that is in progress. None of the species indicated in Table 10 were noted in the 2001 field studies of the road alignment.

Table 10: Rare Plant Species Recorded Within or Near the Izok Lake-Bathurst Inlet Transportation Link

Scientific Name	Common Name	Habitat	Nearest Location
Braya glabella	Braya	mineral soil, damp tundra	near Bathurst Inlet area
Carex morrisseyi	Sedge	minerotrophic *Larix* fens	near the study area and towards Great Bear Lake and Hudson's Bay
Gentiana tendella	Gentian	local on sandy beaches and gravelly mud flats along the Arctic coast	near Bathurst Inlet
Mertensia drummondi	Drummond's Lungwort	sandy banks and eskers; not a seashore species	west of Bathurst Inlet near coast
Ranunculus pallasii	Pallas Buttercup	wet brackish meadow and slough, *i.e.* mainly along seacoast and estuaries.	near Bathurst Inlet and to west on coast

Source: GNWT 1999 in JWEL 2001

3.6 Fish and Wildlife

The Project area supports a complete assemblage of Arctic fish and wildlife species. Lists enumerating marine and terrestrial species of fish, birds, and mammals reported for the Project region indicating their preferred habitats, abundance, and distribution are provided in Tables 11-16. None of the populations of wildlife species that are likely to interact with any aspect of the Project are currently listed as "at risk" in Nunavut (Government of Nunavut, 2000; unpublished).

3.6.1 Fish - marine

The distribution of marine fish in Canada's arctic marine environments was documented in the Project scoping study (JWEL, 2001). Table 11 summarizes those findings on the species that may be present along the marine shipping route. Species appearing in **bold print** were confirmed to occupy the Project region in collections made during 2001 field studies (Rescan 2001; unpublished).

Table 11. Marine fish species, their habitat and economic status, along the marine shipping routes serving the Bathurst Inlet Port

Species	Habitat	Economic status
Arctic cod *Boreogadus saida*	pelagic - very common	subsistence
Polar cod *Arctogadus glacialis*	pelagic	subsistence
Toothed cod *Arctogadus borisovi*	pelagic	subsistence
Saffron cod *Eleginus gracilus*	pelagic	subsistence

Greenland cod *Gadus ogac*	pelagic	subsistence
Arctic charr *Salvelinus alpinus*	anadromous	subsistence and commercial
Lake trout *Salvelinus namaycush*	inshore anadromous	subsistence and commercial
Arctic Grayling *Thymallus arcticus*	inshore anadromous	recreational use
Lake whitefish *Coregonus clupeaformis*	inshore anadromous	subsistence
Broad Whitefish *Coregonus nasus*	inshore anadromous	subsistence
Inconnu *Stenodus leucicthys*	inshore anadromous	subsistence
Pacific herring *Clupea harengus pallasi*	anadromous	subsistence
Arctic cisco *Coregonus autumnalis*	anadromous	subsistence
Least cisco *Coregonus sardinella*	anadromous	subsistence
Capelin *Mallotus villosus*	inshore	subsistence
Rainbow smelt *Osmerus mordax*	anadromous	subsistence
Longnose sucker *Catostomus catostomus*	inshore anadromous	subsistence
Eelpouts - 9 species *Zoarcidae sp.*	benthic	
Bering wolffish *Anarhichas orientalis*	benthic	
Pricklebacks - 6 species *Sticheidae*	benthic	
Northern sand lance *Ammodytes dubuis*	pelagic	
Stout sand lance *Ammodytes hexapterus*	pelagic	
Ninespine stickleback *Pungitius pungitius*	inshore anadromous	

Fourhorn sculpin *Myoxocephalus quadricornis*	benthic	
Arctic alligatorfish *Aspidophoroides oirko*		
Atlantic poacher *Leptogonus decagonus*		
Leatherfin lumpsucker *Eumicrotreus derjugini*	benthic	
Atlantic spiny lumpsucker *Eumicrotremus spinosis*	benthic	
Gelatinous snailfish *Liparis fabricii*	benthic	
Dusky snailfish *Liparis gibbus*	benthic	
Kelp snailfish *Liparus tunicatus*	benthic	
Arctic flounder *Liopsetta glacialis*	benthic	
Starry flounder *Platichthys stellatus*	benthic	
Longhead dab *Limanda proboscidea*		

The conservation status of marine fish in Nunavut has not been assessed (Government of Nunavut, unpublished). Fish and fish habitat in Canada are protected under the Fisheries Act (Canada). Notes on the biology and economic status of marine fishes were taken from Stewart et al (1993).

3.6.2 Fish - freshwater

Numerous studies of the lakes and streams in the Slave Geological Province have provided information on the distribution of freshwater fish species there (Metall, 1993; JWEL, 2001). These reports were supplemented with information from Scott and Crossman (1973, Freshwater Fishes of Canada) for preparing the freshwater species list of fishes in the Project area. Studies by the Project continue to further refine the information on the distribution and abundance of species in the drainage basins bisected by the road. These data will be reported in support of the Project EIS.

