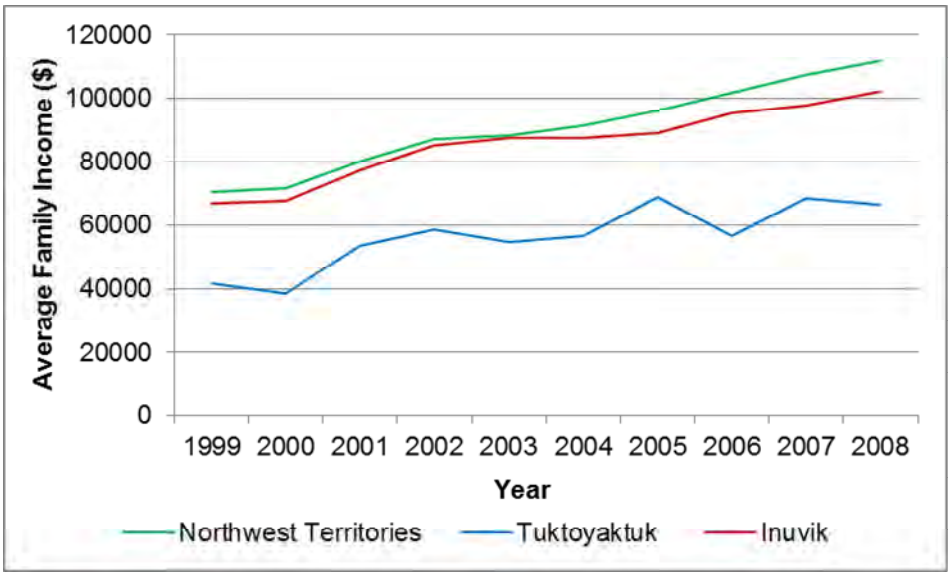
The average personal income for residents of the NWT, Tuktoyaktuk and Inuvik has increased since 1999 (Figure 3.2.4-20). Average personal income refers to the average monetary income from all sources for an individual (GNWT Bureau of Statistics 2009 a, 2009b). In the NWT, the average personal income increased from $35,650 in 1999 to $52,943 in 2008. In Tuktoyaktuk, average personal income increased from $23,273 to $32,204 in 2008. In Inuvik, average personal income increased from $36,060 in 1999 to $52,271 in 2008. The NWT and Inuvik follow similar trends with similar average values; however, the average personal income in Tuktoyaktuk is consistently lower and follows a less consistent trend (GNWT Bureau of Statistics 2010k and 2010l).



Source: GNWT Bureau of Statistics (2010k and 2010l)

Figure 3.2.4-20
Average Personal Income in Tuktoyaktuk and Inuvik, 1999 - 2008

Similar trends are observed in Figure 3.2.4-21 for the average family incomes in the NWT, Tuktoyaktuk, and Inuvik from 1999 to 2008 (GNWT Bureau of Statistics 2010k, 2010l).



Source: GNWT Bureau of Statistics (2010k and 2010l)

Figure 3.2.4-21
Average Family Income in the NWT Tuktoyaktuk and Inuvik, 1999-2008

Poverty and Social Assistance

Specific groups within a community that are more vulnerable to poverty include seniors, persons with disabilities, families led by single mothers and single people in general. Should an individual fall into more than one of these groups they have an even greater vulnerability to poverty (GNWT ECE 2007).

Men and women aged 65 and older are equally vulnerable to poverty. Possible reasons for this vulnerability include lower levels of education, type of work and work history, poor health, and marital break ups (GNWT ECE 2007).

Persons with disabilities typically have higher daily living costs. A person with a profound and prolonged disability is often able to collect supplemental benefits to compensate for the increased daily living costs. A person with a work-limiting disability is more vulnerable to poverty than those persons with profound prolonged disabilities (GNWT ECE 2007).

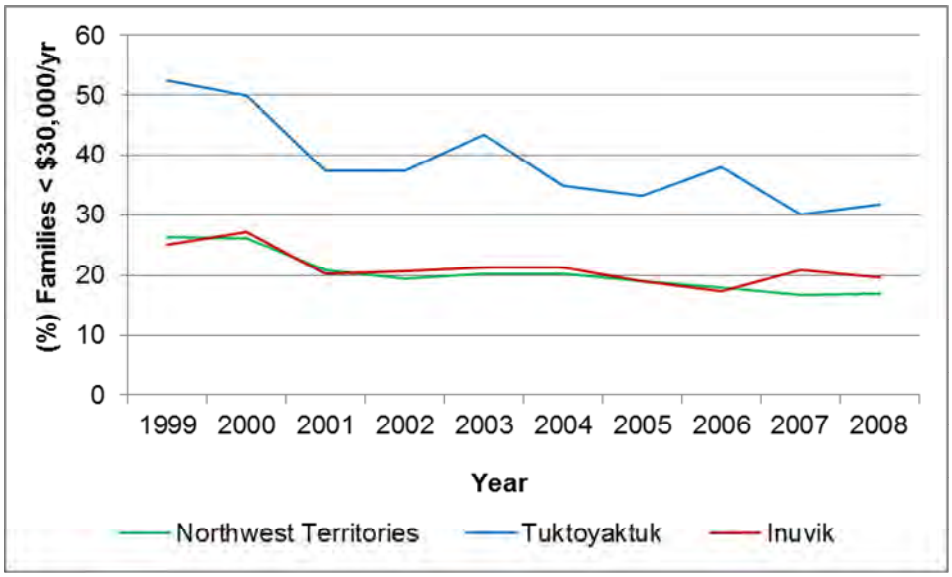
More social assistance programs exist for families and single parents to counteract the proven lifelong potential effects of growing up in poverty. However, there are fewer assistance programs for single persons living in poverty (GNWT ECE 2007).

Poverty is not specifically defined or monitored by Statistics Canada or the GNWT Bureau of Statistics. According to GNWT ECE (2007), it is generally agreed that poverty is not only the result of a lack of financial resources but also an inability to participate in social and economic activities.

According to the GNWT Department of Education, Culture and Employment (ECE), income is one of the most practical indicators of poverty. There is, however, no general consensus on the definition of low-income. Statistics Canada uses three statistical measures for low-income communities: Market Basket Measure (MBM), Low Income Cut Offs (LICO), and Low Income Measure (LIM). These measures are often used as poverty line indicators although Statistics Canada does not define them as such.

In the NWT, LIM is used as a general measure of poverty (as it allows for international comparison). LIM is a 50% fixed percentage of the median adjusted income for households in a specific region. The term "adjusted" indicates that household size and needs were accounted for when calculating income (Statistics Canada 2010a).

Figure 3.2.4-22 shows the percent of families in the NWT, Tuktoyaktuk, and Inuvik that earned less than $30,000 annually from 1999 to 2008. The NWT and Inuvik follow similar trends differing most significantly in 2007 and 2008 when Inuvik had a higher percentage than the NWT. Tuktoyaktuk had a greater percentage than both the NWT and Inuvik, peaking in 1999 at 52.4% then again in 2003 and 2006 at 43.5% and 38.1%, respectively. In general the percent of families earning less than $30,000 annually decreased in Tuktoyaktuk, Inuvik and the NWT from 1999 to 2008.



Source: GNWT Bureau of Statistics (2010k, 2010l)

Figure 3.2.4-22
Percent of Families with Annual Income less than $30,000, 1998 - 2008

Table 3.2.4-2 shows the percentage of households in the NWT with less than $30,000 income categorized by selected characteristics. The household characteristics include the number of people per household and whether the household includes a senior. The percentage of single person households earning less than $30,000 was a 31.9%, while the percentage of seniors' households earning less than $30,000 was 39.9% (GNWT ECE 2007).

TABLE 3.2.4-2: PERCENTAGE OF HOUSEHOLDS IN THE NWT WITH LESS THAN $30,000 INCOME, BY SELECTED CHARACTERISTICS, 2004

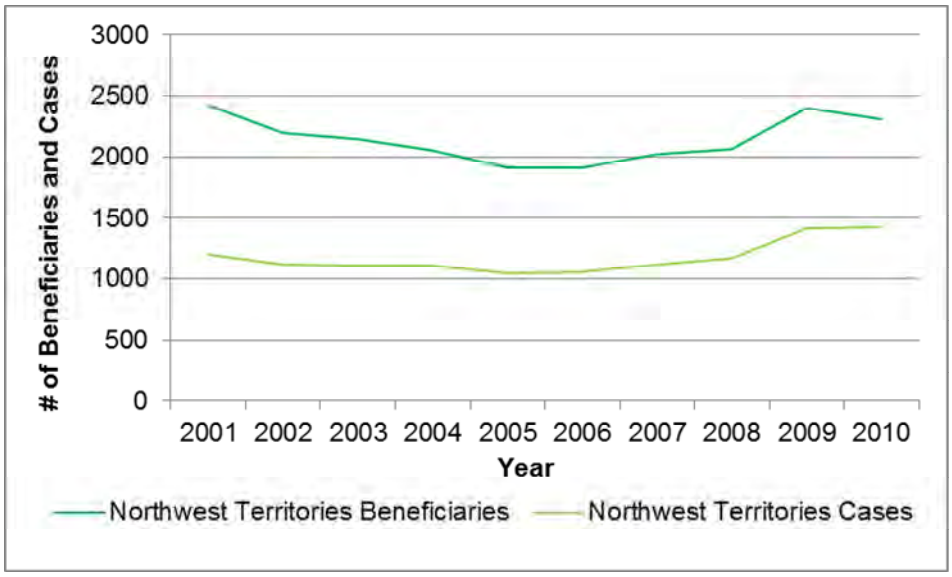
Characteristic	Percentage
One Person	31.9
Two or Three Persons	13.2
Four or Five Persons	8.9
Six or More Persons	9.4
Household with Senior	39.9
Household without Senior	10.8

Source: GNWT ECE (2007)

The GNWT Department of Education Culture and Employment categorizes the usage and monetary cost of income assistance according to:

- Beneficiaries - defined as "the monthly average number of recipients of income assistance and their dependants, if any, over the year";
- Case - defined as "the monthly average number of people receiving social assistance over the year"; and
- Payment – defined as "the total amount of payments made over the year (GNWT Bureau of Statistics 2009a).

In the NWT, the monthly average number of income assistance beneficiaries and cases decreased from 2001 to 2006, then increased from 2006 to 2010. This can be observed in Figure 3.2.4-23 (GNWT Bureau of Statistics 2010k).

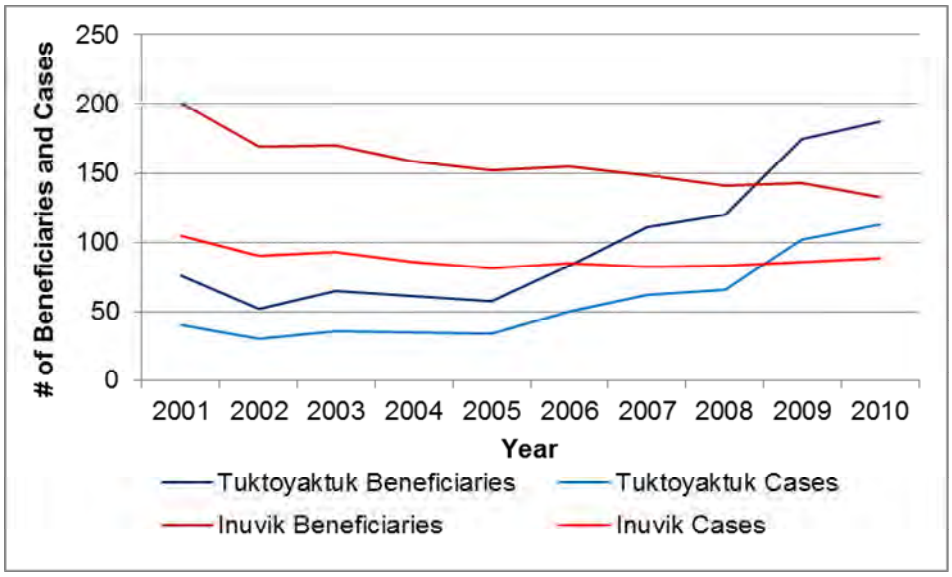


Source: GNWT Bureau of Statistics (2010k)

Figure 3.2.4-23
NWT Income Assistance Cases and Beneficiaries, 2001 - 2010

In Tuktoyaktuk, both the monthly average number of income assistance beneficiaries and cases has increased from 2001 to 2010. Figure 3.2.4-24 indicates that although the monthly average beneficiaries and cases decreased from 2001 to 2002, they increased thereafter until 2010 (GNWT Bureau of Statistics 2010k).

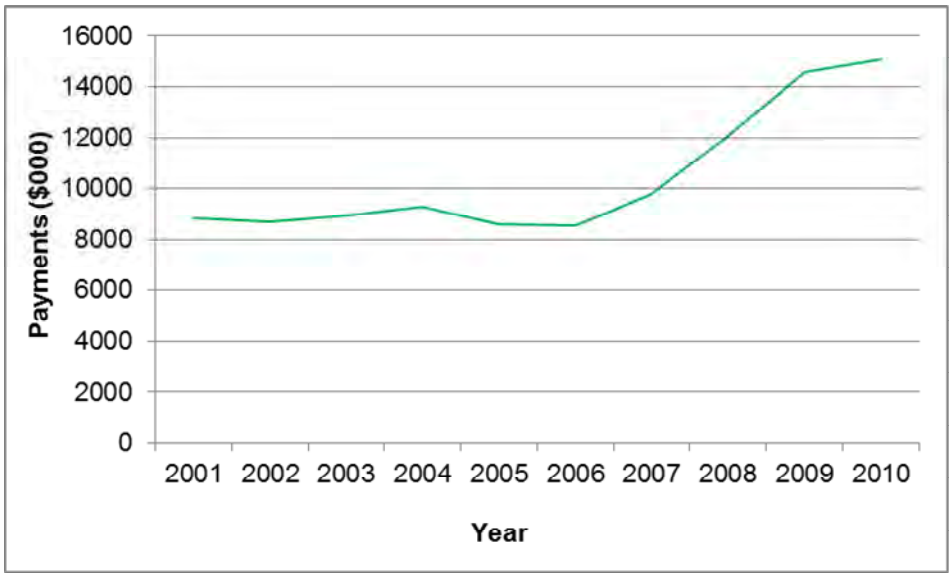
In Inuvik, the monthly average number of income assistance beneficiaries and cases has decreased between 2001 and 2010, as shown in Figure 3.2.4-24 (GNWT Bureau of Statistics 2010l).



Source: GNWT Bureau of Statistics (2010k and 2010l)

Figure 3.2.4-24
Tuktoyaktuk and Inuvik Income Assistance Cases and Beneficiaries, 2001 - 2010

In the NWT, payments from income assistance have increased from $8,840,000 in 2001 to $15,074,000 in 2010. The most drastic increase occurred from 2006 to 2009. This can be observed in Figure 3.2.4-25 (GNWT Bureau of Statistics 2010k).



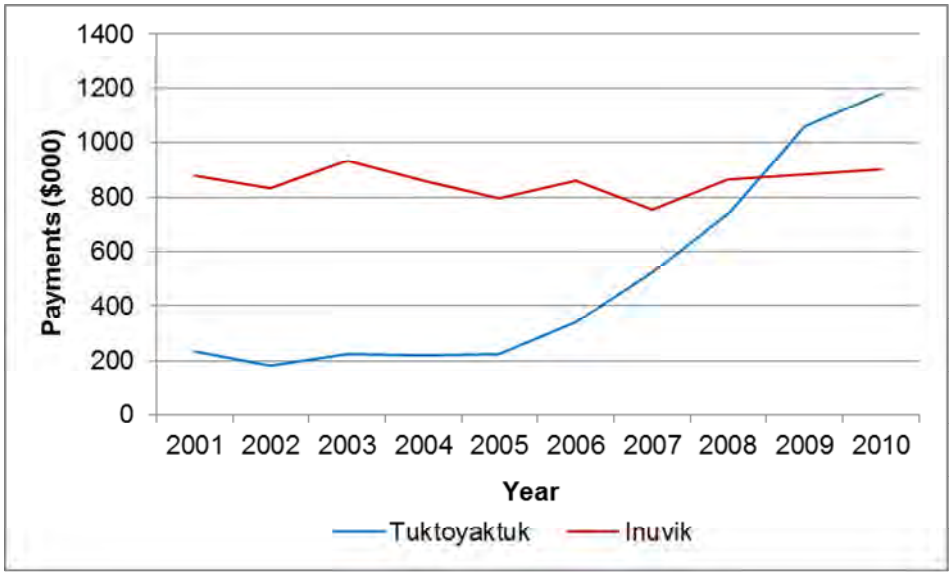
Source: GNWT Bureau of Statistics (2010k)

Figure 3.2.4-25
NWT Income Assistance Payments, 2001 - 2010

In Tuktoyaktuk, payments for income assistance increased from $231,000 in 2001 to $1,177,000 in 2010. The most drastic increased occurred from 2005 to 2009 (GNWT Bureau of Statistics 2010k).

In Inuvik, payments for income assistance increased from $878,000 in 2001 to $903,000 in 2010 (GNWT Bureau of Statistics 2010l).

The annual amount of social assistance benefits for Tuktoyaktuk or Inuvik are not available on a household or per capita basis.



Source: GNWT Bureau of Statistics (2010k and 2010l)

Figure 3.2.4-26
Tuktoyaktuk and Inuvik Income Assistance Payments, 2001 - 2010

Consumer Prices and Cost of Living

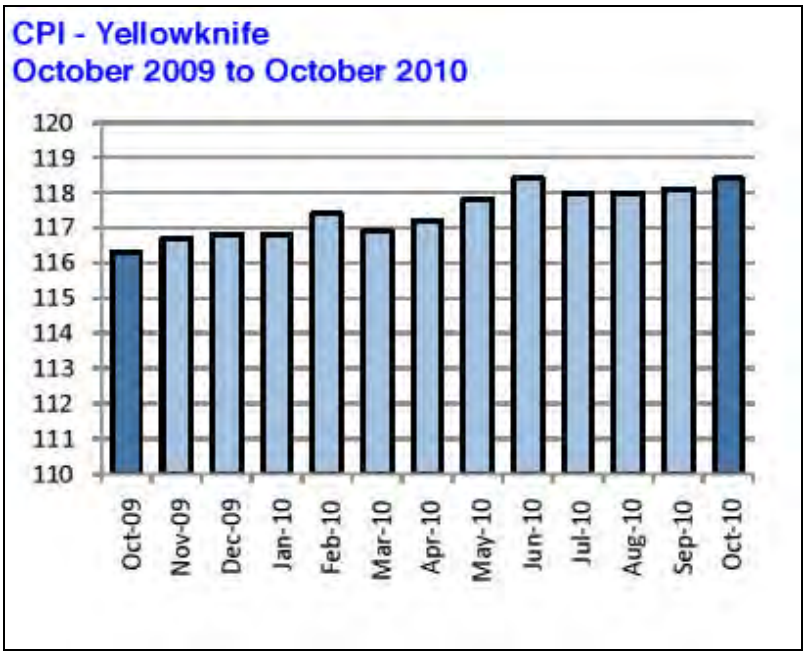
The cost of living in northern communities is a function of the distance from southern supply sources (IOL et al. 2004). Various indices are used to document cost of living, including the Consumer Price Index and the Community Price Index.

Consumer Price Index

According to Statistics Canada, the Consumer Price Index indicates change, or lack thereof, in consumer prices for a specific region. The Consumer Price Index is determined by comparing, over time, the cost of a fixed 'basket' of commodities, purchased by consumers. Because the basket is made up of commodities of unchanging or equivalent quantity and quality, the index reflects purely a change in price (Statistics Canada 2010c).

The Consumer Price Index for Tuktoyaktuk and Inuvik are not available; however, it is expected that the cost of the 'basket of commodities' would be higher in Tuktoyaktuk and Inuvik compared to Yellowknife due to the increased transportation costs. Therefore, the Consumer Price Index for Yellowknife is provided as a likely minimum comparison.

The Consumer Price Index for Yellowknife is reported each month. Figure 3.2.4-27 shows the Consumer Price Index for Yellowknife increasing from October 2009 to October 2010 (GNWT Bureau of Statistics 2010c).



Source: GNWT Bureau of Statistics (2010c)

Figure 3.2.4-27
Yellowknife Consumer Price Index, 2009-2010

Table 3.2.4-3 provides a detailed breakdown of Yellowknife's Consumer Price Index per index. The categories with the highest indices include alcoholic beverages and tobacco products (147.3), followed by shelter (136.2) and food (120.5). Between October 2009 and October 2010, the Consumer Price Index in Yellowknife increased by 1.8% (GNWT Bureau of Statistics 2010c).

TABLE 3.2.4-3: YELLOWKNIFE CONSUMER PRICE INDEX SELECTED INDEXES, 2010

Product	CPI October 2010	% Change from October 2009
All Items	**118.4**	**1.8**
Food	**120.5**	**1.9**
Food from Stores	118.6	0.9
Food from Restaurants	125.3	4.6
Shelter	**136.2**	**2.7**
Water, Fuel & Electricity	162.8	6.9
Household Operations & Furnishings	**108.3**	**2.1**

TABLE 3.2.4-3: YELLOWKNIFE CONSUMER PRICE INDEX SELECTED INDEXES, 2010		
Product	**CPI October 2010**	**% Change from October 2009**
Household Operations	115.1	2.7
Household Furnishings	93.5	0.8
Clothing & Footwear	**95.7**	**1.7**
Clothing	88.3	-3.1
Footwear	93.8	17.4
Clothing Accessories & Jewelry	133.2	8.6
Clothing Material, Notions & Services	111.4	1.1
Transportation	**107.7**	**1.6**
Private Transportation	106.4	3.4
Public Transportation	114.9	-5.1
Health & Personal Care	**112.1**	**1.0**
Health Care	117.6	-0.3
Personal Care	108.4	2.1
Recreation, Education & Reading	**99.0**	**-1.0**
Recreation	96.3	-0.8
Education & Reading	114.8	-2.1
Alcoholic Beverages & Tobacco Products	**147.3**	**1.0**
Alcoholic Beverages	136.1	-
Tobacco Products & Smoker Supplies	158.5	1.9

Source: GNWT Bureau of Statistics (2010c)

Community Price Index

The Community Price Index expresses the difference between the cost of food for a specific region and the cost of the same basket of goods in Yellowknife. The Community Price Index is a spatial index, unlike the Consumer Price Index which is temporal.

The Community Price Index should not be compared over time, but instead within one year as compared to. Yellowknife. A falling index does not indicate that food is getting less expensive in a community; it does, however, indicate that food is getting less expensive relative to Yellowknife. Should the Yellowknife prices go up, nothing is known about the direction of prices in the other communities.

Table 3.2.4.4 presents the Community Price Indexes for communities in the Beaufort-Delta region, using Yellowknife as the basis for comparison. The price of food has increased relative to Yellowknife for some of the communities in the Beaufort-Delta Region (GNWT Bureau of Statistics 2010d).

TABLE 3.2.4-4 COMMUNITY PRICE INDEX, 2000-2010				
	2010	**2004**	**2001**	**2000**
Aklavik	174	183	183	167
Fort McPherson	166	163	150	149
Inuvik	**150**	**140**	**147**	**146**
Paulatuk	196	222	193	174
Sachs Harbour	177	197	188	200
Tsiigehtchic	156	153	130	150
Tuktoyaktuk	**162**	**206**	**165**	**189**
Ulukhaktok	204	188	182	186
Yellowknife	**100**	**100**	**100**	**100**

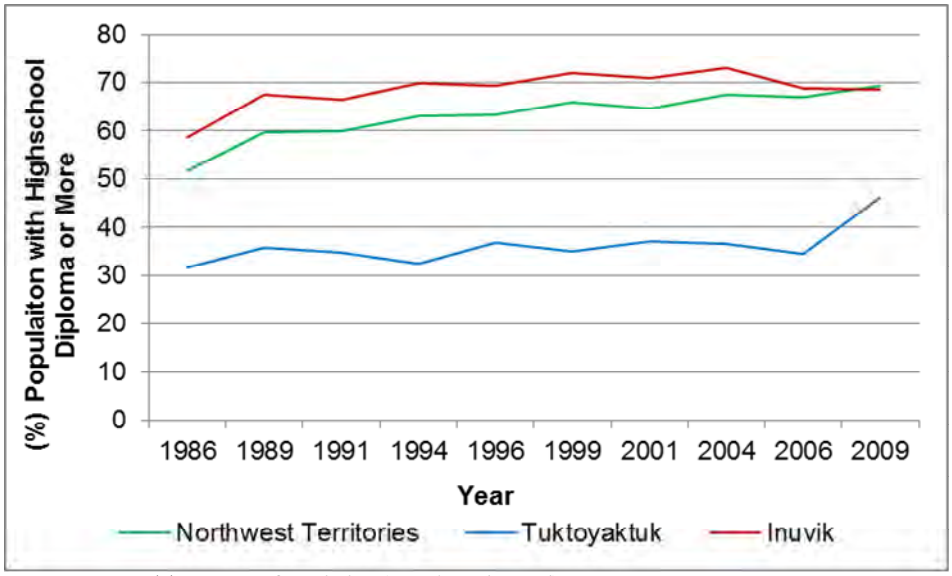
Source: GNWT Bureau of Statistics (2010d)

3.2.4.3 Education

Graduation Rates

The percent of the population with a high school diploma or more in the NWT, Tuktoyaktuk, and Inuvik has increased since 1986, as shown in Figure 3.2.4-28 (GNWT Bureau of Statistics 2010k, 2010l).

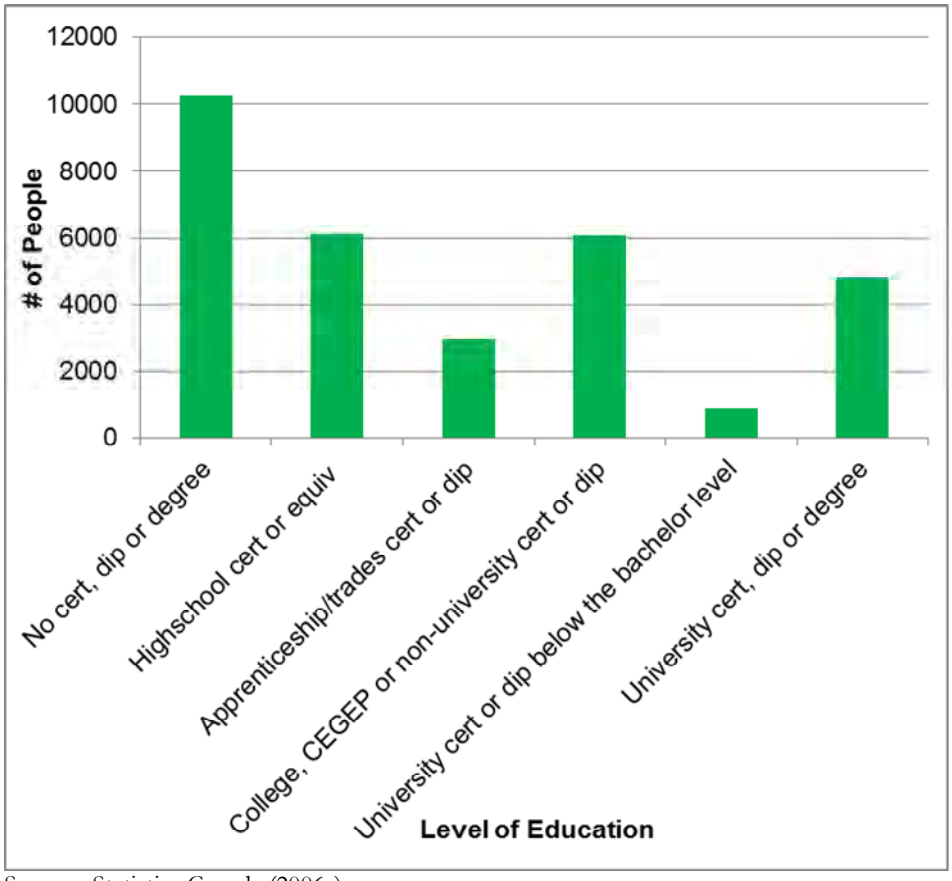
In 1986, 31.6% of Tuktoyaktuk's population had completed high school, compared to 46.1% in 2009. In 1986, 58.7% of Inuvik's population had completed high school, compared to 68.6% by 2009 (GNWT Bureau of Statistics 2010k, 2010l).



