7 NONTRADITIONAL LAND AND RESOURCE USE

This section assesses the project effects on nontraditional land and resource use, including project-specific effects, mitigation measures and residual effects. Detailed baseline information on the existing conditions for nontraditional land and resource use in the project study area can be found in Volume 4, Section 6, Nontraditional Land and Resource Use.

Information on traditional land and resource use and traditional knowledge can be found in Volume 4, Section 5, Traditional Culture, and Volume 1, Section 3, Traditional Knowledge.

Linkages to wildlife, aquatics, noise and air quality are discussed and incorporated throughout this nontraditional land and resource use assessment.

7.1 Assessment Scope

Project effects are presented by administrative region in the Mackenzie Valley to provide community-focused information. For each region, the environmental impact statement (EIS) assessed all project components together, i.e., production area, gathering system, pipeline, associated facilities and infrastructure, and borrow sites. The assessment includes project-specific effects for each valued component (VC), combined project-specific effects and cumulative effects. The spatial and temporal boundaries for the land and resource use assessment are discussed in Section 7.1.4, Effect Descriptions.

7.1.1 Key Issues

Identification of issues relevant to nontraditional land and resource use began with a preliminary list prepared by the project team in 2002. This list was updated throughout 2003 with issues raised at community meetings and technical regional workshops. The following key issues relating to land and resource use were identified:

- changes in land use, such as recreational or commercial hunting and fishing, because of industrial activity and improved access
- effects on ecotourism operations
- disruption of reindeer herding activities in the Inuvialuit Settlement Region (ISR)
- depletion of nonrenewable resources, e.g., gravel, for community and other uses

- changes in availability of renewable resources
- potential future expansion of the oil and gas industry
- decrease in land base
- sensory disturbance to land users and communities from the project
- alteration of aesthetics
- change in access leading to changes in land use, the accessible land base and available resources
- disturbance to protected areas
- disruption of existing oil and gas activities
- disruption of existing granular resource operations
- change in existing timber harvesting practices
- disruption of marine shipping and barging activities
- conflicts with land ownership or zoning

7.1.2 Valued Components

For land and resource use, VCs are land or resource uses, or in some cases resources, that the project could affect. The land and resource use VCs identified for this assessment are:

- land ownership
- granular resources
- timber resources
- mineral resources
- oil and gas activities
- nontraditional resource harvesting
- other commercial activities
- tourism and recreation
- marine operations (ISR only)
- environmentally protected areas
- visual and aesthetic resources

7.1.2.1 Land Ownership

Types of land ownership in the study area include:

- federal Crown lands, administered by Indian and Northern Affairs Canada (INAC)
- provincial Crown lands, administered by Alberta Public Lands
- private lands, administered by lands administrations or corporations specific to the region
- municipal lands, administered by the towns themselves or by Government of the Northwest Territories (GNWT) Municipal and Community Affairs
- commissioner's land, which is federal land administered by the territorial government

This VC was chosen because the project will traverse both public and private lands, and permission to use the lands will be required.

7.1.2.2 Granular Resources

Granular resources refer to sand, gravel, clay, quarry materials and silt. These resources will be required for project construction. Granular resources were chosen as a VC because of the need for these resources not only for industrial development, but also by local communities for construction and maintenance activities. In addition, these materials are sometimes difficult to obtain in the North.

7.1.2.3 Timber Resources

Although the anchor fields do not contain timber, other segments of the project traverse forested lands where timber is important for firewood, construction materials and other uses. Land clearing during construction activities and increased access to forested areas have the potential to affect available timber resources.

7.1.2.4 Mineral Resources

This VC was chosen to assess potential effects on potential mineral development, i.e., areas where mineral potential has been found or where mineral leases are held.

7.1.2.5 Oil and Gas Activities

This VC includes exploration and development activities for oil and natural gas production outside the scope of the project. Oil and gas activities were chosen as a VC because of the strong potential for future oil and gas development in the Northwest Territories in general, and specifically in the area of the project.

7.1.2.6 Nontraditional Resource Harvesting

Nontraditional resource harvesting includes hunting, fishing and trapping by non-Aboriginal residents for domestic, sport or commercial purposes. Nontraditional resource harvesting was chosen as a VC because of the high level of concern for potential effects.

7.1.2.7 Other Commercial Activities

Commercial activities include reindeer herding (in the ISR), commercial transportation and agriculture near the study area. Project activities, directly or indirectly, could affect these commercial activities.

7.1.2.8 Tourism and Recreation

Tourism and recreation activities include ecotourism, guided outfitting, river tours, cultural tours, and recreational activities such as hiking, cross-country skiing, snowmobiling or all-terrain vehicle use. Project construction and operations, and what exists after decommissioning and abandonment, have the potential to affect the nature and level of these activities.

7.1.2.9 Marine Operations (Inuvialuit Settlement Region only)

The Beaufort Sea is used by a variety of vessels for several different purposes. These marine operations could be affected as the currently preferred development approach for Niglintgak includes transporting a barge-based gas conditioning facility through the Beaufort Sea.

7.1.2.10 Environmentally Protected Areas

The project is near or within areas with special designations that, through legislation or other means, are protected or given special status. These areas include:

- Kendall Island Bird Sanctuary
- Inuvialuit Community Conservation Plan category areas
- Gwich'in and Sahtu conservation zones and special management areas
- territorial parks
- proposed and existing protected areas

- International Biological Program sites
- national historic sites
- caribou areas
- recreation areas

7.1.2.11 Visual and Aesthetic Resources

There is little physical presence on the landscape affecting visual or aesthetic value in the study area. Project construction, particularly of facilities, has the potential to affect visual and aesthetic values.

7.1.3 Key Questions and Effect Pathway Diagrams

7.1.3.1 Key Questions

Three key land and resource use questions were developed to address the issues identified in the scoping process and to determine effects on the VCs. The key questions were derived by the project land and resource use team, and were based on a summary of the concerns and issues identified during community meetings and technical regional workshops, as well as the expertise and professional knowledge of the project team.

The first key question deals with the effects of the project on the first nine VCs, described previously. The final two VCs, environmentally protected areas, and visual and aesthetic resources, are dealt with under their own key questions. The three key questions are:

1. How will the project affect nontraditional land and resource use?
2. How will the project affect environmentally protected areas?
3. How will the project affect visual and aesthetic resources?

7.1.3.2 Effect Pathway Diagrams

Effect pathway diagrams were developed for each key question to illustrate the potential cause–effect relationships between the project and the VCs. For example, for the key question, *How will the project affect nontraditional land and resource use?*, the effect pathway diagram examines the different ways the project could affect nontraditional land and resource use, taking into account linkages with other disciplines.

7.1.4 Effect Descriptions

Specific guidelines and scientific thresholds are lacking to assess effects on land and resource use because of several factors, including the inability to quantitatively determine effects on VCs that are not easily defined by numbers.

For example, it is difficult to predict a numerical change in recreational activities, or the change in perceived enjoyment. It is also difficult to determine an exact level of effect on the number of hunters that could go to an area, or the change in their harvest levels. Therefore, qualitative methods are used in this assessment to predict the level of effects on nontraditional land and resource use. These effect predictions were primarily made using professional judgment and linkages with other disciplines, supplemented by the results of the public participation process.

Effect assessment results are illustrated in summary tables. As well, linkages with the results of other disciplines are discussed where applicable, and visual and aesthetic resources are analyzed using a two-dimensional (2-D) viewshed.

The definitions of effect attributes for land and resource use VCs generally follow the socio-economic approach provided in Table 1-2, Section 1, Introduction. However, the definition for geographic extent is slightly modified from the socio-economic approach to include the definitions followed by the biophysical disciplines (see Table 7-1). The study area boundaries for land and resource use are further described in the following text.

Table 7-1: Definitions of Geographic Extent

Attribute	Definition
Geographic Extent	
Local	Socio-economic: Effect will be limited to specific affected persons or communities Biophysical: Effect is limited to the LSA
Regional	Socio-economic: Effect extends to several communities in the affected region Biophysical: Effect is limited to the RSA
Beyond regional	Socio-economic: Effect extends beyond one region to include communities in more than one region of the study area, or include commercial or industrial centres in the Northwest Territories and northwestern Alberta Biophysical: Effect extends beyond the RSA
National	Socio-economic: Effect on the VC extends nationally, or beyond the communities in the study area Biophysical: Not applicable
NOTES: LSA = local study area RSA = regional study area	

Geographic extent describes the quantitative measurement of area within which an effect occurs. The land and resource use assessment follows a combination of the socio-economic definition with the biophysical definition for local or regional extent as some of the VCs are linked to the biophysical disciplines. For example, the local or regional study area as defined for the wildlife discipline is considered in the assessment of potential project effects on resource harvesting to ensure that links are addressed.

A local geographic extent indicates that the effect will be limited to specific affected persons, or communities or both, who use the land and resources related to the VC. In some cases, the local extent can also be defined by the local study area (LSA). The land and resource team identified the LSA for the project as follows:

- a 1-km buffer around the three lease areas, i.e., Niglintgak, Taglu and Parsons Lake
- a 1-km-wide corridor centred on the gathering system rights-of-way
- a 1-km buffer around facility infrastructure sites, e.g., compressor stations, barge landings, camps, roads
- a 1-km-wide corridor centred on the pipeline right-of-way
- a 1 km buffer around borrow sites

A regional geographic extent indicates that the effect on the VC extends to several communities in the affected region, or the effect can apply to the regional study area (RSA) for the VC. The RSA for nontraditional land and resource use is defined as a 15-km-wide buffer:

- around the three anchor fields
- on either side of the gathering system rights-of-way
- on either side of the pipeline rights-of-way

This approach resulted in a study corridor about 30-km wide for the RSA. The proposed shipping route for the barge-based Niglintgak gas conditioning facility was also included in the RSA. The definitions for beyond regional and national geographic extents are provided in Table 7-1 (shown previously). This assessment found that all effects on nontraditional land and resource use will be limited to either local or regional extent. No effects beyond regional or national effects are expected for any of the VCs related to nontraditional land and resource use.

7.2 Project Effects on Nontraditional Land and Resource Use

How will the project affect nontraditional land and resource use?

The following section provides information on the effect pathway process followed for the land and resource use assessment, and describes linkages with other disciplines. Sections 7.2.4 through 7.2.8 examine potential project-specific effects for each VC applicable to this key question. They are organized by the geopolitical regions encountered by the project.

The nine VCs that this key question is applicable to are:

- land ownership
- granular resources
- timber resources
- mineral resources
- oil and gas activities
- nontraditional resource harvesting
- other commercial activities
- tourism and recreation
- marine operations

For each settlement region, effect attributes for these VCs are summarized in a table following the discussion of potential effects. The assessment includes construction, operations, decommissioning and abandonment. Finally, the combined effects and cumulative effects related to the project are discussed for this key question.

7.2.1 Effect Pathway

The effect pathway diagram in Figure 7-1 illustrates the projected influence of the project on nontraditional land and resource use. These pathways will be used throughout the analysis of effects to determine what level of effects could occur.

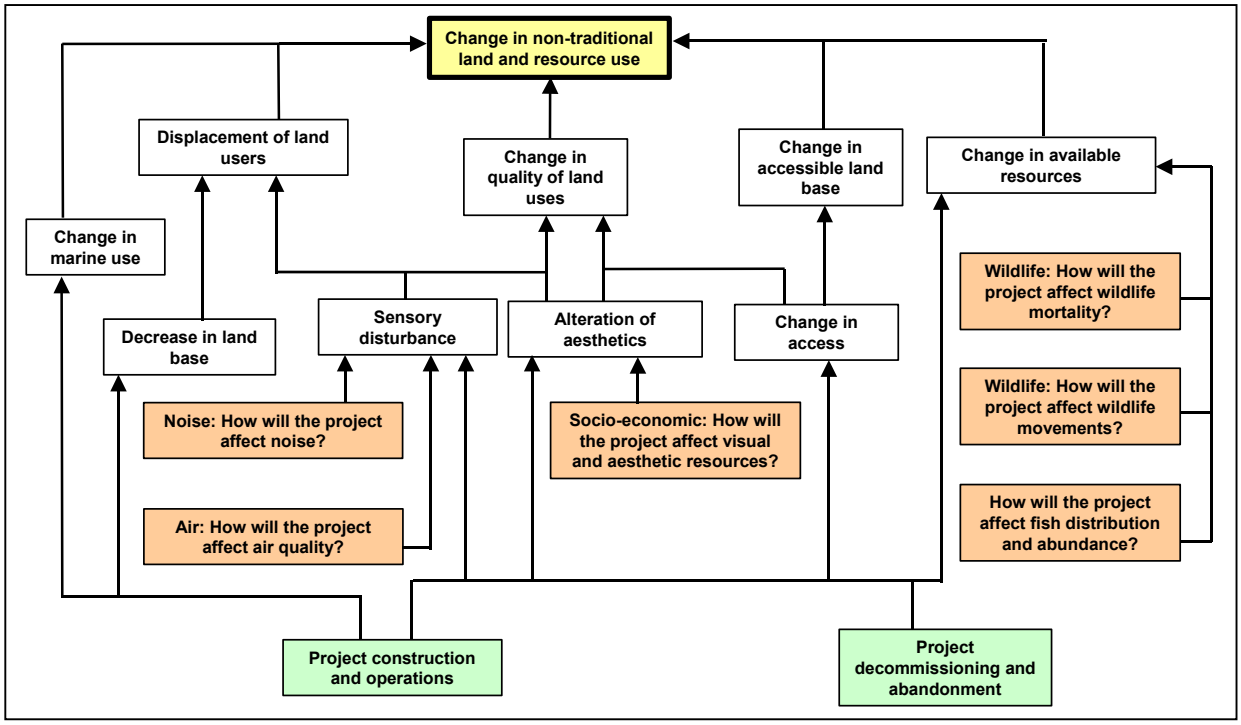

Figure 7-1: Project Effects on Nontraditional Land and Resource Use

The first level in the diagram shows the project phases, construction and operations, and decommissioning and abandonment. The second level identifies the key areas for potential project-specific effects of these activities on nontraditional land and resource use. These effects will directly apply to the VCs for this key question. The third level of the diagram shows indirect effects and will be discussed in terms of the VCs. The fourth or top level indicates that the expected outcome of all these direct and indirect effects will be a change in nontraditional land and resource use.

7.2.1.1 Direct Project-Specific Effects

Decrease in Land Base

Construction activities will lead to a decrease in available land base through clearing of timber and vegetation, and placement of the pipeline, associated facilities and infrastructure. Following construction, reclamation will be initiated along the right-of-way at most borrow and infrastructure sites, and at any locations where operations activities will not occur. During operations, despite the reclaimed areas, there will still be a decrease in available land base for nontraditional land and resource use because of the anchor fields, gathering system and associated infrastructure.

Following decommissioning, lands that are successfully reclaimed will be fully available for use. The above-ground pipeline structures will likely be removed during decommissioning. However, most of the below-ground facilities, infrastructure, i.e., granular pads, and below-ground piping will be left in place. It is expected that there will be very few sites that cannot be completely reclaimed.

Sensory Disturbance

Construction will involve extensive use of heavy machinery and a substantial increase in traffic volume in the Mackenzie River Valley and Delta. This increase in activity will result in increased noise, and could cause sensory disturbance to wildlife and people inhabiting or using the lands traversed by the project. During operations, sensory disturbance could also be caused by continuous noise from the compressor stations and other facilities. Attendees at all the public participation workshops identified noise as a concern, with possible effects for wildlife and people.

Alteration of Aesthetics

The presence of construction machinery and construction camps, and installation of project infrastructure, will alter the existing aesthetics of the area. The appearance of the natural landscape will change because of the project, especially in previously undisturbed areas.

Change in Access

There will be permanent and temporary roads built to access project construction sites. These roads will be used to access facilities, and the right-of-way will be used for operations and maintenance purposes. Following decommissioning, the permanent roads will remain in place but maintenance will likely cease. Increased access to previously inaccessible areas by road could change not only the geographic extent of nontraditional land and resource use, but also the types of uses undertaken in the study area.

Change in Available Resources

Construction activities could lead to a change in the amount of available resources. For example, extraction of granular resources for project use could lead to a depletion of granular materials at some sites.

Change in Marine Use

Shipping and dredging activities related to the barge-based Niglintgak gas conditioning facility could have an effect on shipping operations in the project area. Although there is little use of the area for tourism, there is a possibility that tourist-related boat traffic, such as cruise ships, zodiacs and sea kayaks, could also be affected by shipping and potential dredging activities. As the dredging activities will be of very short duration, there will likely be little disturbance to nonproject-related boat traffic.

7.2.1.2 Indirect Project-Specific Effects

Displacement of Land Users

The combined effects of the direct effects discussed previously could lead to a displacement of land users. For example, recreational users could be displaced to another location because of a change in access or an alteration of the aesthetics of the landscape.

Change in Quality of Land Uses

The direct effect of the project during construction and operations could lead to a change in the quality of land use. For the example of recreation or tourism, participants could feel a perceived decrease in the quality of their experience because of the presence of the project.

Change in Accessible Land Base

Increased access because of new temporary and permanent roads will lead to a change in the accessible land base. During construction, access could be restricted

or blocked to certain areas. However, during operations, new roads and clearings will allow vehicle access to previously inaccessible areas.

7.2.1.3 Combined Effects

Change in Nontraditional Land and Resource Use

All of the direct and indirect effects discussed previously can lead to changes in nontraditional land and resource use. These potential changes are addressed specifically for each VC in each region. The combined effects and cumulative project effects are also examined.

Linkages

The effect pathway diagram shows linkages with other disciplines, including wildlife, aquatics, noise and air quality. Effects could have the following effects:

- changes to fish and wildlife species and habitats that could affect harvesting opportunities
- increased noise could affect tourism and recreation
- a change in air quality could disturb land users in the project area and nearby communities

Linkages, particularly associated with changes in fish and wildlife species, and habitat, were confirmed by attendees at the public participation workshops in all four regions of the Northwest Territories. To reduce these potential effects, environmental effects management will be used whenever possible. For example, mitigation measures will be used to reduce potential effects on fish and wildlife species and their habitat, which in turn will assist in reducing the potential effect on hunting and fishing activities. Another mitigation measure could include timber salvage to reduce the effect of clearing on wood harvesters.

