THE NORTHERN TRANSPORTATION SYSTEMS ASSESSMENT

Phase 1 Report

Northern Transportation Demand Assessment

June 2010

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Submitted to Transport Canada

Submitted by PROLOG Canada Inc.

In Association with EBA Engineering Consultants Ltd.

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1. Introduction and Summary

This is the Phase 1 Report of the Northern Transportation Systems Assessment. The purpose of the Phase 1 Report is to profile current and future traffic demand for each modal system in the North. Subsequently in Phase 2, traffic allocation among modes will be reassessed in terms of emerging economic, resource development and environmental changes impacting both transportation system performance and infrastructure requirements.

The scope of Phase 1 work embraces the surface and air transport systems of Nunavut, The Northwest Territories and Yukon and their extensions into southern Canada and Alaska. This Phase 1 Demand Report is based upon primary data sources obtained through interviews and surveys conducted with all major transportation system stakeholders in government and industry.

The Phase 1 Report has established current traffic demand for the following modal transportation systems:

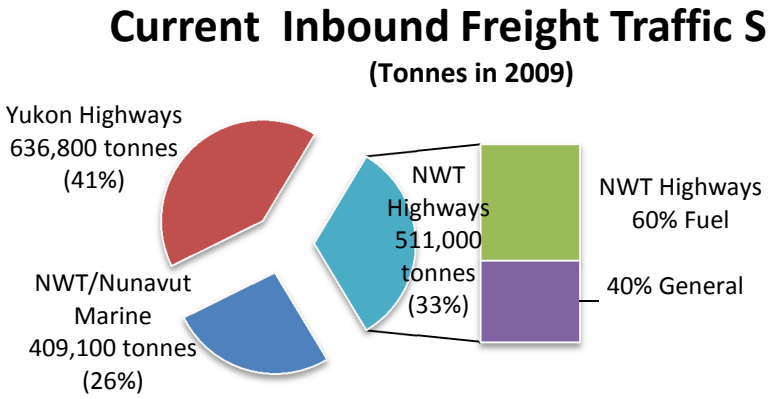
Total Freight in 2009 in Tonnes

Transportation System	Community Resupply General Freight	Resource Projects General Freight	Bulk Fuel Supply	Total Inbound
Eastern Sealift	54,500	39,100	139,900	233,500
Western Sealift	3,750	3,850	58,900	66,500
Hudson Bay	4,300	27,300	38,500	70,100
Mackenzie River	8,900	3,900	26,200	39,000
*Inside Passage **	*59,400*	*24,100*	*64,000*	*147,500*
*Mackenzie Rail **	*8,500*	*1,700*	*201,300*	*211,500*
NWT Highways	163,000	48,000	300,000	511,000
Yukon Highways	371,000	143,900	121,900	636,800
Total Inbound *	**605,350**	**266,050**	**685,400**	1,556,900
Air Freight				20,000
Mineral Exports				**54,000**
Total Tonnes				1,630,900

* Mackenzie Rail and Inside Passage Tonnes included in Highway and River Tonnes, and excluded from Total Tonnes.

From these current demand statistics the following traffic split shows that:

- Yukon Highways carry the most northern traffic (over 40%);
- Nunavut Sealift and NWT Mackenzie River traffic is about a quarter of the total;
- Northwest Territories Highways carry a third of northern traffic and of that total;
- Fuel is approximately 60% of the Northwest Territories Highways traffic total.



The modal split shifts across the North:

- From exclusively Sealift in the roadless Eastern Arctic;
- To a mix of Highway, Intermodal and Western Sealift in the Northwest Territories;
- To a preponderance of trucking on the extensive Yukon Highway System.

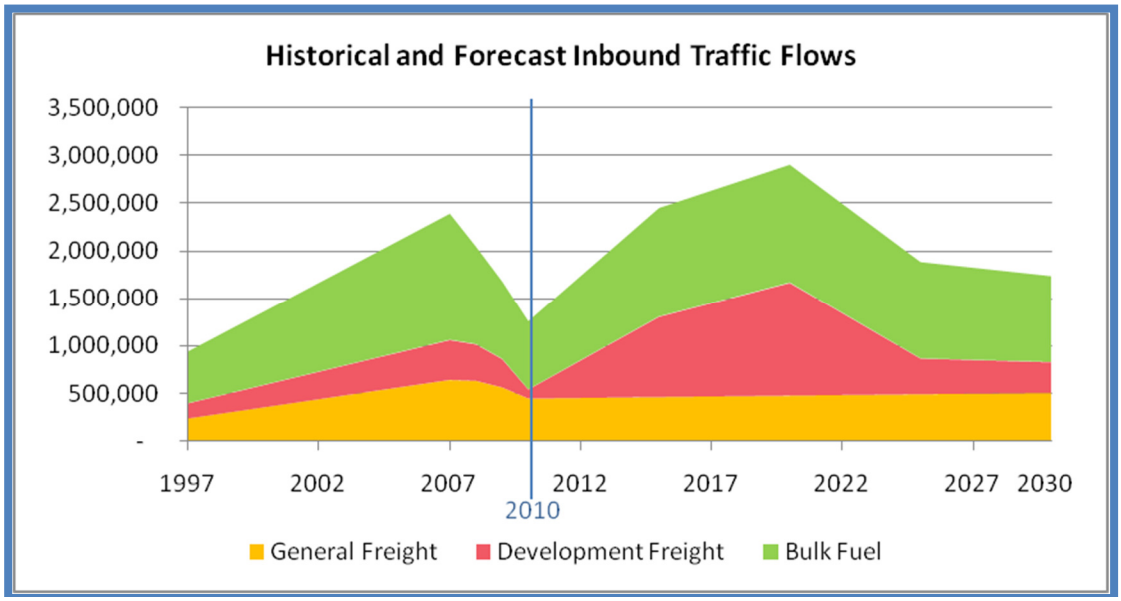
Northern Transport Systems demand development includes traffic generated by resource projects that are currently active. As well, forecasts extended from current baseline traffic are augmented with assessment of resource development projects that may take place over the next 20 years.

Northern Transport Demand Forecast Summary (tonnes)					
	2010	2015	2020	2025	2030
General Freight	443,557	459,499	474,226	489,032	503,737
Development Freight	94,100	846,100	1,193,000	375,000	322,000
Bulk Fuel	718,986	1,142,164	1,233,712	1,017,954	908,614
Total Inbound	**1,256,643**	**2,447,763**	**2,900,938**	**1,881,986**	**1,734,351**
Outbound	**112,000**	**1,381,000**	**19,556,600**	**19,320,600**	**18,820,600**
*Induced Demand**	***18,820***	***169,220***	***238,600***	***75,000***	***64,400***

A 1.20 induced impacts multiplier is applied to development freight to account for the additional traffic demand that can be expected with spin-off economic activity from resource development projects. Induced demand is shown for information only and not included in the totals.

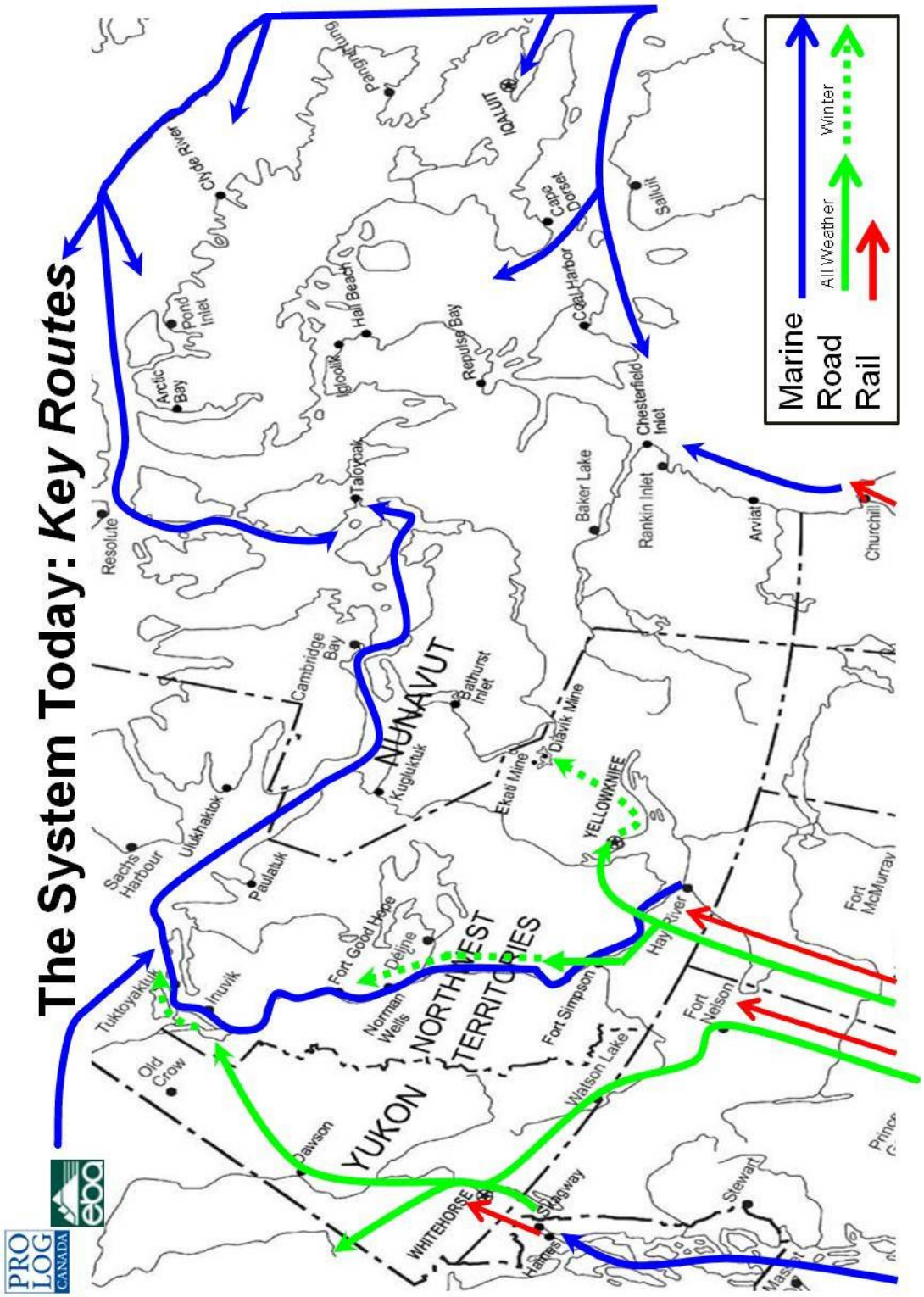
The following chart shows for Northern Transportation Systems Inbound Traffic:

- Historical growth during the decade from 1997 to 2007;
- Recent decline through the economic recession to 2010; and
- Resumed resource development driven growth forecast to 2030.



Source: PROLOG Northern Territories Transportation Systems Study (1998)
and PROLOG contemporary and forecast demand statistics presented in this report.

The balance of this report outlines the operations for each northern transportation system, and documents the detailed traffic demand statistics developed for them.


The System Today: Key Routes
Marine
Road
Rail
All Weather
Winter
NUNAVUT
NORTHWEST TERRITORIES
YUKON
YELLOWKNIFE
WHITEHORSE
IQALUIT
Resolute
Cambridge Bay
Baker Lake
Rankin Inlet
Chesterfield Inlet
Arviat
Churchill
Pond Inlet
Arctic Bay
Hall Beach
Repulse Bay
Cape Dorset
Coal Harbor
Salluit
Clyde River
Pangnirtung
Igloolik
Taloyoak
Bathurst Inlet
Kugluktuk
Ekati Mine
Diavik Mine
Sachs Harbour
Ulukhaktok
Paulatuk
Tuktoyaktuk
Inuvik
Old Crow
Fort Good Hope
Déline
Norman Wells
Fort Simpson
Hay River
Fort Nelson
Fort McMurray
Watson Lake
Dawson
Skagway
Haines
Stewart
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2. Contemporary Transportation Systems Demand

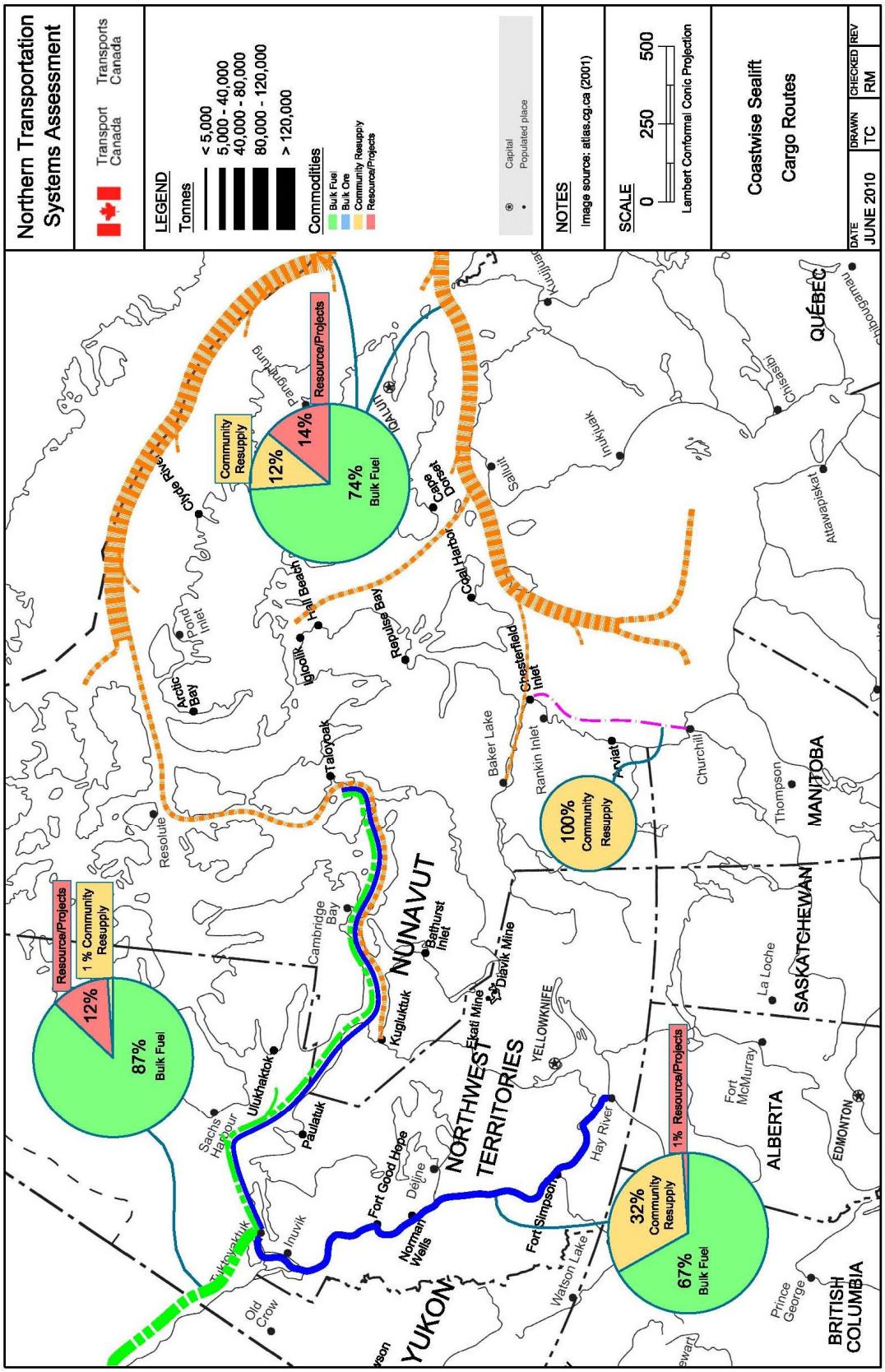
This chapter of the report documents actual demand imposed on the current configuration of Northern Transportation Systems as outlined in the map opposite. Current transportation systems supplying both communities and resource developments in the North are:

- Eastern Sealift Systems – break bulk general cargo ships and bulk fuel product tankers with sailings from the East originating traffic to the Kivalliq, Qikiqtaaluk and Kitikmeot regions of Nunavut.
- Western Sealift Systems – combination deck cargo/bulk fuel Mackenzie River barges or deep draft ocean vessels with sailings from the West originating traffic to the Nunavut and NWT Western Arctic Coast.
- Inland Intermodal Systems – a combination of intermodal container/trailer services and integrated marine and rail or road bulk commodity hauls within Hudson Bay, the Mackenzie Valley and the Alaska/B.C. Inside Passage.
- Truck Transport Systems – a range of roads from the relatively extensive Yukon heavy haul highway system; to all-weather highways extended by winter/ice roads in NWT; to no roads at all in Nunavut.
- Air Passenger & Cargo Systems – Northern Regional Airports at Iqaluit, Rankin Inlet, Yellowknife and Whitehorse linked to Southern Gateway Airports at Montreal, Ottawa, Winnipeg, Edmonton, Calgary and Vancouver.

These northern transportation systems supply the carrying capacity to meet contemporary traffic demand summarized in the following table.

Total Surface Systems Demand (Inbound Tonnes)

	2007	2008	2009
Eastern & Western Sealift	202,800	250,300	300,000
Intermodal Marine/Truck/Rail	313,300	399,000	256,600
Yukon & NWT Through Truck	2,102,400	1,708,000	1,000,300
Total	**2,618,500**	**2,357,300**	**1,556,900**


Northern Transportation Systems Assessment
Transport Canada
Transports Canada
LEGEND
Tonnes
< 5,000
5,000 - 40,000
40,000 - 80,000
80,000 - 120,000
> 120,000
Commodities
Bulk Fuel
Bulk Ore
Community Resupply
Resource/Projects
Capital
Populated place
NOTES
Image source: atlas.cg.ca (2001)
SCALE
0 250 500
Lambert Conformal Conic Projection
Coastwise Sealift
Cargo Routes
DATE
JUNE 2010
DRAWN
TC
CHECKED
RM
REV
12%
1 % Community Resupply
Resource/Projects
87% Bulk Fuel
12%
Community Resupply
14%
Resource/Projects
74% Bulk Fuel
100% Community Resupply
32% Community Resupply
1% Resource/Projects
67% Bulk Fuel
NUNAVUT
NORTHWEST TERRITORIES
YUKON
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUÉBEC
BRITISH COLUMBIA
Resolute
Arctic Bay
Igloolik
Hall Beach
Repulse Bay
Coral Harbour
Cape Dorset
Clyde River
Pangnirtung
Iqaluit
Taloyoak
Cambridge Bay
Kugluktuk
Ulukhaktok
Paulatuk
Sachs Harbour
Inuvik
Old Crow
Fort Good Hope
Norman Wells
Deline
Fort Simpson
Hay River
Watson Lake
Yellowknife
Ekati Mine
Diavik Mine
Baker Lake
Rankin Inlet
Chesterfield Inlet
Arviat
Whale Cove
Churchill
Thompson
La Loche
Fort McMurray
Edmonton
Prince George
Inukjuak
Salluit
Kuujjuaq
Chisasibi
Attawapiskat
Kuujjuaraapik

2.1 Sealift Systems Demand

Arctic Sealift operations resupply coastal communities in Nunavut and the Northwest Territories. There are no permanent road connections to Southern Canada[1] and the only surface transportation access is by sealift, both from the East Coast and from the West Coast:

- The Eastern Sealift is a well developed system of tanker and dry cargo ships historically resupplying Baffin communities - and recently Kivalliq and Kitikmeot communities as well.
- The Western Sealift has recently begun deep draft barge resupply to Kitikmeot and coastal NWT communities historically reached by extension of the Mackenzie River Barge System.

Traffic flows for 2009 and composition for the Eastern and Western Sealift are highlighted on the map opposite. In the table below current demand is shown for each region served by sealift.

Total Eastern and Western Sealift (2009 Tonnes)

Sealift Cargo:	Bulk Fuel	Dry Cargo	Total Cargo
From East To:			
Kivalliq	66,000	40,700	**106,700**
Qikiqtaaluk	74,000	29,300	**103,300**
Kitikmeot		23,500	**23,500**
Total Eastern Sealift	140,000	93,500	**233,500**
From West To:			
Kitikmeot	44,000	6,600	**50,600**
NWT Coast	15,000	900	**15,900**
Total Western Sealift	59,000	7,500	**66,500**
Total East & West Sealift	**199,000**	**101,000**	**300,000**

[1] In the Northwest Territories, all-weather Dempster Highway access to the Mackenzie Delta is seasonally extended to the Arctic Coast by the Inuvik-Tuktoyaktuk winter ice road. In Nunavut, the only permanent road construction has been for mine access: 28 km from Arctic Bay to the former Nanisivik Mine, 100 km from Milne Inlet to the Mary River Mine development, and 110 km from Baker Lake to the new Meadowbank Mine.

There are some 15 sealift sailings each season for Community Resupply and Resource Development Dry Cargo and Bulk Fuel (see appendix for sailings).

Due to the ice regime, this resupply traffic is constrained by a short summer shipping window from the third week of July through the first week of October. From the seasonally-manned Ice Operations Centre at Iqaluit, the Canadian Coast Guard coordinates marine navigation and ice-breaking services to vessels operating in Canadian waters north of the 60th parallel and in Hudson Bay. Ice-breakers are deployed in this region from July through November to insure that the shipping window is maintained within each Shipping Safety Control Zone.

Access to the region was originally controlled under a Zone/Date System [Z/DS] with the Arctic carved up into regions and access dates according to ships ice capabilities. However, zones were established based on knowledge of ice conditions at the time (1960-70's) and do not reflect the changes since then. More recently, the Arctic Ice Regime Shipping System (AIRSS) has been designed precisely to counteract this limitation by taking into account the prevailing ice conditions when deciding whether a ship may enter a zone in the Arctic.

The implementation of the AIRSS system now allows greater flexibility in determining delivery windows since it takes into account the actual ice conditions for a region in the Arctic in determining access for a particular ice classification of vessel. The Z/DS can still be used for planning access dates and delivery schedules but if entry is desired outside of the prescribed dates then the AIRSS system must be used.

Both the original zone date system (Z/DS) and the Arctic Ice Regime Shipping System (AIRSS) system are running in parallel at this time. However work has been undertaken to examine the viability of combining or revising the two systems to form a hybrid system. (See appendix for further information on Z/DS and AIRSS).

The delivery system for Arctic community resupply has evolved over time to match vessel capabilities with limited port facilities. Where dry cargo used to be shipped as break bulk [individual pieces] it is increasingly (half) being shipped by container, the advantage being security, the ability for the individual customer to pack their own container and ease of handling/less damage for the shipper/consolidator and ship owner.

While Western Arctic communities generally have shallow draft docks, offloading at virtually all Eastern Arctic resupply sites requires lightering to a designated “sealift” beach. Some discharge points are open to the sea. Maintenance and improvement of all marine resupply facilities in the Western NWT and Nunavut, are a program responsibility of Canadian Coast Guard/Department of Fisheries and Oceans, delivery of which is carried out by the respective territory.

With more competitive market conditions and a moderating ice regime, resupply sourcing and routing are evolving. Eastern Arctic Sealift from Quebec has expanded at the expense of:

- Hudson Bay barge service from Churchill, Manitoba and Moosonee, Ontario
- Mackenzie River Western Arctic barge service from Hay River, NWT.

There is now an increasing trend for cargo to be shipped from southern Canada or elsewhere direct to the communities with penetration from the east coast almost to Tuktoyaktuk and from the west coast all the way to Taloyoak.

The following sections of this chapter look first at the two Eastern Sealift services for:

- Dry Cargo Resupply; and
- Bulk Fuel Products

Then the Western Sealift, which is in transition, is outlined for:

- The traditional Hay River Gateway; and
- A new West Coast Sealift Gateway.

2.1.1 Eastern Dry Cargo System

The Eastern Dry Cargo Ship System supplies Nunavut by sealift from the southern Canadian east coast including both community resupply and resource development cargo:

- Community Resupply Sealift contracted by the Nunavut Government, Northwest Company (Northern Stores), Arctic Cooperatives or other private shippers.
- Resource Project sealift contracts privately negotiated by resource development companies.

MV Umiavut offloading cargo to lighter barges for delivery to a sealift beach. Nunatsiaq News Photo

For both of these, the following table shows current dry cargo sealift demand in Nunavut.

Current Dry Cargo Sealift Demand (2009 Tonnes)

Government of Nunavut Contract	27,900	
Private Shipper Contracts	26,600	
Community Resupply Total		**54,500**
Resource Development Cargo		**39,100**
Total Dry Cargo Sealift		**93,600**

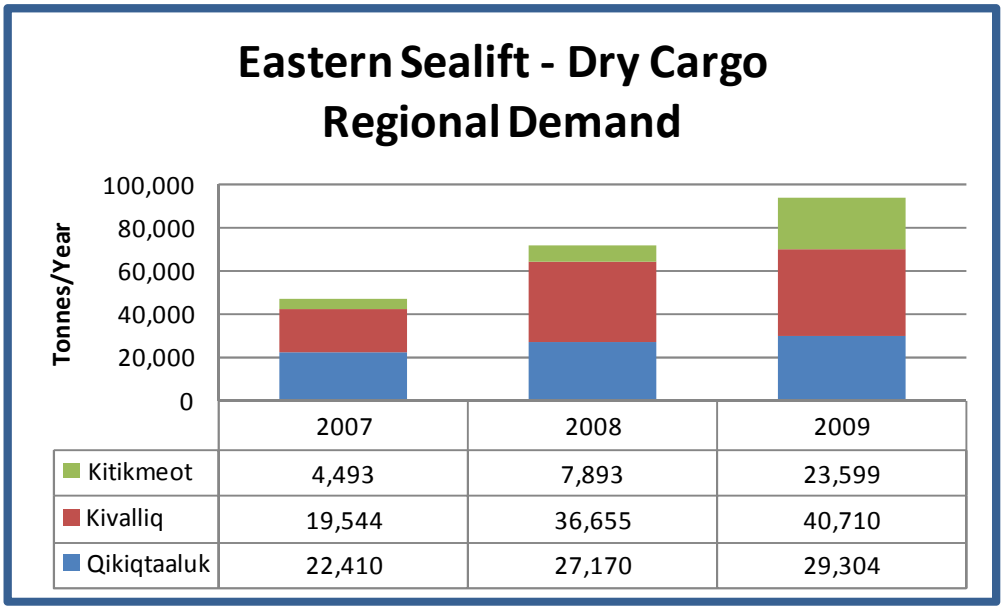
Source: Nunavut Government, Mining Companies, Arctic Cooperatives and a sampling of Northern Stores.

There are three principal marine transportation companies involved in dry cargo resupply to Nunavut (see appendix for fleet statistics):

- **Nunavut Eastern Arctic Shipping (NEAS),** owned by Sakku Investments, Qikiqtaaluk Corporation, Makivik Corporation and Transport Nanuk (itself a joint venture between North West Company and Logistec Corporation). NEAS operates a fleet of ice class container/Roll-On Roll-Off/heavy lift ships carrying dry cargo to northern Quebec and Nunavut.
- **Northern Transportation Co. Ltd. (NTCL)** - Owned by Inuvialuit Development Corporation and Nunasi Corporation, through Norterra a holding company. NTCL utilizes tugs and barges for bulk fuel and deck cargo deliveries, both on rivers and on the oceans. For some of the operations they will charter in ice class ships.
- **Nunavut Sealink & Supply Inc. (NSSI)**, a joint venture between Arctic Co-operatives Limited, the majority shareholder, and Desgagnés Transarctik Inc., the managing partner. NSSI owns a fleet of container/break bulk ships in service to northern Quebec and Nunavut.

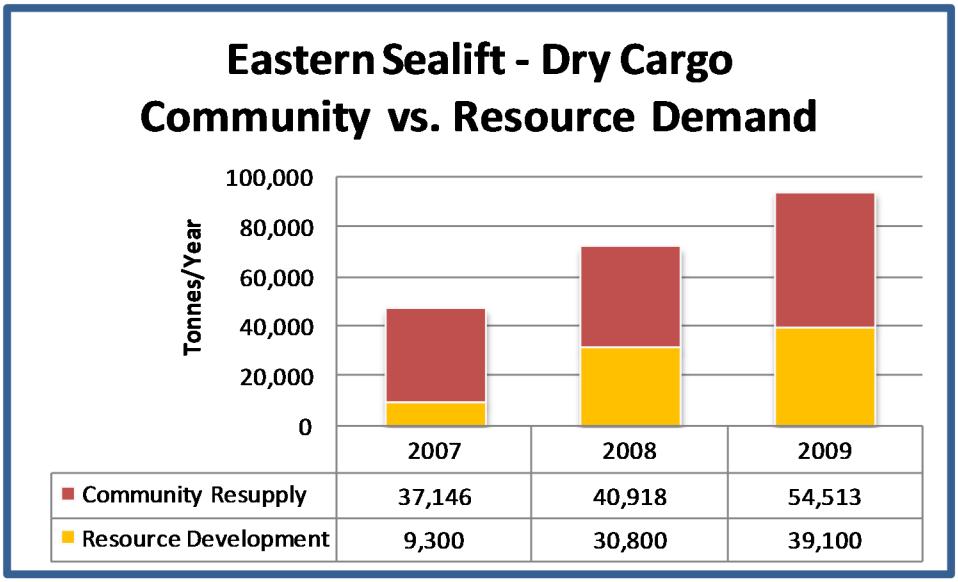
The aboriginal people of Nunavut and the NWT have taken a strong business interest in their own resupply. This is reflected in joint ownership of the above transportation companies that have been structured to obtain preferential treatment provided to Inuit firms under Article 24 of the Nunavut Land Claim Agreement.

The following graph shows the contemporary demand (2007-2009) for Eastern Sealift which these Inuit controlled corporations have handled.



	2007	2008	2009
Kitikmeot	4,493	7,893	23,599
Kivalliq	19,544	36,655	40,710
Qikiqtaaluk	22,410	27,170	29,304

While overall traffic to the north has declined with the recession over the 2007-2009 period, Eastern Sealift traffic to all three regions of Nunavut has increased, pushed up primarily by resource development projects as can be seen in the graph that follows.



Each region in Nunavut has a major mining project in play that is prompting these large sealift traffic increases:

- Newmont Mining is developing the Hope Bay Gold Mine on the Coronation Gulf between Cambridge Bay and Kugluktuk in the Kitikmeot Region
- Baffinland Iron Mines has developed the Mary River mine south of Pond Inlet, and although currently on hold, shipped 130,000 tonnes to European Steel Mills in 2008
- Agnico-Eagle Mining Ltd has developed the Meadowbank Gold mine north of Baker Lake for first year production in 2010.

Development Driven Increasing Demand (2006 to 2009)

Region	*Development*	*Market Increase*
Qikiqtaaluk	**Mary River Mine**	**53% increase**
Kivalliq	**Meadowbank Mine**	**46% increase**
Kitikmeot	**Hope Bay Mine**	**418% increase**

In 2008 the Baffinland Mary River Mine exported three trial cargo shiploads of Nunavut iron ore to European steel mills. Full production is estimated at 18,000,000 tonnes per year. The company is partnering with Federal Commerce and Navigation and Teekay Corporation for its shipping requirements. FedNav has a long history of operating in the Canadian Arctic and TeeKay is experienced in construction and operation of large ships.

Reportedly a consortium of the shipping companies will construct between 10 and 17 icebreaking Capesize bulk carriers of 170,000 tonnes displacement, with a cargo carrying capacity of 130,000 tonnes of ore.

A key enabler of Eastern Arctic Sealift expansion into non-traditional markets has been the opportunity to carry, in addition to regular community resupply cargo, a surge in resource development project cargos. With development driven increasing dry cargo demand, shipowners have re-equipped fleets with new, ice class vessels and are competitively seeking expanded markets:

- beyond the traditional Eastern Arctic Sealift Focus on Baffin (Qikiqtaaluk);
- in both Hudson Bay (Kivalliq) and the Western Arctic (Kitikmeot).

Qikiqtaaluk Dry Cargo Market

While Kivalliq and Kitikmeot Regions have alternative sealift services, the Qikiqtaaluk market is served almost exclusively by the traditional Eastern Sealift from the St. Lawrence Gateway in Quebec. This market is dominated by dry cargo demand at Iqaluit which accounts for 90% of the Qikiqtaaluk Region.

The Eastern Sealift operates along the east coast of Canada and into the Arctic as far west as Cambridge Bay via a St. Lawrence gateway from the Montreal area. Historically, Eastern Arctic Sealift operations have evolved over the last fifty years from a combination of government, military and private sector services.

In the early 1950's Distant Early Warning (DEW) line construction brought an unprecedented level of Eastern Arctic Sealift activity. As many as 50 private, mostly Canadian, vessels were chartere53d by the United States Military Sea Transportation Service (later the Military Sealift Command) to provide construction logistics support. Subsequently, following construction completion and through the late 1970's, primary logistics support to DEW line sites was provided by U.S. Military Sealift Command vessels from Bayonne, New Jersey.

In parallel with DEW Line logistics support controlled by the U.S. Military, the Canadian Federal Government time chartered several small ships each year for community resupply. In the late 1970's, DEW Line logistics requirements were merged into the Canadian Government controlled sealift and the marine transportation contract was shifted to full liner terms.

Coincident with transition from U.S. controlled logistics support of military installations came (a not so coincidental) drastic reduction in those requirements with both base closures and replacement of manned DEW Line sites by the automated North Warning System in the late 1980's. The Canadian Coast Guard coordinated all government sponsored cargo and residual military requirements in a commercially oriented sealift that was almost exclusively Canadian origin goods marshalled at Montreal.

Since the formation of Nunavut in 1999 that government has taken responsibility for the organization and contracting of resupply into its own communities. With devolution of this responsibility to the territories the system has become much more flexible and innovation has lowered the cost to deliver goods to the communities.

Community Resupply Sealift to all Nunavut communities is now managed through the Nunavut Department of Community And Government Services. Competitive contracts are let for the transportation of all government cargo, including schools, hamlets and the federal government requirements. The contracts are structured in such a way as to require the ship owner to provide the same rate for private shippers as for the government.

By pooling cargo and using the leverage of the relatively large volume of government cargo which it controls, the government has effectively used the tendering process to obtain lower rates on behalf of all shippers. In this way the government uses their large requirement to obtain a lower rate than otherwise would be possible for smaller and individual shippers.

Kivalliq Dry Cargo Market

The Kivalliq Region has been served variously by traditional Sealift from the East Coast (Montreal) - and by Churchill, Manitoba and Moosonee, Ontario based barge operations.

Hudson Bay barge operations from the Churchill, Manitoba railhead (see Hudson Bay Marine Intermodal Chapter) were initiated by NTCL in 1975. For 25 years this service replaced the Montreal based sealift for the majority of dry cargo that originates in Winnipeg and moves by truck and rail to Churchill for marine transportation to Kivalliq communities.

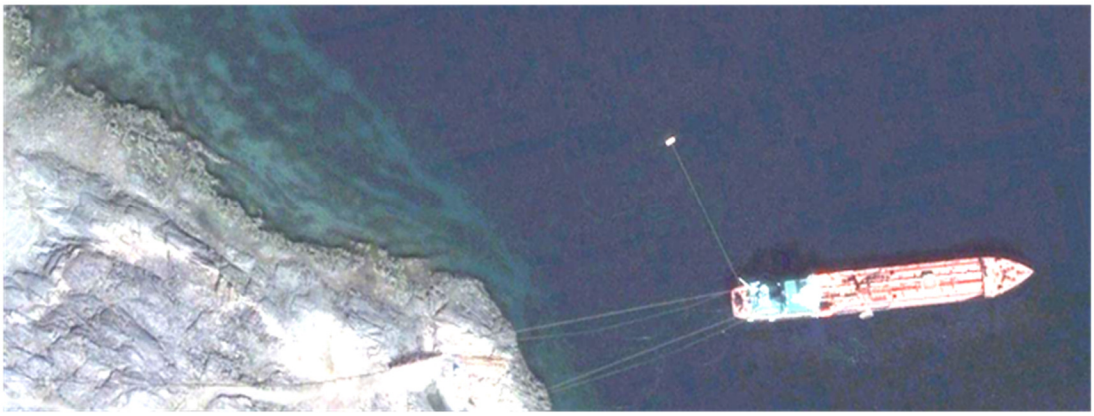
During the last decade, Eastern Sealift Shipowners have re-entered the Hudson Bay community resupply market and currently carry most dry cargo for the region. A small amount of cargo (4 – 8,000 tonnes/year) still moves from Churchill via NTCL tug and barge service. However, both NSSI and NEAS ships call at Churchill as well as providing a through bill of lading service via Montreal for Kivalliq cargo originating in Winnipeg.

Kitikmeot Dry Cargo Market

The Western Arctic was served almost exclusively by NTCL until 2007, when Eastern Sealift shipowners began testing the market (and ice conditions) to determine viability of regular community resupply operations. Since that time, Eastern Sealift sailings have been extended to Nunavut communities in the Kitikmeot region of the Western Arctic every summer.

Ironically, these communities which are located in one of the most remote regions of the North now enjoy a more competitive market than many communities further south. Three marine transportation companies provide alternative southern purchasing and/or northern delivery options from either eastern or western Canada. In all likelihood Eastern Sealift ship owners can extend that Western Arctic market competition to include Northwest Territories community resupply as well.

2.1.2 Eastern Fuel Supply System

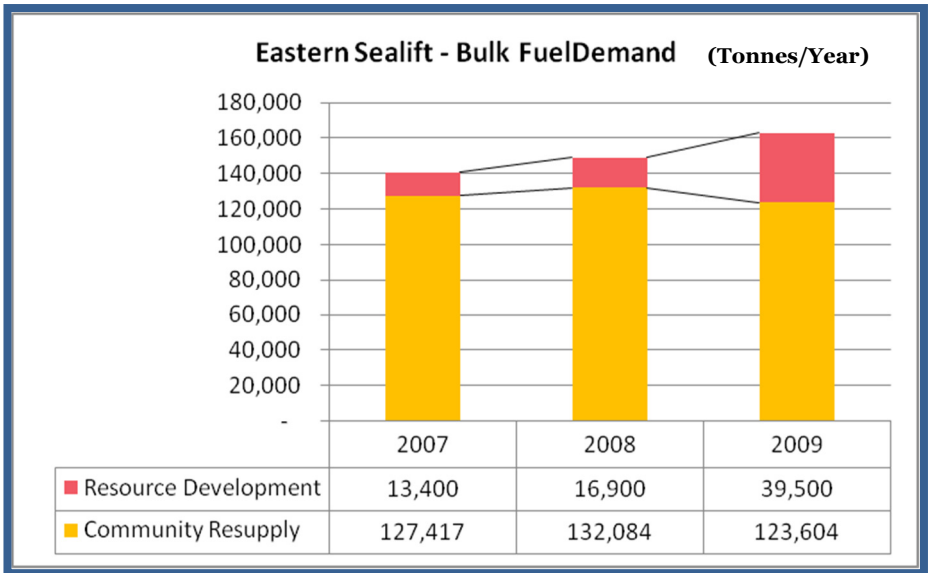


Google Earth Image of fuel product tanker discharge to Inuit Head Pipeline at Iqaluit.

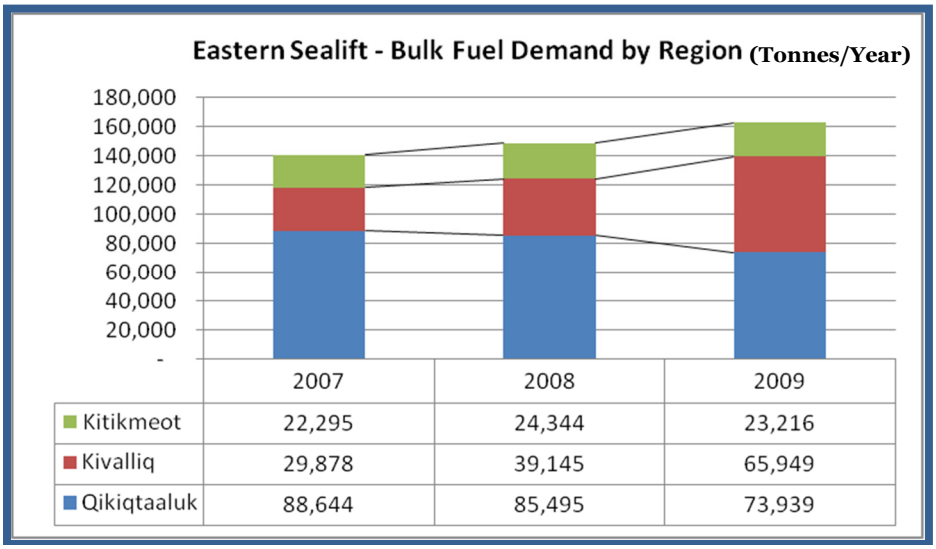
The Eastern Bulk Fuel Tanker System supplies petroleum products for power generation, heating and motor fuel in both the Qikiqtaaluk and Kivalliq Regions:

- Community requirements are contracted by the Petroleum Products Division of the Nunavut Community and Government Services Department.
- Resource development requirements are privately contracted.

In the following graph, note that bulk fuel demand is moving up with resource development.



The Eastern Sealift tanker system has traditionally been limited to the Qikiqtaaluk (Baffin) Region and more recently has replaced NTCL combined bulk fuel and deck cargo barge operations in the Kivalliq region as well. However, it is quite likely that in the Kitikmeot Region, Western Sealift will soon be replaced with Eastern Sealift tanker service, and accordingly the graph below includes bulk fuel demand for all three Nunavut regions.



	2007	2008	2009
Kitikmeot	22,295	24,344	23,216
Kivalliq	29,878	39,145	65,949
Qikiqtaaluk	88,644	85,495	73,939

Previously, the Coast Guard coordinated sealift included fuel supply as well as dry cargo, with fuel quoted FOB Montreal for delivery in a Canadian registered tanker. However, in 1993 the Government of the Northwest Territories took responsibility for fuel shipments and tendered a comprehensive fuel procurement and delivery contract. Fuel supply contracts are now let for a three-year term. Fuel is currently sourced from eastern Canada although in the recent past it has been brought in from overseas.

The Eastern Sealift fuel resupply is presently conducted by Woodward's Oil, a privately held group of companies based in Goose Bay, Labrador. Fuel supply by tanker for Qikiqtaaluk and Kivalliq is carried by Coastal Shipping Ltd., a Woodward's Group company. Coastal Shipping Ltd. has a fleet of small ice class tankers. Details of the fleets of the respective companies can be found in the Appendix.

Bulk fuel is discharged from tankers to communities by floater hoses connected to onshore pipeline manifolds. Tug and barge operations are no longer considered competitive for this sort of resupply compared to the economies of scale that are possible with the larger ice class tankers available and, increasingly much of the bulk fuel supply is conducted with larger, more modern tankers. As well as increasing the overall safety of the transport this also offers greater savings on the cost of delivery.

The major impediment to further reducing tanker costs and decreasing risks is the last segment of delivery that remains reliant on long, over-water, floater hose connections. However, there have been improvements including hoses made of tougher material with longer lengths that have fewer connections in the water.

Qikiqtaaluk Fuel Supply Market

At Iqaluit, resupply is accomplished with approximately 300 metres of 20-cm (8-in) floater hose hauled from the tanker by a workboat. The hose is connected to the pipeline manifold at Inuit Head. The pipeline extends inland to the Iqaluit tank farm. It takes 4 to 5 days to discharge the tanker at 600,000 litres/hour using the 20-cm (8-in) hose.

At other Qikiqtaaluk communities 10-cm (4-in) discharge hose in 300-metre lengths is carried on reels on the tankers and extended to pipeline manifolds on the beach. For comparison, 5 to 6 million litres delivered to Pond Inlet takes 1.5 to 2 days to discharge using a 10-cm (4-in) hose.

With the exception of a permanent docking facility at Nanisivik which is used as a refuelling station by Coast Guard icebreakers, the ability to improve Nunavut sealift logistics with new infrastructure is limited due to high tides (nine metres at Iqaluit) and inevitable ice damage.

Total Qikiqtaaluk fuel supply demand currently stands at about 74,000 tonnes per year (see following table). The fuel delivered to Iqaluit is 40-to 45-million litres which is approximately 45% of the Qikiqtaaluk total. An interim decline in resource development demand is due to temporarily curtailed activity at the Baffinland Mary River Iron Mine.

Qikiqtaaluk Fuel Supply Demand (Tonnes Ex East)

	2007	2008	2009
Community Resupply Fuel	81,644	78,995	72,939
Resource Development Fuel	7,000	6,500	1,000
Total Sealift Fuel Supply Demand	88,644	85,495	73,939

Kivalliq Fuel Supply Market

In the late 1990s the government of the Northwest Territories, which until 1999 included Nunavut, cost-shared with the Canadian Hydrographic Service a program of modern hydrographic surveys of the approaches to Kivalliq communities. The resulting accurate, digital hydrographic charts would enable deep or medium draft tankers to deliver oil directly to all Kivalliq communities except Baker Lake, which requires shallower draft tankers or barges to transit Chesterfield Inlet.

This allowed the inclusion of Kivalliq communities in the 2002 Eastern Arctic Sealift contract for foreign sourcing of Nunavut fuel supply. NTCL, the previous fuel transporter from Churchill, Manitoba, did not win this contract; it was won by Woodward's, a Goose Bay,

Newfoundland, company which had been in the fuel supply business for some time. Since 2002 fuel for Kivalliq communities has remained part of Woodward's fuel supply contract.

Kivalliq region resupply with fuel tankers is now similar to Qikiqtaaluk Region except for Baker Lake. Smaller tankers or barges are required to access Baker Lake via Chesterfield Inlet. However, for many years while Kivalliq resupply was operated by NTCL from Churchill, bulk fuel, as well as deck cargo was carried in combination on the same barge.

Kivalliq Region bulk fuel demand is shown for the 2007-2009 period in the following table.

Kivalliq Fuel Supply Demand – (Tonnes Ex East)

	2007	2008	2009
Community Resupply Fuel	23,478	28,745	27,449
Resource Development Fuel	6,400	10,400	38,500
Total Sealift Fuel Supply Demand	29,878	39,145	65,949

Resource development demand has jumped to the point where it now exceeds Kivalliq community demand by 40%. The Meadowbank Mine near Baker Lake received 38,500 tonnes of bulk fuel in 2009. A tanker owned by Woodwards was chartered to Chesterfield Inlet where fuel was transferred to NTCL barge for final delivery to Baker Lake.

Kitikmeot Fuel Supply Market

While Kitikmeot region fuel has been traditionally supplied by Western Sealift, it is anticipated that Eastern Sealift tanker service will follow the Dry Cargo Sealift into the Western Arctic as well. The Kitikmeot Region demand over the last three years is shown in the following table

Kitikmeot Eastern Fuel Supply Demand

	2007	2008	2009
Total Sealift Fuel Supply Demand	22,300	24,350	27,000

2.1.3 Western Sealift System

NTCL shallow draft barging extended into the Western Arctic

The Western Sealift is a system in transition. NTCL is reconfiguring sealift barge operations to the Western Arctic to meet the multi-carrier market resulting from Eastern Sealift expansion into the Kitikmeot Region and potentially into the Northwest Territories as well:

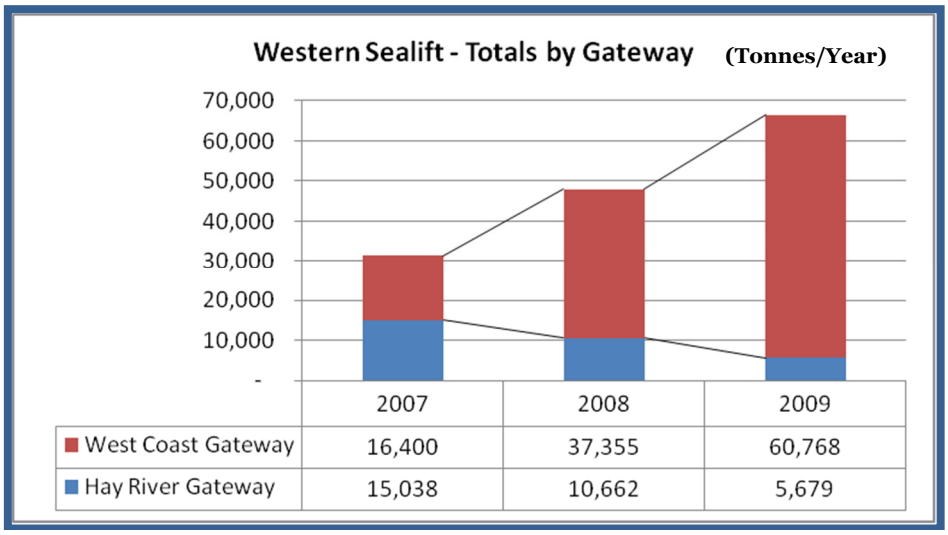
- From extension of conventional combination deck/bulk cargo Mackenzie River barge operations exclusively serving the Western Arctic from the Hay River, NWT railhead;
- To separate deep draft tankers and deck cargo barges originating bulk fuel and community resupply delivery from the West Coast of the United States and Canada.