Source: GNWT Bureau of Statistics (2010k and 2010l)

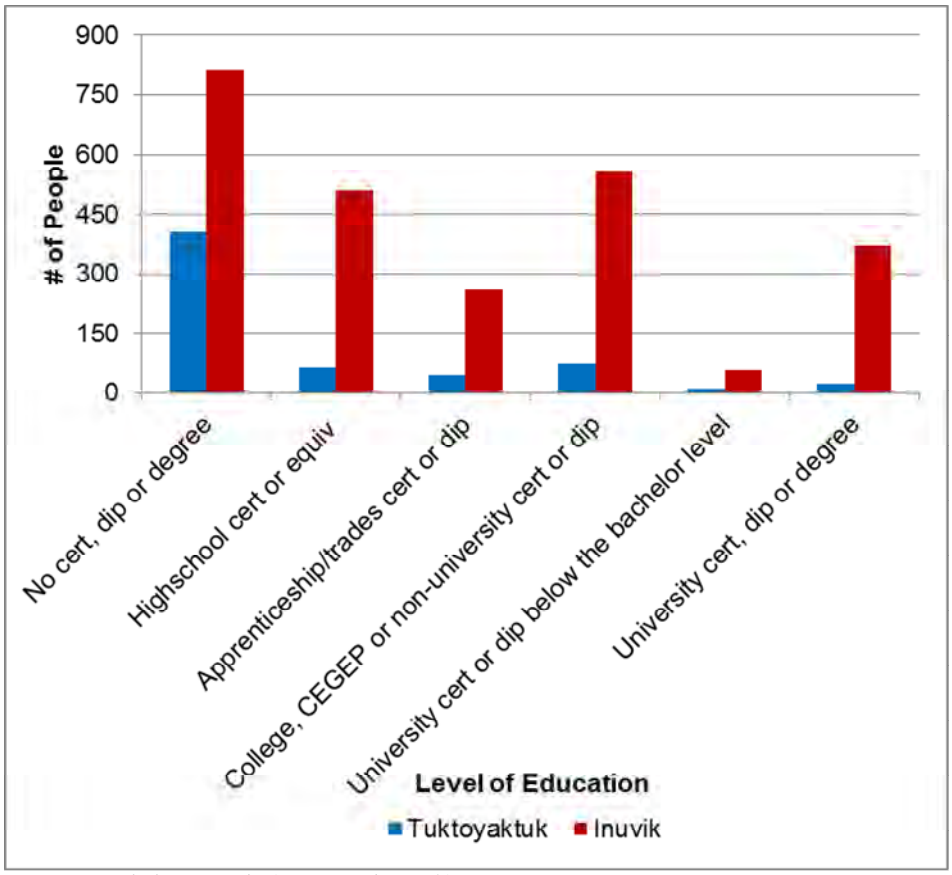
Figure 3.2.4-28
Percent of Population with High School Diploma or more in the NWT Tuktoyaktuk and Inuvik, 1986-2009

The 2006 Census conducted by Statistics Canada collected data on the level of education attained by Canadians. The data for the level of education attained by NWT, Tuktoyaktuk and Inuvik residents is presented in Figures 3.2.4-29 and 3.2.4-30.



Source: Statistics Canada (2006a)

Figure 3.2.4-29
Level of Education Attained by NWT Residents, 2006



Source: Statistics Canada (2006a and 2006b)

Figure 3.2.4-30
Level of Education Attained by Tuktoyaktuk and Inuvik Residents, 2006

Trade Certification Levels

The Aurora College campus in Inuvik offers a variety of programs with different levels of certification (A.M. Picek, Registration, Aurora College, pers. comm., January 26, 2011).

There are many preparation programs for trades, which include academic upgrading and work experience. The graduates of these programs received a record of achievement upon completion (A.M. Picek, Registration, Aurora College, pers. comm., January 26, 2011).

Other certifications that can be earned at this campus include:

- Environmental and Resource Diploma – two year program;
- Business Management Diploma – two year program;
- Office Administration Certificate – one year program;
- Office Administration Diploma – two year program;
- Personal Support Worker – one year program; and
- Aboriginal Language Instructor Program – two year program (A.M. Picek, Registration, Aurora College, pers. comm., January 26, 2011).

Beginning in the fall of 2011, Aurora College will offer a Teacher Education Degree program and a Practical Nurse Diploma. The school offers academic upgrading programs for adults covering grades 8 to 12, as well as entry level safety training courses (A.M. Picek, Registration, Aurora College, January 26, 2011).

Education Programs and Institutions

Tuktoyaktuk's Mangilaluk School offers education from Kindergarten to Grade 12. There are 196 students attending the school and 21 staff members (A. Cudmore, Principal, Mangilaluk School, pers. comm., January 25, 2011). Aurora College offers Adult Basic Education (ABE) or Adult Literacy and Basic Education (ALBE) programs in Tuktoyaktuk at the Community Learning Center (Aurora College 2009).

Inuvik has both an elementary and secondary school. Sir Alexander Mackenzie Elementary School offers Kindergarten to Grade 6 and has 358 students and 36 staff members. Samuel Hearne Secondary School offers Grade 7 to 12, and has 400 students, and 41 staff members (Beaufort-Delta Education Council ND). Aurora College operates a campus and research center in Inuvik.

Education and Training as it Relates to Employment Opportunity

Aurora College has three campuses in the NWT and 24 Community Learning Centres, and offers a variety of programs. According to Beaufort-Delta region Health and Social Services (ND), every program offered by the College applies to employment opportunities that exist in NWT communities. Table 3.2.4-5 compares programs offered at the Aurora College Inuvik campus to the different categories of occupations in the NWT (Aurora College 2009).

A variety of positions will likely be available for the Highway Project, including supervisors, environmental and wildlife monitors, scouts, clerks, engineers, construction staff, labourers, heavy equipment operators, heavy duty mechanics, camp staff, and a variety of other positions.

TABLE 3.2.4-5: COMPARISON OF PROGRAMS OFFERED AT AURORA COLLEGE TO OCCUPATION CATEGORIES

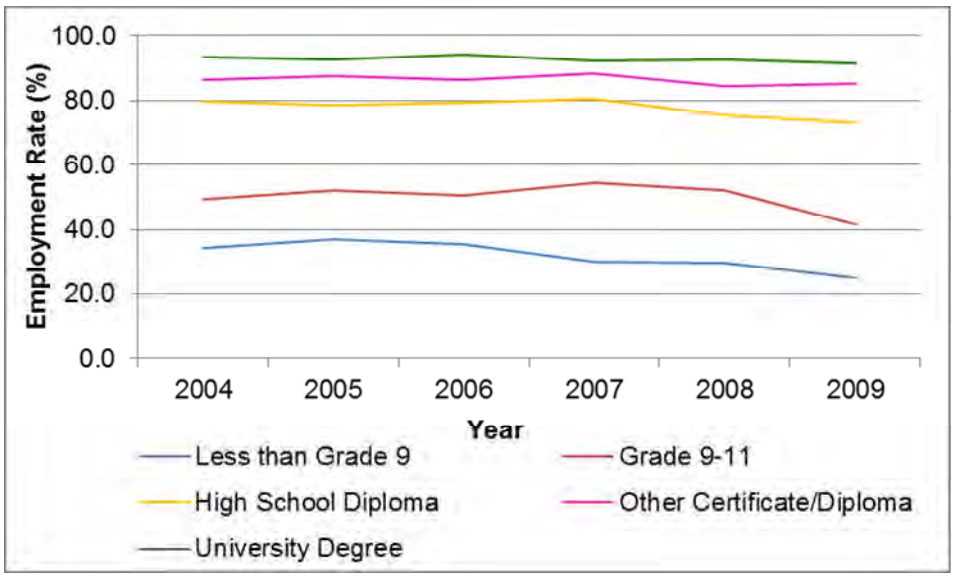
NWT Occupation Categories	Aurora College Programs Offered at Inuvik
Management	PMAC Diploma in Supply Management
Business Finance and Administration	Business Administration Business Administration Access Office Administration Office Administration – Community Office Procedures Program Office Administration – Computers in the Workplace Office Administration – Office Administration Certification Program Office Administration – Office Administration Mining Co-op Cert. Program

TABLE 3.2.4-5: COMPARISON OF PROGRAMS OFFERED AT AURORA COLLEGE TO OCCUPATION CATEGORIES

NWT Occupation Categories	Aurora College Programs Offered at Inuvik
Natural & Applied Sciences	Environment and Natural Resources Technology Access Environment and Natural Resources Technology Program Environmental Monitor Program Natural Resources Technology Access Program
Trades, Transportation & Equipment Operations	Apprenticeship Carpenter Apprenticeship Electrician Apprenticeship Heavy Duty Equipment Technician Apprenticeship Housing Maintainer Apprenticeship Plumber/Gasfitter Program Building Trades Helper Program Heavy Equipment Operator Program Oil Burner Mechanic (TQ) Special Pre-Employment Carpentry Pre-Technology Trades Access Trades Access II
Social Science, Education, Government Services & Religion	Bachelor of Education Program Certificate in Adult Education Developmental Studies (ABE) Early Childhood Education Observer/Communicator Training Program Personal Support Worker Social Work Social Work Access Teacher Education Access
Health	Bachelor of Science in Nursing Community Health Representative Community Health Worker Health and Human Services Access Program Master of Nursing, Nurse Practitioner Primary Health Care System Nursing Access
Art, Culture, Recreation & Sport	Traditional Arts Aboriginal Language and Cultural Instructor Program (ALCIP) II
Primary Industry	Introduction to Underground Mining Underground Miner Training Program
Sales & Service	Camp Cook

Source: Aurora College (2009)

Figure 3.2.4-31 demonstrates that the rate of employment in the NWT increases with the level of education. In 2009, the employment rate (i.e., the percentage of persons aged 15 years or older who were working) for those with a high school diploma or greater was 73-91%, depending on attendance and level of post-secondary education attained. The employment rate for those with less than a high school diploma was 25-42% depending on the grades completed. The employment rate for individuals with a university degree is almost three times greater than for individuals with less than a grade 9 level education (GNWT Bureau of Statistics 2010h).



Source: GNWT Bureau of Statistics (2010h)

Figure 3.2.4-31
NWT Employment Rate by Level of Education, 2004 – 2009

Adult Education

The Northwest Territories Literacy Council (NWTLC) works with individuals and families to promote literacy in all of the official languages of the NWT (NWTLC ND). Aurora College offers a Developmental Studies Program for adult basic education (ABE) (Aurora College 2009). ABE courses are offered both at the Aurora College campus in Inuvik and at the Community Learning Centre in Tuktoyaktuk. Since 1995 the ABE programs have experienced steady enrolment with a focus on English and mathematics courses (GNWT ECE 2005).

3.2.5 Infrastructure and Institutional Capacity Community Services

3.2.5.1 Government Services

This section provides an overview of the federal, territorial, local and Aboriginal governments with key roles in the Inuvialuit Settlement Region. Various government agencies are involved in providing financing, public services and/or maintaining local and regional organizations and infrastructure.

The *Inuvialuit Final Agreement* (IFA), signed in 1984, created the Inuvialuit Settlement Region (ISR) in Canada's western Arctic, spanning 906,430 km^2 (IRC 2009a). The Inuvialuit were the first to complete a land claim settlement process in the North. The Inuvialuit Regional Corporation (IRC) was created to administer the IFA, and to oversee various claim-related responsibilities through several corporations, as outlined in Table 3.2.5-1 below.

Each ISR community has its own Mayor and Council, elected by the residents of each community. In addition, each community in the ISR has a community corporation. The community corporation is the local branch of the Inuvialuit Regional Corporation, elected by the Inuvialuit residents of the municipality to deal with the interests and issues resulting from the IFA.

An Agreement-in-Principle (AIP) for self-government was signed in April 2003 by the Government of Canada, Government of the Northwest Territories, and the Inuvialuit Regional Corporation. On January 26, 2011, the Government of Canada, the Government of the Northwest Territories and the Inuvialuit Regional Corporation signed an AIP for devolution of lands, resources, and administrative responsibilities from Canada to the Government of the Northwest Territories. The final Devolution Agreement will include the transfer of administration, control and management of land, water, mines, minerals, and oil and gas in the Northwest Territories (INAC 2011a).

In the interim, federal and territorial agencies and departments offer direct programs and services in areas ranging from resource management to community well-being and education, and collaborate directly with Inuvialuit organizations. These public services are delivered by several agencies and organizations from multiple levels of government, as noted in Table 3.2.5-1 below.

TABLE 3.2.5-1: GOVERNMENT SERVICES

Organizations and Infrastructure	Public Services Delivered (as relates to the Project)	Funding Role
Federal – Government of Canada		
Federal Agencies	Responsible for federal programs, funding and regulations that are implemented across Canada.	Provides funding to GNWT and directly through federal agencies for distribution to programs throughout the Territory.
Indian and Northern Affairs Canada (INAC)	• Administers funding and monitoring to ensure ISR land claim agreement compliance • Northern Affairs Program - administers legislation concerning use of Crown lands and resources within the NWT • Uses IRC and Inuvialuit Joint Secretariat to administer funds	Funds capacity building, business development and support in the ISR

TABLE 3.2.5-1: GOVERNMENT SERVICES

Organizations and Infrastructure	Public Services Delivered (as relates to the Project)	Funding Role
Department of Fisheries and Oceans (DFO)	• Provides support to the FJMC • Responsible for policy and regulatory changes to accommodate Inuvialuit rights for fish and marine mammal resources in ISR • Promotes cooperative management of ISR fisheries resources	Provides support to the FJMC
Environment Canada	• Reviews and screens development proposals in the ISR region as part of the environmental assessment process • Funds and carries out studies including those for migratory birds • Prioritizes contracts to Inuvialuit-owned entities (half) • Environment Canada - Canadian Wildlife Service (CWS), is on wildlife management Advisory Councils which deal with wildlife issues in the ISR	Funds (federally managed) wildlife studies
Parks Canada	• Responsible for the protection of natural and cultural resources, including the wildlife populations and habitat of three national parks in the ISR • Carries out research and monitoring • Review management plans related to Parks Canada properties	
Public Works and Government Services Canada	• Provides services to the federal government in the areas of centralized purchasing, payments and pensions, property and buildings, security and information services, technology and translation. • Ensures Inuvialuit firms have opportunity to bid on government contracts • Notifies IFA claimants of goods, services and construction opportunities in the ISR	Awards contracts to Inuvialuit-owned businesses
Human Resources Development Canada	• Supports implementation of IFA through career training, childcare and capacity building, under the Aboriginal Human Resources Development Agreement • Funds labour market training for Aboriginal residents of the ISR	Funds Aboriginal programs including career training, childcare, and capacity building
Natural Resources Canada	• Seeks to enhance the responsible development, use and the competitiveness of Canada's natural resources and products related to energy, forests, and minerals and metals.	

TABLE 3.2.5-1: GOVERNMENT SERVICES		
Organizations and Infrastructure	**Public Services Delivered (as relates to the Project)**	**Funding Role**
	• Initiated remediation of their leased Tuktoyaktuk research station beginning September 2010	
National Energy Board	• Regulates cross-border pipelines, electrical power lines and frontier exploration and development in the Canadian public interest. • Funds related environmental studies research, including research in the ISR • Recently approved the Mackenzie Gas Project • Currently engaged in a review of offshore Beaufort Sea petroleum drilling	
Royal Canadian Mounted Police (RCMP)	• Funds and staffs detachments in Tuktoyaktuk and Inuvik	
Territorial - Government of Northwest Territories (GNWT)		
GNWT Departments	Responsible for programs and infrastructure, as indicated by departmental title, across the NWT.	Funds territorial departments which implement programs throughout the NWT
Ministry of Aboriginal Affairs	• Works with GNWT departments and the Inuvialuit Joint Secretariat to implement funding, monitor budgets and facilitate land trades for municipal infrastructure located on Inuvialuit-owned lands	
Education, Culture & Employment	• Develops programs for cultural, heritage and language education, early childhood through to post-secondary education, and career development • Published an Aboriginal Languages Plan with the goal to increase the number of Aboriginal language speakers by 20%	Funds educational, cultural, language, and career development programs
Environment & Natural Resources	• Promotes and supports sustainable use and development of natural resources in the NWT, including the ISR • Services provided include bear response, wildlife population information, and mitigation advice, etc. • Recently instituted a partial ban on caribou hunting in the NWT	
Health & Social Services	• Provides health and social services funding for the NWT and the ISR, including transfer of federal funds to IRC through programs such as Brighter Futures	Provides transfer of federal funds to IRC for programs, such as Brighter Futures

TABLE 3.2.5-1: GOVERNMENT SERVICES		
Organizations and Infrastructure	**Public Services Delivered (as relates to the Project)**	**Funding Role**
Justice	• Contributes to implementation of the IFA by providing legal advice on government usage of Inuvialuit languages, proposed land exchanges, IFA amendments, and proposed changes to the NWT *Wildlife Act*	
Industry, Tourism & Investment	• Partners with local government and the IRC to provide programs and services that promote and support NWT economic prosperity and community self-reliance	Funds local wildlife committees, Take a Kid Hunting/Trapping programs, a part-time position for the Inuvik Petroleum Show, and entrepreneurial pursuits
Municipal & Community Affairs	• Works with community governments, including Inuvik and Tuktoyaktuk, as they organize and manage democratic, responsible and accountable community governments. • Services offered include land administration, office of the fire marshal, emergency management, consumer affairs, licensing, legislation, sports, recreation, youth, volunteerism, water and sewage services	Provides financing for services as listed
Public Works & Services	• Meets economic measures provisions in IFA to issue preferential contracting policies and procedures intended to maximize, local, regional and northern employment and business opportunities in the ISR	Provides contracts to Inuvialuit-owned businesses for services Funding for long term office space leases and work outside the ISR are also provided to Inuvialuit-owned ISR businesses
Transportation	• Oversees the maintenance and development of transportation modes including airports, highways and roads, and ferries	Recently partnered with Hamlet of Tuktoyaktuk on the construction of the Tuktoyaktuk to Source 177 Access Road. Employs a number of beneficiaries and several local contractors
Organizations Operating in the NWT	Responsible for programs and services related to the ISR.	
Beaufort-Delta Health & Social Services •Authority	• Provides regional health and social services to the region through a hospital in Inuvik, a health centre in Tuktoyaktuk and other programs and services.	
Aurora College	• Offers college-level education and upgrading services in the ISR, such as Adult Basic Education, Aboriginal language, business	

TABLE 3.2.5-1: GOVERNMENT SERVICES		
Organizations and Infrastructure	**Public Services Delivered (as relates to the Project)**	**Funding Role**
	administration and other certificate, diploma and degree programs • Has an Inuvik regional campus and Community Learning Centre in Tuktoyaktuk.	
Regional Joint Implementing Bodies (Inter-governmental)	Co-management bodies established by the Inuvialuit, federal and territorial governments to provide support services to the wildlife and environmental institutions of public government and the Inuvialuit Game Council (IGC) in the ISR as per the IFA.	
Joint Secretariat	• Administers funding for Joint Implementing Bodies (as listed below) and provides administrative and technical support	Funds Wildlife Management Advisory Council, Fisheries Joint Management Committee, Fisheries Joint Management Committee, Environmental Impact Screening Committee and Review Board, and the Inuvialuit Game Council
Wildlife Management Advisory Council (NWT)	• Provides wildlife management advice pertaining to the NWT, including the ISR • Prepares wildlife conservation and management plans • Recommends appropriate wildlife harvest quotas in conjunction with Hunter Trapper Committees.	
Fisheries Joint Management Committee	• Assists DFO in the management of fisheries • Responsible for collecting harvest information and making recommendations on subsistence quotas for fish and harvestable quotas for marine mammals • Implemented and manages a system to monitor sports fishing on both Crown and Inuvialuit owned lands • Developed and manages a student mentoring program	
Environmental Impact Screening Committee	• Screens all development proposals within the ISR to determine if an environmental assessment is required (by the EIRB)	
Environmental Impact Review Board	• Responsible for carrying out environmental assessments of development projects	

TABLE 3.2.5-1: GOVERNMENT SERVICES		
Organizations and Infrastructure	**Public Services Delivered (as relates to the Project)**	**Funding Role**
Inuvialuit Game Council	• Represents collective Inuvialuit interest in wildlife and renewable resources in the ISR • Works in parallel with the IRC to implement the IFA • As a regulator, administers and enforces Inuvialuit harvesting rights	
Regional/Aboriginal – Inuvialuit Settlement Region		
Inuvialuit Regional Corporation	• Receives and manages IFA benefits and revenues • Several corporations (as noted below) receive funding from the IRC	Funds Inuvialuit programs delivered through the various corporations Distributes portions of investment equity directly to Inuvialuit beneficiaries
Inuvialuit Investment Corporation	• Oversees management of a diverse securities portfolio that was established with proceeds from the IFA	
Inuvialuit Development Corporation	• Invests in over 20 Inuvialuit companies with complementary industries and visions	Invests in Inuvialuit companies
Inuvialuit Petroleum Corporation	• Establishing itself as a diversified petroleum company • Currently investing proceeds until appropriate hydrocarbon related opportunities arise in the ISR	N/A
Inuvialuit Land Corporation	• Holds title to the Inuvialuit lands received under the IFA. Lands consist of 90,649 km^2, including 13,000 km^2 with sub-surface rights, some in the Beaufort Sea	N/A
Inuvialuit Land Administration	• Responsible for managing and administering Inuvialuit-owned lands in the ISR, including reviewing applications for land and water permits	N/A
Inuvialuit Trust	• Manages financial distribution of benefits to Inuvialuit beneficiaries	Distributes benefits to the Inuvialuit beneficiaries
Community Corporations (Inuvik and Tuktoyaktuk)	• Administers, supervises, governs, and regulates matters of local concerns to the members of the Corporation • Manages Community Corporation membership • Distributes for community-oriented projects • Determines membership of Hunters and Trappers Committees	Distributes funding for community-oriented programs

TABLE 3.2.5-1: GOVERNMENT SERVICES		
Organizations and Infrastructure	**Public Services Delivered (as relates to the Project)**	**Funding Role**
Hunters and Trappers Committee	• Represents the collective Inuvialuit interest in wildlife and upholds harvest rights	
Municipal		
Town of Inuvik & Hamlet of Tuktoyaktuk	• Provides services including utilities, roads, fire protection, parks and community centres, and tourist services	
Sources: INAC (2004a,2006); NWT Board Forum (ND); GNWT Finance (2010b); Public Works and Government Services Canada (2010); AMEC Earth and Environmental (2009); NRC (2010a); GNWT ECE 2010b,2010c); GNWT HSS (2009); GNWT ITI (2010); Joint Secretariat (2010a, 2010b); IRC (2007e,2007f,2007g,2010a); Town of Inuvik (2010f)		

3.2.5.2 Status of Community and Local Government Institutions and Organizations

The potential effects from the Highway on community and local government institutions and organizations institutions and organizations will be addressed in Section 4.3.

3.2.5.3 Health Facilities and Services

Both Inuvik and Tuktoyaktuk have access to Telehealth Services available from Stanton Territorial Hospital in Yellowknife. Services include consultation with a doctor in Inuvik or a specialist in Edmonton or Yellowknife, as well as education sessions for staff. Telehealth bridges geographical distances, improving the access to and delivery of health and social services and health education (BDHSS 2010d).

Medevac services are delivered through business partnerships under contract with the GNWT Department of Health and Social Services (HSS). Medical teams are provided by Medic North Emergency Services Ltd. (Medic North), while aircraft and flight crews are provided by Air Tindi in Yellowknife and Aklak Air in Inuvik. The Inuvik Medic North aircraft extends services to Tuktoyaktuk and the surrounding community (M. Cross, Base Manager, Medic North, pers. comm., January 26, 2011).

Emergency Department Physicians at a receiving hospital (i.e., Inuvik) determine the need for air medical transport either from their own department, or from a Community Health Centre (i.e., Tuktoyaktuk) after consultation with staff there. Approximately 1,200 annual medical transports are conducted each year from 33 communities throughout the NWT. Of those transported, critical and emergent patients in Inuvik constitute 27% (or 72 patients) (Medic North Emergency Services Ltd. 2010).

The GNWT HSS provides Suicide Prevention Training Programs in the Beaufort-Delta to residents interested in learning suicide prevention and intervention skills to help others. The one-week curriculum consists of three culturally-relevant and community-based phases, including grieving and healing work, community asset mapping, and planning to help communities address the issue of suicide.

Tuktoyaktuk

The Rosie Ovayouk Health Centre, located in Tuktoyaktuk, has eight staff including four nurses. Health Centre services include emergency treatment; school health program; chronic disease clinic; immunization programs; wellness clinic; pre and post natal care; health promotion and disease prevention initiatives; diagnostic, restorative, rehabilitative and palliative care services; and home care. Regional providers work in partnership with health centre staff and/or travel to Tuktoyaktuk to provide additional services such as dental therapy, rehabilitation services, nutrition, diabetes education and health promotion. Visiting health services are also provided for eye care and more complicated dental and orthodontic work. The Inuvik Regional Hospital also services the population of Tuktoyaktuk (BDHSS 2010a).

Social services and a counselling program are located in the Government Building. Three community social service workers provide the following services:

- Child protection, child and family services;
- Voluntary family support and adoptions;
- Family violence intervention;
- Community development;
- Mental health and addiction; and
- Services for the aged or those with disabilities.

The Community Counselling Program is implemented by one counsellor and two community wellness workers, and provides crisis intervention, therapeutic counselling, education, and referrals to resources (BDHSS 2010a).

Inuvik

There are several regional health care facilities located in Inuvik. Facilities include the Inuvik Regional Hospital, Public Health Services (Semmler Building), Billy Moore and Charlotte Vehus Homes (group homes for disabled adults), assisted living units, and a Family Counselling Centre.

The 51 bed hospital provides the following services:

- 24/7 emergency room;
- Operating room;
- Obstetrical care;

- Acute and long-term care;
- Pharmacy;
- Diagnostic imaging;
- Laboratory;
- Physician family clinics; and
- Visiting specialist clinics and medical referrals to southern facilities (BDHSSA 2010b).

Other services provided by the hospital for regional use include rehabilitation, nutrition, mental health and addition and telehealth.

The Public Health Services unit is staffed by nine employees, including five nurses. They offer services including a school health program, a chronic disease clinic, immunization programs, wellness clinics, pre- and post-natal care, health promotion and disease prevention initiatives, and home care (BDHSSA 2010c).

Social services programs are located at the Inuvik Regional Hospital and are implemented by seven employees, including five community social service workers. The following services are offered:

- Child protection;
- Child and family services (voluntary family support, foster care, adoptions);
- Services for aged and disabled;
- Family violence intervention;
- Community development;
- Mental health and addition services; and
- Home care support (BDHSSA 2010c).

3.2.5.4 Emergency Response and Law Enforcement Services

Tuktoyaktuk

The Hamlet of Tuktoyaktuk has an emergency response plan, a part time paid Fire Chief, and 10 volunteer firefighters (B. Buckle, Senior Administrative Officer, Hamlet of Tuktoyaktuk, pers. comm., January 14, 2011).

Law enforcement services are provided by the Royal Canadian Mounted Police's (RCMP) five-member detachment (BDHSS 2010e). The police facility has five cells, which can hold up to a maximum of 10 people (C. Roberts, Sergeant, Tuktoyaktuk RCMP, pers. comm., January 25, 2011).