7.2.2 Assessment and Management of Project-Specific Effects

The following sections discuss the expected effects of all project components throughout the project area. Changes in nontraditional land and resource use that are specific to each region are discussed in Sections 7.2.4 to 7.2.8.

An overall effect of project construction in all regions will be a decrease in the available land base for other land and resource uses. Nontraditional land uses that could be affected by installation and operation of the project include:

- borrow operations
- timber harvesting

- mining
- oil and gas activities
- resource harvesting
- other commercial activities
- tourism and recreation

The loss of available land base is a long-term effect for facilities and above-ground pipeline structures, and therefore will continue through to decommissioning. However, for areas of buried pipeline, borrow sites and infrastructure sites, there will be limited effects during operations as reclamation will start after construction is complete.

Infrastructure sites, borrow sites and most access roads will be used during construction. Some sites will continue to be used during operations. Once the sites are no longer needed, they will either be abandoned and reclaimed, or left for community uses. If they are left in place for community use, these lands will continue to be kept out of the land base. However, the positive effects of leaving them for the community will likely outweigh the loss of land base. If the sites are abandoned, it is expected that these lands could again be fully available for other land uses.

During decommissioning, above-ground pipe and structures will be removed, and the lands will be reclaimed to a capability similar to the surrounding area. Where feasible, it is expected that some of the granular material used for pads and airstrips will be removed and reused. Below-ground facilities and pipelines will be left in place. Lands successfully reclaimed will be available for use. It is expected that there will be very few sites that cannot be completely reclaimed.

The overall project effects common to all regions are discussed for each VC.

7.2.2.1 Land Ownership

No project effects are expected on land ownership. For Crown and private lands, it is expected that the necessary permissions for project components will be obtained from the Government of Canada, the Government of Alberta, or the proper private land administration or corporation. On municipal lands, project components will be installed at suitably zoned locations. As there are currently no zoning conflicts, it is expected that permission will be obtained from the towns or the GNWT to install those project components.

7.2.2.2 Granular Resources

The pipeline right-of-way or other project components might cross some granular resources. Although the pipeline will cross few resources, this will effectively remove these resources from availability to the communities for the life of the project. However, after decommissioning, these resources should once again be

available for extraction and use by the local communities. More importantly, the pipeline right-of-way and new roads will open up access to new areas and could lead to improved access to granular resources in existing or new borrow sites.

Project construction activities could block access to existing granular operations in the LSA or RSA. Project effects will only be adverse if existing operations are temporarily closed or inaccessible for community use during construction. However, because extensive granular resources are required for the project, it is more likely that current use and access to existing operations will increase substantially and there will be continued access allowed to residents for local use of granular materials.

There will also be positive effects related to increased northern benefits because of expansion of existing borrow sites and development of new borrow sites (see Volume 2, Section 7, Borrow Sites).

Table 7-2 provides estimates of the total percentage of granular resources that will be used from the primary borrow sites identified for the project. Based on the numbers provided, granular materials available are more than adequate to meet project needs and to allow for future granular resource needs in the project area. Further details on primary borrow source demand and supply can be found in Volume 2, Section 7, Borrow Sites.

Table 7-2: Primary Borrow Source Demand and Supply Estimate

Granular Materials Use	ISR	GSA	SSA – K'ahsho Got'ine District	SSA – Tulita District	DCR	Total
Total required (1,000 m³)	1,311	720	1,455	775	945	5,206
Total available (1,000 m³)[1]	16,410	45,500	52,795	159,165	131,384	405,254
Percentage required of total available (%)	8.0	1.6	2.8	0.5	0.7	1.3

NOTE:
1 Excludes supply estimates for 13 primary borrow sites where data is not available

Removal of some of the granular resources from borrow sites will be permanent. This will result in a depletion of a small percentage of granular materials present in the regional area. However, some infrastructure pads could be decommissioned after construction in 2009, and the gravel will either be used again by other projects or the community, or left in place. In addition, following decommissioning, most borrow material used for facilities and the remaining infrastructure sites could become available for re-use.

During operations, additional granular resources could be required periodically for maintenance and repairs. Although this will further reduce the total amount of granular materials available for extraction, the amounts required will be much less than that needed for construction. Because granular resources will continue to be

removed during operations, the cumulative effect will still increase. However, the primary effect from the project will occur during construction. As mentioned previously, the granular resources used for infrastructure sites could once again be available for local use following decommissioning of the sites, and materials used at facility sites and the remainder of the infrastructure sites could become available following project decommissioning.

Based on the positive and adverse effects discussed previously, the net effect of the project on granular resources over the life of the project is expected to be adverse, but low magnitude. Although some granular materials will be permanently removed from availability, the overall effect of a long-term loss of gravel will be reduced because of positive economic effects, such as:

- development of new sources
- potential hiring of local contractors for project-related granular operations
- opportunity for relatively easily accessible granular materials, i.e., those used for infrastructure and facility sites, could be available for community use following decommissioning

7.2.2.3 Timber Resources

The project will have no major project effects on forestry operations as there are none occurring in the RSA. However, existing timber harvesting practices for local firewood supply or building materials could be disrupted because of restricted access to areas in and around facilities, infrastructure sites, borrow sites and the right-of-way during construction. In addition, clearing of timber along the pipeline right-of-way and project sites will result in a decrease in the available supply of firewood and construction materials for residents in the RSA. However, if the project can enter into an agreement with the communities, timber cleared from the site that is not required for the project will be set aside for the local communities.

During operations, there could be a positive effect for timber harvesters because of increased access to previously unavailable timber. In particular, the increased access provided by the all-weather access road to the Inuvik area facility could improve access for timber harvesters in the Inuvik area.

Operations and maintenance activities could occasionally require removal of timber, which would adversely affect the available supply of timber for use by local residents and communities.

7.2.2.4 Mineral Resources

There are currently no mining operations in the RSA, so there will be no project effects on mining operations during pipeline construction. In addition, there are few mineral showings in the Mackenzie Valley, so the potential for effects on future mining opportunities is low. There are some mineral claims in the RSA near the SSA–DCR boundary and near Fort Simpson. Prospecting permits have recently been issued to several companies and individuals for diamond prospecting north of Fort Good Hope. It is expected that the owners of these claims and permits will be contacted before beginning construction to determine their plans and ensure there will be no conflicts with the project.

7.2.2.5 Oil and Gas Activities

Oil and gas activities near the project could be adversely affected during construction activities because of blocked or restricted access to lands with existing exploration or significant discovery licences. However, it is more likely that other oil and gas operations will plan their activities around the project, and oil and gas activity could actually increase because of the promise of an efficient method of moving product. Construction of new access could cause an increase in oil and gas activity by providing access to previously inaccessible areas.

Once the decision has been made to construct the pipeline, other oil and gas-related activities will likely increase substantially. There are many commercial and economic factors that affect the decision to undertake any oil and gas activities, and the timing and scope of any future oil and gas activity is difficult to establish. On occasion, intermittent ground operations activities could temporarily block access to lands near the pipeline. Few of these instances are expected.

The current Norman Wells oilfield operations are not likely to be adversely affected by the project as that field is owned by Imperial Oil Resources Ventures Limited, a project proponent, which will likely schedule its activities to coordinate with project construction and operations. The project will have a positive effect on the Enbridge Norman Wells pipeline, as it will provide additional liquids to be transported in the currently underused pipeline.

7.2.2.6 Nontraditional Resource Harvesting

Construction of the project components could interfere with nontraditional resource harvesting by affecting fish and wildlife species inhabiting or migrating through the LSA. Restricted access to lands traversed by the project could disrupt nontraditional resource harvesting in the RSA during construction. Fish and wildlife species inhabiting or migrating through the RSA could be displaced by construction activities, such as increased noise from machinery and increased human activity. This displacement could lead to a decrease in harvest success, and

nontraditional resource harvesters could be inconvenienced by having to conduct their activities in different areas.

Comments were received from participants at the first ISR–GSA regional technical workshop held in April 2003 that construction-related noise and light could affect the patterns and routes of migratory birds. They were also concerned about the effects of noise from the pipeline facilities on migratory species, possibly resulting in loss of habitat or a change in harvesting opportunities. Participants also identified possible effects that above-ground pipelines could have on migrating species and the potential for reducing habitat. During the first Sahtu technical regional workshop held in June 2003, attendees expressed concern that noise from the project could affect caribou behaviour. Deh Cho participants at the first regional technical workshop in October 2003 expressed concern that noise in the Blackwater area might affect the moose population. In the subsequent regional technical workshop held in May 2004, they identified possible effects of noise on salmon spawning and over-wintering fish.

Following construction, nontraditional resource harvesting along the pipeline right-of-way should return to normal, except during intermittent ground operations activities that could temporarily displace wildlife or block access to lands near the activity. Once the borrow and infrastructure sites are removed from use and reclaimed, nontraditional resource harvesting at these sites should return to normal.

Disturbance to wildlife is expected to be at its peak during drilling and construction activities. The level of disturbance from noise and human activity will be reduced during operations in the RSA, but disturbance to wildlife could still occur in the local area. There could be a disruption of nontraditional resource harvesting in the local area of the project facilities during operations. Wildlife species inhabiting or migrating through the LSA could be displaced because of the noise created by the facilities. This displacement could lead to a decrease in harvest success in the local area of these facilities, thereby adversely affecting resource harvesters by requiring them to hunt and fish in different places.

Increased access to wildlife or fisheries resources could be provided by the presence of the various project components, particularly the access roads and right-of-way, resulting in a positive effect for local resource harvesters. The effect of increased access was commented on in the regional technical workshops. At the first ISR–GSA regional technical workshop, attendees stated that increased access to previously inaccessible areas could *deplete wildlife and timber resources, and disturb the peace and tranquility of a pristine environment and traditional land use camps*. Similar concerns were registered at the first Sahtu regional technical workshop.

Although regional harvesting levels are not expected to increase because of improved access, it could encourage a change in the locations of where harvesting

occurs. Further information regarding the potential project effects on wildlife can be found in Volume 5, Section 10, Wildlife.

Traffic and activities on winter roads or the Mackenzie River could also displace wildlife from the LSA during construction and operations. In addition, collisions with vehicles on access roads could cause some mortality to wildlife. This should not lead to a decrease in harvest success, but traffic effects of the project can be reduced by decreasing the number of vehicles that must travel on access roads, e.g., by using multi-person vehicles such as buses.

The project policy on hunting and fishing by project workers to manage potential effects on local resource harvesting was described previously in Section 7.2.3, Mitigation Measures.

Minimal effect on local resource harvesting is expected during operations because there will be fewer operations staff than construction staff, and there will likely be very few who would partake in hunting or fishing. The small number of long-term new residents that will be employed by the project are not expected to affect hunting and fishing pressure in the region.

7.2.2.7 Other Commercial Activities

Operation of other commercial activities, e.g., transportation of supplies to communities, and business travel by residents and nonresidents, could be altered because of project traffic during construction. Barge traffic on the river will increase quite substantially during construction, which could result in delays for unrelated barging traffic. It is expected that agreements will be made between the project and transportation companies to ensure nonrelated transportation services remain largely unaffected by the project. The improved access created for the project could provide an opportunity for other commercial activities to be initiated.

7.2.2.8 Tourism and Recreation

Tourism and recreation activities could be affected during construction because of restricted access or changes to existing travel routes. Most tourism activities occur during the summer months and pipeline construction will take place over the winter. However, there will be some construction activities in summer months for development of infrastructure sites and borrow sites.

Sensory disturbance because of increased traffic, noise and emissions during construction could adversely affect the quality of tourism and outdoor recreation activities, particularly those activities enjoyed by local community members, such as snowmobiling or cross-country skiing. However, it is expected that these activities will primarily occur near established communities and there will be less recreational use in the more remote areas. The increased access provided by the

project could have a positive effect on recreational users by allowing them access to lands that were previously difficult to reach.

Aesthetic issues will be of special concern where above-ground pipeline is necessary. Because of the presence of a cleared right-of-way and the activities required to operate it, tourism and recreation activities could decrease in frequency or participants could experience a reduction in the perceived quality of their experience.

The sensory disturbance encountered during construction will no longer be present in most of the RSA following pipeline construction and the subsequent decommissioning and reclamation of many of the borrow and infrastructure sites. Some potential sensory disturbance will continue into operations in the local area of the facilities because of the noise produced by the sites, particularly the compressor stations. Further information on the effects of noise can be found in Volume 5, Section 3, Noise.

It is recommended that controls be in place to manage construction worker participation in local tourism and recreation activities. Ample recreational opportunities will be provided in the camps. However, if southern workers participate in tourist activities during their free time, e.g., days before or following work assignments, the tourism industry would benefit from an increased volume of visitors.

7.2.2.9 Marine Operations

Effects on marine operations will only occur in the ISR, with shipping of the barge-based Niglintgak gas conditioning facility. Moving a single barge into and out of the Mackenzie Delta–Beaufort Sea region and the potential dredging through Kugmallit and Kittigazuit bays are not expected to affect the limited shipping operations that currently occur in the area or Northern Transportation Company Limited's (NTCL's) current barging activity in the Beaufort Sea and the Mackenzie River.

7.2.2.10 Summary of Combined Effects

Table 7-3 summarizes the expected project effects, and the direction, magnitude, geographic extent and expected duration of those effects, discussed previously. This summary assumes that mitigation measures have been applied as described in Volume 7, Environmental Management, and in Section 7.2.3, Mitigation Measures.

Table 7-3: Nontraditional Land and Resource Use – Combined Project Effects

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Land ownership	Contravention of zoning bylaws or land access requirements	Neutral	No effect	N/A	N/A	No
Granular resources	Decrease in available land base for granular extraction	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change to existing granular operations	Positive or adverse	Moderate	Local to regional	Short term	No
		Positive	Low	Regional	Long term	No
	Loss of granular resources	Adverse	Moderate	Regional	Short term to long term	No
		Adverse	Low	Regional	Long term	No
	Net effect on granular resources	Adverse	Low	Regional	Long term	No
Timber resources	Decrease in available land base for timber resources	Adverse	Low	Local	Short term to long term	No
	Disruption to existing forest industry practices	Neutral	No effect	N/A	N/A	No
	Changes to existing timber harvesting practices	Adverse	Low	Regional	Short term	No
		Neutral to positive	No effect to low	Regional	Long term	No
	Loss of timber resources	Neutral to adverse	No effect to low	Local to regional	Long term	No
Mineral resources	Decrease in available land base for mining	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Disruption to existing mining operations	Neutral	No effect	N/A	N/A	No
Oil and gas activities	Decrease in available land base for other oil and gas activities	Adverse	Low	Local	Short term to long term	No
	Changes in other oil and gas activities	Positive to adverse	No effect to low	Local to regional	Short term to long term	No
Nontraditional resource harvesting	Decrease in available land base for resource harvesting activities	Adverse	Low	Local	Short term to long term	No
	Change in nontraditional hunting and fishing success	Adverse	Low to moderate	Regional	Short term	No
		Neutral to adverse	No effect to low	Local	Long term	No
	Change in resource harvesting opportunities	Positive or adverse	Low	Local	Short term to long term	No

Table 7-3: Nontraditional Land and Resource Use – Combined Project Effects (cont'd)

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Other commercial activities	Decrease in available land base for other commercial activities	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change in other commercial activities	Neutral to adverse	No effect to low	Regional	Short term	No
		Positive to adverse	Low	Regional	Long term	No
Tourism and recreation	Decrease in available land base for tourism and outdoor recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term to long term	No
	Change to tourism and recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No
	Change in quality of tourism and outdoor recreation	Neutral to adverse	No effect to low	Local to regional	Short term	No
	Change to summer tourist and recreational boat traffic in the Mackenzie River and Mackenzie Delta	Neutral to adverse	No effect to low	Local to regional	Short term to long term	No
Marine Operations	Disruption of current marine shipping and operation activities	No effect	N/A	N/A	N/A	No

NOTES:
N/A = not applicable

7.2.3 Mitigation Measures

Before assessing any project effects, mitigation must be considered and taken into account. Several mitigation measures for nontraditional land and resource use were assumed before assessing project effects, including:

- all necessary access and land use permits will be obtained and their conditions followed

- access management will be used, to the extent practical and where identified by the communities, regulatory authorities or other concerned parties, to inhibit other potential land users, i.e., nontraditional hunters, timber harvesters and tourists, from using project infrastructure as a method of accessing resources that were previously inaccessible. These access controls will be left in place for operations, and decommissioning and abandonment, if needed.

- at locations directed by the project proponents' representative, access management techniques could include the following:
  - rolling back slash and timber to prevent access along the pipeline right-of-way
  - installing slash berms across the pipeline right-of-way, or winter road easements
  - planting trees or shrubs at potential access points, to visually screen the pipeline right-of-way or road easements
- hunting and fishing by workers will be prohibited while on the job site
- timber will be salvaged for use by the project or where agreements have been made with a community
- the project proponents will inform other nontraditional land and resource users about the pipeline route and construction schedule before beginning construction
- compensation will be negotiated, where required, with granular resource owners for removal of granular resources from their lands
- a plan for abandoning infrastructure and borrow sites will be developed that will include public consultation on alternative uses for the infrastructure and the sites. Local cultural, land use and environmental principles will be incorporated in project planning and implementation decisions.
- once a borrow site is no longer required by the project, it might be available for use by communities or abandoned and reclaimed by the project

7.2.4 Nontraditional Land and Resource Use – Inuvialuit Settlement Region

7.2.4.1 Existing Baseline Conditions

Baseline land and resource use conditions are summarized. For further details, please refer to Volume 4, Section 6, Nontraditional Land and Resource Use.

Land Ownership

Lands traversed by the project in the ISR are either federal Crown lands administered by INAC, or Inuvialuit private lands administered by the Inuvialuit Land Administration. Figure 7-2 depicts land ownership in the ISR.

Figure 7.2 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Granular Resources

The most common type of granular material in the ISR is sand and gravel of fair quality, used for general fill. Limited amounts of excellent- and poor-quality sand and gravel are also present throughout the region. There are many identified deposits around the gathering system northwest of the Parsons Lake field, including the Yaya Lake eskers.