The following table shows how Western Arctic Sealift Demand is being met with a mix of shallow draft river/coastal barges from Hay River and deep draft tankers or ocean barges from the west coast.

Western Sealift Demand (Tonnes in 2009)

	Bulk Fuel	Deck Cargo	Total
Ex Hay River Shallow Draft Barges	**5,000**	**1100**	**6,100**
To NWT Coast	*3,000*	*600*	
To Kitikmeot	*2,000*	*500*	
Ex West Coast Deep Draft Vessels	**54,000**	**6400**	**60,400**
To NWT Coast	*15,000*	*300*	
To Kitikmeot	*27,000*	*2,300*	
To Mining	*12,000*	*3,800*	
Total Western Sealift Demand	**59,000**	**7500**	**66,500**

Increasing resource driven Western Sealift traffic to the Kitikmeot Region and simultaneous shifting from Hay River based operations to West Coast based operations is shown over the 2007-2009 period in the following chart.



Hay River Gateway

Resupply to the Western Arctic was originally provided through a combination of whaling stations, trading posts, Catholic missions and RCMP detachments. All used the wooden schooner, powered by both sail and diesel, for resupply. The last of these was not retired until 1957 when NTCL first extended Mackenzie River barge service to the Western Arctic coast in conjunction with logistics support for the Distant Early Warning line.

Since that time Western Arctic communities in the Northwest Territories and Nunavut have been resupplied by NTCL shallow draft river barges from the Hay River gateway. Staging and trans-shipment for Sealift continuation of barge service to western Arctic coastal communities takes place at Tuktoyaktuk, and with a regional coordination office at Cambridge Bay.

As with the Eastern Arctic, ice and weather are the major operating constraints for sealift service to the Western Arctic. Vessels must be moved in and back out of the Western Arctic between the middle of July and the third week of September. Unlike the Eastern Arctic, most Western Arctic communities have shallow draft floating or fixed docks to which NTCL barges can discharge cargo directly.

Waterways, Alberta was the original terminus of NTCL and the Northern Alberta Railway (NAR) line from Edmonton. Cargo was transferred to barges for the voyage down the Athabasca River, across Lake Athabasca and down the Slave River to Fort Fitzgerald, Alberta.

Due to several sets of impassable rapids in the Slave River, cargo was unloaded at Fort Fitzgerald and moved over a 26 mile portage to Fort Smith, unloaded again to barges for the journey down the Slave River, across Great Slave Lake and down the Mackenzie River.

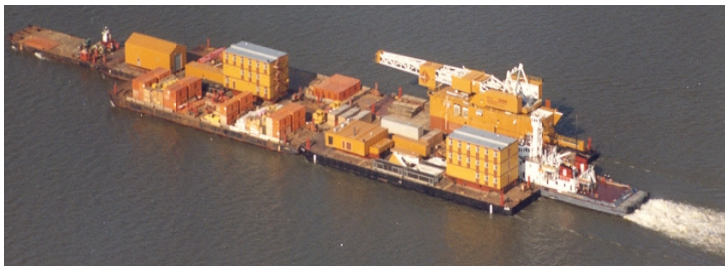
In 1961 NTCL opened a terminal in Hay River, N.W.T., handling freight arriving by highway from Edmonton. Cargo destined for Mackenzie River and Mackenzie Delta communities was shipped in traditional flat-bottom river tugs and barges from Hay River. The home base for NTCL there now features a 25-hectare loading terminal, large shipyard, Syncro-lift and fleet maintenance facility.

In 1964 the Great Slave Lake Railway, a federally-sponsored northern development project and now a sub-division of CN Rail, was completed to Hay River. In time, Hay River became the base of all NTCL marine operations for freight movements to Mackenzie River and Western arctic communities and resource projects.

NTCL was a Federal Crown Corporation until 1985. Since that time, NTCL has been a 100% aboriginal-owned private company, and is the founding member of the NorTerra Inc. group of companies. NorTerra is owned by the Inuvialuit Development Corporation of the Western Arctic on behalf of the Inuvialuit of the Western Arctic and Nunasi Corporation, on behalf of the Inuit of Nunavut.

NTCL has grown to its present fleet of 13 Tug Boats, ranging from 1,100 horsepower to 7,200 horsepower along with 94 combination fuel and deck cargo barges ranging in size from 600 tons to 15,000 tons. 1972 was a record year for cargo movement on the Mackenzie River and the Arctic region when approximately 400,000 tonnes crossed NTCL docks. From that time to the present, tonnage from Hay River has gradually declined. The reasons include the decline of oil exploration in and around Inuvik and the Arctic offshore; the building of the Dempster Highway through Yukon to Inuvik; and NWT Power's conversion of the power plant at Inuvik from diesel fuel to natural gas.

In 1982 a modular drilling rig was transported from Hay River to Prudhoe Bay, Alaska with the largest module weighing 1,167 tons. The total of all modules shipped to this oilfield project was 9,354 tons; the largest sailing ever to leave Hay River.



In 1993, a contract was received from the Alaska North Slope Regional Corporation to deliver bulk fuel to the Alaska communities of Kaktovik, Point Barrow, Wainwright, Point Lay and Point Hope. A total of 20,000 tons was shipped under the contract.

In 1997 NTCL moved a completely modularized production system from Hay River to the BP Badami oil field site on the North Slope of Alaska.

Badami Oil Field Modules Transferring from Road to Barge at Hay River, N.W.T.

This route for oversized oil field modules may be reversed in future, with "over-the-top" delivery of production facilities fabricated offshore for Alberta Athabasca Oil Sands projects. Recently, NTCL and Mammoet Canada, an international heavy lift specialist, formed a joint venture to pursue "over-the-top" delivery of large process modules fabricated in Asia, shipped around Alaska and up the Mackenzie River/Great Slave Lake/Slave and Athabasca River systems to oil sands projects near Fort McMurray, Alberta.

Ocean-going barges carrying modules weighing as much as 2,000 tonnes and transferring to Mackenzie River tugs and barges at the mouth of the Mackenzie River may be more economical than shipping much smaller modules over conventional routes from the south. The current practice is restricted to modules weighing 400 tonnes or less shipped to the Fort McMurray area by truck or rail.

The marine route requires a 38-km portage between Fort Smith and Fort Fitzgerald to avoid five sets of rapids between the two communities. The barge and tug would be winched onto multi-wheeled Mammoet heavy transport trailers, and returned to the river above the rapids for the balance of the journey. Barge designs will have to contemplate the 3 ½ ft. typical draft in the Athabasca River.

NTCL generated interest in the proposed program in 2006 when they conducted a successful trial sailing over the route.

MV *"Marjory"* on Slave River Rapids Portage,
carried by Mammoet Canada's Heavy Haul Trailers

Negotiations with at least one oil sands developer were interrupted when the current economic recession negatively impacted bitumen prices resulting in oil companies curtailing capital investments in oil sands projects.

The "over-the-top" route is being re-examined in 2010, after highway permits were withdrawn for module moves from the head of the Columbia-Snake river system at Lewiston, Idaho following a public outcry. An option similar to the method described above, but without the Fort Fitzgerald portage, is being investigated as an alternative to the U.S. route. At Hay River, depending on weight and dimensions, modules can be transferred to either the CN Rail system to Ft. McMurray; or to truck using the Alberta "High Load" Corridor system.

West Coast Gateway

In parallel with Western Arctic Sealift traditionally originating at Hay River, NTCL has recently started the transition to deep draft barging from the West Coast. NTCL will compete with both NSSI and NEAS now serving Kitikmeot communities from Montreal as an extension of the Eastern Arctic Sealift into the Western Arctic.

With these new market entrants and a more conducive ice regime around Alaska, NTCL has set up a similar supply system using deep draft barges for both bulk fuel and deck cargo from the West Coast into the Western Arctic. The NTCL Western Arctic Sealift Program includes a west coast freight consolidation and staging facility at Delta, B.C. and the "NT 12000", a new 12,000-tonne, deep draft ocean barge purpose built in Korea for NTCL.

NTCL 1200 New Construction Deep Draft Ocean Barge for Western Sealift Service

Before inaugurating the "NT 12000" deep draft barging alternative for deck cargo, NTCL started testing a dedicated Western Sealift fuel supply system in 2006 when 9,000 tons of fuel was moved from the West Coast to the Mackenzie Delta area. NTCL chartered the 12,000 tonne capacity, double-hulled, articulated tug/barge (ATB) "Island Trader" from Vancouver, BC-based Island Tug and Barge for this service.

By 2009, NTCL Western Sealift bulk fuel cargo had jumped to over 40,000 tonnes diverted from NTCL Mackenzie River barges. Fuel was sourced on the West Coast of the USA in 2009 and from Korea in 2008.

The fuel is brought into the Arctic on deep draft vessels and either:

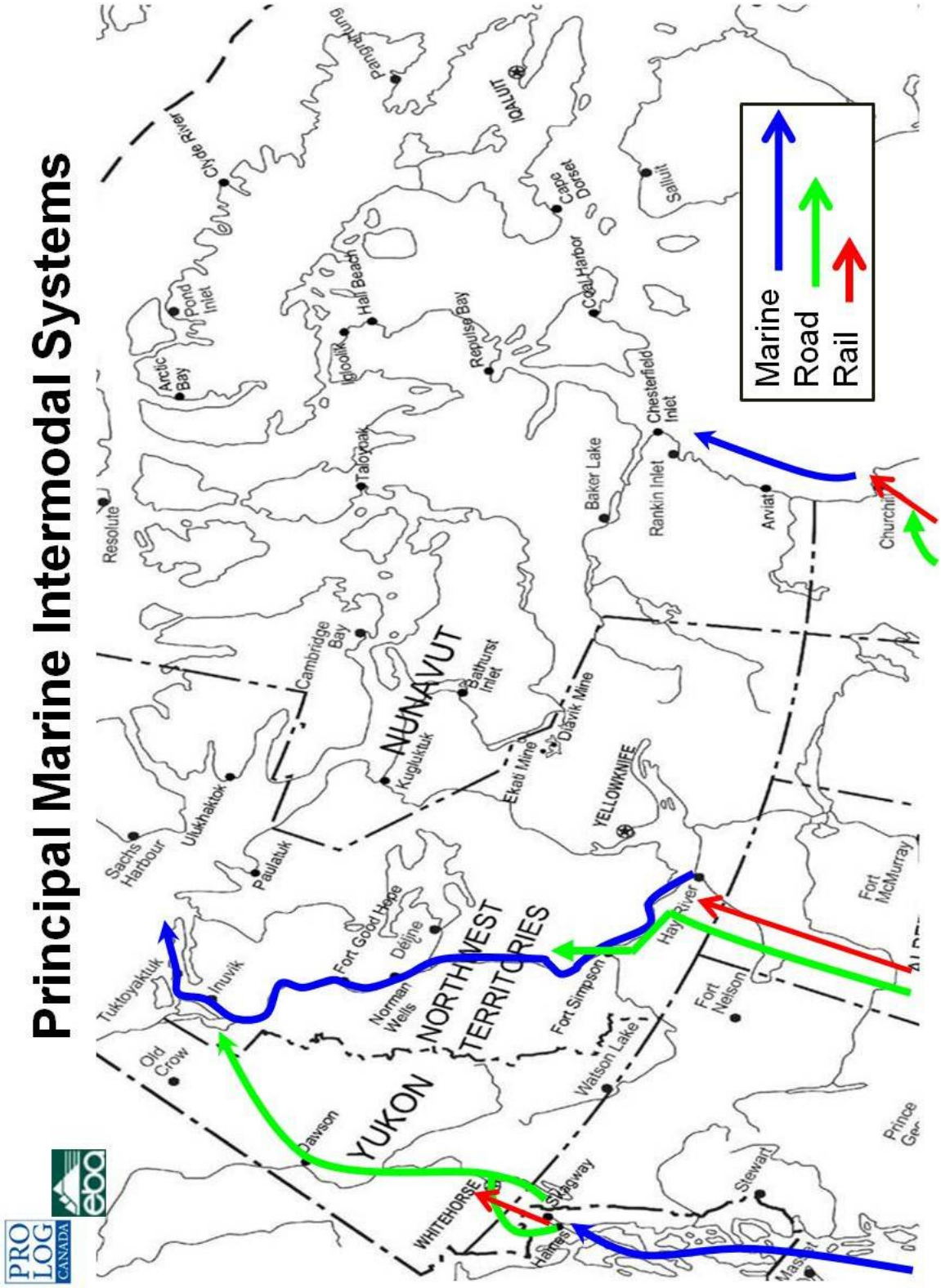
- Transferred to NTCL barges which deliver the cargo to the communities as before; or
- Delivered direct to locations with adequate water depth to discharge remaining fuel.

Despite some difficulties implementing the new service, NTCL transition to a west coast fuel supply system has saved considerably on the freight rate. NTCL has a 3 year fuel supply contract with the Government of Nunavut and a separate contract with the Government of the Northwest Territories. However, future fuel supply tenders for the Western Arctic may well include new Eastern Sealift, as well as Western Sealift, competitors.

Western Sealift also provides the deep draft ocean vessel capability to serve potential oil and gas development projects in the area. This capability was used extensively during the 1980's to support Beaufort Sea off-shore oil exploration. The fleet of CanMar (Dome Petroleum) drill-ships based at McKinley Bay east of Tuktoyaktuk was regularly resupplied with deep draft vessels operating into the Arctic around Alaska from the West Coast.

Following in the steps of the oil and gas resource sector, resource development projects proposed in the mining sector would also exploit western Arctic sealift capabilities. In particular, the Izok Lake lead/zinc mine proposed for development some 270 kms south of Kugluktuk requires construction of a Coronation Gulf port for export of ore concentrates, with backhaul of mine supplies, especially bulk fuel, anticipated as well.

Presently the Newmont Mining Hope Bay project situated near Roberts Bay receives both bulk fuel and deck cargo delivered by NTCL. Western Sealift – as well has general cargo delivered via Eastern Sealift.


Principal Marine Intermodal Systems
Marine
Road
Rail
NUNAVUT
NORTHWEST TERRITORIES
YUKON
YELLOWKNIFE
IQALUIT
Resolute
Arctic Bay
Pond Inlet
Clyde River
Pangnirtung
Igloolik
Hall Beach
Repulse Bay
Cape Dorset
Coral Harbor
Salluit
Chesterfield Inlet
Rankin Inlet
Baker Lake
Arviat
Taloyoak
Cambridge Bay
Bathurst Inlet
Kugluktuk
Ekati Mine
Diavik Mine
Sachs Harbour
Ulukhaktok
Paulatuk
Tuktoyaktuk
Inuvik
Fort Good Hope
Déline
Norman Wells
Fort Simpson
Hay River
Fort McMurray
Fort Nelson
Watson Lake
Old Crow
Dawson
WHITEHORSE
Skagway
Haines
Stewart
Prince
PROLOG CANADA
eba

2.2 Intermodal Systems Demand

There are three northern intermodal systems that combine inland rail, road and marine transport to access each territory (see map on opposite page):

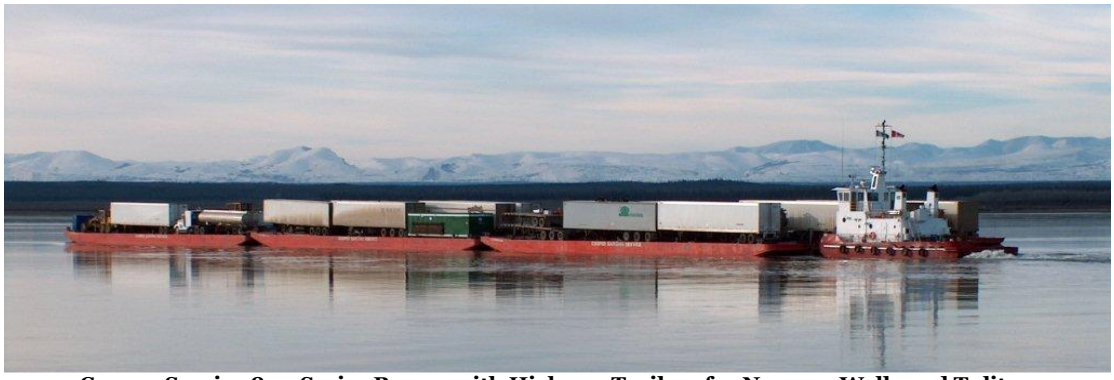
- Mackenzie Intermodal System – Connects Mackenzie River and road links in the NWT at Inuvik, Fort Simpson and the Hay River railhead.
- Hudson Bay Intermodal System – Connects Kivalliq communities in Nunavut to the Port of Churchill railhead and via rail to road links at Gillam or Thompson, Manitoba.
- Inside Passage Intermodal System – Connects Yukon and Mackenzie Delta Communities with Alaska/BC Inside Passage road, marine and rail links.

Another intermodal system at the Moosonee Rail/Marine Gateway is no longer active for Nunavut traffic.

These are primarily barge-based intermodal systems with containers or roll-on/roll-off trailers transferring community general freight among modes. However, there are also inter-modal bulk cargo transfers for inbound fuel and outbound resource cargos to bulk grain carriers at Churchill and ore ships at Skagway.

This section outlines operations and demand for each of these inland intermodal transportation systems.

2.2.1 Mackenzie Intermodal System

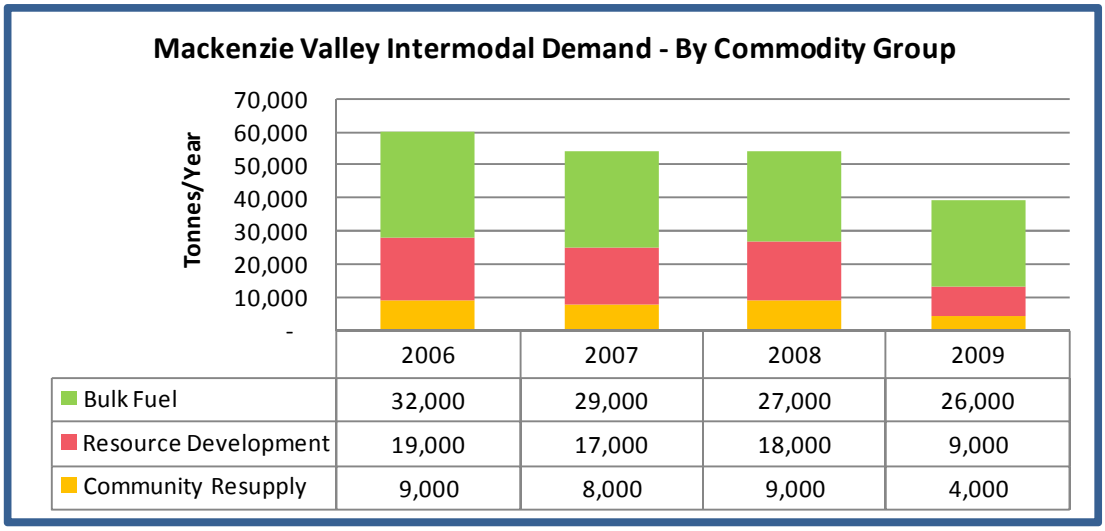


Cooper Service 800 Series Barges with Highway Trailers for Norman Wells and Tulita. Cooper Barging Photo

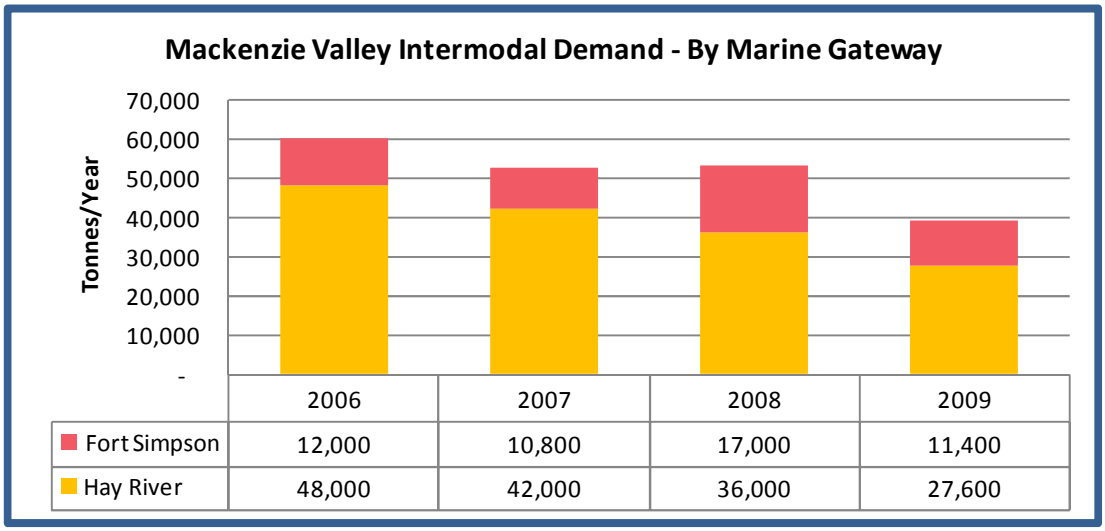
This intermodal transportation system uses the Mackenzie River for summer seasonal barge service to communities and resource developments in the Mackenzie Valley and Delta, as well as along the Western Arctic coast. It integrates CN Rail and southern trucking services with marine operations of NTCL, Cooper Barging and Horizon North.

Inter-modal transfers complete rail and road connections from Alberta and British Columbia:

- The NTCL Hay River Terminal is a major intermodal hub with barge loading facilities to transfer marine containers and other deck cargo delivered by truck via Mackenzie Highway 1 from Alberta;
- The CN Railhead at Hay River/Enterprise is a bulk terminal for Edmonton refinery sourced fuel transfers to barges or trucks – and a barge or truck transload facility for other freight;
- The Coopers Barging Terminal at Fort Simpson is a roll-on/roll-off facility for deck cargo and trailers moved by truck via Mackenzie Highway 1 from Alberta or Liard Highway 7 from B.C.
- The NTCL and Horizon Terminal at Inuvik is an intermodal transload facility for truck freight moved over Dempster Highway 8 from the Alaska Highway or Alaska Inside Passage ports.



	2006	2007	2008	2009
Bulk Fuel	32,000	29,000	27,000	26,000
Resource Development	19,000	17,000	18,000	9,000
Community Resupply	9,000	8,000	9,000	4,000



	2006	2007	2008	2009
Fort Simpson	12,000	10,800	17,000	11,400
Hay River	48,000	42,000	36,000	27,600

Hay River Railhead

The CN Rail Slave Subdivision is a 969 km railway operating in Alberta and the Northwest Territories and terminating at Hay River, N.W.T. It is the northernmost trackage of the contiguous North American railway network.

The rail line originally continued east from Hay River to the Pine Point mine. This section was abandoned in 1988 once concentrate shipments from the closed mine ceased. The total mileage in the Northwest Territories from the border with Alberta to Hay River is approximately 80 miles. Tracks extend into the NTCL terminal and the barge loading docks alongside the Hay River.

Midnight Sun Bulk Fuel Terminal providing interim storage and rail to barge or truck transload for Imperial Oil Limited at the CN Railhead in Hay River. Mark Kimakowich photo.

Originally constructed to a minimum standard over muskeg and discontinuous permafrost, track structure, ties and culverts deteriorated further resulting in trains operating at reduced capacity during summer. The need to significantly upgrade the system was recognized by CN and since 2007, $75 million has been invested in the Slave Subdivision. Ongoing budgets are in place for further investment of $8 to $10 million in 2010, and annually thereafter. The investment has been in new ties and ballast; bridges and culverts; and siding extensions.

NT Terminating Traffic: 2007 thru March 9, 2010

Year	COMMODITY	CARLOADS	METRIC TONNES
2007	AGGREGATES CRSH	9	782
	WOOD PELLET	2	202
	MACH EQP PARTS	5	267
	I&S-PIPE&FITNGS	24	1,834
	SALT	63	5,331
	CALCIUM CHLORID	60	5,392
	JET AVIATI FUEL	344	28,354
	GAS AND DIESEL	4,468	388,191
	HEAVY FUEL OILS	368	29,418
2007 Total		**5,343**	**459,771**
2008	MACH EQP PARTS	13	1,114
	STRUCTURALS	5	475
	SALT	53	4,487
	CALCIUM CHLORID	51	4,601
	JET AVIATI FUEL	405	35,490
	GAS AND DIESEL	2,812	233,450
	HEAVY FUEL OILS	281	21,990
2008 Total		**3,620**	**301,608**
2009	MACH EQP PARTS	21	1,639
	IRON&STEEL MISC	1	90
	SALT	52	4,393
	CALCIUM CHLORID	47	4,093
	CONDENSATE	2	195
	JET AVIATI FUEL	311	27,457
	GAS AND DIESEL	1,685	148,717
	HEAVY FUEL OILS	270	24,956
2009 Total		**2,389**	**211,540**
2010	POOL CAR	2	39
	SALT	14	1,398
	JET AVIATI FUEL	34	3,619
	GAS AND DIESEL	483	50,201
	HEAVY FUEL OILS	88	9,059
2010 Total		**621**	**64,315**

Source: CN Rail

CN Rail reaches southern NWT communities via the highway network; and Mackenzie River and Western Arctic communities via NTCL barges.

Commodities moved on the Slave Subdivision include principally petroleum products and small amounts of agriculture and forest products (see adjacent table). Note the progressive decline since 2007 which is largely accounted for by the attendant decline in fuel shipments to the three diamond mines. Both the impact of a world economic recession resulting in periodic mine closures and new underground vs. open pit mining substantially reduced fuel demand.

Hay River Barge Gateway

NTCL Barge Terminal at Hay River, NWT – NTCL Photo.

The Hay River Gateway originated with the opening of a marine terminal at Hay River, N.W.T. by NTCL in 1962. For three years cargo was transhipped from southern-originating trucks to barges after freight was consolidated for various Mackenzie River community destinations. Since 1965 rail service has connected with barges at Hay River. Currently rail service is mainly for bulk fuel and deck cargo is delivered by truck.

Since 2006 the decline in traffic over the Hay River Gateway has reached the point that it is less than the cargo now delivered to the Western Arctic over the West Coast Gateway.

However, the Mackenzie River intermodal marine route from Hay River (and Fort Simpson) still remains an important northern transportation system. Until an all-weather Mackenzie Valley Highway is constructed, the stranded communities along the river will rely largely on barge service. Construction of the Mackenzie Valley Pipeline, if it proceeds, will rejuvenate oil and gas activity, much of which will be served from Hay River as in the past.

The following table shows Mackenzie Valley Intermodal Marine System Demand, including both Mackenzie Valley traffic and Western Arctic traffic both of which are handled at Hay River as part of the same transportation system.

Hay River Gateway Intermodal Marine System Demand (Tonnes Estimated in 2010)

To:	Deck Cargo	Bulk Fuel	Total Cargo
Mackenzie Valley	1,800	22,500	**24,300**
Western Arctic	1,000	4,500	**5,500**
Gateway Total	**2,800**	**27,000**	**29,800**

Source: NTCL

Fort Simpson Barge Gateway

Cooper Barging Service Fort Simpson terminal near the junction of Mackenzie Highway 1 and Liard Highway 7.

Cooper Barging Photo

In addition to NTCL, Cooper Barging Service transports general freight and construction materials mainly to central Mackenzie River points north of Wrigley, and the oil and gas industry in the area, when active. Coopers Barging provides a competitive barging operation to NTCL on the Mackenzie and Liard Rivers, and Great Slave Lake. Headquartered in Fort Nelson, BC, Coopers Barging started its marine business on the Liard River in 1942, and expanded into trucking and construction in the mid 1960s.

The Company is focused on barging deck cargo, equipment, camps and supplies supporting oil and gas exploration projects in the Mackenzie Valley, and transporting general freight for communities along the river. Its main marine staging base today is the landing dock and storage yard located at the confluence of the Liard and Mackenzie Rivers, at Fort Simpson, N.W.T. Much of the resource development freight arrives at Fort Simpson over the Liard Highway corridor from Fort Nelson and southern B.C.

Coopers operates four shallow-draft river tugs and a fleet of nine barges (see appendix). The Company's barges are designed for deck cargo only (no fuel compartments) and its business is focused on supplies for the oil and gas; minerals; and lumber industries - to which its trucking and construction services are also offered. It also carries LTL freight and other commodities in containers and highway trailers to Norman Wells and other communities on the Mackenzie River not served by road.

Coopers Barging offers regular scheduled services from Fort Simpson annually, generally eight or nine trips from early June to the end of September. Charter services are available for trips on the Liard River. General freight and commodity class tariffs are weight-based and set for destinations along the river, with special rates and tariffs available for highway trailers, container handling and consolidation, and time charter voyages.

Fort Simpson Gateway Intermodal Marine System Demand
(Tonnes Estimated in 2010)

Community Freight	Resource Freight	Total Deck Cargo
3,000 tonnes	**7,000 tonnes**	**10,000 tonnes**

Source: Coopers Barging

Mackenzie Delta Barge Gateway

A Mackenzie Delta Gateway is provided for truck to barge transfer between the Dempster Highway and the Mackenzie River at Inuvik. In addition to NTCL barge terminal facilities at Inuvik and Tuktoyaktuk, Horizon North Logistics provides a broad range of logistics services in the Mackenzie Delta.

NTCL tug wintered over at the Inuvik Barge Terminal and Transload Facility between the Dempster Highway and the Mackenzie River.

Horizon Northern Logistics Inc. is a Canadian publicly-traded company that offers supply, management, and catering of camps; stabilized base platforms for work areas on tundra and permafrost; and marine transportation support services.

The Company, with over 700 employees, has operations in three Western Canadian provinces and the three northern territories, and has entered into a large number of business partnerships with aboriginal organizations where it is active.

Horizon currently offers three business segments; camps and catering; matting systems for surface stabilization; and marine services. The marine services include base camps, off-shore logistics, remote shoreline staging, self-contained barge camps, mobile sleigh camps, river tug and barge transportation.

Horizon operates four tugs and various barges for the transportation of fuel and equipment throughout the Mackenzie Delta. This equipment is made available at daily charter rates during the navigational season, generally from mid-June to mid-October. Horizon provides portable camp/work barges that are moved in close proximity to exploration worksites, mainly in the Mackenzie Delta, with supplies and equipment sufficient to facilitate winter season work programs.

Horizon also owns or has access to three staging sites in the Delta region that have served the oil and gas industry for years, Tuktoyaktuk, Lucas Point and Swimming Point. These are offered to users as field operational bases. The Tuktoyaktuk facility consists of a 280 man camp, fuel tank farm, barge landing docks, maintenance shops and equipment storage areas.

Lucas and Swimming Point are leased from Arctic Oil and Gas Services Inc., a company 50% owned by Horizon, and 50% owned by the Inuvialuit Development Corporation. Swimming Point, located between Inuvik and Tuktoyaktuk, features an 80 man camp, landing strip, fuel storage, barge dock and maintenance and storage buildings. Lucas Point, south of Swimming Point, has a landing dock, storage area and a 4.5 acre gravelled storage yard.

2.2.2 Hudson Bay Intermodal System


Roll-On/Roll-Off and Intermodal Container Traffic en route from Winnipeg via road to rail transload at Thompson, Manitoba for movement by train - the only surface connection - to Hudson Bay Port of Churchill.

The Hudson Bay Intermodal System integrates summer seasonal marine transportation to Kivalliq communities in Nunavut with road and/or rail transport from Winnipeg to Churchill, Manitoba. The system comprises roll-on/roll-off trailers, equipment and packaged freight moved:

- By truck over Manitoba Provincial Trunk Highway 6 to the Thompson Roadhead;
- By train over the Hudson Bay Railway to the Port of Churchill Railhead; and
- By barge or ship from Churchill to Kivalliq Region communities.

As well, an integrated rail/marine bulk fuel supply system to Kivalliq communities was active in the recent past.

Traffic demand for the Hudson Bay Intermodal System is generated by resource developments and communities in the Kivalliq region of Nunavut. These communities have until recent years received their annual resupply via the Hudson Bay Railway to the port of Churchill, Manitoba, and then by tug and barge service from Churchill to the Kivalliq Region.

However, before 1975 and again since the early 2000's these communities have been receiving most of their annual resupply as part of the Eastern Sealift system from Montreal. For this east coast originating traffic as well as the remaining Hudson Bay Intermodal system traffic via the Port of Churchill, the following table shows total Kivalliq Region demand for community and resource general freight as well as for bulk fuel.

Hudson Bay Kivalliq Region Total Traffic Demand			
Community	Resource	Fuel	**Total**
4,300 tonnes	**27,300 tonnes**	**38,500 tonnes**	**70,100 tonnes**

Hudson Bay Railhead

Hudson Bay Railhead at Churchill, Manitoba with Hudson Bay Port of Churchill Grain Terminal in background.

The Hudson Bay Railhead at Churchill, Manitoba is the northern terminus of the closest rail connection to Nunavut. The length of the entire rail route from Churchill to Winnipeg is 1,697 km. As there is no road connection to Churchill, most highway traffic is transferred to trains at Thompson 548 km south of Churchill.

OMNITrax is a shortline railway holding company that owns and operates The Hudson Bay Railway (HBR). HBR runs 920 km between Churchill and The Pas where it connects with the Canadian National rail system. OMNITrax purchased the rail line from Canadian National in 1997 and acquired the Port of Churchill from the federal government at the same time.

The entire line is rated at 263,000 pounds weight on rail which can accommodate 100 tonne carloads. Track condition for the last 296 km between Gilliam and Churchill has historically limited running times to 12 hours.

A $60 million infrastructure upgrade will result in an increase in train speeds on the northern part of the line from 16 km/h to 40 km/h. The work includes tie installations, siding extensions, turnout replacement, bridge work, road crossings and engineering work. The upgrade investment cost is equally shared among OMNITrax, the Federal and Manitoba Governments.

Railway operations are typically:

- 1-2 grain trains/day in summer for ocean exports;
- 2-3 trains/week with freight and fuel for Churchill and Kivalliq communities;
- 3 passenger trains/week for VIA Rail remote communities service in Manitoba;

Integrated truck/rail/marine intermodal transload service between Winnipeg, Thompson, Churchill and Kivalliq communities includes the operations of Gardewine North and Harris Transport.

Hudson Bay Deep Sea Port

Hudson Bay Port of Churchill, Manitoba
Churchill Gateway Development Corp. Photo

The Hudson Bay Port of Churchill is the intermodal interface between rail service from the South and marine operations to the North. It is owned in parallel with the Hudson Bay Railway by OmniTRAX.

The port facility embraces a large grain terminal, a 1000 metre wharf, on-dock rail and warehouse, and a tank farm. The current ice-free shipping season is mid-July through mid-October.

Port capabilities include:

- Four 250 metre ship berths with, from the channel entrance, the first berth used for tanker discharges, two berths for grain loading, and the fourth berth for general cargo/container operations.
- Water depth alongside at mean low water of 12.2 metres at the first three berths and 11.6 metres at the fourth berth.
- A barge loading facility inside the main dock and an on-dock transit warehouse with inside rail access.
- 50 million litres fuel storage tank farm with rail access in the immediate port area.

The centerpiece of the port is a high capacity grain terminal which has been extensively upgraded and handled in excess of 700,000 tonnes of grain in 2000. Canadian Wheat Board grain shipments are reported to account for about 80% of annual shipments through the port.

Port tonnage throughput over the last decade is shown in the following table:

Hudson Bay Port of Churchill Annual Throughput (tonnes)

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
710,579	478,203	279,270	615,394	400,010	466,785	488,754	620,709	424,388	529,391

Source: OmniTRAX

Hudson Bay Barge Gateway

NTCL Tug "Keewatin" and 1800 series barges approaching a barge "push-out" landing in Kivalliq. – NTCL Photo

Barge operations from Churchill conventionally completed the intermodal mix of road, rail and marine between Winnipeg and Kivalliq communities. In recent years barge service has been inconsistent with east coast based sealift ships competing for Kivalliq traffic, including port calls at Churchill.

Historically in 1975 at the request of the Government of Canada, then Crown-owned NTCL entered into an agreement to provide barge service to Kivalliq communities from the Port of Churchill. Switching the Kivalliq resupply by ship from Montreal to the tug-and-barge alternative from Churchill in 1975 helped stimulate business for the underutilized Port of Churchill, the northern most seaport connected by rail or road to southern Canada.

In order to make this service most economical, barges were loaded with both dry cargo and bulk fuel. All cargo was moved to Churchill by railroad: dry cargo primarily from Winnipeg and fuel both from the Imperial Oil refinery in Edmonton and from the Co-op Refinery in Regina.

NTCL continued resupplying Kivalliq communities from Churchill until 2002. In addition to its Churchill-Kivalliq business, in 1996 and again in 1999 NTCL won the Eastern Arctic fuel sealift bid to supply offshore based fuel to eastern Nunavut communities. A large tank farm is part of the Port of Churchill infrastructure, providing surge storage capability for Kivalliq fuel transfers among tankers, barges and railcars.

In 2002 in reaction to loss of the Government of Nunavut fuel re-supply contract for the Kivalliq Region, it became uneconomical to operated barges for deck cargo only.[2] Since 2002 the fuel for Kivalliq communities has been part of a Woodward's Group tanker fuel supply contract, while the dry cargo has been part of the Eastern Arctic sealift service from Montreal. This temporarily ended the use of Hudson Bay Rail, Port and Barge Gateway for Kivalliq fuel and freight resupply.

[2] Base load bulk fuel and cross-subsidized deck cargo provided the combined cargo revenues that made this barge service profitable.

In 2006 NTCL re-entered the Hudson Bay market with cargo from Montreal as well as from the port of Churchill. Plans were to serve all Kivalliq region communities as well as Sanikiluaq, in the Southeast part of Hudson Bay. However, NTCL's main involvement in Kivalliq has recently been in barging between Chesterfield Inlet and Baker Lake the construction materials and fuel for the Meadowbank gold mine north of Baker Lake.

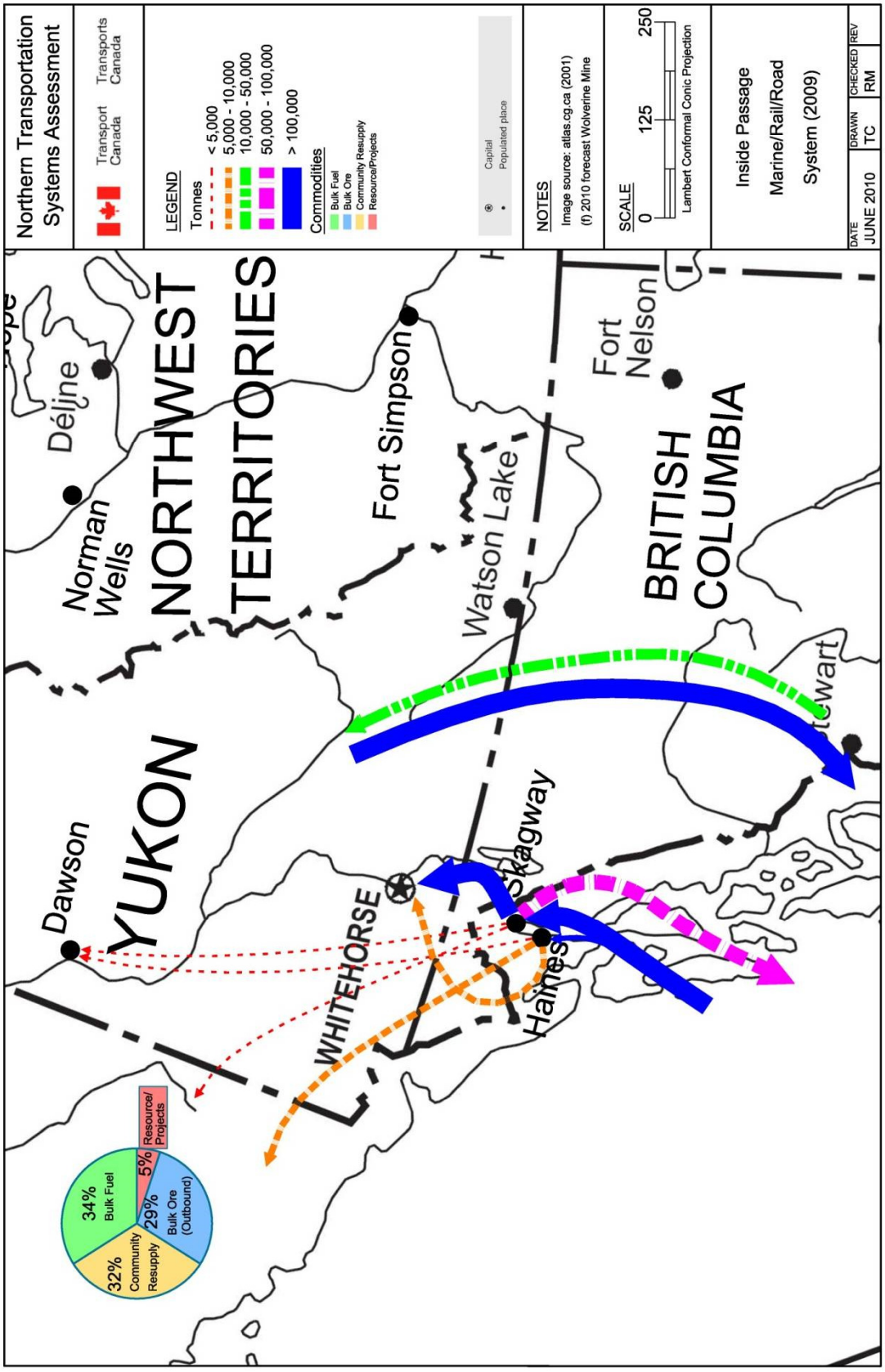
In 2009 all dry cargo to Kivalliq communities was shipped from Montreal. Of the total, most was delivered direct to Kivalliq communities by NSSI or NEAS. However 4,320 tonnes was delivered to Churchill from where it was barged to the communities by NTCL. In 2010 it is planned that all NTCL community dry cargo for the Kivalliq region will be shipped through Churchill.

Moosonee Rail/Barge Gateway

Tug and barge service provided by Moosonee Transportation Ltd. (MTL), based at Moosonee in Northern Ontario on the southern tip of James Bay in southern Hudson Bay, serves James Bay coastal communities in Ontario and Quebec.

Hudson Bay barge operations from the Moosonee, Ontario railhead were initiated by Arctic Transportation Ltd. (a Crowley Maritime/FedNav joint venture). Subsequently Moosonee Transportation Ltd. acquired the operation and until 2005 provided regular community resupply to Nunavut communities in James Bay (Sanikiluaq/Belcher Islands) and sporadic charter sailings to Kivalliq communities along the Hudson Bay coast.

All resupply commodities were brought to Moosonee via Ontario Northland Railway from southern Ontario. However, since 2005 all of Sanikiluaq's annual resupply has been part of the Eastern Arctic sealift.


Northern Transportation Systems Assessment
Transport Canada
Transports Canada
LEGEND
Tonnes
< 5,000
5,000 - 10,000
10,000 - 50,000
50,000 - 100,000
> 100,000
Commodities
Bulk Fuel
Bulk Ore
Community Resupply
Resource/Projects
Capital
Populated place
NOTES
Image source: atlas.cg.ca (2001)
(f) 2010 forecast Wolverine Mine
SCALE
0
125
250
Lambert Conformal Conic Projection
Inside Passage
Marine/Rail/Road
System (2009)
DATE
JUNE 2010
DRAWN
TC
CHECKED
RM
REV
Déline
Norman Wells
NORTHWEST TERRITORIES
Fort Simpson
Watson Lake
Fort Nelson
BRITISH COLUMBIA
Dawson
YUKON
WHITEHORSE
Skagway
Haines
Resource/ Projects
5%
Bulk Ore (Outbound)
29%
Community Resupply
32%
Bulk Fuel
34%

2.2.3 Inside Passage Intermodal System

Alaska Marine Lines offload operations at Skagway, Alaska, including intermodal containers for highway delivery to Yukon.

This Northern Transportation System extends along the Southeast Alaska and B.C. Coastal Inside Passage. It provides year around ice free port access to Yukon - and through Yukon via the Alaska Highway to Interior Alaska, or via the Dempster Highway to the Mackenzie Delta. See current inside Passage traffic flows on the map opposite.

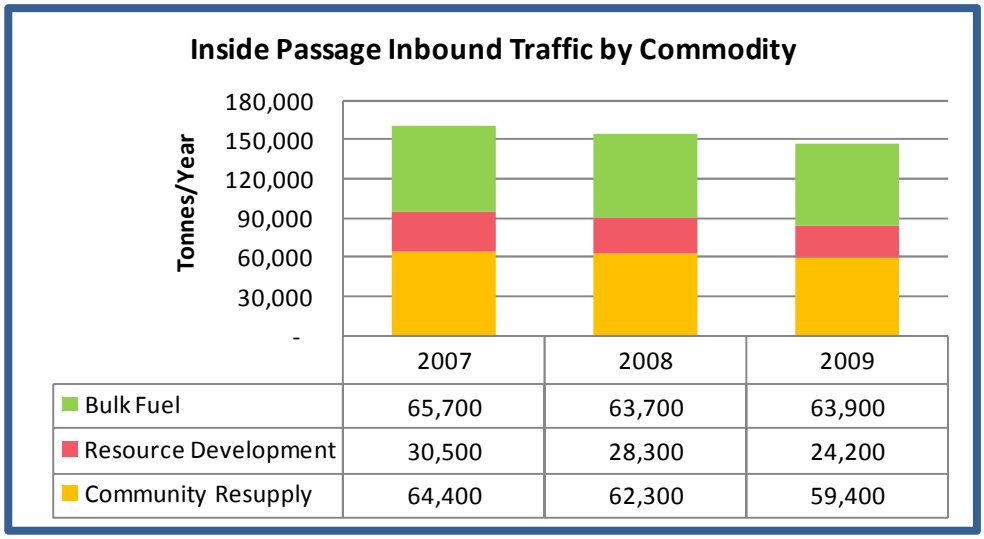
Inside Passage marine accesses rail and/or road infrastructure via the following ports:

- Alaska Highway 1 and Robert Campbell Highway 4 via Cassiar Highway 37 from the Inside Passage Port of Stewart, B. C (bordering Hyder, Alaska)
- Haines Highway 3 and Alaska Highway 1 via the Inside Passage Port of Haines, Alaska (40 miles south of the Alaska/Canada border),
- White Pass & Yukon Route railway (passenger only/potentially reactivated freight service) and parallel Klondike Highway 2 from the Inside Passage Port of Skagway, Alaska (20 miles south of the Alaska/Canada border).

Inbound marine service to Yukon is currently provided by:

- Delta Western – monthly tanker barge service from Vancouver and/or Puget Sound to Haines for Totem Oil (delivering to Mackenzie Fuels in Yukon).
- Island Tug & Barge – monthly tanker barge service from Vancouver to Skagway for PetroMarine (branded North 60 in Yukon).
- Alaska Marine Lines – weekly container/deck cargo barge service from Seattle to both Haines and Skagway.

Inbound Inside Passage demand has held fairly constant after allowing for a peak mining exploration and development year in 2007 as shown in the following chart.



	2007	2008	2009
Bulk Fuel	65,700	63,700	63,900
Resource Development	30,500	28,300	24,200
Community Resupply	64,400	62,300	59,400

Outbound marine traffic from Yukon is mostly mineral concentrates from Skagway and (in 2010) from Stewart. Resumption of Yukon base metal exports began with Minto Mine copper concentrates in July, 2007. Yukon Zinc production at the Wolverine Mine started in 2010.

Inside Passage Mineral Exports from Yukon (tonnes)

	2007	2008	2009	2010 (est)
Skagway	5,000	48,000	54,000	60,000-80,000
Stewart				80,000-100,000

Source: Capstone and Yukon Zinc interviews

In addition to marine cargo traffic there is also a very large Inside Passage Cruise Ship market totalling 424 port calls at Skagway with 779,000 passengers in 2009.

Inside Passage Cruise Ship Passengers Disembarking at Skagway

2006	2007	2008	2009	2010 (est)
755,314	820,744	765,492	779,043	665,491

The Inside Passage provides marine access from Vancouver and Seattle through Skagway and Haines, Alaska with short all-weather highway connections into Yukon. The Port of Skagway has traditionally been the gateway to Yukon since the White Pass and Yukon Railway was completed to Whitehorse in 1900. Until the late 1970's, the Inside Passage essentially provided sole supply access to Yukon.