Inuvik

The Town of Inuvik has an emergency plan. Fire fighting services are provided by two professional firefighters and 24 volunteer firefighters (Town of Inuvik 2010a).

Law enforcement services are provided by the RCMP. The 13-person detachment and two support staff serves the Inuvik Region, Holman Island, Paulatuk and a portion of the Dempster Highway (Town of Inuvik 2010a). The police facility has nine cells with a maximum capacity of 18 people, and 40 people in the holding cell.

3.2.5.5 Waste Disposal and Management

Tuktoyaktuk

The Hamlet of Tuktoyaktuk operates a 1,000 m^2 (0.1 ha) solid waste disposal site, adjacent to Kugmallit Bay. Bulky and metal wastes are placed in a 500 m^2 area next to the site. Combustible materials are burned during the summer. The Hamlet also operates a beverage recycling depot (GNWT ENR 2010c) as part of the Beverage Container Program, which was the first waste reduction initiative implemented as part of the 2003 NWT *Waste Reduction and Recovery Act* (GNWT ENR 2010d).

Inuvik

The Town of Inuvik operates a 175,000 m^2 (17.5 ha) modified landfill site. A full-time attendant supervises landfill operations and provides capping on a regular basis. Tipping fees at the dump are payable only by commercial, institutional and industrial users (Town of Inuvik 2010b).

The Town currently collects waste from approximately 300 dumpsters. Residential areas are serviced by dumpsters and curbside pick-up (Town of Inuvik 2010b).

Within the town, there is a local recycling depot and a beverage container processing center that is currently being rebuilt due to a fire (GNWT ENR 2010g).

3.2.5.6 Water and Sewage Facilities

Tuktoyaktuk

The Hamlet of Tuktoyaktuk's water source is Kudlak Lake. Water for winter use is pumped from Kudlak Lake to a raw water storage reservoir (Earth Tech 2005; AECOM 2009). The total capacity is about 100,500 cubic metres (m^3), with a storage capacity of about 90,300 m^3 (GNWT MACA NDb).

The Hamlet has a Class 1 water treatment plant consisting of a seasonal fill reservoir, a pump service building and a truckfill station. Water is treated using pressure filtration with ultraviolet and liquid chlorine disinfection (GNWT MACA 2010). The Hamlet has three water delivery trucks.

Sewage collection is handled by a private contractor who operates vacuum trucks seven days a week collecting all municipal wastewater and transporting it to the municipal sewage lagoon located approximately 5.0 km from the community. The lagoon is a natural lake, approximately 5.9 ha in area. It has been modified with a perimeter berm at the south edge for retention purposes. The lagoon is discharged to an adjacent ocean inlet once a year in the fall season. A temporary pump is set up on top of the berm to accomplish the discharge

(IEG Environmental 2006). The sewage treatment facility is estimated to have a capacity to serve a population of 1,900 depending upon the level of commercial and industrial activity that occurs in the future (Earth Tech 2005).

Inuvik

The Town of Inuvik's water source is the Mackenzie River and 3 Mile Lake (during winter), and Hidden Lake (during summer). Inuvik requires different water sources during winter and summer due to the higher turbidity of the Mackenzie River during the ice-free period.

The Town has a Class 2 water treatment plant using sand filters (winter only), tempering[5], gaseous chlorine disinfection, liquid fluoridation[6] and storage. Class 2 systems are more complex than a Class 1 Water Treatment System. A typical NWT Class 2 water treatment process may begin with screening to remove coarse suspended particles. The water then moves into a mixing chamber for flash mixing where a coagulant is added to help bind small particles together to form slightly larger particles called 'micro flocs'. The chemically treated water then flows into a flocculating chamber where another chemical, called coagulant aid, is added and the water is slowly stirred. This action will encourage and promote larger flocs to form that can be settled out more easily when the water passes through the sedimentation tank. After sedimentation, the water flows through a multi-media filter as a final polishing step to remove any flocs that may get carried over into the filter. As a final treatment step, chlorine is added to the water to disinfect it before it is stored for distribution (GNWT MACA NDa).

In Inuvik, water distribution and sewage lines are located above-ground in utilidors (Town of Inuvik 2010c). The total length of Inuvik's water distribution network is 15.9 km. This includes 1.1 km of trunk mains, most of which are 300 mm (12 in) in diameter, and 14.8 km of distribution mains, most of which are 200 mm (8 inch), the normal minimum size for fire protection (Earth Tech Canada Inc. 2008).

Inuvik's sewage is treated in a multi-cell lagoon system before being discharged into the Mackenzie River. Active wastewater treatment cells include two primary sedimentation cells, and a large pond which operates as a facultative lagoon in summer. Two additional cells just east of the primary lagoons are used for sludge storage (Earth Tech Canada Inc. 2008).

3.2.5.7 Power and Fuel Services

Given the low density population spread over nearly 1.2 million km^2, operating on a grid system with hydro-electricity is not feasible (NTPC 2010). Therefore, each community has its own power plant and facilities, owned and operated by Northwest Territories Power Corporation, to generate electricity regardless of conditions.

[5] Tempering means heating the water to protect against freezing.

[6] The addition of fluoride to the water helps to prevent dental cavities.

Tuktoyaktuk

The three diesel generators in Tuktoyaktuk have a total installed capacity of 2,205 kilowatts (kW) (NTPC 2010). In 2009, Tuktoyaktuk residents paid a rate of $0.074 per kilowatt hour (kW·h) while commercial rates were $0.066 per KWH (GNWT ITI 2009).

Inuvik

The Thermal Operations regional office complex, located in Inuvik, includes two power plants that consist of:

- Three natural gas generators that generate 2.8 megawatts (MW), 2.8 MW, and 2.1 MW, respectively;
- Four diesel generators that generate 2.5 MW, 2.5 MW, 760 kW and 300 kW, respectively.

In 2009, Inuvik residents paid a rate of $0.063 per kW·h while commercial rates were $0.056 per kW·h (GNWT ITI 2009).

3.2.5.8 Transportation Systems

Table 3.2.5-2 provides a summary of the transportation systems available in each community. Detailed descriptions of each system are provided in the following subsections.

TABLE 3.2.5-2: TRANSPORTATION INFRASTRUCTURE

Transportation Mode	Inuvik	Tuktoyaktuk
Road		
Highway	Dempster Highway No. 8 (all-weather highway, seasonally restricted)	Tuktoyaktuk Winter Road to Inuvik
Average Daily Traffic (Number of vehicles)	2006-2008 = 1,370 2005 = 1,370 2003 = 1,270 2004 = No data 2002 = 1,210 2001 = 1,120 2000 = 1,120	2009 = 139 1997 = 45 1996 = 74
Road Surfaces (km)	Paved, dust-controlled gravel, untreated gravel	Ice and Snow
Winter Roads (Avg. open and close dates)	Nov 28 to April 29	December 17 to April 29 (2004-2009 5 year avg.)

TABLE 3.2.5-2: TRANSPORTATION INFRASTRUCTURE		
Transportation Mode	**Inuvik**	**Tuktoyaktuk**
Water		
Marine Resupply (Deliveries per week, summer only)	2-7	2-6
Ownership of Facility	Federal government owned, privately owned	Federal government owned, privately owned
Water Facility Resupply Classification	A	A
Small Boating Facilities	Jet boat float dock, private docks, boat launch	Jet boat float dock, boat launch
Air		
Runway Dimensions	1,829 m (6000 ft)	1,527 m (5000 ft)
Runway Surface	Asphalt	Gravel
Owner	GNWT	GNWT
Operator	GNWT	E. Gruben's Transport
Critical Aircraft (maximum size of aircraft for runway)	B737	B737 (equipped for gravel)
Weather and Communication Type	Flight service station	Community airport radio station
Navigational Aids	Instrumental landing system, distance measuring equipment, non-directional beacon	Distance measuring equipment

Sources: GNWT DOT (2008), IOL et al. (2005)

Notes:

A = >10,000 t cargo and fuel in and out per year, protected access at all water levels, secure moorage for loading and unloading, access for heavy equipment, secure marshalling and storage site

Roads

Tuktoyaktuk

Tuktoyaktuk is accessible by winter road from Inuvik. The road is typically open from mid-December through the end of April each winter. The average daily traffic in 2009 was 139 vehicles per day (GNWT DOT 2008a). During winter, bus services are provided between Inuvik and Tuktoyaktuk (Northwest Territories Tourism ND). All-weather roads are limited to the Hamlet's boundaries and to Source 177 Access Road.

Most residents use snowmachines during winter to travel to various areas in the region, such as the Husky Lakes or even Inuvik.

Inuvik

Inuvik has year-round access to the Dempster Highway (Highway 8). The highway leads to the Yukon by way of Tsiigehtchic and Fort McPherson. The estimated average daily traffic on the Dempster Highway 1.3 km south of Inuvik is 1,370 vehicles per day (GNWT DOT 2008a). Bus service is available between Whitehorse (Yukon) and Inuvik.

Tug and Barge Service

Tug and barges operate when waterways are free of ice, which is generally from mid-June to mid-October (Horizon 2008). Barged cargo delivery is available between June and September to both Inuvik and Tuktoyaktuk (NTCL 2009a). Services typically originate from Hay River and use the Mackenzie River as the transportation channel (Rescan 1999a). Barges transport community and industrial goods ranging from vehicles, boats, general merchandise, and personal effects to heavy equipment and construction materials (NTCL 2009b). Both community ports have a Class A resupply classification, which means they can accept more than 10,000 tonnes of cargo and fuel in and out per year, have protected access at all water levels, secure moorage, access for heavy equipment, and secure marshalling and storage sites. During summer, Inuvik receives up to seven deliveries each week and Tuktoyaktuk receives up to six deliveries each week (IOL et al. 2005). Diesel used by the Tuktoyaktuk community is brought in by barge by E Gruben's Transport Ltd., which delivers approximately 3,200,000 litres to tank farms for storage (R. Newmark, CEO, E. Gruben's Transport Ltd., pers. comm., December 16, 2010). Bulk fuel constitutes 75% of all cargo delivered by the Northern Transportation Company Ltd. in the NWT (GNWT ITI 2009).

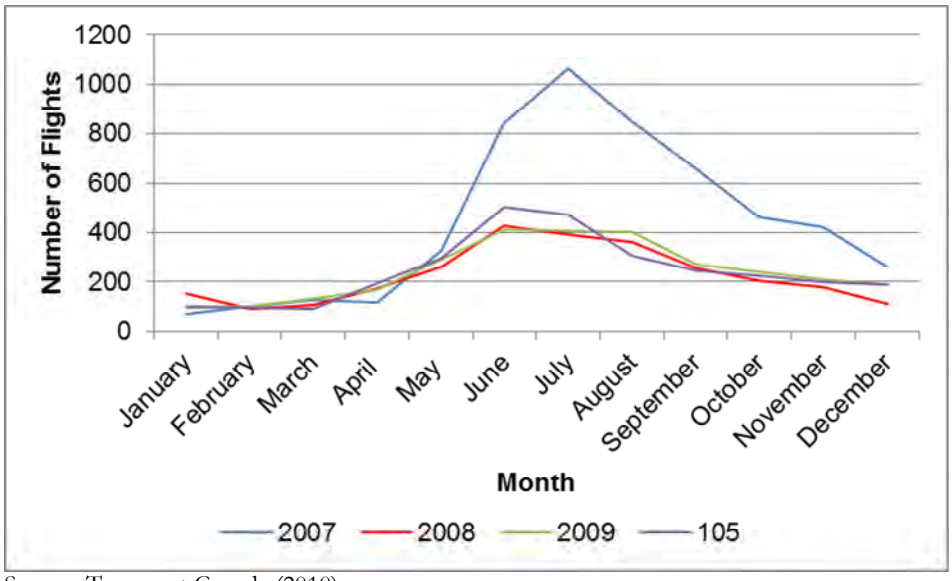
Air Travel

Tuktoyaktuk

The Tuktoyaktuk Airport was built in 1955 and is located next to the Hamlet. It has a 1,527 m (5,000 ft) gravel runway and an air terminal building. Scheduled flights to Inuvik are operated by Aklak Air, North-Wright Airways Ltd. (GNWT DOT ND and GNWT DOT 2005a). Flights are scheduled twice daily, are subject to demand, and weekend flights are not available when the winter road is open between December and April (Borek Air ND). In the Mackenzie region, especially Tuktoyaktuk, air charter carriers also play a significant role, operating to all communities and industrial sites (CHMC ND).

While 15-passenger planes are typically used, the airport has the capacity to handle aircraft as large as Boeing 737s that are specially equipped for gravel runways (Explore North 2010).

The Tuktoyaktuk Airport has an average estimated total aircraft movements of 3,300 per year, based on an average from 2004-2009 (Statistics Canada 2009c). Flights more than double during the road closure in summer than when the winter road is open, as noted in Figure 3.2.5-1. This may also be influenced by such factors as fair weather, longer days, and increased tourism activity.



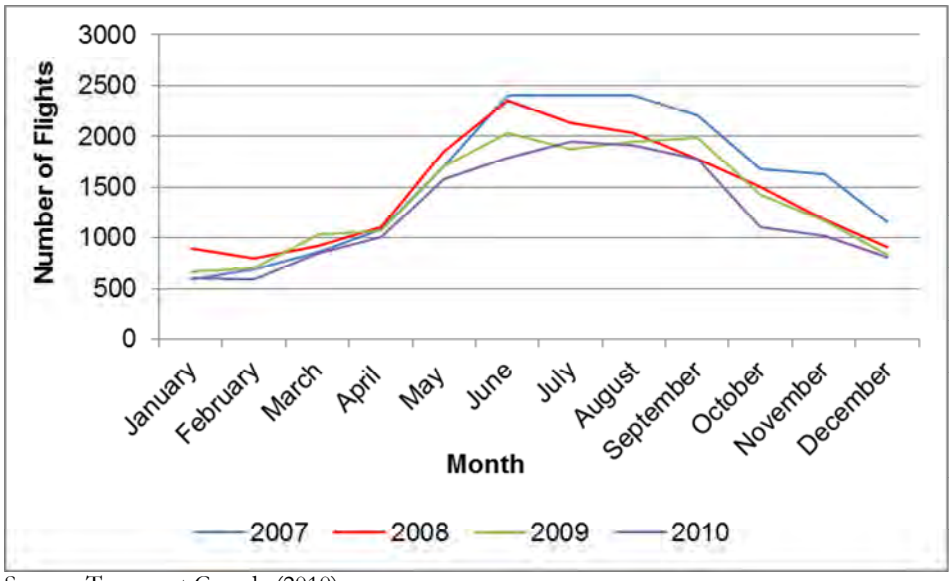
Source: Transport Canada (2010)

Figure 3.2.5-1
Tuktoyaktuk Airport – Aircraft Movement Compared by Year

Inuvik

Twelve kilometres east of the community, the Inuvik full-service airport was built in 1958 and operates as a regional hub. It has a 1,829 m (6000 ft) asphalt runway and an air terminal building (GNWT DOT ND). A number of scheduled and charter flights operate daily. Seven air carriers provide service from Inuvik: Air North, Aklak Air, Canadian North, First Air, North Wright Airways, Canadian Helicopters and Gwich'in Helicopters (GNWT DOT 2005b).

The Inuvik Airport has an average estimated total aircraft movements of 17,000 per year, based on data from 2005-2010 (Statistics Canada 2010j). Flights more than triple during the road closure in summer, as noted in Figure 3.2.5-2. This may also be influenced by such factors as: fair weather, longer days, and increased tourism activity.



Source: Transport Canada (2010)

Figure 3.2.5-2
Inuvik Airport – Aircraft Movement Compared by Year

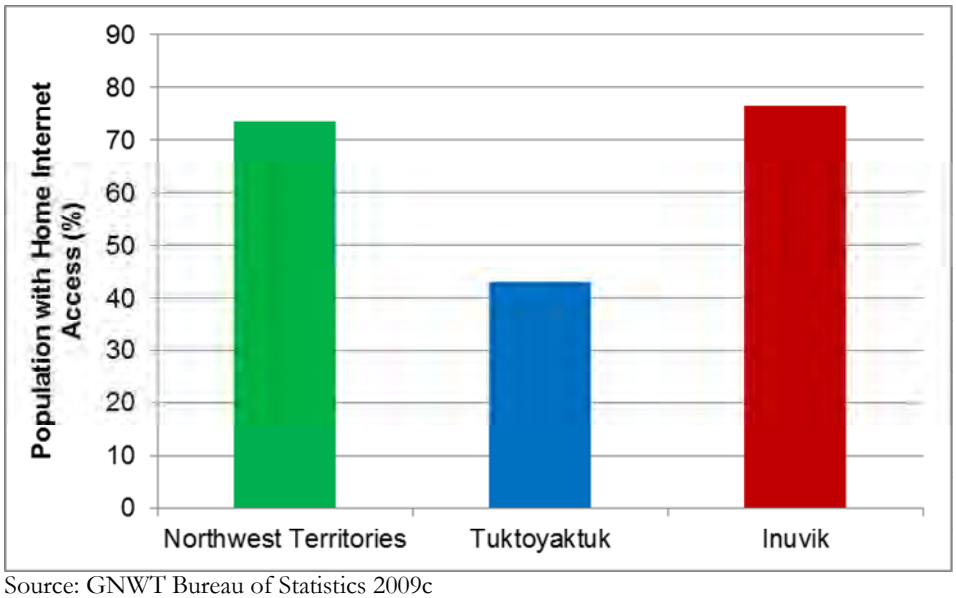
3.2.5.9 Telephone and Communication Services

Telecommunications

Northwestel provides residential and business phone services in the NWT. Cell phone services are provided in Inuvik and Tuktoyaktuk by Northwestel, Ice Wireless and Bell Canada. According to a Northwestel representative, cell phone services function within city limits in Inuvik and Tuktoyaktuk (A. Lee, Representative, Northwestel Latitude Wireless, pers. comm., January 26, 2011). Satellite telephones are also used throughout remote areas of the NWT.

Internet service development is a priority in the NWT. In 2010, Falcon Communications and SSI Micro, the service providers, installed high-speed satellite internet receiving stations in 30 communities. The project was partly funded by the GNWT and Canada. Residents and businesses, including those at remote camps, can also use Northwestel's Netkaster broadband satellite Internet service (GNWT ITI 2009).

The GNWT Bureau of Statistics surveyed NWT communities in 2009 to determine the percentage of the population with access to the internet from home. The results of that survey for the NWT, Tuktoyaktuk and Inuvik are presented in Figure 3.2.5-3.



Source: GNWT Bureau of Statistics 2009c

Figure 3.2.5-3
Percent of Population in NWT, Tuktoyaktuk and Inuvik with Home Internet Access, 2009

For residents and businesses in the NWT, access to the internet provides real advantages:

- It reduces the cost of communications;
- Provides access to world markets at reduced costs;
- Provides access to banking, tax and other financial services; and
- Allows businesses to access new suppliers and services.

3.2.5.10 Fire Protection and Emergency Response

Tuktoyaktuk

The Tuktoyaktuk Volunteer Fire Department has one part-time paid fire chief and 10 volunteer firefighters. There are typically 2-3 fires per year, and the fire department also responds to a few false alarm calls from various institutional buildings (B. Buckle, Senior Administrative Officer, Hamlet of Tuktoyaktuk, pers. comm., January 14, 2011).

Ambulance services are not available in Tuktoyaktuk. Instead, the Health Centre has a ground transportation contract with the local taxi service to transport residents who require medical attention (B. Buckle, Senior Administrative Officer, Hamlet of Tuktoyaktuk, pers. comm., January 14, 2011). The Hamlet has an emergency response plan.

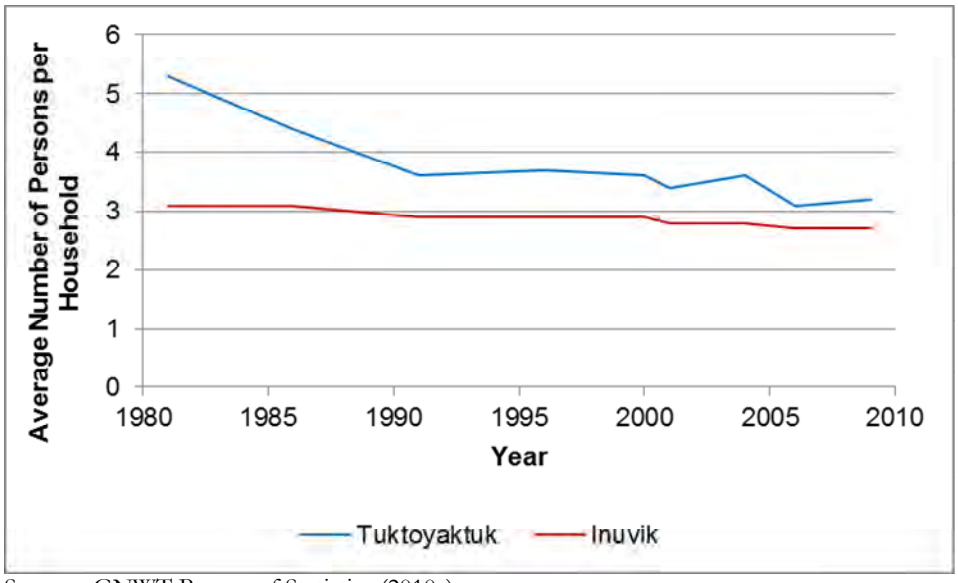
Inuvik

The Inuvik Volunteer Fire Department has one full-time paid fire chief and 30 volunteer firefighters, serving 3,500 residents. Of the volunteers, two are deputy chiefs, two are captains, three are lieutenants, and one is a safety officer. The fire chief and one deputy chief have certification through the National Fire Protection Association while the remaining volunteers are working to complete the first level of that certification process. Additional emergency response team members include five nurses and one emergency medical technician (J. Miller, Deputy Fire Chief, Inuvik Volunteer Fire Department, pers. comm., January 14, 2011).

The Inuvik Volunteer Fire Department plays an active role in the community through fire prevention initiatives, special events, and offering support to other communities in the Beaufort-Delta Region (Town of Inuvik 2010d). The Fire Department uses a manual system to track calls so does not have an estimate of emergency calls at this time. In 2010, approximately 85% of emergency calls were fire-related, with the balance being water-related rescue calls. There are no determined geographic boundaries between municipal emergency response departments for the ice road. For example, if Tuktoyaktuk's fire department is unable to respond to the situation, then Inuvik's fire department will respond. According to the Deputy Fire Chief, in the past 13 years, Inuvik has responded to two motor vehicle incidents on the ice road between Inuvik and Tuktoyaktuk (J. Miller, Deputy Fire Chief, Inuvik Volunteer Fire Department, pers. comm., January 14, 2011, February 3, 2011). Inuvik also has an emergency plan.

3.2.5.11 Housing

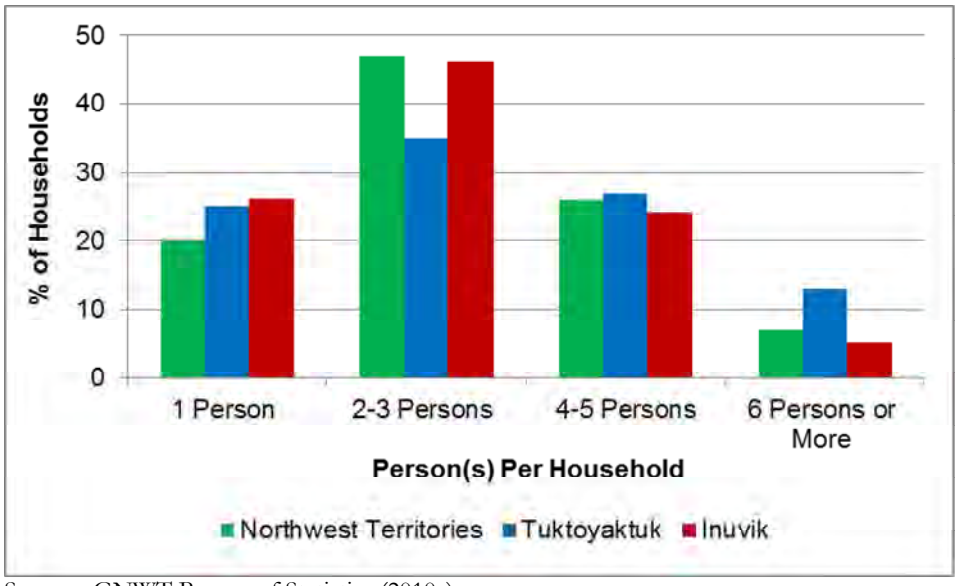
The average number of persons per household has varied in Tuktoyaktuk and Inuvik from 1981 to 2009. In Tuktoyaktuk the average number of persons per household has decreased from 5.3 in 1981 to 3.2 in 2009. The average number of persons per household in Inuvik has remained relatively stable, decreasing from 3.1 in 1981 to 2.7 in 2009, as shown in Figure 3.2.5-4 (GNWT Bureau of Statistics 2010e).



Source: GNWT Bureau of Statistics (2010e)

Figure 3.2.5-4
Average Number of Persons per Household in Tuktoyaktuk and Inuvik, 1981-2009

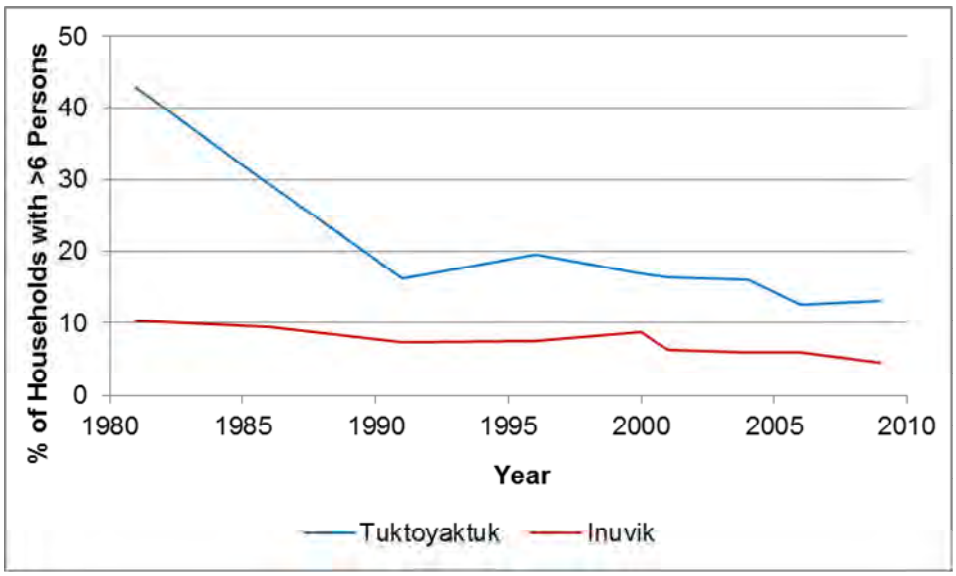
The majority of households in the NWT, Tuktoyaktuk, and Inuvik have three or fewer people; the highest percentage of households have 2-3 persons. Tuktoyaktuk had the highest percentage of households with 4-5 persons and 6 persons or more, as shown in Figure 3.2.5-5 (GNWT Bureau of Statistics 2010e).



Source: GNWT Bureau of Statistics (2010e)

Figure 3.2.5-5
Households by Number of Residents, NWT, Tuktoyaktuk and Inuvik, 2009

In Tuktoyaktuk and Inuvik, the percentage of households with more than six people has decreased from 1981 to 2009, as shown in Figure 3.2.5-6. In Tuktoyaktuk, the percentage of households with more than six people has decreased from 42.9% in 1981 to 13.0% in 2009 (GNWT Bureau of Statistics 2010e). Similarly, in Inuvik 10.3% of households had more than six people in 1981; by 2009, this percentage had declined to 4.5% (GNWT Bureau of Statistics 2010e).