The Inuvialuit own granular resources found on Inuvialuit lands with subsurface rights. On all other Inuvialuit lands, i.e., surface rights only, and Crown lands, the granular resources are owned by INAC.

Timber Resources

Most of the ISR lies north of the treeline, in the Tundra Ecological Zone, so timber resources are not sufficient for commercial operation in this region. A portable sawmill, located in Inuvik, processes about 14 to 18 m^3 of wood each year for picnic tables and small projects.

Mineral Resources

There are no mines located in this part of the study area in the ISR, and there are no identified mineral showings.

Oil and Gas Activities

To date, the only oil or gas field developed in the Mackenzie Delta–Beaufort Sea region has been the onshore Ikhil field. The Ikhil gas field and pipeline is an Inuvialuit Petroleum Corporation project that began operating in 1999 to provide natural gas to the community of Inuvik. Several exploratory licences and significant discovery licences have been issued in the ISR. See Figure 7-3 for locations of these dispositions.

Nontraditional Resource Harvesting

Commercial, domestic and sport hunting activities occur in the ISR, but limited information is available for harvest numbers in the study area. Only sporadic use of the gathering system area by resident hunters occurs.

Caribou is one of the more popularly hunted species in the ISR. Other game species include polar bear, grizzly bear and moose. Polar bear hunting is not common in the study area, and there is limited nontraditional moose hunting. There is also game hunting for black bear and small nonfurbearing mammals, i.e., hare, marmot, porcupine and squirrel, and game bird hunting for ptarmigan and grouse.

Figure 7.3 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

About 12 commercial fishing licences are issued annually in the Inuvik area to Gwich'in and Inuvialuit beneficiaries who distribute or sell fish to restaurants or individuals. Four domestic fishing licences are issued for the ISR for large geographic areas around Inuvik. Common areas for sport fishing include Sitidgi, Noell, Husky, Jimmy and Yaya lakes, and the Yaya River.

Other Commercial Activities

Additional commercial activities in the ISR are:

- transportation services for tourism and industry, e.g., barge, road and air
- shipping supplies to communities
- reindeer herding
- selling game meat for consumption

Tourism and Recreation

Licensed Inuvialuit guides and outfitters lead most land- and water-based tours in the ISR, and air charter companies operate air tours. About 16 tour operator companies are based in the Mackenzie Delta area, offering a range of services. Cruise ships travel to Tuktoyaktuk and Herschel Island, and tourists travel and camp along the Mackenzie River and Dempster Highway. Inuvik is the gateway to four National Parks, including Aulavik and Tuktut Nogait National Parks in the Northwest Territories, and Vuntut and Ivvavik National Parks in the Yukon.

Marine Operations

In the last 15 years, shipping activity has been limited in the Mackenzie Delta and Beaufort Sea. Most shipping activity in the area is related to NTCL transporting supplies to communities, and logistics and staging locations throughout the North. About 20 to 25 round trips per year are made by NTCL from Hay River to Tuktoyaktuk.

The Canadian Coast Guard operates in the Beaufort Sea and Mackenzie River, maintaining aids to navigation, and providing fixed and drifting marine research platforms. Some foreign-flag, ice-strengthened cruise ships and foreign-flag icebreakers acting as cruise ships pass through the region.

Dredging has occurred in the Beaufort Sea since the early 1970s (see Figure 7-4). Only one dredging project in the Mackenzie River has been registered under the *Canadian Environmental Protection Act* since 1982. GNWT Transportation confirmed that no dredging has been conducted in the river in the last eight to nine years. The Canadian Coast Guard reports that there has been no recent dredging in the reach of the Mackenzie River applicable to the project.

Figure 7.4 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

7.2.4.2 Assessment and Management of Project-Specific Effects

For each of the land and resource use VCs, project-specific effects for the ISR are discussed. These potential effects are specific to the ISR. This section has been divided into separate assessments for Niglintgak, Taglu, Parsons Lake, and the gathering system and associated project components.

Niglintgak

Development of the Niglintgak wells and facilities will result in a decrease in the available land base for other land and resource uses. However, as oil and gas exploration occurred at Niglintgak in the past, it is unlikely that the area would have been developed for other uses. The barge option will slightly reduce the lost land base, as the gas conditioning facility will be located on a barge rather than on land.

Land Ownership

Niglintgak is entirely located within federal Crown lands, and it is expected that the necessary permissions will be obtained from INAC and the Canadian Wildlife Service before construction. Thus, there will be no effect on land ownership because of this development.

Granular, Timber and Mineral Resources

There are no granular resources, timber resources or mineral deposits currently identified at Niglintgak. Niglintgak is also relatively remote from any established roads or communities.

Oil and Gas Activities

Other oil and gas operations should not be affected by development at Niglintgak. Shell Canada Limited, a project proponent, holds the oil and gas rights at Niglintgak. It is expected Shell will schedule its activities at Niglintgak to accommodate the project.

Nontraditional Resource Harvesting

General project effects on nontraditional resource harvesting are discussed in Section 7.2.2.6, Nontraditional Resource Harvesting. There are no additional specific effects expected for nontraditional resource harvesting in the Niglintgak area.

Other Commercial Activities

No other commercial activities occur in the Niglintgak area.

Tourism and Recreation

Activities taking place at Niglintgak throughout the life of the project could affect tourism and recreational activities in the LSA, mostly through aesthetic effects.

The Kendall Island Bird Sanctuary is an area occasionally visited by tourists, and there is the possibility that the level or quality of tourism activities could be affected by the presence of the site. The project effects on the birds and other wildlife in the sanctuary are discussed in Volume 5, Section 10, Wildlife.

Recreational boat traffic could be temporarily disrupted. Barge-based shipping and potential dredging activities could disrupt tourist-related boat traffic, such as zodiacs and sea kayaks, although there is little use of the waterways by tourism. These effects are expected to be low in magnitude, given the small numbers of tourism-related boats in the area and the short barge transport season.

Marine Operations

Movement of a single gas conditioning facility barge into and out of the Mackenzie Delta–Beaufort Sea region, and the potential dredging along the transport route are not expected to affect the limited shipping and barging operations currently occurring in the area.

Taglu

Development of Taglu will result in a decrease in the available land base for other land and resource uses. However, as oil and gas exploration has occurred at Taglu in the past, it is unlikely that the area would have been developed for other uses.

Land Ownership

Taglu is entirely located within federal Crown lands, and the necessary permissions will be obtained from INAC before construction. Thus, there will be no effect on land ownership because of this development.

Granular, Timber and Mineral Resources

There are no granular resources, timber resources or mineral deposits currently identified at Taglu. Taglu is relatively remote from any established roads or communities.

Oil and Gas Activities

Other oil and gas operations should not be affected by development at Taglu. Imperial Oil Resources Limited, a project proponent, holds the oil and gas rights at Taglu. It is expected that Imperial Oil Resources Limited will schedule its activities at Taglu to accommodate this project.

Nontraditional Resource Harvesting

General project effects on nontraditional resource harvesting are discussed in Section 7.2.2.6, Nontraditional Resource Harvesting. There are no additional specific effects expected for nontraditional resource harvesting in the Taglu area.

Other Commercial Activities

No other commercial activities occur in the Taglu area.

Tourism and Recreation

Activities taking place at Taglu throughout the life of the project could affect tourism and recreational activities in the LSA, mostly through aesthetic effects.

The Kendall Island Bird Sanctuary is an area occasionally visited by tourists, and there is the possibility that the level or quality of tourism activities could be affected by the presence of this site. The project effects on the birds and other wildlife in the sanctuary are discussed in Volume 5, Section 10, Wildlife.

Parsons Lake

Development of the Parsons Lake lease will result in a decrease in the available land base for other land and resource uses. However, as oil and gas exploration occurred at Parsons Lake in the past, it is unlikely that the area would have been developed for other uses.

Land Ownership

The parts of Parsons Lake being developed are entirely located within federal Crown lands, and the necessary permissions will be obtained from INAC before construction. Thus, there will be no effect on land ownership because of this development.

Granular, Timber and Mineral Resources

There are no high-quality granular resources, timber resources or mineral deposits currently identified in the LSA at Parsons Lake.

Oil and Gas Activities

Other oil and gas operations should not be affected by development of Parsons Lake. The oil and gas rights at Parsons Lake are held by ConocoPhillips Canada (North) Limited and ExxonMobil Canada Properties, both project proponents. It is expected that they will schedule their activities in this area to accommodate the project.

Nontraditional Resource Harvesting

General project effects on nontraditional resource harvesting are discussed in Section 7.2.2.6, Nontraditional Resource Harvesting. There are no additional specific effects expected for nontraditional resource harvesting in the Parsons Lake area.

Other Commercial Activities

No other commercial activities occur in the Parsons Lake area.

Tourism and Recreation

Activities taking place at Parsons Lake throughout the life of the project could affect tourism activities, mostly through aesthetic effects. It should be noted that no specific tourism activities have been identified as occurring in the RSA of Parsons Lake. However, there could still be occasional recreational use of the area.

The quality of recreational activities in the LSA could be affected by sensory disturbance from increased traffic, noise and emissions during construction, particularly for those activities that could be enjoyed by local community members, such as snowmobiling. This effect could continue into operations in the LSA of Parsons Lake because of the noise produced by the facility. However, it is assumed that few of these activities occur in the RSA of Parsons Lake because of its relatively remote location.

Gathering System and Other Project Components

Construction of the gathering system, infrastructure, facilities and borrow sites in the ISR will result in a decrease in the available land base for other land and resource use. However, it is unlikely that this area would have been developed for other uses.

Land Ownership

No project effects are expected on land ownership in the ISR. For Crown and private lands, it is expected that the necessary permissions will be obtained from the Government of Canada or the Inuvialuit Land Administration.

Granular Resources

General project effects on granular resources are discussed in Section 7.2.2.2, Granular Resources. There are no additional specific effects expected on granular resources for the gathering system and other project components.

Timber Resources

As most of the gathering system and other project components in the ISR lie beyond the northern extent of timber resources, effects on timber will be very low. Some timber is present near the ISR–GSA boundary. In this area, existing timber harvesting practices for local firewood supply could be disrupted because of restricted access to areas within the right-of-way during construction. In addition, clearing of timber along the pipeline right-of-way and at other project component sites will decrease the total available supply of firewood and construction materials for local residents. However, at the current rate that timber is harvested in the area, removal of this timber should have little to no effect. If the project can enter into an agreement with the communities, timber cleared from the site that is not required for the project would be set aside for local use.

Mineral Resources

There are currently no mining operations in the RSA. In addition, there are few mineral showings in the ISR, so the potential for effects on future mining opportunities is low.

Oil and Gas Activities

General project effects on oil and gas activities were discussed previously in Section 7.2.2.5, Oil and Gas Activities. There are no additional specific effects expected for oil and gas activities in the gathering system area.

Nontraditional Resource Harvesting

General project effects on nontraditional resource harvesting are discussed in Section 7.2.2.6, Nontraditional Resource Harvesting. There are no additional specific effects expected for nontraditional resource harvesting in the gathering system area.

Other Commercial Activities

Construction of the gathering system could conflict with the activities of the reindeer herd owned by the Kuñnek Resource Development Corporation. The Kuñnek Resource Development Corporation will be consulted to ensure that reindeer herding activities and project activities do not conflict. Following pipeline construction, there should be no conflicts with the reindeer herd.

Changes in access in the ISR because of the project could positively affect other commercial activities by creating access to previously inaccessible areas.

Tourism and Recreation

Some tourism and recreation activities could be altered during construction because of restricted access to areas that are currently used or changes to existing travel routes. Tourism should not be adversely affected by construction activities at the Inuvik area facility, as few tourism activities occur in this area.

Noise produced by the site could continue into operations in the LSA of the Inuvik area facility. However, it is expected that few tourism activities will occur near the facility because of its relatively remote location. Following completion of construction activities, there could be a positive effect to recreation because of access to previously inaccessible areas along the access road to the Inuvik area facility. Further information on the effects of noise can be found in Volume 5, Section 3, Noise.

Summary of Project-Specific Effects

Table 7-4 summarizes the expected project effects in the ISR, and the direction, magnitude, geographic extent and expected duration of those effects discussed previously. This summary describes the expected effects following application of mitigation, as described in Volume 7, Environmental Management and in the following text.

7.2.5 Nontraditional Land and Resource Use – Gwich'in Settlement Area

7.2.5.1 Existing Baseline Conditions

The following is a summary of the baseline land and resource use conditions for the GSA. For further detail, please refer to Volume 4, Section 6, Nontraditional Land and Resource Use.

Land Ownership

Most of the lands traversed by the project in the GSA are either federal Crown lands, administered by INAC, or Gwich'in private lands, administered by the Gwich'in Land Administration. Lands in the Town of Inuvik are municipal lands administered by the town. Figure 7-5 depicts land ownership in the GSA.

Figure 7.5 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Table 7-4: Nontraditional Land and Resource Use – Project Effect Attributes for the Inuvialuit Settlement Region

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Land ownership	Contravention of zoning bylaws or land access requirements	Neutral	No effect	N/A	N/A	No
Granular resources	Decrease in available land base for granular extraction	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change to existing granular operations	Positive or adverse	Moderate	Local to regional	Short term	No
		Positive	Low	Regional	Long term	No
	Loss of granular resources	Adverse	Moderate	Regional	Short term to long term	No
		Adverse	Low	Regional	Long term	No
	Net effect on granular resources	Adverse	Low	Regional	Long term	No
Timber resources	Decrease in available land base for timber resources	Adverse	Low	Local	Short term to long term	No
	Disruption to existing forest industry practices	Neutral	No effect	N/A	N/A	No
	Changes to existing timber harvesting practices	Adverse	Low	Regional	Short term	No
		Neutral to positive	No effect to low	Regional	Long term	No
	Loss of timber resources	Neutral to adverse	No effect to low	Local to regional	Long term	No
Mineral resources	Decrease in available land base for mining	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Disruption to existing mining operations	Neutral	No effect	N/A	N/A	No
Oil and gas activities	Decrease in available land base for other oil and gas activities	Adverse	Low	Local	Short term to long term	No
	Changes in other oil and gas activities	Positive to adverse	No effect to low	Local to regional	Short term to long term	No
Nontraditional resource harvesting	Decrease in available land base for resource harvesting activities	Adverse	Low	Local	Short term to long term	No
	Change in nontraditional hunting and fishing success	Adverse	Low to moderate	Regional	Short term	No
		Neutral to adverse	No effect to low	Local	Long term	No
	Change in resource harvesting opportunities	Positive or adverse	Low	Local	Short term to long term	No

Table 7-4: Nontraditional Land and Resource Use – Project Effect Attributes for the Inuvialuit Settlement Region (cont'd)

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Other commercial activities	Decrease in available land base for other commercial activities	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change in other commercial activities	Neutral to adverse	No effect to low	Regional	Short term	No
		Positive to adverse	No effect to low	Regional	Long term	No
Tourism and recreation	Decrease in available land base for tourism and outdoor recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term to long term	No
	Change to tourism and recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No
	Change in quality of tourism and outdoor recreation	Neutral to adverse	No effect to low	Local to regional	Short term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No
	Change to summer tourist and recreational boat traffic in the Mackenzie River and Mackenzie Delta	Neutral to adverse	No effect to low	Local to regional	Short term to long term	No
Marine Operations	Disruption of current marine shipping and operation activities	No effect	N/A	N/A	N/A	No

NOTE:
N/A = not applicable

Granular Resources

In the GSA, several borrow sites are located near the Dempster Highway, and there is an area of granular potential near Caribou Lake (Gwich'in Land Use Planning Board 2002). Existing borrow sites regularly used by the Town of Inuvik include (EBA 1987):

- the Kenaston Pit located at Campbell Lake
- a pit near the Inuvik airport
- a pit about 20 km southeast of Inuvik

The Gwich'in own granular resources found on Gwich'in lands with subsurface rights. On all other Gwich'in lands, i.e., surface rights only, and Crown lands, the granular resources are owned by INAC.

Timber Resources

There is currently no commercial timber harvesting in the GSA, with the exception of fuel wood harvesting by Gwich'in beneficiaries and some residents. It is highly unlikely that there will be any expansion of timber harvesting in the study area in the future because of the limited amounts of timber resources in the GSA.

Mineral Resources

There are no mines or ore deposits of interest in the study area in the GSA. Several prospecting permits have recently been issued to Diamondex Resources Ltd. along the eastern edge of the GSA.

Oil and Gas Activities

The pipeline corridor in the GSA crosses two oil and gas exploratory licences held by Devlan Exploration (see Figure 7-6). The potential for discovery of oil throughout the GSA is low. However, natural gas could be present.

Nontraditional Resource Harvesting

Game hunting is permitted in the GSA for:

- black bear
- moose
- barren-ground and woodland caribou
- wolf
- wolverine
- coyote
- small nonfurbearing mammals

Game bird hunting is permitted for ptarmigan and grouse. The pipeline corridor does not traverse any designated guide–outfitter areas in the GSA.

No commercial fishing licences are issued in the GSA near the study area. Fisheries and Oceans Canada has issued some domestic fishing licences to residents in the GSA. However, it is believed that little, if any, domestic fishing occurs in the area.

Sport fishing in the GSA is licensed by GNWT RWED, and is subject to the terms and conditions set out in the Gwich'in Comprehensive Land Claim. Inuvik residents sport fish in Point Lake and Sunny Lake southwest of the study area in spring and summer and, to a lesser degree, during the winter.

Figure 7.6 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Other Commercial Activities

Other commercial activities that take place in the GSA are limited. There are transportation activities on both the Mackenzie River and Dempster Highway. The Mackenzie River is an important transportation corridor for barges and other boats that deliver goods to many of the communities along its banks, on the Beaufort Sea and in other parts of the Arctic. Barging activities along the Mackenzie River run from mid-June through mid-October.

Tourism and Recreation

There is limited opportunity for recreational use in the part of the study area in the GSA. Many residents travel to Sunny and Point lakes to camp in the spring and summer. There is one cabin used by an Inuvik resident on Sunny Lake. Nonresident use of waterways in the study area is incidental in the GSA. The study area traverses the old Canadian National Telegraph line along which some recreational use, such as snowmobiling, occurs.