Although the White Pass and Yukon Railway is still in place from Skagway to Whitehorse, it is presently in use for summer tourist trains from Skagway, only as far into Yukon as Carcross. In 1979, the South Klondike Highway was completed parallel to the railway. It was initially intended only as a summer tourist road closed to truck traffic. In 1986 as part of a package of inducements to re-open the mine at Faro, the Government of Yukon initiated an agreement with the State of Alaska that now accommodates year-round heavy trucking on the South Klondike Highway.

The South Klondike Highway was opened to heavy trucking primarily to ensure a viable transportation corridor to tidewater for Yukon and to enhance the viability of mining operations in Yukon and nearby B.C. However, its connection to the Mackenzie Delta via the North Klondike Highway and Dempster Highway (also completed in 1979) now provide a year-round ice-free port access route to the Western NWT, as well.

The White Pass System continued to provide intermodal container service with its own ships into the 1990's. However, much of the traffic traditionally moving through this historical gateway to Yukon has been diverted to the Alaska Highway from Vancouver and, increasingly, from Edmonton. In 1996 the last of the White Pass ships was removed from service.

Skagway is the primary tidewater access point for, and historical gateway to, Yukon. It is just 18 miles (29 km) from the Canadian border and 180 km from Whitehorse. Most inbound cargo is bulk fuel and container traffic for furtherance to Yukon. Virtually all outbound cargo is Canadian bulk commodity export traffic (mostly ore concentrate and some timber).

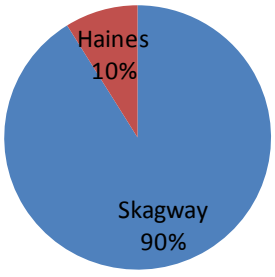
Haines is an alternate port for Yukon and the primary port for U.S. traffic connecting through Yukon and the southeast panhandle of Alaska to the interior of Alaska from the lower 48 United States. Haines is 405 km from Whitehorse or 225 km further than Skagway. Despite the additional distance, Haines plays an important alternate marine access role for Yukon.

Alaska/BC Marine Container Gateway.

Most community general freight on the Inside Passage moves in marine containers transferred to trucks at Skagway for highway delivery to Yukon destinations or Haines for highway delivery through Yukon to Interior Alaska destinations. Current inbound community general freight flows, via Haines and Skagway both to Yukon communities and through Yukon to Interior Alaska, consist of:

Inside Passage Community General Freight
(tonnes in 2009)

	Through Yukon	To Yukon	Total
Via Haines	5,000	1,000	6,000
Via Skagway	1,000	52,000	53,000
Total	6,000	53,000	**59,000**



Although the Alaska Highway is now the principal transportation system for Yukon community resupply traffic, the Inside Passage marine intermodal system still provides a significant alternative for less time sensitive traffic.

Intermodal container service to Yukon is now provided by Alaska Marine Lines (AML) from Seattle, Washington. With the demise of White Pass Marine operations, AML was granted a waiver of Canadian coastwise restrictions and allowed to carry Canadian origin goods via Seattle and Skagway to Yukon. While White Pass traditionally operated two containerships providing two sailings a week with a one week turnaround on the vessels, AML operates a slower, but less costly, barge based service.

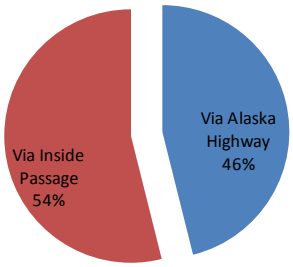
AML is the principal transportation service to Southeast Alaska communities which, with the exception of Skagway and Haines (and Hyder near Stewart, B.C.), are not connected to the southern highway system. The Yukon container service is integrated with the much larger Southeast Alaska market which supports twice weekly sailings to Juneau – and weekly sailings continuing that service to Skagway and Haines. Barges are operated on a two-week turnaround out of Seattle, Washington.

Yukon traffic sourced from Vancouver can be consolidated into 20, 40 or 53 foot intermodal containers and trucked to Seattle for barge loading. However, about half Yukon traffic (typically bulk commodities like cement) is source loaded at Seattle in AML containers. At Skagway containers are placed on truck chassis and delivered directly to Yukon destinations. While most Skagway traffic is destined to Yukon, most Haines traffic transits Yukon to Interior Alaska.

Alaska/BC Bulk Fuel Supply Gateway.

Current Inside Passage bulk fuel supply to Yukon is through both Skagway and to a much lesser extent Haines. Fuel Traffic through this gateway as well as via the Alaska Highway is shown in the following table.

Inside Passage vs. Alaska Highway Fuel Supply	
Inside Passage Via Haines	6,654 tonnes
Inside Passage Via Skagway	57,285 tonnes
Total Fuel Via Inside Passage	63,939 tonnes
Total Fuel Via Alaska Highway	54,719 tonnes



The majority of bulk fuel supply to Yukon is moved via the Alaska Inside Passage and connecting land links from Skagway and Haines. As shown in the above figure Skagway continues to be the principal port for Yukon Bulk Fuel Supply and Inside Passage Marine tanker barge traffic continues to exceed Alaska Highway tank truck traffic.

Historically, Skagway has been the principal port for Yukon fuel supply. Until 1994, the White Pass pipeline between Skagway and Whitehorse moved the majority of Yukon bulk fuel delivered from Vancouver refineries via the Alaska Inside Passage. In October of 1994, the pipeline was shut down and the White Pass fuel distributorship (Chevron) was sold to an Alaska firm, Petro-Marine which rebranded Yukon fuel distribution operations as North 60.

Petro-Marine has one barge sailing per month into Skagway discharging over a two- to three-day period approximately six million litres to pipeline headers located at the ore dock. Fuel is delivered from Vancouver refiners by Canadian contract barge operators. With exception of some fuel for local requirements and ferry fuelling, the balance of fuel at Skagway is now trucked to Whitehorse for Yukon distribution.

Haines, Alaska is an alternative Yukon fuel supply gateway. In 1991, to induce a more competitive market place, the Yukon Government guaranteed financing (subsequently repaid ahead of schedule) for a new common-user bulk fuel terminal at Haines, Alaska. Delta-Western currently operates the Haines terminal and provides fuel barge service to it from Alaska and Washington State refineries. Delta Western uses barges with capacity varying from three to eight million litres and calling at Haines less than once a month.

Alaska/BC Resource Development Gateway

Current Inbound Resource and Construction Project traffic is:

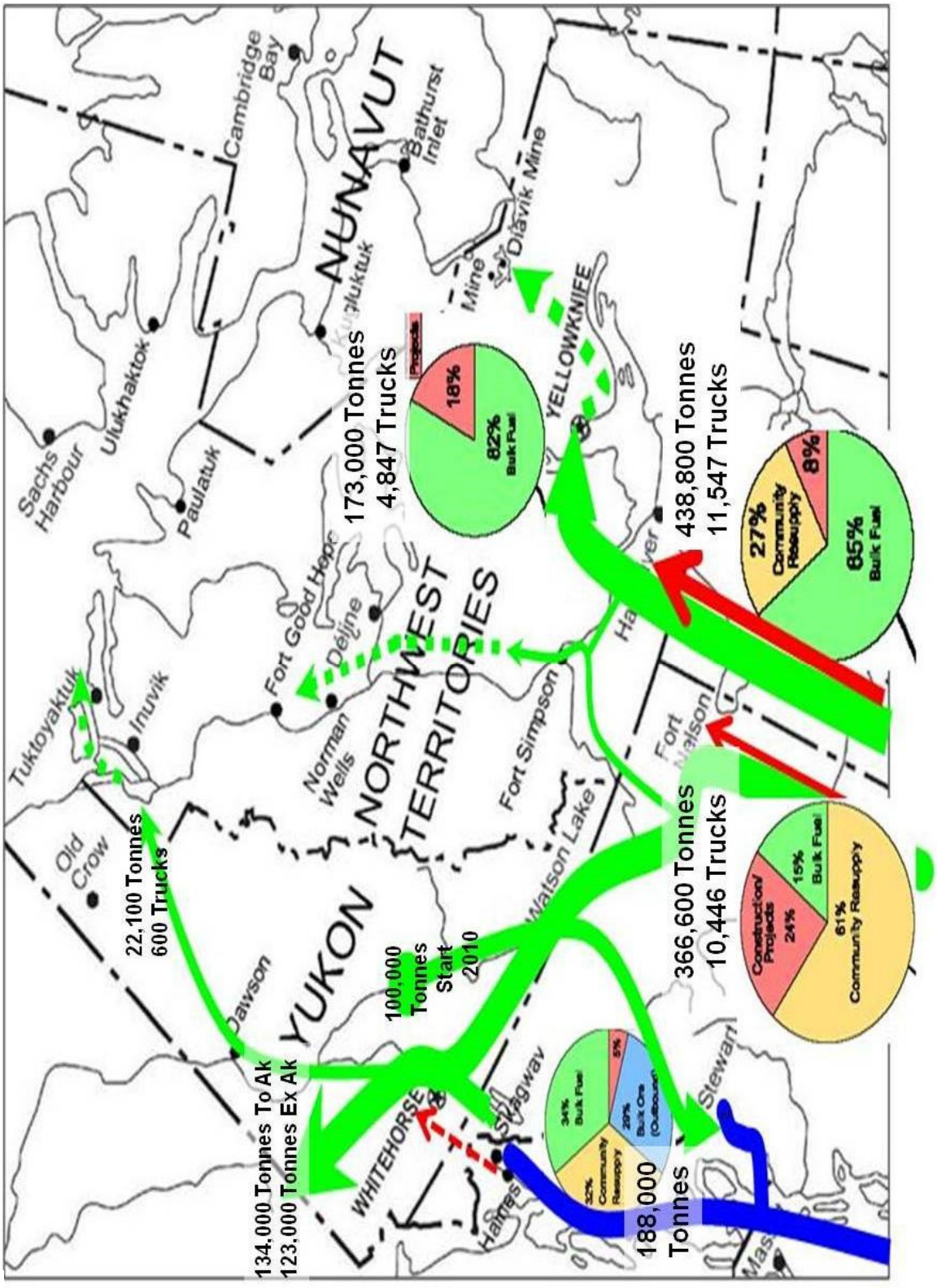
- via Haines 510 tonnes to Interior Alaska and 142 tonnes to Yukon
- via Skagway119 tonnes to Interior Alaska and 9106 tonnes to Yukon

Yukon Resource and Construction Project traffic has traditionally accessed the Inside Passage Marine System at Stewart, B.C. as well as at Haines and Skagway Alaska. Before closure of the Cassiar Asbestos mine, outbound fibre and inbound mine supplies were initially handled via the White Pass intermodal rail/marine system through Skagway and later shifted to a similarly coordinated intermodal marine/truck system through Stewart.

A Stewart marine/truck system will start handling lead/zinc ore concentrate and mine supplies for the Yukon Zinc Wolverine mine in 2010.

Skagway has handled over half a million tonnes of outbound concentrates and corresponding inbound mine supplies when the lead/zinc mine at Faro was in operation. Since closure of that mine there has been little outbound traffic from Yukon until the opening of the Minto copper mine.

Current Minto copper concentrates outbound exceed 54,000 tonnes/year. In 2010 Skagway mineral exports will be matched by Stewart outbound mineral traffic anticipated to grow from 60,000 tonnes/year to over 100,000 tonnes/year.


NUNAVUT
NORTHWEST TERRITORIES
YUKON
YELLOWKNIFE
Cambridge Bay
Bathurst Inlet
Diavik Mine
Sachs Harbour
Ulukhaktok
Paulatuk
Tuktoyaktuk
Inuvik
Fort Good Hope
Déline
Norman Wells
Fort Simpson
Fort Nelson
Old Crow
Dawson
Watson Lake
WHITEHORSE
Skagway
Haines
Stewart
22,100 Tonnes
600 Trucks
134,000 Tonnes To Ak
123,000 Tonnes Ex Ak
100,000 Tonnes Start 2010
173,000 Tonnes
4,847 Trucks
18%
82% Bulk Fuel
438,800 Tonnes
11,547 Trucks
27% Community Resupply
8%
85% Bulk Fuel
366,600 Tonnes
10,446 Trucks
Construction Projects 24%
15% Bulk Fuel
61% Community Resupply
188,000 Tonnes
34% Bulk Fuel
5%
29% Bulk Ore (Outbound)
32% Community Resupply

2.3 Trucking Systems Demand

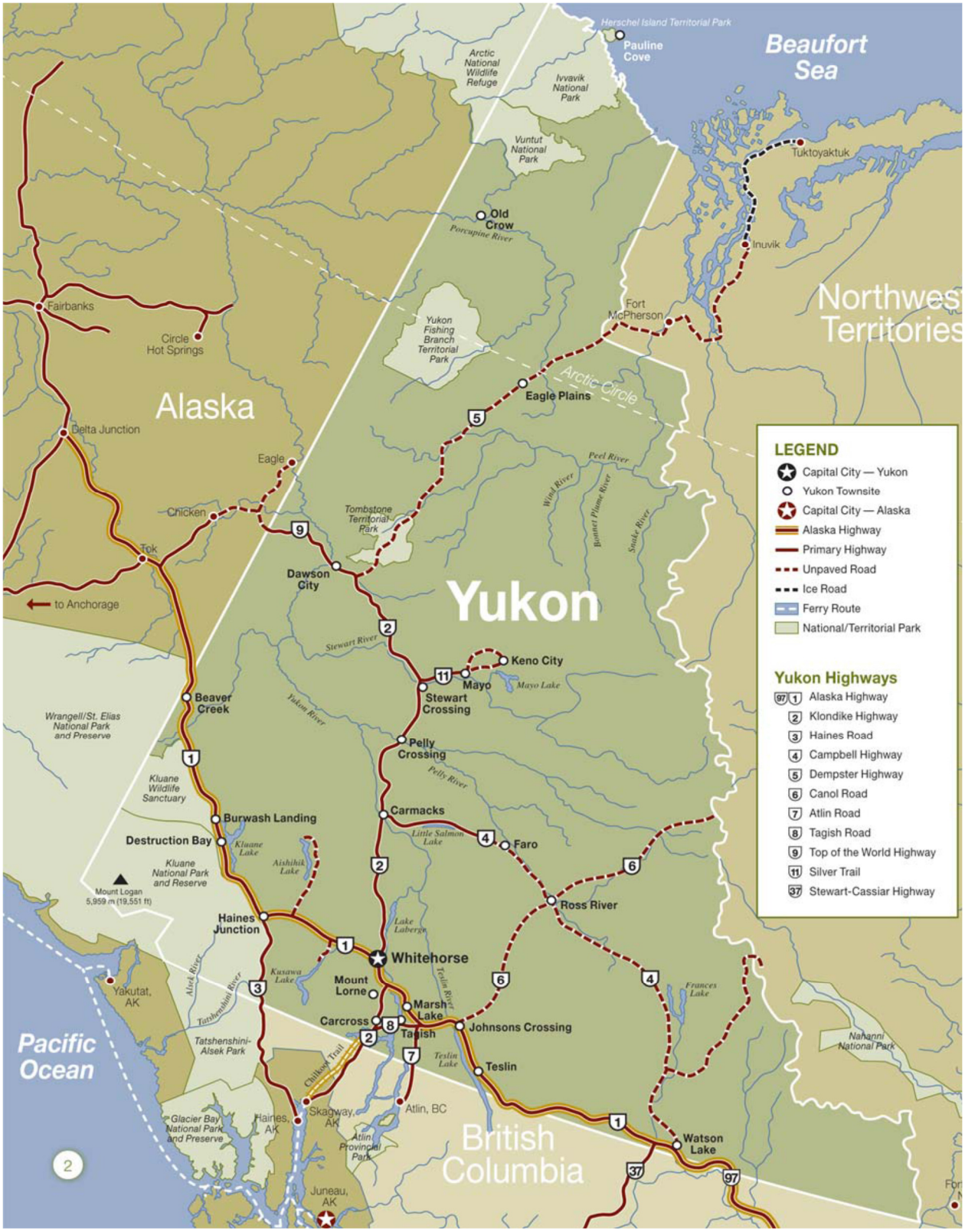
Northern truck transport systems are extensions of the Alaska Highway from British Columbia and the Mackenzie Highway from Alberta:

- In Yukon, an extensive all-weather heavy haul system has expanded from the Alaska Highway to include the Robert Campbell, Dempster, North and South Klondike Highways
- In the Northwest Territories, winter roads seasonally extend Mackenzie Highway trucking operations into the Slave Geologic Province, to Tlicho communities and along the Mackenzie Valley.
- In Nunavut, no communities are connected by road - either within the territory or between Nunavut and the southern Provinces.

Traffic flows and composition for Northern Truck Transport systems are highlighted on the map opposite for current demand exceeding one million tonnes per year by 2010.

Highway systems demand in both Yukon and NWT was derived in large part from weigh scale data. See appendix for detailed statistical development.

Yukon Highway System



2.3.1 Yukon Heavy Haul Highway System

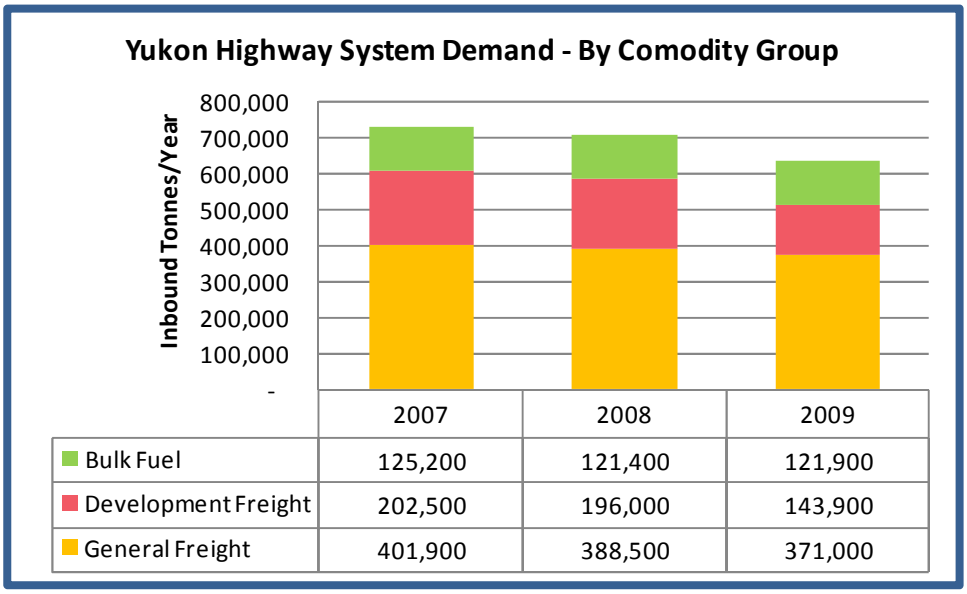
Crossing Nares River Bridge at Carcross, Yukon, Canadian Lynden Transport bulk haul permitted "Super B" train carrying 53 tonnes of copper concentrate from Minto Mine to the Skagway, Alaska ore terminal.

Building upon Alaska Highway construction completed by the U.S. military during World War II, Yukon now has the most extensive highway system in the North. Over much of this system bulk haul permits accommodate heavy haul truck transport not normally allowed elsewhere in North America.

The Yukon Heavy Haul Highway System has been key to overcoming high cost bulk transportation that might otherwise preclude remote resource development critical to sustained economic growth in the territory. This part of the report provides highway system demand data at three major gateways that funnel truck traffic into Yukon (see highway map opposite):

- The major gateway for Northbound Traffic is Watson Lake at the Junction of the Alaska Highway and Cassiar Highway from British Columbia with Robert Campbell Highway 4 and continuation of Alaska Highway 1 in Yukon.
- The major gateway for North and Southbound truck traffic to and from marine connections is the Inside Passage at Skagway, Alaska via Klondike Highway 2 or Haines, Alaska via Haines Highway 3, both connecting to Alaska Highway 1
- The major gateway for Southbound Traffic is Beaver Creek on the Alaska Highway at the US/Canada border crossing from Interior Alaska.

The current 2009 Yukon Highways traffic survey and PROLOG's results analysis provides traffic flows over the three main Gateways for the three main commodity groupings, and historical cargo flows for 2008, and 2007. The chart and table below provide a listing of the three commodity group traffic flows for the three years, up to and including 2009.

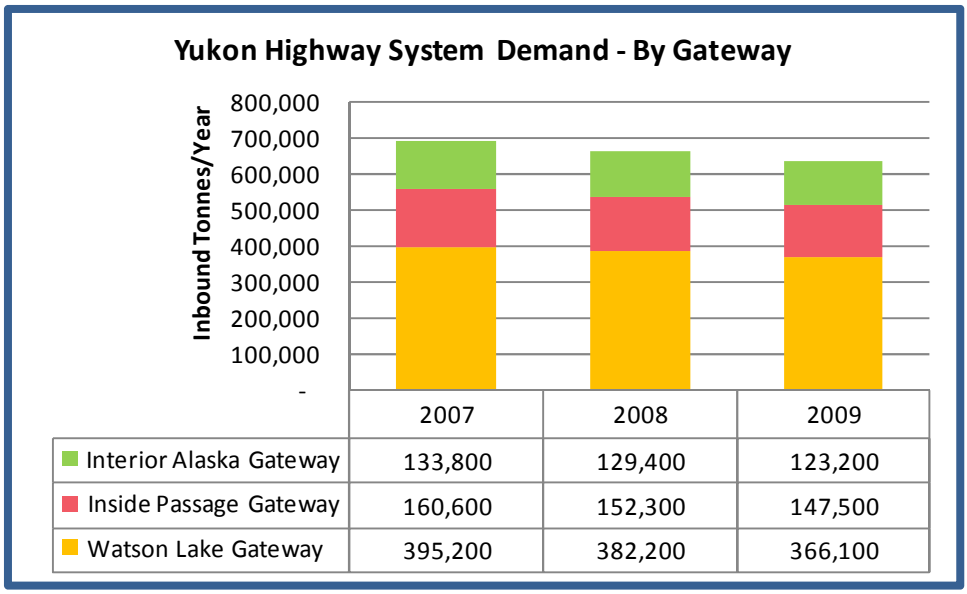


Yukon Highway System Traffic Summary						
	2007		2008		2009	
	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes
Community Resupply	16,000	401,800	15,550	388,700	14,000	371,000
Development Freight	7,500	202,500	7,250	195,900	7,000	143,900
Bulk Fuel	3,200	125,300	3,100	121,300	3,000	121,900
Total	**26,700**	**729,600**	**25,900**	**705,900**	**24,000**	**636,800**

The decline in cargo movements to and through Yukon from 2007 to 2009 clearly reflects the condition of the overall Canadian and world economies in those years. The drop in total tonnage in Yukon would have been even more dramatic if the Minto Mine had not come into production in early 2008.

There are three major gateways to the Yukon Highway System. In addition to the Inside Passage Marine Intermodal Gateway at Skagway, Alaska, truck traffic from southern Canada enters Yukon from the Cassiar and Alaska Highways through the Watson Lake Gateway on the B.C./Yukon border. Southbound Alaska Highway truck traffic enters Yukon through the Interior Alaska Gateway on the Canada/U.S. border at Beaver Creek, Yukon. In addition, the Dempster Highway provides truck access between Yukon and Inuvik, N.W.T. and the Top of the World Highway provides an alternate summer-only connection between Interior Alaska and Dawson City, Yukon.

Inbound traffic demand at the three major Yukon Highway System gateways is shown on the following chart for the 2007-2009 period.



	2007	2008	2009
Interior Alaska Gateway	133,800	129,400	123,200
Inside Passage Gateway	160,600	152,300	147,500
Watson Lake Gateway	395,200	382,200	366,100

Many truck movements over a corridor from a Gateway entry point to a destination are known to involve a specific commodity. For example, Mackenzie Fuels carries jet fuel from the Port of Haines to Whitehorse three times per week; and to Dawson City twice per week. Accordingly, the "Bulk Fuel" commodity group content from that Gateway; in that corridor; to that destination - accounts for 95% of the commodity groupings in tabulating Haines to South Yukon traffic flows.

Yukon will have three mines in production by the end of 2010. Capstone Mining's Minto Copper Mine is currently producing in excess of planned 60,000 tonnes of copper concentrate/year and will continue to do so through 2018. Concentrates are shipped to the marine ore terminal at Skagway, AK, for export markets. Yukon Zinc will bring its Wolverine Mine on stream mid-2010 and is expected to produce 135,000 tonnes of lead, zinc and copper concentrates annually, to be transported to the port of Stewart, B.C. The Cantung mine owned by North American Tungsten will re-open on October, 2010 with 9,000 tonnes/year tungsten compound WO_3 production, to 2014.

Yukon Highway Operations

Yukon possesses an extensive road network of some 4700 kilometres, including a highway trunk system which includes eleven numbered routes, and a number of secondary or seasonal roads that provide access to resource projects and recreational areas. The primary routes are generally maintained to typical North American standards with the exception of the Canol Road (Hwy 6) and the Top of the World Highway (Hwy 9) which are closed in winter. The Nahanni Range Road is kept open by Yukon Highways year-round when the Cantung Mine is operating. North American Tungsten Corp. plans to open the mine again in October, 2010.

The following Table 3.1 details the extent of highways and roads in Yukon that are maintained by Yukon Highways and Public Works.

Highway Network Description	
Trunk Highways – Paved	2,136.44 km
Trunk Highways – Gravel Surface	1,487.22 km
Other Roads – Paved	20.25 km
Other Roads – Gravel	1,037.35 km
Total Maintained Roads	**4,681.26 km**

There is also a large network of winter roads, exploration trails, and mine access roads that are, or were constructed and maintained privately. These and other future roads built for similar purposes vary considerably in their ability to function as future resource corridors. Their upgrading to all-weather facilities would have to survive geological, engineering, environmental and socio-economic studies to establish their suitability to be added to the permanent road system.

All of the bridges on the primary road network are considered adequate to handle conventional truck axle weights into the foreseeable future. Certain secondary roads are assessed reduced axle weights or total truck bans during the spring break-up period.

Following are Yukon public highways and distances.

Yukon Public Road System		
Highway #	Highway Name	Length (km)
1	Alaska Highway	943.9
2	Klondike Highway	691.9
3	Haines Road	174.0
4	Campbell Highway	582.3
5	Dempster Highway	465.0
6	North and South Canol*	462.7
7	Atlin Road	41.0
8	Tagish Road	54.0
9	Top Of The World Highway*	105.9
10	Nahanni Range Road	134.0
11	Silver Trail	110.4
*Seasonal Restrictions		

The following table lists those segments of the Yukon highway system that permit up to 77,111 kgs. allowable GVW which adds 13.6 tonnes the normal Yukon highway permissible gross vehicle weight limit of 63,500 kgs.

Yukon Heavy Haul Highways with Bulk Permitting

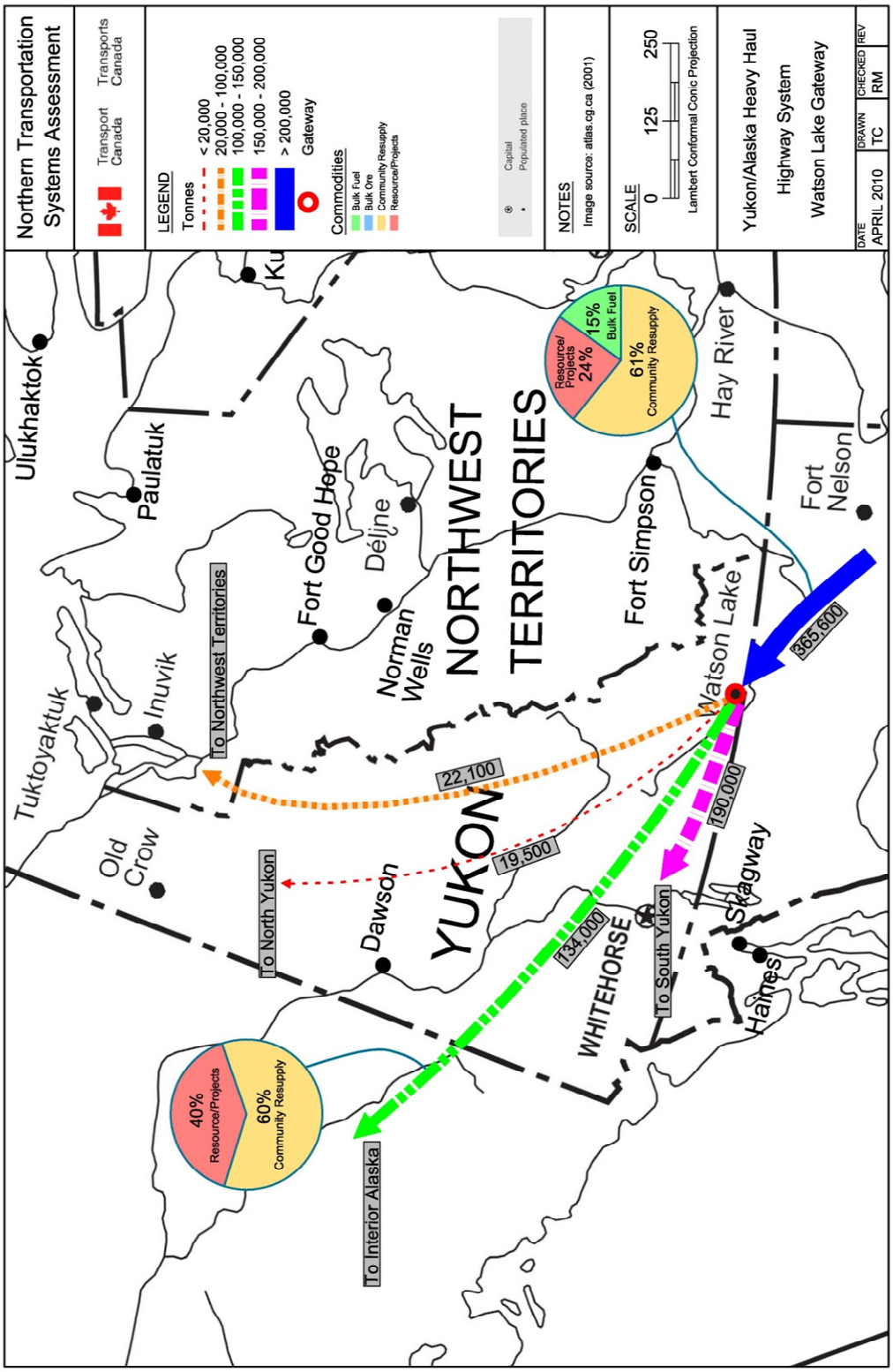
Highway Name	Comments/Description
Hwy 1 (Alaska)	Bridges may require strengthening. Permits likely OK. Bulk haul permitted from Campbell Highway to South Klondike Highway when Sa Dena Hess Mine was in production.
Hwy 2 (Klondike)	Permits issued for ore haul from Carmacks, to Skagway; fuel from Skagway to Whitehorse. Past haul from Faro to Skagway permitted
Hwy 3 (Haines Rd)	No applications to date. Would likely be permitted
Hwy 4 (Campbell)	Permitted west of Faro and south from Sa Dena Hess when mines were in production. Wolverine Mine haul will be permitted.

The current Bulk Haul permit tariff charged by Yukon Highways is one cent per tonne kilometre applied to the weight over the legal GVW limit, for the portion of the haul on a public highway.

The Highways Department does not attempt to tie the tariff to the incremental maintenance cost as might be perceived is inflicted on the highway from the added weight and traffic increase. Rather, it is a negotiated fee with a historical basis, and likely to prevail in the future as a precedent and because Highways does not have a scientific basis for determining the actual cost.

Currently, two bulk haul permits are active. Canadian Lynden Transport carries copper concentrate from the Minto Mine south to the Skagway ore terminal in Super B Train trucks carrying 53 tonne payloads. North 60 Transport transports petroleum products from the Petro Marine Services tank farm at the Port of Skagway (mainly) to its tank farm at Whitehorse. It averages 43 tonnes with a mixed fleet of trucking equipment types.

Additional bulk haul permits are anticipated as new mines go into production (e.g., Bellekeno and Wolverine in 2010).


Northern Transportation Systems Assessment
Transport Canada
Transports Canada
LEGEND
Tonnes
< 20,000
20,000 - 100,000
100,000 - 150,000
150,000 - 200,000
> 200,000
Gateway
Commodities
Bulk Fuel
Bulk Ore
Community Resupply
Resource/Projects
Capital
Populated place
NOTES
Image source: atlas.cg.ca (2001)
SCALE
0 125 250
Lambert Conformal Conic Projection
Yukon/Alaska Heavy Haul
Highway System
Watson Lake Gateway
DATE
APRIL 2010
DRAWN
TC
CHECKED
RM
REV
Ulukhaktok
Paulatuk
Tuktoyaktuk
Inuvik
Old Crow
Fort Good Hope
Déline
Norman Wells
NORTHWEST TERRITORIES
YUKON
Fort Simpson
Hay River
Fort Nelson
Watson Lake
Dawson
WHITEHORSE
Skagway
Haines
To Northwest Territories
To North Yukon
To South Yukon
To Interior Alaska
22,100
19,500
365,600
190,000
134,000
Resource/ Projects 24%
15% Bulk Fuel
61% Community Resupply
40% Resource/Projects
60% Community Resupply

Watson Lake Gateway

Watson Lake located near the British Columbia border, is the major point of entry for inbound highway freight to Yukon originating in southern Canada and the USA. It is also the main gateway for through freight destined for the interior of Alaska. The map opposite graphically displays corridor routings and traffic densities.

At Watson Lake inbound truck traffic enters Yukon:

- Over B.C. Highway 97 (The Alaska Highway) from primarily Edmonton, Alberta and the railhead at Fort Nelson, B.C.;
- Over B.C. Highway 37 (The Cassiar Highway) from primarily Vancouver and potentially the ports of Prince Rupert, Kitimat and Stewart, B.C.

From the Watson Lake Gateway, Alaska Highway 1 and Robert Campbell Highway 4 continue into Yukon.

Alaska Highway

Yukon`s 935 km Alaska Highway No. 1 which originates at Dawson Creek, BC and terminates at Delta Junction, AK, is constructed and maintained to full North American standards for its full distance through the territory. It forms part of the continental highway system to the south.

This primary transportation spine also provides access to year round ice-free Pacific Ocean ports at Skagway (via the South Klondike Highway 2) and Haines (via the Haines Road, Highway 3), Alaska. Northward, the highway links the interior of Alaska and the NWT over the North Klondike Highway 2 and the Dempster Highway No. 5.

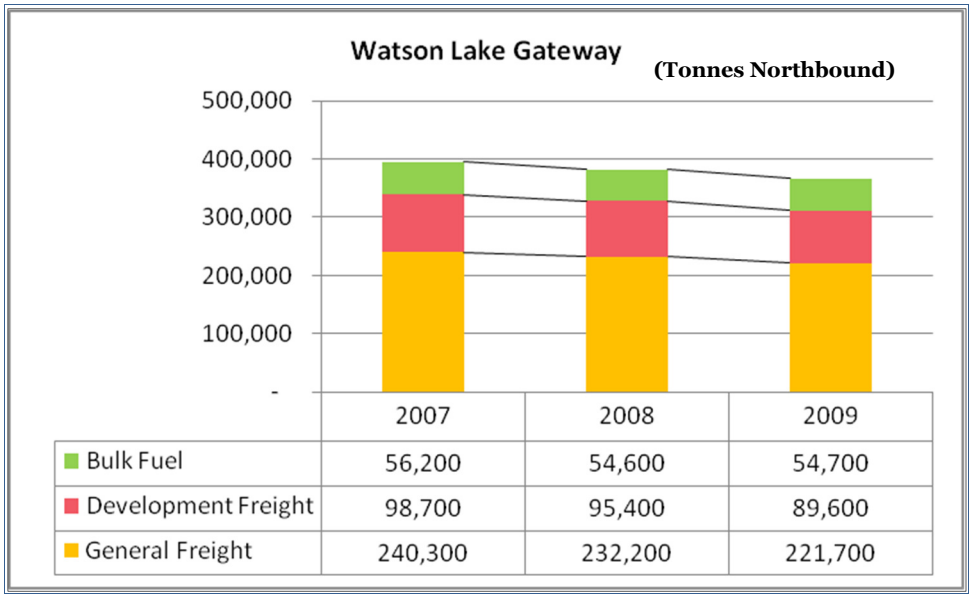
Robert Campbell Highway

The 582 km Robert Campbell Highway No. 4 originates at Watson Lake, YT and ends at Carmacks, YT on the North Klondike Highway. Highway officials describe it as a relatively narrow gravel road that requires substantial upgrading south of Faro, YT if any significant further mine development occurs in the area. The Anvil, St. Cyr and Simpson Ranges in the Selwyn Mountains adjacent to the Campbell highway have been a major host to mining activity over the years in Yukon.

The following table shows total inbound and outbound cargo flows over the Watson Lake Gateway, totalling 481,000 tonnes in 2009. During the year, *366,000 tonnes* of northbound cargo passed through the Gateway into Yukon including *135,000 tonnes* to the Interior of Alaska; and *22,000 tonnes* to the Northwest Territory's Mackenzie Delta area.

This volume includes Cassiar Highway (B.C. Hwy 37) traffic, most of it originating in Vancouver and funnelled on to the Alaska Highway from a point a few kms west of Watson Lake.

190,000 tonnes were delivered to Southern Yukon destinations, mainly Whitehorse, and 19,400 tonnes to Northern Yukon points, mainly the Minto Mine near Carmacks, and Dawson City. 2009 outbound traffic includes 116,000 tonnes originating in the interior of Alaska



Watson Lake Gateway Traffic (2009)

	Route	Origin	Destination	Truckloads	Tonnes
Inbound	Alaska Hwy 1	AB, BC	South Yukon	7,642	190,000
	AK Hwy 1, Hwy 2	AB, BC	North Yukon	781	19,000
	AK Hwy to YT			8,423	209,000
	AK Hwy 1, Hwy 5	AB, BC	NWT	923	22,000
	AK Hwy 1	AB, BC,US	Interior Alaska	5,377	135,000
	Through YT			6,300	157,000
	Total Inbound			**14,723**	**366,000**
Outbound	Alaska Hwy 1	Int. AK, NWT	AB, BC,US	5,060	116,000
	Total Outbound			**5,060**	**116,000**
TOTAL	**GATEWAY**			**19,783**	**482,000**

Inside Passage Gateway

Inside Passage Gateway - South Klondike Hwy 2 joins Alaska Highway 1 South of Whitehorse

The Inside Passage Gateway connects the Yukon Heavy Haul Highway system with tidewater at the ice-free ports of Skagway and Haines, Alaska (see 2.2.3 Inside Passage Intermodal System for map of marine traffic flows connecting to the Yukon Highway System.):

- From Skagway, Klondike Highway 2 is the traditional mine haul route connecting with Alaska Highway 1 at Whitehorse, Robert Campbell Highway 4 at Carmacks - and Dempster Highway 5 near Dawson City for Mackenzie Delta Traffic.
- From Haines, Haines Highway 3 is the traditional route for Interior Alaska traffic moving through Yukon to the Haines Junction connection with the Alaska Highway and continuing to the border crossing at Beaver Creek.

From the Klondike Corridor to Skagway, the Tagish Road and Canol Road diverge toward mineral developments in the Ross River area. As well, many mineral developments access the North Klondike Highway and the Dempster Highway diverges at Dawson toward potential oil and gas developments in Northern Yukon and the Mackenzie Delta.

North Klondike/Dempster Highways

The North Klondike Highway 2 from Carmacks (km 360) to Dawson (km 700) is not considered adequate to facilitate truck haul frequencies much greater than current traffic levels. Although this section of the highway has BST classification (bituminous surface treatment) for suppressing dust, over $100 million would be required to strengthen the road base to facilitate such projects as the Mackenzie Gas Project (MGP) which could see up to 8,000 heavy truckloads of pipeline construction materials shipped to the northern segments of the pipeline over this route.

The more recently developed Dempster Highway 5 (junction km 680) to the NWT border, on the other hand, was constructed to full North American standards and requires very little upgrading to support new resource development projects north of Dawson.

Tagish Road

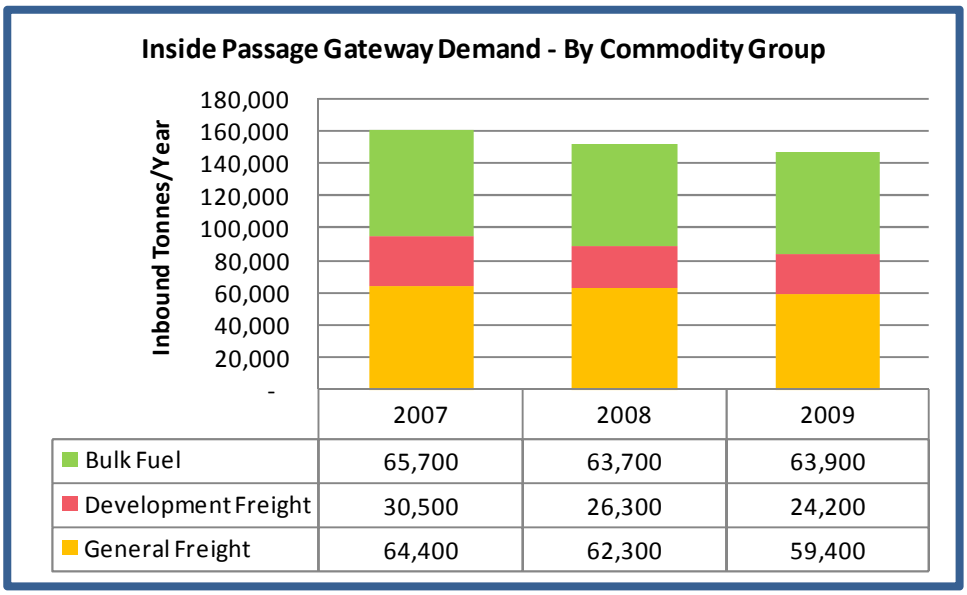
The 54 km Highway 8 link between Carcross and Highway 1 (Jake's Corner) has limited truck traffic, more likely as the result of local residential influence than technical inadequacy.

Future mine traffic off the lower segment of the Robert Campbell Highway and northern B.C. on to the Alaska Highway and destined to the Skagway, AK ore terminal over the Tagish Road could feature lower trucking costs based on the distance saved by avoiding the circuitous Whitehorse route alternative. The aforementioned mines are all potential candidates for the Skagway ore terminal, and the presence of the new facility constructed by the Alaska Industrial Development and Export Authority for the Minto Mine could well be the magnet required to draw new mine traffic to the closest tidewater port.

Canol Road

The seasonal South Canol Road (Highway 6) is theoretically available for commercial traffic. However, the road is a winding route that follows topographical contours with minimal cuts and fills, and has many tight, hairpin curves in and out of valleys.

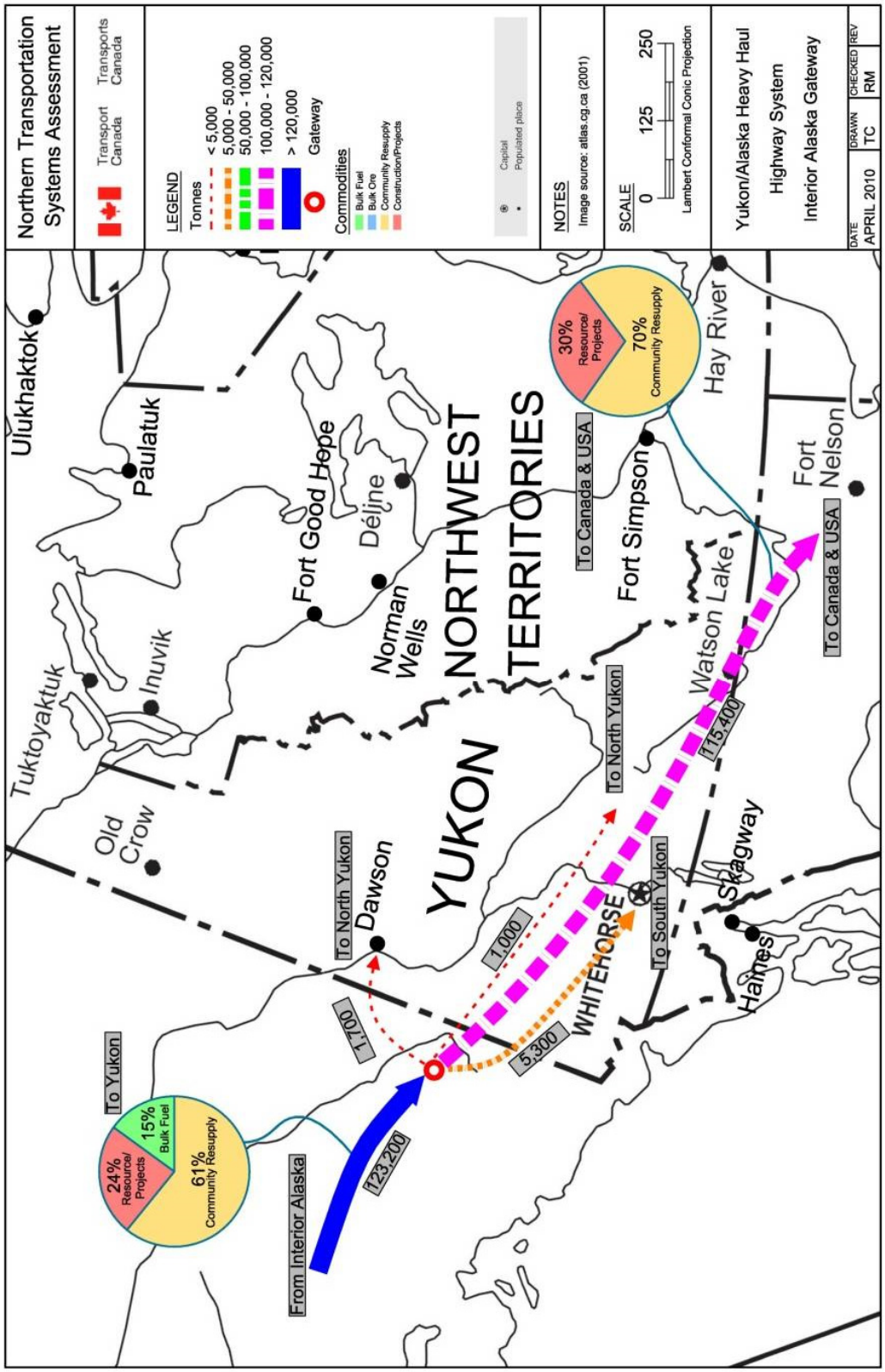
Some engineering studies have been carried out on improving the North Canol Road, and to a lesser extent, the South Canol. The entire Hwy 6 route from Johnson's Crossing to the NWT border represents an important potential mine haul road that can dramatically reduce the cost of transporting concentrates out, and supplies in - to mines in the area. The Selwyn Howard Pass, Mactung and Wolverine mineral properties all could benefit from development of the Canol route as a dedicated mine haul road.



	2007	2008	2009
Bulk Fuel	65,700	63,700	63,900
Development Freight	30,500	26,300	24,200
General Freight	64,400	62,300	59,400

Traffic through the Inside Passage Gateway to Yukon and Alaska (2009)					
	Route	Origin	Destination	Truckloads	Tonnes
Inbound	Klondike 2, Hwy 1	Skagway	So. Yukon	2,776	84,000
	+ No. 60 Haul	Skagway	Whitehorse	839	36,000
	Klondike Hwy 2	Skagway	No. Yukon	29	1,000
	Haines Hwy 3, Hwy 1	Haines	So. Yukon	158	6,000
	Hwy 3, Hwy 2	Haines	No. Yukon	25	1,000
	Total Inside Psg to Yukon			**3,827**	**128,000**
	Klondike 2, Hwy 1	Skagway	Int. Alaska	44	1,000
	Haines Hwy 3, Hwy 1	Haines	Int. Alaska	189	5,000
	Total Inbound			**4,060**	**134,000**
Outbound	Klondike Hwy 2	Minto Mine	Skagway	1,023	54,000
TOTAL				5,083	188,000

Note that in addition to inbound truckloads, since 2007 outbound mineral concentrate shipments (54,000 tonnes of copper concentrate in 2009) have resumed via Klondike Highway 2 and the Inside Passage Gateway at Skagway, Alaska.