The river basins bisected by the road alignment include the Coppermine (above Point Lake), Burnside and Back (Contwoyto Lake drains into both), Mara/ Burnside, and the upper reaches of the Western rivers. Numerous freshwater and anadromous fish species are known to occupy the region. Table 12 summarizes the species that may be present in the lakes, ponds, and streams adjacent to the road alignment. While there are currently no commercial or tourist operations that are located in the immediate vicinity of the Project's proposed facilities, some of the fish species in the region offer recreational opportunity for new commercial ventures that may arise in the future as a result of the Project.

None of the fish populations of the species in the region are listed as endangered or threatened (Government of Nunavut, 2000; unpublished). Species appearing in **bold print** were confirmed to occupy the Project region in collections made during 2001 field studies (Rescan 2001; unpublished).

Table 12: Freshwater fish species reported for the Project area and their conservation and economic status.

Species	Habitat/abundance	Conservation status *	Economic status / potential
Northern pike *Esox lucius*	lake and stream uncommon	secure	subsistence and recreational use
Longnose sucker *Catostomus catostomus*	lake	undetermined	subsistence use
Round whitefish *Prosopium cylindraceum*	lake and stream	undetermined	subsistence use
Lake cisco *Coregonus artedii*	lake and stream	secure	
Least cisco *Coregonus sardinella*	lakes and streams, anadromous	sensitive	
Arctic cisco Coregonus autumnalis	lakes and streams	sensitive	
Arctic charr *Salvelinus alpinus*	lake and stream, anadromous, common	sensitive	subsistence and recreational use
Lake trout *Salvelinus namaycush*	lake and stream, anadromous, common	secure	subsistence and recreational use
Arctic grayling *Thymallus arcticus*	lake and stream, common	sensitive	recreational use
Burbot *Lota lota*	lake	secure	
Ninespine stickleback *Pungitius pungitius*	lakes and streams	secure	
Slimy sculpin *Cottus cognatus*	lakes and streams	undetermined	

* the conservation status of freshwater fish in Nunavut as ranked in "Nunavut Wild Species Report, 2000" (Government of Nunavut, unpublished).

3.6.3 Birds

The bird species of the Project region include migratory and non-migratory species. Migratory birds may or may not be covered by the Migratory Birds Convention Act (Canada). Most raptor species are migratory and are not protected by the federal legislation but are covered by the Wildlife Act (Nunavut). This territorial statue is administered by the Government of Nunavut Department of Sustainable Development. The Migratory Birds Convention Act (Canada) is administered by Environment Canada. Tables 13 and 14 enumerate species that are covered by territorial and federal statute respectively;

providing as well some notes on distribution and economic value. The information in these tables was gleaned from Tahera (2001) and supplemented with information from Godfrey (1966, Birds of Canada). Most bird species resident in the region are summer visitors with no particular significance to the domestic economy of the communities in the region; those that do, however, are so indicated.

None of the bird species known to breed in the Project area are listed as endangered or threatened (Government of Nunavut , 2000; unpublished; GNWT, 2000;).

Table 13: Birds of the Project area protected by the Wildlife Act (Nunavut)

Species*	Distribution	Conservation status**	Economic status
Golden eagle *Aquila chrysaetos*	terrestrial; summer resident	sensitive	
Bald eagle *Haliaeetus leucocephalus*	terrestrial ; summer resident and migratory	accidental/vagrant	
Northern harrier *Circus cyaneus*	terrestrial; summer resident and migratory	sensitive	
Gyrfalcon *Falco rusticolus*	terrestrial; summer resident and migratory	secure	
Peregrine falcon *Falco peregrinus tundrius*	terrestrial; summer resident and migratory	may be at risk	
Rough-legged hawk *Buteo lagopus*	terrestrial; summer resident and migratory	secure	
Willow ptarmigan *Lagopus lagopus*	terrestrial; summer resident and migratory	secure	recreational and subsistence use
Rock ptarmigan *Lagopus mutus*	terrestrial; summer resident and migratory	sensitive	recreational and subsistence use
Raven *Corvus corax*	terrestrial year round resident	secure	
Snowy owl *Nyctea scandiaca*	terrestrial; summer resident and migratory	secure	
Short-eared owl *Asio flameus*	terrestrial; summer resident and migratory	sensitive	

* species appearing in **bold print** have been confirmed to breed in at least one location in the Project region

** the conservation status of birds Nunavut as ranked in "Nunavut Wild Species Report, 2000" (Government of Nunavut, unpublished).