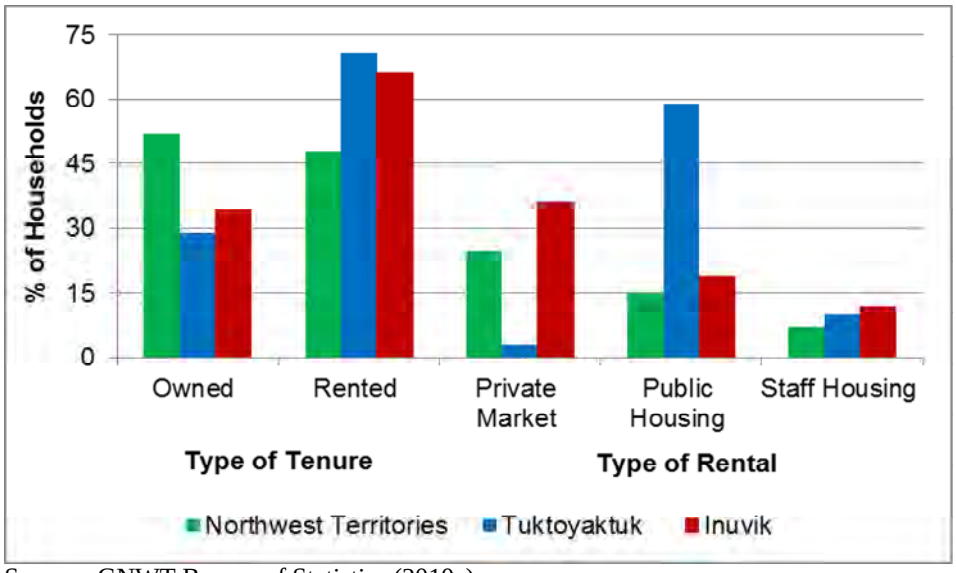


Source: GNWT Bureau of Statistics (2010e)

Figure 3.2.5-6
Percent of Households with 6 Persons or More in Tuktoyaktuk and Inuvik, 1981-2009

There are 14,522 households in the NWT, 283 in Tuktoyaktuk and 1,280 in Inuvik. Of the total in the NWT, 7,623 (52%) are owned and 6,899 (48%) are rented. In Tuktoyaktuk, 81 (29%) are owned and 202 (71%) are rented, and in Inuvik, 432 (34%) are owned and 848 (66%) are rented. Figure 3.2.5-7 shows the percentage of households by tenure for the NWT, Tuktoyaktuk and Inuvik (GNWT Bureau of Statistics 2010e).

According to the GNWT Bureau of Statistics (2010e), there are three types of rental housing: private market, public housing and staff housing. Private market housing includes housing that is owned privately and rented out. Public housing includes government subsidized housing geared towards low-income households. Staff housing includes facilities such as nurses' residences, RCMP residences or residences for those involved in various industrial activities in the region. There is a greater percentage of private market rental housing available in Inuvik, compared to Tuktoyaktuk, but there is a greater percentage of public housing in Tuktoyaktuk compared to Inuvik. Figure 3.2.5-7 identifies the percentage of rental housing by type in the NWT, Tuktoyaktuk and Inuvik (K. Odziemkowska, Labour Market Statistician, GNWT Bureau of Statistics, pers. comm., January 28, 2011).



Source: GNWT Bureau of Statistics (2010e)

Figure 3.2.5-7
Beaufort-Delta Region and Communities, Households by Tenure, 2009

3.2.5.12 Safe Houses and Shelters

Tuktoyaktuk

Tuktoyaktuk Women's and Children's Shelter (Transition House) has eight beds and provides a safe environment for those fleeing family violence. The Hamlet also sponsors a Community Counselling Program with one counsellor and two community wellness workers (BDHSS 2010a).

Inuvik

The Inuvik Transition House is an eight-bed shelter that provides safety for women and children fleeing family violence. A&E Enterprises – Child Welfare Group Home operates a six-bed facility that also provides safe placements for children in care (BDHSS 2010c).

3.2.5.13 Child Care and Elder Care Services

The Inuvialuit Child Care Program works with Child Development Centres across the ISR, including Tuktoyaktuk and Inuvik, providing administration, support, and training to ensure programs comply with the NWT's *Child Day Care Act* and the guidelines of funding bodies. Funding is received from Inuit Child Care, Aboriginal Head Start, and the territorial Healthy Children's Initiative. To encourage daily use of Inuvialuktun (the Inuvialuit language), the Inuvialuit Cultural Resource Centre also funds fluent-speaker staff positions in each centre (IRC 2007c).

Tuktoyaktuk

The Hamlet has a Child Development Centre with a capacity of 8 infants/toddlers and 14 preschoolers with a waiting list of six infants/toddlers (A. Thrasher, Director, IRC Childcare, pers. comm., January 31, 2011).

Through one home support worker, the Rosie Ovayouk Health Centre provides home and palliative care for Elders, coordinated respite care, home management and personal care, and caregiver support and education (BDHSS 2010a).

Inuvik

The Town has four child care centres with varying capacity (P. Jellema, Director, Inuvik CDC, pers. comm., January 18, 2011):

- Inuvik Child Development Centre
  Enrolment: 26 preschool (45 on wait list), 20 afterschool;
- Inuvik Preschool
  Enrolment: 14 preschool, 14 after school (at capacity, no wait list);
- Aboriginal Head Start
  Enrolment: 19 preschool (12 on waitlist); and
- Tot Spot
  Enrolment: 4 infants (2 spots available), 8 preschoolers.

Long-term care facilities at Inuvik Regional Hospital provide care for residents who have substantial physical and/or mental functional disability that require daily treatment or supervision by nursing staff or other trained staff, such as rehabilitation or nutritional services. There are 25 beds in the long-term care facility, two of which are reserved as respite beds to provide occasional relief to caregiver family members (GNWT HSS 2010a).

The Elderly Day Program focuses on the social, rehabilitation, and activity needs of Elders in Inuvik. Located at the Inuvik Hospital, the program targets long-term care residents and community members. Elderly community members are provided transportation to the hospital where lunch and activities are provided. The program operates Monday to Thursday each week (GNWT Seniors' Society 2009).

The Residential School Survivors Support Team offers an Aboriginal Elders Program that provides peer support for Elders involved in residential school compensation processes or who have emotional issues related to their residential school experience. The program also links Elders to resources in the community (GNWT Seniors' Society 2009).

3.2.5.14 School and Education Services

The NWT Literacy Council works with individuals and families to promote literacy in all of the official languages of the NWT (NWTLC ND). Aurora College offers a Developmental Studies Program for Adult Basic Education (ABE) (Aurora College 2009). The ABLE

programs have experienced steady enrolment, particularly in English and mathematics courses (GNWT ECE 2005).

In 2009, funding was awarded for afterschool programs at three schools, including schools in Tuktoyaktuk and Inuvik (GNWT MACA 2009).

Tuktoyaktuk

Mangilaluk School is the only school operating in Tuktoyaktuk, teaching Kindergarten to Grade 12. There are approximately 200 students attending the school and 24 staff members (Beaufort-Delta Education Council ND). Aurora College offers Adult Basic Education (ABE) programs in Tuktoyaktuk through the local Community Learning Centre (Aurora College 2009).

Inuvik

Inuvik has both an elementary and a secondary school. Sir Alexander Mackenzie Elementary School teaches Kindergarten to Grade 6, and had an estimated 320 students and 36 staff members in 2010. Samuel Hearne Secondary School teaches Grade 7 to Grade 12, and had an estimated 340 students and 42 staff members in 2010 (R. Mahnic, Principal, Inuvik Secondary School, pers. comm., January 25, 2011). Aurora College operates a campus and a research centre in Inuvik with 150 full-time students (Aurora College 2009).

According to the 2010 Assessment of Services and Self-Government Survey by the Inuvik CC, approximately 7% of Inuvik students aged 6-17 years do not attend school. Forty percent of those truancies were because students fell behind in their schoolwork and found it too difficult to catch up (IRC 2007e).

3.2.5.15 Recreation Services

Tuktoyaktuk

Indoor recreational facilities in Tuktoyaktuk include Kitti Hall, a 250-person capacity community centre, and an ice arena (The Hamlet of Tuktoyaktuk 2006). A recreational coordinator oversees programs for the community and works with recreation staff and volunteers to plan and implement activities. Recreational activities offered in the community include sports, family games nights, drum dancing, and cooking sessions. Outdoor recreation areas include the school playground and a golf course.

Inuvik

Inuvik's Midnight Sun Complex & Conference Centre is a modern, multi-use facility is used for community recreational activities such as fitness, swimming, hockey, and curling, conferences, tradeshows, workshops, seminars, meetings, cultural events, public forums, banquets, and other activities. The conference centre is located within walking distance of accommodations and downtown facilities, with parking available outside the building. The centre includes a full stage and banquet facilities to accommodate up to 325 people.

Inuvik has over 20 outdoor recreational spaces, which include parks and playgrounds, trails, boat launch, basketball court, skateboard park and tennis courts (Town of Inuvik 2010e).

3.2.5.16 Management of Renewable Resources

Renewable resources, such as wildlife, fish, and plants, are very important to the people of the ISR and the NWT. Historically, resources from the land were closely linked to the Aboriginal economy and to cultural and spiritual values. Hunting, fishing, trapping and recreational use of these resources remain integral components of traditional lifestyles and economies. Similarly, many non-Aboriginal residents of the NWT and visitors from outside the NWT associate important social, spiritual, and environmental values with their use of renewable resources (GNWT ENR 2005i).

The Tuktoyaktuk and Inuvik Inuvialuit Community Conservation Plans state that "subsistence and recreational use of well-managed renewable resources is desirable and consistent with their conservation" (Community of Tuktoyaktuk et al. 2008, p. 139; Community of Inuvik et al. 2008, p. 159). The Community Conservation Plans note that Inuvialuit knowledge and experience are essential elements in the proper management of renewable resources in the Settlement Region (Community of Tuktoyaktuk et al. 2008; Community of Inuvik et al. 2008).

According to the Community Conservation Plans, the proposed Highway alignment passes through several special management areas designated Management Categories "B", "C", and "E".

Management Category "B" refers to the "lands and waters where there are cultural or renewable resources of some significance and sensitivity but where terms and conditions associated with permits and leases shall assure the conservation of these resources."

Management Category "C" refers to the "lands and waters where cultural or renewable resources are of particular significance and sensitivity during specific times of the year. These lands and waters shall be managed so as to eliminate, to the greatest extent possible, potential damage and disruption."

Management Category "E" refers to "lands and waters where cultural or renewable resources are of extreme significance and sensitivity. There shall be no development on these areas. These lands and waters shall be managed to eliminate, to the greatest extent possible, potential damage and disruption. This category recommends the highest degree of protection in this document."

Specific information related to land use and harvesting are found in Sections 3.2.9 and 3.2.8.5 of the Environmental Impact Statement, respectively.

Level of use and sustainability of renewable resources are monitored by the GNWT Department of Environment and Natural Resources (ENR) using indicators ranging from hunting and fishing to eco-tourism (GNWT ENR 2005i). Monitoring in the ISR is done in conjunction with various groups including Wildlife Management Advisory Councils (NWT and North Slope), Fisheries Joint Management Committee, Inuvialuit Game Council, and

Hunters and Trappers Committees. Decisions regarding land use that may affect renewable resources are made by the Inuvialuit Land Administration, the Environmental Impact Screening Committee, and the Environmental Impact Review Board.

Baseline information regarding valued wildlife, bird and fish resources is provided in the Section 3.1.

3.2.5.17 Supply of Aggregate and Granular Materials

The investigation and evaluation of granular material resources in the Mackenzie Delta region has been conducted since the 1950s by government and private industry. Locations of available aggregate and granular materials have been mapped and the approximate amount of available resources has been identified. The most recent surficial geology mapping of the Project study area, and the one used to perform this work, was prepared by Rampton (1987).

During the 1980s and early 1990s, the focus of the various studies and investigations of granular materials was directed to issues dealing with Aboriginal land claims. In this regard, the work in the Mackenzie Delta region was primarily directed to the *Inuvialuit Final Agreement* (IFA). The granular materials inventory work completed by EBA Engineering Ltd. (EBA) in 1987 for Indian and Northern Affairs Canada (INAC) formed part of the IFA. The comprehensive granular materials inventory was assembled for resources within the Inuvialuit Settlement Region (ISR) using the available information collected over the years.

Under the IFA, signed by the Government of Canada and the Inuvialuit in 1984, ownership of most of the accessible granular material deposits in the ISR was transferred to the Inuvialuit (IRC 1987). Management of this resource is now the responsibility of the Inuvialuit Land Administration (ILA) in consultation with local groups such as the Community Corporations and Hunters and Trappers Committees.

The borrow sources for the Highway development are in relatively close proximity to Inuvik and Tuktoyaktuk and access to these resources could benefit the communities' future development projects. Further information regarding borrow sources is located in Section 2.6.8.

3.2.5.18 Planned Projects

Major social and institutional projects are regularly planned throughout the ISR. Below is a summary of projects currently planned or implemented in the ISR, Tuktoyaktuk and Inuvik. Project funding comes from a combination of resources including the federal government, territorial government, and the Inuvialuit Regional Corporation.

Some social projects are informed by government directives or government initiatives and strategic plans, which are then funded accordingly. Examples include the *Brighter Futures* federal wellness program (GNWT HSS 2010b), Northwest Territories Health and Social Services System Strategic Plan (GNWT HSS 2010c), and the Building on Our Success Strategic Plan 2005-2015 (GNWT ECE 2009). From the review of these documents, it was

determined that ongoing programming is being funded, but that no major new social programs were scheduled for implementation in the Project area.

The largest proposed capital projects in the region are the Mackenzie Gas Project, the proposed Mackenzie Valley Highway, and the proposed Inuvik to Tuktoyaktuk Highway. If the Mackenzie Gas Project is constructed, there will be processing facilities and pipelines constructed in the ISR that extend to northern Alberta. In 2006, the federal government established a $500 million Mackenzie Gas Project Impact Fund to be utilized should the project move forward. The purpose of this fund is to support regional projects that can alleviate potential socio-economic impacts on NWT communities affected by the proposed project, during the planning, construction and operation of the Mackenzie Gas Project. This fund will also deal with existing conditions that may be affected by the project. The release of funding is contingent on the Mackenzie Gas Project proceeding (INAC 2010a).

The all-weather portion of the Mackenzie Valley Highway currently extends from the Alberta border to Wrigley, NWT. The GNWT, with its local partners, are proposing to construct the remaining all-weather sections of the highway from Wrigley to Inuvik, linking the southern NWT to Inuvik, and potentially to Tuktoyaktuk, if the Inuvik to Tuktoyaktuk Highway is approved and constructed. If all proposed sections of the Mackenzie Valley Highway are completed, it will be possible to drive from Fort Smith to Tuktoyaktuk entirely within the borders of the NWT

Potential municipal projects are discussed in the following subsections.

Tuktoyaktuk

The GNWT is providing capital funding for the following projects in the 2011-2012 Fiscal Year (GNWT Finance 2010a):

- Public Housing - 4 units replaced, 15 retrofitted, warehouse plan and design;
- Public Works and Services – mechanic shop replacement; and
- Transportation – 19 km gravel access road.

There are several infrastructure and land development capital projects proposed for 2011. A Curling Club building exists but needs engineering. Council is pursuing preliminary work on a new solid waste site estimated to cost over $3 million. Canadian Northern Development Agency has been pursuing a wind mill project, new hotel and other infrastructure (B. Buckle, Senior Administrative Officer, Hamlet of Tuktoyaktuk, pers. comm., February 2, 2011).

Inuvik

The GNWT is providing capital funding for the following projects in the 2011-2012 fiscal year:

- Public Housing:
  - Retrofit five housing units.
  - Construct one new housing unit.

- Public Works and Services:
  - Ongoing construction of GNWT Office and Record Centre/Warehouse/Data Centre - 3,470 m².
  - Ongoing construction of GNWT Records Storage Facility - 940 m².
- Health and Social Services:
  - Improvements to GNWT Office and Record Centre for Health & Social Services Warehouse Area - 384 m²:
  - Purchase of medical equipment for the Inuvik Regional Hospital including: hematology analyzer, ultrasound, laproscopy, operating microscopes.
- Education and Culture – Construction/ replacement of Sir Alexander Mackenzie Elementary School and Samuel Hearne Secondary School - 11,900 m².
- Airports – purchase of a vibratory packer.
- Industry Tourism and Investment:
  - Improvements to Jak Park Territorial park hiking trails.
  - Improvements to Gwich'in Territorial Park boat dock slip way.
- Environment and Natural Resources – design, acquire, transport and construct East Hans Lake Enforcement and Compliance Facility (all-weather cabin) - 38m² (GNWT Finance 2010a).

Current and future major capital projects are as follows:

- Completion of the new combined elementary and secondary school is planned for 2013. It will have capacity for 900-1000 students (current combined enrolment for 2010-11 is 660).
- Planning for a new child care centre by the Children's First Society is underway. Land has been purchased and a building design is being prepared. The project will be grant funded.
- The Town of Inuvik is setting aside capital funds each year for a for a new water plant. Currently all water is chlorinated, and winter water from the Mackenzie River is filtered.
- A future project is to extend the Inuvik airport runway to better accommodate larger planes, such as those used for the military (R. Campbell, Director, Inuvik Public Services, pers. comm., February 4, 2011).

In April 14, 2010, the Inuvik Community Corporation purchased the Inuvik Youth Centre property from the Town of Inuvik. IRC plans to convert it to a multi-use building designed to hold cultural activities, office space, and possibly retail space (IRC 2007e). The plan has not yet been finalized, and the property will not be converted until the Inuvik Youth Centre moves to a new space (V. Kasook, Corporate Manager, Inuvik Community Corporation, pers. comm., February 2, 2011).

3.2.6 Human Health and Community Wellness

3.2.6.1 Age, Gender and Ethnicity

Data for age, gender and ethnicity in the Beaufort-Delta region and communities of Tuktoyaktuk and Inuvik are described in the Demographics section of this document (Section 3.2.2).

3.2.6.2 Mortality, Morbidity and Relevant Non-Communicable and Infectious Diseases

Mortality is defined as a fatal outcome or death (Medicine Net 2011a). The mortality rates, measured as the "Number of Deaths" by GNWT Bureau of Statistics for Tuktoyaktuk and Inuvik are described in the Demographics section of this report.

Morbidity is defined as illness or disease (Medicine Net 2011b). Table 3.2.6-1 provides the morbidity rates by age and gender for four common illnesses and diseases in the ISR: diabetes, cancer, high blood pressure, and high cholesterol.

The Inuit Health Survey 2007-2008, was conducted by G.M. Egeland. A total of 288 households or 362 individuals participated, with 244 of the participants being female and 118 being male. Participants of the survey were from the communities of Aklavik, Inuvik, Tuktoyaktuk, Sachs Harbour, Paulatuk, and Ulukhaktok.

TABLE 3.2.6-1: HEALTH HISTORY FOR THE PARTICIPANTS OF THE INUIT HEALTH SURVEY, 2007

Health Problem Reported by Participants	Age		Gender	
	<40 yr	≥40 yr	Male	Female
Diabetes	0.0%	8.0%	4.8%	5.0%
Cancer	1.0%	10.4%	3.6%	8.3%
High Blood Pressure	9.1%	32.3%	26.5%	22.0%
High Cholesterol	3.0%	21.3%	14.3%	14.1%

Source: Egeland (2010)

The Inuit Health Survey found that 8% of participants aged 40 years and older reported having diabetes. No participants aged less than 40 reported reported having diabetes (Egeland 2010).

More than 10% of participants over the age of 40 reported having cancer. Rates of cancer were higher in the female participants (8.3%) than in the male participants (3.6%) (Egeland 2010). Types of cancer were not specified in the survey.

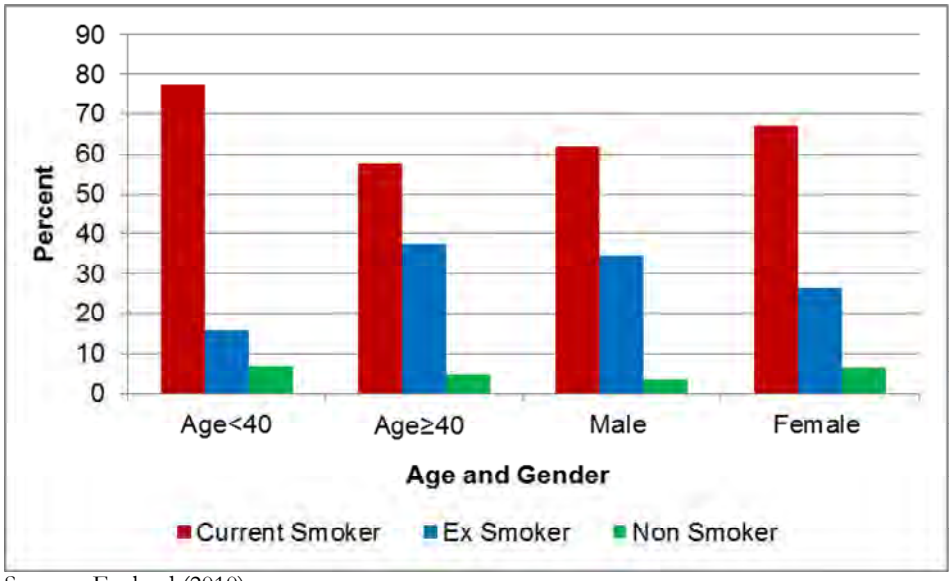
More than 30% of participants over the age of 40 reported having high blood pressure; this was the most common health concern among participants. In comparison, approximately 16% of Canadians reported having high blood pressure in 2007. High blood pressure is primarily treated through medication, exercise and diet (Egeland 2010).

A much higher percentage (21.3%) of participants over the age of 40 reported having high cholesterol compared to 3.0% of participants age 40 or younger. There appeared to be almost no gender variation, although reporting rates for males were slightly higher than for females: 14.3% and 14.1%, respectively (Egeland 2010).

The GNWT Health and Social Services (HSS) has established the Health Promotion Strategy, which provides a framework for increased investment in promotion and prevention activities at the territorial, regional, local and individual levels (GNWT HSS 2006b).

A recent and significant achievement for HSS is the reduction in new cases of tuberculosis, which was a very serious health concern for northern communities until recently. The number of new cases of tuberculosis has been decreasing steadily from 24 cases in 1996 to four cases in 2002 (IOL et al. 2004).

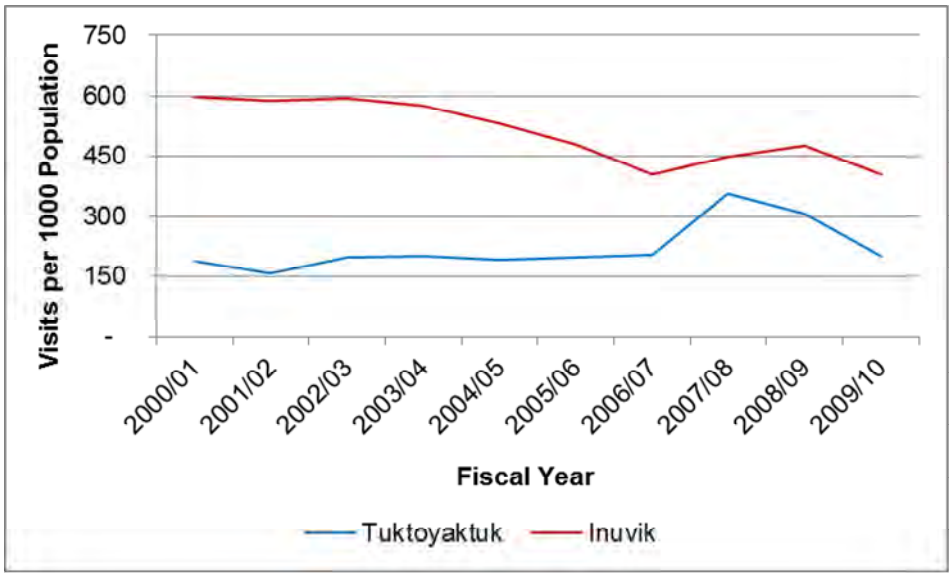
There are high rates of smoking in the ISR. The Inuit Health Survey reported that 65% of participants smoked cigarettes in 2007, compared to 22% for all Canadians in the same year. The daily average number of cigarettes smoked by Inuit men was 13 and for women was 10. The average age that participants began smoking was 15.5 years old. Figure 3.2.6-1 shows the average number of ex-smokers, current smokers and non-smokers by age and gender. Young (<40 year old) females appear to have the greatest tendency to be smokers (Egeland 2010).



Source: Egeland (2010)

Figure 3.2.6-1
Percent of Ex-Smokers, Current Smokers, and Smokers by Age and Gender, 2007-2008

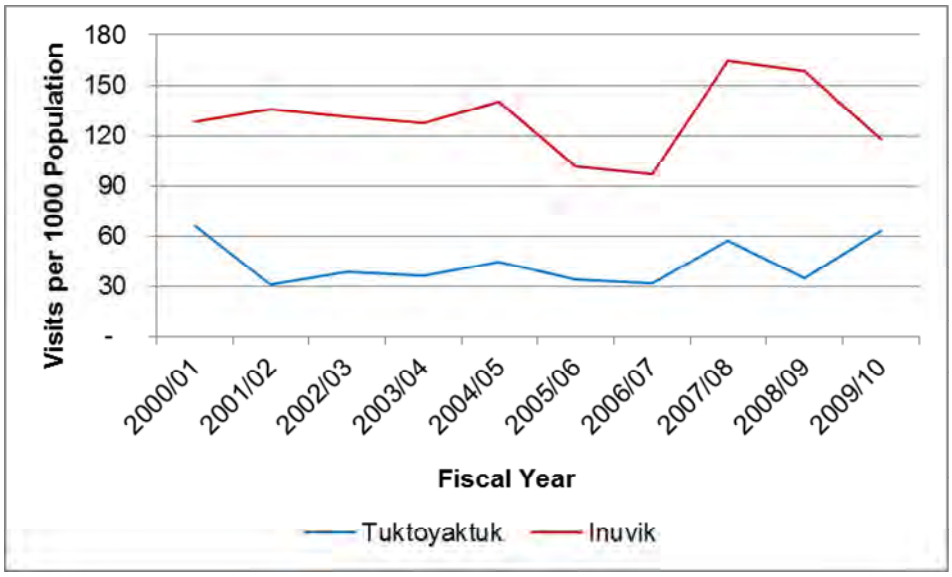
The high rates of smoking, 53% in Inuvik compared with 42% in the NWT, contributes to higher rates of respiratory diseases such as chronic obstructive pulmonary disease. Figure 3.2.6-2 identifies the number of cases of respiratory diseases treated by physicians in Tuktoyaktuk and Inuvik from the fiscal year of 2000/01 to 2009/10. In general, Tuktoyaktuk had a lower number of visits to physicians per 1,000 population than Inuvik. Both communities experienced a spike then decline in number of visits between 2006 and 2010 (GNWT HSS 2010e).



Source: GNWT HSS (2010e)

Figure 3.2.6-2
Cases of Respiratory Diseases Treated by Physicians, 2000 – 2010

Figure 3.2.6-3 shows the number of cases of infectious and parasitic disease per 1,000 individual in Tuktoyaktuk and Inuvik. In general, Tuktoyaktuk had fewer number of visits to physicians per 1,000 residents than Inuvik. However, both communities experienced an increase in visits to physicians in the fiscal year 2006/07(GNWT HSS 2010e).