Northern Transportation Systems Assessment
Transport Canada
Transports Canada
LEGEND
Tonnes
< 5,000
5,000 - 50,000
50,000 - 100,000
100,000 - 120,000
> 120,000
Gateway
Commodities
Bulk Fuel
Bulk Ore
Community Resupply
Construction/Projects
Capital
Populated place
NOTES
Image source: atlas.cg.ca (2001)
SCALE
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Lambert Conformal Conic Projection
Yukon/Alaska Heavy Haul Highway System
Interior Alaska Gateway
DATE
APRIL 2010
DRAWN
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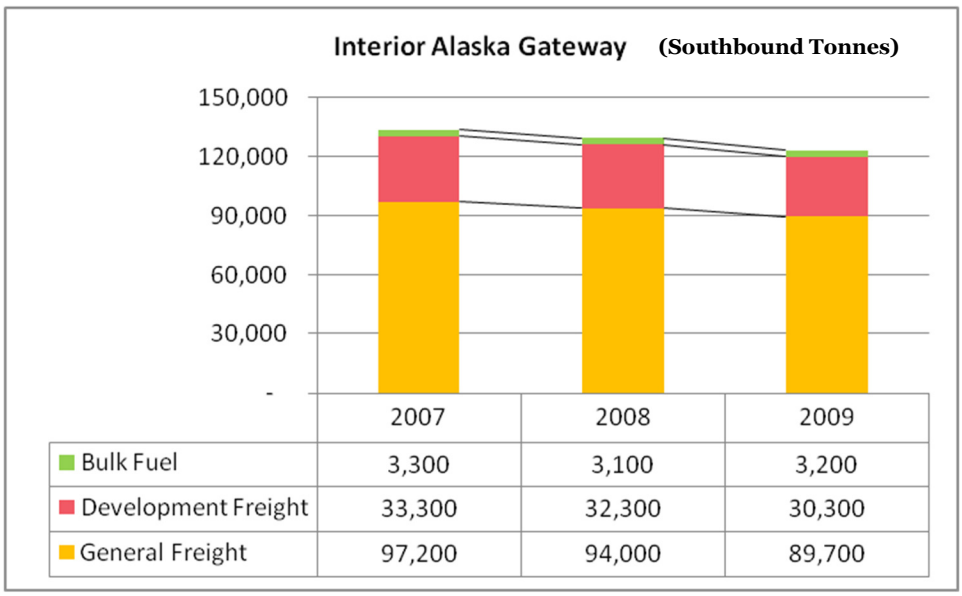
Ulukhaktok
Paulatuk
Tuktoyaktuk
Inuvik
Old Crow
Fort Good Hope
Déline
Norman Wells
NORTHWEST TERRITORIES
YUKON
Fort Simpson
Hay River
Fort Nelson
Watson Lake
Dawson
WHITEHORSE
Skagway
Haines
To Canada & USA
To North Yukon
To South Yukon
To Yukon
From Interior Alaska
123,200
1,700
1,000
5,300
115,400
30% Resource/ Projects
70% Community Resupply
24% Resource/ Projects
15% Bulk Fuel
61% Community Resupply

Interior Alaska Gateway

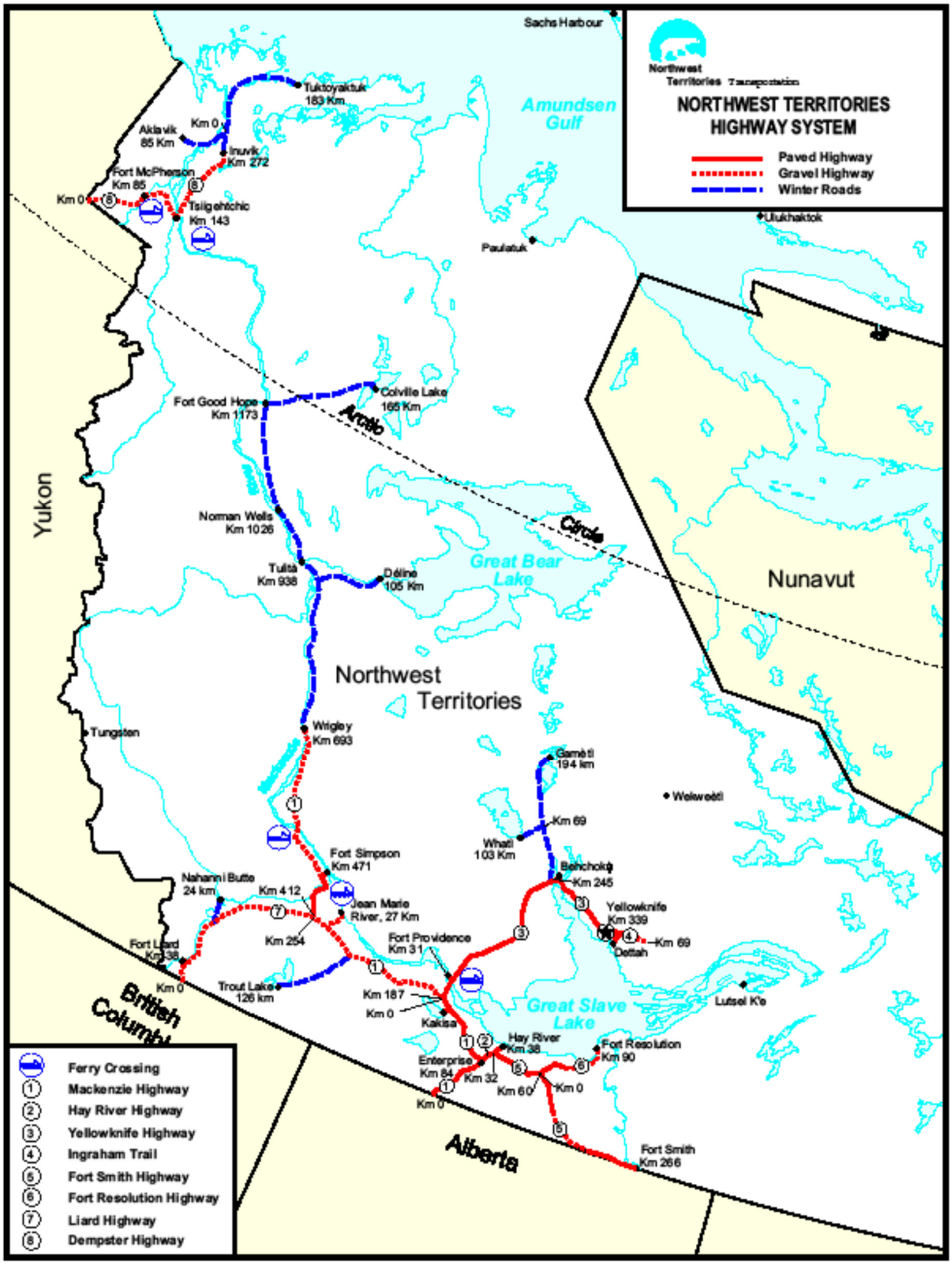
This gateway is the main point of entry to/from the State of Alaska on Alaska State Highway 2 and is located near the Yukon community of Beaver Creek, located on the Alaska Highway - Yukon Hwy 1. This route from Interior Alaska brings mainly outbound freight destined for the USA and southern Canada, plus a relatively small volume of fuel, and construction equipment and materials into North and South Yukon. Fuel hauls originated at the North Pole, AK refinery near Fairbanks. This facility is scheduled for closure in the near future.

A relatively small volume of *8,000 tonnes* of total cargo was transported from the interior of Alaska inbound to Yukon destinations, during 2009. A large percentage of this was fuel sourced at the Flint Hills Refinery at North Pole, AK, near Fairbanks. A large volume of highway traffic (*115,000 tonnes*) passed directly from the interior of Alaska southbound over the Alaska Highway through Yukon to destinations in the USA and southern Canada.



Interior Alaska Gateway Traffic - 2009

	Route	Origin	Destination	Truckloads	Tonnes
Inbound	AK Hwy 1, 2	Int. Alaska	North Yukon	26	1,000
	Top Of The World Hwy	Int. Alaska	North Yukon	51	2,000
	AK Hwy 1	Int. Alaska	South Yukon	204	5,000
	Total Int. AK to Yukon			**281**	**8,000**
Outbound	AK Hwy 1	Int. Alaska	USA, Canada	5,040	115,000
TOTAL	**INTERIOR ALASKA**			**5,321**	**123,000**


Northwest Territories Transportation
NORTHWEST TERRITORIES
HIGHWAY SYSTEM
Paved Highway
Gravel Highway
Winter Roads
Sachs Harbour
Tuktoyaktuk
183 Km
Amundsen Gulf
Aklavik
85 Km
Km 0
Inuvik
Km 272
Fort McPherson
Km 85
Km 0
Tsiigehtchic
Km 143
Paulatuk
Ulukhaktok
Fort Good Hope
Km 1173
Colville Lake
165 Km
Arctic
Yukon
Norman Wells
Km 1026
Tulita
Km 938
Déline
105 Km
Great Bear Lake
Circle
Nunavut
Northwest Territories
Tungsten
Wrigley
Km 693
Gamètì
194 km
Welwèètì
Km 69
Whatì
103 Km
Fort Simpson
Km 471
Behchokǫ̀
Km 245
Nahanni Butte
24 km
Km 412
Joan Marie
River, 27 Km
Yellowknife
Km 339
Km 69
Dettah
Km 254
Fort Liard
Km 38
Km 0
Fort Providence
Km 31
Trout Lake
126 km
Km 187
Km 0
Kakisa
Great Slave Lake
Lutsel K'e
Hay River
Km 38
Fort Resolution
Km 90
Enterprise
Km 84
Km 32
Km 60
Km 0
Km 0
British Columbia
Alberta
Fort Smith
Km 266
Ferry Crossing
1 Mackenzie Highway
2 Hay River Highway
3 Yellowknife Highway
4 Ingraham Trail
5 Fort Smith Highway
6 Fort Resolution Highway
7 Liard Highway
8 Dempster Highway

2.3.2 NWT Highway and Winter Road Systems

Fort Providence Ferry crossing of the Mackenzie River on Yellowknife Highway 3 near junction with Mackenzie Highway 1. A new bridge is under construction here.

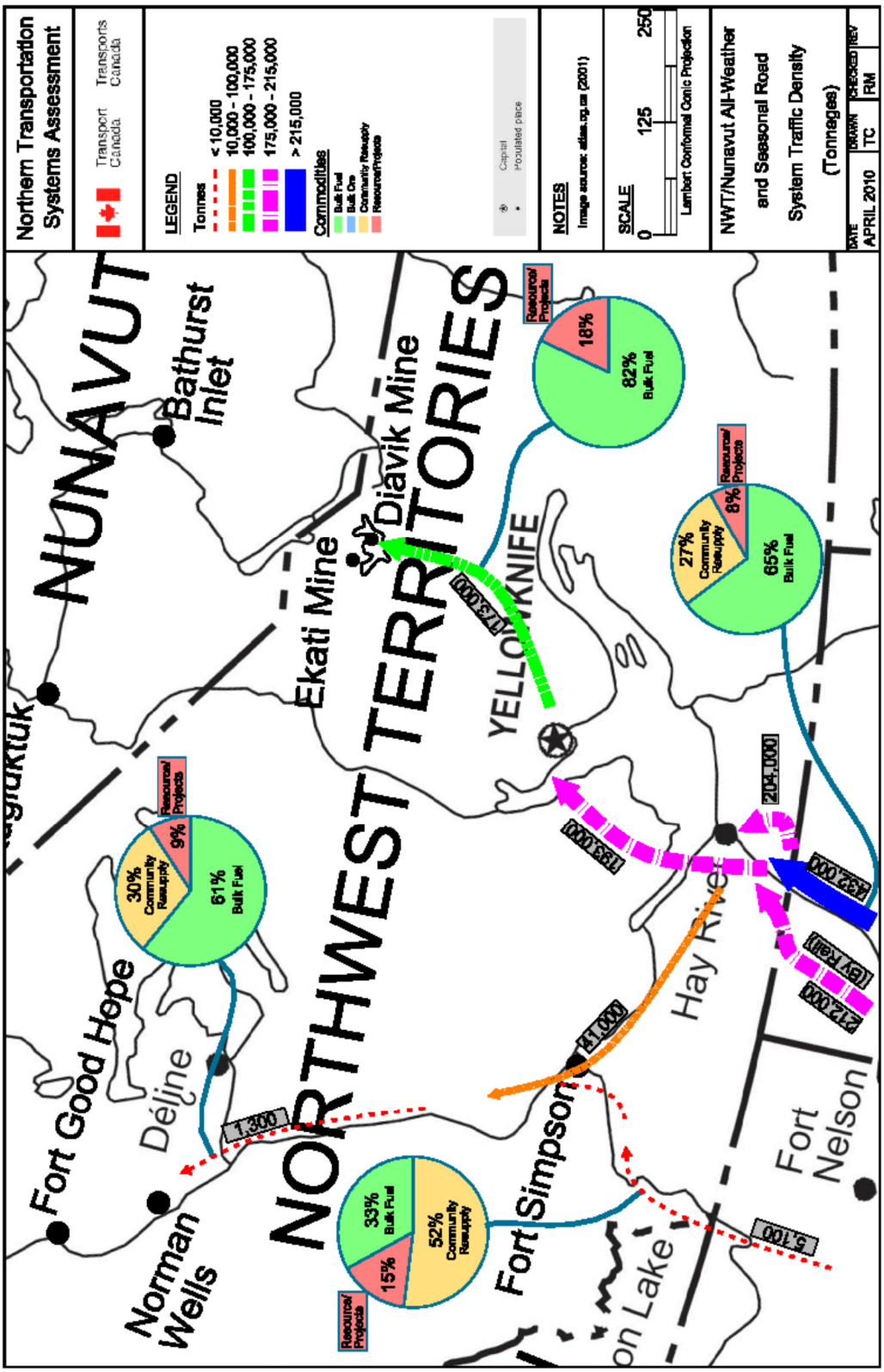
The Mackenzie Highway from Alberta is the primary truck corridor into the Northwest Territories. From the Hay River/Enterprise Gateway, a system of all-weather highways with winter road extensions is still evolving. The Liard and Dempster Highway Corridors also provide NWT trucking access. See highway system map opposite.

This part of the report provides all-weather highway and winter/ice road demand data for the following regions and highway corridors to them:

- ***Hay River/Yellowknife Corridor*** - *Mackenzie Highway 1* from Alberta to Hay River and Yellowknife corridor communities extended by winter/ice road to Whati and Gameti as well as to resource developments in the Great Slave Lake area and, via winter/ice road, in the Slave Geologic Province;
- ***Mackenzie Valley Corridor*** – Mackenzie Highway 1 from Alberta and Liard Highway 7 from British Columbia to Fort Liard, Fort Simpson and from Wrigley extended by winter road to other communities and resource developments in the Mackenzie Valley;
- ***Mackenzie Delta Corridor*** - *Dempster Highway 8* from Yukon to Inuvik, and extended by ice road to Aklavik, Tuktoyaktuk and offshore development support activities in the Delta/Beaufort Region.

Although not a separate transport corridor to the Northwest Territories, Highway 5 (Fort Smith Highway) extends into the northeast corner of Alberta and bridges Mackenzie Highway traffic from Alberta over a connecting winter road between Fort Smith and Fort Chipewyan, an otherwise isolated Alberta community on Lake Athabasca.

The total current demand for all three of these NWT Highway corridors in 2009 is 460,000 tonnes per year - equivalent to approximately 14,150 truckloads.


Northern Transportation Systems Assessment
Transport Canada
Transports Canada
LEGEND
Tonnes
< 10,000
10,000 - 100,000
100,000 - 175,000
175,000 - 215,000
> 215,000
Commodities
Bulk Fuel
Bulk Dry
Community Resupply
Resource Projects
Capital
Populated place
NOTES
Image source: atlas.nrcan.gc.ca (2001)
SCALE
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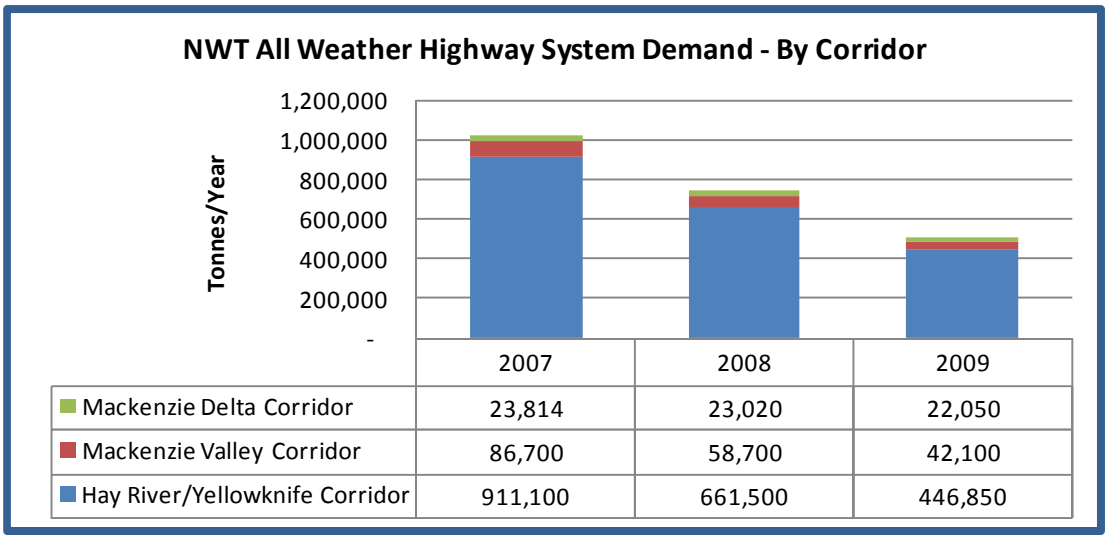
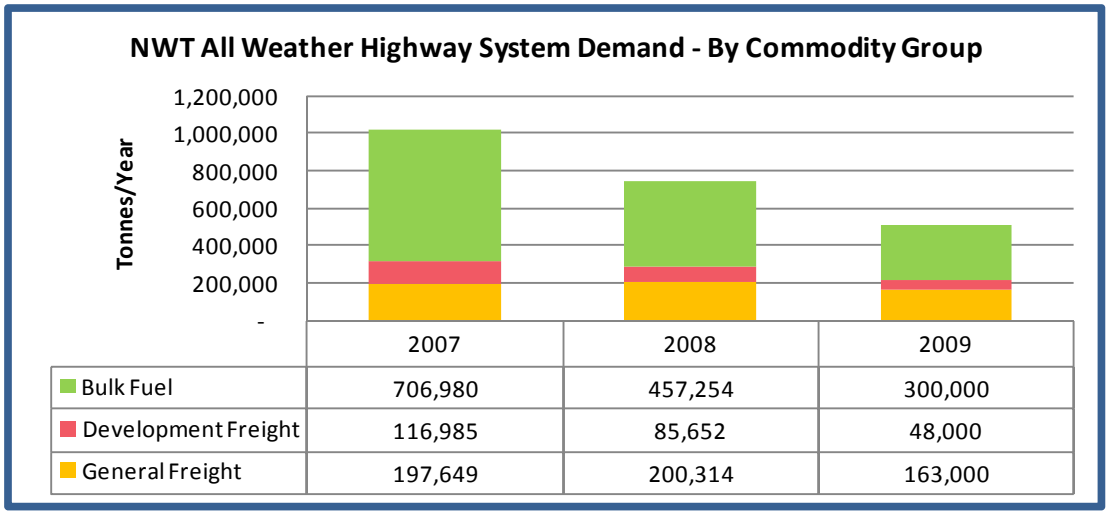
125
250
Lambert Conformal Conic Projection
NWT/Nunavut All-Weather and Seasonal Road System Traffic Density (Tonnages)
DATE
APRIL 2010
DRAWN
TC
CHECKED
RM
NUNAVUT
NORTHWEST TERRITORIES
Bathurst Inlet
Ekati Mine
Diavik Mine
YELLOWKNIFE
Fort Good Hope
Déline
Norman Wells
Fort Simpson
Hay River
Fort Nelson
1,300
41,000
5,100
212,000
204,000
18%
Resource Projects
82%
Bulk Fuel
8%
Resource Projects
27%
Community Resupply
65%
Bulk Fuel
9%
Resource Projects
30%
Community Resupply
61%
Bulk Fuel
15%
Resource Projects
33%
Bulk Fuel
52%
Community Resupply

Truck traffic ranges between 86% and 99% concentrated on the southern NWT Highway System (Mackenzie Valley and Hay River/Yellowknife Corridors) as shown in the following table and in the traffic density map opposite.



	2007	2008	2009
Mackenzie Delta Corridor	23,814	23,020	22,050
Mackenzie Valley Corridor	86,700	58,700	42,100
Hay River/Yellowknife Corridor	911,100	661,500	446,850

The following figure shows both the predominance of bulk fuel traffic and how it declines in direct relation to resource development demand.



	2007	2008	2009
Bulk Fuel	706,980	457,254	300,000
Development Freight	116,985	85,652	48,000
General Freight	197,649	200,314	163,000

NWT Highway Operations

NWT surface access for communities and resource developments is provided by:

- All-weather roads (year-round availability)
- Ice bridge and ferry crossings (fall and/or spring interruptions)
- Winter roads over land and ice roads on rivers or lakes (limited season)
- Seasonal access roads that prolong winter/ice availability (extended season).

Most all-weather and winter roads are public roads provided by the Department of Transportation of the Government of Northwest Territories.

The NWT primary highway system6 consists of 2,021 kilometres of all-weather roads, most of which were constructed between 1960 and 1983. The following table lists the highways according to the three main transportation corridors.

NWT All Weather Highway System

Highway or Road	Length (km)
Alberta to Hay River/Yellowknife Corridor	
Highway 1 (Mackenzie Highway to Jct 3)	187.0
Highway 2 (Hay River Highway)	43.7
Highway 3 (Yellowknife Highway)	338.8
Highway 4 (Ingraham Trail)	69.2
Highway 5 (Fort Smith Highway)	266.0
Highway 6 (Fort Resolution Highway)	90.0
B. C. to Mackenzie Valley Corridor	
Highway 1 (Jct 3 to Wrigley)	503.0
Highway 7 (Liard Highway)	254.1
Yukon to Mackenzie Delta Corridor	
Highway 8 (Dempster Highway)	269.3
Total All-Weather Highway System	**2021.1**

Historically, the first highway in the Northwest Territories was the CANOL Road from Norman Wells to the Alaska Highway. It was built by the U.S. Army during World War II parallel to the CANOL pipeline for which it provided construction and maintenance logistics support. The CANOL Road and Pipeline were abandoned after less than a year of service.

The first permanent highway access to the Northwest Territories came with completion of the Mackenzie Highway to Hay River in 1949. Since then, the Mackenzie Highway corridor has been extended with a regional road network to reach most communities in the Great Slave Lake Basin and the southern Mackenzie/Liard River watersheds. A counterpart corridor to the northern Mackenzie Delta is the Dempster Highway completed in 1979.

In general, Highways 1, 2 and 5 in the area between the Alberta/NWT border and Great Slave Lake are paved surfaces with either hot mix asphalt or chip seal (single asphalt surface treatment). There are some segments along Highway 5 that have been reverted back to gravel and for the most part, Highway 6 to Fort Resolution is gravel.

From the Mackenzie River to the Behchoko and Yellowknife area north of Great Slave Lake, Highway 3 is a chip seal paved surface. North of Yellowknife, Highway 4 is a combination of paved and gravel surfaces.

Along the south side of the Mackenzie River and through the Mackenzie Valley to Wrigley, Highway 1 is predominantly gravel with a section south of Fort Simpson that is paved. Through the Liard area to the British Columbia/NWT border, Highway 7 is gravel.

At the north end of the Mackenzie Valley and into the Mackenzie Delta, Highway 8 from the Yukon/NWT border to Inuvik is predominantly gravel with very short paved sections entering the Town of Inuvik.

The Tuktoyaktuk Winter Road is an ice road on frozen Mackenzie River Delta channels and the frozen Arctic Ocean between the communities of Inuvik and Tuktoyaktuk. It services natural gas fields and exploration facilities and is a key community resupply route for Tuktoyaktuk and Aklavik. The ice road season is typically from mid-December to mid-April.

Gravel surfaced highways in the NWT are generally treated each year with Calcium Chloride or other commonly used dust suppressants.

NWT All-Weather Highways are generally available to truck transport year-round. For the most part, they are constrained only by the fall freeze-up and spring thaw transition periods between ferry and ice-bridge crossings:

- The Mackenzie River at Fort Providence, N'Dulee and Tsiigehtchic;
- The Liard River at Fort Simpson; and
- The Peel River at Fort McPherson.

The transition period can be up to two months in the fall before an ice bridge is up to full truckload weights but is generally only a week or so in the Spring while the ice breaks up and clears the river crossing.

At the Fort Providence crossing, ferry service continues into the winter until the parallel ice bridge is up to full truckload limits. Construction of a permanent bridge is replacing the Fort Providence ferry and ice bridge crossing.

All-Weather Highway System

Three corridors channel highway traffic into the northwest Territories – The Hay River/Yellowknife Corridor, the Mackenzie Valley Corridor, and the Mackenzie delta corridor:.

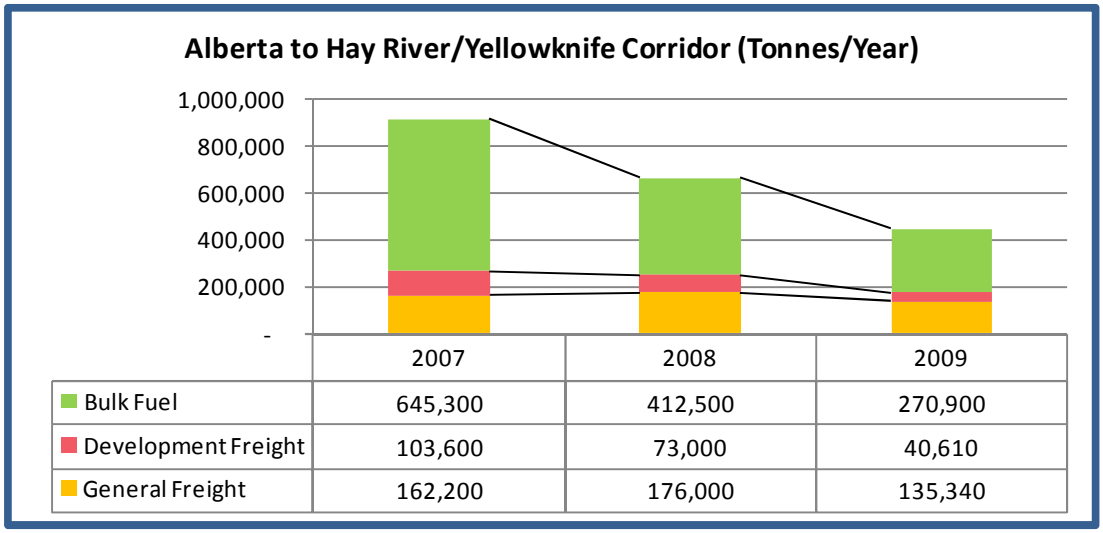
The Hay River/Yellowknife Corridor - From Alberta, the Mackenzie Highway 1 brings traffic from the Calgary-Edmonton-Peace River corridor into the Great Slave Lake area. It embraces the portion of the NWT Highway System that is paved, including the Mackenzie Highway from Alberta and connecting highways to Hay River, Fort Resolution and Fort Smith. The Mackenzie/Yellowknife Highway route is paved as far as Behchoko.

The Mackenzie Valley Corridor - This trucking corridor extends from the Mackenzie highway through the Mackenzie Valley and may ultimately lead to the link-up of a continuous all-weather extension of the Mackenzie Highway. At that point, residual dependence upon the Mackenzie River barge service will be removed and in all likelihood replaced by competing truck services – at least for dry freight. It includes Liard Highway 7 from British Columbia over which BC Highway 97 brings traffic from the Vancouver and the Fort Nelson railhead into the Mackenzie Valley. It was completed in 1983 to access the Mackenzie/Liard River basins from British Columbia. Mackenzie Valley resource development never reached anticipated levels and accordingly the Liard Highway has never attracted much through traffic. However, currently there is a significant amount of local truck traffic associated with gas field activity on the Liard Plateau and logging operations in the region, as well as some mining work primarily associated with the Prairie Creek project.

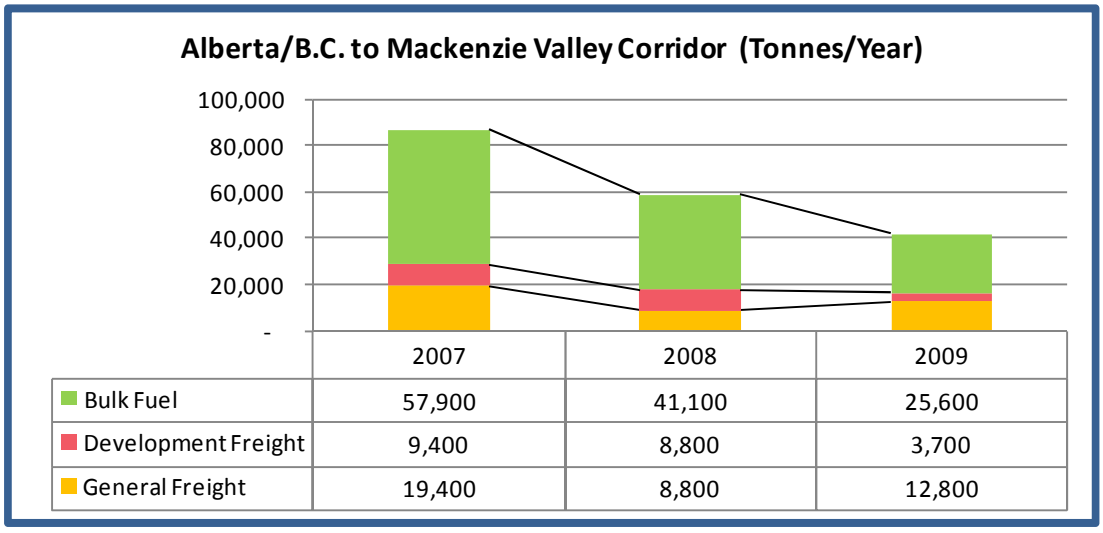
The Mackenzie Delta Corridor - From Yukon, the Dempster Highway (Yukon Hwy 5/NWT Hwy 8) brings Alaska/Klondike Highway traffic into the Mackenzie Delta. It was completed in 1979 as a "road to resources" to support Mackenzie Delta/Beaufort Sea oil and gas development. That development is still pending. However, currently the Dempster Highway provides year-round highway access to Mackenzie Delta communities that otherwise would have to await extension of the Mackenzie Highway from Wrigley. A 180 km seasonal winter (ice) road connects Inuvik and Tuktoyatuk and an initial 20 km of a future all-weather highway to Inuvik has been completed south from Tuktoyaktuk to Gravel Source 177 in 2010.

Contemporary demand for commodity movements through each of these corridors is shown in the following three figures[3].

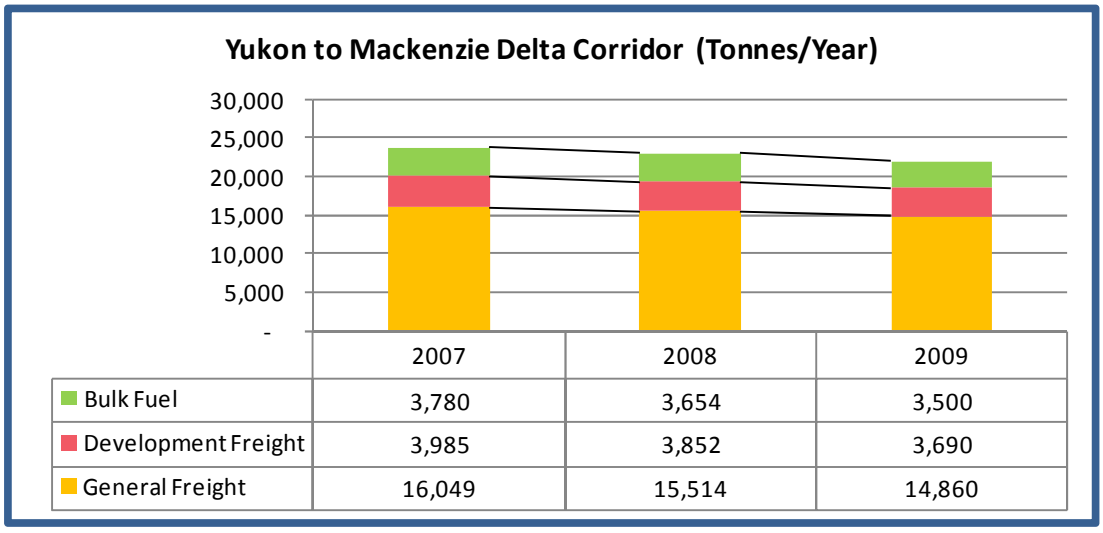
[3] Tonnages to Southern Northwest Territories are based on tonnages provided for Highway 1, Highway 2 and Highway 3. Tonnages provided in the data for Highway 7 are destined to Highway 1 and/or 3 and are therefore accounted for. Tonnages provided in the data for the TCWR would originate from Highway 3 and are therefore accounted for. Tonnages to the Mackenzie Valley are based on tonnages provided for Highway 1 (Mackenzie Highway Winter Road, Wrigley to Fort Good Hope). Tonnages to the Mackenzie Delta are based on tonnages provided for Highway 8 (Dempster Highway).



	2007	2008	2009
Bulk Fuel	645,300	412,500	270,900
Development Freight	103,600	73,000	40,610
General Freight	162,200	176,000	135,340



	2007	2008	2009
Bulk Fuel	57,900	41,100	25,600
Development Freight	9,400	8,800	3,700
General Freight	19,400	8,800	12,800



	2007	2008	2009
Bulk Fuel	3,780	3,654	3,500
Development Freight	3,985	3,852	3,690
General Freight	16,049	15,514	14,860

NWT Winter/Ice Road System

Inuvik-Tuktoyaktuk Winter Ice Road on East Channel of Mackenzie River.

A winter road system is constructed each year in the NWT. With 1,277 km of public winter roads plus another 580 kilometres of privately constructed winter roads, this seasonal system more than equals the distance covered by the all-weather highway network. Historically, the program has facilitated resource exploration and development in areas inaccessible during other seasons; and provided community road access otherwise impossible.

There are four major winter/ice road systems extending all-weather highway corridors in the NWT:

- The Mackenzie Valley Winter Road from Wrigley to Tulita, Deline, Norman Wells and Fort Good Hope;
- The Inuvik-Tuktoyaktuk Ice Road along the Mackenzie River East Channel to Aklavik and Tuktoyaktuk;
- The Gameti Winter/Ice Road from Bechoko to Wha Ti and Gameti.
- The Tibbett Lake to Contwoyto Lake Winter/Ice Road

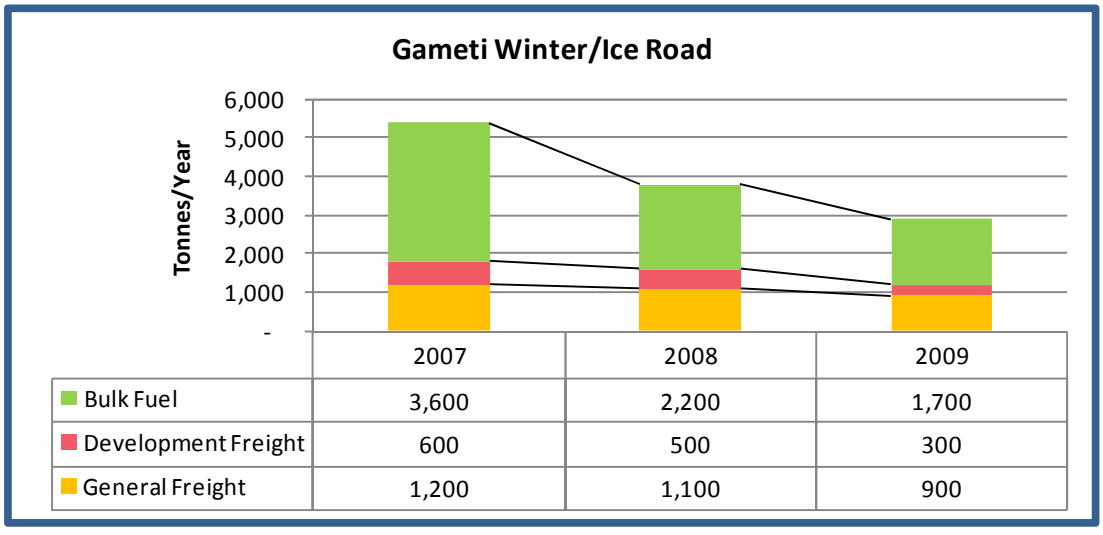
With the major exception of the privately constructed and operated Tibbett to Contwoyto Winter Road, most other winter/ice roads are part of the public highway system. The most extensive of these is the Mackenzie Winter Road which is 480 km distance between Wrigley and Fort Good Hope and another 106 km between Tulita and Deline.

The public winter/ice road system is supplemented by seasonal winter and ice roads constructed and operated by private enterprises. The most significant and long standing of such roads is the Tibbitt to Contwoyto Winter Road. The TCWR is the only current land based transportation system into the Slave Geologic Province, a mineral rich area of Canada extending north from Great Slave Lake in the Northwest Territories through Nunavut to the Arctic Coast. Originally constructed between Yellowknife and the Lupin Gold Mine, which is located approximately 550 km to the north in Nunavut, the TCWR is currently constructed and operated on an annual basis to primarily serve the diamond mines located in the Northwest Territories approximately 375 km north of Yellowknife.

Trucking distance on these principal winter roads, as well as shorter seasonal community access roads, is shown in the following table:

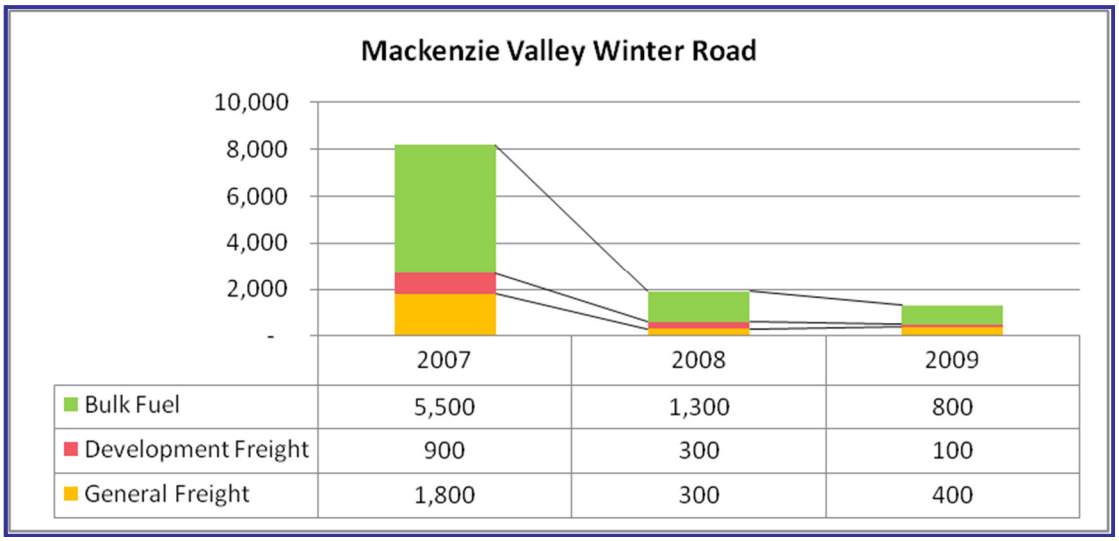
Seasonal Winter/Ice Road System	
Mackenzie Valley	
Highway 1 (Mackenzie Highway, Wrigley to Fort Good Hope)	**480.0**
Deline Access	**106.0**
Inuvik-Tuktoyaktuk	
Tuktoyaktuk Access	**194.0**
Aklavik Access	**86.0**
Gameti	
Gameti Road	**100.0**
Whati Road	**145.0**
Tibbett Lake to Contwoyto (Private)	
Tibbett Lake to Contwoyto	**580.0**
Other seasonal access roads	
Nahanni Butte Access	**22.0**
Highway 3 Ice Crossing	**13.0**
Trout Lake Access	**126.0**
Dettah Access	**6.0**
Total	**1,858**

Truck traffic on the principal winter roads is shown in the following tables:

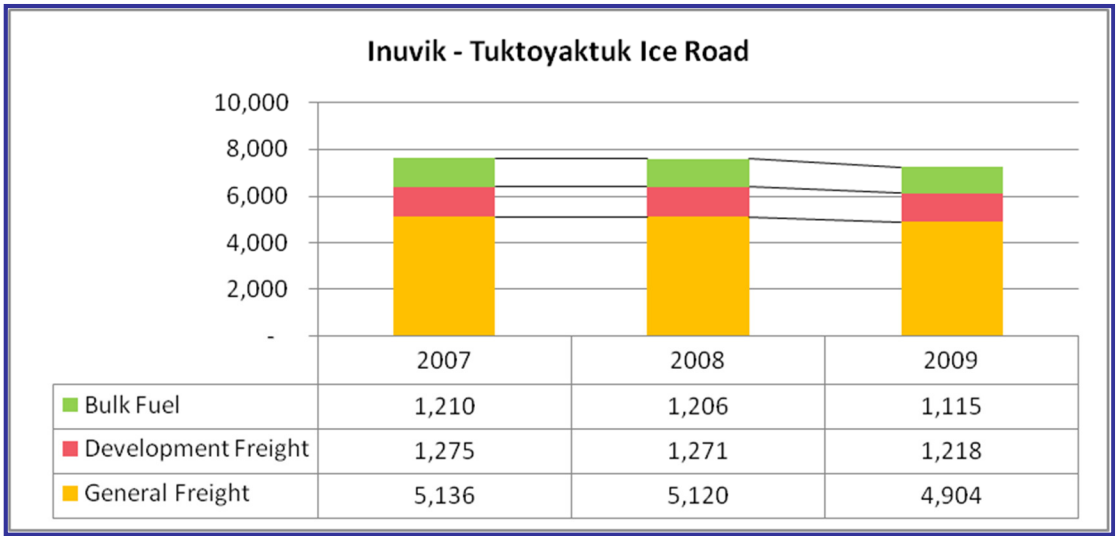


	2007	2008	2009
Bulk Fuel	3,600	2,200	1,700
Development Freight	600	500	300
General Freight	1,200	1,100	900

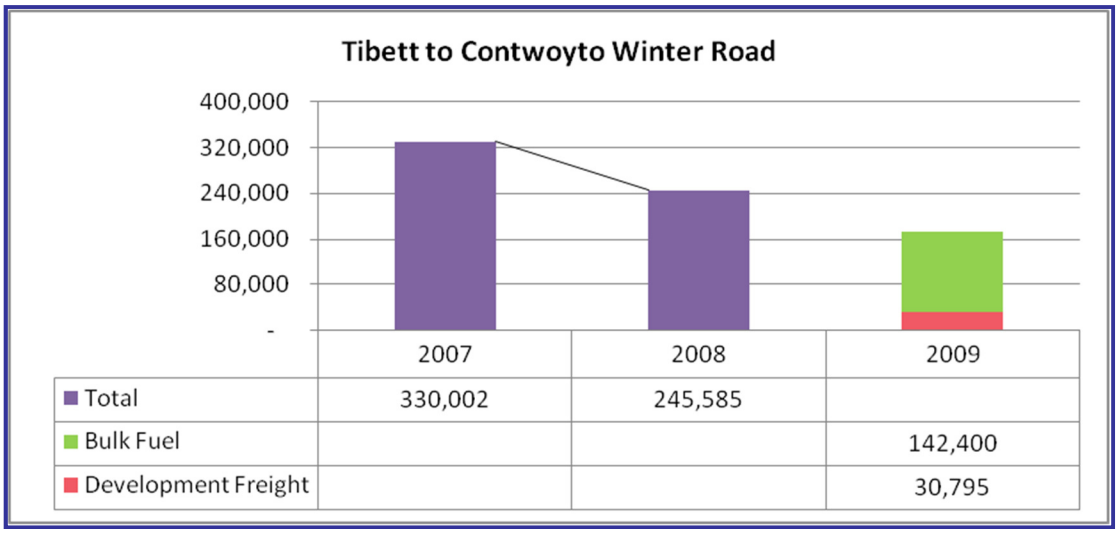
Winter Road Tonnes/Year



	2007	2008	2009
Bulk Fuel	5,500	1,300	800
Development Freight	900	300	100
General Freight	1,800	300	400



	2007	2008	2009
Bulk Fuel	1,210	1,206	1,115
Development Freight	1,275	1,271	1,218
General Freight	5,136	5,120	4,904



	2007	2008	2009
Total	330,002	245,585	
Bulk Fuel			142,400
Development Freight			30,795

The overland Mackenzie winter road system has been gradually improved with the installation of bridges and culverts, and upgrading alignments along the permanent right-of-way for an all-weather extension of the Mackenzie Highway.

The Mackenzie Winter Road System has become a valuable transportation asset in terms of providing two season resupply capability to complement summer only barge service. Winter oil and gas exploration continues sporadically in the Norman Wells and Tulita areas, serviced by the Mackenzie winter road system.

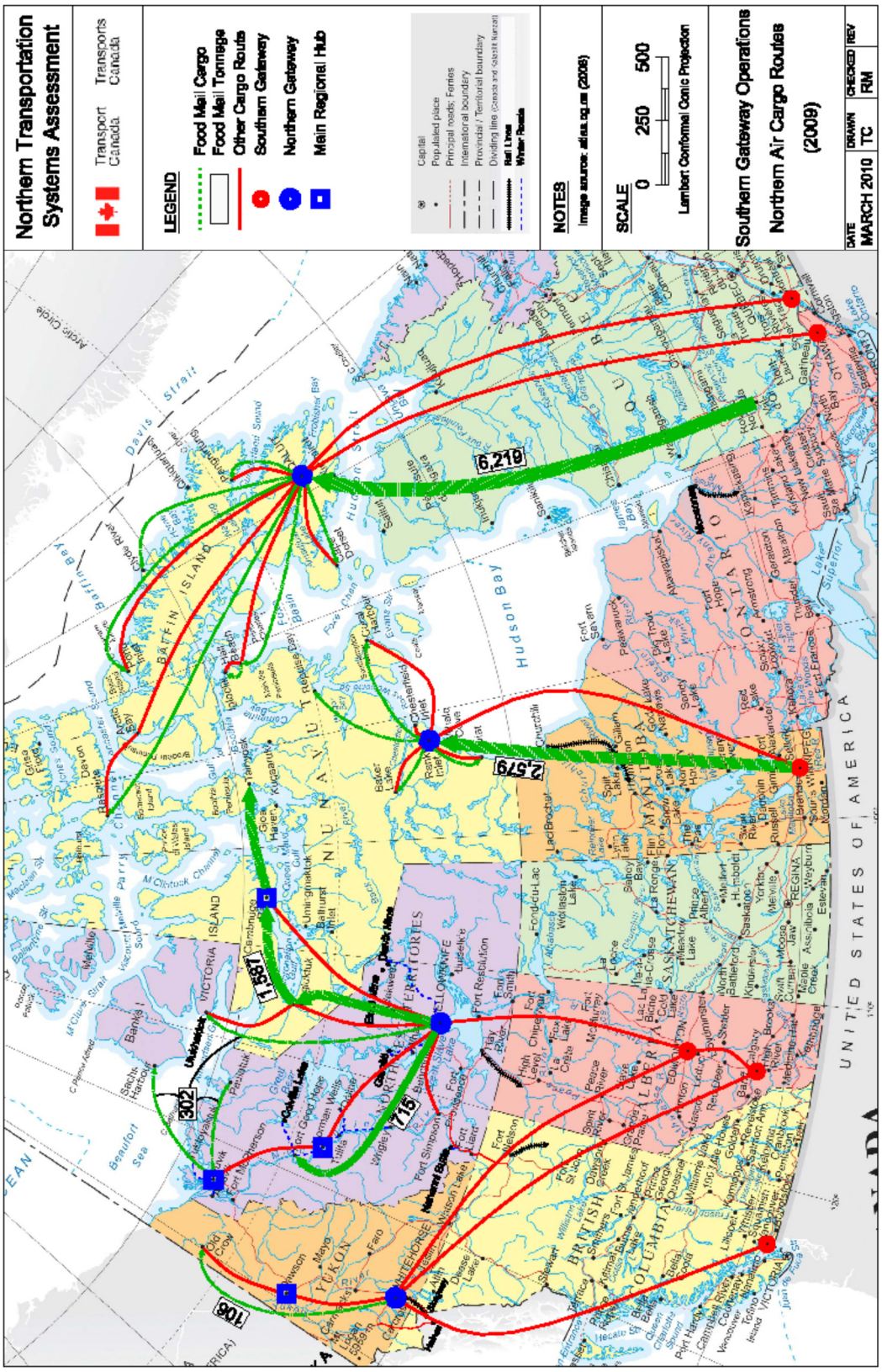
Further north, the Inuvik-Tuktoyaktuk Ice Road is built on the East Channel of the Mackenzie River over 194 km between Inuvik and the Tuktoyaktuk Peninsula. As well there is an 86 km spur to Aklavik.