Table 14: Birds of the Project area protected by the Migratory Birds Convention Act (Canada)

Species*	Distribution	Conservation status**	Economic status
Red-throated loon *Gavia stellata*	summer resident	secure	

Arctic loon *Gavia arctica*	summer resident	secure	
Yellow-billed loon *Gavia adamsii (Gray)*	summer resident	secure	
Tundra swan *Cygnus columbianus*	summer resident	secure	
White-fronted goose *Anser albifrons*	summer resident	secure	recreational and subsistence use
Canada goose *Branta canadensis*	summer resident	secure	recreational and subsistence use
Brant *Branta bernicla*	summer resident	secure	recreational and subsistence use
Green-winged teal *Anas crecca*	summer resident	undetermined	recreational and subsistence use
Northern pintail *Anas acuta*	summer resident	sensitive	recreational and subsistence use
Canvasback *Athya valisineria*	summer resident		recreational and subsistence use
Greater Scaup *Aythya marila*	summer resident	undetermined	recreational and subsistence use
Oldsquaw *Clangula hyemalis*	summer resident	secure	recreational and subsistence use
Common eider *Somateria mollissima*	summer resident	sensitive	recreational and subsistence use
King eider *Somateria spectabilis*	summer resident	sensitive	recreational and subsistence use
White winged scoter *Melanitta fusca*	summer resident	undetermined	recreational and subsistence use
Black scoter *Melanitta nigra*	summer resident		recreational and subsistence use
Surf scoter *Melanitta perspicillata*	summer resident		recreational and subsistence use
Red-breasted merganser *Mergus serrator*	summer resident	secure	
Common merganser *Mergus merganser*	summer resident		
Sandhill crane *Grus canadensis*	summer migrant	secure	

Lesser golden plover *Pluvialus dominica*	summer resident	secure	
Semipalmated plover *Charadrius semipalmatus*	summer resident	undetermined	
Lesser yellowlegs *Tringa flavipes*	summer resident	undetermined	
Ruddy turnstone *Arenaria interpres*	summer resident	secure	
Sanderling *Calidris alba*	summer resident	secure	
Semipalmated sandpiper *Calidris pusilla*	summer resident	sensitive	
Least sandpiper *Calidris minutilla*	summer resident	sensitive	
White-rumped sandpiper *Calidris fuscicollis*	summer resident	secure	
Baird's sandpiper *Calidris bairdii*	summer resident	secure	
Pectoral sandpiper *Calidris melanotos*	summer resident	secure	
Stilt sandpiper *Calidris himantopus*	summer resident	undetermined	
Common snipe *Gallinago gallinago*	summer resident	sensitive	
Red-necked phalarope *Phalaropus lobatus*	summer resident	sensitive	
Northern phalarope *Lobipes lobatus*	summer resident		
Pomarine jaeger *Stercorarius pomarinus*	summer resident	secure	
Parasitic jaeger *Stercorarius parasiticus*	summer resident	secure	
Long-tailed jaeger *Stercorarius longicaudus*	summer resident	secure	
Glaucous gull *Larus hyperboreus*	summer resident; colonial nesting on coastal cliffs and islands	secure	eggs are gathered
Thayer's gull *Larus thayeri*	summer resident; nesting on coastal cliffs and islands	not assessed	
Herring gull *Larus argentatus*	summer resident; colonial nesting on coastal cliffs and islands	secure	eggs are gathered

Sabine's gull *Xema sabini*	summer resident	secure	
Arctic tern *Sterna paradisaea*	summer resident	secure	
Common nighthawk *Chordeiles minor*	summer resident		
Horned lark *Eremophila alpestris*	summer resident	sensitive	
Cliff swallow *Hirundo pyrrhonota*	summer resident	secure	
Bank swallow *Riparia riparia*	summer resident		
Northern wheatear *Oenanthe oenanthe*	summer resident	undetermined	
Gray-cheeked thrush *Catharus minimus*	summer resident	secure	
American robin *Turdus migratorius*	summer resident	secure	
Water pipit *Anthus spinoletta*	summer resident	sensitive	
Yellow warbler *Dendroica petechia*	summer resident	undetermined	
Yellow-rumped warbler *Dendroica coronata*	summer resident	undetermined	
Blackpoll warbler *Dendroica striata*	summer resident	may be at risk	
American tree sparrow *Spizella arborea*	summer resident	sensitive	
Savannah sparrow *Passerculus sandwichensis*	summer resident	secure	
White-crowned sparrow *Zonotrichia leucophrys*	summer resident	sensitive	
Harris's sparrow *Zonotrichia querula*	summer resident	sensitive	
Lapland longspur *Calcarius lapponicus*	summer resident	secure	
Smith's longspur *Calcarius pictus*	summer resident	secure	

Snow bunting *Plectrophenaz nivalis*	summer resident	sensitive	
Common redpoll *Carduelis flammea*	summer resident	secure	
Hoary redpoll *Carduelis hornamanni*	summer resident	secure	

* species appearing in **bold print** have been confirmed to breed in at least one location in the Project region .

** the conservation status of birds in Nunavut as ranked in "Nunavut Wild Species Report, 2000" (Government of Nunavut, unpublished).

3.6.4 Mammals - terrestrial

All terrestrial mammals in Nunavut, including polar bear, are protected by the Wildlife Act (Nunavut). This territorial statute is administered by the Government of Nunavut Department of Sustainable Development. The distribution and economic status of mammals in the Project area is summarized in Table 15.

Table 15: Terrestrial mammals reported to occupy the Project area.