7.2.5.2 Assessment and Management of Project-Specific Effects

Project-specific effects for the GSA are discussed for each VC for land and resource use. These potential effects are specific to the GSA.

The loss of available land base is a long-term effect for facilities and above-ground pipeline structures, and therefore will continue through to decommissioning. The Inuvik area facility and access road to the facility will be constructed in the GSA. During decommissioning, above-ground structures will be removed, and the lands will be reclaimed to a capability similar to the surrounding area. Where feasible, it is expected that some of the granular material used for pads will be removed and reused. Below-ground facilities will be left in place. Lands successfully reclaimed will be available for use. It is expected that there will be very few sites that cannot be completely reclaimed.

Land Ownership

No project effects are expected on land ownership in the GSA. For Crown and private lands, it is expected that the necessary permissions will be obtained from the Government of Canada or the Gwich'in Land Administration before construction.

Granular Resources

Removal of some of the granular resources from borrow sites will be permanent and will result in a depletion of the total amount of granular materials present in the GSA. However, some infrastructure pads, e.g., Campbell Lake camp, could be

decommissioned after construction and the gravel could be used again by other projects or the community, or left in place.

Timber Resources

Project effects on timber resources are expected to be minimal.

In the GSA, there could be a positive effect for timber harvesters during construction and operations of the project. Increased access, particularly because of the all-weather access road to the Inuvik area facility, will improve current access routes for timber harvesting in this area and could open up new areas for timber harvesting.

Mineral Resources

Several prospecting permits have recently been issued along the eastern edge of the GSA. It is expected that the owners of these claims will be contacted to determine their plans and ensure there will be no conflicts with the project. There are no known mineral showings in the GSA, so the potential for effects on future mining opportunities is low.

Oil and Gas Activities

General project effects on oil and gas activities were discussed previously in Section 7.2.2.5, Oil and Gas Activities. There are no additional specific effects expected for oil and gas activities in the GSA.

Nontraditional Resource Harvesting

General project effects on nontraditional resource harvesting are discussed in Section 7.2.2.6, Nontraditional Resource Harvesting. There are no additional specific effects expected for nontraditional resource harvesting in the GSA.

Other Commercial Activities

General project effects on other commercial activities are discussed in Section 7.2.2.7, Other Commercial Activities. There are no additional specific effects on other commercial activities in the GSA.

Tourism and Recreation

Following completion of construction activities, there could be a positive effect to recreation because of access to previously inaccessible areas along the right-of-way, particularly south of Inuvik.

Tourism should not be adversely affected by construction activities at the Inuvik area facility, as few tourism activities occur in this area.

Noise produced by the site could continue into operations in the LSA of the Inuvik area facility. However, it is expected that few tourism activities will occur near the facility because of its relatively remote location. Further information on the effects of noise can be found in Volume 5, Section 3, Noise.

Summary of Project-Specific Effects

Table 7-5 summarizes the expected project effects in the GSA, and the direction, magnitude, geographic extent and expected duration of those effects, discussed previously.

7.2.6 Nontraditional Land and Resource Use – Sahtu Settlement Area

7.2.6.1 Existing Baseline Conditions

The following is a summary of the baseline land and resource use conditions in the SSA. For further detail, please refer to Volume 4, Section 6, Nontraditional Land and Resource Use.

Land Ownership

Most of the lands traversed by the project in the SSA are either federal Crown lands, administered by INAC, or Sahtu private lands, administered by either the K'ahsho Got'ine District Land Corporation or the Tulita District Land Corporation. Lands encountered by project components in the towns of Fort Good Hope, Norman Wells and Tulita are municipal lands, administered either by the town itself or by GNWT Municipal and Community Affairs. Figure 7-7 shows land ownership in the SSA.

Granular Resources

Several borrow sites and related operations are located in the SSA part of the study area, especially near Norman Wells. A large quarry is located about 3 km east of Norman Wells, near the town landfill site. There is also an existing gravel pit between Norman Wells and Tulita at the Little Bear River.

The Sahtu own granular resources found on Sahtu lands with subsurface rights. On all other Sahtu lands, i.e., surface rights only, and Crown lands, the granular resources are owned by INAC.

Figure 7.7 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Table 7-5: Nontraditional Land and Resource Use – Project Effect Attributes for the Gwich'in Settlement Area

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Land ownership	Contravention of zoning bylaws or land access requirements	Neutral	No effect	N/A	N/A	No
Granular resources	Decrease in available land base for granular extraction	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change to existing granular operations	Positive or adverse	Moderate	Local to regional	Short term	No
		Positive	Low	Regional	Long term	No
	Loss of granular resources	Adverse	Moderate	Regional	Short term to long term	No
		Adverse	Low	Regional	Long term	No
	Net effect on granular resources	Adverse	Low	Regional	Long term	No
Timber resources	Decrease in available land base for timber resources	Adverse	Low	Local	Short term to long term	No
	Disruption to existing forest industry practices	Neutral	No effect	N/A	N/A	No
	Changes to existing timber harvesting practices	Adverse	Low	Regional	Short term	No
		Neutral to positive	No effect to low	Regional	Long term	No
	Loss of timber resources	Adverse	Low	Local to regional	Long term	No
Mineral resources	Decrease in available land base for mining	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Disruption to existing mining operations	Neutral	No effect	N/A	N/A	No
Oil and gas activities	Decrease in available land base for other oil and gas activities	Adverse	Low	Local	Short term to long term	No
	Changes in other oil and gas activities	Positive to adverse	No effect to low	Local to regional	Short term to long term	No
Nontraditional resource harvesting	Decrease in available land base for resource harvesting activities	Adverse	Low	Local	Short term to long term	No
	Change in nontraditional hunting and fishing success	Adverse	Low to moderate	Regional	Short term	No
		Neutral to adverse	No effect to low	Local	Long term	No

Table 7-5: Nontraditional Land and Resource Use – Project Effect Attributes for the Gwich'in Settlement Area (cont'd)

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Nontraditional resource harvesting (cont'd)	Change in resource harvesting opportunities	Positive or adverse	Low	Local	Short term to long term	No
Other commercial activities	Decrease in available land base for other commercial activities	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change in other commercial activities	Neutral to adverse	No effect to low	Regional	Short term	No
		Positive to adverse	No effect to low	Regional	Long term	No
Tourism and recreation	Decrease in available land base for tourism and outdoor recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term to long term	No
	Change to tourism and recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No
	Change in quality of tourism and outdoor recreation	Neutral to adverse	No effect to low	Local to regional	Short term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No

NOTE:
N/A = not applicable

Timber Resources

There are no major timber harvesting operations in the SSA near the study area. Timber harvesting facilities used in the past were located at Little Chicago and Grandview. Each community in the SSA has a small lumber mill to process timber for local use. Residents harvest fuel wood along winter roads throughout the SSA.

Mineral Resources

No deposits of interest have been identified near the study area in the SSA. There are several mineral claims, held by Patrician Consolidated Gold Mines Ltd., located in the RSA at the southern boundary of the SSA. North of Fort Good Hope, several prospecting permits were recently issued to Diamondex Resources Ltd., DeBeers Exploration Inc. and an individual. The lands traversed by the pipeline corridor have been rated as having low mineral potential.

Oil and Gas Activities

The most prominent petroleum industry activity in the SSA part of the study area is the Norman Wells oil field, operated by Imperial Oil Resources Ventures Limited, and the associated Enbridge pipeline. In addition, several oil and gas exploratory licences are located near Norman Wells, Tulita and Colville Lake. Some significant discovery licences are also held in the Colville Lake area (see Figure 7-6, shown previously).

Nontraditional Resource Harvesting

In the SSA, game hunting is permitted for:

- black bear
- moose
- caribou
- muskox
- wolf
- wolverine
- small nonfurbearing mammals

Game bird hunting is permitted for ptarmigan and grouse. GNWT RWED has recently established a limited-entry draw for muskox in the SSA.

There are no designated guide–outfitter areas in the study area part of the SSA. However, one outfitter, Jackson's Arctic Circle Tours, operates out of Fort Good Hope at Manual Lake.

Only one commercial fishing licence is issued near the study area – on Lennie Lake, located on the east side of the Norman Range. There are about 12 domestic fishing licences issued to residents of Norman Wells. Some of this fishing occurs in the Mackenzie River.

Sport fishing occurs in many lakes and streams in the SSA and is licensed by the GNWT RWED. Sport fishing is also subject to the terms and conditions set out in the Sahtu Comprehensive Land Claim.

Sport fish species present in the SSA include:

- Arctic grayling
- burbot
- Dolly Varden
- inconnu
- lake trout
- northern pike

- walleye
- whitefish

Other Commercial Activities

The Mackenzie Highway is extended via a winter road from Wrigley to Fort Good Hope during the winter. It is a transportation corridor for trucks carrying goods to the valley communities. The Mackenzie River is an important transportation corridor for barges and other boats that deliver goods to many of the communities along its banks, on the Beaufort Sea and in other parts of the Arctic.

Tourism and Recreation

Residents use a variety of waterways in the SSA for recreational purposes. The Mackenzie River is travelled by boats for recreation by residents and to a lesser extent by nonresidents. The Great Bear River is a popular canoeing destination in the summer months, mostly for residents. The winter road and the Enbridge right-of-way are used by residents and some nonresidents throughout all seasons for recreational purposes, such as snowmobiling, cross-country skiing or hiking.

There are several tourism operators in the SSA. The *SS Norweta* tour boat travels up and down the Mackenzie River all summer. Archie Lennie of Tulita offers jet boat tours on the Mackenzie River and its tributaries, and Winter Lennie of Norman Wells offers tourism opportunities on Kelly Lake during the summer. Wilfred Jackson from Fort Good Hope has a tourist camp on Manual Lake that operates primarily in the summer.

7.2.6.2 Assessment and Management of Project-Specific Effects

Project-Specific effects for the SSA are discussed for each land and resource use VC. These potential effects are specific to the SSA.

Land Ownership

No effects on land ownership are expected in the SSA. For Crown and private lands, it is expected that the necessary permissions for project components will be obtained from the Government of Canada or from the Sahtu Land Administration.

In Fort Good Hope and Norman Wells, site zoning permits the project components. In Tulita, the infrastructure site is being installed on an existing barge landing, so no zoning issues are expected. As there is no zoning conflict, it is expected that permission will be obtained from the towns to install those project components.

Granular Resources

General project effects on granular resources are discussed in Section 7.2.2.2, Granular Resources. There are no additional specific effects expected for granular resources in the SSA.

Timber Resources

General project effects on timber resources are discussed in Section 7.2.2.3, Timber Resources. There are no additional specific effects expected for timber resources in the SSA.

Mineral Resources

There are several mineral claims in the RSA near the southern boundary of the SSA. In addition, several prospecting permits have been issued for diamond exploration north of Fort Good Hope. The project proponents will inform the owners of these claims and permits about project plans, to ensure any conflicts with the project are addressed. There are no other mineral showings currently identified in the SSA.

Oil and Gas Activities

The current Norman Wells oilfield operations are not likely to be adversely affected by the project as that field is owned by Imperial Oil Resources Ventures Ltd., one of the project proponents, who will likely schedule its activities to coordinate with pipeline construction and operations. The project will have a positive effect on the Enbridge Norman Wells pipeline as it will provide additional liquids for transport in the currently underused pipeline.

Nontraditional Resource Harvesting

General project effects on nontraditional resource harvesting are discussed in Section 7.2.2.6, Nontraditional Resource Harvesting. There are no additional specific effects expected for nontraditional resource harvesting in the SSA.

Other Commercial Activities

General project effects on other commercial activities are discussed in Section 7.2.2.7, Other Commercial Activities. There are no additional specific effects expected for other commercial activities in the SSA.

Tourism and Recreation

Following completion of construction activities, there could be a positive effect on recreation because of access to previously inaccessible areas along the pipeline

right-of-way and other project-related clearings, like access roads, particularly north of Fort Good Hope.

Noise produced at the sites could continue to affect tourism and recreation in the LSA of the facilities into operations. However, it is expected that few of these activities occur in the RSA of the Little Chicago compressor station because of its relatively remote location. In addition, recreational land users will likely not be affected by the Norman Wells facility because of its closeness to an existing industrial facility. Further information on the effects of noise can be found in Volume 5, Section 3, Noise.

Summary of Project-Specific Effects

Table 7-6 summarizes the expected project effects in the SSA, and the direction, magnitude, geographic extent and expected duration of those effects, discussed previously.

7.2.7 Nontraditional Land and Resource Use – Deh Cho Region

7.2.7.1 Existing Baseline Conditions

Land Ownership

Most lands traversed by the project in the DCR are federal Crown lands, administered by INAC. In the north DCR near the Blackwater River, there are several parcels of Sahtu private lands, administered by the Tulita District Land Corporation. Some project components will be located in Fort Simpson and Hay River on municipal lands administered by the towns. Figure 7-8 depicts land ownership in the DCR.

Granular Resources

Several previously developed borrow sites are located along the Mackenzie Highway between Wrigley and Fort Simpson. Most of these sites were used during highway construction and have since been abandoned. With the exception of these sites, no other known borrow sites are located in the DCR part of the study area.

As the DCR is primarily Crown land, most of the granular resources are owned by INAC. However, the current land ownership and subsurface rights to resources could change once the Deh Cho First Nation has negotiated and finalized its settlement claim.

Figure 7.8 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Table 7-6: Nontraditional Land and Resource Use – Project Effect Attributes for the Sahtu Settlement Area

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Land ownership	Contravention of zoning bylaws or land access requirements	Neutral	No effect	N/A	N/A	No
Granular resources	Decrease in available land base for granular extraction	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change to existing granular operations	Positive or adverse	Moderate	Local to regional	Short term	No
		Positive	Low	Regional	Long term	No
	Loss of granular resources	Adverse	Moderate	Regional	Short term to long term	No
		Adverse	Low	Regional	Long term	No
	Net effect on granular resources	Adverse	Low	Regional	Long term	No
Timber resources	Decrease in available land base for timber resources	Adverse	Low	Local	Short term to long term	No
	Disruption to existing forest industry practices	Neutral	No effect	N/A	N/A	No
	Changes to existing timber harvesting practices	Adverse	Low	Regional	Short term	No
		Neutral to positive	No effect to low	Regional	Long term	No
	Loss of timber resources	Adverse	Low	Local to regional	Long term	No
Mineral resources	Decrease in available land base for mining	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Disruption to existing mining operations	Neutral	No effect	N/A	N/A	No
Oil and gas activities	Decrease in available land base for other oil and gas activities	Adverse	Low	Local	Short term to long term	No
	Changes in other oil and gas activities	Positive to adverse	No effect to low	Local to regional	Short term to long term	No
Nontraditional resource harvesting	Decrease in available land base for resource harvesting activities	Adverse	Low	Local	Short term to long term	No
	Change in nontraditional hunting and fishing success	Adverse	Low to moderate	Regional	Short term	No
		Neutral to adverse	No effect to low	Local	Long term	No
	Change in resource harvesting opportunities	Positive or adverse	Low	Local	Short term to long term	No

Table 7-6: Nontraditional Land and Resource Use – Project Effect Attributes for the Sahtu Settlement Area (cont'd)

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Other commercial activities	Decrease in available land base for other commercial activities	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change in other commercial activities	Neutral to adverse	No effect to low	Regional	Short term	No
		Positive to adverse	No effect to low	Regional	Long term	No
Tourism and recreation	Decrease in available land base for tourism and outdoor recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term to long term	No
	Change to tourism and recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No
	Change in quality of tourism and outdoor recreation	Neutral to adverse	No effect to low	Local to regional	Short term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No
NOTES: N/A = not applicable						

Timber Resources

There are no major timber harvesting operations in the DCR. Jean Marie River residents operate a small community lumber mill and log home operation. However, the harvesting area is located outside the pipeline corridor. There is also a sawmill at Checkpoint, but it is not currently being used. Residents harvest fuel wood throughout the DCR and use the highway for access.

Mineral Resources

Mineral showings for copper, iron and zinc have been identified north of Wrigley. A gold deposit (placer) has been reported near the River Between Two Mountains and a zinc deposit has been identified in the Ebbutt Hills area. There are several mineral claims held south of Fort Simpson in the pipeline corridor. The primary minerals sought are unclear as no known mineral deposits exist in this area.

Oil and Gas Activities

Existing petroleum industry activity in the DCR part of the study area is limited to the Enbridge Norman Wells pipeline. The closest locations of other current

activity are the Fort Liard and Cameron Hills areas, both outside the RSA (see Figure 7-9).

Nontraditional Resource Harvesting

Some hunting occurs near the pipeline in the DCR, primarily along:

- the Mackenzie River and Mackenzie Highway
- other highways, winter roads and access roads
- the Enbridge pipeline right-of-way
- seismic lines

Species for which game hunting is permitted in the DCR include:

- black bear
- moose
- woodland caribou
- wolf
- wolverine
- coyote
- small nonfurbearing mammals
- incidental wood bison hunting

Game bird hunting for ptarmigan and grouse is permitted. The study area does not traverse any designated guide–outfitter areas in the DCR.

No commercial or domestic fishing takes place within the RSA in the DCR. GNWT RWED licenses sport fishing in the DCR. Most sport fishing takes place along the road system near Fort Simpson, only a small part of which is in the RSA. Sport fish species present in the DCR include:

- Arctic grayling
- burbot
- bull trout
- inconnu
- lake trout
- northern pike
- walleye
- whitefish

One trapping licence is issued to a resident of Liidlii Kue. However, the trapping area is west of Wrigley, well away from the study area. It is likely that on completion of the claims process, the Deh Cho First Nation will introduce trapping regulations similar to those applied in the GSA and SSA.

Figure 7.9 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Other Commercial Activities

There are some minor areas of forage crop production near Fort Simpson. The Mackenzie Highway is a transportation corridor for trucks carrying goods to the valley communities. The Mackenzie River is an important transportation corridor for barges and other boats that deliver goods to many of the towns along its banks, and communities on the Beaufort Sea and in other parts of the Arctic.