The public winter road system was previously extended with private ice roads along the arctic coast east to Herschel Island and west to McKinley Bay, in support of offshore exploration operations.

The other major public system is the Gameti and Wha Ti winter/ice road totalling 225 km largely constructed over lake surfaces. Until the Colomac mine was shut down in 1997, a portion of this route (the first 60 km) was heavily used for mine resupply.

The Tibbett to Contwoyto Winter Road Joint Venture is comprised of Diamond Mines in the Slave Geologic Province and holds an exclusive concession permit (Letter of Occupancy issued by the Federal Government) for construction of this 580 km winter road. The terms of occupancy require that the road be open to all users on a shared-cost basis and that all users pay an equal fee for use.

Unlike the public winter roads, the TCWR system has no potential for serving any community resupply requirements. It is a true "[winter] road to resources" with links to many mining prospects, but not to any communities. Nevertheless, the TCWR has become an important transportation asset for reducing resource development logistics costs – and accordingly increasing current and potential economic benefits to the NWT.


Northern Transportation Systems Assessment
Transport Canada
Transports Canada
LEGEND
Food Mail Cargo
Food Mail Tonnage
Other Cargo Routes
Southern Gateway
Northern Gateway
Main Regional Hub
Capital
Populated place
Principal roads; Ferries
International boundary
Provincial / Territorial boundary
Dividing line (Canada and Alaska Hwy)
Rail Lines
Water Routes
NOTES
Image source: atlas.gc.ca (2006)
SCALE
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Lambert Conformal Conic Projection
Southern Gateway Operations
Northern Air Cargo Routes
(2009)
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RM
REV
6,210
2,579
1,587
302
715
706
Hudson Bay
Davis Strait
Baffin Bay
Beaufort Sea
UNITED STATES OF AMERICA

2.4 Airport Systems Demand

The Northern Airport System with air transport routes and air cargo flows from Southern Gateway Airports are shown in the map opposite. This section of the report outlines for both air cargo and passenger demand:

- The air transportation system in Northern Canada; and
- Current baseline traffic and forecasts to 2030.

The need for air service varies dramatically among the territories. In Yukon, where there is a fairly well developed road system, the need for air transport is not nearly as great as in Nunuvut, where there is a virtual absence of roads. In the Northwest Territories, the all-weather road system is confined mainly to the western end of Great Slave Lake (Yellowknife, Hay River), north along the Mackenzie Valley (to Wrigley) and around Inuvik and the northern end of the Dempster Highway. During the winter months, the all-weather road system is augmented with seasonal winter roads and winter ice roads.

Depending on their size, northern communities are served by a variety of aircraft, including the Boeing 737, the Hawker Siddeley 748, the ATR-42 and the DHC-6 Twin Otter. Communities are often served by combination (Combi) aircraft (e.g. B737, HS748) where passengers and cargo are both carried on the main deck, separated by a moveable bulkhead. Financial viability of many northern air services, particularly at smaller communities, often relies on revenue from both types of payload. As well, fares on mainline services to northern gateways, like Yellowknife and Iqaluit, can support service to smaller communities.[4]

Passenger volumes in the North are dominated by government travel, estimated to account for up to two-thirds of total traffic. The Government of Nunavut, for example, has decentralized operations, with departmental functions dispersed to 11 different communities. While this is assisted by advanced communications, it has nevertheless contributed to the overall need for government air travel. Air transport also performs an important Medevac role for patients requiring treatment at regional or southern medical facilities.

While traffic bottlenecks can occur at northern airports, these facilities can generally accommodate significant surges in traffic. However, future northern projects will likely require infrastructure improvements at certain airports, including runway upgrades, new passenger and cargo facilities, expanded parking aprons and improved navigational aids.[5]

[4] In fact, there is concern that new mainline competition from the South will negatively impact the incumbent northern carriers and their ability to support regional passenger and cargo service to smaller northern communities.

[5] Southern gateways - like Vancouver, Edmonton, Winnipeg and Ottawa - are already well developed and are less likely to require infrastructure improvements to accommodate the air transportation needs of future northern development.

2.4.1 Northern Air Service Network

First Air ATR-42 and Canadian North Dash 8 at Yellowknife Air Terminal Building

Yukon, the Northwest Territories and Nunavut offer an extensive network of airports that are operated by the territorial governments, the federal government and commercial and industrial interests.

Yukon has 4 airports and 22 aerodromes operated by the territorial government and three of these have scheduled air service - Whitehorse, Dawson and Old Crow.[6] The Government of Northwest Territories operates 27 airports and almost two-thirds of these have scheduled air service. There are 26 government operated airports in Nunavut, most of which receive scheduled air service, again reflecting the virtual absence of roads.

There are a number of other airports, not operated by the territorial governments, that receive charter or semi-scheduled flights from carriers like Air North, Canadian North, First Air, Alkan Air, Air Tindi (Tlicho Air), Arctic Sunwest and Northwestern Air Lease for personnel movements and cargo re-supply. These include:

In Yukon
- Minto operated by Minto Explorations
- La Biche River- operated by Devon Canada Corp.

In NWT
- Ekati, Diavik, Gahcho Kue, Snap Lake - operated by BHP, Rio Tinto and DeBeers.
- Snare Lake and Taltson River - operated by Northwest Territories Power Corp.
- Rae/Edzo - operated by the Dogrib Rae Band.
- Prairie Creek - operated by Canadian Zinc Corp.
- Tungsten - operated by North American Tungsten Corp.
- Great Bear Lake and Taltheilei - operated by Plummers Lodge.

In Nunavut
- Alert, Eureka, Tanquary Fiord - operated by various federal government departments.
- Hope Bay and Doris Lake - operated by Hope Bay Mining.

Northern Canada receives scheduled jet service from a number of major cities in the South – Vancouver, Calgary/Edmonton, Winnipeg and Ottawa/Montreal. These services connect to

[6] Although its infrastructure is in need of renewal, Watson Lake Airport in southeast Yukon is fairly well developed and up to the early 1990s enjoyed scheduled jet service.

four northern gateways – Whitehorse, Yellowknife, Rankin Inlet and Iqaluit. Jet service also extends north from Yellowknife to Norman Wells, Inuvik and Cambridge Bay and east-west between Yellowknife, Rankin Inlet and Iqaluit. West of Yellowknife, turboprop service operates to Fort Simpson.

Mainly turboprop service extends beyond the northern gateways and certain regional hubs (e.g. Norman Wells, Inuvik, Cambridge Bay) to smaller communities throughout the North. The jet carriers serving the North are Air North, Canadian North, First Air, Air Canada and WestJet. Air North, Canadian North and First Air are all native birthright corporations. Canadian North is owned by Inuvialuit Development Corp. and Nunasi Corporation; First Air is wholly owned by the northern Quebec Makivik Corporation; and Air North is partially owned by the Gwichin First Nation. Other smaller carriers, like North Wright Airways and Aklak Air, are also birthright corporations.

Scheduled northern air service is outlined in detail in the appendix.

2.4.2 Passenger Traffic

Canadian North B737 aircraft at Norman Wells Airport.

Enplaned-Deplaned Passengers

The following table shows historical enplaned-deplaned passenger volumes for nine northern airports. It should be noted that the historical years are 2005 and 2009 for Yukon and Nunavut airports and 2004 and 2008 for the Northwest Territories.

This table also provides baseline passenger forecasts to the years 2020 and 2030. Once again, historic traffic growth varies widely between the various airports, from negative growth at Norman Wells to positive annual growth of 8.3% at Yellowknife. Traffic growth can vary dramatically from year to year, mainly due to fluctuations in the natural resource industry.

Future baseline growth will be driven by a number of factors, including the comparative isolation of many northern communities, population growth, government travel, tourism demand and traffic generated by existing resource production. While the first four should generate fairly consistent growth, resource production will be driven by fluctuations in world commodity markets.

Yukon and the western side of the Northwest Territories are reasonably well served by all-weather roads but Nunavut has virtually no permanent roads and air travel demand is exacerbated by a de-centralized territorial government. However, Nunavut has less resource production than the other two territories.

Based on the foregoing, we have projected annual passenger growth at 2.0% for the airports in all three territories.

Enplaned/Deplaned Passengers at Major Northern Airports

	2005	2009	2015	2020	2025	2030
Yukon						
Whitehorse	188,275	228,993	257,846	284,638	314,407	247,153
NWT						
Yellowknife	373,852	514,489	591,148	652,372	720,285	795,400
Inuvik	58,206	74,322	85,396	94,240	104,051	114,902
Norman Wells	48,048	44,871	51,557	56,896	62,819	69,371
Hay River	26,018	30,402	34,932	38,550	42,563	47,001
Fort Smith	12,734	14,214	16,332	18,023	19,900	21,975
Fort Simpson	9,059	9,722	11,228	12,391	13,861	15,018
Nunavut						
Iqaluit	108,000	115,000	129,490	142,945	157,895	174,340
Rankin Inlet		60,000	67,560	74,580	82,380	90,960

Source: Governments of Yukon, Northwest Territories and Nunavut.

Service Segment Passengers

Although origin-destination data was not available, general estimates of service segment traffic were developed by determining the number of available seats[7] offered on major northern route segments over a 12-month period and applying an assumed load factor. Service segment statistics indicate the number of two-way passengers travelling over a flight segment, irrespective of origin or destination. For example, a passenger travelling on a flight between Edmonton and Yellowknife may have Yellowknife, Norman Wells, Inuvik or some other northern community as his final destination.

[7] Available seat statistics were provided by Transport Canada from airline schedule information published by the Official Airline Guide.

Estimated service segment passenger volumes for 2009 for a number of major northern routes are shown in the following table.

Service Segment Passengers, 2009
Major Northern Routes

Service Segment	Passengers
Calgary/Edmonton – Yellowknife	412,000
Vancouver – Whitehorse	193,000
Ottawa – Iqaluit	98,000
Yellowknife – Inuvik	120,000
Yellowknife – Cambridge Bay	81,000
Yellowknife – Iqaluit	53,000
Calgary/Edmonton – Whitehorse	48,000
Winnipeg – Rankin Inlet	40,000
Yellowknife – Whitehorse	10,000

Industrial Passenger Traffic

Northern mining operations are significant generators of passenger traffic through the regular rotation of work crews. Some of the workers are northern residents while others originate from the South. Depending on the availability of all-weather roads, workers are transported to and from the mines by either air or surface transport. For example, the diamond mines – Ekati, Diavik and Snap Lake – can only be accessed by air. However, mining operations in Yukon are accessed by a combination of air and surface transport.

Air transport to the mines is carried out by a combination of scheduled services and private company charters. Consequently, only part of this traffic, the scheduled portion, will be captured in the previous tables.

The following table shows two-way passenger traffic – air and surface - at northern mines operational in 2010.

Operating Mines – Northern Canada
Air and Surface Passenger Traffic[8]

Mine	Point of Origin	Annual 2-way Passengers
Diavik (diamonds), NWT	Yellowknife	15,000
Snap Lake (diamonds), NWT	Yellowknife	14,439
Ekati (diamonds), NWT	Yellowknife	14,500
Meadowbank (gold), Nunavut[9]	Montreal, Val d'Or, Kivalliq	12,376
Cantung (tungsten), NWT[10]		
Wolverine (copper, zinc), Yukon[11]	Whitehorse	7,800
Minto (copper), Yukon[12]	Whitehorse, Carmacks	8,200

2.4.3 Air Cargo Traffic

Canadian North B737 Combi via Norman Wells and Air North HS748 Combi via Old Crow converge at Inuvik.

Air cargo in the North can be divided into three separate categories:

- Subsidized perishable food and other essential items moving under the Nutrition North (Former Food Mail) Program;
- General cargo that moves on a regular basis to communities as a co-product of scheduled passenger service.
- air cargo support for major capital projects, mainly related to resource development.

[8] This information was sourced from the mine owners and operators.

[9] Employees from Baker Lake are bussed to the Meadowbank mine site; employees from other Kivalliq communities are flown directly to the mine by charter aircraft; employees from the South are flown directly to the mine by charter from Montreal and Val d'Or.

[10] Mining operations at Cantung were suspended in October 2009 and are expected to re-commence in October 2010.

[11] Workers at the Wolverine mine are hired both locally and from the south. About 8% are bussed to and from the mine – the rest are airlifted.

[12] The Minto mine employs workers from the territories and the South. Workers are rotated in and out of the mine by air from Whitehorse, with one plane making a stop in Carmacks.

Nutrition North (Food Mail)

In the 2009 fiscal year, Food Mail in the three territories accounted for 11,511 tonnes of air cargo, more than double the 1998 volume of 5,334 tonnes. The program has been operated by Canada Post and Indian and North Affairs Canada (INAC) and serves 41 communities in eight regions over a number of designated entry points. The regions and official entry points (in brackets) are Baffin (Val d'Or), Kivalliq (Winnipeg, Churchill, Thompson), Kitikmeot (Yellowknife), Beaufort-Delta (Yellowknife/Inuvik), Sahtu (Yellowknife), Great Slave Lake (Yellowknife), Deh Cho (Fort Simpson/Hay River) and Yukon (Whitehorse).

The 'postage rate' for air transporting perishable food, the biggest category by volume, is a flat 80¢ per kilogram plus 75¢ per package. Non-perishable and non-food items carry a rate of $2.15 per kilogram and the same package rate. Nunavut is by far the biggest user of the program because of the relative remoteness of its communities and the virtual absence of roads. In contrast, Yukon has only one community, Old Crow, that qualifies for the program.

It is noteworthy that Food Mail destined for the Baffin region is mainly airlifted from Val d'Or, Quebec, to Iqaluit for furtherance to the other communities by air. Similarly, most of the Food Mail destined for the Kivalliq region is flown directly from Winnipeg to Rankin Inlet for transhipment by air to the smaller communities. Food Mail destined for the Sahtu and Kitikmeot regions is trucked to Yellowknife and then airlifted to the smaller communities. In a similar vein, Food Mail destined for the Beaufort-Delta region is transported by truck to Inuvik and then distributed by air.

The Food Mail Program has undergone a major review because of escalating demand, rising costs and a concern about sustainability. As a result, changes were recently announced under a new name, Nutrition North Canada. Under the new program subsidies will go directly to the retailers and wholesalers and market forces will determine the most efficient routing for transporting eligible items. There will no longer be designated entry points.[13]

General Cargo

General air cargo moves to the northern gateways by the air and surface modes and is then airlifted to smaller remote communities throughout the North. While some cargo is transported on freighter aircraft, most of it moves as a co-product of passenger service, often on combination aircraft like the B-737 and HS-748. Accordingly, it follows much the same route network as scheduled passenger service.

[13] Food Mail Review, Interim Report, INAC, 2009. Changes to the Food Mail Program and the emergence of Nutrition North Canada were formally announced by the Indian and Northern Affairs Minister on May 21, 2010.

Mine Re-supply

Air Tindi Dash 8 at Diavik Diamond Mine Airport.

The air cargo mode is used to support northern mine development and operations - depending on the availability of all-weather and seasonal roads. In Yukon, most of the operating mines are accessible by all-weather road.

However, in the Northwest Territories and Nunavut access to current mining operations is much more limited. The table below provides current air cargo volumes to/from the mine site for operating mines in the three territories. These tonnages are made up mainly of perishables and other consumables.

Operating Mines – Northern Canada
Air Cargo Re-supply[14]

Mine	Point of Origin	Annual Air Cargo (tonnes)
Diavik (diamonds), NWT	Yellowknife	2,700
Snap Lake (diamonds), NWT	Yellowknife	1,900
Ekati (diamonds), NWT[15]	Yellowknife	3,476
Meadowbank (gold), Nunavut	Thompson, Man.	1,264
Cantung (tungsten), NWT[16]		Nil
Wolverine (copper, zinc), Yukon		nil
Minto (copper), Yukon[17]	Whitehorse	260

[14] This information was sourced from the mine owners and operators.

[15] The Ekati mine has cut back its reliance on the Winter Ice Road, with only large, bulky items moving via that mode. A small amount of air cargo also originates from Hay River.

[16] The Cantung and Wolverine mines have a limited need for air cargo support because of the availability of all-weather road access to the mine sites. For Cantung, which is located just across the territorial border in the NWT, cargo is typically trucked to the mine from Watson Lake. For Wolverine, cargo is trucked to the mine via Watson Lake and/or Whitehorse.

The following table illustrates 2009 cargo flows for Food Mail and general cargo by northern gateway and region. These figures do not include air cargo volumes for re-supply of mining operations. Based on industry input, 60/40 split between Food Mail and general cargo is assumed for Nunavut and the Northwest Territories and 10/90 for Yukon.

Baseline forecasts have been developed for northern air cargo that assume that Food Mail will continue to be an important component of future growth. Between 1998 and 2009 Food Mail volumes delivered to Nunavut increased at an annual rate of 7.6%. The corresponding rates of growth for the Northwest Territories and Yukon were 5.4% and 0.6% respectively.

With rapidly rising Food Mail demand and escalating costs, the Federal Government undertook an extensive program review in 2006. While the review recognized the value of the program in supplying nutritious food to northern residents at affordable prices, measures were recommended that may or may not restrain future growth in Food Mail volumes. Accordingly, overall air cargo forecasts have been developed assuming a 4.0% annual growth rate for Nunavut, 3.0% for the Northwest Territories and a nominal 1.0% for Yukon.

Northern Air Cargo Flows (tonnes)

		2009			Forecast	
Gateway	Destination	Food Mail	Gen Cargo	Total	2020	2030
Nunavut						
Iqaluit	Baffin	6,219	4,146	10,365	15,952	23,622
Rankin Inlet	Kivalliq	2,579	1,719	4,298	6,615	9,795
Yellowknife	Kitikmeot	1,587	1,058	2,645	4,071	6,028
		10,385	**6,923**	**17,308**	**23,638**	**39,445**
NWT						
Yellowknife & Inuvik	Beaufort-Delta	302				
Yellowknife	Sahtu	715				
Yellowknife	Great Slave Lake	3				
Fort Simpson & Hay River	Deh Cho	0				
		1,020	**680**	**1,700**	**2,353**	**3,162**
Yukon						
Whitehorse	Yukon	**106**	**950**	**1,056**	**1,178**	**1,301**

[17] The Minto mine is accessed by all-weather road via the Klondike Highway and ice-road or barge across the Yukon River. Air support is only used during freeze-up and break-up of the river when the barge or the ice-road are not operational. Otherwise, air cargo is used for emergency situations only.

Northern Airport Activity Forecast

Aircraft movements (landings and takeoffs) are a measure of airport activity against which we can gauge an airport's physical capacity to accommodate aircraft volumes and aircraft of differing specifications and operating characteristics. For example, larger aircraft will generally require longer runways, more apron space, higher pavement loadings and larger passenger and cargo facilities to accommodate bigger payloads.

The infrastructure requirements of a northern airport will depend mainly on its elevation and the dimensions, gross weight and payload capacity of aircraft that regularly serve the facility.

The table following shows historical takeoffs and landings (local and itinerant) at airports in all three territories.[18][19] For 2008, it also shows the split in itinerant traffic volumes between light and heavy aircraft based on gross take-off weight. The heaviest aircraft in the light category (≤5,670 kgs) includes the Twin Otter; the heavy category (>5,670 kgs) includes aircraft like the B737, the Lockheed Hercules and the HS-748. It is noteworthy that there tends to be a predominance of light aircraft activity at the smaller airports and more heavy aircraft activity at the northern gateways and regional hubs. For our baseline forecast it is assumed that the two weight categories will maintain the same proportions of total traffic throughout the forecast period.

This table provides normal or baseline forecasts of aircraft movements to the years 2020 and 2030, assuming no economic development stimulus during the forecast period. Except for the bigger airports, traffic was projected at an annual growth rate of 1.0%, slightly above the average growth rate across all the northern airports for the historical period. Historical growth at the larger airports varied significantly, from 0.1% at Inuvik to 5.6% at Iqaluit. Recognizing that airport traffic in the North can experience unpredictable swings, we applied an annual growth rate of 2.0% to Whitehorse, Dawson, Yellowknife, Norman Wells, Inuvik and Iqaluit, which is well within long-term historical trends but reflects the comparatively busier nature of northern gateways and regional hubs.

[18] Total aircraft movements consist of local and itinerant movements. A local movement refers to an aircraft movement that does not leave the air traffic control circuit or the close proximity of the airport. An itinerant movement is an aircraft landing or taking off that is arriving from or departing to another place or that temporarily leaves the circuit.

[19] Although Churchill is located in northern Manitoba, it is an important transportation gateway to the Kivalliq region.

Aircraft Movements at Larger Northern Airports Takeoffs and Landings								
			2008 Itinerant		Forecast			
	2004	2008	<5,670kg	>5,670kg	2015	2020	2025	2030
YUKON								
Whitehorse	23,984	25,920	12,209	5,564	29,782	32,867	36,285	40,065
Dawson	6,408	5,175	3,799	1,038	5,946	6,562	7,244	7,999
Watson Lake	5,995	3,869	3,483	323	4,148	4,356	4,578	4,809
Mayo	2,221	3,289	3,199	30	3,526	3,703	3,892	4,088
Old Crow	1,492	1,209	376	833	1,296	1,361	1,430	1,503
NWT								
Yellowknife	58,885	64,835	23,712	28,012	74,495	82,211	90,761	100,215
Norman Wells	18,647	19,791	11,466	2,454	22,740	25,095	27,705	30,591
Inuvik	17,406	17,464	11,902	4,632	20,066	22,144	24,447	26,994
Hay River	6,527	6,897	2,402	4,376	7,394	7,766	8,162	8,574
Fort Smith	8,856	6,060	3,236	2,572	6,496	6,824	7,172	7,534
NUNAVUT								
Iqaluit	16,842	20,965	6,671	12,772	24,089	26,584	29,349	32,405
Rankin Inlet	13,219	14,045	6,210	7,671	16,138	17,809	19,661	21,709
Baker Lake	5,308	7,840	4,263	3,546	8,404	8,828	9,278	9,746
Cambridge Bay	5,763	6,806	3,477	2,806	7,296	7,664	8,055	8,461
Arviat	2,220	2,500	752	1,748	2,680	2,815	2,959	3,108

Source: Statistics Canada, 51-209 and 51-210

Note: The historical figures are for total movements, which includes both Local and Itinerant traffic. The aircraft movements for the two weight groupings are for Itinerant traffic only.

3. Emergent Resource Development Demand

This part of the report details transportation demand emerging from resource development projects, present and future[20].

Resource development is forecasted for:

- Mineral Projects, including outbound ore/concentrates and inbound mine supply;
- Energy Projects, including oil and gas and pipeline developments.

For Mineral Projects, three forecast scenarios are developed:

- Starting with currently producing mines - the low forecast scenario;
- Adding probable mid-term mine developments – the medium forecast scenario; and
- Adding possible longer term mine developments – the high forecast scenario.

Yukon Minto Mine Ore Concentrate Ship at Skagway, Alaska.
Photo courtesy of Pacific Contracting Company

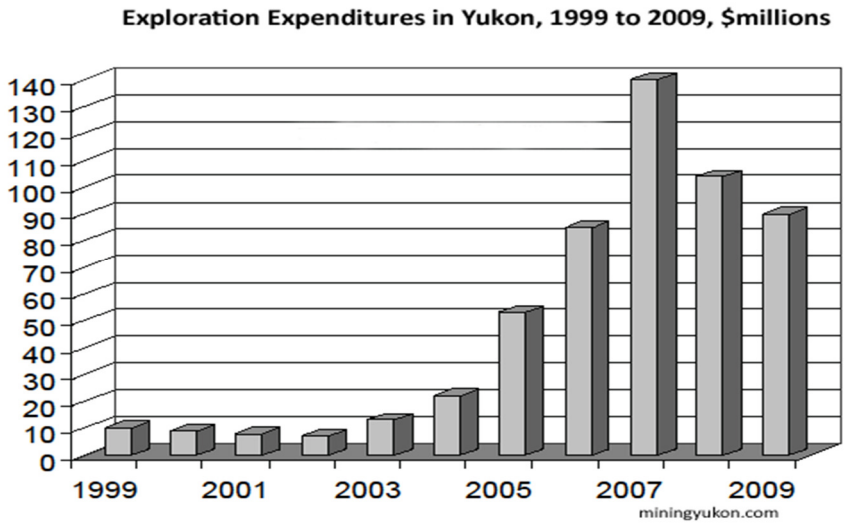
[20] Mineral development forecasts in this chapter are based on meetings with the Yukon Chamber of Mines, the NWT/Nunavut Chamber of Mines and individual interviews with management of most of the major mining projects in each territory. Energy development forecasts are based on previous PROLOG studies as updated by key stakeholder interviews.

3.1 Yukon Mining & Energy Overview

Yukon's $1.4 billion economy (2008 GDP) grew 4.1% from 2007 to 2008. The Mining and Oil and Gas sector while representing only some 5.1% of the total GDP is the fastest growing single sector in the territory having increased 56.3% from 2007 to 2008.

Yukon currently produces and exports 300,000 cubic metres/day (approx. 80,000 tonnes/year) of natural gas from its Kotaneelee field in the southeast corner of the territory; and 60,000 tonnes per year of copper concentrate at the Minto Mine in Central Yukon, trucked to the Port of Skagway, AK and exported to Asian refineries.

Mineral exploration in Canada's Yukon in 2009 remained active with exploration expenditures estimated to be $90 million. Several advanced exploration projects returned significant drill results, highlighting the under-explored potential of these properties even at an advanced stage of exploration.

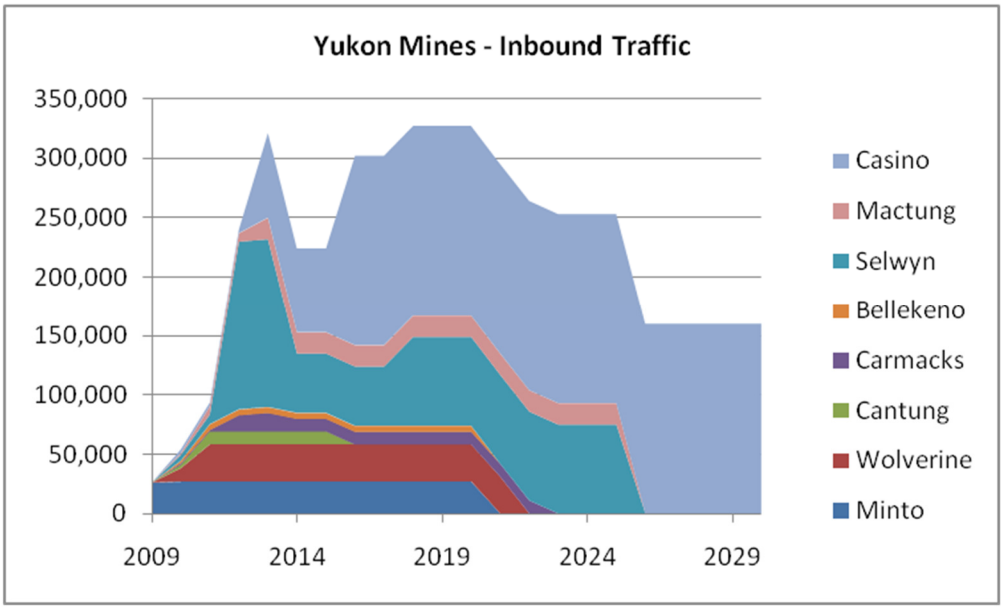


Yukon has a progressive regulatory permitting process, established in 2003 with the passing of the Yukon *Environmental and Socio-Economic Assessment Act* (YESAA). YESSA provides a single, multi-jurisdictional assessment process for projects under federal, territorial or First Nation jurisdiction that applies to most mining exploration and development activities.

The YESAA process provides mining and energy companies with a timely recommendation or deficiency list on applications. In 2009, 56 project assessments were completed and decision documents issued. Of these 48 authorizations and land use approval permits were issued. Unlike other jurisdictions, First Nations approval processes and benefit agreement rights are established. Yukon is at the forefront of land claim settlements in Canada, with eleven of fourteen Yukon First Nations land claims finalized. Mineral rights and land tenure in these areas provide regulatory certainty to both the Yukon government and industry.

Summary of Yukon Resource Traffic Forecasts (Tonnes/Year)					
	2010	2015	2020	2025	2030
Mining					
Low Scenario					
Inbound	41,000	69,000	58,000		
Outbound	112,000	209,000	200,000		
Medium Scenario					
Inbound	49,500	135,000	149,000	75,000	
Outbound	112,000	565,000	736,000	500,000	
High Scenario					
Inbound	54,000	224,000	327,000	253,000	160,000
Outbound	112,000	580,000	1,051,000	815,000	300,000
Energy					
Pipeline					
Inbound			786,000		
Outbound					
Resupply				3,000	3,000
Exploration					
Inbound			3,000	6,000	6,000

For the three mining scenarios, the following figure shows the maximum traffic demand that would occur in Yukon with the cumulative impact of all base metal mining projects included in the High Scenario Forecast.



3.1.2 Yukon Producing Mines (Low Scenario)

Currently there is only one producing mine in Yukon. Capstone Mining Corporation's Minto Mine is a high-grade copper-gold mine that commenced production operations in October, 2007. The property is located 240 km north of Whitehorse and is accessed by the North Klondike Hwy 2 to a turnoff near Carmacks, and a private 29 km all-weather but seasonally-constrained road to the mine from the west side of the Yukon River. Some 60,000 tonnes of copper concentrate was shipped from the mine in 2009, to Asian smelters over a new tidewater ore terminal at Skagway, Alaska.

The low scenario developed in the resource project forecast is assumed to be the freight to/from the currently producing mines in operation in 2010. In Yukon, two more mines will be in production during 2010 and their in and outbound volumes are therefore included in the low (currently producing) scenario forming the baseline freight forecast.

The Cantung Mine owned by North American Tungsten Corp. will resume production of tungsten oxide (WO3) and copper concentrates in the fourth quarter, 2010; and Yukon Zinc Corporation's Wolverine Mine base and precious metal property is scheduled for start-up mid-2010. Yukon Zinc is a subsidiary of China's Jinduicheng Molybdenum Group.

From the original start-up of production in 1962, the Cantung Mine went through a number of owners until purchased by North American Tungsten in 1997. It has also experienced a number of commodity-price caused closures over the years and has a relatively short remaining production life, now forecasted to be mined out by 2015.

Actually located in NWT a short distance from the Yukon border, the mine is some 300 km northeast of Watson Lake, and is accessed through, and draws its staff from labour pools in -Yukon. As in past operations, commencing October, 2010 it will produce 9,000 tonnes/year of tungsten oxide (WO3) and copper concentrate, and require 8,000 tonnes of fuel for electrical generation, heat and equipment; and 3,000 tonnes of mine re-supplies, annually. Tungsten oxide is trucked directly to the United States.

The Wolverine Mine is located 190 km north west of Watson Lake, YT, and is accessed by a 26 km private all-weather road off the Robert Campbell Hwy 4. Its logistics plan involves hauling 135,000 tonnes of mixed base metal concentrates from the mine to the ore terminal at Stewart, BC. Eleven megawatts power will be diesel-generated on-site, requiring 21,000 tonnes of fuel for it, heating and the underground mining equipment. The mine has an anticipated ten year life.

3.1.3 Yukon Probable Mines (Medium Scenario)

Medium Scenario Yukon mines in the "probable" category are three properties with proven reserves supporting an economically viable business plan; regulatory process underway; and financing in place.

Alexo Resource Corporation's **Bellekeno Mine** is a short term operation located near Keno off Yukon Hwy 11 is scheduled to come on stream in 2011, and be wound up by 2014. Silver will be produced along with lead and zinc concentrates totalling *20,000 tonnes/year* destined for either Skagway, or optionally trucked directly to the metals refinery at Trail, BC. Power is expected to be supplied from the Yukon grid and the 5 - 8 megawatt "Mayo B" hydro station expansion, resulting in relatively small volumes of inbound mine re-supply freight and fuel.

Selwyn Resources Project in the Howard's Pass Base Metal District is a potentially large mining operation located near the NWT border in southeast Yukon. It is accessed from the Nahanni Range Road Hwy 10, north of the Cantung Mine. Selwyn recently formed a 50/50 joint venture with the Yunnan Chihong Group of China. Production of lead and zinc concentrates of up to *500,000 tonnes/year* is expected to start in 2014 with a currently foreseeable mine life of ten years. *60,000 tonnes of fuel/year* will be required to service the mine and 20 megawatt diesel powered generating system, although the Company is investigating hydro-based options.

Selwyn's current logistics plan involves construction of a slurry pipeline for its concentrate to a separation facility on the Robert Campbell Highway. The product will then be shipped by truck to Skagway, AK, if appropriate arrangements can be made. The Company is dealing with various authorities at Skagway and is promoting a consolidation of these interests to ease the process of obtaining access to the port, and throughput agreement(s) and permits for use of the State-owned ore terminal.

Western Copper Corporation's **Carmacks Copper Project** is a property located on an 13 km access road off the Freegold Road some 33 km north of Carmacks. The open pit mine will produce *16,000 tonnes of copper cathodes* annually for a period of six and one half years, to be trucked south; and *11,000 tonnes/year of inbound* process sulphur, re-supplies and mobile equipment fuel. Power will be supplied to the mine from the Yukon grid, currently 12 km from the property.

A major upgrade of Freegold Road may be required to support mining operations, even without the bulk haul incremental loads (see Yukon Heavy Haul Highway System Section) not currently planned. If studies indicate a need to re-route Freegold Road around Carmacks requiring a new crossing of the Nordenskiold River, upgrading costs could total $20 million. Any further highway impacts have not yet been determined.

3.1.3 Yukon Possible Mines (High Scenario)

High Scenario Yukon mines in the "possible" category are two properties with production further out in the future; proven reserves identified but still in the pre-feasibility stage; regulatory processes not yet started; and specific project financing not yet in place.

Western Copper Corporation's ambitious **Casino Project** has been placed in this category. This property is located on the Casino Trail 120 km west of the current terminus of the Freegold Road at Big Creek, 84 km northwest of Carmacks. The Company views the 120 km

all-weather extension of the Freegold Road as essential to the success of the venture. It will also require substantial upgrading of the Freegold Road itself.

This large open pit operation will produce approximately *300,000 tonnes of copper,* silver and molybdenum concentrate annually commencing in 2016, and require *160,000 tonnes/year of inbound fuel and re-supply* freight over its 24 year life. A 100 megawatt power generation facility is planned and a nearby coal deposit is seen by the Company as the best option for a source of fuel.

Also in the High Scenario "Possible" Case is North American Tungsten's **Mactung Mine.** The project is still carrying out exploration and has not begun the final YESAA permitting activity. Unlike Cantung, the Mactung property is on the Yukon side of the NWT/Yukon border, some 8 km north of MacMillan Pass. Scheduled for start-up in 2015, the underground mine has an estimated ten year productive life and the Company plans to gradually re-employ many of their staff soon to be active again at its Cantung Mine. It will produce *13,000 tonnes annually of tungsten oxide* and copper concentrate when in production and require *5,000 tonnes/year of mine supplies and fuel.*

At this point, the Company does not have a logistics plan other than one similar to the current all-truck Cantung program transporting concentrates from the mine direct to its US customers. Recently however, a proposal was submitted to North American Tungsten to truck their concentrate to Skagway in bulk containers. The containers could then be barged to Seattle and either placed on rail or trucked to the Company's American customers thereby offering freight cost savings vs. the all-trucking route now used. Year-round operation and improvements to the North Canol Road, Yukon Hwy 6, would significantly benefit Mactung.

3.1.4 Yukon Energy Development

The Federal Government devolved responsibility for energy resource management to Yukon in 1998. The Yukon Energy, Mines and Resources Department conducts all oil and gas rights dispositions (land use permits, water rights, etc.) and along with the First nations, the common royalty regimes. The Federal Government continues to have responsibility for oil and gas development in the Beaufort Sea. In 2007 and 2008, nearly $2.5 billion was bid for offshore rights in the Beaufort, largely by BP and Imperial Oil/Exxon.

Oil & Gas Prospects

Yukon contains eight distinct sedimentary basins, each with its own unique geological history and character. 73 wells have been drilled in Yukon to date, and the Territory has estimated the natural gas potential at 17 trillion cubic feet, and oil potential at 790 million barrels.

The territory's single producing natural gas field is Kotaneelee in the Liard plateau in southeast Yukon, currently producing 300,000 cubic metres/day. Gas is delivered via the 178 km Pointed Mountain Pipeline to the Spectre Energy system at Fort Nelson, BC.

The Eagle Plains and Peel Plateau and Plain are the two basins attracting the greatest exploration interest in Yukon. However, in February, 2010 the Yukon Government temporarily suspended the issuance of new oil and gas rights in the Peel Watershed Planning Region while a land use planning process is carried out. As far back as 1950, surface exploration work was carried out in both basins. 34 wells were drilled in the Eagle Plain from 1960 to 1985 resulting in 15 petroleum plays (9 gas and 6 oil) yielding proven discoveries. 19 wells have been drilled in the Peel Plateau Basin from 1965 to 1977 resulting in several gas shows but no economic reserves.

Over the years, permits and Significant Discovery Licenses have been issued to major industry players such as Devon, Hunt Oil, Chevron Canada, EnCana Corporation, Nexen Inc., BP Canada Resources, Phillips Petroleum, PetroCanada and Imperial Oil. Several of these are licenses are for exploration work in the Beaufort Sea, off the Yukon coast. Yukon has an agreement in place with the federal government to participate in the management of the offshore drilling and production programs, and in the sharing of revenues.

As costs to explore for oil and gas continue to escalate in the Canadian oil patch, and dramatically so in frontier areas of northern Canada without infrastructure - Yukon, with its established road system, will be relatively attractive to explorers in their search for new reserves.

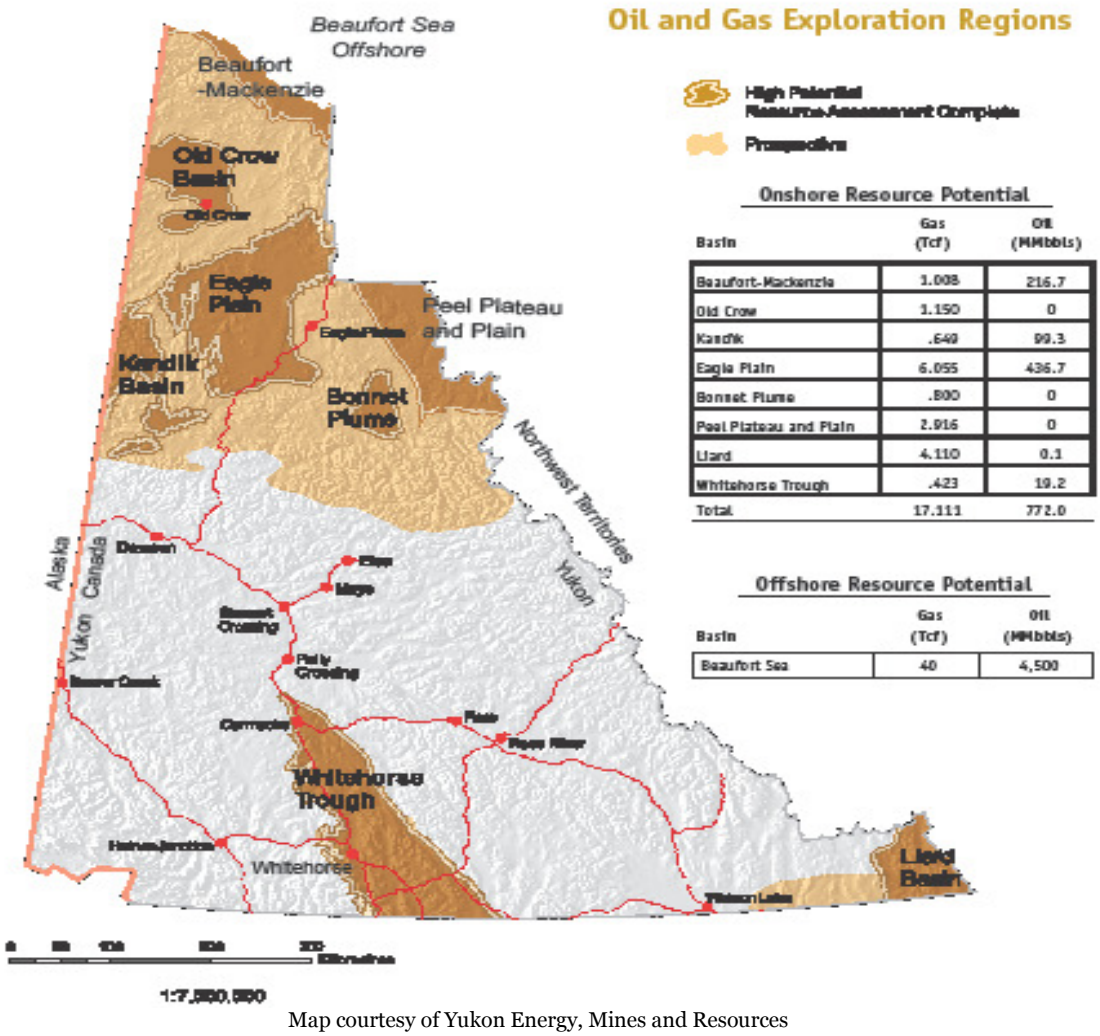
The best guess at this time is that the Mackenzie Gas Project (MGP) will be completed and on stream by 2018. The forecast assumes that a drilling rig will be employed in the Peel Plateau or Eagle Plain Basins at that time, implementing a strategy to prove up a natural gas reservoir there and produce gas that can be shipped by pipeline to the MGP.

Each drilling rig move, set up and operation is assumed to require about 60 - 80 truckloads to service the project. 3,000 tonnes is therefore provided in the forecast for this activity commencing 2020; increasing to two rigs (6,000 tonnes) before 2030. This volume of freight per rig is typical of the logistics program supporting recent drilling operations in the Mackenzie Delta.

Yukon's historical investment in highways and future access to major pipelines will serve this future mid-term economic development opportunity very well.

The following map, displays the various Oil and Gas Exploration Regions in Yukon, and the onshore and offshore resource potential in each of the eight oil and gas basins in the Territory.

Note the Eagle Plains and Peel Plateau Basins proximity to the NWT border, and their total potential reserves representing 52% of the total for all Yukon oil and gas basins.



Onshore Resource Potential

Basin	Gas (Tcf)	Oil (MMbbls)
Beaufort-Mackenzie	1.008	216.7
Old Crow	1.150	0
Kandik	.649	99.3
Eagle Plain	6.055	436.7
Bonnet Plume	.800	0
Peel Plateau and Plain	2.916	0
Liard	4.110	0.1
Whitehorse Trough	.423	19.2
Total	17.111	772.0

Offshore Resource Potential

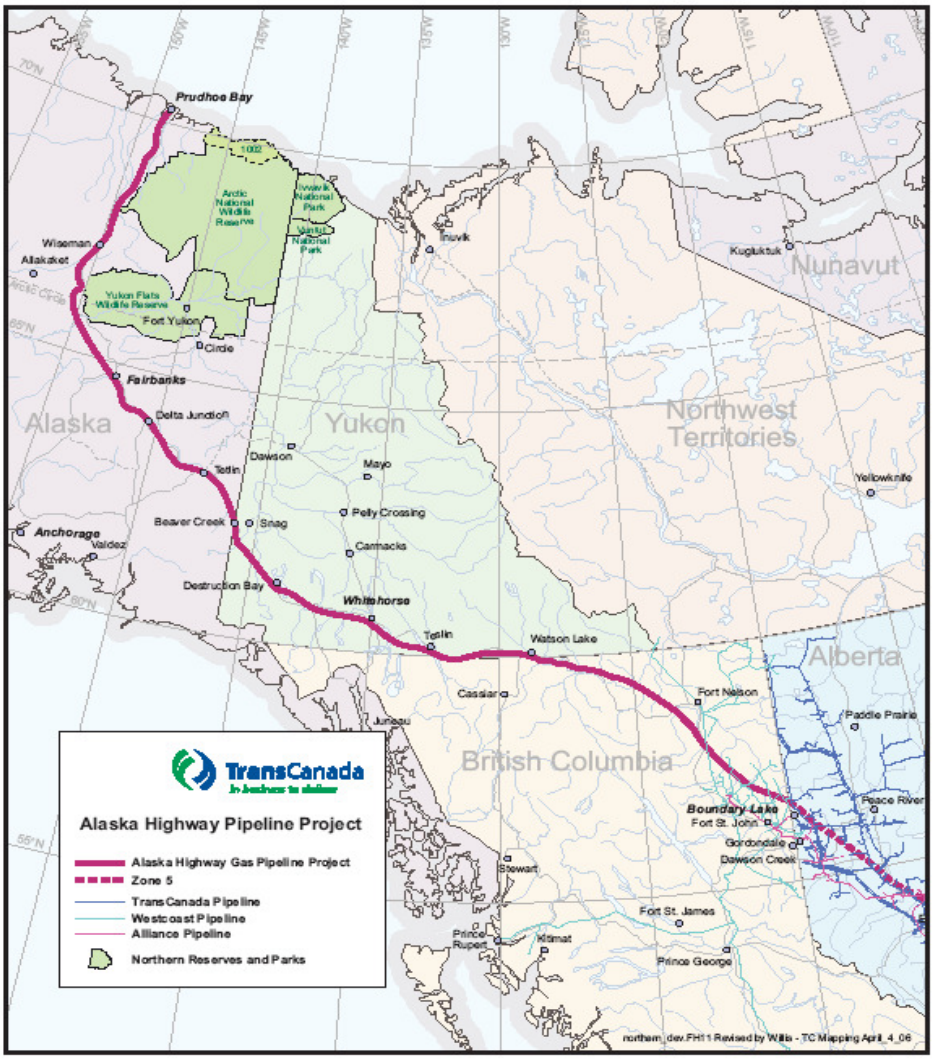
Basin	Gas (Tcf)	Oil (MMbbls)
Beaufort Sea	40	4,500

Map courtesy of Yukon Energy, Mines and Resources

Alaska Highway Gas Pipeline

In addition to potential development of Yukon oil and gas basins, the Alaska Highway Gas Pipeline Project is planned for construction through the territory. The AHGPP currently has two developer/sponsors, Denali - a joint venture between BP and ConocoPhillips; and a second initiative by Trans Canada Pipeline supported by Exxon/Mobil Corporation. Both proposals to build and operate the pipeline are entering the "Open Season" period of the project, where submissions are made to the regulatory authorities identifying potential users

of the system and their financial and participatory commitment to the project. Discussions between various levels of government on both sides of the border are continuing at this time on issues of royalties, financing support programs, and construction and ownership rights. Much detailed engineering work has yet to be completed. Although other concepts such as an all-Alaska pipeline to an LNG (liquefied natural gas) marine terminal at Valdez are still being considered, it seems probable that the conventional pipeline and Dalton/Alaska Highway route to Alberta will persevere, and likely follow the MGP by several years. The accompanying map shows the pipeline route through Alaska, Yukon and into southern Canada.



With estimated costs to build the Mackenzie Valley pipeline now increased to over $16 billion, the prospect of a Dempster Highway lateral, originally proposed by producers in the 1970's, may again be considered. This option for Mackenzie Delta gas, with connection to the AHGPP shortens the pipeline distance by some 250 km.

Even with the currently proposed Mackenzie Valley pipeline route, the Mackenzie Gas Project (MGP) could have a significant impact on Yukon transportation systems demand with respect to both Alaska Highway and Inside Passage access to the Mackenzie Delta via the Dempster Highway. However, the proponents of the MGP led by Imperial Oil have not considered this alternative to date. The producer's current plans call for all pipeline major commodities to be delivered to the project stockpile sites by barge or truck from the CN Railhead at Hay River, NWT, with only Shell Canada planning to use the Beaufort Sea route for modules to be used for gas treatment at their Niglintgak production site in the Mackenzie Delta. Accordingly, the MGP freight volumes are not included in the Yukon energy forecast.

The volumes are included in the NWT Resource Project forecast and the inbound pipeline primary construction materials mobilization volume (400,000 tonnes) is identified in the 2015 forecast figures.