Species	Habitat and distribution	Conservation status*	Economic status
Masked Shrew *Sorex cinereus*	expected throughout Project area	not assessed	
Arctic hare *Lepus arcticus*	expected throughout Project area	secure	recreational and subsistence use
Arctic ground squirrel *Spermophilus parryii*	expected throughout Project area; inactive in winter	secure	occasional subsistence use
Tundra redback vole *Clethrionomys rutilus*	expected throughout Project area	undetermined	
Brown lemming *Lemmus sibiricus*	expected throughout Project area	secure	
Greenland collared lemming *Dicrostonyx torquatus*	expected throughout Project area		
Tundra vole *Microtus oeconomus*	expected throughout Project area	not assessed	
Wolf *Canis lupus*	expected throughout Project area	sensitive	recreational, subsistence and economic value
Arctic fox *Alopex lagopus*	expected throughout Project area	secure	economic value
Red fox *Vulpes vulpes*	expected throughout Project area	secure	economic value

Grizzly bear *Ursus horribilis*	expected throughout Project area; inactive in winter	sensitive	recreational, and economic value
Short-tailed weasel *Mustela erminea*	expected throughout Project area	secure	
Least Weasel *Mustela nivalis*	expected throughout Project area	not assessed	
Wolverine *Gulo luscus*	expected throughout Project area	sensitive	recreational, subsistence and economic value
Barren-ground caribou *Rangifer tarandus*	migratory; historic calving ground in Project area	secure	recreational, subsistence and economic value
Muskox *Ovibos moschatos*	expected throughout Project area	secure	recreational, subsistence and economic value

* the conservation status of terrestrial mammals in Nunavut as ranked in "Nunavut Wild Species Report, 2000" (Government of Nunavut, unpublished).

3.6.5 Mammals - marine

Marine mammals in the Project shipping lanes include the same species that the current marine shipping would encounter in Lancaster Sound and Coronation Gulf; seals, whales and walruses (Chapman and Feldhamer, 1982; JWEL 2001). These species are protected by the Fisheries Act (Canada) which is administered by the Federal Department of Fisheries and Oceans. . Table 16 enumerates the species that are reported for the eastern and western shipping routes, and for Bathurst Inlet and also indicates their conservation and economic status in the northern economy.

Table 16: Marine mammals reported for the shipping lanes serving the Bathurst Inlet port.

Species*	Distribution	Conservation status**	Economic status
Ringed seal *Phoca hispida*	throughout marine east and west shipping routes	secure	important subsistence use in coastal communities
Bearded seal *Erignathus barbatus*	throughout marine east and west shipping routes	secure	important subsistence use in coastal communities
Bowhead whale *Balaena mysticetus*	western route to Amundsen Gulf and eastern route to Lancaster Sound; endangered species	at risk	harvest in Nunavut by special permit of the Minister for DFO
Beluga *Delphinapterus leucas*	western route and eastern route in Lancaster Sound	sensitive	important subsistence use in coastal communities
Narwhal *Monodon monocerus*	eastern route in Lancaster Sound	secure	important subsistence use in coastal communities
Walrus *Odobenus rosmarus*	western route to Amundsen Gulf and eastern route to Barrow Strait	secure	important subsistence use in coastal communities

* species known to be resident in Bathurst Inlet are shown in **bold print**

** the conservation status of marine mammals in Nunavut as ranked in "Nunavut Wild Species Report, 2000" (Government of Nunavut, unpublished).

3.7 Traditional Knowledge

The Project area has been occupied by Inuit for many generations as shown by archaeological remains on the land. Inuit families living in Kitikmeot communities today lived at various locations in the Project area within the past 50 years and have an intimate knowledge of the land, the waters, and the fish and wildlife that they harvested. Two different projects have undertaken to document the traditional knowledge of elders in the region. The Naonaiyaotit Traditional Knowledge Project (NTKP) documented responses by elders from the West Kitikmeot Region of Nunavut to a set of 145 questions on 10 specific land based themes. The Tuktu Nogak Project focused on traditional knowledge of caribou. In both projects the resulting information was compiled in geographic referenced data bases. Access to the NTKP data base remains proprietary until the necessary verification of the data sets are completed. When both traditional knowledge data bases are accessible, the information that is relevant to the Project development sites and road alignment will be extracted and examined to ensure that Project plans are, or can be made to be, compatible with important features like burial sites and traditional carnivore dens that may be at risk of disturbance in the present alignment and site configurations. This information will be submitted in support of the Project EIS.

3.8 Heritage resources

A survey of heritage resources and archaeological sites along the proposed road alignment and at the port and barge sites was completed in July and August, 2001. The survey area included the entire Project area which focused on sites that showed a high potential in a preparatory study of land forms and other terrestrial features of the general area of the road and port, as well as previous archeological studies in the region. Specific objectives of the field work included confirming the location and condition of known sites in the Project area as well as recording new, previously unrecorded sites. Field work included an aerial overview of the Project area, foot traverses and visual inspections of areas with high potential, and shovel testing for the presence of artifacts and other evidence of human occupation (Fedirchuk McCullogh & Associates, 2001; unpublished).

An inventory of 101 heritage sites in the Project area was developed including:

- 5 precontact campsites
- 59 precontact artifact scatters
- 19 precontact isolated finds
- 3 caches
- 7 historical/traditional sites
- 5 mixed type sites.

Please see Figure 27 for the locations and distribution of known heritage sites in the Project area.