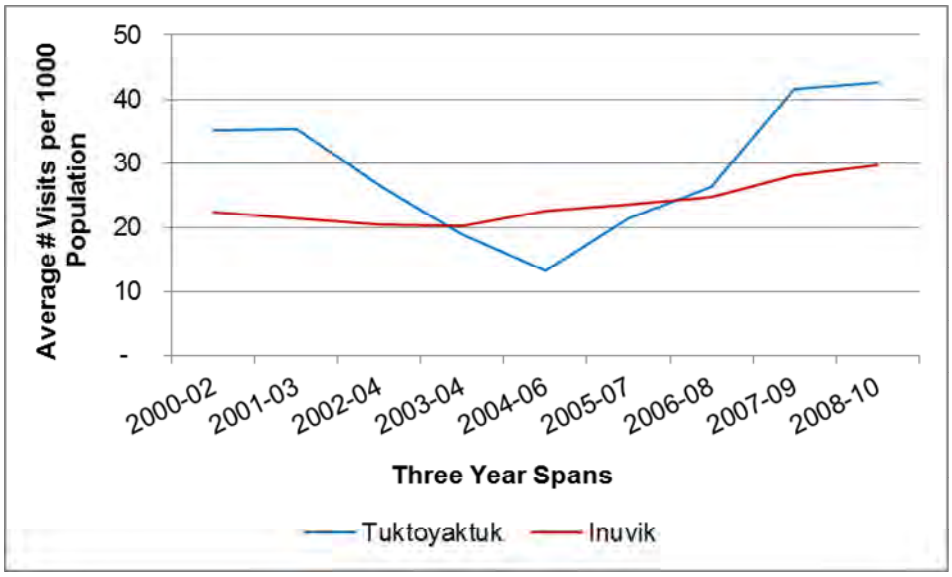


Source: GNWT HSS (2010e)

Figure 3.2.6-3
Cases of Infectious and Parasitic Diseases Treated by Physicians, 2000 – 2010

Figure 3.2.6-4 shows the three-year average number of sexually transmitted infections treated by physicians in Tuktoyaktuk and Inuvik. The three-year average number of cases is typically higher in Tuktoyaktuk than Inuvik, with the exception of 2004 to 2006. The number of cases have increased in both communities from 2000 to 2010 (GNWT HSS 2010e).

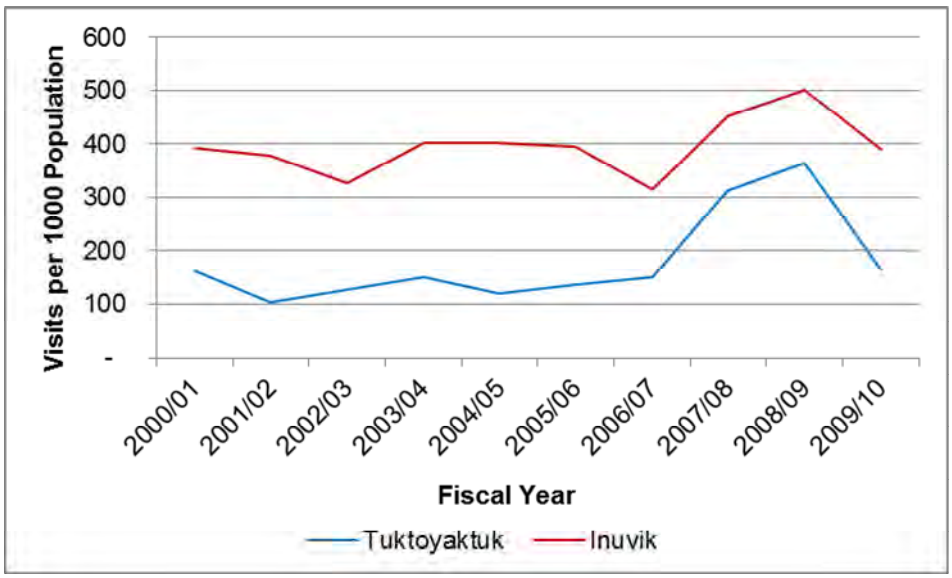
According to M. Heffel, Head Nurse at the Rosie Ovayouk Health Centre in Tuktoyaktuk, the number of cases of sexually transmitted infections increases during the winter months when the winter road is in operation (pers. comm., January 18, 2011).



Source: GNWT HSS (2010e)

Figure 3.2.6-4
Three-Year Average Number of Sexually Transmitted Infections[7] Treated by Physicians in Tuktoyaktuk and Inuvik, 2000 - 2010

The average number of cases per 1,000 individuals of accidents, injuries or poisonings follows a similar trend in both Tuktoyaktuk and Inuvik as shown in Figure 3.2.6-5 (GNWT HSS 2010e).

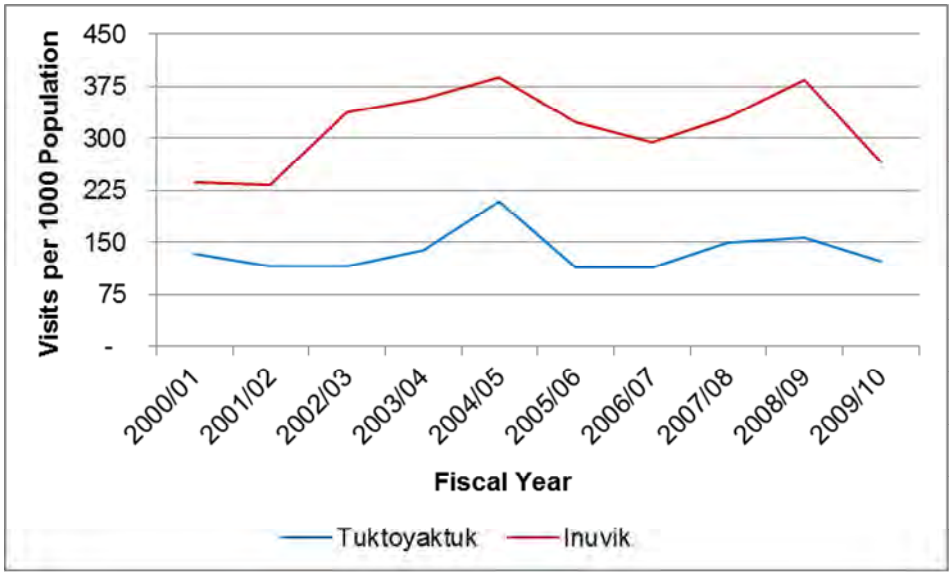


Source: GNWT HSS (2010e)

Figure 3.2.6-5
Cases of Accidents, Injuries and Poisonings Treated by Physicians, 2000 – 2010

[7] Note: Average rate is for both sexes, and all ages

The average number of cases of mental disorders per 1,000 individuals follows a similar trend in both Tuktoyaktuk and Inuvik as shown in Figure 3.2.6-6 (GNWT HSS 2010e).

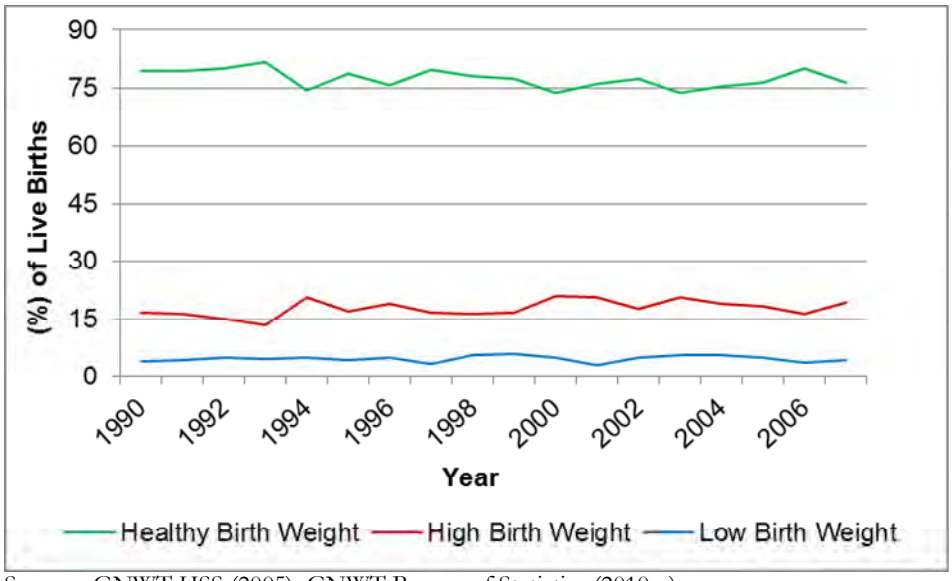


Source: GNWT HSS (2010e)

Figure 3.2.6-6
Cases of Mental Disorder Treated by Physicians, 2000 – 2010

3.2.6.3 Children's Health

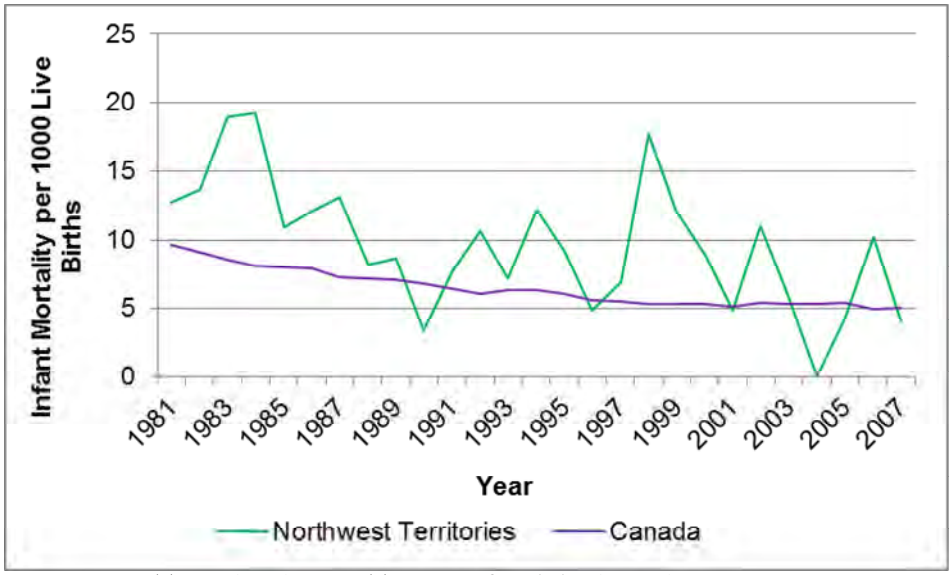
Children's health information was available at the territorial and federal level, but unavailable for the region or specific communities. Birth weight is a key determinant in child health. A low birth weight (<2,500g) indicates a risk for developmental delays and health problems. A high birth weight (>4,000g) indicates that the mother will most likely experience a difficult delivery. Figure 3.2.6-7 shows the incidences of low, high and healthy birth weights in the NWT as a percentage of live births (GNWT HSS 2005; GNWT Bureau of Statistics 2010m).



Source: GNWT HSS (2005); GNWT Bureau of Statistics (2010m)

Figure 3.2.6-7
Incidences of Low, High Birth Weights, and Healthy Births in NWT, 1990-2007

The infant mortality rate is a measure used to determine the status of child and maternal health. Figure 3.2.6-8 shows the infant mortality rate in the NWT and Canada from 1981 to 2007. The infant mortality rate is based on 1,000 live births. In Canada, the infant mortality rates steadily decreased from 1981 to 2007. In the NWT, infant mortality rates also decreased in general; however, the rates tend to fluctuate over the years (GNWT HSS 2005; GNWT Bureau of Statistics 2010m).



Source: GNWT HSS (2005); GNWT Bureau of Statistics (2010m)

Figure 3.2.6-8
Infant Mortality Rate in the NWT and Canada, 1981 – 2007

There is little information regarding the dental health of children in the NWT. A report by Thompson et al. (1998), states that girls tend to brush their teeth more often and consume fewer sweets between meals. Aboriginal students generally went for dental treatment when needed; however, they brushed their teeth less frequently than other students and often learned on their own without parental instruction (Thompson et al. 1998).

The Hamlet of Tuktoyaktuk has a dental health program for children. The program is called "Little Teeth are a Big Deal" and covers topics such as tooth and gum maintenance (M. Heffel, Head Nurse, Rosie Ovayouk Health Centre, pers. comm., January 18, 2011). Due to the reluctance of the Inuvik health staff to participate in a phone interview, little is known regarding the dental health programs in Inuvik.

3.2.6.4 Nutrition

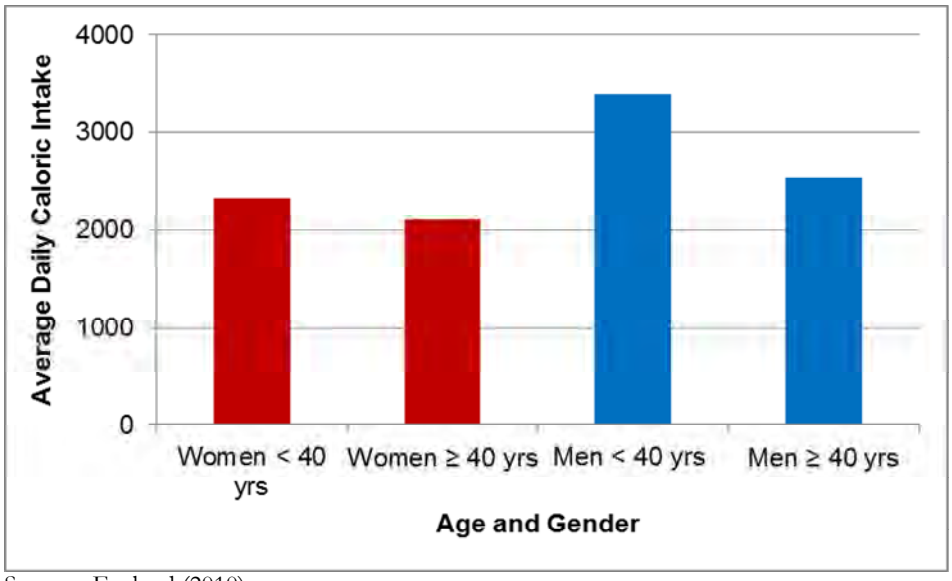
The Inuit Health Survey included a food security questionnaire. The results of the survey indicated that more than half (54%) of the households participating had enough food to eat or were considered food secure. Of the remaining households, 33% showed moderate food insecurity and 13% showed severe food insecurity (Egeland 2010).

Overall, approximately 40-60% of people living in small NWT communities rely on country food for at least 75% of their meat and fish (GNWT ENR NDa). For information regarding food sharing, refer to Section 3.2.7.2.

The Inuit Health Survey found participants preferred to eat nutrient-rich country foods; however, the high cost of obtaining country foods makes it difficult to do so. Of those that do consume country food, men tend to eat more than women, and older adults (>40 years) tend to eat more than younger adults (<40 years). Of the country foods consumed, fresh caribou meat and Arctic char were the two that were eaten most often and in the largest quantities (Egeland 2010).

The Inuit Health Survey identified that market foods such as chips, pop, sweet drinks (made from crystals), and chocolate bars/candy were consumed regularly by many adults. Almost 80% of adult participants reported drinking 2-4 cans (355 ml/can) of sweetened soda pop daily. As such, 25-33% of the total calories consumed by participants came from high sugar foods and drinks.

Men consumed more calories from protein and fat than women, and women consumed more calories from carbohydrates then men. Typically men consumed more calories than women, and younger adults consumed more calories than older adults. In 2004, the average caloric intake for the Inuvialuit was higher than the Canadian average. Figure 3.2.6-9 shows the average caloric intake for older and younger men and women (Egeland 2010).



Source: Egeland (2010)

Figure 3.2.6-9
Average Caloric Intake of Inuit People by Age and Gender, 2007-2008

The Inuit Health Survey reported that 74% of participants said they walked about 20 minutes a day, five days a week. Men walked for a longer period of time than women (Egeland 2010).

3.2.6.5 Country Foods

Consuming country foods is important to Inuvialuit identity, and is the culmination of a series of co-operative activities - harvesting, processing, distributing, and preparing - that require behaving in ways that emphasize Inuvialuit values of co-operation, sharing, and generosity (IRC 2007k).

Traditional food is relied upon by residents in Arctic communities for both physical and nutritional well-being. A study conducted by Lambden et al. (2007) indicated that people in Arctic communities felt that traditional food was healthier for them and contained large quantities of iron and had added benefits derived from food purity i.e. no chemicals, steroids and preservatives (Lambden et. al. 2007).

Access to traditional food is not only culturally and nutritionally important it also plays a fundamental role in food security in the north (Lambden et. al. 2007). A discussion regarding accessibility to country foods and food sharing networks is located in Section 3.2.7.2 of this report.

Although store-bought food is generally available in some variety, many Inuvialuit continue to eat country foods and to hunt and fish for a good part of their diet (IRC 2007k). According to the Inuvialuit Regional Corporation (2007j), Inuvialuit look forward to the changing seasons as their diet varies with the season. For example, geese and muskox are

hunted in the spring and fall; whaling and fishing take place in the summer; caribou hunting occurs in the fall and winter (IRC 2007j).

There are several nutritional benefits of country foods. Based on a study of 43 Arctic communities, the Centre for Indigenous Peoples' Nutrition and Environment (NDa) found that the benefits of a country foods diet are:

- More lean meats and fish;
- Less calories – helpful for weight control;
- Less saturated fat – better for the heart;
- More iron – better for muscles and blood;
- More zinc – better for wound healing and fighting infection;
- More Vitamin A – better for vision and fighting disease;
- More calcium – better for strong bones and teeth; and
- Strengthened cultural capacity and well-being.

Table 3.2.6-2 provides a summary of the types of animals that are hunted or fished for country foods. The information is summarized from the Tuktoyaktuk and Inuvik Inuvialuit Community Conservation Plans (Community of Inuvik et al. 2008, Community of Tuktoyaktuk et al. 2008).

TABLE 3.2.6-2: SUMMARY OF COUNTRY FOODS

Mammals		Beluga Whale (*Delphinapterus leucas*) Qilalugaq
		Bowhead Whale[8] (*Balaena mysticetus*) Aqviq or Arvia
		Ringed Seal (*Phoca hispida*) Natchiq
		Caribou (*Rangifer tarandus*) Tuktu
		Lynx (*Lynx canadensis*) Niutuyiq
		Moose (*Alces alces*) Tuttuvak
		Muskrat (*Ondatra zibethicus*) Kivgaluk
		Snowshoe hare or Rabbit (*Lepus americanus*) Ukalliq
Birds	Ducks / Qaugait	King Eider (*Somateria spectabilis*) Quingalivik
		Common Eider (*Somateria mollissima*) Quingalik
		Mallards (*Anas platyrhynchos*) Kurugakpak
		Scoters (Black Duck) (*Melanitta* spp.) Taakruaq
		Wigeon (Baldpate Duck) (*Anas americana*) Ugiuhiuq
		Old Squaw (*Clangula hyemalis*) Ahaliq
		Pintail (*Anas acuta*) Kurugak

[8] Although described as a country food consumed in the region, bowhead whales have been rarely caught in the past several years.

TABLE 3.2.6-2: SUMMARY OF COUNTRY FOODS		
	Geese / Tundra Swan	Canada Goose (*Branta canadensis*) Uluagullik
		Tundra swan (*Cygnus columbianus*) Qugruk
		Snow Goose (*Chen caerulescens*) Kanguq
		White-fronted Goose (*Anser albifrons frontalis*) Nirliq
		Brant (*Branta bernicla*) Niglignaq
	Ptarmigan (*Lagopus spp.)* Qaiq	Rock Ptarmigan (*Lagopus mutus*)
		Willow Ptarmigan (*Lagopus lagopus*)
	Other	Snowy Owl (*Nyctea scandiaca*)Ukpik
Fish		Arctic Charr (*Salvelinus alpinus*) Qalukpik
		Arctic Cisco (*Coregonus autumnalis*)
		Jackfish or Northern Pike (*Esox lucius*) Siulik
		Arctic Grayling (*Thymallus arcticus*) Hulukpaugaq
		Blue or Pacific Herring (*Clupea pallasi*)
		Lake Trout (*Salvelinus namaycush*) Iqaluakpak
		Broad Whitefish (*Coregonus nasus*) Anaakiq
		Burbot or Loche (*Lota lota*) Tittaaliq
		Lake Whitefish/ Crooked Backs (*Coregonus cluepeaformis*) Pikuktuq
		Coney or Inconnu (*Stenodus leucichthys*) Higaq
		Dolly Varden Charr (*Salvelinus malma*) Qalukpik
		Least Cisco or Big-eyed Herring (*Coregonus sardinella*)
Plants		Black bearberry (*Arctostaphylos alpine*) Paungat
		Dwarf Arctic Birch (*B. nana* subsp. *exilis*)
		Marsh marigold (*Caltha palustris* subsp. *arctica*)
		Crowberry (*Empetrum nigrum* subsp. *hermaphroditum*) Paungat
		Fireweed (*Epilobium angustifolium*)
		River beauty or willowherd (*E. latifolium*)
		Horsetail (*Equisetum arvense*)
		Lettergrass (*Eriophorum angustifolium* subsp. *subarcticum*)
		Licorice root, Eskimo potato (*Hedysarum alpinum* subsp. *americanum*) Masu
		Mare's tail (*H. vulgaris*)
		Seabeach sandwort (*Honckenya peploides*)
		Mountain sorrel (*Oxyria digyna*)
		Wooly Lousewort (*P. kanei* subsp. *kanei*)
		Lousewort (*P. langsdorffii* subsp. *arctica*)
		Lousewort (*P. s.* subsp. *interior*)

TABLE 3.2.6-2: SUMMARY OF COUNTRY FOODS	
	Sweet Coltsfoot (*Petasites frigidus*)
	Sweet Coltsfoot (*P. hyperboreus*)
	Eskimo rhubarb (*Polygonum alaskanum*) Qaugaq
	Bistort (*P. bistorta* subsp. *plumosum*)
	Alpine bistort (*P. viviparum*)
	Buttercup (*R. pallasii*)
	Arctic raspberry (*Rubus arcticus* subsp. *stellatus*)
	Cloudberry (*R. chamaemorus*) Aqpik
	Arctic Dock (*R. arcticus*)
	Alaska willow (*Salix alaxensis*)
	Diamond-leaf willow (*S. pulchra*)
	Bulblet saxifrage (*S. cernua*)
	Bulblet saxifrage (*S. cernua*)
	Bog saxifrage (*S. hirculus*)
	Cordate leaved Saxifragi (*S. punctata* subsp. *nelsoniana*)
	Dandelion (*T. lacerum*)
	Blueberry (*Vaccinium uligonosum* subsp. *alpinum*) Asivit
	Blueberry (*V. u.* subsp. *microphyllum*) Asivit
	Lingonberry, Cranberry (*V. vitis-idaea* subsp. *minus*) Kimingnat

Source: Community of Inuvik et al. (2008) and Community of Tuktoyaktuk et al. (2008)

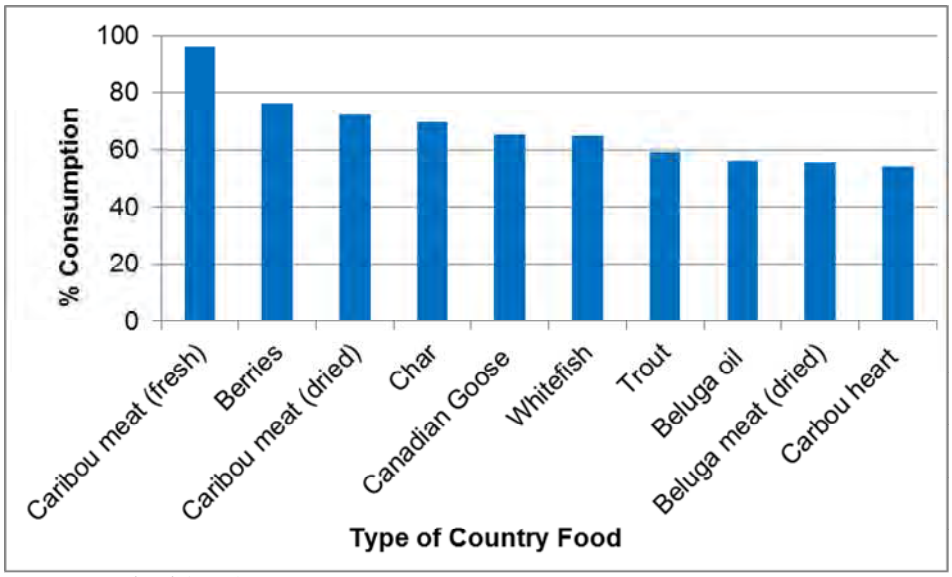
The abundance of these country foods is dependent on the species population, habitat availability, and ongoing tradition of hunting/ trapping/ fishing. A discussion regarding key species population and habitat is located in Section 3.1.7 to 3.1.10 and discussion of the current and historic levels of hunting/trapping/ fishing is located in Section 3.2.8 of this EIS.

Lambden et al. (2007) surveyed Yukon First Nations, Dene/Metis and Inuit women in 44 Arctic communities on recent changes in the quality or health of traditional plants or harvested wildlife. Between 10% and 38% of participants (depending on the community) reported noticing change in the quality of the traditional food species.

Specific changes were noted by 10% to 27% of participants. These changes included physical deformities such as "fish scales looking funny" and "caribou liver and lungs being stuck to their ribs"; decreased accessibility; contamination of traditional foods; reduced animal size; and change in taste and other sensory changes such as "the fish flesh is not as firm as it used to be" and "the fish don't taste the same" (Lambden et. al. 2007).

Intake of traditional foods by age and gender differs. Consistently, older adults consumed more traditional foods (gram/day) than younger adults, and men consumed more than women. Younger people consumed less than older people and children consumed much less traditional foods than either of the other groups (Kuhnlein and Receveur 2007).

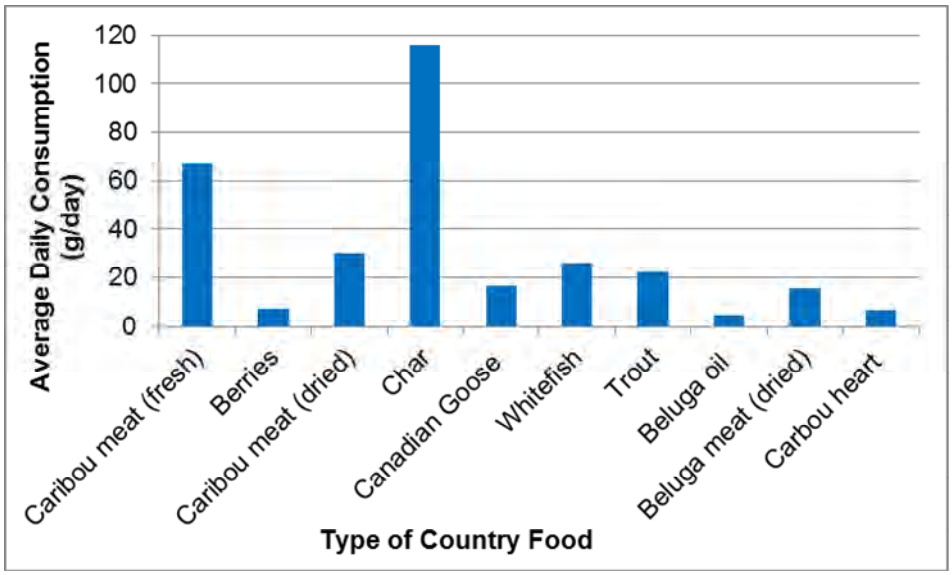
The Inuit Health Survey reported the most commonly consumed country food in the ISR (Figure 3.2.6-10). Fresh caribou meat was the most commonly consumed food, followed by berries and dried caribou meat. Caribou heart was the least commonly consumed country food (Egeland 2010).



Source: Egeland (2010)

Figure 3.2.6-10
Most Commonly Consumed Country Food in the ISR, 2007-2008

The Inuit Health Survey also documented the average daily intake of country food for each participant (Figure 3.2.6-11). Char was consumed in the greatest amounts (116.0 g/day) followed by fresh caribou meat (66.7 g/day) and dried caribou meat (30.2 g/day) (Egeland 2010).