Completion of the MGP will almost certainly encourage Yukon natural gas exploration activity in the Eagle Plain and Peel Plateau and Plain. Resulting production would then be transported by pipeline to connect with the MGP. The freight volumes associated with this drilling is included in the Yukon Energy forecast.

3.2 NWT Mining and Energy

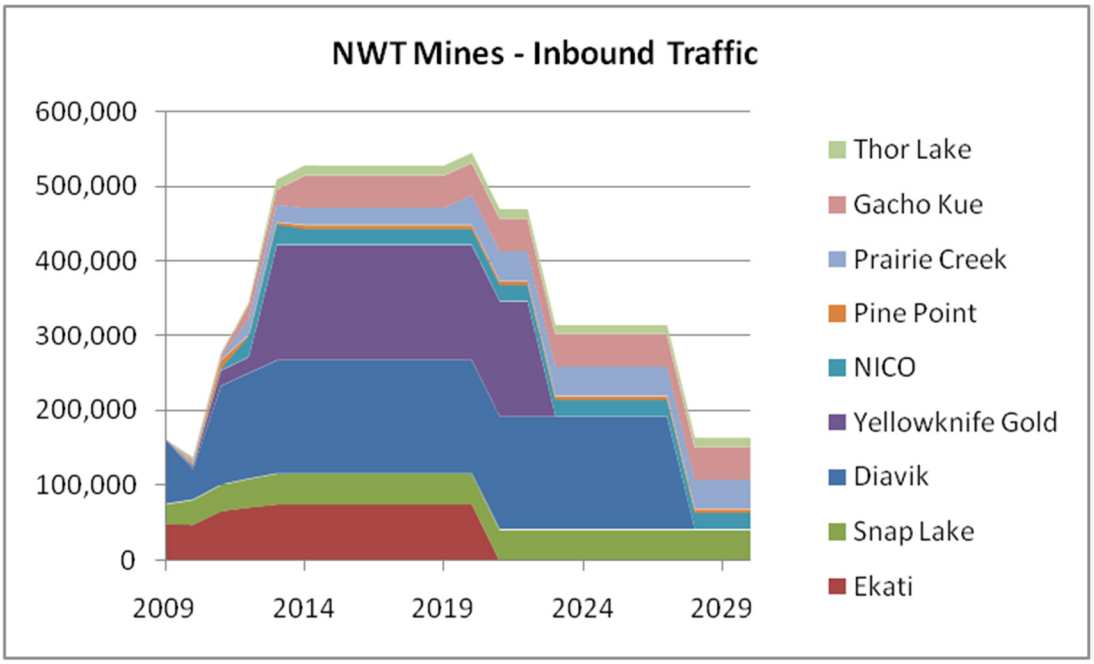
In recent years the NWT mining industry has contributed over $2 billion to the economy of the Northwest Territory, thanks to four operating mines. Over $10 billion has been invested by the mines actively in production and in exploration activity. A combination of the recent downturn in the world economy resulting in reduced metal prices; an attendant inability to finance projects; and cumbersome regulatory processes and complex political issues has resulted in a dramatic decline in mineral exploration - from $147 million in 2007 to $30 million in 2009.

The industry contributes about 50% of the NWT's economic base; provides over 2,500 permanent jobs; and offers five or six prospective "probable" additional mines that could be in production within five years.

NWT Resource Traffic Forecasts (Tonnes/Year)

	2010	2015	2020	2025	2030
Mining					
Low Scenario					
Inbound	121,000	267,000	267,000	192,000	41,000
Outbound					
Medium Scenario					
Inbound	135,000	515,000	532,000	302,000	151,000
Outbound		386,000	386,000	386,000	386,000
High Scenario					
Inbound	138,000	523,000	542,000	312,000	161,000
Outbound		416,000	416,000	416,000	416,000
Energy					
Pipeline					
Inbound		400,000			
Outbound					
Resupply			5,000	5,000	5,000
Exploration					
Inbound	6,000	69,000	73,000	102,000	142,000

For the three mining scenarios, the following figure shows the maximum mineral development that would occur in NWT with the cumulative impact of all projects included in the High Scenario Forecast.



3.2.1 NWT Producing Mines (Low Scenario)

The Low Scenario developed in the resource project forecast is assumed to be the freight to/from the currently producing mines in 2010. In NWT, the three producing diamond mines are included in the Low Scenario forming the baseline freight forecast. The three diamond mines currently in operation are Ekati, owned by BHP-Billiton Plc. expected to operate until 2020; Diavik, controlled by Rio Tinto Plc. will be in production until 2027; and DeBeers Canada Snap Lake Mine will operate to 2031.

Transport Systems demand for these mines is essentially the traffic on the Tibbett to Contwoyto Winter Road (TCWR)[21]. A joint venture of the major mines using this road has been formed to finance annual construction and operations of the TCWR, monitor all freight movements over the system, and pro-rate the total program costs each year back to the users based on their volume of freight and distance to the mines. The TCWR system exists under a "License of Occupation" issued by DIAND, and does not expire until 2033.

[21] Discussion with Erik Madsen, Director of Winter Road Operations for the Tibbett to Contwoyto Winter Road.

Leases on three rest camp sites are also included in the operation. The system commences operation in early February when 28 inches of ice depth is gained, allowing light loads only until 41 inches of ice is in place, generally 10 - 14 days later. Truck speeds are closely controlled in both directions.

The annual cost to construct and operate the TCWR system can be raised or lowered to meet the anticipated volume of traffic forecasted by each of the users. In 2009, the total cost was $16 million to facilitate the movement of 173,000 tonnes of freight using 5,377 truckloads. This resulted in a 53 cent per tonne-km charge-back to the mining companies for the season.

For the 2010 season, which was somewhat shortened by mild weather - 3,937 truckloads moved 120,000 tonnes, from February 4 to March 21st. 90,000 tonnes (75%) of this was fuel.

During the 2010 ice road supply season, the **Diavik Mine** received 18,000 tonnes of fuel and 22,000 tonnes of mine resupplies. These relatively low volumes reflect the mine's temporary closure and depressed diamond market. Between this year and 2012, Diavik will change from an open pit mine to an all underground operation. This will significantly impact the future mix and volumes of fuel and supplies to the mine.

Commencing 2013 *Diavik is estimating its requirements at 69,000 tonnes of fuel, and 82,000 tonnes of mine supplies,* much of this cement for backfilling the mined out sub-surface caverns. Diavik's mine life is expected to continue to 2017. Much of the fuel demand is for power generation requirements for the 41 MW system at the mine.

The Diavik Mine located at Lac de Gras, controlled by Rio Tinto Plc., is in its seventh year of operation and has produced over 50 million carats of rough diamonds to date. The Company has spent approximately $5 billion so far in construction and operating costs, 73% northern.

BHP-Billiton's **Ekati Mine** has been in operation since 1998, and produces approximately 3 million carats per year from 9,000 tonnes of ore mined daily. Kimberlite ore production involves two open pit, and two underground mines. About 800 staff are employed and a further 700 contractors are on the site at any given time. The mine's life is currently estimated to last until 2020.

Freight volume estimates provided *forecast ongoing demand for 57,000 tonnes of fuel and 18,000 tonnes of mine resupplies.* Fuel is used for mining equipment, heating and to self-generate the 30 MW of power required for all operations.

The future forecast for Ekati estimates annual fuel requirements of 57,000 tonnes; and 18,000 tonnes of mine supplies.

The DeBeers Canada diamond mine at **Snap Lake** is the first deBeers mine located outside Africa. It is an all-underground mine located 220 km northeast of Yellowknife and is accessed over the TCWR and a private winter road to the property. The mine is expected to remain in production beyond the study period through 2030.

The Company commenced operations in 2008 and to date has invested over $1.5 billion in construction and operations costs, 70% of which was to NWT-based contractors, suppliers and Aboriginal businesses.

Snap Lake is forecasting annual fuel requirements of 29,000 tonnes, and a further 12,000 tonnes of mine supplies. Gatcho Kue Mine, also owned by DeBeers, is expected to open in 2016.

3.2.2 NWT Probable Mines (Medium Scenario)

Medium Scenario mines in NWT that fall into the "probable" category are five properties with proven reserves supporting an economically viable business plan; regulatory process underway; and financing identified or in place.

The **Yellowknife Gold** project is a gold mine owned by Tyhee Development, and is located 90 km north of Yellowknife, currently accessed by winter road. The Company is investigating construction of an all-weather "trail" generally following the TCWR "secondary" route from the south end of Gordon Lake to Yellowknife.

The trail would be structurally adequate to handle heavy trucks but would not be built to official highway geometric standards. Tyhee state that the road could also give permanent access to the territory's Bluefish Hydro facility as well as for TCWR traffic. Tyhee hopes to access Bluefish hydro power, but would require the station to be upgraded and its capacity expanded.

An open pit operation, the mine estimates future *inbound fuel requirements of 125,000 tonnes/year commencing 2013, and other re-supply freight of 30,000 tonnes/year* The expected mine life is nine years, pending additional discoveries.

The **NICO Mine**, owned by Fortune Minerals Limited is located 160 km northwest of Yellowknife. It is a primarily a cobalt and bismuth property with gold and copper by-product production planned. The mine, which is in the environmental permitting stage, is currently accessed by a winter road, but is hopeful an all-weather road being studied by the Federal, N.W.T. and Tlicho governments will eventually be available. The mine life is forecasted to be 17 years, with start-up planned for 2014.

With both underground and open pit mining planned, it will require 10 MW of power and is hopeful of accessing electricity from an expanded Snare River Hydro facility 22 km east of the mine, or a new hydro project being studied on the La Martre River, near the community of Whati.

NICO will produce 66,000 tonnes of outbound concentrates annually, and require 17,000 tonnes of fuel and 5,000 tonnes of mine supplies each year over the life of the mine.

Tamerlane Ventures Inc. plan to re-open the **Pine Point Mine** in the near future using new cryogenic technology that will enable it to access lead and zinc ore deposits inaccessible during the initial Pine Point operations from 1964 to 1988. The plan calls for trucking initially *200,000 tonnes/year of concentrates* to a CN Rail transfer terminal near Hay River. Concentrate production will go to 120,000 tonnes/year after five years of mining operations.

Inbound fuel (4,000 tonnes/year) and mining supplies (1,000 tonnes/year) are small volumes as the mine will be supplied power from the Taltson River hydro station, and mining operations will be underground for the planned 20 year mine life.

Canadian Zinc Corporation continues with regulatory and environmental approval activity through 2010 for its **Prairie Creek** lead, zinc concentrate and silver underground mine located in the South Mackenzie Mountains in the southwest corner of NWT. Current access is by 170 km winter road from the Liard Highway near Nahanni Butte, NT. Originally known as the Cadillac Silver Mine much of the mine head works is in place including a 1,000 meter air strip. Approximately $19 million has been invested by the Company recently to upgrade the facilities and continue exploration work.

120,000 tonnes/year of lead and zinc concentrate is planned to be trucked to the railhead at Fort Nelson, BC when the mine commences production scheduled for 2012. This outbound volume is planned to increase to 200,000 tonnes/year in 2020 with expansion of the mine. *Inbound fuel 8,000 tonnes and 15,000 tonnes of mine supplies are required annually, increasing to 15,000 tonnes and 25,000 tonnes* respectively when production increases in 2020. The current logistics plan calls for inbound supplies to be sourced over Hay River, NT.

DeBeers Canada, with 51% controlling interest, plans to start mining its **Gaucho Kue** kimberlitic diamond deposit in 2014. The property is located 85 km southeast of DeBeer's Snap Lake project and 300 km east-northeast of Yellowknife, at Kennedy Lake. Access will be by a spur off the TCWR, likely extended from the existing ice road spur to Snap Lake.

The mine is scheduled to commence production in 2014, using open pit mining methods and processing up to 6,000 tonnes of ore per day and over a mine life of 16 years. *Inbound fuel for trucks and on-site diesel 10 MW power generation will total 25,000 tonnes/year, and dry cargo freight supplies 18,000 tonnes/year*

3.2.3 NWT Possible Mines (High Scenario)

High Scenario volume mines in NWT that fall into the "possible" category are a single property with production further out in the future; proven reserves identified but still in the pre-feasibility stage; regulatory processes not yet started; and specific project financing not yet in place.

The **Thor Lake** property owned by Avalon Rare Earth Metals Inc. is a rare earth element (REE) mining property located 100 km east southeast of Yellowknife, near the north shore of Great Slave Lake. Rare earth elements are a group of some 16 elements with unique chemical, magnetic and luminescent properties that are used in the manufacture of computers, cell phones, batteries, etc.

Avalon plans to start production in 2015 and ship 65,000 tonnes of REE ore annually by barge to a concentrator located at the Pine Point Mine. 35,000 tonnes of REE concentrate will then be trucked to Hay River for trans-shipment to CN Rail. *Inbound freight will include 3,000 tonnes/year of chemical re-agents, and 8,000 tonnes/year of fuel* will be required at the mine. 6 MW of electricity from the Taltson hydro grid will be required to power the concentrator at Pine Point.

3.2.4 NWT Energy Development

The only drilling activity during 2010 in NWT is in the Cameron Hills field which straddles the Alberta/NWT border, and is being carried out by Paramount Energy. This is basically an Alberta play as all production and related oilfield services is to/from Alberta.

Some exploration work continues in the Central Mackenzie Basin area. Supplies are moved to Norman Wells storage yards, generally by Coopers Barging. The company is planning to transport some 4,500 tonnes of oilfield dry cargo freight and equipment in 2010.

Much of the malaise in the industry is blamed on delays in the regulatory approvals process and the Joint Review Panel review of the Mackenzie Valley natural gas pipeline project proposed by the Mackenzie Gas Project (MGP) oil company proponents.

Previous drilling activity by MGM, Devon and PetroCanada in the Coleville Lake area, Mackenzie Delta and Beaufort Sea has all been shelved pending further studies into the MGP economic viability by its owners; government and First Nations support; and gas pricing, fiscal and market issues.

The Mackenzie Gas Project

The Mackenzie Gas Project (MGP) is a proposed 1,196 km natural gas pipeline system along the Mackenzie River valley which connects onshore Mackenzie River Delta gas fields with the existing gas pipeline transportation system in northern Alberta and North American markets. The pipeline, estimated to cost $16 billion, is currently designed to transport an initial 1.2 billion cubic feet of gas to the Alberta pipeline network and to southern markets. The project is currently being assessed by the National Energy Board as part of the government(s) regulatory process. A statement of support by the NEB is expected by the end of September, 2010 - likely with conditions attached. How this will impact the economic viability of the project remains to be seen.

The proponents of the MGP are energy companies Shell Oil, ConocoPhillips/ ExxonMobil and Imperial Oil along with the Aboriginal Pipeline Group (APG). The three oil companies will provide their "anchor field" production of some 800 million cubic feet per day as the baseline volume, and make the additional capacity available to third party producers seeking access to the system.

The current plan calls for a major gas processing plant at Inuvik where gas liquids will be separated from the anchor field gathering system's natural gas flow. Gas processing, gas chilling and compression, and liquids stabilization will occur at the Inuvik area facility. The dry gas will be transported to Alberta through a 30-inch pipeline.

The natural gas liquids pipeline will be a 10-inch diameter pipeline extending about480 kilometres from the Inuvik area facility to Norman Wells, where it will connect with the existing Enbridge pipeline. More pumping facilities added along the route in the future will increase the capacity of natural gas liquids, if necessary.

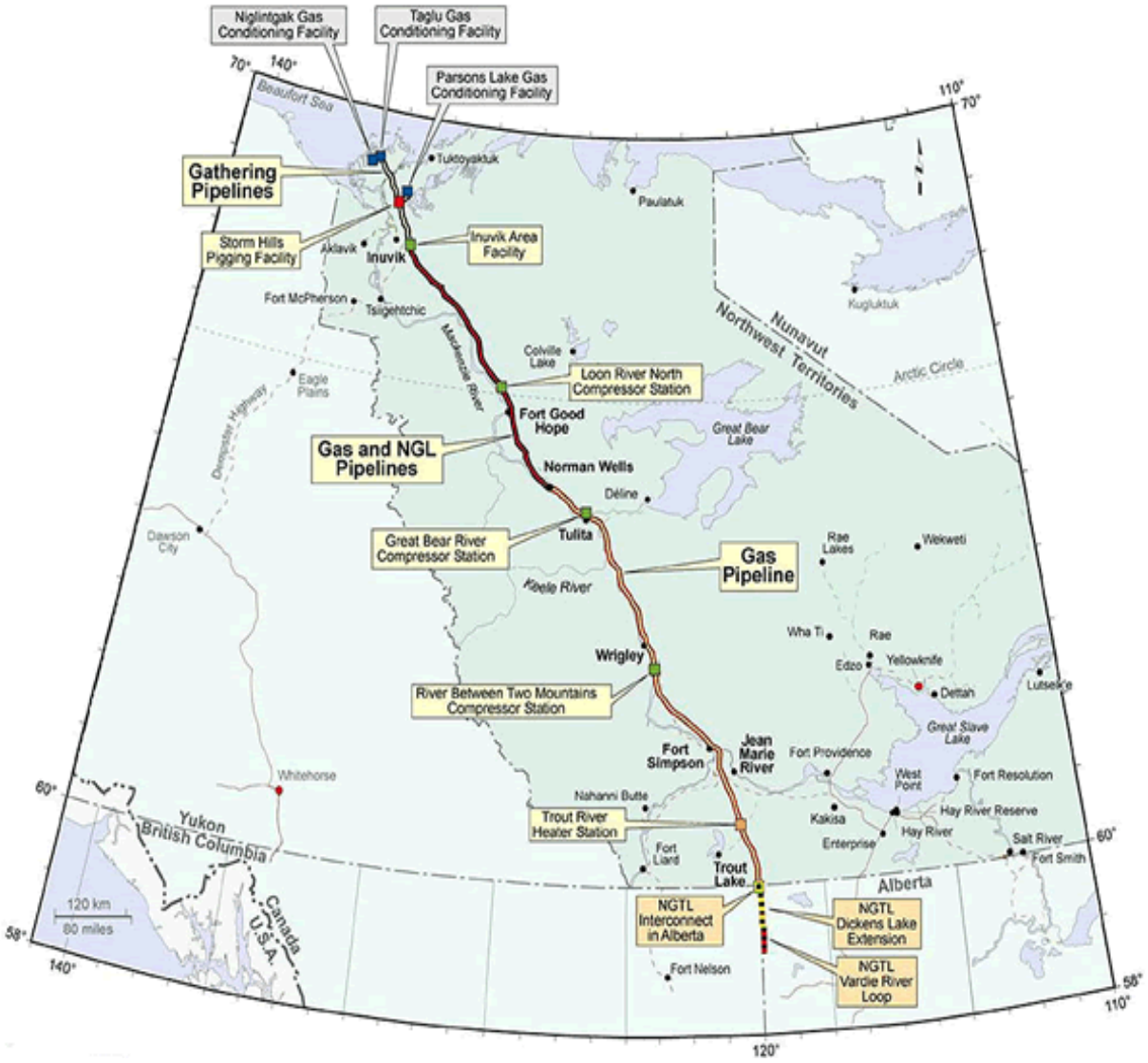
This assessment assumes that the MGP project will proceed. It has the support of all but one of the First Nations in the Mackenzie Valley. Indeed a full one third equity interest in the project is now held by their Aboriginal Pipeline Group. TransCanada Corporation have provided APG financial support and will likely take on a more prominent planning role if/when the project proceeds to the next detailed engineering stage.

The forecast provided herein identifies project construction to commence in 2015 when approximately 46% of the primary construction materials and modules totalling 400,000 tonnes will be mobilized and (mainly) barged (>90%) to stockpile sites at river discharge points along the pipeline right-of-way.

Barging is being planned for anchor field modules and materials destined for pipeline construction "spreads" from the Delta to around Fort Simpson, and trucks used for the remaining distance to the Alberta border.

The map on the following page shows the MGP pipeline route and facilities location.

Mackenzie Gas Project
Mackenzie Valley Pipeline Route
And Associated Facilities



NWT Oil and Gas Exploration

The presence of the Mackenzie Gas Pipeline when certain will generate new exploration activity throughout NWT. This assessment assumes four active drilling rigs will be employed in the Central Mackenzie Basin region in 2015, which was the same level experienced in 2005. This work will require 27,000 tonnes of oilfield equipment, fuel and supplies annually. Six rigs are assumed to be exploring in 2025, and eight in 2030 generating 40,000 tonnes and 54,000 tonnes/year respectively.

In the Beaufort Sea Basin the assumption is also made that starting in 2015 one drill-ship will be active similar to the level experienced in 2005. This will require four barge loads of equipment and supplies totalling 4,000 tonnes for a single drill-ship; increasing to two drill-ships in 2025 (8,000 tonnes); and three by 2030 (12,000 tonnes).

With the MGP anchor field processing facilities and gathering system in place in the Mackenzie Delta, by 2015 five drilling rigs will be active in the Basin requiring 38,000 tonnes of equipment, fuel and supplies. The assessment assumes this will increase to seven rigs by 2025 and ten by 2030 requiring 54,000 tonnes and 76,000 tonnes respectively of inbound equipment, fuel and support supplies annually.

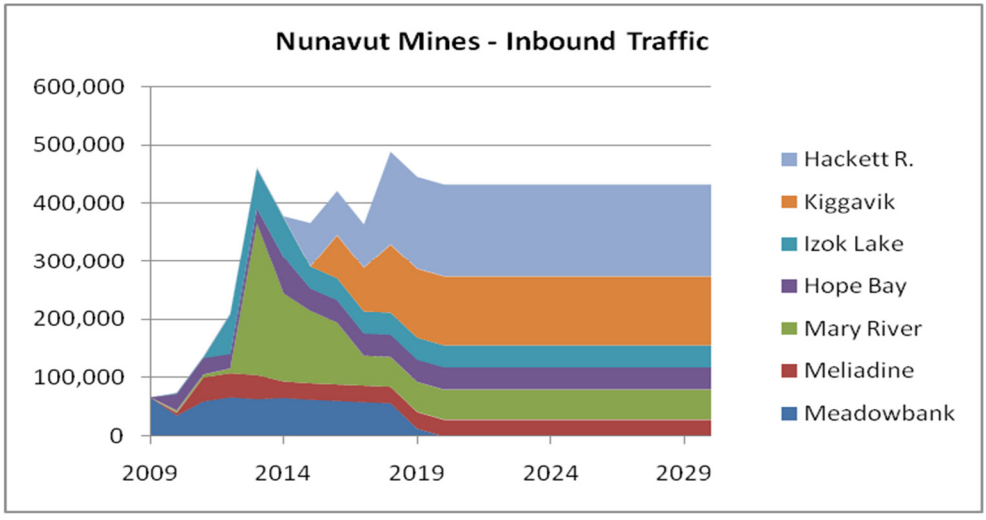
3.3 Nunavut Mining and Energy Overview

Nunavut, with its large land area and the wealth of its geological provinces, has major potential for mining. Traces of base metals (copper, iron, nickel, lead, zinc) precious materials (for example, gold, and diamonds), hydrocarbons (oil and gas) and radioactive elements (uranium) have been detected in various locations of the territory in recent years.

Nunavut Resource Traffic Forecasts (Tonnes/Year)

	2010	2015	2020	2025	2030
Mining					
Low Scenario					
Inbound	35,000	62,000			
Outbound					
Medium Scenario					
Inbound	73,800	291,300	274,000	274,000	274,000
Outbound		430,000	18,434,600	18,434,600	18,434,600
High Scenario					
Inbound	75,300	366,000	432,000	432,000	432,000
Outbound		430,000	18,884,600	18,884,600	18,884,600
Energy					
Exploration					
Inbound		4,000	8,000	8,000	12,000

The following figure shows the cumulative impact of all projects included in the three scenario forecasts with the maximum mineral development that could occur in Nunavut.



3.3.1 Nunavut Producing Mines (Low Scenario)

Through 2009, there were no mines in production in Nunavut, with the successful Nanisivik and Polaris base metal mines mined out and closed a few years ago. However, the Meadowbank Gold Mine owned by Agnico-Eagle Mining Ltd., in the Kivalliq Region near Baker Lake, should be in production by mid-2010. Meadowbank is an open pit gold mine accessed from the community of Baker Lake by a 110 km all-weather road (AWR).

The Low Scenario in the resource project forecast is assumed to be the freight to/from the Meadowbank mine in operation in 2010. Only the Meadowbank Gold Mine is included in the Low Scenario for producing mines forming the baseline freight forecast.

The **Meadowbank Gold Mine** owned by Agnico-Eagle Mining Ltd., is located approximately 70 km north of Baker Lake in the Kivalliq Region of Nunavut. The mine will be in production by mid-2010. Meadowbank is an open pit mine accessed from by a 110 km all-weather road beginning at the staging area on the lake off Chesterfield Inlet. All inbound bulk commodities and supplies are delivered to the mine dock during the summer marine navigational season. Fuel for the mine's 28 MW diesel electric system is lightered from small coastal tankers to barges in Chesterfield Inlet, and off-loaded to a tank farm at Baker Lake. Inbound mine supplies arrive from the rail head at Churchill, MN and are also brought in by barges directly to the new landing dock at Baker Lake during the summer navigational season. An airstrip at the mine facilitates the transport of employees on rotational shifts; and the supply of consumables, etc.

The open pit mine has a currently scheduled life of nine years. *32 - 35,000 tonnes of fuel* will be required annually, and *25 - 30,000 tonnes of dry cargo* supplies to sustain operations.

3.3.2 Nunavut Probable Mines (Medium Scenario)

Medium Scenario mines in Nunavut that fall into the "probable" category are five properties with proven reserves supporting an economically viable business plan; regulatory process underway; and financing identified or in place.

The **Meliadine Mine** developed by Comaplex Minerals Corporation near Rankin Inlet is the next resource project after Meadowbank likely to come on stream in Nunavut's Kivalliq region. The property was recently purchased by Agnico-Eagle which is clearly consolidating its gold mining interests in the area.

The Meliadine West property is located in Nunavut Territory, approximately 28 kilometres northwest of Rankin Inlet. The goal of exploration on the property is to find an economic mesothermal lode gold deposit. In excess of CAD $118 million has been spent on exploration of the property since 1990.

An initial 12 year mine life is predicted for Meliadine with operations commencing in 2014. It will produce 15 MW power using diesel generators and use both open pit and underground mine methods. *20,000 tonnes of fuel* will be required annually, along with *8,000 tonnes of mine supplies*.

The huge **Mary River Mine** iron ore deposit, with some 365 million tonnes of proven and probable reserves, is located about 160 km south of the community of Pond Inlet on North Baffin Island, in the Qikiktaaluk region of Nunavut.

Mine owner Baffinland Iron Mines Corporation plans to transport (initially) *18 million tonnes/year of high-grade iron ore* from its Mary River open pit mine on North Baffin Island, 143 km by rail to a new port facility to be constructed at Steensby Inlet. Production is scheduled to commence in 2016, and the mine has a 21 year life. The initial outbound ore volume could increase to 30 million tonnes/year with mine expansion. When operational, inbound freight will consist of *41,000 tonnes of fuel and 10,000 tonnes of dry cargo* supplies which will be transported to the mine over the rail system or alternatively, a winter road from Milne Inlet on the north side of the Island. Fuel for diesel-powered generation at the mine will be railed to the property from a permanent marine tank farm at the Steensby Inlet port. There will also be a diesel-powered plant at the port. Together the plants will produce about 45 MW. Mary River is an open pit mining operation which will employ 275 people at the mine, and 175 at the port, when in production. *During the mine construction period 138,000 tonnes of equipment, materials and supplies will be supplied to the sites along with 35,000 tonnes of fuel.*

The deepwater port plan provides for one ore carrier berth and two service ship berths. Ore will be loaded from a stockpile to ships via a 12,000 tonne/hr. conveyor.

Baffinland has formed a partnership alliance with Edna Limited to complete shipping studies and eventually coordinate all marine transportation functions. Cape-size ore carriers are planned - Polar Class 4 vessels with 135,000 DWT capacities. Some 10 ships will be required and the port should be operational 12 months/year

Newmont Mining Corporation is a large American-owned international mining company that is actively bringing the **Hope Bay Mine** in the Kitikmeot region of Nunavut into play. The Hope Bay gold property is located 90 km south of Cambridge Bay near the Canadian mainland coast, south of Melville Sound. Some $85 million has been invested by Newmont in mine preparations and exploration over the last two years.

Access for inbound commodities is by barge over a shallow water jetty in Roberts Bay off Melville Sound. The decision to proceed with mine development was reached in October, 2009 and will commence with a major sealift of nearly *30,000 tonnes of fuel, equipment and construction materials* in 2010.

Production is planned using both open pit and underground mining methods. Start-up is currently scheduled for 2014 with an initial predicted mine life of 20 years. Power

requirements will be met by on-site diesel generators. When in production, Hope Bay will require *34,000 tonnes of fuel and 5,000 tonnes of dry cargo supplies*, annually. The mine supplies will likely be sourced from the East Coast as it is the main source of mine materials and equipment in North America.

The **Izok Lake** property owned now by MMG of China is a potentially huge base metal mine located approximately 300 km north of Yellowknife. The nearest surface access is by winter road from the Lupin Gold Mine on Contwoyto Lake, the terminus of the TCWR.

The best current estimate of production start-up is 2015. Using both underground and open pit mining methods, the operation is forecasted to produce *430,000 tonnes/year of lead*, zinc and copper concentrates over a predicted mine life of 12 - 14 years.

Production at Izok Lake is totally dependent on an all-weather road system to an arctic port facility to store concentrates and load ice-class ships to be located at either Bathurst Inlet or elsewhere on the Coronation Gulf. From a tank farm located at the port, the Izok lake Mine is estimated to require *28,000 tonnes of fuel* annually, together with *10,000 tonnes of mine supplies* to be shipped over either or both the arctic port or the TCWR. On-site diesel power generation will be employed under the existing development plan.

The **Kiggavik Project** is a proposed $1.5 billion uranium mining and milling operation located in the Kivalliq region of Nunavut approximately 80 km west of the community of Baker Lake.

AREVA Resources Canada, a subsidiary of the large international French Areva Energy Group, is proposing to use open pit and underground mining methods at two main sites on the property. 2,000 tonnes/day of ore will be excavated, trucked to an ore stockpile and directed to a mill to produce yellowcake, a uranium concentrate. A dock site at Baker Lake would serve as a transfer and storage facility for materials and supplies. A 90 – 100 km haul road would be constructed to link the Baker Lake dock site to the main project site. A 27 MW diesel-powered electrical generation plant is planned to service the mine.

About *4,600 tonnes of yellowcake concentrate*, sealed in steel drums and stuffed to marine containers, will be shipped either by air or barge to southern points for processing. *58,000 tonnes of fuel* will be required annually to sustain operations, along with *60,000 tonnes of mine supplies* when both sites are in production.

3.3.3 Nunavut Possible Mines (High Scenario)

The High Scenario mine in Nunavut that falls into the "possible" category is a single property with production further out in the future; proven reserves identified but still in the pre-feasibility stage; regulatory processes not yet started; and specific project financing not yet in place.

The **Hackett River** base and precious metal mine owned by Sabina Gold and Silver Corporation is located about 480 km northeast of Yellowknife and some 75 km south of the potential deep-water port being promoted at Bathurst Inlet. Lead, zinc and copper concentrates along with silver will be mined using open pit mining technology, over the 18-year predicted mine life scheduled for start-up in 2018.

This is a large mining operation that will require an all-weather access road to a port facility similar to the one proposed for Bathurst Inlet. If the seaport is developed at Bathurst Inlet it will also no doubt serve the Izok Lake Mine as well, and likely provide a lower cost fuel and bulk commodity supply point for other mines in the area, including the diamond mines in NWT in the Lac de Gras area.

12,000 tonnes of ore will be processed daily at the mine which *will produce 450,000 tonnes of mixed concentrates annually. 58,000 tonnes of fuel will be consumed by mining trucks and a diesel power generation facility. Inbound mine supply requirements are estimated to be 100,000 tonnes/year ,* identified in the pre-feasibility studies.

3.3.4 Nunavut Oil and Gas

Nunavut is believed to have significant oil and natural gas potential. The largest known fossil fuel reserves lie in a remote area in the Sverdrup Basin in the High Arctic, west of Axel Heiberg Island. Current estimates place the recoverable reserves in this Basin alone at 17.4 trillion cubic feet of natural gas, and 334 million barrels of oil. This is equal to about 11 per cent of Canada's total crude oil resources and 20 per cent of Canada's natural gas resources, and represents a potential value far exceeding that of mining in Nunavut.

Nineteen discoveries were made in this Basin between 1969 and 1985, including a major gas field at Drake Point and the Bent Horn oil field. Bent Horn produced light crude for eleven years between 1985 and 1996. The record of drilling success in the High Arctic has been impressive with one discovery for every six wells drilled in the Sverdrup Basin itself. This offers a high potential for further discoveries of both offshore and onshore oil and gas.

However, oil and gas exploration and development activity has been frustrated for many years in the eastern Arctic due to complicated ownership structures, high costs of development, and dated seismic data.

New exploration, production and transportation technologies now available should encourage re-evaluation of exploration ventures that can lead to Oil and Gas field development in Nunavut.

The forecast for this report assumes one on-shore exploration drilling rig will be employed in the High Arctic in Nunavut by 2015 resulting in the mobilization of *4,000 tonnes of equipment, fuel and oilfield supplies*; increasing to two rigs by 2020 (*8,000 tonnes of supplies*) and three by 2030 requiring *12,000 tonnes of total freight*.

3.4 Northern Strategy Developments

3.4.1 The Canadian High Arctic Research Station (CHARS)

In the October 2007 Speech from the Throne the federal government committed to building an arctic research station "on the cutting-edge of arctic issues, including environmental science and resource development". Indian and Northern Affairs(INAC) is the lead department.

INAC consulted with various stakeholders to create a Visioning Workshop report entitled Defining Science Priorities for Canada's New Arctic Science Station. They then commissioned the Council of Canadian Academics to come up with a report entitled "Vision for the Canadian Arctic Research Initiative: Assessing the Opportunities".

The department has narrowed the site selection to three communities, Resolute Bay, Cambridge Bay and Pond Inlet. They are in the process of defining the objectives of the station. This will determine what kind of research will be done and kind of facility that is required.

Resolute Bay has some advantages since the Polar Continental Shelf Program (PCSP) is currently located there. PCSP has a number of services for scientists conducting research in the arctic including twin otter aircraft and helicopters.

There is also field equipment; satellite telephones, etc. All this would have to be duplicated should another site be chosen. As well the Department of National Defence has chosen Resolute Bay as their site for an Arctic Training Centre. This could provide synergies that could assist both departments by reducing costs.

At this point based on the information available it is felt that the station could accommodate between 20 and 50 researchers and staff. This would include an executive director, a person in charge of each science team and team members.

To support these people there would need to be 4 tonnes of dry cargo plus 3.5 tonnes of fuel per person. The range would be between 80 and 200 tonnes of dry cargo annually. For fuel the range would be between 70 to 175 tonnes.

3.4.2 Canadian Forces Army Training Centre

As part of their Northern Strategy Commitments, the federal government announced the establishment of a Canadian Forces Army Training Centre in Resolute Bay. The training facility will provide a permanent staging base in the Arctic for Army capabilities.

The stated goals of this facility are:

- To provide a multi-use facility capable of supporting the Army Advanced Winter Warfare Course; Army Sovereignty Operations and Canadian Forces Joint Exercises; Search and Rescue Technician Arctic survival training; Canadian Rangers training; and a command and control centre for regional military and civilian disaster-response operations;
- To increase the Canadian Military expertise and knowledge of operating in the Arctic, and the overall Canadian military's presence in the North; and
- To provide year-round training facilities and a location for pre-positioning training equipment and various types of vehicles in the High Arctic. ("The Canadian Forces and Private Military Companies: A Possible Partnership in the Arctic"; Lt. Colonel Denis Boucher)

Details of the training centre have not been released. However; it is felt that the site could include 20 to 40 permanent staff, with an average of 10 persons in training throughout the year. Major exercises if based at the site would not have a significant impact on the regular re-supply of the centre. Exercises such as Nanook 2009 which was based out of Iqaluit, had all equipment and supplies brought in for the operations. Logistics support is a vital part of the exercise since it demonstrates the military's ability to support such a mission and sustain it in the field. For Nanook 2009 numerous C17 and Hercules aircraft flights were used to support the operation as were navy and Coast Guard vessels. Resolute Bay as the goals indicate would be used for pre-positioning of equipment.

Re-supply would involve approximately 5 tonnes of dry cargo per person to support the training throughout the year. The range would be 150 tonnes to 250 tonnes of dry cargo. Normal requirements plus the use of equipment such as snow machines would result in an average fuel consumption of 4.5 tonnes per person per year. This creates a range of 135 tonnes to 225 tonnes of fuel.

3.4.3 Arctic Deep Water Port

As part of the Northern Strategy the government also announced the building of a naval docking and refueling facility in Nanisivik. This site will expand an existing deep water berthing area which until recently was used by the Coast Guard.

Located in sheltered Strathcona Sound inside the eastern entrance to the Northwest Passage, the base is expected to serve as a staging area for the new Arctic/Offshore Patrol Vessels (AOPV), enabling them to resupply, refuel, embark equipment and supplies, and transfer personnel. Coast Guard are also expected to return to the site once the facilities are operational. Maintenance and operating costs are projected at approximately $200 million over 20 years. (Standing Senate Committee on Fisheries and Oceans)

The AOPVs were part of the Northern Strategy announcement and are to include six to eight new armed, ice-strengthened offshore patrol vessels ("Polar Class 5 Arctic/ Offshore Patrol Vessels"). The fuel consumption is forecast to be 11 tonnes per day per ship. Of the six ships it is likely that only two will be in the Arctic at any one time. It is assumed that they travel for half the time and that they spend three months per year in the Arctic this results in 90 days/2 x 2 ships x 11 tpd = 990 tonnes, or approximately 1,000 tonnes of diesel. This assumes they leave the south full of bunker and keep topped up via Nanisivik. By adding Coast Guard requirements it is forecast that annual requirements will be approximately 6,000 tonnes of fuel.

The refuelling base will be seasonal and will probably operate for 5 months per year with a staff of 10. Resupply will be 4 tonnes of dry cargo per person and 4.5 tonnes of fuel per person. Resupply for ships will include fuel and dry goods which will basically be fresh goods and other essential items estimated at 20 tonnes. Total dry good for Nanisivik would be approximately 16.5 tonnes for base re-supply and 20 tonnes for ship re-supply or approximately 36.5 tonnes of dry cargo. Fuel resupply would be 19 tonnes for the base and 6,000 tonnes for vessel refuelling or approximately 6,020 tonnes of fuel.

New Sealift Traffic – Northern Strategy Initiatives (Tonnes/Year)

	LOW Scenario	HIGH Scenario
Arctic Research Station		
Dry Goods	80.0	200.0
Fuel	70.0	175.0
CF Army Training Centre		
Dry Goods	150.0	250.0
Fuel	135.0	225.0
Nanisivik Deep Water Port		
Port Dry Goods	16.5	16.5
Port Fuel	19.0	19.0
Ship Dry Goods	20.0	20.0
Ship Fuel	6,000.0	6,000.0
Total		
Dry Goods	**266.5**	**486.5**
Fuel	**6,224.0**	**6,419.0**
Total All Cargo	**6,490.5**	**6,905.5**

Nanisivik provides DND with a base of operation to serve the Eastern Arctic. There are currently no plans to develop a deep water capability in the Western Arctic. However, it is unlikely that such a facility if developed would be a standalone operation due to the prohibitive costs of developing such a base.

It is more likely to be a joint venture taking advantage of deep water marine facilities developed to support resource development. This would provide an opportunity to operate in the Western Arctic without having to incur the full capital costs of developing a standalone deep water facility.

An existing site in the Western Arctic is Tuktoyaktuk Harbour. There are currently marine facilities in place and the harbour has been used to support oil and gas drilling operations in the Beaufort Sea. The entrance to the harbour is shallow and could be an issue depending of the size of vessels planned. The site does have advantages that may appeal to DND in the future.

If a Western Arctic deep water facility is developed it is likely to be similar to the proposed Nanisivik operation. Re-supply would be approximately 40 tonnes of dry cargo and approximately 1000 tonnes of fuel.

4. Consolidated Commodity Forecasts

From the current year 2009 baseline, traffic forecasts have been extended forward 20 years based on Statistics Canada medium growth population projections (see appendix) for Community Resupply traffic; and on medium scenario forecasts (see previous Chapter 3) for Resource Development traffic.

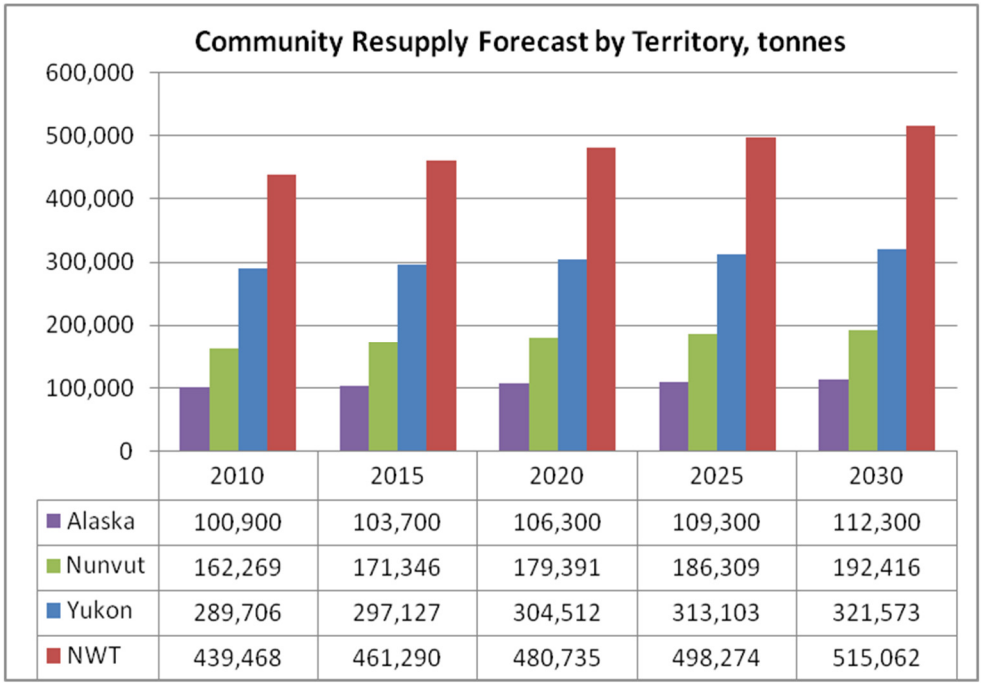
The following table provides a major commodity summary forecast for Northern Transportation Systems Demand through 2030.

Northern Transport Demand Forecast Summary (tonnes)					
	2010	2015	2020	2025	2030
General Freight	443,557	459,499	474,226	489,032	503,737
Development Freight	94,100	846,100	1,193,000	375,000	322,000
Bulk Fuel	718,986	1,142,164	1,233,712	1,017,954	908,614
Total Inbound	**1,256,643**	**2,447,763**	**2,900,938**	**1,881,986**	**1,734,351**
Outbound	**112,000**	**1,381,000**	**19,556,600**	**19,320,600**	**18,820,600**
Induced Demand*	***18,820***	***169,220***	***238,600***	***75,000***	***64,400***

*A 1.20 induced impacts multiplier is applied to development freight to account for the additional traffic demand that can be expected with spin-off economic activity from resource development projects. Induced demand is shown for information only and not included in the totals.

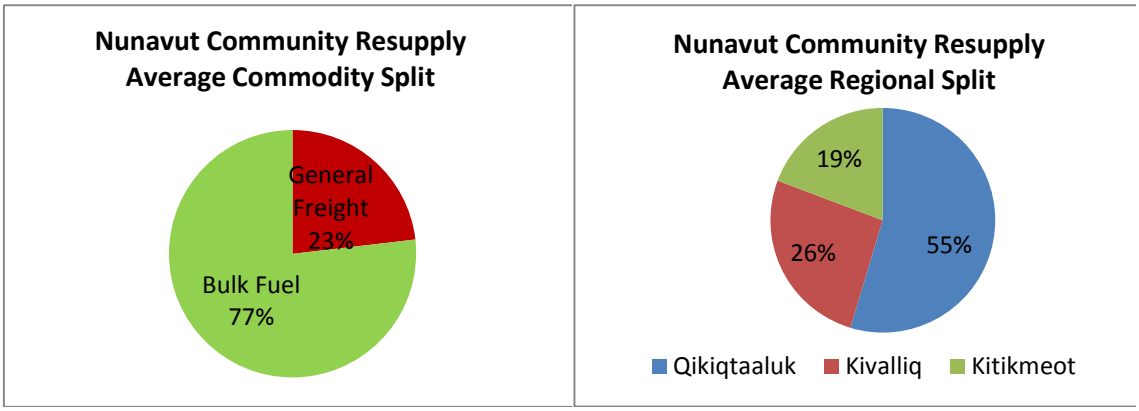
The balance of this section provides 20 year forecasts with graphical presentations for Community Resupply and Resource Development Traffic within each territory.

4.1 Community Resupply Traffic Forecasts



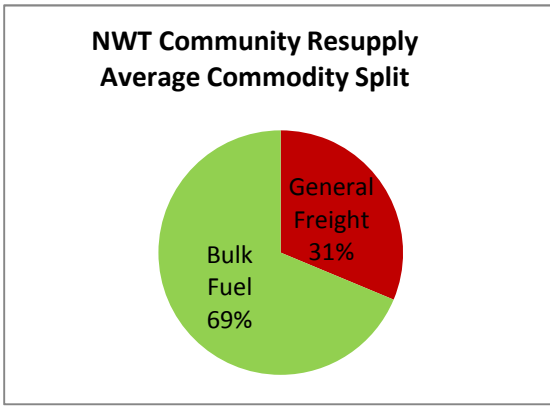
	2010	2015	2020	2025	2030
Alaska	100,900	103,700	106,300	109,300	112,300
Nunvut	162,269	171,346	179,391	186,309	192,416
Yukon	289,706	297,127	304,512	313,103	321,573
NWT	439,468	461,290	480,735	498,274	515,062

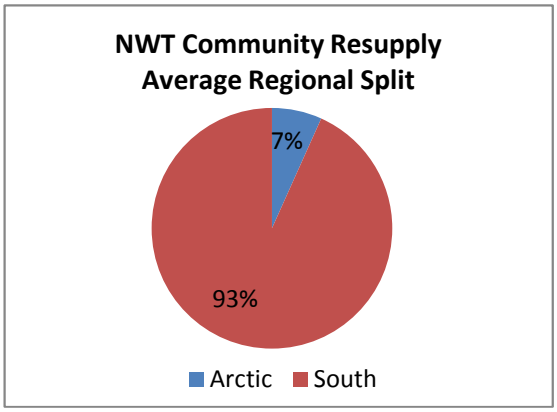
4.1.1 Nunavut Community Resupply



Nunavut Community Resupply Forecast (Tonnes/Year)					
	2010	2015	2020	2025	2030
Qikiqtaaluk					
General Freight	15,145	15,985	16,736	17,381	17,951
Bulk Fuel	73,596	77,680	81,327	84,464	87,236
Total	88,741	93,665	98,063	101,845	105,187
Kivalliq					
General Freight	14,592	15,403	16,126	16,748	17,292
Bulk Fuel	27,696	29,233	30,606	31,786	32,829
Total	42,288	44,636	46,732	48,534	50,121
Kitikmeot					
General Freight	7,815	8,319	8,710	9,046	9,342
Bulk Fuel	23,425	24,726	25,886	26,884	27,766
Total	31,240	33,045	34,596	35,930	37,108
Nunavut Total	**162,269**	**171,346**	**179,391**	**186,309**	**192,416**

4.1.2 NWT Community Resupply



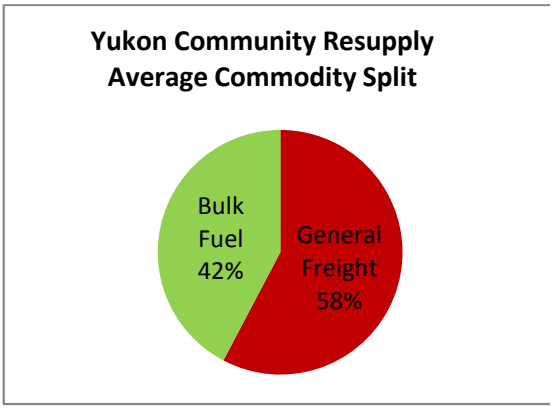


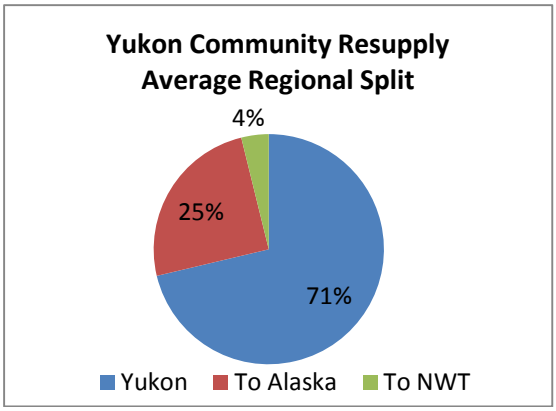
Arctic Coastal NWT Community Resupply Forecast (Tonnes/Year)					
	2010	2015	2020	2025	2030
General Freight	14,994	15,573	16,188	16,703	17,327
Bulk Fuel	14,956	15,534	16,127	16,661	17,283
Total	**29,950**	**31,107**	**32,315**	**33,364**	**34,610**

Southern NWT Community Resupply Forecast (Tonnes/Year)					
	2010	2015	2020	2025	2030
General Freight	121,705	127,850	133,273	138,033	142,793
Bulk Fuel	286,813	301,291	314,066	325,759	336,500
Total	**408,518**	**429,141**	**447,339**	**463,792**	**479,293**

Note: All Arctic Region figures include general freight delivered via the Yukon Highway System (Dempster Highway)
Commodity split includes marine and truck traffic (split on truck traffic alone is 60% fuel/40% general).