The heritage survey by archaeologists included a visit to the area by 3 elders each from Kugluktuk and Cambridge Bay on July 30. The tour with the elders included an overview of the field techniques used to locate and identify heritage sites as well a field trip and inspection of a previously known heritage site located near the Izok Project which includes the remains of 10 individual structures.

The work on heritage resources will continue in 2002 with a more detailed examination of proposed borrow and quarry sites as well as a thorough examination of the Port site and barge terminals. These data will be used for impact assessment and developing a heritage sites mitigation plan for use during Project construction.

3.9 Social and economic setting

A social, and economic profile of the Kitikmeot Region of Nunavut is provided in the Draft West Kitikmeot Regional Land Use Plan (1997). The traditional land use areas of each of the West Kitikmeot communities - Kugluktuk, Bathurst Inlet, Umingmaktok, and Cambridge Bay - were provided by the Nunavut Planning Commission and are shown in Figures 28 to 31 in relation to the proposed Project.

Census Canada data (collected in 1991) for the region showed a population of 4,385 with 3,920 Inuit comprising 89.4% of the overall population of the region. The largest communities in the West Kitikmeot Region are Cambridge Bay (population of 1,116 in 1991), and Kugluktuk (population 1,059 in 1991). The populations of each community were in periods of rapid growth in that both will double in size within a generation. The population projections for Cambridge Bay and Kugluktuk for 2005 are 1,581 and 1,556 respectively (Dillon, 2001). In both communities more than 50% of the population was less than 25 years of age and at the current rate of growth, that characteristic is unlikely to change. The social and economic profile of the region will be updated in the Project EIS based on the 2001 Census Canada data.

The draft West Kitikmeot Regional Land Use Plan emphasized the importance of traditional land based activities to the economy of the West Kitikmeot. The overall labor force of Cambridge Bay and Kugluktuk showed an unemployment rate of 23%. Both communities showed a significant number of adults with less than Grade 9 education.

Tables 14, 15, and 16 provide social and economic profiles prepared in a study of Kitikmeot communities for the Hope Bay Joint Venture (Hornal 2000; courtesy of Miramar Mining Corporation).

A more comprehensive description of the social and economic setting of the region is in preparation and will be submitted in support of the Project EIS. This will include an assessment of the capacity of the labour force and businesses in the region to participate in the construction and ongoing operations of the Project.

Table 17: Demographic Profile of Kitikmeot Communities.

	Kugluktuk	Cambridge Bay	Bathurst Inlet	Umingmaktok	Gjoa Haven	Taloyoak	Kugaaruk	Kitikmeot Region
Population[1,2,3,4]								
1998	1,267	1,413	15[5]	51	957	729	539	4,971
1996	1,201	1,351	18	51	876	648	496	4,641
1991	1,059	1,116	18	53	783	580	409	4,018
Percent Change								
1996-1998	5	5	0	0	8.5	11	8.5	7.1
1991-1996	13.4	21	0	-4	12	12	2.1	15.5
Age of Pop. (1996)[6]								
Under 14 years	460	480	N/A	15	370	270	225	1,820
15 to 64	695	840	N/A	30	490	365	280	2,700
65 +	31	30	N/A	0	30	20	10	121
Ethnicity (1996)[6]								
% Aboriginal	88.8	76	100	100	95	94	95	88.5
% Non Aboriginal	10.4	24	0	0	5	6	5	11.5
Gender (1996)[4]								
Female	605	670	N/A	25	420	320	230	2,270
Male	590	685	N/A	30	460	330	265	2,360

1. GNWT Bureau of Statistics, 1999a. *(Numbers do no add due to rounding.)*
2. GNWT Bureau of Statistics, 1999b.
3 GNWT Bureau of Statistics, 1999c.
4. GNWT Bureau of Statistics, 1997.
5. R. Homal, Pers. Comm. 1999.
6. GNT Bureau of Statistics, 1999b

N/A Not available

Source: R. Homal 2000

Table 18. Profile of working aged adults in Kitikmeot communities.

	Kugluktuk	Cambridge Bay	Bathurst Inlet	Umingmaktok	Gjoa Haven	Taloyoak	Kugaaruk	Kitikmeot Region
Population 15 yrs. & older (1996)[1]	745	870	N/A	35	510	375	280	3,080
Level of Education of Working Age Population (1996) (Percent)[1]								
Less than Grade 9	38.3	23.0	N/A	N/A	46.1	45.3	55.4	38.3
High School W/O Certificate	19.5	18.4	N/A	N/A	16.7	18.7	14.3	17.9
High School Diploma	2.0	5.2	N/A	0	2.0	2.7	0	2.8
Trade or Other Certificate	31.5	39.7	N/A	N/A	30.4	25.3	21.4	32.0
University Without Degree	2.0	5.2	N/A	0	2.0	4.0	3.6	3.1
University Degree	6.7	8.6	N/A	0	3.9	4.0	3.6	5.8
Employment by Industry (1996) (Percent)[1]								
Goods Producing	15.7	16.0	N/A	N/A	4.1	4.5	6.7	13.0
Retail & Wholesale	11.2	12.0	N/A	N/A	16.3	25.0	20.0	14.9
Gov't., Education & Health	48.3	43.2	N/A	N/A	40.8	40.9	46.7	43.8
Other Services	24.7	30.4	N/A	N/A	34.7	18.2	33.3	28.1
Income Support (1998/99)[2]								
# of Cases in fiscal year 1998-99	1,437	1,246	2	96	1,828	1,113	830	6,550
Average $ Amount/Case/month	$590	$541	$826	$447	$628	$721	$725	$629
Income Support (1995/96)[3]								
# of Cases in fiscal year 1995-96	1,131	808	22	120	1,856	1,417	887	6,241
Average $Amount/Case/month	$550	$508	$676	$635	$730	$696	$726	$659
Number Tax Returns Filed in 1996[1]	590	700	N/A	N/A	410	330	250	2,480
Average Income in 1996[1]	$22,739	$32,143	N/A	N/A	$18,75	$21,303	$20,472	$23,985