Source: Egeland (2010)

Figure 3.2.6-11
Average Daily Consumption of Country Food in the ISR, 2007-2008

Market or store-bought food groups represent the main categories of grains, meats, fruits, vegetables, dairy, and meat alternatives. A variety of market foods are available in Inuvik and Tuktoyaktuk. In a survey of five Arctic communities in the Yukon and the NWT, the most frequently consumed market foods are tea, sugar, white bread, biscuits, lard, crystal-powdered drinks, instant coffee, evaporated milk, flaked corn cereal, soft drinks, butter and eggs (Kuhnlein and Receveur 2007). These market foods are major sources of energy, but are generally expensive due to shipping costs (Kuhnlein and Receveur 2007).

Kuhnlein and Receveur (2007) state that when traditional meats or fish were included in the diet, daily intakes of energy as protein and many micronutrients (including vitamin D, vitamin E, riboflavin, vitamin B-6, iron, copper, magnesium, manganese, phosphorus, potassium, and selenium) were significantly higher than when market foods were consumed. For children, daily diets containing traditional foods had significantly more iron, zinc, copper, magnesium, phosphorus, potassium, vitamin E, riboflavin, and vitamin B-6 than on days with no traditional foods.

3.2.6.6 Social Pathology or Dysfunction

Family Violence

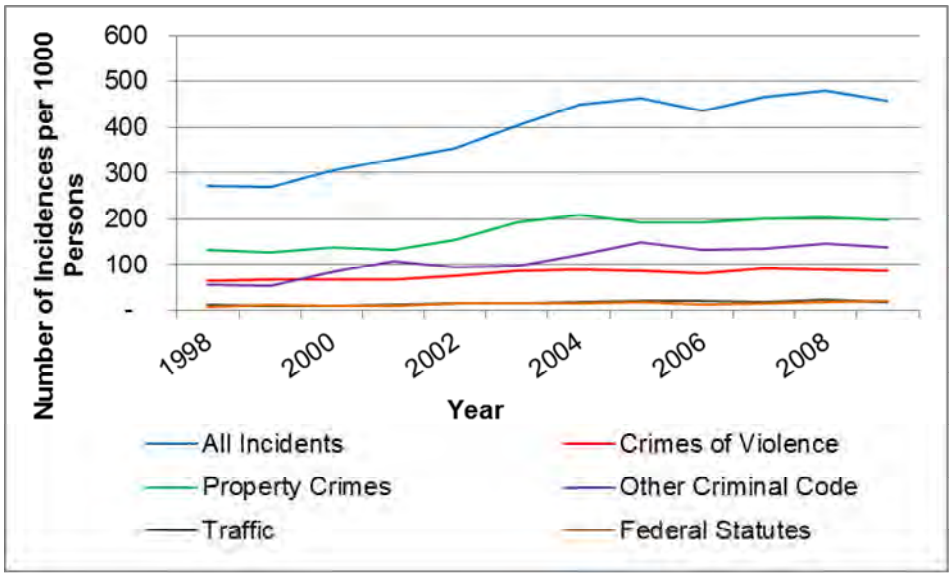
According to the Family Violence Survey conducted in the NWT in 2007, 87.5% of participants stated that they were either very worried or somewhat worried about family violence in their communities. The perception of family violence varied with gender, with 25.2% of men and 15.6% of women agreeing that physical violence is a private matter to be dealt with within the family. Of those surveyed, 46.6% agreed that children aged 12 years and younger were at the greatest risk from family violence. Approximately 33% of participants noted an increase in the rate of family violence from 2002 to 2007 in their

communities while 44.4% stated the rates have remained the same (GNWT Bureau of Statistics 2008e).

Community based family violence statistics were unavailable.

Northwest Territories Crime Rates

In the NWT, the number of all criminal incidences has steadily increased from 1998 to 2009. Property crimes occurred most frequently, and traffic crimes and federal statutes occurred the least frequently, these trends can be observed in Figure 3.2.6-12.

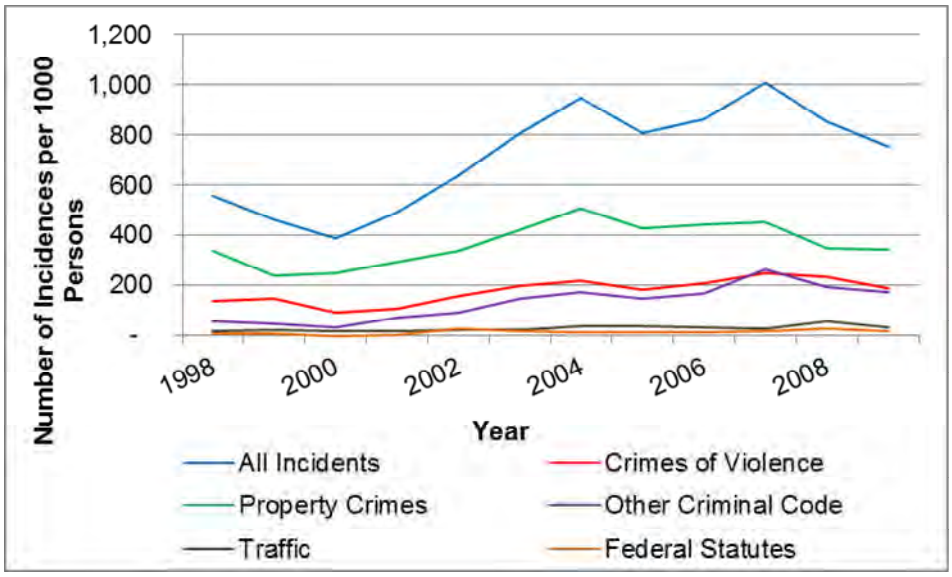


Source: GNWT Bureau of Statistics (2010p)

Figure 3.2.6-12
NWT Crimes, 1998-2009

Tuktoyaktuk Crime Rates

The Tuktoyaktuk RCMP detachment reports on crime statistics. Crime levels have generally increased since 1999, with noticeable increases in the numbers of crimes recorded between 2002 and 2004 followed by a decrease in 2005 and a subsequent increase between 2006 and 2007 (Figure 3.2.6-13).

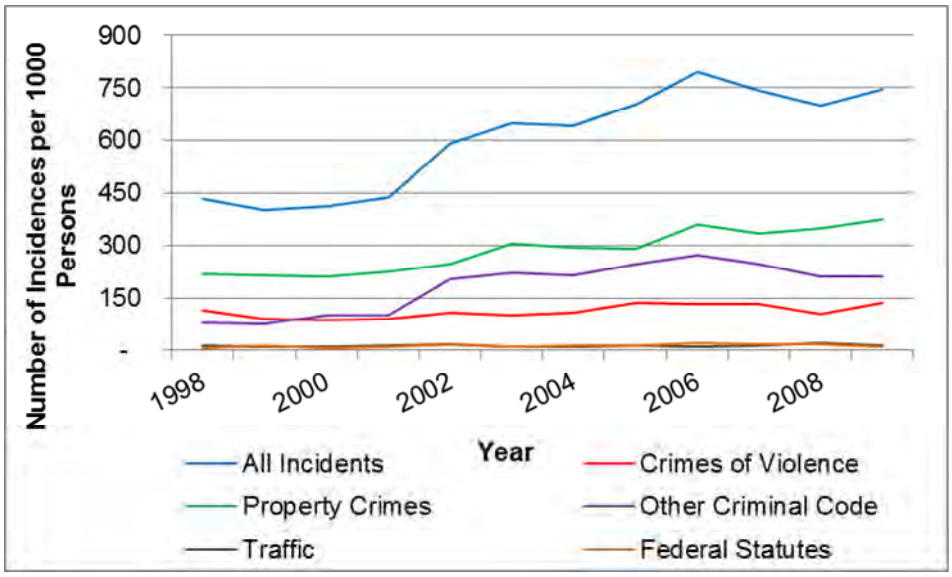


Source: GNWT Bureau of Statistics (2010p)

Figure 3.2.6-13
Tuktoyaktuk Crimes, 1999 – 2009

Inuvik Crime Rates

The Inuvik RCMP detachment reports on crime statistics. Crime levels have generally increased since 2000, with noticeable spikes in the number of crimes between 2002, 2003, and 2006 (Figure 3.2.6-14).



Source: GNWT Bureau of Statistics (2010p)

Figure 3.2.6-14
Inuvik Crimes, 1999-2009

Alcohol, Drug and Other Substance Abuse

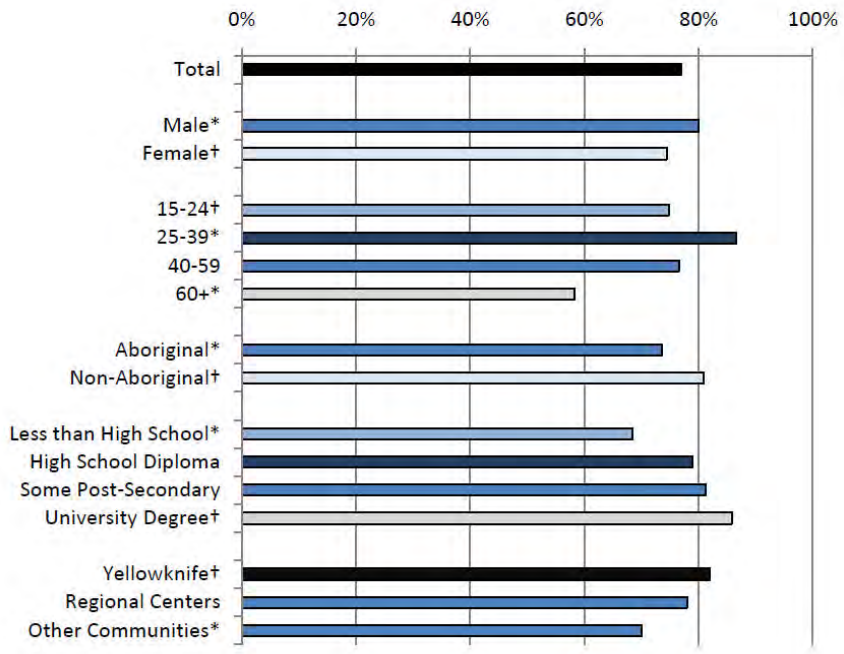
Data for alcohol and drug use is not available on a community level, but is available at the territorial level. The GNWT Department of Health and Social Services conducts an Addiction Survey every few years. Data collected in these surveys is published in the NWT Addiction Report and used to monitor trends in alcohol, tobacco, illicit drug use and gambling activities in the NWT (GNWT HSS 2010d).

Alcohol

The Addiction Survey measures five degrees of alcohol consumption: current drinkers, drinking frequency, usual consumption, frequency of heavy drinking and harmful/ hazardous drinking.

Current drinkers were individuals who indicated they had consumed a drink in the past 12 months. The term "drink" in this report refers to one bottle or can of beer, one glass of wine or a cooler, or one straight or mixed drink with one and a half ounces of hard liquor.

The proportion of current drinkers is organized by demographic characteristics and presented in Figure 3.2.6-15. Participants in the 25 to 39 year old age group were most likely to be current drinkers while those in the 60 and over age group were least likely. Furthermore, males were more likely to be current drinkers than females (GNWT HSS 2010d).



† Reference category- basis of comparison for the other categories.

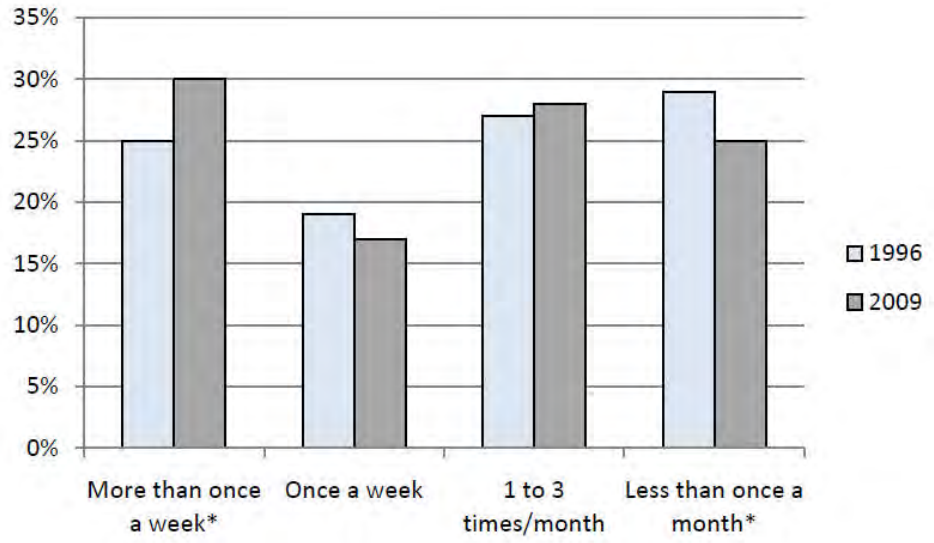
* Significant difference at the .05 level

Source: GNWT HSS (2010d)

Figure 3.2.6-15
Proportion of Current Drinkers by Demographic Characteristics among Residents Aged 15+, NWT 2009

Current drinkers were surveyed for drinking frequency. Drinking frequency was determined by posing the following question during the Addiction Survey: during the past 12 months, how often did you drink alcoholic beverages? The answers were recorded in one of four categories: more than once a week, once a week, 1-3 times a month, and less than once a month.

Figure 3.2.6-16 compares the drinking frequency results from 1996 to 2009. The frequency of current drinkers drinking more than once a week has increased from 25% in 1996 to 30% in 2009. While the frequency of those drinking less than once a month has decreased from 29% to 25% (GNWT HSS 2010d).

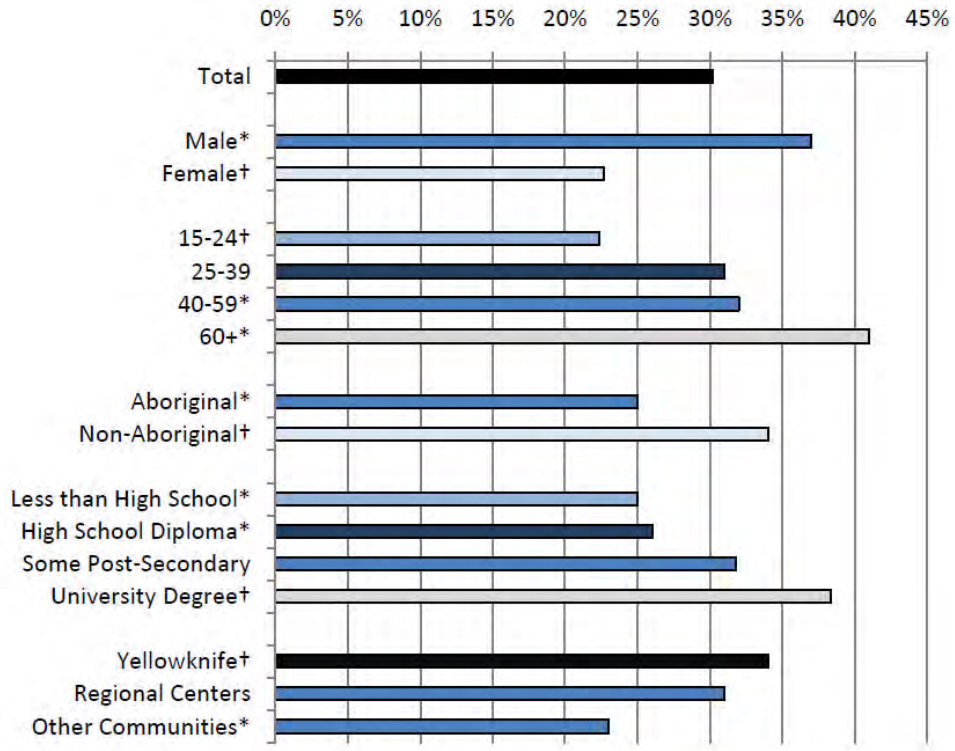


* Significant difference at the .05 level between 1996 and 2009.

Source: GNWT HSS (2010d)

Figure 3.2.6-16
Trends in the Frequency of Drinking among Current Drinkers Aged 15+, NWT 1996 – 2009

Figure 3.2.6-17 shows the demographic characteristics of current drinkers aged 15 and older who reported drinking more than once a week in 2009. Those in the age group 15 to 24 years of age were the least likely of all age groups to drink more than once a week. Males were more likely than females to drink more than once a week in 2009 (GNWT HSS 2010d).



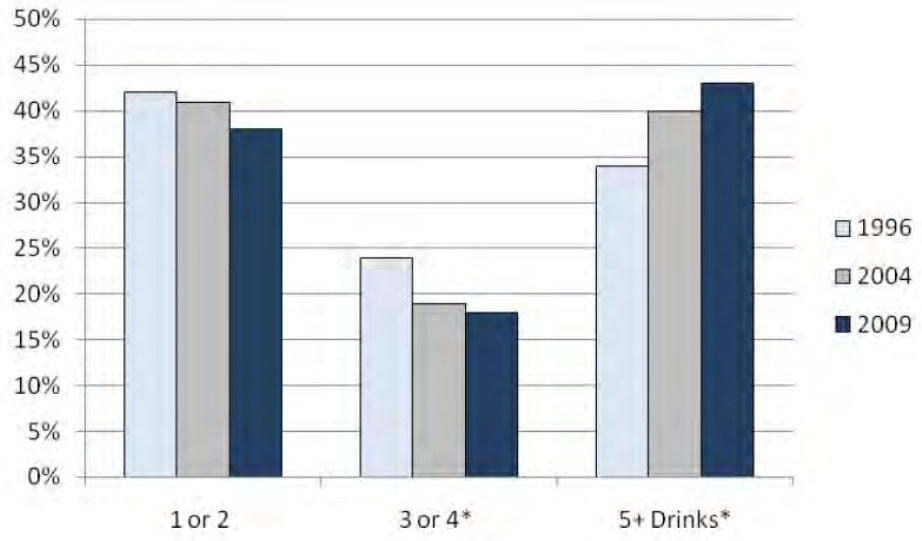
† Reference category- basis of comparison for the other categories.

* Significant difference at the .05 level

Source: GNWT HSS (2010d)

Figure 3.2.6-17
Demographic Characteristics of Those Aged 15+ Drinking More Than Once a Week, NWT 2009

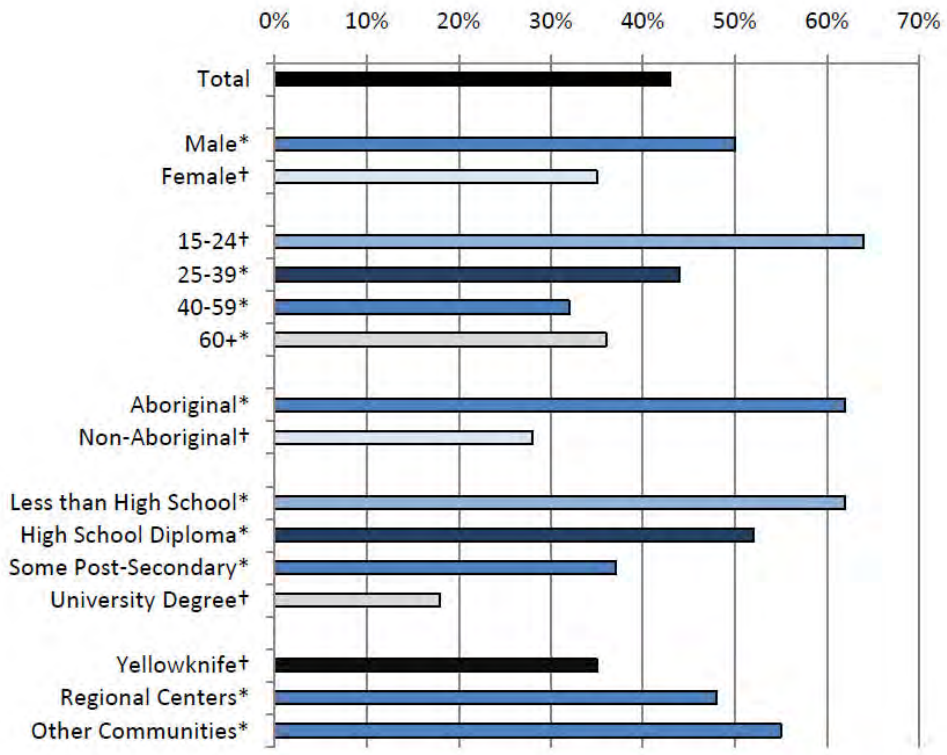
Usual consumption refers to the usual amount of drinks typically consumed by survey participants on a single occasion. Figure 3.2.6-18 compares the usual consumption in the NWT for 1996, 2004, and 2009. Since 1996 the percentage of current drinkers consuming one to two drinks or three to four drinks has decreased; however, the percentage of current drinkers consuming five or more drinks has increased (GNWT HSS 2010d).



* Significant difference at the .05 level between 1996 and 2009.
Source: GNWT HSS (2010d)

Figure 3.2.6-18
Usual Number of Drinks Consumed on a Single Occasion by Current Drinkers Aged 15+, NWT 1996 – 2009

Figure 3.2.6-19 shows the demographic characteristics of current drinkers aged 15 and older who reported drinking five or more drinks on a single occasion. Those in the age group 15-24 years of age were more likely to consume five drinks or more on a single occasion than any other age group. Aboriginal people were nearly three times more likely than non-Aboriginal people to consume five or more drinks. Drinking five or more drinks was highest among those with an education level of less than a high school diploma (GNWT HSS 2010d).



† Reference category- basis of comparison for the other categories.

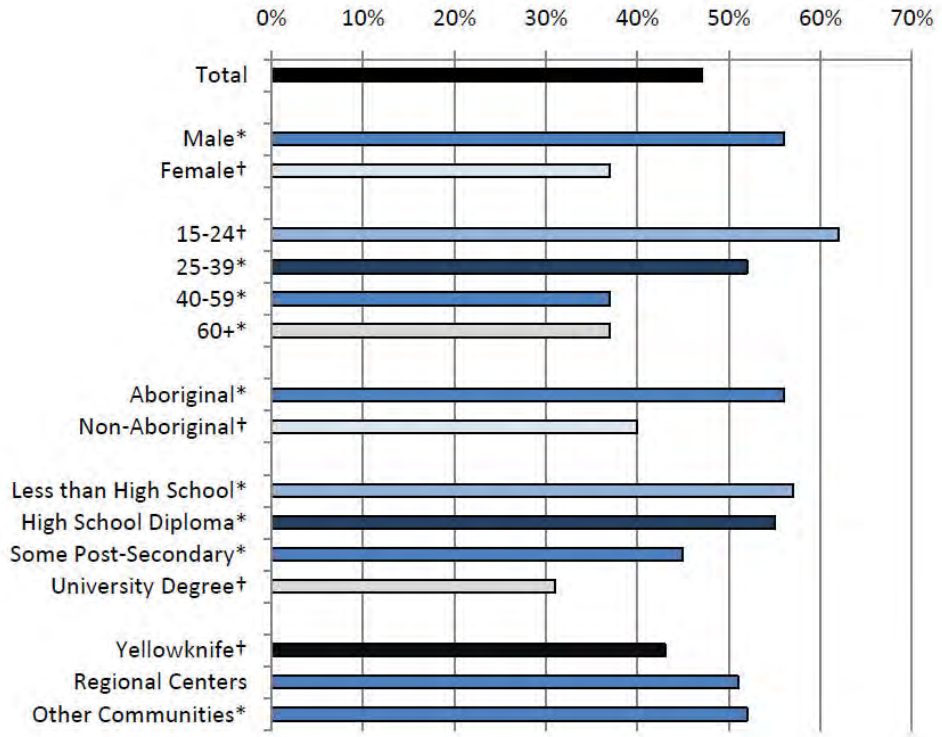
* Significant difference at the .05 level

Source: GNWT HSS (2010d)

Figure 3.2.6-19
Demographic Characteristics of Current Drinkers Aged 15+ Consuming 5+ Drinks on a Single Occasion, NWT 2009

Heavy drinking increases the risk of alcohol-related problems. The Centre for Addiction and Mental Health (CAMH) and the Canadian Centre on Substance Abuse define heavy drinking as "a pattern of alcohol consumption that brings the blood alcohol concentration to 0.08% or more." This blood alcohol concentration usually corresponds to five drinks for males and four for females over the span of two hours.

Figure 3.2.6-20 shows the proportion of current drinkers aged 15 or more in the NWT that drink heavily at least once per month. Similar to Figure 3.2.6-19, the age group 15-24 was most likely to drink heavily once per month, males were more likely than females, Aboriginal people were more likely than non-Aboriginal people, and those with less than a high school diploma were more likely to drink heavily once per month (GNWT HSS 2010d).



† Reference category- basis of comparison for the other categories.

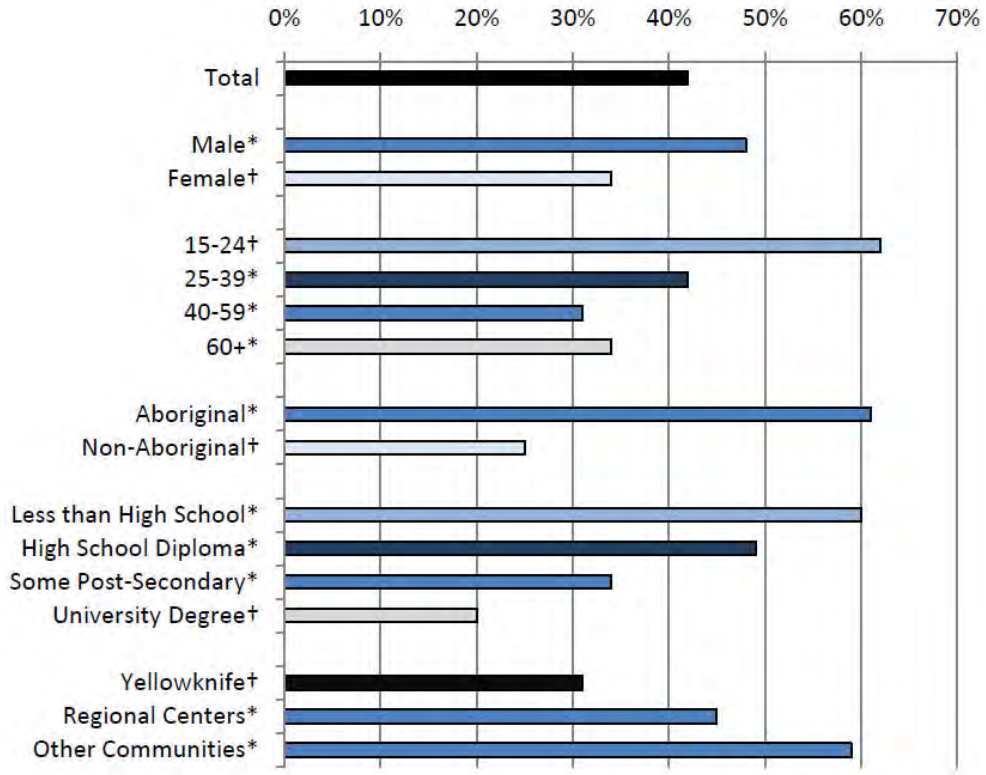
* Significant difference at the .05 level

Source: GNWT HSS (2010d)

Figure 3.2.6-20
Demographic Characteristics of Current Drinkers
Aged 15+ Drinking Heavily at Least Once per Month, NWT 2009

An Alcohol Use Disorder Identification Test (AUDIT) has been developed to identify hazardous patterns of alcohol use and indicate alcohol dependency. AUDIT generates a score derived from a questionnaire composed of ten items. A score of eight or more indicates a harmful/hazardous use of alcohol.

Figure 3.2.6-21 shows the demographic characteristics of current drinkers in the NWT age 15 years and older that score eight or more on the AUDIT. A total of 42% of participants scored eight or more on AUDIT. Males, 15-24 year olds, Aboriginal people, those with lower levels of education, and residents outside of Yellowknife were all more likely to score eight or more on AUDIT and, therefore, were more likely to engage in harmful/hazardous drinking (GNWT HSS 2010d).