4.1.3 Yukon Community Resupply





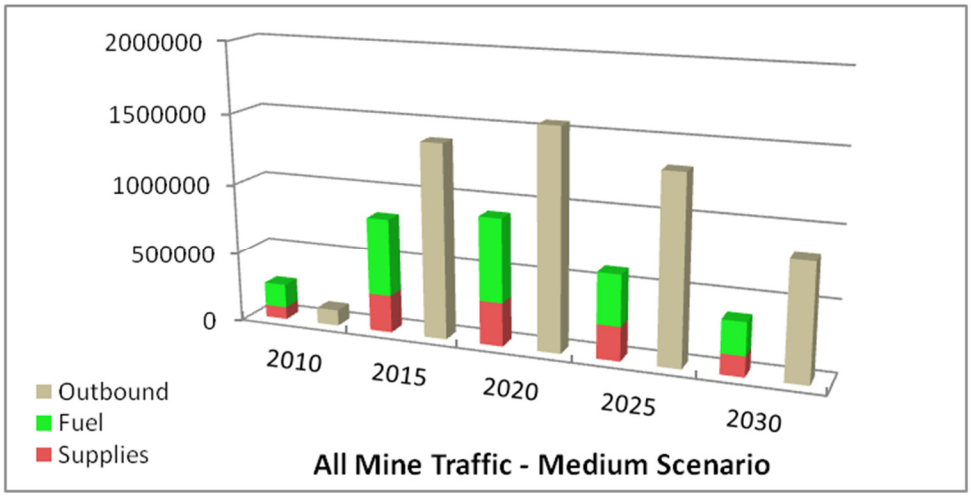
Yukon Community Resupply Traffic Forecast (Tonnes/Year)					
	2010	2015	2020	2025	2030
General Freight	167,406	171,627	175,812	180,703	185,573
Bulk Fuel	122,300	125,500	128,700	132,400	136,000
Total Yukon	**289,706**	**297,127**	**304,512**	**313,103**	**321,573**
To Alaska	100,900	103,700	106,300	109,300	112,300
To NWT	14,994	15,573	16,188	16,703	17,327
Total	**405,600**	**416,400**	**427,000**	**439,106**	**451,200**

Note: General freight to Alaska and NWT is included to show total demand on Yukon Highways.

4.2 Resource Development Traffic Forecasts

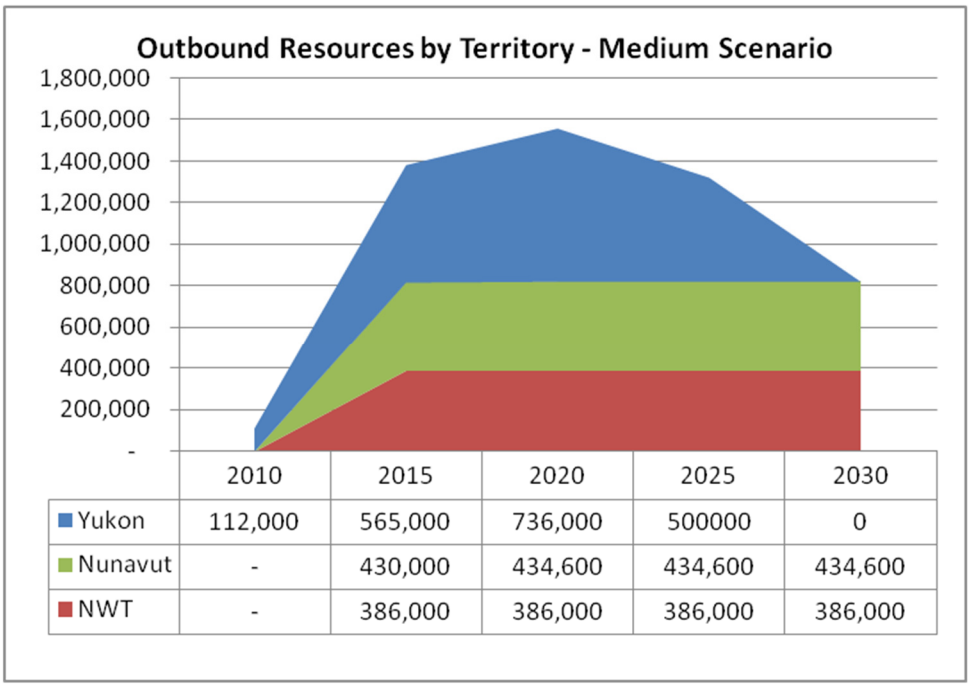
All Resource Traffic Forecasts (Tonnes/Year)					
	2010	2015	2020	2025	2030
Mining					
Medium Scenario					
Inbound	258,300	941,300	955,000	651,000	425,000
Outbound	112,000	1,381,000	19,556,600	19,320,600	18,820,600
Energy					
Pipeline					
Inbound	-	400,000	786,000		
Resupply			5,000	8,000	8,000
Exploration					
Inbound	6,000	73,000	84,000	116,000	160,000
All Resource Traffic					
Inbound	264,300	1,414,300	1,830,000	775,000	593,000
Outbound	112,000	1,381,000	19,556,600	19,320,600	18,820,600

Total Mine Traffic Forecast (Tonnes/Year)



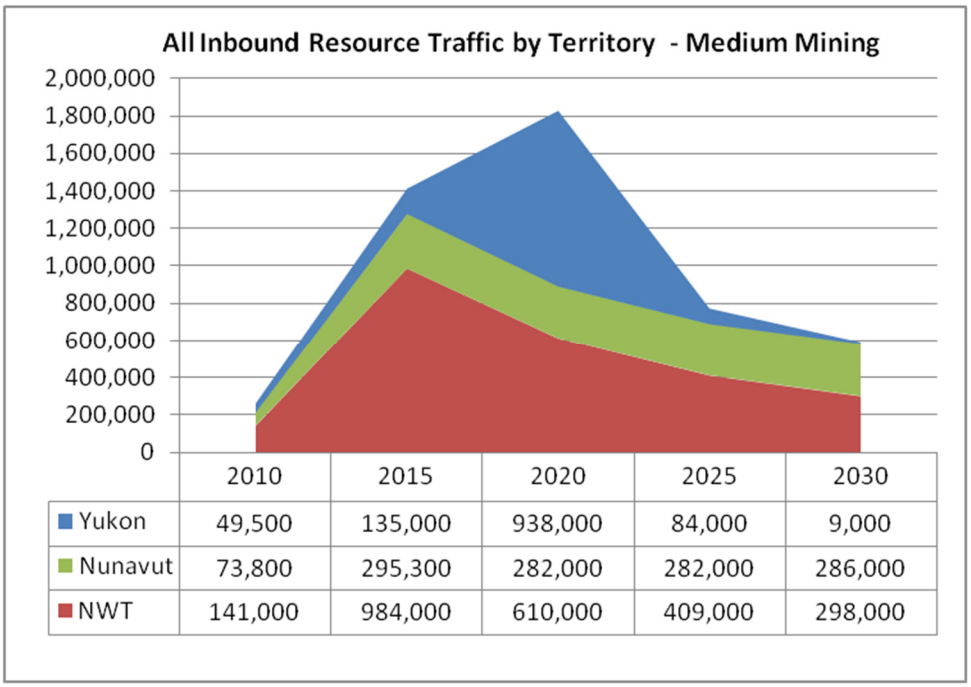
Excludes Baffinland Mary River Iron Mine (18 million tonnes/year)

Territorial Mine Traffic Forecasts (Tonnes/Year)



	2010	2015	2020	2025	2030
Yukon	112,000	565,000	736,000	500000	0
Nunavut	-	430,000	434,600	434,600	434,600
NWT	-	386,000	386,000	386,000	386,000

Excludes Baffinland Mary River Iron Mine (18 million tonnes/year)

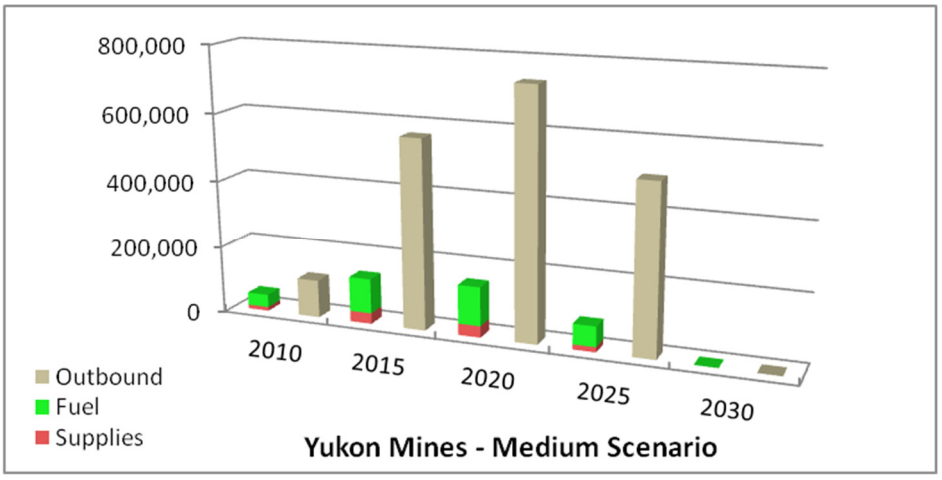


	2010	2015	2020	2025	2030
Yukon	49,500	135,000	938,000	84,000	9,000
Nunavut	73,800	295,300	282,000	282,000	286,000
NWT	141,000	984,000	610,000	409,000	298,000

4.2.1 Yukon Resource Development

Yukon Resource Traffic Forecast Summary (Tonnes/Year)					
	2010	2015	2020	2025	2030
Mining					
Medium Scenario					
Inbound	49,500	135,000	149,000	75,000	
Outbound	112,000	565,000	736,000	500,000	
Energy					
Pipeline					
Inbound			786,000		
Resupply				3,000	3,000
Exploration					
Inbound			3,000	6,000	6,000

Yukon Mining Forecast (Tonnes/Year)



Yukon Mineral Development by Region – Medium Scenario (Tonnes/Year)						
Mine	Traffic	2010	2015	2020	2025	2030
Carmacks						
Minto	Outbound	65,000	65,000	65,000		
	Fuel	23,000	23,000	23,000		
	Supplies	4,000	4,000	4,000		
Carmacks Copper	Outbound		16,000	16,000		
	Fuel	1,000	8,000	8,000		
	Supplies	500	3,000	3,000		
Bellekeno	Outbound		20,000	20,000		
	Fuel	1,000	3,000	3,000		
	Supplies	1,000	2,000	2,000		
Carmacks Total	Outbound	65,000	101,000	101,000	0	0
	Fuel	25,000	34,000	34,000	0	0
	Supplies	5,500	9,000	9,000	0	0
Canol						
Selwyn	Outbound		320,000	500,000	500000	
	Fuel	3,000	40,000	60,000	60000	
	Supplies	2,000	10,000	15,000	15,000	
Wolverine	Outbound	45,000	135,000	135,000		
	Fuel	8,000	21,000	21,000		
	Supplies	3,000	10,000	10,000		
Cantung	Outbound	2,000	9,000			
	Fuel	2,000	8,000			
	Supplies	1,000	3,000			
Canol Total	Outbound	47,000	464,000	635,000	500000	0
	Fuel	13,000	69,000	81,000	60000	0
	Supplies	6,000	23,000	25,000	15,000	0
Yukon Total	Outbound	112,000	565,000	736,000	500000	0
	Fuel	38,000	103,000	115,000	60000	0
	Supplies	11,500	32,000	34,000	15,000	0

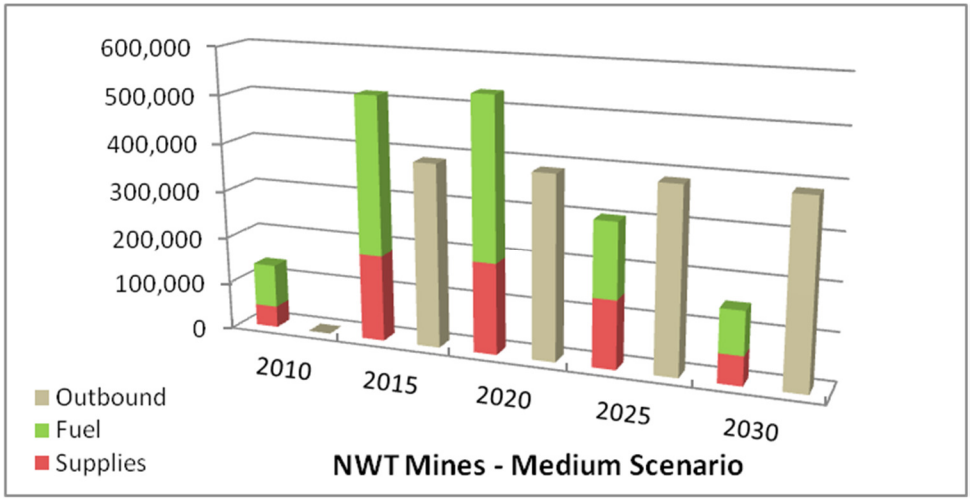
Yukon Oil and Gas Development (Tonnes/Year)						
Development	Traffic	2010	2015	2020	2025	2030
Alaska Gas Pipeline	Inbound	0	0	786,500	3,000	3,000
Oil & Gas Exploration	Inbound	0	0	3,000	6,000	6,000
Total		**0**	**0**	**789,500**	**9,000**	**9,000**

Note: Casino property included in longer term sceanrio would export 300,000 tonnes/year of copper concentrate and require 100,000 tonnes/year of fuel and 60,000 tonnes/year of other mine supplies.

4.2.2 NWT Resource Development

NWT Resource Traffic Forecast Summary (Tonnes/Year)					
	2010	2015	2020	2025	2030
Mining					
Medium Scenario					
Inbound	135,000	515,000	532,000	302,000	151,000
Outbound		386,000	386,000	386,000	386,000
Energy					
Pipeline					
Inbound		400,000			
Resupply			5,000	5,000	5,000
Exploration					
Inbound	6,000	69,000	73,000	102,000	142,000

NWT Mining Traffic Forecast (Tonnes/Year)



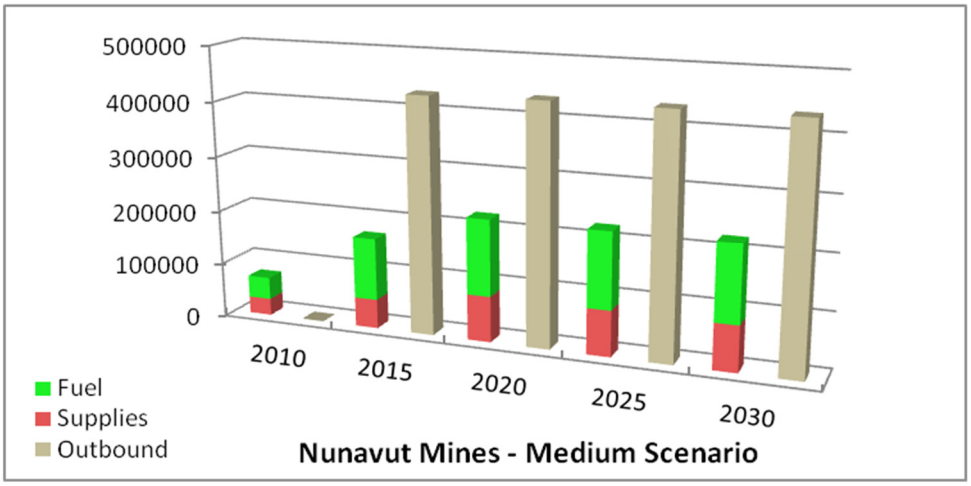
NWT Mineral Development by Region (Tonnes/Year)						
		2010	2015	2020	2025	2030
South East						
Diavik						
Diamond	Fuel	18,000	69,000	69,000	69,000	
	Supplies	22,000	82,000	82,000	82000	
Ekati						
Diamond	Fuel	36,000	57,000	57,000		
	Supplies	12,000	18,000	18,000		
Snap Lake						
Diamond	Fuel	27,000	29,000	29,000	29,000	29000
	Supplies	6,000	12,000	12,000	12000	12000
Gacho Kue						
Diamond	Fuel	2,000	25,000	25,000	25,000	25000
	Supplies	1,000	18,000	18,000	18000	18000
Total South East						
	Fuel	83,000	180,000	180,000	123,000	54000
	Supplies	41,000	130,000	130,000	112000	30000
South Central						
Yellowknife Gold						
Gold	Fuel	2,000	125,000	125,000		
	Supplies	1,000	30,000	30,000		
NICO			66,000	66,000	66,000	66,000
Cobalt Bismuth	Fuel	2,000	17,000	17,000	17,000	17000
	Supplies	1,000	5,000	5,000	5000	5000
Pine Point			200,000	120,000	120,000	120,000
Lead Zinc	Fuel	1,000	4,000	4,000	4,000	4000
	Supplies	1,000	1,000	1,000	1000	1000
Prairie Creek			120,000	200,000	200,000	200,000
Lead Zinc	Fuel	2,000	8,000	15,000	15,000	15000
	Supplies	1,000	15,000	25,000	25000	25000
Total S Central			386,000	386,000	386,000	386,000
	Fuel	7,000	154,000	161,000	36,000	36000
	Supplies	4,000	51,000	61,000	31,000	31,000

NWT Oil and Gas Development (Tonnes/Year)						
Development	Traffic	2010	2015	2020	2025	2030
Mackenzie Gas Pipeline	Inbound	0	400,000	5,000	5,000	5,000
Oil & Gas Exploration						
Baufort Sea	Inbound		4,000	8,000	8,000	12,000
Mackenzie Delta	Inbound		38,000	38,000	54,000	76,000
Mackenzie Basin	Inbound	6,000	27,000	27,000	40,000	54,000
Total		**6,000**	**469,000**	**78,000**	**107,000**	**147,000**

4.3.3 Nunavut Resource Development

Nunavut Resource Traffic Summary (Tonnes/Year)					
	2010	2015	2020	2025	2030
Mining					
Medium Scenario					
Inbound	73,800	291,300	274,000	274,000	274,000
Outbound		430,000	18,434,600	18,434,600	18,434,600
Energy					
Exploration					
Inbound		4,000	8,000	8,000	12,000

Nunavut Mining Traffic Forecast (Tonnes/Year)



Excludes Baffinland Mary River Iron Mine (18 million tonnes/year)

Nunavut Mineral Development by Region (Tonnes/Year)						
		2010	2015	2020	2025	2030
Kivalliq						
Meadowbank						
Gold	Fuel	20,000	32,000			
	Supplies	15,000	30,000			
Meliadine						
Gold	Fuel	3,000	20,000	20,000	20,000	20000
	Supplies	2,000	8,000	8,000	8000	8000
Kiggavik	Outbound			4,600	4,600	4,600
Yellowcake	Fuel	200	200	58,000	58,000	58000
	Supplies	100	100	60,000	60000	60000
Kivalliq Total	Outbound	0	0	4,600	4,600	4,600
	Fuel	23,200	52,200	78,000	78,000	78000
	Supplies	17,100	38,100	68,000	68000	68000
Kitikmeot						
Hope Bay						
Gold	Fuel	16,000	34,000	34,000	34,000	34000
	Supplies	13,000	5,000	5,000	5000	5000
Izok Lake	Outbound		430,000	430,000	430,000	430,000
Pb Zn Cu	Fuel	1,000	28,000	28,000	28,000	28000
	Supplies	500	10,000	10,000	10000	10000
Kitikmeot	Outbound	0	430,000	430,000	430,000	430,000
	Fuel	17,000	62,000	62,000	62,000	62000
	Supplies	13,500	15,000	15,000	15000	15000
Qikiqtaaluk						
Mary River	Outbound			**18,000,000**	**18,000,000**	**18,000,000**
Iron Ore	Fuel	2,000	17,000	41,000	41,000	41000
	Supplies	1,000	107,000	10,000	10000	10000
Nunavut Total	Outbound	0	430000	**18,434,600**	**18,434,600**	**18,434,600**
	Fuel	42,200	131,200	181,000	181,000	181000
	Supplies	31,600	160,100	93,000	93000	93000

Nunavut Oil and Gas Development (Tonnes/Year)						
Development	Traffic	2010	2015	2020	2025	2030
Oil & Gas Exploration	Inbound	0	4,000	8,000	8,000	12,000

5. Future System Performance

Ongoing changes in northern transportation demand are driving systems performance issues across the North. These include:

- Kivalliq resupply shifting from Churchill based barge operations to Montreal based Eastern Sealift operations and possibly back again with NTCL re-entering the market, especially for the Meadowbank mine resupply at Baker Lake.
- Kitikmeot resupply shifting from Hay River based Mackenzie River barging to Montreal based Eastern Sealift operations with both NSSI and NEAS offering community resupply and resource development support (Newmont/Hope Bay Mine)
- NWT River resupply for deck cargo and bulk fuel to the Western Arctic shifting to Western Sealift operations originating in the Vancouver Area as well as fuel sourcing from the US west coast.
- NWT Seasonal Road constraints due to mild weather precluding sufficient ice thickness thorough a full operating season (with supplemental air cargo operations required in 2005 for approximately one third of the mine resupply tonnage).
- NWT, Nunavut and Yukon prospects for increasing mineral developments driving new port access project proposals to reach remote production areas and to exploit opportunities for more efficient export transportation.
- Yukon Port of Skagway mineral export facility reconstruction in parallel with Stewart Bulk Terminal facilities in British Columbia providing competing options for Yukon mining industry.

These ongoing demand driven performance changes set the requirements for Infrastructure Assessment in Phase 2 of the Northern Transportation Systems Assessment.

Appendix

1) Nunavut Socio-Economic Differences

2) Marine Fleet and Sailing Statistics

3) Highway Statistics Development

4) Community Resupply Forecast Methodology

5) Scheduled Northern Air Service and Representative Aircraft

6) Resource Development Forecast Detail

7) Stakeholder Interviews Conducted

Nunavut Socio-Economic Differences

In the course of completing the Northern Transportation Systems Assessment *Phase 1 Demand Report*, it has become apparent that relative to the other territories, Community Resupply Traffic to Nunavut is much lower. The following points out a number of the socio-economic differences that can cause that effect.

Transportation Infrastructure

The three Canadian territories may have many similarities but are also very dissimilar. One major difference lies in transportation infrastructure. Yukon has an extensive all weather highway system that links all but one of the major communities. The Northwest Territories (NWT) has an extensive highway system in the south but there are many communities in the north which are without all weather roads (Inuvik is linked by all weather road to the Yukon via the Dempster Highway). In stark contrast the Nunavut Territory (NU) has no road system other than local roads. The highway system in Yukon and NWT not only allows for year round re-supply but supports businesses that require a reliable transportation system to maintain their sophisticated logistic chains.

Population Distribution

Another major difference between the territories lies in how populations are distributed within the three territories. Of Yukon's 34,000 inhabitants approximately 75 percent live in the Whitehorse area. In the NWT nearly 45 percent of the 43,000 population live in Yellowknife. Of Nunavut's 32,000 population approximately 23 percent of the population lives in the capital of Iqaluit.

The population densities of communities like Whitehorse and Yellowknife offer economies of scales that together with reliable transportation and socio-economic conditions contribute toward economies that benefit from the multiplier effect. There are tertiary businesses such as a limited manufacturing sector which supports operations like mining and transportation. Also, service sectors support government, tourism and mining. These businesses contribute to higher employment, incomes and consumption.

Retail Outlets

Both Whitehorse and Yellowknife have benefited by the introduction of big box stores. Operations like Wal-Mart, Superstore, Canadian Tire, The Brick, Marks Work Warehouse and others have allowed Northerners in these communities to benefit from lower prices and enjoy a selection of merchandise that was previously not known in the North. The availability of paved all-weather roads has ensured that these large stores can fit into the logistic chains of their corporations and provide reliability in service and cheaper prices. The increase in selection also contributes to impulse spending. This together with other factors mentioned

below helps contribute to an increase in consumption which increases consumer spending and increases the volume of freight moved into the territories.

Food Services

The introduction of fast food outlets in the North also contributes to increased freight movements. In both Whitehorse and Yellowknife there are food services such as Tim Horton's, Starbucks, McDonalds, Boston Pizza, Subway, Kentucky Fried Chicken, A&W, etc which are based on a steady reliable re-supply of fresh supplies to stay in business. The success of these operations demonstrates that the transportation system is efficient and able to meet the needs of both the management of the operations and their customers.

Monthly Receipts for Food Services and Drinking Places (Stats Canada)

	March 2009 ($000)	February 2010 ($000)
Yukon	3,549	4,586
Northwest Territories	6,190	6,912
Nunavut	1,425	1,554

In March of 2009 Yukon receipts were almost 150 percent more than Nunavut's. Although Yukon registered almost two hundred percent more receipts in February 2010 than does Nunavut one reason for this difference is that Whitehorse holds it Rendezvous celebrations during the month of February. What the chart does demonstrate is that there is a significant difference in food service and drinking place receipts and this is reflective of a number of factors including tourism that create greater demand for consumables.

Demographics/Disposable Income

In Yukon less than 25 percent of the population is aboriginal while in the NWT it is 50 percent and in NU it is 85 percent. Aboriginals tend to be concentrated in the remote communities where there are limited employment opportunities and where the cost of living tends to be higher.

The economic situation in Northern communities varies dramatically. Government remains the major employer in the three territories and is supported by industries such as mining and tourism. The major communities benefit the most from government activity and unemployment rates in the capitals is significantly lower than other communities, particularly isolated ones. In NU mining exploration and the development of new mines are having some impact but unemployment remains high.

Nunavut Economic Data by Community

Community	Pop.	Median Household Income (2005)	Unemployment Rate	More than one person per room	Average Age
Iqaluit	6,184	$89,088	7.8	6.7	28.8
Clyde River	820	$46,464	24.2	35.1	20.8
Igloolik	1,538	$47,744	16.1	27.7	18.9
Pangnirtung	1,325	$44,928	17.1	12.3	21.9
Arviat	2,060	$45,184	13.0	30.8	19.5
Baker Lake	1,728	$41,344	18.9	24.4	22.0
Rankin Inlet	2,358	$73,344	10.2	16.0	23.9
Repulse Bay	748	$40,576	34.5	42.9	18.9
Cambridge Bay	1,477	$71,936	9.7	12.2	26.3
Kugaaruk	688	$58,624	21.3	44.4	18.0
Taloyoak	809	$45,952	28.1	35.1	19.6

Data from "Inventory of Health Services in Nunavut" October 22, 2009. Much of the data is based on the 2006 Census and although the communities have grown. The relationship between unemployment, income, household income and housing conditions is still very much relevant.

As noted above government is the major employer in the three territories. When you subtract the capital of Iqaluit and the regional centres of Cambridge Bay and Rankin Inlet the employment rates and household incomes are quite low. Although not all 26 NU communities are listed here the relationships are the same. When one takes into account that the cost of food in these communities is extremely high it is obvious that the disposable income of many of these communities is very low which limits the amount of purchasing that can be done.

The federal government is altering the food mail program to address the need to ensure that nutritious food is made available to these communities at reasonable prices to help promote healthy life styles. This will help in the smaller communities where incomes are low and all of the fresh produce must be flown in.

Average Annual Household Income in Canada (AAHI)

YEAR	2006	2001	1996
CANADA	53,634	52,438	49,142
NORTHWEST TERRITORIES	80,085	71,475	72,448
YUKON TERRITORY	60,105	58,215	60,993
NUNAVUT TERRITORY	60,221	50,971	48,896

Source: Statistics Canada

While the AAHI in Yukon and Nunavut are similar there is a large variation between the capital cities and other communities. In Whitehorse the AAHI is $66,191while in Iqaluit it is $89,088 which are significantly above other communities in their territories (in Yukon the

AAHI for Old Crow is $36,352 and in Watson Lake the second largest community it is $47,232). However; in Yukon Old Crow is connected by scheduled air service to Whitehorse, six days per week and benefits from Whitehorse's lower food and retail costs. Other Yukon communities benefit from their highway connection to Whitehorse since people frequently travel to the capital for various reasons including medical and business. Nunavut's other communities do not benefit from air links to Iqaluit since all fresh food products are flown to Iqaluit from the south so that no real advantages exist in shopping in the Nunavut capital. Yukon and the NWT because of their road connections therefore have a significant advantage in terms of pricing for food stuffs and other retail items. The lower costs are reflected in higher disposable income.

The NWT communities served by all weather roads also have an advantage over Nunavut communities. Much of the food mail destined for communities north of Yellowknife is trucked to Yellowknife then transferred to air for the final leg of the journey. This helps reduce costs but does not overcome the cost implications of air transportation.

Traditional Foods

Another factor affecting dry goods consumption is that aboriginal peoples tend to rely more heavily on traditional foods for their sustenance. Although only the NWT has conducted a survey of reliance on traditional foods it is believed to be representative of aboriginal peoples in all three territories. The survey conducted in 2008 was to determine the number of households where more than half of the meat and fish consumed came from hunting and fishing. In communities with a high proportion of aboriginals, traditional food consumption was very high as in Tuktoyaktuk (63.3), Holman (62.9), Fort Liard (66.5), Jean Marie River (90.0), Colville Lake (94.3), and Lutselk'e (91.9). In larger communities where there is a higher proportion of non-aboriginals results are quite different as in Inuvik (25.2), Fort Simpson (34.4), Hay River (15.7), and Yellowknife (10.7). In Nunavut where 85% of the population is aboriginal, it is believed that consumption of fish and meat caught through hunting and fishing would be very similar to the numbers in the Northwest Territories.

Retail Trade

Retail Trade by Province and Territory

	2005 (000)	2006 (000)	2007 (000)	2008 (000)	2009 (000)
Canada	365,994.1	389,459.5	412,565.3	427,895.9	415,413.4
Yukon	434.7	452.5	502.7	534.5	526.7
NWT	574.6	599.1	678.1	705.6	693.0
Nunavut	249.5	260.4	278.1	308.7	324.2

Source: Statistics Canada

Yukon and Nunavut have similar size populations however Yukon has 62 percent more retail trade than Nunavut. This reflects the socio-economic situation, tourism, and the selection available to Yukoners through lower costs provided by the variety of shopping options.

Employment

Employment Labour Force	
Jurisdiction	Total
Canada	16,021,180
Yukon	17,315
NWT	21,350
Nunavut	10,670

Source: Statistics Canada 2006 Census

Despite having similar populations Yukon has 62 percent more people in the labour force. Part of the explanation for this is that Nunavut has a very young population. The median age is 23.1 and 33.9 percent are 14 years or younger.

Tourism

Tourism in Yukon accounts for 4.4 percent of the territory's GDP contributing approximately $500 million to the economy. Tourism is the largest private sector employer in Yukon, and roughly 70 percent of Yukon's employment population work for businesses that report some level of tourism revenue. Approximately 300,000 travellers cross Yukon's international border each year. By contrast tourism in the Northwest Territories generates approximately $113.6 million in revenue annually and attracts 36,000 visitors per year. Nunavut attracted approximately 13,000 visitors in 2005 but the increase in cruise ship visits has the potential to increase this number.

In Yukon the number of tourists has a significant impact on consumption of dry cargo items. Bus tours stay at local hotels, purchase meals and purchase other retail items.

Driving the Alaska Highway is a major tourist attraction. Motor homes and trailers from all over North America and from Europe can be seen travelling the highway. These tourists patronize local stores and are a significant contributor to the local economy.

Although not a significant as tourism there are a large number of trucks that transit Yukon to and from Alaska. These truckers not only purchase fuel but also purchase food and other consumables.

Northern Marine Voyages (2009 Sailings)

Northwest Passage Transits
(Source: NORDREG Reporting)

3 Coast Guard Sailings

2 Commercial Sailings

8 Pleasure Craft Sailings

4 Cruise Ship Sailings
(592 Passengers)

Eastern Sealift
(Source: Government of Nunavut)

7 Woodwards Tanker Sailings to Iqaluit

4 Woodwards Tanker Sailings to Rankin Inlet

3 Woodwards Tanker Sailings to Cape Dorset & Baker Lake

1 or 2 Woodwards Tanker Sailings to all other Kivalliq and Qiqitaaluk Communities

1 or 2 NSSI and NEAS Dry Cargo Resupply Ship Sailings to all Nunavut Communities

15 additional NSSI or NEAS Dry Cargo Resupply Ship Sailings to Iqaluit

Western Sealift
(Source: NTCL)

2 NTCL Charter Tanker Sailings from West Coast to Western Arctic Communities

3 NTCL Bulk/Deck Cargo Barge Sailings from Hay River to Western Arctic Communities

Mackenzie River Sailings
(Source: NTCL and Cooper Services)

14 NTCL Bulk/Deck Cargo Barge Sailings from Hay River to Mackenzie River Communities

9 Coopers Barge Sailings from Fort Nelson to Tulita and Norman Wells

Inside Passage Sailings
(Skagway Convention & Visitors Bureau)

52 Scheduled Container Barge Sailings to Skagway and Haines

12 Scheduled Fuel Barge Sailings to Skagway and Haines
424 Cruise Ship Sailings to Skagway or Haines
(779,043 passengers)

Churchill Port Calls
(Source: OmniTRAX and NTCL)

18 Bulk Ships loading grain for export

1 NTCL Barge Sailing to Kivalliq

Northern Marine Fleet

Ships	Built	Ice Class	HP	Speed	LOA	Breadth	Depth	Draft	DWT Tonnes	Container
Nunavut Eastern Arctic Sealift										
MV Aivik	1980	BV ICE 111	5200	14	109.9m	19.4	12.95	5.92	4860	280
MV Umiavut	1988	LR Ice Class	6000	15	113.16	18.90	11.28	8.54	9587	567
MV Avataq	1989	LR Ice Class	6000	15	113.16	18.90	11.28	8.54	9587	567
MV Qamutik	1994	LR Ice Class	7380	16	137.16	18.90	11.65	8.515	12754	730
Nunavut Sealink & Supply Inc.										
Anna Desgagnes	1986	BV Ice Class	10330	14.5	173.5	23.05	13.70	10	17850	553
Camilla Desgagnes	1982	LR?	7797	14.5	133.41	20.93	14.13	6.87	7000	
Rosaire Desgagnes	2007	GL E3	7344	15.5	138.07	21		8	12744	673
Sedna	2009	GL E3	7344	15.5	139	21		8	12612	665
Zeleda	2009	GL E3	7344	15.5	138.98	21		8	12692	665
Coastal Shipping Ltd. (Woodwards Group)										
Dorsch	1980	GL ?	6,000	14.50	130.75	18.50	10.62	8.310	10,556	
Mokami	1989	RMR ?	3,502	13.5	97.4	?	6.510	4.501	2,853	
Tuvaq	1977	DNV Ice 1A	2x	14.0	164.47	21.51	12.02	9.502	15,954	

Northern Marine Fleet

Tugs	Built	Ice	HP	Speed	LOA	Breadth	Depth	Draft	Barges	Built	Series	Length	Breadth	Capy
Northern Transportation Company Limited														
M.V. Alex Gordon	1975	LR Class	7200	15.5 kts	205'	45'	18'2"	14'2"	4	1974	1800	210’	56’	2590t
M.V. Jim Kilabuk	1975	LR Class	7200	15.5	205'	45'	18'2"	14'2"	1	2009	1500	250’	56’	2190t
M.V. Nunakput	1969	-	4300	12	167'6"	47'9"	10'6"	6'	20	1972	1500	250’	56’	2190t
M.V. Pisurayak Kootook	1969	-	4300	12	160'	40'	10'6"	6'6"	8	1969	1500	250’	56’	2190t
M.V. Pat Lyall	1969	-	4300	12	160'	40'	10'6"	6'6"	1	-	1050	216’	49’	1730t
M.V. Vic Ingraham	1970	-	4500	12	154'6"	50'	9'6"	3'9"	3	-	1030	200’	48’	1270t
M.V. Edgar Kotokak	1973	-	5600	14	153'3'	52'1"	9'6	3'9"	24	1969	1000	200’	50’	1005t
M.V. Henry	1973	-	4500	14	153'3'	52'1"	9'6	3'9"	2	1965	820	175’	50’	900t
M.V. Kelly Ovayuak	1973	-	5600	14	148'3'	52'1"	9'6	3'9"	11	1962	800	160’	48’	930t
M.V. Jock McNiven	1973	-	4500	14	148'3'	52'1"	9'6	3'9"	2	1965	700	155’	45’	camp
M.V. Keewatin	1974	LR Class	3375	12	126'6"	38'1"	12'1"	8'10"	18	1957	600	150’	35’	607t
M.V. Marjory	-	-	1100	10	81'1"	29'6"	7'9"	3'6"						
M.V. Arctic Kugaluk	-	-	2250	12	98'	38'	7'	4'6"						
M.V. Sans Sault	-	-	1500	12	77'6"	24'	6'8 1/2	3'9"						

Northern Marine Fleet

Tugs	Built	Ice	HP	Speed	LOA	Breadth	Depth	Draft
Cooper Barging Services								
MV "Malta"			800					
MV "Sheila J"			800					
MV "Hugh A Young"			1450					
MV "Miller Delta"			2200					
Horizon Marine								
MV "Bert Long"			2,000					
MV "Risco Reagan"			1000					
MV "W.H. Horton"			1000					
MV "Delta Eagle"								

Barges	Built	Series	Length	Breadth	Capy
3	2001	800	165’	45’	900t
5		400	127’	32’	275t
1		200			

- SBMT 802 Barge Camp
- William Bradley Landing Barge
- Arctic Star Self-contained Barge Camp
- John Wurmlinger Machine Shop Barge

Resource Development Projects Detailed Demand Forecast

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NORTHERN TRANSPORTATION SYSTEMS ASSESSMENT

BASE METAL MINES - NORTHERN TERRITORIES

(tonnes)

				Project Life			*Max. Year*			
	MINE	**Products**	**Status -12/10**	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Remarks**
YUKON	**Minto**	Cu	Producing	323,000	775,000	**1,098,000**	*27,000*	*65,000*	***92,000***	Truck - Skagway
	Wolverine	Pb, Zn, Cu	Producing	352,000	1,530,000	**1,882,000**	*31,000*	*135,000*	***166,000***	Truck - Stewart, BC
	Cantung	W03, Cu	Producing	58,000	47,000	**105,000**	*11,000*	*9,000*	***20,000***	Re-opens Oct. '10
	Carmacks	Cu	Short Term	132,000	144,000	**276,000**	*11,000*	*16,000*	***27,000***	Copper cathodes
	Selwyn	Zn, Pb	Short Term	1,097,000	2,352,000	**3,449,000**	*75,000*	*500,000*	***575,000***	Concentrate slurry pipeline
	Bellekeno	Zn, Pb, Ag	Short Term	52,000	200,000	**252,000**	*5,000*	*20,000*	***25,000***	Includes future development
	Casino	Cu, Moly	Long Term	2,622,000	4,500,000	**7,122,000**	*160,000*	*300,000*	***460,000***	Coal-fired power generation
	Mactung	W03, Cu	Long Term	249,500	195,000	**444,500**	*18,000*	*15,000*	***33,000***	Move resources from Cantung
			Total Yukon	**4,885,500**	**9,743,000**	**14,628,500**	**338,000**	***1,060,000***	***1,398,000***	
NWT	**NICO**	Co, Bi	Short Term	436,000	1,122,000	**1,558,000**	*22,000*	*66,000*	***88,000***	Process cons in Saskatoon
	Pine Point	Zn, Pb	Short Term	103,000	2,510,000	**2,613,000**	*5,000*	*200,000*	***205,000***	Re-open with new technology
	Prairie Cr.	Pb, Zn, Cu, Ag	Short Term	630,000	3,160,000	**3,790,000**	*40,000*	*200,000*	***240,000***	Old Cadillac Silver Mine
	Thor Lake	REE	Long Term	243,600	480,000	**723,600**	*13,000*	*30,000*	***43,000***	Rare Earth Elements
			Total NWT	**1,412,600**	**7,272,000**	**8,684,600**	***80,000***	***496,000***	***576,000***	
NUNAVUT	**Mary River**	Fe Ore	Short Term	1,373,000	261,000,000	**262,373,000**	*51,000*	*18,000,000*	***18,051,000***	Huge iron ore production
	Izok Lake	Pb, Zn, Cu	Short Term	815,000	6,880,000	**7,695,000**	*38,000*	*430,000*	***468,000***	Rich Mine - Requires arctic port
	Kiggavik	U3O8	Short Term	1,685,800	59,800	**1,745,600**	*118,000*	*4,600*	***122,600***	Product - Yellowcake
	Hackett R.	Pb, Zn, Cu	Long Term	2,286,500	5,850,000	**8,136,500**	*158,000*	*450,000*	***608,000***	Rich Mine - Requires arctic port
			Total Nunavut	**6,160,300**	**273,789,800**	**279,950,100**	***365,000***	***18,884,600***	***19,249,600***	
	Totals - All Territories			***12,458,400***	***290,804,800***	**303,263,200**	***783,000***	***20,440,600***	***21,223,600***	

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NTSA

NORTHERN TERRITORIES *TOTAL RESOURCE PROJECT* FREIGHT DEMAND

(TONNES)

PIPELINES		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Mackenzie Gas Project																						
	Construction																					
	Inbound						400,000	466,000														
	Outbound								112,000													
	Re-supplies								5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Alaska Gas Pipeline - Yukon Section																						
	Construction																					
	Inbound											786,500	317,700									
	Outbound													83,000								
	Re-supplies													3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
	Total Inbound						400,000	466,000	5,000	5,000	5,000	791,500	322,700	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Total Outbound								112,000					83,000								
OIL & GAS EXPLORATION																						
Mackenzie O&G Exploration																						
Beaufort Sea Offshore						4,000	4,000	4,000	4,000	4,000	4,000	8,000	8,000	8,000	8,000	8,000	8,000	12,000	12,000	12,000	12,000	12,000
Mackenzie Delta Onshore						23,000	38,000	38,000	38,000	38,000	38,000	38,000	54,000	54,000	54,000	54,000	54,000	76,000	76,000	76,000	76,000	76,000
Central Mackenzie Basin		6,000	6,000	6,000	6,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	40,000	40,000	40,000	40,000	40,000	54,000	54,000	54,000	54,000	54,000
Eastern Arctic O&G Exploration						4,000	4,000	4,000	4,000	4,000	4,000	8,000	8,000	8,000	8,000	8,000	8,000	12,000	12,000	12,000	12,000	12,000
Yukon O&G Exploration										3,000	3,000	3,000	3,000	3,000	3,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Total Inbound	6000	6000	6000	6000	58000	73000	73000	73000	76000	76000	84000	113000	113000	113000	116000	116000	160000	160000	160000	160000	160000
MINING																						
Yukon	Outbound	112,000	229,000	229,000	244,000	580,000	580,000	871,000	871,000	1,051,000	1,051,000	1,051,000	966,000	831,000	815,000	815,000	815,000	300,000	300,000	300,000	300,000	300,000
	Inbound	54,000	93,500	240,000	321,000	224,000	224,000	302,000	302,000	327,000	327,000	327,000	295,000	264,000	253,000	253,000	253,000	160,000	160,000	160,000	160,000	160,000
NWT	Outbound			50,000	100,000	366,000	496,000	496,000	496,000	416,000	416,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000
	Inbound	138,000	277,000	326,000	489,300	515,300	523,000	523,000	523,000	523,000	523,000	542,000	467,000	467,000	312,000	312,000	312,000	312,000	312,000	161,000	161,000	161,000
Nunavut	Outbound						430,000	430,000	430,000	884,600	884,600	884,600	884,600	884,600	884,600	884,600	884,600	884,600	884,600	884,600	884,600	884,600
	Inbound	75,300	137,300	210,800	461,800	377,800	366,300	421,000	364,000	488,000	445,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000
	Total Outbound	112,000	229,000	279,000	344,000	946,000	1,506,000	1,797,000	1,797,000	2,351,600	2,351,600	2,551,600	2,466,600	2,331,600	2,315,600	2,315,600	2,315,600	1,800,600	1,800,600	1,800,600	1,800,600	1,800,600
	Total Inbound	267,300	507,800	776,800	########	########	1,113,300	1,246,000	1,189,000	1,338,000	1,295,000	1,301,000	1,194,000	1,163,000	997,000	997,000	997,000	904,000	904,000	753,000	753,000	753,000
Mary River	**Outbound**							9,000,000	#########	18,000,000	#########	#########	#########	#########	18,000,000	18,000,000	#########	18,000,000	#########	18,000,000	18,000,000	18,000,000
TOTAL RESOURCE PROJECT																						
	Total Outbound	112,000	229,000	279,000	344,000	946,000	1,506,000	1,797,000	1,909,000	2,351,600	2,351,600	2,551,600	2,466,600	2,414,600	2,315,600	2,315,600	2,315,600	1,800,600	1,800,600	1,800,600	1,800,600	1,800,600
	Mary River Ore							9,000,000	#########	18,000,000	#########	#########	#########	#########	18,000,000	18,000,000	#########	18,000,000	#########	18,000,000	18,000,000	18,000,000
	Total Inbound	273,300	513,800	782,800	########	########	1,586,300	1,785,000	1,267,000	1,419,000	1,376,000	2,176,500	1,629,700	1,284,000	1,118,000	1,121,000	1,121,000	1,072,000	1,072,000	921,000	921,000	921,000
RESOURCE TRAFFIC																						
BY TERRITORY																						
Yukon	**Outbound**	112,000	229,000	229,000	244,000	580,000	580,000	871,000	871,000	1,051,000	1,051,000	1,051,000	966,000	914,000	815,000	815,000	815,000	300,000	300,000	300,000	300,000	300,000
	Inbound	54,000	93,500	240,000	321,000	224,000	224,000	302,000	302,000	330,000	330,000	1,116,500	615,700	270,000	259,000	262,000	262,000	169,000	169,000	169,000	169,000	169,000
NWT	**Outbound**			50,000	100,000	366,000	496,000	496,000	608,000	416,000	416,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000	616,000
	Inbound	144,000	283,000	332,000	495,300	569,300	992,000	1,058,000	597,000	597,000	597,000	620,000	574,000	574,000	419,000	419,000	419,000	459,000	459,000	308,000	308,000	308,000
Nunavut	**Outbound**						430,000	9,430,000	#########	18,884,600	#########	#########	#########	#########	18,884,600	18,884,600	#########	18,884,600	#########	18,884,600	18,884,600	18,884,600
	Inbound	75,300	137,300	210,800	461,800	381,800	370,300	425,000	368,000	492,000	449,000	440,000	440,000	440,000	440,000	440,000	440,000	444,000	444,000	444,000	444,000	444,000

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NTSA

NORTHERN TERRITORIES ANNUAL FREIGHT DEMAND

YUKON MINES

(TONNES)