1. GNT Bureau of Statistics, 1999b.
2. Ecklund, L., Pers. Comm., 2000.
3. GNWT Dept of Education, Culture & Employment, 1996.

N/A Not available

Source: R. Hornal 2000

Table 19. Labour force activity in Kitikmeot communities.

	Kugluktuk	Cambridge Bay	Bathurst Inlet	Umingmaktok	Gjoa Haven	Taloyoak	Kugaaruk	Kitikmeot Region
Persons 15 yrs. & over in 1999 [1]	821	935	N/A	N/A	539	416	324	3,035
Labour Force (1999)	476	728	N/A	N/A	308	290	204	2,006
Employment Rate	42%	67.1%	N/A	N/A	34.9%	59.1%	48.8%	78%
Unemployment Rate	27.5%	13.9%	N/A	N/A	39%	15.2%	22.5%	22%
Participation Rate	58%	77.9%	N/A	N/A	57.1%	69.7%	63.0%	66.1%
Persons 15 yrs. & over in 1996 [2]	745	865	N/A	35	505	375	275	3,080
Labour Force (1996)	470	635	N/A	20	275	230	155	1,960
Employment Rate	53.0%	67.1%	N/A	42.9%	38.6%	49.3%	43.6%	33.9%
Unemployment Rate	14.9%	7.9%	N/A	N/A	29.1%	19.6%	22.6%	15.1%
Participation Rate	63.1%	73.4%	N/A	57.1%	54.5%	61.3%	56.4%	63.6%
Persons 15 yrs. & over Involved in Traditional Activities (1994)[4]								
% Hunted & Fished	56.1	28.3	N/A	38.2	60.6	86.2	96.5	57.8
% Made Crafts	30.7	15.1	N/A	29.4	20.1	39	5.8	23.8
% Trapped	7.3	7.1	N/A	32.4	9.6	13.3	15.8	9.8
Number of Working Age Residents Not Working But Wanting Work (1999)[1, 3]								
	250	183	N/A	N/A	179	118	106	836
Number of Working Age Residents Not Working But Wanting Work (1994)[4]								
	292	141	N/A	9	195	167	125	929
Employment Rate (1994) (% Employed)[4]								
% Aboriginal	30	54	N/A	32	37	41	42	41
% Non Aboriginal	80	94	N/A	N/A	88	72	100	87
% Female	29	63	N/A	19	31	41	40	43
% Male	45	68	N/A	44	47	45	46	57

1. GNT Bureau of Statistics, 1999a.
2. GNT Bureau of Statistics, 1999b.
3. GNWT Bureau of Statistics, 1999d.
4. GNWT Bureau of Statistics, 1994.

N/A Not available

Source: R. Hornal 2000

4.0 Public Consultation Process

The process of developing this Project has its roots in the Kitikmeot Region of Nunavut. The overall Community Advisory Committee to the Project is chaired by Mr. Charlie Evalik, President of KIA and includes representatives of the Kitikmeot communities, the HTO's, and Government of Nunavut. The details and technical aspects of the Project were developed under the supervision of the Project's Technical Committee described above. The Technical Committee has been active in consulting in the Kitikmeot region and on May 6 and 7, 2001 met with the mayors and municipal councils in both Kugluktuk and Cambridge Bay respectively. Also, elders from each of these communities visited heritage sites along the road alignment on July 30, 2001 as part of the Project's heritage resources study.

This Project Description was developed under the direction of the Project Technical Committee. It was reviewed in public meetings in Kugluktuk and Cambridge Bay in January and Gjoa Haven, Taloyoak, and Kugaaruk in March. A special meeting was held on January 15, 2002 in Cambridge Bay to review the Project with persons from Bathurst Inlet and to discuss concerns related to Project operations. A similar consultation process will attend the development of the Project EIS expected for late 2002. In these consultations, special emphasis has been placed on confirming local knowledge of the Project area, and also on community and local work force preparations for Project construction and operations.

It is understood that ongoing consultations and reporting both social, economic and environmental performance will be a feature of Project operations and that these activities may be requirements of an Inuit Impact Benefit Agreement between the Project and the Kitikmeot Inuit Association.