Tourism and Recreation

Several tourism-based businesses operate in the area that might be traversed by the pipeline corridor. Activities offered include:

- boat charters
- river cruises
- day trip fishing charters for walleye and pike
- package vacations
- various tours of the DCR from Fort Simpson
- canoeing
- sightseeing
- bush camps
- road safaris
- Wrigley community tours
- hiking
- mountain biking

Recreationalists frequently use all-weather and winter road corridors throughout the DCR, particularly in the Fort Simpson area, for touring by snowmobile or all-terrain vehicle.

7.2.7.2 Assessment and Management of Project-Specific Effects

Project-Specific effects for the DCR are discussed for each land and resource use VC. These potential effects are specific to the DCR.

Land Ownership

No project effects are expected on land ownership in the DCR. There are Sahtu private lands located within the DCR boundary (see Figure 7-8, shown previously). For federal Crown and Sahtu private lands, it is expected that the necessary permissions for project components will be obtained from the Government of Canada or the Sahtu Land Administration.

The infrastructure sites are being installed at existing locations in the towns of Fort Simpson and Hay River, so no issues with zoning are expected. As there is

no zoning conflict, it is expected that permission will be obtained from the towns to install those project components.

Granular Resources

General project effects on granular resources are discussed in Section 7.2.2.2, Granular Resources. There are no additional specific effects expected for granular resources in the DCR.

Timber Resources

General project effects on timber resources are discussed in Section 7.2.2.3, Timber Resources. There are no additional specific effects expected for timber resources in the DCR.

Mineral Resources

There are several mineral claims in the RSA near Fort Simpson. The project proponents will inform the owners of these claims and permits about project plans, to ensure any potential conflicts with the project are addressed. There are few other mineral showings currently identified in the DCR, so the potential for effects on future mining opportunities is low.

Oil and Gas Activities

With the exception of the Norman Wells pipeline, there is very little oil and gas activity taking place in the RSA, so no adverse effects in other oil and gas operations are expected. However, there is the possibility that the project will encourage oil and gas activity because of the promise of an efficient method of moving product. The current Norman Wells pipeline, which is loosely paralleled by the project pipeline, is not likely to be adversely affected by the project.

Nontraditional Resource Harvesting

General project effects on nontraditional resource harvesting are discussed in Section 7.2.2.6, Nontraditional Resource Harvesting. There are no additional specific effects expected for nontraditional resource harvesting in the DCR.

Other Commercial Activities

General project effects on other commercial activities are discussed in Section 7.2.2.7, Other Commercial Activities. There are no additional specific effects expected for other commercial activities in the DCR.

Tourism and Recreation

Noise produced by the sites could affect tourism and recreation into operations in the LSA of the facilities. However, few of these activities occur in the local area of the Blackwater River or Trail River compressor stations because of their relatively remote locations. Further information on the effects of noise can be found in Volume 5, Section 3, Noise.

Summary of Project-Specific Effects

Table 7-7 summarizes the expected project effects in the DCR, and the direction, magnitude, geographic extent and expected duration of those effects, discussed previously.

Table 7-7: Nontraditional Land and Resource Use – Project Effect Attributes for the Deh Cho Region

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Land ownership	Contravention of zoning bylaws or land access requirements	Neutral	No effect	N/A	N/A	No
Granular resources	Decrease in available land base for granular extraction	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change to existing granular operations	Positive or adverse	Moderate	Local to regional	Short term	No
		Positive	Low	Regional	Long term	No
	Loss of granular resources	Adverse	Moderate	Regional	Short term to long term	No
		Adverse	Low	Regional	Long term	No
	Net effect on granular resources	Adverse	Low	Regional	Long term	No
Timber resources	Decrease in available land base for timber resources	Adverse	Low	Local	Short term to long term	No
	Disruption to existing forest industry practices	Neutral	No effect	N/A	N/A	No
	Changes to existing timber harvesting practices	Adverse	Low	Regional	Short term	No
		Neutral to positive	No effect to low	Regional	Long term	No
	Loss of timber resources	Adverse	Low	Local to regional	Long term	No
Mineral resources	Decrease in available land base for mining	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Disruption to existing mining operations	Neutral	No effect	N/A	N/A	No

Table 7-7: Nontraditional Land and Resource Use – Project Effect Attributes for the Deh Cho Region (cont'd)

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Oil and gas activities	Decrease in available land base for other oil and gas activities	Adverse	Low	Local	Short term to long term	No
	Changes in other oil and gas activities	Positive to adverse	No effect to low	Local to regional	Short term to long term	No
Nontraditional resource harvesting	Decrease in available land base for resource harvesting activities	Adverse	Low	Local	Short term to long term	No
	Change in nontraditional hunting and fishing success	Adverse	Low to moderate	Regional	Short term	No
		Neutral to adverse	No effect to low	Local	Long term	No
	Change in resource harvesting opportunities	Positive or adverse	Low	Local	Short term to long term	No
Other commercial activities	Decrease in available land base for other commercial activities	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change in other commercial activities	Neutral to adverse	No effect to low	Regional	Short term	No
		Positive to adverse	No effect to low	Regional	Long term	No
Tourism and recreation	Decrease in available land base for tourism and outdoor recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term to long term	No
	Change to tourism and recreation activities	Neutral to adverse	No effect to low	Local to regional	Short term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No
		Neutral to adverse	No effect to low	Local to regional	Short term	No
		Positive to adverse	No effect to low	Local to regional	Long term	No

NOTES:
N/A = not applicable

7.2.8 Nontraditional Land and Resource Use – Northwestern Alberta

7.2.8.1 Existing Baseline Conditions

Land Ownership

Lands traversed by the project in northwestern Alberta are all provincial Crown lands, administered by Alberta Sustainable Resource Development.

Granular Resources

There are no known granular resources in the study area in northwestern Alberta.

Timber Resources

In northwestern Alberta, all of the study area is in Forest Management Unit 20. There are no Forest Management Agreements currently in place in this area.

Mineral Resources

No mines or areas of mineral exploration are located near the study area in northwestern Alberta. There are currently no coal dispositions in this area.

Oil and Gas Activities

Several existing oil and gas developments are located in the study area in Alberta. Developments include seismic exploration, well sites and pipelines. The companies involved in these activities include NOVA Gas Transmission Ltd. (NGTL), Talisman Energy, Husky Oil Operations Ltd. and Archean Energy Ltd.

Nontraditional Resource Harvesting

Alberta Sustainable Resource Development regulates hunting in Alberta. The study area is located in Wildlife Management Unit 539, where there are currently nine guide–outfitter licences issued. It is unclear how much guided hunting occurs on or near the pipeline corridor, although all of the nine outfitters are authorized to hunt black bear or moose.

The general hunting season for white-tailed deer, mule deer, moose, spruce grouse, sharp-tailed grouse and ruffed grouse extends from early September to late November. The general hunting season for black bear runs from early September to late November and from mid-April to early July. Duck, coot, common snipe, white-fronted goose, snow goose, Ross' goose and ptarmigan can be hunted from early September to mid-December. In northwestern Alberta, the pipeline corridor traverses Registered Fur Management Areas 99 and 224.

There is currently no domestic or commercial fishing in the northwestern Alberta part of the study area. Alberta Sustainable Resource Development licences sport fishing in Alberta. Bistcho Lake, located east of the pipeline corridor, is very popular for sport fishing. Sport fish species found in waterbodies in the study area in northwestern Alberta include:

- Arctic grayling
- walleye
- burbot

- northern pike
- whitefish

Other Commercial Activities

Because of the remote nature of the project area in northwestern Alberta, no other commercial activities have been identified or are likely to be present.

Tourism and Recreation

Recreational activities in the northwestern Alberta part of the study area are limited because of the remoteness of the area.

7.2.8.2 Assessment and Management of Project-Specific Effects

For each of the land and resource use VCs, project-specific effects for northwestern Alberta are discussed.

Land Ownership

No project effects are expected on land ownership in northwestern Alberta. It is expected that the necessary permissions for components will be obtained from the Government of Alberta.

Granular Resources

There are no granular resources or mineral deposits currently identified in the RSA, so there will be no effects on these resources.

Timber Resources

Installation and operation of the northwestern Alberta part of the project will have no effects on commercial forestry operations as there are no major forest industry practices in the RSA. Because of its current remote nature, it is also unlikely that any individuals harvest wood from the RSA in northwestern Alberta. However, clearing of timber for the project in northwestern Alberta will result in a decrease in the available supply of timber in the LSA. If required, removed timber will be salvaged.

Mineral Resources

There are no mining operations or mineral deposits currently identified in the RSA, so there will be no effects on these resources.

Oil and Gas Activities

Other oil and gas operations should not be affected by the northwestern Alberta part of the project. Oil and gas development in northwestern Alberta is quite

extensive, and other oil and gas developers in this area have experience in working around each other with limited delays.

Nontraditional Resource Harvesting

Activities taking place in northwestern Alberta throughout the life of the project are not likely to affect nontraditional resource harvesting. This area is remote and is not likely to be visited by hunters or fishers. Further information regarding the potential project effects on wildlife can be found in Volume 5, Section 10, Wildlife.

Other Commercial Activities

As it is unlikely that any other commercial activities take place in the project area in northwestern Alberta, there will be minimal effects on other commercial activities in this area.

Tourism and Recreation

Activities taking place in northwestern Alberta throughout the life of the project are not likely to affect tourism and recreational activities. This area is remote and is not likely to be visited by tourists or recreational users.

Summary of Project-Specific Effects

Table 7-8 summarizes the expected project effects in northwestern Alberta, and the direction, magnitude, geographic extent and expected duration of those effects, discussed previously.

There are no significant effects predicted for nontraditional land and resource use. The magnitude of most project effects on nontraditional land and resource use is low to moderate. They will occur within a local or regional geographic extent. Project effects on land and resource use are expected to be greatest during construction and decommissioning because of the presence of heavy machinery, equipment, many workers, camps and extensive activity in the region. There will be fewer effects during operations because of a much lower level of activity required once the project is operational.

Table 7-8: Nontraditional Land and Resource Use – Project Effect Attributes for Northwestern Alberta

Valued Component	Effect	Effect Attribute				Significant
		Direction	Magnitude	Geographic Extent	Duration	
Land ownership	Contravention of zoning bylaws or land access requirements	Neutral	No effect	N/A	N/A	No
Granular resources	No effects are expected	N/A	N/A	N/A	N/A	No
Timber resources	Decrease in available land base for timber resources	Adverse	Low	Local	Short term to long term	No
	Disruption to existing forest industry practices	Neutral	No effect	N/A	N/A	No
	Changes to existing timber harvesting practices	Neutral	No effect	N/A	N/A	No
	Loss of timber resources	Adverse	Low	Local	Long term	No
Mineral resources	No effects are expected	N/A	N/A	N/A	N/A	No
Oil and gas activities	Decrease in available land base for other oil and gas activities	Neutral to adverse	Low	Local	Short term to long term	No
	Change in other oil and gas activities	Neutral to positive	No effect to low	Regional	Short term to long term	No
Nontraditional resource harvesting	Decrease in available land base for resource harvesting activities	Adverse	Low	Local	Short term to long term	No
	Change in nontraditional fishing, trapping and hunting success	Neutral	No effect	N/A	N/A	No
	Change in resource harvesting opportunities	Neutral	No effect	N/A	N/A	No
Other commercial activities	Decrease in available land base for other commercial activities	Neutral to adverse	No effect to low	Local	Short term to long term	No
	Change in other commercial activities	Neutral	No effect	N/A	N/A	No
Tourism and recreation	No effects are expected	N/A	N/A	N/A	N/A	No

NOTE:
N/A = not applicable

7.3 Project Effects on Protected Areas

7.3.1 Effect Pathway

How will the project affect environmentally protected areas?

The effect pathway diagram (see Figure 7-10) shows how construction and operations activities are expected to affect protected areas. The first level in the diagram shows the project phases, construction and operations, and the second level identifies the expected project-specific effects of these activities on protected areas. For example, construction activities in protected areas will lead to a decrease in available land base because of site clearing, and installation of the pipeline, facilities and associated infrastructure. Construction of new permanent and temporary roads for the project will lead to an increase in access to protected areas.

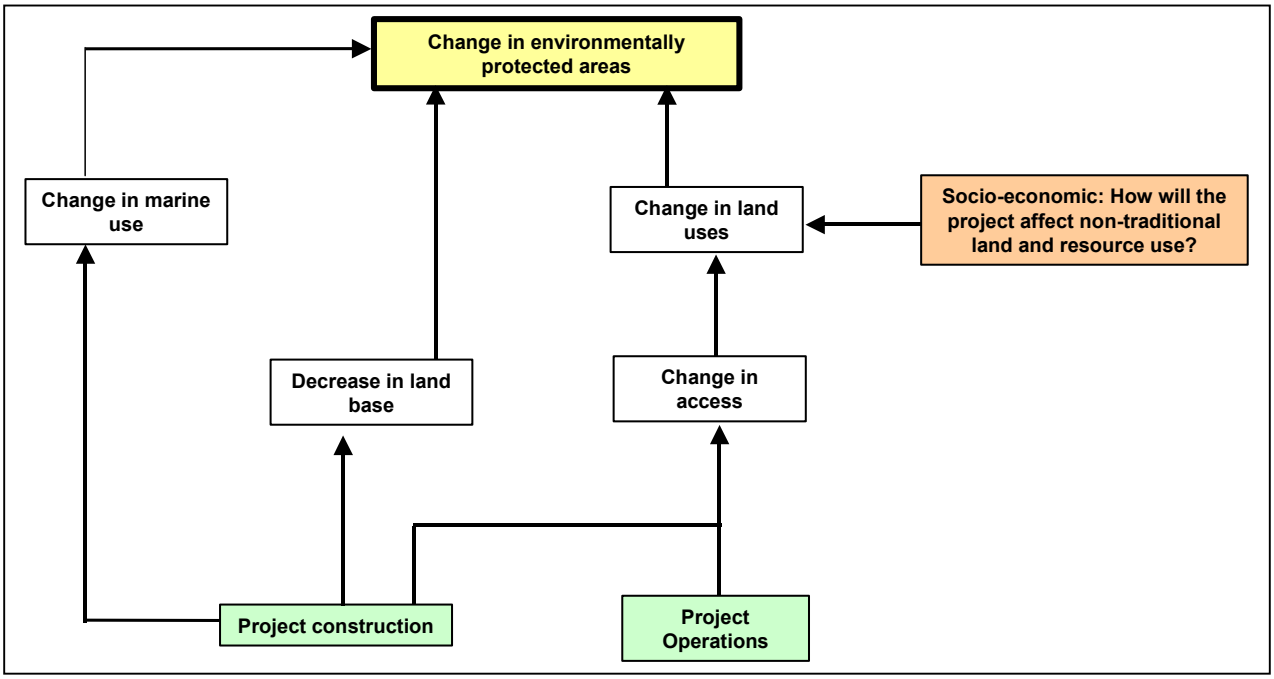

Figure 7-10: Project Effects on Environmentally Protected Areas

The third level in the diagram shows a change in land use in the protected areas as a potential indirect effect. The increased access because of the project could lead to increased use of the areas and new types of land uses could be proposed in these areas. The fourth level of the diagram shows the predicted effect – a change in environmentally protected areas.

The analysis used to assess the magnitude of effects on nontraditional land and resource use is largely qualitative. This is because of several factors, including the inability to quantitatively determine effects on VCs that are not easily defined by

numbers. For example, although the project's encroachment on protected areas can be measured quantitatively, it is difficult to predict a numerical change in recreational activities, or the change in perceived enjoyment. Therefore, professional judgment, supplemented by the results of the EIS public participation process and linkages with other disciplines, was used to determine effect predictions.

7.3.2 Assessment and Management of Project-Specific Effects

Construction of the pipeline and associated project components will overlap with some areas designated for limited development. Construction of the various project components will result in a decrease in the undisturbed area in these areas. However, in all cases, the project will be developed to meet the recommendations or requirements of the various land use plans and regulations that apply.

The importance of managing possible effects on protected areas was discussed during the second nongovernment organization (NGO) workshop in March 2004. As well, participants requested that a landscape approach to terrestrial and marine studies be considered.

The presence of additional temporary and permanent roads for the project could change access to other land uses in protected and proposed protected areas. This could result in changes to other land uses already present in these areas, or in an increase in other land uses. It is expected that other land users will also follow the requirements and recommendations of the applicable land use plan or regulations for development in protected or proposed protected areas.

The Northwest Territories Protected Areas Strategy was reviewed and considered in the assessment of project effects. As previously mentioned, the project encounters only two areas identified under the protected areas strategy. There is potential for other areas along the pipeline corridor to be identified in the future under the protected areas strategy. However, the project has taken a landscape-based approach to the environmental and socio-economic effect assessments, resulting in a 30-km-wide corridor centred on the pipeline. This approach provides an information base for assessing potential effects of the project on any future areas in the pipeline corridor that are identified under the protected areas strategy.

Summary of Combined Effects

Table 7-9 summarizes the expected project effects on protected areas throughout the project area, and the direction, magnitude, geographic extent and expected duration of those effects, discussed previously.

Table 7-9: Protected Areas – Combined Project Effects

Effect	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Loss of available land base in protected areas	Neutral to adverse	No effect to low	Regional	Short term to long term	No
Disturbance to protected areas	Adverse	Moderate	Local and regional	Short term	No
	Adverse	Low to moderate	Local and regional	Long term	No
Disturbance to Beluga Management Zone 1A	Adverse	Low	Local	Short term	No

7.3.3 Mitigation Measures

Before assessing any project effects, mitigation measures must be considered and taken into account. For protected areas, access management will be the primary mitigation measure for controlling the extent that other potential land users, i.e., nontraditional hunters, timber harvesters and tourists, use project roads to access protected areas that were previously inaccessible.

At locations directed by the project proponents' representative, access management techniques could include the following:

- rolling back slash and timber to prevent access along the pipeline right-of-way
- installing slash berms across the pipeline right-of-way or winter road easements
- planting trees or shrubs at potential access points, to visually screen the pipeline right-of-way or road easements

These access controls will be left in place through operations, if needed. In addition, all government guidelines and regulations for activities in protected areas will be followed or, if this is not practical, the project will submit a request for a variance of the guidelines or regulations, if permissible.