MINE			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTALS
Operating Mines																									
Minto	*Outbound*	*Production*	60,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000											*775,000*
	Inbound	Fuel	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000											*276,000*
		Supplies	3,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000											*47,000*
	Total	Inbound	26,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000											*323,000*
Wolverine	*Outbound*	*Production*		45,000	135,000	135,000	135,000	135,000	135,000	135,000	135,000	135,000	135,000	135,000	135,000										*1,530,000*
	Inbound	Fuel		8,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000										*239,000*
		Supplies		3,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000										*113,000*
	Total	Inbound		11,000	31,000	31,000	31,000	31,000	31,000	31,000	31,000	31,000	31,000	31,000	31,000										*352,000*
Cantung	*Outbound*	*Production*		2,000	9,000	9,000	9,000	9,000	9,000																*47,000*
	Inbound	Fuel		2,000	8,000	8,000	8,000	8,000	8,000																*42,000*
		Supplies		1,000	3,000	3,000	3,000	3,000	3,000																*16,000*
	Total	Inbound		3,000	11,000	11,000	11,000	11,000	11,000																*58,000*
	Total	Outbound	60,000	112,000	209,000	209,000	209,000	209,000	209,000	200,000	200,000	200,000	200,000	200,000	135,000										*2,352,000*
	inbound	Fuel		33,000					52,000					44,000											
	inbound	Supplies		8,000					17,000					14,000											
	Total	Inbound	26,000	41,000	69,000	69,000	69,000	69,000	69,000	58,000	58,000	58,000	58,000	58,000	31,000										*733,000*
Total - Operating Mines			86,000	153,000	278,000	278,000	278,000	278,000	278,000	258,000	258,000	258,000	258,000	258,000	166,000										*3,085,000*
Probable Mines (short term)																									
Carmacks	*Outbound*	*Production*						16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000									*144,000*
Copper	*Inbound*	Fuel		1,000	1,000	2,000	3,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000									*79,000*
		Supplies		500	500	12,000	13,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000									*53,000*
	Total	Inbound		1,500	1,500	14,000	16,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000									*132,000*
Selwyn	*Outbound*	*Production*						320,000	320,000	320,000	320,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000						*5,280,000*
	Inbound	Fuel		3,000	5,000	42,000	42,000	40,000	40,000	40,000	40,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000						*732,000*
		Supplies		2,000	3,000	100,000	100,000	10,000	10,000	10,000	10,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000						*365,000*
	Total	Inbound		5,000	8,000	142,000	142,000	50,000	50,000	50,000	50,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000						*1,097,000*
Bellekeno	*Outbound*	*Production*			20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000											*200,000*
	Inbound	Fuel		1,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000											*31,000*
		Supplies		1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000											*21,000*
	Total	Inbound		2,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000											*52,000*
	Total	Outbound			20,000	20,000	20,000	356,000	356,000	356,000	356,000	536,000	536,000	536,000	516,000	516,000	500,000	500,000	500,000						*5,624,000*
	inbound	Fuel		5,000					51,000					71,000					60,000						
	inbound	Supplies		3,500					15,000					20,000					15,000						
	Total	Inbound		8,500	14,500	161,000	163,000	66,000	66,000	66,000	66,000	91,000	91,000	91,000	86,000	86,000	75,000	75,000	75,000						*1,281,000*
Total - Short Term Mines				8,500	34,500	181,000	183,000	422,000	422,000	422,000	422,000	627,000	627,000	627,000	602,000	602,000	575,000	575,000	575,000						*6,905,000*
Possible Mines (long term)																									
Casino	*Outbound*	*Production*								300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	*4,500,000*
	Inbound	Fuel		2,000	2,000	2,000	21,000	21,000	21,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	*1,569,000*
		Supplies		1,000	1,000	1,000	50,000	50,000	50,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	*1,053,000*
	Total	Inbound		3,000	3,000	3,000	71,000	71,000	71,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	*2,622,000*
Mactung	*Outbound*	*Production*					15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000						*195,000*
	Inbound	Fuel		1,000	5,000	5,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000						*180,000*
		Supplies		500	2,000	2,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000						*69,500*
	Total	Inbound		1,500	7,000	7,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000						*249,500*
	Total	Outbound					15,000	15,000	15,000	315,000	315,000	315,000	315,000	315,000	315,000	315,000	315,000	315,000	315,000	300,000	300,000	300,000	300,000	300,000	*4,695,000*
	inbound	Fuel		3,000					34,000					113,000					113,000					100,000	
	inbound	Supplies		1,500					55,000					65,000					65,000					60,000	
	Total	Inbound		4,500	10,000	10,000	89,000	89,000	89,000	178,000	178,000	178,000	178,000	178,000	178,000	178,000	178,000	178,000	178,000	160,000	160,000	160,000	160,000	160,000	*2,871,500*
Total - Long Term Mines				4,500	10,000	10,000	104,000	104,000	104,000	493,000	493,000	493,000	493,000	493,000	493,000	493,000	493,000	493,000	493,000	460,000	460,000	460,000	460,000	460,000	*7,566,500*
Total - All mines	Outbound		60,000	112,000	229,000	229,000	244,000	580,000	580,000	871,000	871,000	1,051,000	1,051,000	1,051,000	966,000	831,000	815,000	815,000	815,000	300,000	300,000	300,000	300,000	300,000	*12,671,000*
Total - All mines	Inbound		26,000	54,000	93,500	240,000	321,000	224,000	224,000	302,000	302,000	327,000	327,000	327,000	295,000	264,000	253,000	253,000	253,000	160,000	160,000	160,000	160,000	160,000	*4,885,500*
	TOTAL - ALL MINES		86,000	166,000	322,500	469,000	565,000	804,000	804,000	1,173,000	1,173,000	1,378,000	1,378,000	1,378,000	1,261,000	1,095,000	1,068,000	1,068,000	1,068,000	460,000	460,000	460,000	460,000	460,000	17,556,500

May 8/10 SHEET 3

NTSA

NORTHERN TERRITORIES ANNUAL FREIGHT DEMAND

NWT MINES (TONNES)

MINE			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTALS
Operating Mines																									
Diavik	*Outbound*		Actuals																						
	Inbound	Fuel	44,000	18,000	60,000	64,000	69,000	69,000	69,000	69,000	69,000	69,000	69,000	69,000	69,000	69,000	69,000	69,000	69,000	69,000	69,000				
		Supplies	53,000	22,000	72,000	77,000	82,000	82,000	82,000	82,000	82,000	82,000	82,000	82,000	82,000	82,000	82,000	82,000	82,000	82,000	82,000				
	Total	Inbound	87,000	40,000	132,000	141,000	151,000	151,000	151,000	151,000	151,000	151,000	151,000	151,000	151,000	151,000	151,000	151,000	151,000	151,000	151,000				2,665,000
Ekati	*Outbound*																								
	Inbound	Fuel	37,000	36,000	50,000	54,000	57,000	57,000	57,000	57,000	57,000	57,000	57,000	57,000											
		Supplies	12,000	12,000	16,000	17,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000											
	Total	Inbound	49,000	48,000	66,000	71,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000											834,000
Snap Lake	*Outbound*																								
	Inbound	Fuel	18,000	27,000	25,000	27,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	
		Supplies	8,000	6,000	10,000	11,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	
	Total	Inbound	26,000	33,000	35,000	38,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	870,000
Total - Operating Mines			162,000	121,000	233,000	250,000	267,000	267,000	267,000	267,000	267,000	267,000	267,000	267,000	192,000	192,000	192,000	192,000	192,000	192,000	192,000	41,000	41,000	41,000	4,369,000
	Total	Outbound																							
	Total	Inbound	162,000	121,000	233,000	250,000	267,000	267,000	267,000	267,000	267,000	267,000	267,000	267,000	192,000	192,000	192,000	192,000	192,000	192,000	192,000	41,000	41,000	41,000	4,369,000
Probable Mines (short term)			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Y'knife Au	*Outbound*																								
	Inbound	Fuel		2,000	16,000	17,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000									
		Supplies		1,000	4,000	4,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000									
	Total	Inbound		3,000	20,000	21,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000	155,000									1,594,000
NICO	*Outbound*							66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	66,000	1,122,000
	Inbound	Fuel		2,000	2,000	3,000	3,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	299,000
		Supplies		1,000	1,000	25,000	25,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	137,000
	Total	Inbound		3,000	3,000	28,000	28,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	436,000
Pine Point	*Outbound*					50,000	100,000	200,000	200,000	200,000	200,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	2,510,000
	Inbound	Fuel		1,000	1,000	1,000	2,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	73,000
		Supplies		1,000	10,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	30,000
	Total	Inbound		2,000	11,000	2,000	3,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	103,000
Prairie	*Outbound*					120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	3,160,000
Creek	*Inbound*	Fuel		2,000	2,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	233,000
		Supplies		1,000	1,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	397,000
	Total	Inbound		3,000	3,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	630,000
Gacho Kue	*Outbound*																								
	Inbound	Fuel		2,000	3,000	4,000	5,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	439,000
		Supplies		1,000	1,000	15,000	15,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	338,000
	Total	Inbound		3,000	4,000	19,000	20,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	777,000
	Total	Outbound				170,000	220,000	386,000	386,000	386,000	386,000	306,000	306,000	386,000	386,000	386,000	386,000	386,000	386,000	386,000	386,000	386,000	386,000	386,000	6,792,000
	Total	Inbound		14,000	41,000	93,000	229,000	248,000	248,000	248,000	248,000	248,000	248,000	265,000	265,000	265,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	3,540,000
Total - Short Term Mines				14,000	41,000	263,000	449,000	634,000	634,000	634,000	634,000	554,000	554,000	651,000	651,000	651,000	496,000	496,000	496,000	496,000	496,000	496,000	496,000	496,000	10,332,000
Possible Mines (long term)			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Thor Lake	*Outbound*								30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	480,000
	Inbound	Fuel		2,000	2,000	2,000	8,300	8,300	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	182,600
		Supplies		1,000	1,000	1,000	5,000	5,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	61,000
	Total	Inbound		3,000	3,000	3,000	13,300	13,300	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	243,600
Total - Long Term Mines				3,000	3,000	3,000	13,300	13,300	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	723,600
Total - All mines	Outbound					170,000	220,000	386,000	416,000	416,000	416,000	336,000	336,000	416,000	416,000	416,000	416,000	416,000	416,000	416,000	416,000	416,000	416,000	416,000	7,272,000
Total - All mines	Inbound		162,000	138,000	277,000	346,000	509,300	528,300	528,000	528,000	528,000	528,000	528,000	545,000	470,000	470,000	315,000	315,000	315,000	315,000	315,000	164,000	164,000	164,000	8,152,600
TOTAL - ALL MINES			162,000	138,000	277,000	516,000	729,300	914,300	944,000	944,000	944,000	864,000	864,000	961,000	886,000	886,000	731,000	731,000	731,000	731,000	731,000	580,000	580,000	580,000	15,424,600

May 8/10 SHEET 4

NTSA

NORTHERN TERRITORIES ANNUAL FREIGHT DEMAND

NUNAVUT MINES

(TONNES)

MINE			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTALS
Operating Mines																									
Meadowbank	*Outbound*		Actuals																						
	Inbound	Fuel	38,500	20,000	34,000	35,000	34,000	35,000	32,000	32,000	32,000	32,000	8,000												332,500
		Supplies	27,300	15,000	25,000	31,000	29,000	30,000	30,000	28,000	26,000	24,000	5,000												270,300
	Total	Inbound	65,800	35,000	59,000	66,000	63,000	65,000	62,000	60,000	58,000	56,000	13,000												602,800
Probable Mines (short term)			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Meliadine	*Outbound*																								
	Inbound	Fuel		3,000	21,000	21,000	21,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	406,000
		Supplies		2,000	20,000	20,000	20,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	198,000
	Total	Inbound		5,000	41,000	41,000	41,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	604,000
Mary River	*Outbound*								9,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	261,000,000
	Inbound	Fuel		2,000	3,000	5,000	41,000	33,000	17,000	50,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	725,000
		Supplies		1,000	2,000	3,000	221,000	118,000	107,000	56,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	648,000
	Total	Inbound		3,000	5,000	8,000	262,000	151,000	124,000	106,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	1,373,000
Hope Bay	*Outbound*																								
	Inbound	Fuel		16,000	16,000	16,000	16,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	642,000
		Supplies		13,000	13,000	10,000	10,000	30,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	156,000
	Total	Inbound		29,000	29,000	26,000	26,000	64,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	798,000
Izok Lake	*Outbound*								430,000	430,000	430,000	430,000	430,000	430,000	430,000	430,000	430,000	430,000	430,000	430,000	430,000	430,000	430,000	430,000	6,880,000
	Inbound	Fuel		1,000	1,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	534,000
		Supplies		500	500	40,000	40,000	40,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	281,000
	Total	Inbound		1,500	1,500	68,000	68,000	68,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	815,000
Kiggavik	*Outbound*											4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	59,800
	Inbound	Fuel		200	200	200	200	200	200	50,000	50,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	855,200
		Supplies		100	100	100	100	100	100	25,000	25,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	830,600
	Total	Inbound		300	300	300	300	300	300	75,000	75,000	118,000	118,000	118,000	118,000	118,000	118,000	118,000	118,000	118,000	118,000	118,000	118,000	118,000	1,685,800
	Total	Outbound							430,000	9,430,000	18,430,000	18,434,600	18,434,600	18,434,600	18,434,600	18,434,600	18,434,600	18,434,600	18,434,600	18,434,600	18,434,600	18,434,600	18,434,600	18,434,600	267,939,800
	Total	Inbound		38,800	76,800	143,300	397,300	311,300	229,300	286,000	231,000	274,000	274,000	274,000	274,000	274,000	274,000	274,000	274,000	274,000	274,000	274,000	274,000	274,000	5,275,800
Possible Mines (long term)																									
Hackett R.	*Outbound*											450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	5,850,000
	Inbound	Fuel		1,000	1,000	1,000	1,000	1,000	30,000	30,000	30,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	849,000
		Supplies		500	500	500	500	500	45,000	45,000	45,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,437,500
	Total	Inbound		1,500	1,500	1,500	1,500	1,500	75,000	75,000	75,000	158,000	158,000	158,000	158,000	158,000	158,000	158,000	158,000	158,000	158,000	158,000	158,000	158,000	2,286,500
Total - All mines	Outbound								430,000	9,430,000	18,430,000	18,884,600	18,884,600	18,884,600	18,884,600	18,884,600	18,884,600	18,884,600	18,884,600	18,884,600	18,884,600	18,884,600	18,884,600	18,884,600	273,789,800
Total - All mines	Inbound		65,800	75,300	137,300	210,800	461,800	377,800	366,300	421,000	364,000	488,000	445,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	432,000	8,165,100
	TOTAL - ALL MINES			65,800	75,300	137,300	210,800	461,800	377,800	796,300	9,851,000	18,794,000	19,372,600	19,329,600	19,316,600	19,316,600	19,316,600	19,316,600	19,316,600	19,316,600	19,316,600	19,316,600	19,316,600	19,316,600	281,954,900

Community Resupply Traffic Forecasting Methodology

Phase 1 of this study has prepared a reasonably complete picture of the historical and current traffic in the various regions of the three territories. The various sources of the data have been noted in the respective sections of the report dealing with each of the gateways.

Different forecasting methods were used for different types of traffic. As resource developments vary in size and type of traffic, it is not possible to use formula or template to forecast their traffic. The traffic associated with future resource developments, such as mines, was estimated on the basis of information obtained from mining companies directly or the territorial Chambers of Mines. .

The forecasting of the regular "community oriented" traffic was done on the basis of projected population. The following table shows the current (2009) and forecast populations for Yukon, NWT and Nunavut for the years 2010, 2015, 2020 and 2030 (Note the assumptions on which the population forecasts are based). Future traffic in each of these years was estimated by multiplying the 2009 traffic tonnages by the ratio of the future population and the 2009 population.

It should be noted that the traffic generated by the periodic, one-of-a-kind construction of, for example, a school may not be fully captured in the per capita tonnage rates.

Source: Statistics Canada

Population Projections Utilized for Traffic Forecasts

	2009	2010	2015	2020	2025	2030
Yukon % of 2009	33,700 100.0%	33,800 100.3%	34,700 103.0%	35,600 105.6%	36,600 108.6%	37,600 111.6%
NWT % of 2009	43,400 100.0 %	43,800 100.9%	45,500 104.8%	47,200 108.8%	48,900 112.7%	50,600 116.6%
Nunavut % of 2009	32,200 100.0%	32,500 100.9%	34,300 106.5%	35,900 111.5%	37,200 115.5%	38,500 119.6%

Assumptions:

1. These populations are estimated from the population projections obtained from Statistics Canada on May 26, 2010. The base population for these projections is obtained from the preliminary postcensal estimates of the population on July 1st, 2009 as calculated by Statistics Canada's Demography Division based on the 2006 Census and are adjusted to take account of net undercoverage by province/territory.
2. These estimates are based on medium-growth scenario which was developed on the basis of assumptions reflecting the medium trends observed in the past.
3. These estimates of population consider interprovincial migration assumption based on the historical trend for the period 1981/1982 to 2007/2008.

Highway Statistical Development – Yukon & NWT

Yukon Commercial Traffic Measurement

Yukon Highways and Public Works operate a weigh scale near Whitehorse that captures the vast majority of truck traffic serving or passing through, Yukon. This facility is operated 24/7 and each truck stopped provides:

- a sequenced transaction number and date weighed
- commodity carried (14 commodity classifications)
- configuration code (25 axle arrangements from straight trucks to multi-axle trains)
- origin, destination and route direction (north or south)
- total GVW (kgs), number of Axles, and axle and axle grouping weights (kgs)

Monthly reports are prepared that provide the following information:

- Loads - Origin/Destination/Route vs. Truck Configuration. A monthly report that provides the number of loads that can be grouped and aggregated by corridor.
- Loads/Commodity Summary. A monthly report that provides the number of loads measured in each commodity group. Also provides the number of empty trucks counted.
- Bulk Haul Reports. Monthly reports for each of North 60 Transport and Canadian Lynden Transport, truckers currently carrying payloads exceeding the maximum permissible gross vehicle weight (GVW) under special "Bulk Haul Permits" issued by the Department of Highways.
- Dangerous Goods Summary Report. Provides the number of trucks and their GVW, for each dangerous goods classification code.

The Bulk Haul reports are compiled separately to provide a basis for calculating the fees levelled by the Highways Department on the trucking companies permitted to haul over-sized loads up to 77,111 kgs. GVW.

Yukon Volume Estimates Calculations

Commodity Groupings

The Whitehorse Weigh Scale reports above, when analyzed, provide sufficient information to aggregate loads by commodity groups, by corridor. The commodity groupings are consistent with all other Northern Territories transportation systems measured:

A	B	C
Community Resupply, General Freight	Construction and Resource Development	Bulk Fuel Supply
Agricultural Products	Construction Materials	Petroleum Products
General Merchandise	Iron, Pipe & Steel	Propane
Household Goods	Mine Ore	Asphalt
Livestock	Equipment &	Flammable Liquids
Mobile Homes	Machinery, Timber, Logs	

Vehicles

The vehicle classification code system provides detailed axle and axle grouping information which is helpful to identify and segregate commodity flows in the selected corridors. The dominant truck types providing the bulk of all movements in Yukon are as follows:

Classification Code	Vehicle Description	Usual Commodities Carried				Typical Tare (kgs)
			A	B	C	
8	Three axle straight truck		X	X		10,000
12	3 axle tractor, 2 axle semi		X	X	X	17,000
14	3 axle tractor, tridem trailer		X	X	X	19,000
18	7 or 8 axle A or C train	X	X			21,000
20	7 axle B train double		X	X	X	22,000
21	8 axle B train double		X	X	X	23,000
22	9+ axle multi-unit vehicle			X	X	24,000
23	10 axle double			X		24,000+

Vehicle tare weights in Yukon are easily established as empty trucks must report and be weighed as well as loaded vehicles, and form part of the daily accounting. By subtracting the tare weight from the measured gross vehicle weight (GVW), the payload for that truck is determined.

Knowing the truck type, average GVW and tare of weighed trucks, attendant payloads are applied to the total monthly movements, resulting in the volume in tonnes for that specific commodity and corridor for the period.

Truck traffic into Yukon was segregated to two destinations. South Yukon includes all communities along and south of Alaska Hwy 1; and every destination north of Hwy 1 was grouped as North Yukon.

Obvious high volume truck hauls with an established origin and destination stand out in certain Yukon corridors and becomes evident in analyzing the traffic statistics. Much of this traffic lends itself to "Bulk Haul" permits as mentioned above, issued by YTG which allows oversized loads on selected highway segments.

Hwy #	Hwy Name	Section				Normal Limit	Bulk Haul	Comments
		km	Description	km		(63.5 t GVW)	(77.1 t GVW)	
1	Alaska	967.6	BC/YT border south of Watson Lake	1965.7	YT/AK border north of Beaver Creek	yes	yes	Section from Whitehorse to Alaska border may require bridge strengthening to allow bulk haul weights. Bridge analysis hasn't been done because no applications have been received to carry out a bulk haul on this section. Bulk hauling would likely be OK.
2	Klondike	24.1	AK/BC border	157.8	Joins Alaska Hwy south of Whitehorse	yes	yes	bulk haul was allowed in the past for concentrate from Faro and is now allowed for fuel haul from Skagway to Whitehorse
2	Klondike	157.8		191.8	Leaves Alaska Hwy north of Whitehorse	yes	yes	Section that runs concurrently with Alaska Highway through Whtehorse
2	Klondike	191.8		359.0	Joins Campbell Hwy @ Carmacks	yes	yes	Whitehorse to Carmacks. Bulk haul was allowed in the past
2	Klondike	359.0		388.4	End of fully structured road north of Carmacks	yes	yes	Meets structural standard for bulk haul but hasn't been permitted in the past because ensuing sections aren't structurally capable for bulk haul
2	Klondike	388.4		716.0	Dawson City	yes, seasonally	no	About 28 kilometres south of Stewart Crossing meet the structural standard for bulk haul, but the remainder of the section does not.
3	Haines Road	71.3	AK/BC border	246.1	Haines Junction	yes	yes	No applications for bulk haul received for the Haines Road
4	Campbell	0.0	Watson Lake	10.0	Watson Lake airport access road	yes	yes	Asphalt pavement
4	Campbell	10.0		414.4	Faro access road (Mitchell Rd)	yes, seasonally	no	Bulk haul was allowed up to km 46.8 when Sa Dena Hes mine operated. This section is mostly narrow, unimproved gravel with a few short sections of fully structured road with BST surface on the southern end.
4	Campbell	414.4		448.0	End of fully structured road west of Faro access road	yes	yes	Reconstructed to full structural standard with BST surface
4	Campbell	448.0		582.3	Joins Klondike Hwy @ Carmacks	yes	yes	Part of the Faro bulk haul route. Has not been restricted in spring, but should be as the BST surfaces placed after shutdown of the mine have no structure to support them. BST will disappear should bulk haul resume
5	Dempster	0.0	Leaves Klondike Hwy near Dawson City	465.0	YT/NWT border	yes	no	
6	South Canol Rd	0.0	Leaves Alaska Hwy km 1295	228.0	Ferry @ Ross River		no	
6	North Canol Road	228.0	Ferry @ Ross River	462.7	YT/NWT border		no	
7	Atlin Road	0.0	Leaves Tagish Rd km 1.7	41.0	YT/BC border	yes, seasonally	no	
8	Tagish Road	0.0	Leaves Alaska Hwy km 1337.3	54.0	Joins Klondike Hwy km 106.4	no	no	Straight trucks only, maximum GVW 26.4 tonnes for standard 3 axle unit
9	Top of the World Hwy	0.0	Ferry @ Dawson City	105.9	YT/AK border	yes, seasonally	no	
10	Nahanni Range Road	0.0	Leaves Campbell Hwy km 107.8	134.0	End of YG maintenance	yes	no	YT/NWT border km 192 approx. East section maintained by mine
11	Silver Trail	0.0	Leaves Klondike Hwy km 532.8	110.4	Keno	yes, seasonally	no	
	Note: Where "seasonally" is included in the normal limit column it means spring load restrictions are imposed							

NWT Commercial Traffic Measurement

The information regarding movements and tonnages presented in the following sections was provided by Mr. Rob Thom of the Department of Transportation, GNWT and Mr. Eric Madsen of the TCWR Joint Venture. It should be noted that the tonnages moving by road public highway system are not directly measured, but have been derived from various sources, including:

- Weigh Scales located at Enterprise, Inuvik and Fort Liard;
- Vehicle classification and traffic volumes from the 5 highway ferries;
- Total traffic volumes and average daily traffic collected from permanent and temporary traffic counters on the NWT Highway system; and
- Vehicle classification and traffic volumes from the Fort Providence weigh-in-motion scale.

Data Sources Used to Develop Estimates

Sources of data used to calculate the volume of goods on the transportation corridors in the Northwest Territories include:

- Weigh Scales located at Enterprise, Inuvik and Fort Liard;
- Vehicle classification and traffic volumes from the 5 highway ferries;
- Total traffic volumes and average daily traffic collected from permanent and temporary traffic counters on the NWT Highway system; and
- Vehicle classification and traffic volumes from Fort Providence weigh-in-motion scale.

Commercial Traffic from Weigh Scales

The data base maintained at the Enterprise Weigh Scale contains comprehensive information on commercial vehicle volumes, classifications, weights and material transported. This information is the basis for determining the amount of commodities transported on the different transportation corridors.

The following table shows the classification of material from each commercial vehicle reporting to the Enterprise Weigh Scale according to the three commodity categories in the *Northern Transportation Systems Assessment Survey*.

Material Categories at Enterprise Weigh Scale		
A – Community Gen Freight	B – Const & Resource Dev	C – Bulk Fuel Supply
Asphalt	Ammonium Nitrate	Aviation Fuel
Building Material	Camp Shack	Flammable Liquids
Calcium	Cement	Fuel Oil
Compressed Gases	Construction Material	Gasoline
Containers	Drill Rig	Liquified Petrol Gases
Corrosive Materials	Equipment	
Danger Placard	Explosives	
General Freight	Pipe	
Gravel	Steel	
Hay Bales	Tanks	
Highway Salt	Tires	
Household Furniture		
Lime, Logs, Lumber		
Miscellaneous		
Mixed Dangerous Goods		
Mobile Homes		
Vehicles		

The class of each commercial vehicle reporting to the Enterprise Weigh Scale is recorded under "Unit Type". Unit Types and assumed tare weights are shown in the following table.

Unit Types and Tare Weights	
Unit Type	Assumed Tare Weight (kg)
Single Axle Straight Truck	7,000
Tandem Axle Straight Truck	9,000
4-Axle Semi	15,000
5-Axle Semi	16,000
6-Axle Semi	18,000
A-Train	20,000
B-Train	20,000
C-Train	20,000
Super B-Train	20,000
Logging Truck	15,000

Commercial vehicle data is only collected when the Enterprise Weigh Scale is open. The scale is normally open until 5:30 pm. Trucks do not report to the scale if it is not open, resulting in under reporting. Data from the Fort Providence Weigh-in-Motion Scale suggests that 20 percent of all traffic passing through Enterprise do not report to the weigh scale due to it being closed. A factor of 1.20 is applied to account for under-reporting.

The payload of each commercial vehicle is calculated by subtracting the assumed tare weight from the vehicle's total weight. For the Enterprise Weigh Scale, the total number of trucks reporting, and the quantity of goods in the 3 commodity groups from 2007 to 2009 is shown in the table below.

Commercial Vehicle Traffic and Commodities Reported at Enterprise Weigh Scale

Year	Trucks Reporting	Trucks Carrying Dangerous Goods	A–Community Gen Frt (kg)	B–Const & Resource Dev (kg)	C – Bulk Fuel Supply (kg)
2007	21,460	8,947	148,417,352	72,210,877	291,822,247
2008	18,820	6,280	160,010,590	66,558,330	187,893,900
2009	10,861	3,620	97,862,030	28,551,330	116,943,850

Commercial vehicle traffic is also collected at the weigh scales located in Inuvik and Fort Liard. The Fort Liard Weigh Scale closed to traffic in 2007. While the data available from these weigh scales is not as comprehensive as at the Enterprise Weigh Scale (i.e. type of commodities transported), enough information is collected to complete the annual Transportation of Dangerous Goods Report, including; total number of trucks reporting, number of trucks transporting dangerous goods, and quantities of bulk fuel. The tables below show the number of trucks reporting, number of trucks carrying dangerous goods, and quantity of bulk fuel from 2003 to 2009 for the Inuvik and Fort Liard Weigh Scales, respectively.

Commercial Vehicle Traffic at Inuvik Weigh Scale

Year	Trucks Reporting	Trucks Carrying Dangerous Goods	C – Bulk Fuel Supply (kg)
2003	4,486	333	8,161,018
2004	5,502	413	10,092,707
2005	1,700	426	10,215,411
2006	3,344	251	11,933,494
2007	3,520	264	13,256,492
2008	3,426	450	14,303,543
2009	2,983	357	14,726,163

Commercial Vehicle Traffic at Fort Liard Weigh Scale			
Year	Trucks Reporting	Trucks Carrying Dangerous Goods	C – Bulk Fuel Supply (kg)
2003	990	87	2,475,829
2004	427	35	1,612,157
2005	597	49	2,535,481
2006	270	53	2,390,814
2007	200	44	2,314,058

Commercial Traffic from Highway Ferries

Vehicle classification information is collected at the five ferries that operate on the highway system. This provides important information on the number and proportion of commercial trucks to total traffic which is used to assign weigh scale commodity volumes to the highway network. Information on vehicle weights or commodities is not collected.

Fort Providence Weigh In Motion Scale

Located on Highway #3, 2 km north of the junction with Highway #1, the Fort Providence Weigh-in-Motion (WIM) Scale collects detailed information on commercial vehicles, including travel lane, speed, vehicle classification, axle weights, axle spacing, total weight and total length. Unlike the highway weigh scales, the Fort Providence WIM collects data 24 hours per day, 365 days per year. The Fort Providence WIM became operational in January 2008. The WIM does not collect information on commodities.

The extent of under-reporting at the 3 highway weigh scales can be estimated by dividing the total number of north bound trucks by the number of north bound trucks passing through the Fort Providence WIM between 7 am and 7 pm. Using data from 2009, the only year for which complete information is available, this ratio is 1.22.

Permanent and Temporary Traffic Counters

The Department of Transportation collects traffic volume data from 28 permanent traffic counter locations on all-weather highways and from several temporary counters on the winter road system. These counters provide hourly information on traffic for the complete year, or selected portions of the year for counters located on winter roads. These counters do not collect vehicle classification information, with the exception of one counter installed on the Mackenzie Valley Winter Road. This particular counter provides separate counts for light vehicles and commercial vehicles. In 2007 and 2008, the proportion of commercial traffic to total traffic on the Mackenzie valley Winter Road near Tulita is 8 percent.

The traffic counters do not collect any information on vehicle weights, dimensions or commodities.

Vehicle classification information from the highway ferries and the Fort Providence WIM are used in conjunction with volume data from the traffic counters to estimate truck volumes or proportion of truck traffic to total traffic on highway segments.

Volume Estimates Calculations

Estimated Volume of Goods at Enterprise Weigh Scale			
Year	**$A_{Enterprise}$**	**$B_{Enterprsie}$**	**$C_{Enterprise}$**
2007	178,100,822	86,653,052	350,186,696
2008	192,012,708	79,869,996	225,472,680
2009	117,434,436	34,261,596	140,332,620

Estimated Volume of Goods at Inuvik Weigh Scale			
Year	A_{Inuvik}	B_{Inuvik}	C_{Inuvik}
2007	46,343,505	22,547,937	15,907,790
2008	45,568,566	18,954,793	17,164,252
2009	42,588,431	12,425,211	17,671,396

Estimated Volume of Goods at the Fort Liard Weigh Scale			
Year	A_{Liard}	B_{Liard}	C_{Liard}
2007	1,659,840	807,577	2,776,870
2008	4,371,718	1,818,469	2,686,655
2009	2,673,731	780,063	1,672,156

Weigh scale results are assigned to highway segments based on average daily truck traffic (ADTT) through vehicle classification data collected at the highway ferries and traffic volume data collected by permanent and temporary traffic counters.

General assumptions:

- All bulk fuel passing through the Enterprise Weigh Scale originate in Hay River and travels south on Highway #2;
- All community general freight and construction & resource development commodities passing through the Enterprise Weigh Scale ($A_{Enterprise}$, $B_{Enterprise}$)originate in Alberta and travels north on Highway #1;

- All commodities passing through the Inuvik Weigh Scale (A_{Inuvik}, B_{Inuvik}, and C_{Inuvik}) originate in the Yukon and travels north on Highway #8;
- All commodities passing through the Fort Liard Weigh Scale (A_{Liard}, B_{Liard}, and C_{Liard}) originate in British Columbia and travels north on Highway #7;
- The quantity of back haul goods is negligible;
- The volume of north bound traffic is equal to the volume of south bound traffic on any highway segment;
- No traffic that passes through the Fort Liard Weigh Scale travels on Highway #2 or Highway #5; and
- Commodity volumes vary in direct proportion to the number of trucks or ADTT on a highway segment.

Estimated quantities of goods (in kilograms)

Via Fort Simpson Highway #1

The estimated quantities of goods travelling up Highway #1 to Fort Simpson are calculated as follows:

	$ADTT_{Lafferty}$, [1]	$ADTT_{Merv\ Hardie}$ [1]	% Trucks Lafferty Ferry	ADT at Highway #2, km 10	$ADTT_{Hwy2\text{-}10}$ [2]
2007	16.6	95.3	15.3	380	58.1
2008	19.9	94.1	18.1	450	81.5
2009	19.9	94.1	18.1	450	81.5

[1] Values for 2009 are presently not available for the highway ferries. It is assumed that the ADTT's and % Trucks are the same as 2008.

[2] The ADTT for Highway #2 is calculated by multiplying the ADT from data obtained from the traffic counter located on Highway #2, km 10 by the % trucks at the Lafferty Ferry. It is assumed that the % trucks at the Lafferty Ferry is representative of traffic on Highway #2, Highway #5, Highway #7 and Highway #1 between Highway #3 and Fort Simpson.

The estimated quantities of goods travelling up Highway #1 to Fort Simpson are:

	A_{Hwy1}	B_{Hwy1}	C_{Hwy1}
2007	17,637,253	8,581,217	52,360,994
2008	8,447,424	8,447,424	39,827,814
2009	12,420,414	3,623,666	24,824,824

Via Hay River Highway #2

The estimated quantities of goods travelling along Highway 2 are:

	A_{Hwy2}	B_{Hwy2}	C_{Hwy2}
2007	60,868,575	55,142,852	350,186,696
2008	80,046,218	33,296,188	225,472,680
2009	48,956,044	14,282,967	140,332,620

Via Yellowknife Highway #3

The estimated quantities of goods travelling along Highway 3 are:

	A_{Hwy3}	B_{Hwy3}	C_{Hwy3}
2007	101,254,834	49,264,458	300,602,572
2008	96,030,047	39,944,853	188,331,521
2009	58,731,709	17,135,026	117,216,223

Via Liard Highway #7

All traffic and goods that travel along Highway 7 pass through the Fort Liard Weigh Scale:

	A_{Hwy7}	B_{Hwy7}	C_{Hwy7}
2007	1,659,840	807,577	2,776,870
2008	4,371,718	1,818,469	2,686,655
2009	2,673,731	780,063	1,672,156

Via Mackenzie Winter Road

The estimated quantities of goods travelling Highway 1 to Fort Simpson is used to estimate goods going up the Mackenzie Valley Winter Road. Quantities are calculated as follows:

	A_{MVWR}	B_{MVWR}	C_{MVWR}
2007	1,838,411	894,459	5,457,823
2008	283,346	283,346	1,335,917
2009	394,680	115,148	788,851

Via Rae Lakes Winter Road

	A_{RLWR}	B_{RLWR}	C_{RLWR}
2007	1,197,734	582,745	3,555,800
2008	1,115,101	463,839	2,186,905
2009	848,832	247,648	1,694,092

Via Dempster Highway 8

In the section of this study report which describes the truck traffic in Yukon, traffic estimates for the segment of the Dempster Highway south of the Yukon/NWT border are reported to be much lower than the data provided by the Department of Transportation, GNWT for the northern portion of the Dempster Highway. For the purposes of this study, the lower traffic estimates have been considered for the segment of the Dempster Highway north of the Yukon/NWT border to Inuvik. Traffic estimates for the Inuvik to Tuktoyaktuk Ice Road are reported by the Department of Transportation, GNWT to be approximately one third of the reported traffic on the Dempster Highway near Inuvik, and that same proportion has been considered to estimate the traffic on the Inuvik to Tuktoyaktuk Ice Road for this study.

Via Inuvik-Tuktoyaktuk Winter Road

The Inuvik - Tuktoyaktuk Winter Road is an ice road on frozen Mackenzie River Delta channels and the frozen Beaufort Sea along the Tuktoyaktuk Peninsula. It serves natural gas fields and exploration facilities at Mallik, Aput, and Langley. The winter road also serves Horizon Logistic's ice-locked camp barges, *Wurmlinger* and *Arctic Star*, which act as bases of operations for both winter road crews and exploration personnel. In addition, the winter road is a key supply line for Tuktoyaktuk and Aklavik.

The ice road season for the Tuktoyaktuk (Tuk) Ice Road route along the east channel of the Mackenzie River generally commences mid-December and lasts until mid-April. The ice is not sufficiently strong enough for first ten days to two weeks to support the largest of commercial trucks and 17 weeks is the average period for full heavy haul traffic measurement.

Carriers most active during the Tuk winter ice road shipping season:

- Manitoulin/Northwest Transport
- Matco Transportation Systems
- Northwind Industries
- Klamik Transport

Manitoulin, Matco and Inuvik-based Klamik Transport are the chief motor carriers in the general freight business. All freight for Tuk and Aklavik arrives over the Dempster; is off-loaded at Inuvik terminals, and consolidated there for the two communities. Klamik has the contract for Stanton Stores, and Manitoulin looks after Northwest Stores.

Gruben, Northwind and Allen Transport are the major truckers serving the resource and construction industry. Drilling fluids, chemical re-agents, cement, mud compounds, equipment, water, fuel, lubricants, etc. - all from the south and taken in for each rig move.

In 2009 there were B Trains on the Ice Road hauling fuel from the south, likely aviation fuel for helicopters and small aircraft servicing the drilling activity in the Delta.

Akita drilling had a single rig in operation in the Delta during the 2009 drilling season and the two preceding years. The rig was moved three times to new drilling sites. Northwind estimate 50 - 100 truckloads per move excluding the rig and drilling equipment itself. These loads are combinations of straight trucks, semi-trailers or combination vehicles. 3,000 tonnes is the average estimated total freight requirement to service a drilling operation for a season in the arctic (ref: Akita Drilling).

Truck payloads vary from approximately 8 tonnes for a tandem axle straight truck, to 40 tonnes for an 8-axle B Train. 25 tonnes per load is selected as the average truckload to service a seasonal drilling program.

For community re-supply shipments to Aklavik and Tuk, the combination of LTL and TL mixed loads results in a payload of 23.2 tonnes - the typical average used throughout this assessment for general cargo, dry freight trucking.

The following table formats the information gathered from carriers which in turn substantiates a rationalized freight analysis for the Inuvik-Tuktoyaktuk Winter Road:

Tuktoyaktuk Ice Road Traffic 2009

Carrier	Loads/wk	Weeks	Payload	Volume
Community Resupply				
Manitoulin	3	17	23.2	1,183
Matco	1.5	17	23.2	592
Klamik	3	17	23.2	1,183
Others	3	17	23.2	1,183
Total				4,140
Resource Development				
Northwind, Gruben, Allen (Oilfield)	7	17	25	3,000
Others				1,000
Total				4,000
Total				**8,100**

Scheduled Northern Air Service and Representative Aircraft

Scheduled Air Service at Northern Communities – Yukon			
Airport	Airlines[22]	Equipment	To/From
Whitehorse	Air North, Air Canada	Jet	Calgary/Edmonton/Vancouver
Dawson City	Air North	Turboprop	Whitehorse
Old Crow	Air North	Turboprop	Whitehorse

Scheduled Air Service at Northern Communities – NWT			
Airport	Airlines[23]	Equipment	To/From
Yellowknife	Canadian North, WestJet, Air Canada, First Air	Turboprop, Jet	Calgary/Edmonton/Vancouver Iqaluit, Whitehorse
Hay River	First Air	Turboprop	Yellowknife
	Buffalo Airways	Prop	Yellowknife
	Northwestern Air	Turboprop	Edmonton
Fort Smith	Northwestern Air	Turboprop	Edmonton
Fort Simpson	First Air Air Tindi	Turboprop	Yellowknife Whitehorse
Inuvik	Canadian North; First Air	Jet	Yellowknife
Norman Wells	Canadian North; First Air	Jet	Yellowknife
Fort Good Hope	North Wright	Turbo Prop	Norman Wells
Tulita	North Wright	Turbo Prop	Norman Wells
Deline	North Wright	Turbo Prop	Norman Wells
Colville Lake	North Wright	Turbo Prop	Norman Wells
Tuktoyaktuk	Aklak Air	Turbo Prop	Inuvik
Aklavik	Aklak Air	Turbo Prop	Inuvik
Fort McPherson	Aklak Air	Turbo Prop	Inuvik

[22] Northern mainline carriers sometimes provide service to smaller communities through partner airlines. For example, Canadian North partners with Aklak, Calm Air, Air Tindi, North Wright and Kenn Borek.

[23] Northern mainline carriers sometimes provide service to smaller communities through partner airlines. For example, Canadian North partners with Aklak, Calm Air, Air Tindi, North Wright and Kenn Borek.

Paulatuk	Aklak Air	Turbo Prop	Inuvik
Sachs Harbour	Aklak Air	Turbo Prop	Inuvik
Holman/Ulukhaktok	First Air; Aklak Air	Turbo Prop	Yellowknife, Inuvik
Wha Ti	Air Tindi	Turbo Prop	Yellowknife
Gameti/Rae Lakes	Air Tindi	Turbo Prop	Yellowknife
Lutsel K'e	Air Tindi	Turbo Prop	Yellowknife
Wekweeti/Snare Lake	Air Tindi	Turbo Prop	Yellowknife

Scheduled Air Service at Northern Communities – Nunavut

Airport	Airlines	Equipment	To/From
Iqaluit	Air Canada; First Air;	Jet	Montreal, Ottawa
	Canadian North		Yellowknife
Rankin Inlet	Canadian North; First Air;	Jet	Yellowknife, Iqaluit
	Calm Air; Kivalliq Air	Turbo Prop	Winnipeg; Churchill
Pangnirtung	First Air; Canadian North	Turbo Prop	Iqaluit
Quiqtarjuaq	First Air; Canadian North	Turbo Prop	Iqaluit
Clyde River	First Air; Canadian North	Turbo Prop	Iqaluit
Pond Inlet	First Air; Canadian North	Turbo Prop	Iqaluit
Nanisivik	First Air	Turbo Prop	Iqaluit
Resolute	First Air	Turbo Prop	Iqaluit
Grise Fiord	Kenn Borek	Turbo Prop	Resolute
Igloolik	First Air; Canadian North	Turbo Prop	Iqaluit
Hall Beach	First Air; Canadian North	Turbo Prop	Iqaluit
Cape Dorset	First Air; Canadian North	Turbo Prop	Iqaluit
Coral Harbour	Calm Air; Kivalliq Air	Turbo Prop	Rankin, Winnipeg. Churchill
Chesterfield Inlet	Calm Air; Kivalliq Air	Turbo Prop	Rankin, Winnipeg. Churchill
Kimmirut	First Air	Turbo Prop	Iqaluit
Arviat	Calm Air; First Air; Kivalliq Air	Turbo Prop	Rankin, Winnipeg. Churchill
Whale Cove	Calm Air; Kivalliq Air	Turbo Prop	Rankin, Winnipeg. Churchill
Baker Lake	Calm Air; First Air, Kivalliq Air	Turbo Prop	Rankin, Winnipeg. Churchill
Repulse Bay	Calm Air; Kivalliq Air	Turbo Prop	Rankin, Winnipeg. Churchill
Kugluktuk	Canadian North; First Air	Turbo Prop	Yellowknife
Cambridge Bay	Canadian North; First Air	Jet; Turbo Prop	Yellowknife
Gjoa Haven	Canadian North; First Air	Turbo Prop	Yellowknife
Taloyoak	Canadian North; First Air	Turbo Prop	Yellowknife
Kugaaruk	Canadian North; First Air	Turbo Prop	Yellowknife

Representative aircraft that currently operate in northern Canada		
	Maximum Payload (lbs)	Takeoff Distance (ft)[24]
Beech 99	2,900	2,500
Cessna 208 Caravan	3,200	2,500
DHC-6 Twin Otter	3,500	STOL
Dash-8-100	7,400	3,200
ATR-42-300	10,000	3,400
DHC-7	10,500	STOL
HS-748	10,500	4,000
DHC-5 Buffalo	18,000	STOL
B737-200C	31,300	5,000-6,000
L-188 Electra	33,000	5,000-6,000
L-382 Hercules	45,800	5,000-6,000
B767-223SF	98,700	6,000-7,000

[24] These are illustrative takeoff distances. Actual takeoff distance will be determined by airport elevation, aircraft payload and aircraft fuel load, the latter being determined by the length of the anticipated flight stage. Elevations of northern airports can vary from sea level to 3,000 feet. The DHC-5, DHC-6 and DHC-7 all have short takeoff and landing (STOL) capability.

Stakeholder Interviews

Government

Wally Hidinger	Director of Planning Yukon Highways and Public Works
Vern Janz	Director, Transport Services Yukon Highways and Public Works
John Warkentin	Manager, Carrier Compliance Highways and Public Works
Harvey Brooks	Deputy Minister Yukon Economic Development
Greg Komaromi	Assistant Deputy Minister Yukon Energy, Mines & Resources
Robert Holmes	Director Yukon Energy, Mines & Resources Minerals Branch
Ron Sumanik,	Manager, Business Development Yukon Energy, Mines & Resources Oil & Gas Resources
David Morrison,	President & CEO Yukon Energy Corporation
Jim Stevens	Director of Planning GNWT Transportation
Mark McCulloch	Nunavut Community & Govt Services Community Resupply
Jon Paton	Nunavut Community & Govt Services Community Resupply
Alan Johnson	Nunavut Econ Dev & Transportation Transportation Planning
Todd McKay	Community & Govt Services Petroleum Products Division
Marinka Darling	Canada Customs
Allan Nixon	Assistant Deputy Minister Yukon Highways & Public works

Mining

J. Michael Wark	Executive Director Yukon Chamber of Mines
Carl Shultze	Geologist All-Terrane Mineral Exploration Services President, Yukon Chamber of Mines
Mike Vaydik	General Manager, NWT and Nunavut Chamber of Mines
Lou Covello	Consultant Director, NWT and Nunavut Chamber of Mines, Member of Infrastructure Committee
Gary Lee	Geologist Past President and Director Yukon Chamber of Mines
Jonathon Clegg	Vice President, Engineering Western Copper Corporation
Robert L. McIntyre	Vice President, Corporate Affairs Alexco Resource Corp
Robert T. McNight	Director, Vice President Corporate Development Selwyn Resources Ltd.
Lionel Labelle	Director, Procurement & Supply Chain Management Yukon Zinc Corporation
Robin Goad	President, Fortune Minerals Limited Director, NWT and Nunavut Chamber of Mines Member of Infrastructure Committee
Dave Webb	President, Tyhee Development Corporation Director, NWT and Nunavut Chamber of Mines Member of Infrastructure Committee
John F. Kearney	Chairman and President Canadian Zinc Corporation
Erik Madsen	Director, Winter Road Operations TCWR Joint Venture
Michael T. Zurowski,	Executive Vice President, Baffinland Iron Mines
Stephen Quinn	President, Capstone Mining

Transportation

Gary W. Lewis	Manager, Whitehorse Branch Canadian Freightways
Sheldon King,	Sales Manager Pacific Northwest Moving
Lloyd Bjork	Manager, Canadian Lynden Transport
Damen Anderson,	Regional Manager Matco Transportation Services
John Lindsay	Vice President & General Manager Island Tug & Barge Ltd.
Steve Pollock	Director of Planning Island Tug & Barge Ltd.
John Marshall, Martin Landry and Bill Smith	Marketing Department Northern Transportation Company Limited
Mark Kimakowich,	Assistant Superintendent CN Rail
Larry Wheaton	Vice President of Operations Robinson Enterprises Ltd
Barry Henkel,	Manager, Colomac and Snap Lake Operations Tlicho Logistics
Suzanne Pacquin	President Nunavut Eastern Arctic Shipping
Daniel Desgagnes	Managing Director, Nunavut Sealink & Supply Inc.
Dennis Clarke	President, Gardewine North
Dennis White	General Manger, Woodwards Group of Companies
Bill Drew	Executive Director, Churchill Gateway Development Corp.
Shane Hutchins	Churchill Port Director, OMNITrax
Michael Brandt	Vice President, White Pass & Yukon Route