5.0 Project Environmental Effects

Interactions between the Project and the environment will occur during both construction and operations. Potential interactions during Project construction will span the full length of the Project, a distance of 290 km of road. Similarly, potential interactions during operations span the full length of the road.

A comprehensive suite of environmental baseline studies was initiated in 2001. Studies include water quality, fish populations, bird populations, small mammals, carnivores, and caribou and muskox. These studies will be completed and used to prepare to prepare the Project EIS.

5.1 Port and barge site construction

Port construction and operations will involve both the marine and terrestrial environment. The wharf will be a sheet pile rock filled structure extending into Bathurst Inlet 70 m to the 12 meter water depth. The terrestrial elements of the port include a 200 person camp, a 220 million liter tank farm, a concentrate storage building, a maintenance facility, and an airstrip (Figure 6).

Construction at the site will begin as soon as the construction fleet is delivered by barge in the fall of 2004. Construction will be completed 24 months later in the fall of 2006. Construction will require quarrying 700,000 m^3 of local rock to develop a level building site for the concentrate storage shelter. The rock will be removed by drill, blast, haul sequence. All the rock removed in developing the site for the concentrate storage building will be used to develop the remaining structures and roads at the port site. Much of the rock will be crushed to various sizes as required for site development.

Construction workers will be based at the 200 person camp at the port, a 42 person camp at Contwoyto Lake and at Lupin. These bases will support 1 or 2 mobile construction camps working on specific spreads of road between the port and Contwoyto Lake. Construction of the Lupin to Izok road will be based at Lupin supporting one mobile road construction camp. Mobile construction camps will typically house 60 workers. Mobile camps will relocate every 60 days. All combustible camp waste will be incinerated in a mobile industrial incinerator that will be moved with the camp. Sewage will be treated in a skid mounted sewage treatment plant prior to release onto the tundra. Non-combustible waste will be returned to the base camps for permanent disposal.

5.1.1 Air quality effects

Air quality at the port will be affected by several primary activities. Construction equipment exhaust contains greenhouse gasses. Quarrying, crushing, hauling, and placing rock produces dust.

5.1.2 Marine and freshwater effects

5.1.2.1 Marine

The wharf will extend into the marine environment 70 meters along approximately 225 meters of shoreline; 21,000 m^2 of seabed will be covered by crushed rock required to fill the sheet pile wharf. The sheet pile will be placed by driving it from the surface of the ice in the spring of 2005. The surface of the wharf will be 5 m above water level. A small crushed rock jetty will also be built to serve barge traffic between the port and Kitikmeot communities (Figure 6). It will extend 40 m into the marine environment to the 3 meter water depth and cover about 2000 m^2 of seabed. Environmental sampling at the port in August and September 2001 showed that 11 species of fish occur in the marine environment of the area (see Table 11 for marine fish species in the Project area). These data will be reported in support of the Project EIS.

5.1.2.2 Freshwater

Port construction does not encroach on any freshwater streams or water bodies. Potable water for camp needs will be produced by desalination. Port construction will not affect any freshwater fish populations.

Barge landings on Contwoyto Lake will require rock filled pushouts at km 211 of the road and at Lupin (Figures 8 and 9). Each pushout will be built to a depth that will allow the safe landing of a loaded barge - approximately 3 meters. Based on the bathymetry of the sites, approximately 1000 m^2 of lake bottom will be covered with rock at each site. The area that will be covered at each site includes the shoreline habitat that is subjected to annual ice scour and so only the deeper portion of the proposed pushout areas provide a stable benthic environment for aquatic life.

Data on these areas were collected in 2001 studies; eight fish species were captured in samplings at the proposed barge locations (see Table 12 for the species in the Project area). These data will be reported in support of the Project EIS.

5.1.2.3 Terrain

The port site is a well drained tundra upland that is covered in dryland tundra plants. Studies in 2001 included a terrain analysis for ecosystem mapping. The resulting maps will be used for designing and planning the environmental management system for the port area.

Facilities at the port will require tundra terrain alteration by placing blast and crushed rock for road and site development. Areas affected will be:

• 200 person camp, truck stop and power house:	3.7 ha
• concentrate storage site:	8.5 ha
• fuel tank farm:	110.8 ha
• fuel dispensing and load out station:	2.8 ha
• cargo lay down area:	4.0 ha
• airstrip and heliport:	7.8 ha
• ammonium nitrate storage:	4.0 ha
• sewage treatment plant:	0.1 ha
• service roads:	7.4 ha
• borrow pit and quarry:	1.0 ha.
The total area of altered terrestrial terrain at the port will be	150.1 ha.

5.1.2.4 Birds

The port area is habitat for migratory upland tundra breeding birds as well as ptarmigan and raptors (see Tables 13 and 14 for birds of the area). Preliminary surveys of the area in 2001 showed no concentration of breeding birds in the area nor any evidence of species designated for special conservation status. Raptor nesting at the port was not reported from 2001 studies. Further surveys are planned for the area. A full review of data and information from related literature will be developed and submitted in support of the Project EIS.

5.1.2.5 Mammals

The upland habitat of the port is suitable for lemmings, voles, ground squirrels and arctic hare, all of which should be expected there. Site construction therefore will change habitat used by rodents and hare in the port area.