† Reference category- basis of comparison for the other categories.

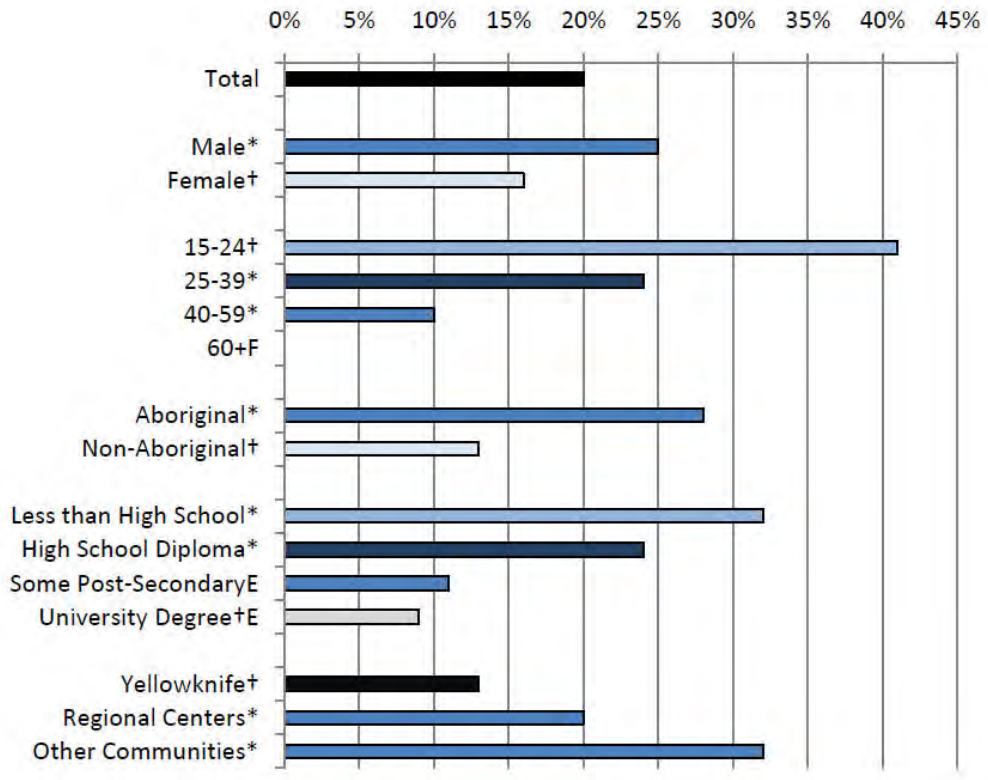
* Significant difference at the .05 level

Source: GNWT HSS (2010d)

Figure 3.2.6-21
Demographic Characteristics of Current Drinkers
Aged 15+ Scoring 8+ in AUDIT, NWT 2009

Cannabis

Participants of the NWT Addiction Survey 2009 were asked if they had used cannabis within 12 months prior to the survey. Between 1996 and 2009 the use of cannabis within the NWT population age 15 and older has remained stable at 20%. In 2009, males, 15-24 year olds, Aboriginal people, individuals with less than a high school diploma, and residents living outside of Yellowknife were all more likely to have used cannabis in the 12 months prior to the survey. These characteristics are shown in Figure 3.6.2-22 (GNWT HSS 2010d).



[E] Moderate sampling variability - interpret with caution.

[F] High sampling variability - data was suppressed.

† Reference category- basis of comparison for the other categories.

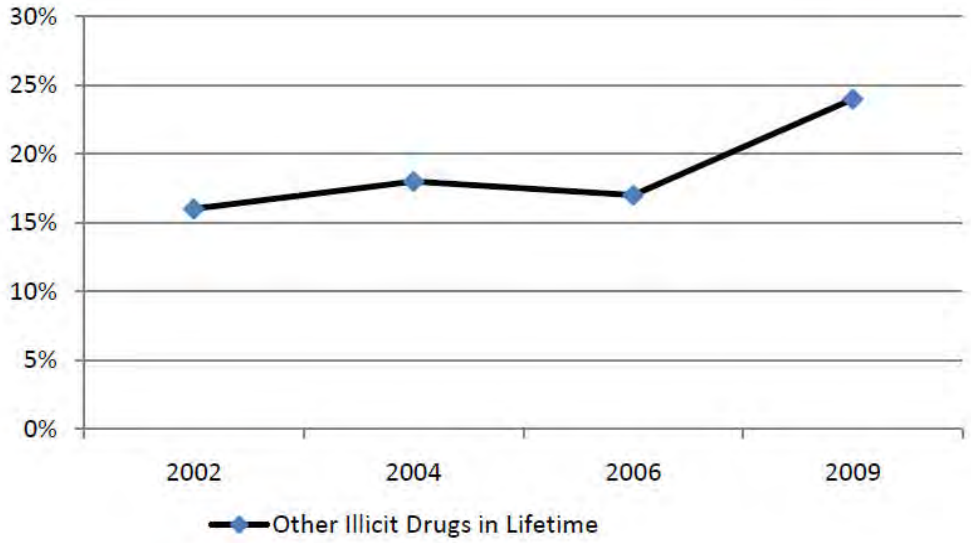
* Significant difference at the .05 level.

Source: GNWT HSS (2010d)

Figure 3.2.6-22
Proportion of Cannabis Use in the Past 12 Months by Demographic Characteristic among Residents Age 15+, NWT 2009

Other Illicit Drugs

Participants of the 2009 NWT Addiction Survey were asked if they had tried any of the following drugs in their lifetime: cocaine/crack, hallucinogens (magic mushrooms, PCP or LSD/acid), speed, ecstasy and heroin. Figure 3.2.6-23 compares the proportion of NWT residents age 15 and older from 2002 to 2009 who have used these drugs at any point in their lifetime. The trend is increasing over time. According to the 2009 NWT Addiction Report, the most common drugs used at least once in the NWT in 2009 were hallucinogens (20%) followed by cocaine/crack (11%), ecstasy (6%) and speed (3%) (GNWT HSS 2010d).



Source: GNWT HSS (2010d)

Figure 3.2.6-23
Cocaine/crack, Hallucinogens, Speed, Ecstasy and Heroin
"Ever Used in Lifetime" among Residents Age 15+, NWT 2009

3.2.6.7 Support Services and Programs

Both Inuvik and Tuktoyaktuk have access to Telehealth Services available from Stanton Territorial Hospital in Yellowknife. Services include consultation with a doctor in Inuvik or a specialist in Edmonton or Yellowknife, as well as education sessions for staff. Telehealth bridges geographical distances, improving the access to and delivery of health and social services, including health education (BDHSS 2010d).

Tuktoyaktuk

The Rosie Ovayouk Health Centre has eight staff including four nurses. Health Centre services include emergency treatment, school health programs, chronic disease clinic, immunization programs, wellness clinic, pre and post-natal care, health promotion and disease prevention initiatives, diagnostic, restorative, rehabilitative and palliative care services, and home care.

Regional providers work in partnership with health centre staff and/or travel to Tuktoyaktuk to provide additional services such as dental therapy, rehabilitation services, nutrition counselling, diabetes education and health promotion. Visiting health services also provide eye care and more complicated dental and orthodontic work. The Inuvik Regional Hospital also services the population of Tuktoyaktuk.

Social services and a counselling program are located in the Government Building. Three community social service workers provide the following services:

- Child protection, child and family services;
- Voluntary family support and adoptions;
- Family violence intervention;
- Community development;
- Mental health and addiction;
- Services for the aged or those with disabilities.

The Community Counselling Program is implemented by one counsellor and two community wellness workers, and provides crisis intervention, therapeutic counselling, education, and referrals to resources (BDHSS 2010a).

Inuvik

There are several regional health care facilities located in Inuvik. Facilities include: the Inuvik Regional Hospital, Public Health Services (Semmler Building), Billy Moore and Charlotte Vehus Homes (group homes for disabled adults), assisted living units, and a Family Counselling Centre.

The 51 bed hospital provides the following services:

- 24/7 emergency room;
- Operating room;
- Obstetrical care;
- Acute and long-term care;
- Pharmacy;
- Diagnostic imaging;
- Laboratory;
- Physician family clinics; and
- Visiting specialist clinics and medical referrals to southern facilities (BDHSSA 2010c).

Other services provided by the hospital for the region include rehabilitation, nutrition, mental health and addition and telehealth.

The Public Health Services unit is staffed by nine employees, including five nurses. They offer services including a school health program, a chronic disease clinic, immunization programs, wellness clinics, pre and post natal care, health promotion and disease prevention initiatives, and home care (BDHSS 2010c).

Social services programs are located at the Inuvik Regional Hospital and are implemented by seven employees, including five community social service workers. The following services are offered:

- Child protection;
- Child and family services (voluntary family support, foster care, adoptions);
- Services for aged and disabled;
- Family violence intervention;
- Community development;
- Mental health and addition services; and
- Home care support (BDHSS 2010cc).

3.2.7 Socio-cultural Patterns

This section describes socio-cultural patterns and social organizations in Tuktoyaktuk and Inuvik. Becoming familiar with traditional culture is critical to understanding socio-cultural patterns in the ISR. For more on social programs, see Sections 3.2.4.3 Education and 3.2.5.16 Recreation Services.

Indicator data showing adherence to traditional beliefs and values is currently not available for the study area communities. However, culture is reflected in activities that are shaped by beliefs and values, activities that make use of traditional knowledge, skills, and disciplines, and programs that support social and cultural development. As stated in an Alaskan Journal of Anthropology article entitled *Inuvialuit Rising: The Evolution of Inuvialuit Identity in the Modern Era*, the younger generations are working hard to reclaim Inuvialuit languages and cultural traditions and to forge a cohesive Inuvialuit identity in the modern world (Lyons 2009). To that end, the Inuvialuit Regional Corporation provides funding to support ongoing social and cultural development, and notes that traditional activities are actively pursued in both Inuvik and Tuktoyaktuk (IRC 2007d).

Activities reviewed in this section range from cultural and spiritual life, including language, family and community life, social relations, and social and cultural programs.

3.2.7.1 Cultural and Spiritual Life

Cultural and spiritual life is demonstrated through speaking traditional languages and partaking in cultural events and ceremonies. Several churches exist in both communities.

Tuktoyaktuk

The Hamlet hosts the Beluga Jamboree each year (BDHSS 2010e), and many residents head south to Inuvik for various festivals and cultural events (M. Gruben, Mayor, Tuktoyaktuk, pers. comm., January 7, 2011). The Kitti Hall Community Centre hosts drum dancing, cooking and other traditional activities.

Several churches have historically operated in the community, and one church operates regular services. The Glad Tidings Mission, a Pentecostal Church, has approximately 40 people attending services each week. The Anglican Church historically operated but no longer has a parish (Diocese of the Arctic 2010a). The Catholic Church is open only a few times a year.

The percentage of Tuktoyaktuk's population that speak an Aboriginal language has been slowly declining. In 1984, 35.8% of the Aboriginal population could speak an Aboriginal language, but this subsequently declined to 22.3% in 2009 (GNWT Bureau of Statistics 2009a). More recent data regarding use Aboriginal languages are not available.

Inuvik

Inuvik hosts several festivals throughout the year: Sunrise Festival (January), Muskrat Jamboree (spring), Midnight Madness (June), Great Northern Arts Festival (July), and the End of The Road Music Festival (August). The town is also home to a Choral and Theatrical Society and has traditional dancing and singing groups (BDHSS 2010f). A 2010 Christmas feast featured local music and dancing at one of many yearly events held at the Midnight Sun Complex (Inuvik Drum 2010).

Source: Inuvik Drum (2010)

Photo 3.2.7-1
The Delta Good Times Band and Ingamo Friendship Dancers at the Inuvik Christmas Feast

Inuvik is home to four churches and a mosque: Our Lady of Victory Church, First Bible Baptist Church, Lighthouse Community Church, Anglican Church of Ascension, and The Midnight Sun Mosque. Our Lady of Victory Church is an Inuvik landmark also known as Inuvik's Igloo Church. Built by volunteer labour, this church took two years to build

from start to completion (Yukon Info ND). The Anglican Church of Ascension has a regular membership and offers services on Sunday at both the church and hospital chapel (Diocese of the Arctic 2010b). The First Bible Baptist Church has a Pastor and a primarily Aboriginal membership of approximately 35; it offers three services a week, two on Sunday and one on Wednesday evening. They also host a Friday evening addictions therapy session (S. Donley, Pastor, First Bible Baptist Church, January 31, 2011). The Lighthouse Community Church also offers a Sunday service. The Midnight Sun Mosque was shipped to Inuvik by barge in September 2010 to serve the growing Muslim population in the community. The mosque was built by a Manitoba-based Islamic charity, the Zubaidah Tallab Foundation (Canadian Broadcasting Corporation 2010).

The percentage of Inuvik's Aboriginal population that speaks an Aboriginal language is slowly declining. In 1984, 35.2% of the Aboriginal population could speak an Aboriginal language. This has since declined to 16.2% in 2009 (GNWT Bureau of Statistics 2009b). According to the 2010 Assessment of Services and Self-Government Survey by the Inuvik CC, almost half (46%) of the Elders spoke Inuvialuktun (IRC 2007e).

3.2.7.2 Family and Community Life

Little information is available regarding household social organization. Based on census data, the majority of households have three or fewer people. Compared to the Beaufort-Delta region and Inuvik, Tuktoyaktuk has the highest percentage of households with 4-5 persons and 6 or more persons (GNWT Bureau of Statistics 2009a, 2009b). The majority of houses in Tuktoyaktuk and Inuvik are rented compared to owned (GNWT Bureau of Statistics, 2010e). More detailed information is available in Section 3.2.2.

The communities are led by a Mayor and Council. Under the IFA, the region is operated by the IRC and several organizations and committees to assist in the management of the region, as shown below.

- Inuvialuit Regional Corporation – receives and manages IFA benefits and revenues.
- Inuvialuit Investment Corporation – oversees management of a diverse securities portfolio that was established with proceeds from the IFA.
- Inuvialuit Development Corporation – invests in over 20 Inuvialuit companies with complementary industries and visions.
- Inuvialuit Petroleum Corporation – established as a diversified petroleum company and is currently investing proceeds until hydrocarbon-related opportunities become available.
- Inuvialuit Land Corporation – holds title to the Inuvialuit lands received under the IFA. Lands consist of 90,649 km^2, including 13,000 km^2 with sub-surface rights.
- Inuvialuit Land Administration – responsible for managing and administering Inuvialuit-owned lands in the ISR, including reviewing applications for land and water permits.

- Inuvialuit Trust – manages financial distribution of benefits to Inuvialuit beneficiaries.
- Community Corporations (Inuvik and Tuktoyaktuk) – administers, supervises, governs, and regulates matters of local concerns to the members of the Corporation.
- Hunters and Trappers Committee – represents the collective Inuvialuit interest in wildlife and upholds harvest rights.
- Joint Secretariat – administers funding for Joint Implementing Bodies (as listed below) and provides administrative and technical support.
- Wildlife Management Advisory Council (NWT) – provides wildlife management advice pertaining to the Western Arctic region of the NWT, including the ISR.
- Fisheries Joint Management Committee – responsible for collecting harvest information and making recommendations on subsistence quotas for fish and harvestable quotas for marine mammals. Manages a student mentoring program.
- Environmental Impact Screening Committee – screens all development proposals within the ISR to determine if an environmental assessment is required (by the EIRB).
- Environmental Impact Review Board – responsible for carrying out environmental assessments of development projects.
- Inuvialuit Game Council – represents collective Inuvialuit interest in wildlife and renewable resources in the ISR.

The social and community life in Inuvik and Tuktoyaktuk are at times differentiated by whether the people are Aboriginal or non-Aboriginal, and whether the people live a more or less traditional lifestyle. Households with a traditional lifestyle are more typically involved in subsistence harvesting, with regular trips on the land and may or may not be part of the wage economy. Households with non-traditional or less-traditional lifestyles may or may not partake in subsistence harvesting and may be more involved in the wage economy.

The 2006 Census conducted by Statistics Canada, collected data for unpaid work. Work in this category includes housework, childcare, and senior care. The unpaid services can either be provided to the households of the worker or other households (Statistics Canada 2006a, 2006b).

In Section 3.2.4, Figure 3.2.4-16 shows the categories of unpaid work for both Tuktoyaktuk and Inuvik. Housework is the category of unpaid work with the highest participation from people aged 15 years and older. In 2006, in Tuktoyaktuk, 540 people (60% of the total population) and 2,345 people (64%) in Inuvik reported unpaid housework. Housework includes general housekeeping, yard work, and home maintenance (Statistics Canada 2006a, 2006b).

Other forms of unpaid work are subsistence harvesting or community volunteer work. Subsistence harvesting is a key cultural attribute and is conducted by many residents of Tuktoyaktuk and Inuvik, as is volunteerism.

Information regarding social roles may be derived from the NWT labour force statistics and interviews with community members. In 2006, the industries with the greatest female participation rate included public administration (23.4%), health care and social assistance (15.9%), and retail trade (10.5%). The industries with the greatest male participation rate included public administration (19.4%), transportation and warehousing (11.8%), and construction (10.9%). Based on these statistics, it may be suggested that women are likely to hold more local jobs with regular work hours, whereas men hold jobs of a more transient nature (e.g., construction projects) or that require shift work (e.g., transportation). Some interviewees have observed that women take on a primary role in the household with up to 90% of the responsibility (A. Kasook, Director, Transition House, pers. comm., January 27, 2011; P. Donley, Pastor, First Bible Baptist Church, pers. comm., January 31, 2011).

Table 3.2.7-1 shows that men are more likely to participate in hunting and trapping than women, whereas women are more centrally involved in berry picking. However, this does not preclude women from joining in on trips to the land. Mentorship programs through the HTC work to improve access to various harvesting activities (INAC 2004b).

TABLE 3.2.7-1: PERCENT OF PERSONS IN HARVESTING ACTIVITIES, BY SELECTED CHARACTERISTICS FOR THE NWT, 2002

	Trapped	Hunted or Fished	Gathered Berries	Gathered Plants
Persons 15 Years and Over	5.0	40.2	18.2	6.8
Males	7.6	51.4	12.8	5.7
Females	2.2	27.9	24.4	7.9
15-24 Years	4.0	34.6	12.9	3.9
25-39 Years	4.7	40.8	16.9	5.2
40-59 Years	5.1	46.1	22.1	7.3
60 Years and Over	8.3	31.6	23.8	16.6
Aboriginals	9.9	44.9	23.6	13.0
Males	15.4	58.3	16.6	10.7
Females	4.3	30.7	30.9	15.5
Non-Aboriginals	0.7	36.5	13.2	1.3
Males	1.1	46.2	9.4	1.7
Females	0.3	25.4	17.9	1.0

Source: GNWT HSS (2006a)

Very little information regarding sharing and mutual aid is publically available. The two areas reviewed pertained to food sharing and housing. According to the 2007-2008 Inuit Health Survey, food sharing networks are strong and the majority of households share their country food with others. When households were out of country food, more than 67% received supplementary country foods from family, friends, the community freezer, or hunter and trapper organizations. Of households that ran out of food, almost 60% bought more store food, 30% went hunting or fishing, and over 25% went without (IRC 2010). It was noted that, given the cost and effort associated with harvesting, it can be difficult to ask

to share in someone else's harvest without offering some kind of compensation (A. Kasook, Director, Transition House, pers. comm., January 27, 2011). There is also a food bank in Inuvik, run primarily by volunteers, that is open on Wednesday evenings (Inuvik Photos 2010).

The challenges of sharing housing, especially public housing, were discussed by those interviewed. For example, if family members open their homes to others in transition, they risk losing their own housing or if an Elder is legally sharing a unit with family, then passes away, a grandchild may be forced to move (P. Donley, Pastor, First Bible Baptist Church, pers. comm., January 31, 2011). In Tuktoyaktuk, it was noted that homelessness has become more common over the past 10 years (A. Kasook, Director, Transition House, pers. comm., January 27, 2011).

3.2.7.3 Traditional Activity Participation

According to the Inuvialuit Communications Society (ICS 2009), young people are encouraged to participate and are mentored in various traditional activities including producing clothing, harvesting and cooking country foods, drum dancing, participating in northern games, sharing through oral tradition, and using traditional languages. Funding from the IRC supports youth mentoring programs related to hunting, fishing, trapping and other cultural activities. The Inuvialuit Cultural Resource Centre Director was unable to elaborate further on traditional activities and expand upon specific ways that traditional activity participation ranges by age and gender due to a conflict of interest related to the review process (C. Cockney, Director, Inuvialuit Cultural Resource Centre, pers. comm., February 3, 2011).

Clothing – In the past, winter clothing was made entirely from animal furs and hides. Today, fabric parkas, trimmed with fur for protection from wind and snow, are popular. Muskrat fur coats may also occasionally be seen. Mukluks (boots) made of caribou skin, sealskin, rabbit skin, or muskox wool provide water and wind protection for the feet. Fur mitts, often attached to the parka by strings, help keep hands warm. In the summer, both men and women wear an atikluk - the outer shell of a parka - which is not only cooling in hot weather but also offers protection from northern mosquitoes. Moccasin dancing slippers made of moose hide, sewn with sinew, and featuring colourful beadwork and appliqué, are used for Old Time Dances (IRC 2007b).

Foods – Although store-bought food is readily available in great variety, many Inuvialuit continue to hunt, fish, and eat more nutritious and less costly country foods for a large portion of their diet. Consuming country foods is important to Inuvialuit identity, and the culmination of a series of cooperative activities - harvesting, processing, distributing, and preparing - that require behaving in ways that emphasize Inuvialuit values of cooperation, sharing, and generosity. Traditional country foods include caribou, muskox, arctic hare, muskrat, seal, duck, goose, beluga and bowhead whale, fish (whitefish, herring, inconnu, arctic char, and trout), and berries (akpiks, blueberries, crowberries, currants, and cranberries) (IRC 2007k).

Source: ICS (2009)

Photo 3.2.7-2
Summer Fish Harvest

Drum Dancing – From early times, the Inuvialuit have used songs and chants to recount legends, stories, and traditions. In this way, Inuvialuit history has been handed down through the generations. Not long ago, drum dancing was being practiced less and less in the culture. However, a few Elders did not forget and together with groups of determined young people, they began to work on its revival. Today, the tradition continues. Drum dancing has experienced a resurgence and is flourishing in the communities of Aklavik, Inuvik, Paulatuk, Tuktoyaktuk and Ulukhaktok (Holman). In the last few years, drum dance groups have performed at home and around the world, including Japan, Mexico, and the Canadian Pavilion at Expo 2000 in Hanover, Germany (IRC2007j).

Northern Games – Traditional northern games originate from the time when the Inuvialuit were semi-nomadic. Played for both fun and survival, these games developed strength, endurance, and resistance to pain. The people were tested and prepared for the hard life on the land. Traditional games, such as the blanket toss, were also played when groups from different areas visited and celebrated their culture together. Today, the Arctic Winter Games and the annual Northern Games keep the traditions of celebration, gathering, and sharing alive (IRC 2007j).

Oral Tradition – Until recently, there was no written form of Inuvialuktun. History, knowledge and traditions were passed by Elders from generation to generation as stories, legends, and songs. Today, Elders are being interviewed in several oral history projects including the Inuvialuit Oral Histories Project, the Kitigaaryuit Oral Traditions Research Project 1996, and the Yellow Beetle Oral History and Archaeology Project (IRC 2007j).

Photo 3.2.7-3
Elders share oral traditions with school children. Source: IRC (2007b)

Language – The Inuvialuit belong to three linguistic groups. Collectively the three dialects they speak are known as the Inuvialuktun language:

Uummarmiut meaning "people of the evergreens and willows" is spoken in the tree-lined inland communities of Aklavik and Inuvik.

Siglit (its meaning is debated) is spoken in the coastal communities of Tuktoyaktuk, Paulatuk and Sachs Harbour.

Kangiryuarmiut meaning "people of the large bay" is spoken in the community of Ulukhaktok (Holman) on Victoria Island (IRC 2007j).

Language rates are declining, as noted above in Section 3.2.7.1. However, many initiatives are underway to increase exposure to traditional languages. Young people are exposed to traditional languages through books such as Inuvialuktun Nursery Rhymes (ICS 2008), and by prioritizing the training and hiring of traditional language-speaking childcare workers in various community social programs. To encourage daily use of Inuvialuktun, the Inuvialuit Cultural Resource Centre also funds fluent-speaker positions in each Child Development Centre (IRC 2007c). The use of Inuvialuktun is encouraged in the Inuvik Community Corporate office where traditional names are used for staff signage and meeting minutes, and flashcards with numbers, common expressions, days, and colours are posted in the office (IRC 2010).

3.2.7.4 Social Relations

Information regarding the social relations between residents and non-residents, men and women, younger and older generations, and Aboriginal and non-Aboriginal people is not publicly available. A variety of sources, including personal communications, were used to identify a sense of the relationships. However, it should be noted, that many people asked to discuss this topic were reluctant to provide an opinion or to be put on record. As such,

the names of people that contributed potentially sensitive data have been removed from the citation. Unless self-identified, it was not specifically noted whether participants were Aboriginal or non-Aboriginal. Furthermore, it should be noted that information reflected in this section is personal opinion and is subjective in nature.

It was noted by many that relations between Aboriginal and non-Aboriginal, and residents and non-residents have improved significantly over the past 20 years. Those interviewed had different ways of characterizing relationships. With regard to Aboriginal and non-Aboriginal social relations, a school administrator in Inuvik observed that there is healthy interaction overall, while another person described interactions between Aboriginal and non-Aboriginal as cordial and working, but not generally more intimate than that (pers. comm., January 31, 2011). It was also noted that non-residents are often brought in for management positions with more security and this can cause tension (pers. comm., January 31, 2011). A health professional in that situation admitted to feeling like a minority, and that some outsiders tend to try to maintain a professional distance, while others do not (pers.comm., January 17, 2011).

Elders are generally respected in the community, and are actively encouraged to share traditional knowledge through various IRC programs (IRC 2007b). Issues related to poverty and addiction can inadvertently result in emotional abuse, an issue that is being addressed through various health programs (GNWT Seniors' Society 2009).

Detailed information was not provided for social relations between men and women, other than to note that unemployment, addiction, and mental health are a few of the issues that strain relationships (A. Kasook, Director, Transition House, pers. comm., January 27, 2011).

3.2.7.5 Social and Cultural Support Systems and Programs

Social and cultural development issues are considered a community priority, as evidenced by the variety of support systems and programs available regionally and locally. As summarized in an Inuvik Roundtable discussion, "We need to safeguard traditional occupations and find a balance. Creating knowledge, not just jobs… It starts with the family – the importance of culture, having self-esteem" (GNWT Premier's Office 2010). The Inuvialuit are supported by federal, territorial, regional and local programs.

The IRC supports the skills development of cultural elements such as clothing, foods, drum dancing, language, oral traditions, and northern games, as discussed in Section 3.2.7.3.

Inuvialuktun is classified as an endangered language because it is spoken by fewer than 50% of the population, many of whom are Elders. As a result, in May 1998, the Inuvialuit Cultural Resource Centre (ICRC) opened as a regional centre in Tuktoyaktuk with a mandate to preserve the Inuvialuktun language with the assistance of Elders, provide support and a language curriculum for Inuvialuktun teachers, and promote the on-going development of the Inuvialuktun language (IRC 2007a).

In April 2000, ICRC was relocated from Tuktoyaktuk to Inuvik to better serve the region with easier access to the governments and other Inuvialuit communities. Funding for ICRC comes from INAC, GNWT Education, Culture and Employment, Parks Canada and the

Beaufort-Delta Divisional Board of Education. Recent projects undertaken with this funding include:

- Indigenous Language Conference;
- Summer Language and Cultural Camps;
- Community Language Programs;
- Elder Database Development with translations and recordings;
- Language Teacher Training and Language Program Development;
- Production of classroom materials for language teachers; and
- Development of an Inuvialuit Culture and History Program (Grades 1 to 6) and a teaching kit with books, videos and traditional tools.