For the Alberta portion of the pipeline, NGTL will develop and implement mitigation measures as approved by the appropriate regulatory authority.

7.3.4 Protected Areas – Inuvialuit Settlement Region

7.3.4.1 Existing Baseline Conditions

The following section is a summary of baseline information focusing on protected areas that could be affected by the project. Details on other protected areas in the region are in Volume 4, Section 6, Nontraditional Land and Resource Use.

Community conservation plans have been developed for the Tuktoyaktuk, Aklavik and Inuvik areas in the ISR. The community conservation plans offer guidelines for development that reflect the views of hunters, trappers and anglers in the communities. The guidelines are designed to ensure conservation of renewable resources.

Land use categories identified in the community conservation plan areas range from Category A, lands with no known significant and sensitive cultural or renewable resources, to Category E, lands where cultural or renewable resources are of extreme significance and sensitivity. Land designations in the project area range from Category B, lands where cultural or renewable resources are of some significance, to Category E, lands of extreme significance and sensitivity. These areas are shown in Figure 7-11.

The Kendall Island Bird Sanctuary encompasses 623 km² of the Mackenzie Delta, providing important habitat for waterfowl and shorebirds. The Canadian Wildlife Service manages the site in cooperation with local communities and regional Aboriginal organizations, under the *Migratory Birds Convention Act.*

The proposed Niglintgak barge-based gas conditioning facility might be towed through Kugmallit and Kittigazuit bays to the Mackenzie River, passing through Community Conservation Plan Area 714CDE. The Category E part of this area encompasses a traditional beluga harvesting area. The beluga harvesting area in Kittigazuit Bay is Beluga Management Zone 1A, and is considered a protected area according to the guidelines described in the Inuvialuit Renewable Resource Conservation and Management Plan (Wildlife Management Advisory Council [NWT] and Fisheries Joint Management Committee [FJMC] 1988). Figure 7-12 shows the location of the beluga management zones in the Beaufort Sea, east of Tuktoyaktuk.

Figure 7.11 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Figure 7.12 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

The Beluga Management Plan guidelines for industrial activity in Zone 1A are:

- the oil and gas industry should not be permitted to explore for resources within or on the shores of any Zone 1 waters nor to produce hydrocarbons, or construct or operate any type of facility
- no mining activities, e.g., gravel removal, should be permitted within or on the shores of any Zone 1A waters
- development activities such as hydroelectric or mining projects, even if located outside Zone 1, should be evaluated for their potential deleterious effects on water quality and quantity, or on the salinity and integrity of ice in Zone 1 waters
- all shipping activities, including dredging, should be confined to designated routes and areas. Passage through or close to Zone 1A outside designated routes, even if the shortest route, should be avoided from breakup to August 15
- no port development should be allowed within or on the shores of any Zone 1A waters
- commercial fishing proposals for Zone 1 should be evaluated and regulated with regard to beluga food species

The hunters' and trappers' committees (HTCs) have designated the Kugmallit Bay area as Category C, D, and E. The Tuktoyaktuk Community Conservation Plan makes the following recommendations with respect to industrial activity in Kugmallit Bay (FJMC 1994):

- FJMC should designate a shipping channel through Kugmallit Bay to Tuktoyaktuk Harbour and, if necessary, through Zone 1A, as stipulated in the Beluga Management Plan (see Figure 7-13 for the designated route through Kittigazuit Bay)
- the GNWT RWED and the HTCs should regulate whale-watching tours as stated in the Beluga Management Plan, through application of the *Beluga Protection Regulations* and HTC bylaws
- INAC should ensure no oil and gas seismic or production activities are allowed in Zone 1A of Kugmallit Bay from breakup to August 15, as outlined in the Beluga Management Plan
- FJMC and INAC should ensure that industrial activities or other projects permitted in Zone 2 areas do not adversely affect conservation of beluga and their habitat, as outlined in the Beluga Management Plan

- the Wildlife Management Advisory Council (NWT), Canadian Wildlife Service and INAC should ensure that waterfowl and their habitat are protected from industrial activities and other projects in the area from May 1 to September 30

- FJMC and INAC should ensure seals, their habitat and food sources are protected from July to September during fish runs and migrations

- FJMC and INAC should ensure that no dredging equipment or other facilities are deployed in Kugmallit Bay before the end of the first week of August

- community members should abide by the Beaufort Sea Beluga Management Plan Tourism Guidelines in the ISR

The Beaufort Sea Integrated Management Planning Initiative working group is evaluating the Beaufort Sea Beluga Management Zone 1A area as a possible marine protected area, and is carrying out socio-economic, ecological and technical assessments.

7.3.4.2 Assessment and Management of Project-Specific Effects

Project effects on environmentally protected areas in the ISR are discussed for the anchor fields, gathering system and other project components. These effects are found only in the ISR.

Niglintgak

Development of Niglintgak will result in a decrease in the total land base of the Kendall Island Bird Sanctuary for the life of the project. This could result in an adverse effect on the protected resources in this area, specifically migratory birds. Activities that occur in winter will not have a marked effect on the sanctuary as no birds are present during winter. However, some spring and summer activities will be required, and these activities could affect the migratory bird population that uses the bird sanctuary. Project effects on wildlife are discussed in Volume 5, Section 10, Wildlife.

Figure 7.13 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Community working groups have recommended that there be no nonrenewable resource development and no air traffic within a 16-km radius of the Kendall Island Bird Sanctuary from May 1 to September 30. Currently, discussions are being held with the Canadian Wildlife Service regarding how much area could be developed, and the best ways to reduce disturbance to birds and the Kendall Island Bird Sanctuary.

Niglintgak is located within several areas designated as Inuvialuit Category C lands for:

- spring goose harvesting
- fall goose harvesting
- important migratory bird habitat

The Inuvialuit community conservation plans permit development in these areas, but recommend managing these areas to eliminate potential damage to the greatest practical extent. It is expected that this recommendation will be met following implementation of mitigation measures, outlined in Volume 7, Environmental Management.

A proposed route for bringing the barge-based gas conditioning facility to the Niglintgak site is through Kittigazuit Bay, up East Channel and then down Middle Channel of the Mackenzie River to the Niglintgak site. The Kittigazuit Bay area is Beluga Management Zone 1A and is classified as Category E by the Inuvialuit community conservation plans. All Beluga Management 1A zones are under consideration to become marine protected areas.

Dredging and shipping are permitted in Beluga 1A zones at all times of the year as long as the activity is taking place along a designated route. Designated routes are those marine transportation corridors established, following consultation with the Department of Fisheries and Oceans, by Transport Canada.

A designated shipping route through the Beluga Management 1A Zone is currently used by NTCL for barging activities. The potential dredging and shipping required to transport the Niglintgak barge through this area will have a low-magnitude effect on the management objectives of Beluga Management Zone 1A. There will be disturbance in the local area during activities, but these activities are short term and will only occur during one summer season. These activities could be repeated during decommissioning, likely causing the same level of disturbance as during construction.

Possible project effects on marine mammals were discussed at the second NGO workshop in March 2004. Attendees reiterated that the project needs to follow marine management plans already in place.

Effects that could occur related to the beluga whales and to the traditional beluga hunt because of Niglintgak barge installation are discussed in Volume 5, Section 10, Wildlife. Installation of the Niglintgak gas conditioning facility and other components could affect other land uses in surrounding protected areas.

Taglu

Development of Taglu will result in a decrease in the total land base of the Kendall Island Bird Sanctuary for the life of the project. Effects would be similar to those discussed for Niglintgak.

Taglu is located within several areas designated as Inuvialuit Category C lands for:

- spring goose harvesting
- fall goose harvesting
- important migratory bird habitat

The Inuvialuit community conservation plans permit development in these areas, but recommend managing these areas to eliminate, to the greatest extent practical, potential damage and disruption. Following implementation of mitigation measures, outlined in Volume 7, Environmental Management, it is expected that this recommendation will be met.

Installation at Taglu could affect other land uses in surrounding protected areas.

Parsons Lake

Parsons Lake will be built entirely within areas designated as Inuvialuit Category B and C lands. Construction will result in a reduction of the undisturbed land base in these areas. The Inuvialuit community conservation plans permit development in these areas, but recommend managing them to eliminate, to the greatest extent practical, potential damage and disruption. Following implementation of mitigation measures, outlined in Volume 7, Environmental Management, it is expected that this recommendation will be met.

Access to lands near Parsons Lake will be increased because of construction of a new winter road. This could result in a change in the activities of other land users in the area.

Gathering System and Other Project Components

The part of the gathering system that connects Niglintgak and Taglu and their infrastructure sites is in the Kendall Island Bird Sanctuary. Pipeline and infrastructure site installation will affect previously undisturbed lands in this sanctuary. Community working groups have recommended that there be no

nonrenewable resource development and no air traffic within a 16-km radius from May 1 to September 30. Currently, discussions are being held with Canadian Wildlife Service regarding how much area could be developed and the best ways to reduce disturbance to birds and the Kendall Island Bird Sanctuary. All of the activities associated with gathering system construction will take place during the winter when no migratory birds are present. However, infrastructure installation will require work in the summer. This could result in an adverse effect on the protected resources in this area, specifically migratory birds. Potential project effects on migratory birds are addressed in Volume 5, Section 10, Wildlife.

The remaining lands encountered by the gathering system, other infrastructure sites and borrow sites, are primarily Category C lands, with some project components also falling in areas designated Category B lands. The Inuvialuit community conservation plans permit development in these areas, but recommend managing it to eliminate, to the greatest extent practical, potential damage and disruption. Following implementation of mitigation measures, outlined in Volume 7, Environmental Management, it is expected that this recommendation will be met.

The presence of additional winter roads in the ISR could result in changes to other land uses in protected areas. It is expected that any other land uses that could take place because of this increased access will follow the recommendations of the Canadian Wildlife Service in the Kendall Island Bird Sanctuary, and the recommendations of the community conservation plans for other lands.

Development of the project will provide a travel corridor, resulting in increased access to the lands in the local area of the gathering system. This could result in changes to other land uses within these lands.

Summary of Project-Specific Effects

Table 7-10 summarizes the expected project effects on protected areas in the ISR, and the direction, magnitude, geographic extent and expected duration of those effects.

Table 7-10: Protected Areas – Project Effect Attributes for the Inuvialuit Settlement Region

Effect	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Loss of available land base in protected areas	Neutral to adverse	No effect to low	Regional	Short term to long term	No
Disturbance to protected areas	Adverse	Moderate	Local and regional	Short term to long term	No
Disturbance to Beluga Management 1A Zone	Adverse	Low	Local	Short term to long term	No

7.3.5 Protected Areas – Gwich'in Settlement Area

7.3.5.1 Existing Baseline Conditions

The following section is a summary of baseline information focusing on protected areas that could be affected by the project. Additional details on other protected areas in the region are provided in Volume 4, Section 6, Nontraditional Land and Resource Use.

The Gwich'in Land Use Plan identifies special management zones in which developments must protect valued resources identified by communities, and conservation zones in which industrial activities are usually not permitted. The final federal approval for the Gwich'in Land Use Plan was received in August 2003, officially putting the plan into effect. Figure 7-14 shows the special management areas designated for limited development in the GSA.

The study area traverses five proposed special management zones:

- Campbell Creek Special Management Zone
- Campbell Hills Special Management Zone
- Lakes Around Travaillant Lake Special Management Zone
- Mackenzie River Special Management Zone
- Transportation Special Management Zone

The goal of these areas is to protect important fish and heritage resources by applying certain conditions. During peak fish migration periods in the spring and fall, no new activities requiring permits, licences or authorizations will be allowed in these areas unless it can be demonstrated that no negative effects on fish will occur.

The pipeline route will traverse the proposed Travaillant Lake, Mackenzie/Tree River Conservation Zone in the GSA. Currently, no development activity, including oil and gas development, is permitted in this zone. However, the Gwich'in Land Use Planning Board has acknowledged that the pipeline has a potential use through this area and, with proper planning, the potential negative environmental and cultural effects can be managed.

7.3.5.2 Assessment and Management of Project-Specific Effects

Project effects on environmentally protected areas in the GSA are discussed. These effects are found only in the GSA.

Figure 7.14 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

The pipeline right-of-way traverses Campbell Creek Special Management Zone and Lakes Around Travaillant Lake Special Management Zone. The Inuvik area facility is located in Campbell Creek Special Management Zone. The block valve sites near Fish Trap Lake and Thunder River are both located in Lakes Around Travaillant Lake Special Management Zone. The Campbell Lake infrastructure site is located in Transportation Special Management Zone. Several borrow sites and parts of some of the proposed access roads are also located in several special management zones.

Project component installation in special management zones will result in a decrease in the land base in these areas. The presence of development in the areas traversed by the right-of-way will be a permanent change to the landscape. The Gwich'in Land Use Plan does allow for development in these areas, as long as the conditions outlined in the land use plan are met. These conditions will be met during all phases of the project.

The pipeline right-of-way passes through Travaillant Lake–Mackenzie/Tree River Conservation Zone. During the first ISR–GSA regional technical workshop, representatives from the GSA registered the importance of the Travaillant Lake area as a prime fishing and trapping area for the communities of Fort McPherson and Tsiigehtchic. Currently, no development activity, including oil and gas development, is permitted in this zone. However, the Gwich'in Land Use Planning Board has acknowledged that the pipeline is a potential use through this area and, with proper planning, the potential negative environmental and cultural effects can be managed. The proposed pipeline corridor through this zone will be discussed with the Gwich'in Land Use Planning Board to ensure the board's requirements are met.

The Gwich'in Land Use Plan currently states that developments associated with the pipeline, such as gravel pits, access roads and camps, are not permitted in the Travaillant Lake–Mackenzie/Tree River Conservation Zone. Currently, one borrow site has been proposed in this area. The Gwich'in Land Use Planning Board will be requested to amend the Gwich'in Land Use Plan to allow the project to operate this borrow site. Removal of granular material will have a permanent effect on these areas. However, if the sites are reclaimed or assigned for community use, the effects will be minimal for the protected area and positive for the communities.

Installation of the pipeline and two borrow sites in the conservation zone will result in a decrease in the available land base in these areas. Clearings in the conservation zone will be a permanent change to the landscape.

Development of the project will provide increased access to the special management and conservation zones encountered, particularly for Campbell Creek Special Management Area, which will be accessible by the

permanent access road to the Inuvik area facility. This could result in changes to other land uses already present in these areas or an increase in other land uses because of the increased access. It is expected that other land users will also need to meet the requirements of the Gwich'in Land Use Plan before conducting other land uses in these zones.

Summary of Project-Specific Effects

Table 7-11 summarizes the expected project effects on protected areas in the GSA, and the direction, magnitude, geographic extent and expected duration of those effects.

Table 7-11: Protected Areas – Project Effect Attributes for the Gwich'in Settlement Area

Effect	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Loss of available land base in protected areas	Neutral to adverse	No effect to low	Regional	Short term to long term	No
Disturbance to protected area	Adverse	Moderate	Local and regional	Short term	No
	Adverse	Low	Local	Long term	No

7.3.6 Protected Areas – Sahtu Settlement Area

7.3.6.1 Existing Baseline Conditions

The following section is a summary of baseline information focusing on protected areas that could be affected by the project. Additional details on other protected areas in the region are provided in Volume 4, Section 6, Nontraditional Land and Resource Use.

The Draft Sahtu Land Use Plan, released in January 2003, identifies several special management areas and conservation areas (see Figure 7-15). The pipeline route encounters four special management areas in the SSA:

- Yeltea and Manual Lakes
- Colville Lake Trail
- Lac à Jacques, Turton Lake and Sam Macrae Lake
- the Mackenzie River

The right-of-way also traverses two conservation areas in the SSA:

- Fort Anderson Trail
- Great Bear River

Figure 7.15 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

The Sahtu Land Use Plan specifies that oil and gas exploration and development are acceptable activities in special management areas but are restricted or unacceptable in conservation areas. However, the Sahtu Land Use Planning Board (SLUPB) will likely grant an amendment or exception to allow the pipeline to pass through these areas, as long as amendment procedures and conditions are followed.

The Willow Lake and River area, also referred to as Bracket Lake, is located just north of the Great Bear River, in the pipeline corridor. This area was considered for designation as an International Biological Program site. The reserve was enlarged to include the potential highway and pipeline transportation corridor to monitor the natural recovery processes following human disturbance.

7.3.6.2 Assessment and Management of Project-Specific Effects

Project effects on environmentally protected areas in the SSA are discussed. These effects are found only in the SSA.

Project components will be located in all four Special Management Areas in the SSA.

The Norman Wells and Little Chicago compressor stations are near the Mackenzie River Special Management Area. The Chick Lake block valve site is situated in the Lac à Jacques Special Management Area, and both the Tulita and Little Smith Creek block valve sites are located near the Mackenzie River Special Management Area. Most of the infrastructure sites in the SSA have components in the Mackenzie River Special Management Area. Several of the borrow sites are located in special management areas.

Installation of the project in special management areas will result in a decrease in the total undisturbed land base of these areas. However, the Draft Sahtu Land Use Plan does allow oil and gas development activities in special management areas, if the conditions in the Sahtu Land Use Plan are followed. The project will follow these conditions during all phases.

The pipeline crosses two conservation areas in the SSA. The Loon River block valve site and one borrow site are located near the Fort Anderson Trail Conservation Zone. A part of the Tulita infrastructure site might be located in the Great Bear River Conservation Zone.

Installation of project components in conservation zones will result in a decrease in the total undisturbed land base of these areas. The draft Sahtu Land Use Plan specifies that oil and gas exploration and development is restricted or unacceptable in conservation areas. However, the SLUPB will grant an amendment or exception to allow the pipeline to pass through these areas, as long as amendment procedures and conditions are followed. The project will discuss

these procedures with the SLUPB and determine the necessary steps to allow development of project components in the proposed conservation zones.

The pipeline also passes through the Willow Lake and River area (Bracket Lake) International Biological Program site. This will result in a loss of land base in this area, but as noted in the baseline (see Volume 4, Socio-Economic Baseline), the International Biological Program site was enlarged to include the potential highway and pipeline transportation corridor to monitor the natural recovery processes following human disturbance. The winter road and Enbridge pipeline also run through the same part of this International Biological Program site.