Studies in 2001 did not identify any carnivore dens in the port area. The Project area is within the normal range of foxes, wolves, wolverine and grizzly bear. All should be expected in the area at any time of year other than grizzly in winter.

The port area is muskox range and they should be expected in all seasons.

Historic data on the distribution of the Bathurst caribou herd calving grounds show that the port site and adjacent lands were occupied for caribou calving of "medium density" in 1986. This was the only calving activity noted in the vicinity of the port area in fourteen surveys reported in the 1965 to 1996 period (Sutherland and Gunn, 1996). Bathurst herd calving grounds since 1996 have been 100 km or more to the west of the port site. Monitoring caribou use during the calving season of traditional calving grounds near the Prudhoe Bay oil development in Alaska showed that calving grounds continued to be used following initial oil field infrastructure (roads and pipelines) development on the calving ground (Dau and Cameron, 1986; LGL, 1994; Murphy and Lawhead, 2000).

5.2 Port operations

Annual activity cycles at the port will be determined by marine and Contwoyto Lake shipping conditions. The estimated mean annual volume that are planned to be handled at the port every year for the first 10 years of operations are in Table 20.

Table 20. Estimate of annual volume of cargo passing through the port in years 1 - 10.

	Imports		Exports	
Destination/Source	Fuel (000's L)	Supplies (t)	Fuel (000's L)	Supplies (t)
Lupin	14030	4704		
Ekati	100080	20000		
Diavik	56204	9408		
Jericho	8640	2664		
Izok	17853	7872		339271
Hope Bay	7200		7200	
Gjoa Haven	4200	80	4200	80
Cambridge Bay	6240	150	6240	250
Kugluktuk	3624	110	3624	110
Taloyoak	2280	60	2280	80
Bathurst Inlet	54		54	
Umingmaktok	60		60	
Total	220465	45048	23658	339791

The number of barge trips for each of the Kitikmeot communities served by the barge from Bathurst Inlet is estimated to be 1 for Taloyoak, 2 Gjoa Haven and Kugluktuk , and 3 for Cambridge Bay.

The year round labor force of 30 for port operations will be based at the camp. The camp at the port will increase in response to cargo volumes on the road and may reach 200 in winter when the major fuel haul to all participating sites is under way.

5.2.1 Air quality effects

The dominant environmental effect of the land based activities at the port will be dust, noise, and exhaust emissions. Dust will be managed by an ongoing surface watering effort. Noise will be addressed initially by placement of buildings and roads so that port activities do not unduly disturb workers "off shift" who are sleeping. Exhaust emissions will be reduced by an overall fuel conservation effort including residual heat recovery in the power house for space heating.

5.2.2 Marine and aquatic interactions

5.2.2.1 Marine

Marine shipping activities will be completed within the normal "open water" period - usually up to 110 days beginning mid-July. The arrival date of the first vessel for the season will usually be dependent on ice conditions in Victoria Strait northeast of Queen Maude Gulf. Inbound cargo will include 45,048 tonnes of dry cargo (explosives, mining reagents, and grinding media) and 220.4 million liters of diesel fuel. Fuel will be transferred from ship to tank farm by two 12" diameter pipelines with a capacity of 5600 liters/min. Outbound cargo will consist of up to 470,000 tonnes of base metal concentrate in 10 ship loads and fuel and supplies for Kitikmeot communities. Resupply for the communities will require three barge movements from the port. The range of concentrate to be shipped will vary between 300,000 - 470,000 tonnes/year or 6 - 10 ship loads. Concentrate will be transferred to the ships by way of high volume bulk loader moving concentrate at 1500 tonnes per hour. The normal turn around time for a ship will be 48 - 72 hours. The last ship movement to/from the port will occur in late October. All shipping will be completed without the assistance of an ice breaker to extend the shipping season. The environmental interactions will be similar to those of the annual barge resupply to the communities of the Kitikmeot region of Nunavut, or the occasional cruise ship that has passed through the Northwest Passage in recent years. As with other developments in the Arctic, the Project will rely on ice breaker support to some degree during the shipping season, but the Project is not based on extending the normal shipping season.

Late season shipping is a concern raised by a hunter from Bathurst Inlet. A marine ice cover of four inches is sufficient to support both caribou and snowmobiles. Such conditions can be achieved in late October in some years. Concern is that if a ship were to make a transit through such ice and a snow fall obscure the track before the former ice thickness were to be reestablished, caribou crossing Bathurst Inlet could be lost through the thinner snow covered ice (Sam Kapolak, Bathurst Inlet).

Interaction with marine life will be the same as with any other form of shipping in arctic water. No concentration of marine wildlife is expected along the route that is not now exposed to arctic marine traffic.

5.2.2.2 Aquatic interactions

Port operations will not encroach on any freshwater streams or water bodies. Potable water for camp needs will be produced by desalination at a rate of 45,000 liters/day. Sewage will be treated by extended aeration, with effluent discharged directly to Bathurst Inlet in compliance with guidelines for marine sewage disposal.

Port operation will not have any significant interactions with the freshwater environment or fish populations of the port area.