It was reported in the December 2010 IRC Board Summary Newsletter that the ICRC is producing a video series of Inuvialuit activities:

- *Drum Dance Instructional;*
- *Beluga Whale Hunting with Billy Day;*
- *Our Children's Legacy;* and
- *A Path for Our Children* (IRC 2010).

Other recent ICRC publications include the new *Siglit Dictionaries, Reindeer Days Remembered*, and *Tuktoyaktuk Place Names* and *Inuvialuit Nautchiangit: Relationships Between People and Plants*. The latter is a collection of traditional knowledge on the use of plants from more than 40 Inuvialuit Elders in the ISR who were interviewed and filmed by the project's ethnobotanist over a period of four years (Parks Canada 2009b).

The IRC (2010) identified that due to budget cuts, there was less funding available from the Canadian Heritage (Aboriginal Language Initiative) and the Beaufort-Delta Education Council budgets.

The Inuvialuit Communications Society also produces print and video content from Canada's western arctic, reflecting the lives and traditions of the Inuvialuit people. The magazine *Tusaayaksat* is published four times a year and distributed to Inuvialuit beneficiaries. ICS also produces a series of television programming (ICS 2010). Two example publications include the *Inuvialuktun Nursery Rhymes* (ICS 2008) and *The Inuvialuit Year* (Photo 3.2.7-4; ICS 2010).

Source: ICS (2008, 2009)

Photo 3.2.7-4
Inuvialuit Communication Society Publications

3.2.8 Harvesting

The traditional culture of the Inuvialuit is unique due to the adaptations to everyday challenges posed by living in the harsh and remote northern environment. Traditionally the people have lived off the land and relied on a variety of wildlife, fish and plant species for sustenance. The ability to survive in such an environment has shaped Inuvialuit behaviour and activities, creating a focus on harvesting game, fish and fowl for food because the supply of available plant foods was too limited and seasonal to sustain life. Despite the continued importance of harvesting to the Inuvialuit culture, these activities have diminished in recent years. More information can be found in Section 3.2.8.3 Participation in Harvesting Activities for Household Food Supply, of this report (GNWT Bureau of Statistics 2009a and 2009b).

Traditional activities, such as hunting, fishing and trapping, sustain the Inuvialuit values and identity. The Inuvialuit use local resources to provide traditional foods and their hunting, fishing and trapping activities convey a tradition-based and fundamental relationship between the Inuvialuit and their environment. Species that the Inuvialuit have traditionally relied upon for sustenance include beluga whale, seal, caribou, furbearing animals, fish and birds. The most important food sources to the Inuvialuit are caribou and whale (IOL et al. 2004).

3.2.8.1 Contribution of Harvesting to the Economy

Many of the harvesting activities that occur in the NWT contribute to the local economy. Caribou harvests generate an estimated $17 million annually (GNWT ENR 2010b). Regional data or data specific to wildlife species are not available.

To determine the economic contribution of country food to local communities, based on the cost to purchase store or country foods instead of harvesting country foods, a monetary

value was assigned to harvested wildlife. The monetary value of harvested wildlife is calculated based on the cost of replacing harvested wildlife, birds and fish with market beef, chicken and fish. An Inuvik food price index was used as the baseline and the 2000 base prices used for each category of food as follows:

- $10.50/kg for boneless beef blade roast
- $11.00/kg for boneless chicken
- $10.00/kg for haddock fillets (IOL et al. 2004)

The food prices previously described are now outdated. Several attempts were made to contact the local grocery stores for current prices with no response so updated prices were calculated based on the annual inflation rate from 2000 to 2010. Specific inflation rates for Inuvik and Tuktoyaktuk are not available so inflation rates for Yellowknife were used. Table 3.2.8-1 shows the inflation rates for each fiscal year ending December 31 for 2000 to 2010, and the calculated (adjusted) food prices per year for each comparable food product (GNWT Bureau of Statistics 2010j). The inflation rates in Yellowknife may not accurately reflect the inflation rates in Inuvik or Tuktoyaktuk, and other factors may affect product costs at local stores.

TABLE 3.2.8-1: INFLATION RATES FOR YELLOWKNIFE AND ADJUSTED FOOD COST

Comparable Food Product	Cost to Purchase in Store in 2000	Inflation Rate (%) Per Year										
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
		1.7	1.6	3.0	2.3	1.5	2.3	1.4	2.9	4.0	0.6	1.7
Beef	$10.50/kg	10.68	10.85	11.17	11.43	11.60	11.87	12.04	12.39	12.88	12.96	13.18
Chicken	$11.00/kg	11.19	11.37	11.71	11.98	12.16	12.44	12.61	12.98	13.49	13.58	13.81
Haddock	$10.00/kg	10.17	10.33	10.64	10.89	11.05	11.30	11.46	11.80	12.27	12.34	12.55

Source: GNWT Bureau of Statistics (2010j); IOL et al. (2004).

The current number of harvesters in Tuktoyaktuk and Inuvik is not readily available, nor is the quantity of wildlife harvested. According to IOL et al. (2004), the quantity (in kilograms) of wildlife harvested, per type, in 1997 throughout the ISR was:

- mammals – 163,868 kg
- birds – 22,693 kg
- fish – 62,751 kg

Based on the calculated (adjusted) costs to purchase comparable foods in the local stores, the overall contribution of harvesting to the economy in the ISR is estimated as:

- $2,160,000 for mammals;
- $313,000 for birds; and
- $788,000 for fish.

As shown in Table 3.2.8-2, the percentage of households consuming country foods in 2008 is higher in Tuktoyaktuk than in Inuvik but is declining (GNWT Bureau of Statistics 2010k and 2010l).

TABLE 3.2.8-2: PERCENTAGE OF HOUSEHOLDS CONSUMING COUNTRY FOODS

Location	Percentage of Households Consuming Country Foods (%)			
	1993	1998	2002	2008
NWT	29	30	33	28
Beaufort-Delta Region	51	51	45	-
Tuktoyaktuk	71	71	-	63
Inuvik	30	31	29	25

Source: IOL et al. (2004); GNWT Bureau of Statistics (2010k, 2010l)

Trapping is another contributor to the NWT economy. The traditional fur economy is promoted through the Genuine Mackenzie Valley Furs (GMVF) Program, by the GNWT in partnership with the NWT Harvesters. The GNWT ITI compiled the annual harvest totals based on fur auction records for 2007-2008 in GNWT, as shown in Table 3.2.8-3. Specific data for the Beaufort-Delta region, Tuktoyaktuk, and Inuvik are not available.

TABLE 3.2.8-3: GNWT ANNUAL HARVEST TOTALS, 2007-2008

Annual Harvest Total (2007-2008)				Annual Sold Total (2007-2008)	
Species		Harvest	Number Sold	Sold ($)	Prime Fur Bonus ($)
Bear	Black	7	12	945.00	200
	Grizzly	3	2	1,750.00	100
	Polar	1	1	2,300.00	50
Beaver		1,399	1,277	24,914.00	7,580
Coyote		3	2	60.00	20
Fisher		27	32	2,004.00	330
Fox	Cross	110	115	4,090.23	1,020
	Red	136	145	3,642.00	930
	Silver	13	12	327.00	105
	White (Arctic)	193	346	7,180.75	2,445
Lynx		723	725	171,499.58	17,300

TABLE 3.2.8-3: GNWT ANNUAL HARVEST TOTALS, 2007-2008

Annual Harvest Total (2007-2008)				Annual Sold Total (2007-2008)	
Species		Harvest	Number Sold	Sold ($)	Prime Fur Bonus ($)
Marten		11,282	11,093	1,019,223.97	211,522
Mink		704	675	10,817.00	1,030
Moose Hide		4	4	3,350.00	0
Muskrat		10,736	4,768	13,885.96	623
Otter		22	40	1,475.00	50
Seal	Ringed	309	42	2,489.00	725
Squirrel		645	678	1,202.90	255
Weasel		814	268	1,821.30	214
Wolf	Boreal	51	44	5,946.00	250
	Arctic	3	3	850.00	0
	Tundra	3	7	1,768.00	200
Wolverine		78	76	19,747.00	2,750
Total		27,269	20, 367	$1,301,288.69	$247,699

Source: IOL et al. (2004); GNWT Bureau of Statistics (2010k, 2010l)

Marten were harvested and sold the most compared to other species in 2007-2008, in terms of number sold and overall sales value. Marten generated the highest Prime Fur Bonus (PFB), which occurs when the fur sells for a price greater than or equal to the guaranteed advance (GNWT ITI 2007). The guaranteed advance is an advance payment to trappers who ship their furs through the GMVF program. These advances are reconciled when the fur has been sold (GNWT ITI ND).

3.2.8.2 Resource Accessibility, Quality and Level of Harvest

Importance and Management of Resource

Wildlife and land resources are of primary importance to the Inuvialuit, and are used for cultural, traditional, and subsistence purposes. The importance of these resources can be determined from the number of people involved in traditional activities and from the number of households with people who prefer to consume country foods.

In the majority (86%) of households in the ISR, people prefer to eat more country food than is actually available (Egeland 2010). A factor that is currently affecting availability of country foods is a decline in species population, such as caribou. Country foods are also considered inaccessible to some people in the region due to lack of active hunters in the household, lack of transportation such as snowmachine or boat, and high cost of supplies and fuel to go fishing and hunting (Egeland 2010).

Changes in lifestyle can also make acquiring country foods a challenge. As residents are increasingly tied to the wage economy, they hunt or fish on weekends in areas nearer to their places of residence. Harvesting time limited to weekends means they have less time to travel to find game, fish or wildfowl (Community of Tuktoyaktuk et al. 2008).

Modes of transportation have also changed in favour of faster means of transportation. In winter, hunters use snowmachines, and in summer, boats and four-wheel drive or all-terrain vehicles (Community of Tuktoyaktuk et al. 2008). Purchase of these vehicles adds to the overall costs of harvesting country foods.

The Community Conservation Plans for both Tuktoyaktuk and Inuvik were prepared in accordance with principles laid out in the IFA to aid Inuvialuit communities with land management in order to preserve the option of living off the land for present and future generations (Community of Tuktoyaktuk et al. 2008).

The IFA sets up several resource management bodies, including:

- Wildlife Management Advisory Council (NWT and North Slope). Responsible for advising government ministers and Inuvialuit agencies on all wildlife-related matters.
- Fisheries Joint Management Committee (FJMC). Responsible for managing marine mammals harvesting and marine and freshwater fisheries.
- Inuvialuit Game Council (IGC). Manages and regulates the collective Inuvialuit interest in wildlife and advises the government.
- Hunters and Trappers Committees (HTC). Allocates resources and promotes Inuvialuit involvement in conservation, research, management, enforcement and utilization.
- Inuvialuit Land Administration (ILA). Manages and administers access to Inuvialuit private lands. The ILA also screens development proposals on Inuvialuit private lands.
- Environmental Impact Screening Committee (EISC). Screens all development proposals on Crown lands within the ISR for potentially negative environmental impacts.
- Environmental Impact Review Board (EIRB). Reviews project proposals which may have significant environmental impacts. The EIRB has the authority to conduct detailed public reviews and make recommendations to the federal government regarding proposed developments (Community of Tuktoyaktuk et al. 2008).

Harvesting Areas and Amount Harvested

This section describes the harvesting areas and amount harvested for key species. The data presented in the following section are primarily derived from the Inuvialuit Harvest Study 1988-1997 (Joint Secretariat 2003). This study has not been updated since it was originally published; in the Inuvialuit Settlement Region, comprehensive harvest studies are no longer being conducted (G. More, Land and Water Manager, GNWT ENR, pers. comm., October 26, 2010). Additional harvest information is provided, where available.

Caribou

The Inuvialuit have exclusive harvesting rights to caribou within the Inuvialuit Settlement Region. Inuvialuit communities rely on the Cape Bathurst and Bluenose-West herds of barren-ground caribou which occupy the northern portion of the Northwest Territories and

western Nunavut (Community of Inuvik et al. 2008; Community of Tuktoyaktuk et al. 2008).

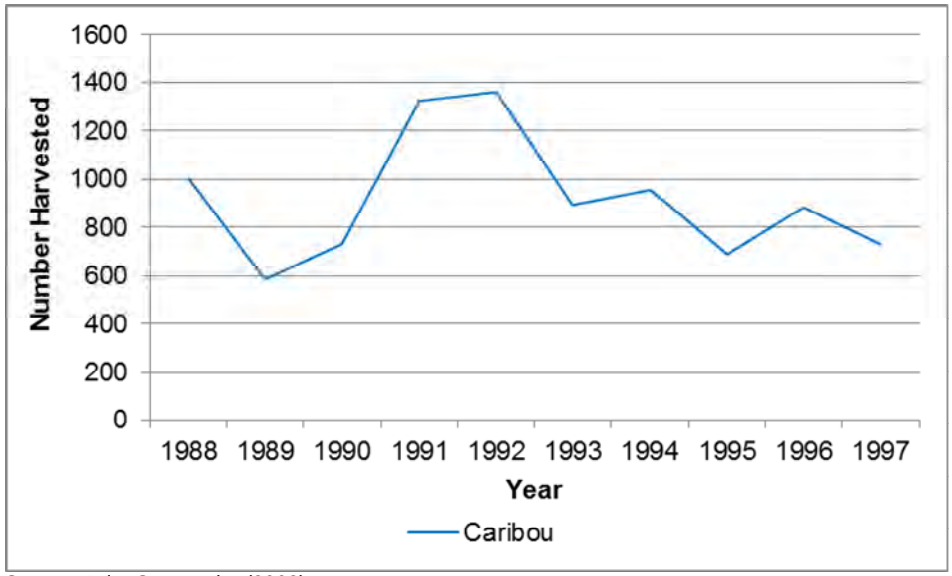
Due to a decline in barren-ground caribou population, hunting has been closed to all hunters, including Inuvialuit beneficiaries, from July 1, 2006 to the present in Area I/BC/07 (which includes the area of the proposed Highway). In Area I/BC/08, located to the north and east of Tuktoyaktuk, hunting for the Tuktoyaktuk Peninsula Herd is still permitted by Inuvialuit hunters between June 16 and March 31. This area is closed for hunting from April 1 to June 15 to allow the Cape Bathurst caribou herd to migrate back to their calving grounds along the coast.

Figure 3.2.8-1 shows the seasonal caribou harvesting areas.

Tuktoyaktuk

Between 1988 and 1997, the annual caribou harvest near Tuktoyaktuk fluctuated from a high of 1,398 caribou harvested in 1992 to a low of 586 caribou in 1989 (Figure 3.2.8-2). With the exception of the 1991 and 1992 harvest years, annual caribou harvests have remained below 1,000 caribou per year in the Tuktoyaktuk region (Joint Secretariat 2003).

The declining population, hunting bans and hunting season restrictions have affected the location and likely the number of caribou harvested in the Tuktoyaktuk area. However, current caribou harvesting data for this community are not available.



Source: Joint Secretariat (2003)

Figure 3.2.8-2
Estimated Annual Caribou Harvest, Tuktoyaktuk, 1988-1997

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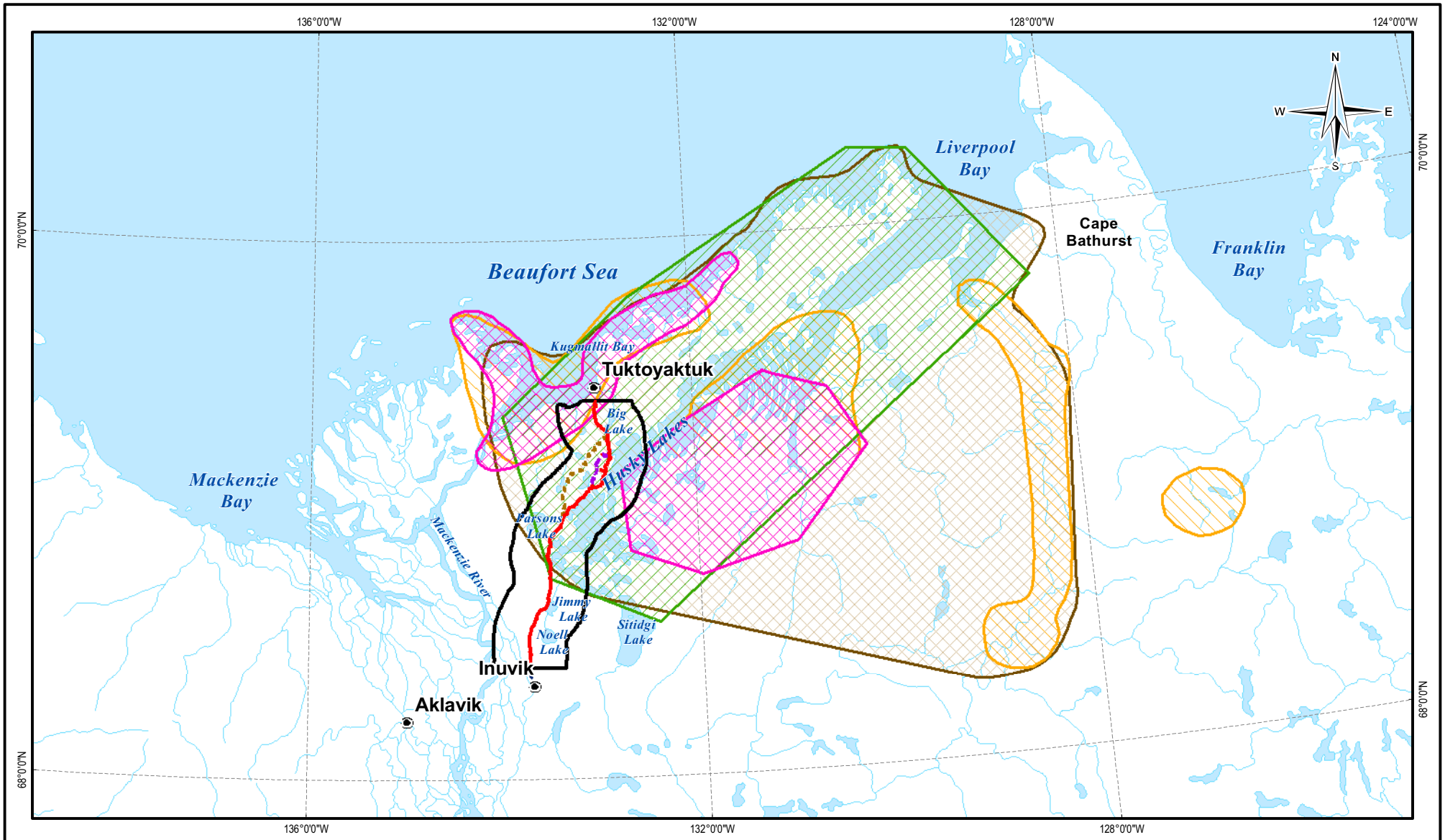


LEGEND

- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- Navy Road
- 302C-Spring Caribou Harvest Area
- 306C-Summer Caribou Harvest Area
- 309C-Fall Caribou Harvest Area
- 315C-Winter Caribou Harvesting Area
- Watercourse
- Waterbody

NOTES

Base data source: National Atlas
Caribou Harvest Areas: Joint Secretariat, Tuktoyaktuk CCP April 2008

ISSUED FOR USE

Scale: 1:2,250,000

20 10 0 20 40 60 80

Kilometres

PROJECTION	DATUM
UTM Zone 8	NAD83

FILE NO. V23201322_EIS_Map008_Trad_CaribouHarv.mxd

Town of Inuvik | Northwest Territories | KIGGIAK - EBA

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Caribou Harvesting Areas Spring, Summer, Fall, Winter

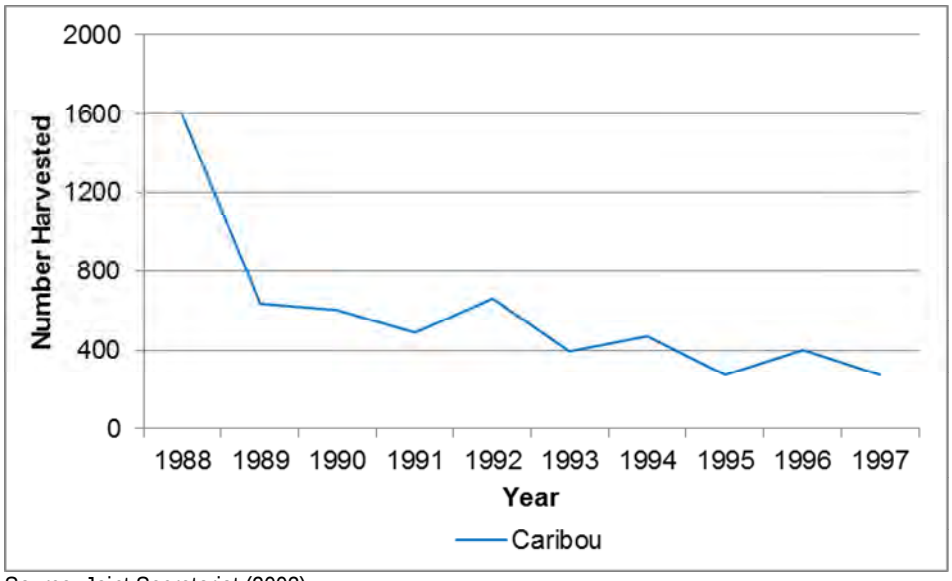
PROJECT NO.	DWN	CKD	REV
V23201322	SL	TS	0

OFFICE	DATE
EBA-VANC	May 2, 2011

Figure 3.2.8-1

Inuvik

In the Inuvik area, between 1988 and 1997, the Inuvialuit annual caribou harvest fell from 1,589 to 275 animals per year (Figure 3.2.8-3). The sharpest decline followed the 1988 hunting season; 1,589 caribou were harvested in 1988, compared with 635 in 1989. Since 1989, the number of caribou harvested has continued to decline to as few as 275 in 1997. The declining population, hunting bans and hunting season restrictions have affected the location and likely the number of caribou harvested in the Inuvik area. However, current caribou harvesting data for this community are not available.



Source: Joint Secretariat (2003)

Figure 3.2.8-3
Estimated Annual Caribou Harvest, Inuvik, 1988-1997

Big-Game

Other big-game harvested include moose, grizzly bear and, to a lesser extent, black bear. Moose are an important alternate food source when caribou are not available, and are also used for clothing and tools (Community of Inuvik et al. 2008). Figure 3.2.8-4 shows the spring moose harvesting areas. Traditionally, grizzlies are hunted for their fur (Community of Tuktoyaktuk et al. 2008).

GNWT ENR records indicate the grizzly bear harvests recorded in the Inuvialuit Harvest Study (Joint Secretariat 2003) were biased low. More recent data indicate that between July 2005 and June 2010, 48 grizzly bears were harvested using Tuktoyaktuk tags (GNWT ENR 2010h). Despite the increase from the earlier data, the harvest between 2005 and 2010 was less than the quota for the two hunting areas (GNWT ENR 2010h).

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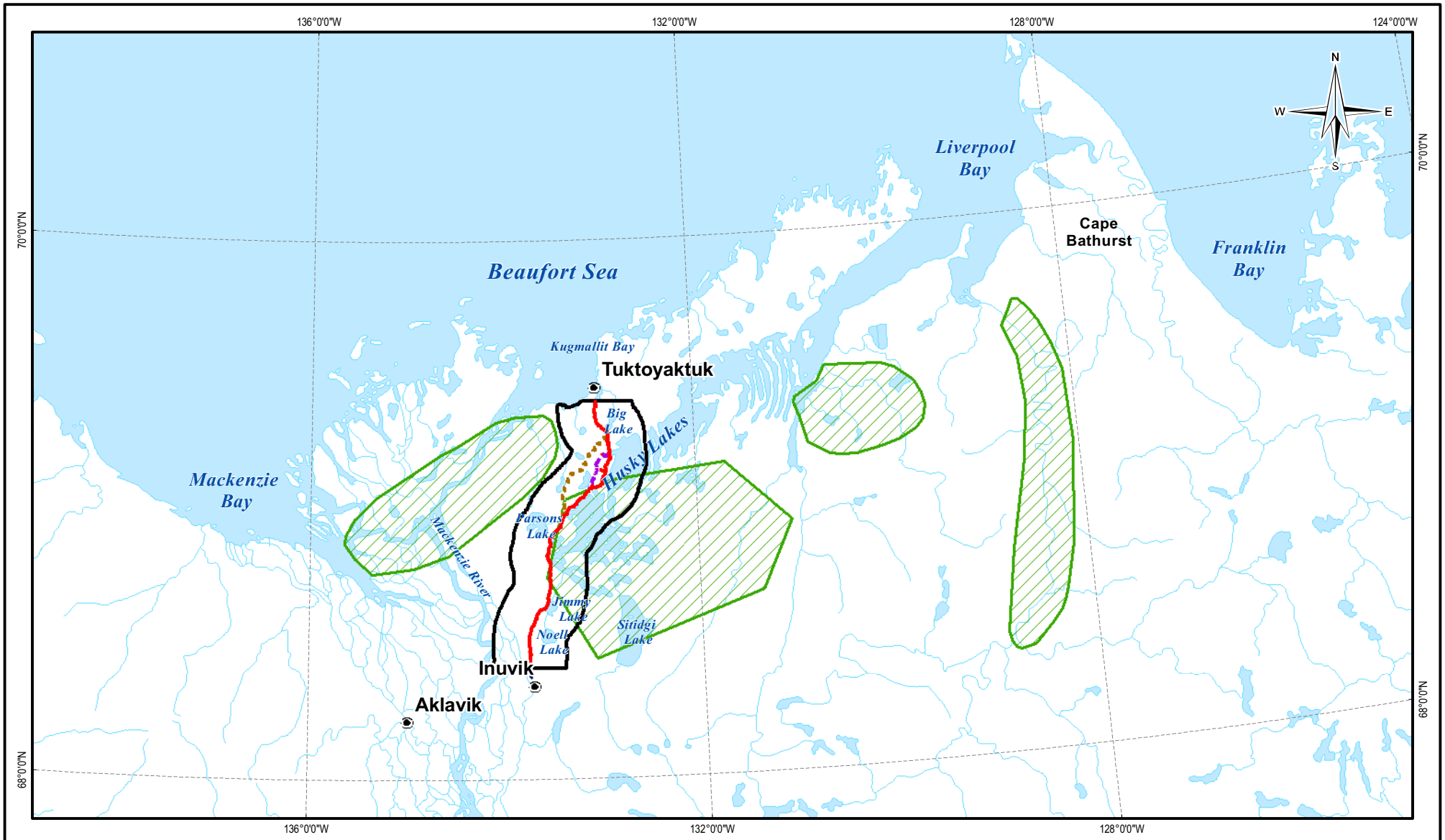

LEGEND

- Regional Study Area (15 km buffer)
- Primary 2009 Route
- Alternative 1 (2009 Minor Realignment)
- Alternative 2 (Upland Route)
- Alternative 3 (2010 Minor Realignment)
- Navy Road
- 303B-Spring Moose Harvesting Area
- Watercourse
- Waterbody

NOTES

Base data source: National Atlas
Moose Harvest Areas: Joint Secretariat, Tuktoyaktuk CCP April 2008

ISSUED FOR USE

Scale: 1:2,250,000

20 10 0 20 40 60 80

Kilometres

PROJECTION	DATUM
UTM Zone 8	NAD83

FILE NO.
V23201322_EIS_Map011_Trad_MooseHarv.mxd

Town of Inuvik · Northwest Territories · KIGGIAK - EBA

PROPOSED INUVIK-TUKTOYAKTUK HIGHWAY ENVIRONMENTAL IMPACT STATEMENT

Moose Harvesting Areas Spring

PROJECT NO.	DWN	CKD	REV
V23201322	SL	TS	0

OFFICE	DATE
EBA-VANC	May 2, 2011

Figure 3.2.8-4