Development of the project, particularly the access roads, will provide increased access to the special management and conservation areas traversed by the right-of-way. This could result in changes to other land uses already present in these areas or an increase in other land uses. It is expected that other land users will also need to meet the requirements of the Sahtu Land Use Plan before conducting other land uses in these zones.

Comments received during the first Sahtu regional technical workshop indicated concerns with possible project effects on increasing access to fish habitat and increasing pressure on sensitive harvesting areas. Earlier in the public participation process (November 2001), the Sahtu Land and Water Board identified concerns regarding effects on recreational areas.

Summary of Project-Specific Effects

Table 7-12 summarizes the expected project effects on protected areas in the SSA, and the direction, magnitude, geographic extent and expected duration of those effects.

Table 7-12: Protected Areas – Project Effect Attributes for the Sahtu Settlement Area

Effect	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Loss of available land base in protected areas	Neutral to Adverse	No effect to low	Regional	Short term to long term	No
Disturbance to protected area	Adverse	Moderate	Local and regional	Short term	No
	Adverse	Low	Local	Long term	No

7.3.7 Protected Areas – Deh Cho Region

7.3.7.1 Existing Baseline Conditions

The following section is a summary of baseline information focusing on protected areas that could be affected by the project. Additional details on other protected

areas in the region are provided in Volume 4, Section 6, Nontraditional Land and Resource Use.

There are several existing and proposed protected areas in the DCR located near the study area (see Figure 7-16).

The Edéhzhíe Candidate Protected Area in the DCR was withdrawn from development under the Northwest Territories Protected Areas Strategy process. This area includes a large part of land known as the Horne Plateau and extends west to the Mackenzie River along the Willowlake River Valley. The *Guidelines for Interim Protection* stipulate that no new dispositions will be granted in the area, but that existing rights will be honoured. The candidate area includes the Enbridge Norman Wells pipeline right-of-way and the Mackenzie Highway. There are provisions for a pipeline corridor at the western tip of Edéhzhíe.

The Protected Areas Strategy has designated Pehdzeh Ki Deh, near Wrigley, as an area of interest for its lakes and watersheds, and traditional use by Pehdzeh Ki First Nation people. This area is important for protecting sacred sites of the Pehdzeh Ki First Nation.

Liard River Crossing Territorial Park is located on the east side of the Liard River, south of Fort Simpson, less than 5 km west of the pipeline corridor.

7.3.7.2 Assessment and Management of Project-Specific Effects

Project effects on environmentally protected areas in the DCR are discussed for the anchor fields, gathering system and other project components. These effects are found only in the DCR.

A part of the pipeline right-of-way and one borrow site are in the Edéhzhíe Candidate Protected Area. Project component construction will result in a loss of available undisturbed land base in this area. Lands in the Edéhzhíe Candidate Protected Area have been withdrawn, meaning no new developments are permitted in this area for five years. However, a 4-km development corridor, centred on the existing Enbridge pipeline, has been excluded from the land withdrawal. This development corridor encompasses the existing Mackenzie Highway, and the current project route and borrow site location in the Edéhzhíe Candidate Protected Area.

Figure 7.16 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

A part of the proposed pipeline, the Blackwater River compressor station, the Ochre River and Smith Creek infrastructure sites, and several borrow sites, are located in the Pehdzeh Ki Deh Area of Interest. Project component construction will result in a loss of available undisturbed land base in this area. In addition, the pipeline generally parallels the existing Enbridge pipeline, Mackenzie Highway and a winter road. Currently, no restrictions to development are in place in the Pehdzeh Ki Deh Area of Interest.

The Liard Ferry Crossing infrastructure site is located near Liard River Crossing Territorial Park, which is adjacent to the Mackenzie Highway, a major transportation route in the area. Activities in and around Liard Ferry Crossing could disturb individuals using the park. However, the bulk of project activity in this area will occur in the winter, and the Liard River Crossing Territorial Park is used primarily in the summer. As the bulk of project activities will occur when the park is not in use, effects will be greatly reduced. However, some activities will still take place during the summer, and this could affect users of the park. If necessary, discussions will be held with GNWT RWED to ensure that disturbance to this park is reduced.

Development of project components, particularly the pipeline and access roads, could provide increased access to the protected and proposed protected areas traversed by the right-of-way. This could result in changes to other land uses already present in these areas or an increase in other land uses. It is expected that other land users will also follow the requirements for development in protected or proposed protected areas.

Summary of Project-Specific Effects

Table 7-13 summarizes the expected project effects on protected areas in the in the DCR, and the direction, magnitude, geographic extent and expected duration of those effects.

Table 7-13: Protected Areas – Project Effect Attributes for the Deh Cho Region

Effect	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Loss of available land base in protected areas	Neutral to adverse	No effect to low	Regional	Short term to long term	No
Disturbance to protected areas	Adverse	Moderate	Local and regional	Short term	No
	Adverse	Low	Local	Long term	No

7.3.8 Protected Areas – Northwestern Alberta

7.3.8.1 Existing Baseline Conditions

In northwestern Alberta, the project lies in a Caribou Protection Area. The study corridor does not traverse any other existing or proposed protected areas in Alberta.

7.3.8.2 Assessment and Management of Project-Specific Effects

Development of the Alberta part of the project will result in a loss of undisturbed land base in a Caribou Protection Area. As required by regulations, a Caribou Protection Plan will be developed for this area and project activities will be required to meet the conditions set in the plan to reduce disturbance to caribou.

Summary of Project-Specific Effects

Table 7-14 summarizes the expected effects from the project on protected areas in northwestern Alberta, and the direction, magnitude, geographic extent and expected duration of those effects.

The magnitude of project effects on protected areas will be low to moderate, and effects will be local or regional in extent. Effects are expected to be greatest during construction and decommissioning because of the presence of heavy machinery, equipment, many workers, camps and extensive activity in the region. There will be fewer effects during operations because of the much lower level of activity required once the project is operational. Adverse effects on protected areas could exceed guidelines but will not limit the opportunities of current generations beyond the lands assigned to the project.

Table 7-14: Protected Areas – Project Effect Attributes for Northwestern Alberta

Effect	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Loss of available land base in protected areas	Neutral to adverse	No effect to low	Regional	Short term to long term	No
Disturbance to caribou protected area	Adverse	Moderate	Local and regional	Short term	No
	Adverse	Low	Local	Long term	No

7.4 Project Effects on Visual and Aesthetic Resources

How will the project affect visual and aesthetic resources?

Visual resources are defined as the land, water, vegetation, animals and structures visible on the land (U.S. Bureau of Land Management 1998). Concern about

effects on visual and aesthetic resources was identified during the EIS public participation process.

An assessment of potential project effects on visual and aesthetic resources is presented in the following subsections.

7.4.1 Key Visual and Aesthetic Resources Issues

Several project components or activities could cause a change in the visual resources of an area in which a project is located. These include:

- areas of clearing, such as pipeline rights-of-way, seismic lines, well pads and green trails
- light pollution
- ice fog and water vapour
- noise
- above-ground pipelines
- compressor stations
- gas processing facilities
- other project-related facilities and infrastructure

Each potential effect is described, followed by an explanation of the effect pathway diagram.

7.4.1.1 Pipeline Rights-of-Way, Seismic Lines, Well Pads and Green Trails

The proposed pipeline rights-of-way range from 30 to 50 m wide. Most rights-of-way are revegetated after construction, but a trail will still be visible, particularly viewed from the air. Climate limitations could also hinder revegetation success.

Revegetation of seismic lines and drill pads in northern conditions can be problematic, and takes time. There could be a long-term visual effect because of slow revegetation. Permafrost could melt beneath the surface structure, which in turn changes the temperature regime of the soil and resulting plant composition. This could result in a difference in appearance along seismic lines and where drill pads were located (U.S. Bureau of Land Management 1998).

Winter construction activities use winter roads to move vehicles and equipment. However, compaction of snow and vegetative matter could result in greater availability of moisture and nutrients for underlying vegetation the following

growing season. This can result in *green trails* (U.S. Bureau of Land Management 1998). These trails do not necessarily develop over the entire route of an overland move but when they do, they can be detectable from the air for two to five years, or in some cases even longer. However, they might not be recognizable from the ground.

7.4.1.2 Light Pollution

Light pollution is caused by urban and rural industrial lighting, and affects both city and rural residents. Sources of light pollution include:

- vehicles
- flares
- lighting around project facilities

The light could be present for a short time, periodically or semipermanently. The quality of light varies according to activity and facility. Lighting will be used during nondaylight hours which, during the winter months, might mean periods where lighting is required on a 24-hour basis. Conversely, during the late spring and through summer months, lighting will not be required at all because of the extended daylight hours.

The visual effect of lighting can be partially reduced by using lighting design features such as shields, and through proper placement and use of lighting only in areas where it is required.

7.4.1.3 Ice Fog and Water Vapour

Ice fog and water vapour plumes will be generated at various project facilities, resulting in noticeable features on the landscape and potential visibility problems. At ambient temperatures of -29°C or cooler, water vapour emitted from equipment and vehicle operations at facilities could contribute to periodic ice fog (U.S. Bureau of Land Management 2002).

Participants at the first ISR–GSA regional technical workshop noted concerns with ice fog causing delays and potential safety issues in air travel. The aesthetic issue of pollution from idling vehicles creating a haze and smell was also raised.

7.4.1.4 Noise

Construction and operations activities often generate noise, from heavy equipment, compressor stations and even from flaring activities. This noise could in turn affect the aesthetic resources of an area. See Volume 5, Section 3, Noise, for more specific information on effects of project-related noise.

7.4.2 Effect Pathway

Figure 7-17 shows the predicted effect pathways for visual and aesthetic resources.

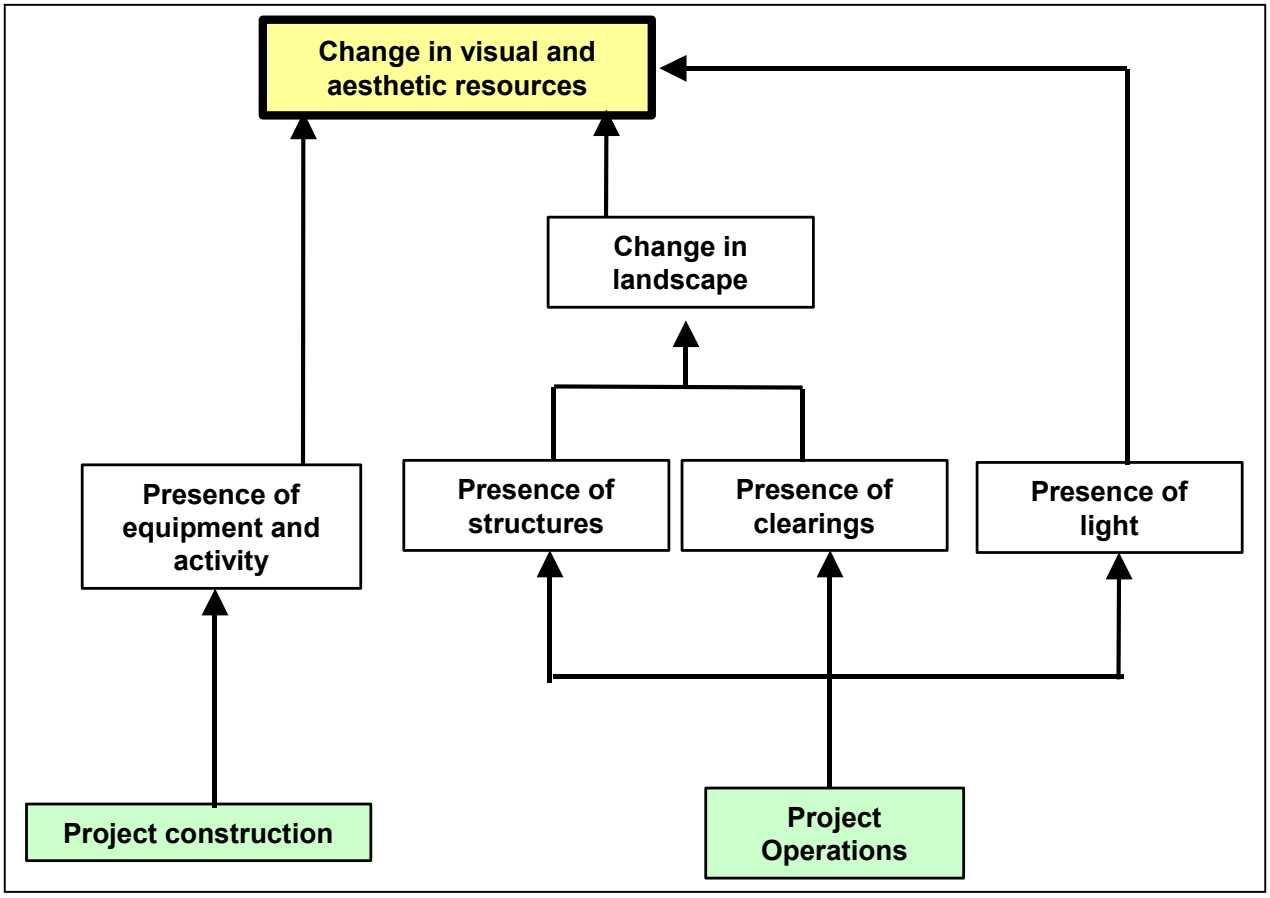

Figure 7-17: Project Effects on Visual and Aesthetic Resources

The effect pathway diagram shows how construction and operations activities are expected to affect visual and aesthetic resources. The first level shows the direct effects. For example, construction will bring about the presence of equipment and activity in an area that has been previously undisturbed. This could cause sensory disturbance to people using the area or observing it from above.

Operations will bring about structures, clearings and lights, which in turn will lead to a change in the landscape. There could be ice fog during cold weather, lights will be visible during the winter dark season and flares could be present.

Decommissioning will reduce the effect on visual and aesthetic resources by removing structures, traffic and the human presence of the project, except for the footprint left on the landscape. This could take longer to return to baseline

conditions, because of the length of time required for revegetation in the northern climate.

7.4.3 Assessment and Management of Project-Specific Effects

Project effects on visual and aesthetic resources in the anchor fields will vary compared with the remainder of the project components. However, when looking at combined project-specific effects, they will be most noticeable on the ground at a local scale, or from the air on a regional scale.

Most effects will be felt during construction, when facilities and other project components are first installed. Construction of the pipeline corridor, and facility, infrastructure and borrow sites will involve:

- site clearing
- terrain modification
- noise
- traffic
- smoke and exhaust
- lights
- a general change in the landscape

This will lead to an adverse effect on visual and aesthetic resources. However, for the most part, the effect will be local. Locating infrastructure sites on previously disturbed areas or at existing sites will greatly reduce the potential effects associated with developing a new area. Where practical, lighting will be placed to light only required areas.

Effects on visual and aesthetic resources during operations will be most strongly associated with facilities, as there will be noise, lights, and other sources of visual and aesthetic disturbance. The effect could be adverse for those who are disturbed by the presence of light on the landscape, or could be positive for those who use the light as a landmark or navigational aid. Where practical, lighting will be placed to light only required areas. Presence of the pipeline right-of-way will cause some effect because of the wide clearing, but the effects should be local.

Progressive reclamation will help reduce effects on visual and aesthetic resources. However, climate and terrain limitations will restrict the short-term benefits of reclamation activities. Following completion of construction, and decommissioning and abandonment, some seeding and revegetation efforts will speed up the recovery of native vegetation in disturbed areas. This will help reduce visual project effects. Seeding and revegetation will follow the reclamation strategies and guidelines in Volume 7, Environmental Management.

During decommissioning and abandonment, there will be construction activity and equipment in some areas to remove facilities, roads and other features. Although borrow sites will be recontoured and revegetated, there will still be obvious clearings where sites were located. Reclamation of all project features will be ongoing, and the degree of effect on visual and aesthetic resources will depend on the time it takes for reclamation to bring the land back to a condition similar to the surrounding land.

Summary of Combined Effects

Table 7-15 summarizes the expected combined effects from the project on visual and aesthetic resources in the project area, and the direction, magnitude, geographic extent and expected duration of those effects.

Table 7-15: Visual and Aesthetic Resources – Combined Project Effects

Effect	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Effect of change in landscape on people travelling in the area or on local land users	Adverse	Low to moderate	Local to regional	Long term	No

7.4.4 Mitigation Measures

Mitigation techniques will be used to decrease the effect of project components on visual and aesthetic resources, including:

- using existing disturbed areas for infrastructure sites to reduce development effects, where practical
- using terrain features or vegetation, e.g., forest in the southern regions of the project, to screen ground facilities from view of other land and resource users, where practical. Guidelines for installing a visual screen to reduce line-of-sight are included in Volume 7, Environmental Management.
- placing lighting to illuminate only required areas, where feasible
- managing the need for, and duration of, flaring
- seeding and revegetating disturbed areas after construction and decommissioning to speed up recovery of native vegetation, and reduce effects on visual and aesthetic resources. Revegetation guidelines and the reclamation strategy are described in detail in Volume 7, Environmental Management.

Methods

Project effects on visual and aesthetic resources were determined:

- qualitatively
- using Geographic Information System (GIS) modelling

The qualitative assessment was based on the notion that the presence of industrial construction and operations activities in previously undisturbed areas could have an effect on the visual and aesthetic resources of the area.

Viewshed modelling was done for selected areas and project components, including the:

- facility building and predicted ice fog and water vapour plumes at Niglintgak
- facility buildings at Taglu and Parsons Lake
- facility building and predicted ice fog and water vapour plumes at the Inuvik area facility

Computer modelling for the viewshed assessment was done using the GIS program ArcGIS, mapping information and terrain features information, including terrain data acquired from Canadian Digital Elevation Data. Project design information for modelling features was then added, including building locations and heights, and the locations and heights of water vapour plumes.

Modelling was also done to determine the potential visibility of ice fog and water vapour plumes created from water vapour released from compressor facilities during cold weather. The air quality team used standard methodologies to determine visible plume heights at the Niglintgak and Inuvik area facility compressors for each month of the year. Niglintgak was chosen for modelling as it is the anchor field nearest the ocean (moisture source) and visible plumes are more likely there than at the Taglu and Parsons Lake facilities. Plume heights were not determined for months with no daylight hours, as plumes would be visible during daylight only.

Once plume heights were determined for a variety of scenarios, the monthly average for the 50^{th} percentile, i.e., the average plume height, and 95^{th} percentile plume were used to model potential visibility. The 95^{th} percentile plume was used for this assessment because the maximum (100 percentile plume) is expected to occur very rarely, so the 95^{th} presents a more realistic situation.

In Figures 7-18 to 7-21, potential visibility is shown using colour splotches. Potential visibility means there is a clear line of sight between the feature, i.e., the plume or facility, and the coloured area on the map. These figures show the potential visibility under optimum conditions and do not take into account:

- climatic conditions, such as cloud cover
- mitigation techniques, such as vegetative screening
- individual observer variations. An individual observer might only be able to see for 5 or 10 km, even when there is a much longer clear line of sight. In addition, the terrain information used for modelling is not sensitive enough to account for small terrain features that could obscure a particular project feature from view.

Project effects on visual and aesthetic resources for each individual will be greatly influenced by that person's perception of the disturbance. Some individuals might consider even a small clearing to be a significant effect, whereas others might have a much higher threshold for acceptance of changes to the landscape. This assessment does not test the project effects in terms of individual perceptions.

7.4.5 Visual and Aesthetic Resources – Inuvialuit Settlement Region

7.4.5.1 Existing Baseline Conditions

Niglintgak has no all-weather roads, but there is evidence of past winter roads, seismic lines, old well pads and gravel stockpiles. The area is mostly floodplain with patterned ground, dwarf shrubs and large quantities of water. Beach ridges occur throughout the lease.

Taglu has a telecommunications tower and all-weather gravel roads connecting some of the old well pads. There is some evidence of winter roads, e.g., green lines through the tundra, and also of old well pads and gravel stockpiles left behind from past activity, e.g., tubes sticking out of the ground. The area is mostly floodplain with patterned ground, dwarf shrubs and large quantities of water. There are pingos on the eastern side of the lease area.

Parsons Lake is an upland area with dwarf shrubs, upland plant communities and large quantities of water. It is adjacent to the North Storm Hills, which have an elevation of up to 250 m. The terrain is very hilly. There is evidence of an old camp on the lakeshore, old pad sites, seismic lines and an old road.

The northernmost part of the gathering system is in the Mackenzie Delta floodplain. This area is low and subject to annual flooding. Vegetation is low, with some shrubs on drained sites. The terrain is fairly flat.

Farther south, the mainland part of the gathering system is higher in elevation and is not subject to annual flooding. Vegetation communities are more varied, and include upland varieties and shrubs. The Holmes Creek area and a part of the outer Parsons Lake lease are the only two forested areas in the project area. Holmes Creek has black spruce and shrub communities, whereas cottonwoods have been found at the edge of the Parsons Lake lease.

Infrastructure sites, other than those at the anchor fields, will primarily be located in areas where there are existing developments, some that are active, some partially reclaimed. For example, Camp Farewell, Swimming Point, Lucas Point and Tununuk (Bar C) sites, all have some existing infrastructure. Camp Farewell and Swimming Point are industrial staging sites, with camps, airstrips, barge landings and fuel storage. Lucas Point is an industrial staging site with a barge landing, an airstrip and a seasonal camp facility. Tununuk Point, or Bar C, was an exploratory staging site that has been partially reclaimed. Remnants of a camp remain on the site, and there is an airstrip and a barge landing.

7.4.5.2 Assessment and Management of Project-Specific Effects

Project effects on visual and aesthetic resources in the ISR are discussed for the anchor fields, gathering system and other project components. These effects are found only in the ISR.

Niglintgak

Current design plans for Niglintgak include three drill sites and well pads, wells, granular pads, above-ground flow lines and a gas conditioning facility. The preferred option is a barge-based facility instead of a land-based facility. Placement of these components, as well as construction, operations and decommissioning, all have the potential to affect visual and aesthetic resources. Wherever practical, existing locations have been used when planning locations for project components, which will help reduce effects at this location.

Construction activities, including site clearing and flow line construction, will bring a new industrial presence to the area. This will change the visual quality of the area for people using the area or observing it from above. The effects will be most evident during spring and summer, when there is sufficient daylight for travelling in this area.

Effects because of operations activities will include the presence of structures, including a barge-based gas conditioning facility, above-ground pipeline, flares and lights, which in turn will lead to a change in the visual landscape. There could be ice fog during cold weather which, if lit by facility lighting, might be visible to hunters during the winter, and might be visible on colder days during daylight hours. Lights will be visible during the winter dark season and flares could be present.

Lighting at the anchor fields will be particularly noticeable during winter months when there is little daylight. Although the sun does not rise above the horizon, there is light for a few hours each day. However, lighting will be required 24 hours a day. Lighting will be noticeable from the ground or the air. Given the flat topography of the area, these lights could be noticeable from a distance. The effect could be adverse for those who are disturbed by the presence of light on the landscape, or could be positive for those who use the light as a landmark or navigational aid.

During both construction and operations, local resource harvesters who use the land during spring or winter hunting seasons when lighting would be visible would be affected most by the visual effect of the anchor field.

The anchor fields will also be visible from the air. Aircraft travel between Inuvik, Tuktoyaktuk, camps such as Swimming Point, other tourism destinations, and oil and gas camps is quite common during spring and summer. Many flights between Inuvik and Tuktoyaktuk either follow a direct line or East Channel of the Mackenzie River. Arctic Nature Tours flies to a variety of areas in or near the Mackenzie Delta. Some of these flights might pass over Niglintgak. Other tour operators flying in and around the Kendall Island Bird Sanctuary will also likely pass over Niglintgak.

When practical, mitigation measures will include placing lighting only where necessary, and flaring only when required.

The barge-based gas conditioning facility will not change the nature of effects on visual and aesthetic resources, although the presence of such a facility on a channel of the Mackenzie River might or might not be an issue for some observers.

Figure 7-18 shows the potential visibility of facility buildings at Niglintgak. Because of the flat topography, there is a clear line of site from areas 30 km away in the south, just north of the Yaya River, and about 12 km away in the north, near the beginning of Middle Channel of the Mackenzie River, and potentially to Garry, Pelly and Hooper islands. Actual visibility depends on weather conditions, i.e., cloudy or clear, and the ability of the observer to see over that distance.

Predicted water vapour plume heights for the Niglintgak gas conditioning facility range from an average 4 m high, 50% of the time, to an average 69 m high, 5% of the time. The yearly average predicted height is 16 m.

Figure 7-18 also shows the potential visibility of the 50^{th} and 95^{th} percentile water vapour plumes from the Niglintgak gas conditioning facility. These figures show that the line of site for the average plume (50^{th} percentile) is similar to potential visibility of the facility itself. However, the potential visibility for the maximum plume (95^{th} percentile) increases to an area about 80 km across, and might be seen

from as far away as Ellis Island and Beluga Bay, and places in between. The actual visibility will depend on weather conditions, i.e., cloudy or clear, and the ability of the observer to see over that distance.

Taglu

Current design plans for Taglu include one drill site and well pad, wells and processing facilities. Placement of these features, and construction, operations and decommissioning and abandonment, all have the potential to affect visual and aesthetic resources. To help reduce effects wherever possible, existing locations have been used when planning for project components.

Construction activities, including site clearing and building of facilities, will bring a new industrial presence to the area. This will change the visual quality of the area for people using the area or observing it from above. The effects will be most evident during spring and summer, when there is sufficient daylight for travelling in this area.

Operations effects will include the presence of structures, clearings, flares and lights, which in turn will lead to a change in the landscape. There could be ice fog during cold weather, which might include periods during daylight, lights will be visible during the winter dark season, and flares could be present. The effect of lighting at the anchor fields will be particularly noticeable during the winter months when there is little daylight. Although the sun does not rise above the horizon, there is light for a few hours. It will also be noticeable when lighting will be required 24 hours a day.

The presence of lighting will be noticeable to land travellers and people in aircraft. Given the flat topography of the area, these lights could be noticeable from a distance. The effect could be adverse for those who are disturbed by the presence of light on the landscape, or could be positive for those who use the light as a landmark or navigational aid.

In this area, during construction and operations, those who might be affected by the visual effect of the anchor field will be on the land during the spring or winter hunting seasons, when lighting will be visible.

The anchor field will be visible from the air. Aircraft travel between Inuvik, Tuktoyaktuk, camps such as Swimming Point, other tourism destinations, and oil and gas camps, is quite common during spring and summer. Many flights between Inuvik and Tuktoyaktuk either follow a direct line or follow East Channel of the Mackenzie River. Arctic Nature Tours flies to a variety of areas in or near the Mackenzie Delta. Some of these flights might pass over Taglu. Other tour operators flying in and around the Kendall Island Bird Sanctuary will also likely pass over Taglu.

Figure 7.18 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Mitigation measures, when practical, will include placing lighting only where necessary, and flaring only when required.

Figure 7-19 shows the potential visibility of facility buildings at Taglu. Because of the flat topography, there is a clear line of site from areas 30 km away in the south, just north of Yaya River, about 15 km away in the north to Beluga Bay, and potentially to parts of Hooper, Petty and Garry islands. Actual visibility depends on weather conditions, i.e., cloudy or clear, and the ability of the observer to see over that distance.

Viewshed modelling was not done for Taglu. However, it is assumed that visibility of the Taglu water vapour plumes would be similar to or less than Niglintgak plumes.

Parsons Lake

Current design plans for Parsons Lake include two production areas that will be developed in two stages. Features include drill sites and well pads, wells, above-ground flow lines, a gas conditioning facility and an all-weather airstrip. Placement of these features, and construction, operations and decommissioning and abandonment, all have the potential to affect visual and aesthetic resources. To the degree practical, existing disturbed areas will be used for infrastructure sites to reduce development effects.

Construction activities, including site clearing and building of facilities, will bring a new industrial presence to the area. This will change the visual quality of the area for people using the area or observing it from the air. The effects will be most evident during spring and summer, when there is sufficient daylight for travelling in this area. Most people will be on the land in this area during the spring or winter hunting seasons, when lighting will be visible. Parsons Lake will be located in a popular caribou hunting area, so during the winter hunting season, people nearby might be positively or negatively affected.

Effects from operations activities will be the presence of structures, clearings, an above-ground pipeline, flares and lights, which in turn will lead to a change in the landscape. There could be ice fog during cold weather, which might include periods during daylight. Lights will be visible during the winter dark season and flares could be present. The effect of lighting at the anchor fields will be particularly noticeable during the winter months when there is little daylight. Although the sun does not rise above the horizon, there is light for a few hours. However, lighting will be required 24 hours a day.

Figure 7.19 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Lighting will be noticeable to land travellers and people in aircraft. Given the flat topography of the area, these lights could be noticeable from a distance. The effect could be adverse for those who are disturbed by the presence of light on the landscape, or could be positive for those who use the light as a landmark or navigational aid.

Hunters use the area in the spring and winter hunting seasons, especially during the winter caribou season. There might be an effect on these users and those flying over the anchor field, whether for tourism purposes or en route to other locations such as Tuktoyaktuk or various camps. Where possible, lighting will be placed to light only the required areas. Flaring will be done only when necessary.

Figure 7-20 shows the potential visibility of facility buildings at Parsons Lake. Terrain features limit the line of site to areas on and around Parsons Lake, and from areas of higher elevation like the North Storm Hills to the west and areas of higher elevation to the south. Actual visibility depends on weather conditions, i.e., cloudy or clear, and the ability of the observer to see over that distance.

Viewshed modelling was not done for Parsons Lake. However, it is assumed that visibility of the Parsons Lake water vapour plumes would be similar to or less than Niglintgak plumes.

Gathering System and Other Project Components

As well as the anchor fields, there will be a gathering system between the anchor fields and the Inuvik area facility, a pigging facility, two block valves, infrastructure sites, access roads and borrow sites. All these components will result in an effect on the visual and aesthetic resources in those areas.

Construction activities, including site clearing and building of facilities, will bring a new industrial presence to the area. This will change the visual quality of the area for people using the locale or observing it from the air. Associated with construction activities will be an increase in noise, which could have an effect on the aesthetic resources of the area (see Volume 5, Section 3, Noise). The effects will be most evident during spring and summer, when there is sufficient daylight for travelling in this area. Most people would be on the land in this area during the spring or winter hunting seasons, when lighting would be visible.

Construction activities will include pipeline and infrastructure site construction, and borrow site operation. Associated with such activities will be traffic, construction equipment, noise, lights and vehicle exhaust. Following construction, some seeding and revegetation efforts could speed up recovery of native vegetation, helping reduce the visual effect of the right-of-way. Effects will occur mostly during spring and winter hunting seasons, when hunters are out on the land.

Figure 7.20 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

The presence of the gathering system might also affect people flying over it, whether for tourism purposes or while on their way to other locations. Aircraft travel between Inuvik, Tuktoyaktuk, camps such as Swimming Point, other tourism destinations, and oil and gas camps, is quite common during spring and summer. Arctic Nature Tours flies to a variety of areas in or near the Mackenzie Delta. Some of these flights might pass over Niglintgak and Taglu. Other tour operators flying in and around the Kendall Island Bird Sanctuary will also likely pass over Niglintgak and Taglu.

Summary of Project-Specific Effects

Table 7-16 summarizes the expected project effects on visual and aesthetic resources in the ISR, and the direction, magnitude, geographic extent and expected duration of those effects.

Table 7-16: Visual and Aesthetic Resources – Project Effect Attributes for the Inuvialuit Settlement Region

Effect	Effect Attributes				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Effect of change in landscape at anchor fields on people travelling in the area or on local land users	Adverse	Low to moderate	Local to regional	Short term to long term	No
Effect of change in landscape along gathering system on people travelling in the area or on local land users	Adverse	Low to moderate	Local to regional	Short term to long term	No
Net effect on visual and aesthetic resources	Adverse	Low to moderate	Regional	Long term	No

7.4.6 Visual and Aesthetic Resources – Gwich'in Settlement Area

7.4.6.1 Existing Baseline Conditions

From the GSA–ISR boundary, the landscape slowly changes from tundra and becomes more forested. This is known as the treeline, or Transition Ecological Zone. The transition zone grades from black spruce and tamarack trees with dwarf shrubs to a predominantly forested region from Travaillant River to the GSA–SSA boundary. Forests contain black and white spruce and white birch, and terrain varies from flat and rolling plains to uplands and rocky ridges.

In some areas, the pipeline will follow an existing Canadian National Telegraph cutline. Infrastructure sites will often be located in areas with existing development. For example, the Campbell Lake site is currently used as an industry staging site.

7.4.6.2 Assessment and Management of Project-Specific Effects

Project effects on visual and aesthetic resources in the GSA are discussed. These effects are found only in the GSA.

Figure 7-21 shows the potential visibility of facility buildings at the Inuvik area facility. Terrain features limit the line of site mostly to areas to the east, including the South Storm Hills, and the area between south Sitidgi Lake and Campbell Lake. The Inuvik area facility will be located near a trail to Sitidgi Lake, well used by snowmobilers during the winter months. In addition, the Campbell Creek area is used for fishing and other recreational uses. There is a limited line of site west of the facility toward Inuvik. Actual visibility depends on weather conditions, i.e., cloudy or clear, and the ability of the observer to see over that distance.

Predicted water vapour plume heights for the Inuvik area facility range from an average of 7 m high, 50% of the time, to an average of 119 m high, 5% of the time. The yearly average predicted height is 28 m.

Figure 7-21 also shows the potential visibility of the 50^{th} (average) and 95^{th} (maximum) percentile water vapour plume heights from the Inuvik area facility compressor. These figures show that the area with a clear line of site for the average plume is not much more than the potential visibility of the facility buildings, with the exception that the line of sight includes the southern part of Sitidgi Lake. The potential visibility for the maximum plume does increase to include areas around Noel Lake, the Caribou Hills and just south of Bonnet Plume Lake. The plume could also be visible from areas between the facility and Inuvik. Actual visibility depends on:

- weather conditions, i.e., cloudy or clear
- time of year, i.e., daylight or nondaylight, and the presence of light
- ability of the observer to see over that distance

Summary of Project-Specific Effects

Table 7-17 summarizes the expected project effects on visual and aesthetic resources in the GSA, and the direction, magnitude, geographic extent and expected duration of those effects.

Figure 7.21 has been removed for the purposes of reducing file size and can be viewed as a graphic separately. This document can be accessed through the link in the Table of Contents reference web page.

Table 7-17: Visual and Aesthetic Resources – Project Effect Attributes for the Gwich'in Settlement Area

Effect	Effect Attributes				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Effect of change in landscape along pipeline corridor on people travelling in the area or on local land users	Adverse	Low to moderate	Local to regional	Short term to long term	No

7.4.7 Visual and Aesthetic Resources – Sahtu Settlement Area

7.4.7.1 Existing Baseline Conditions

The predominant visual feature of the SSA is the forests, which include both black and white spruce, and white birch on uplands and rocky ridges. There are also rolling plains with trees, shrubs, bogs and fens. Farther south are upland forests and extensive forests in more level areas, which tend to be poorly drained.

Seismic lines are found throughout the SSA, and industrial activity is especially prominent around Norman Wells. From Norman Wells south to Alberta, the pipeline will generally parallel the Enbridge right-of-way. The project will endeavour to use existing infrastructure sites. For example, the Little Chicago site includes an existing barge landing, airstrip and seasonal camp facility. There is a meteorological station at the site, and nearby areas are used for local hunting and fishing camps. The Fort Good Hope site is situated at a barge landing and is heavily used by Fort Good Hope residents. The Norman Wells site is in Norman Wells, which already has an industrial presence. The site planned near Tulita is currently used as an industrial staging site and seasonal camp facility, with the Norman Wells to Tulita winter road running through the site. The camp site in the SSA is the Little Smith Creek site, which will be located at an existing site along the Enbridge right-of-way used for maintenance activities. It also has an airstrip.

7.4.7.2 Assessment and Management of Project-Specific Effects

Viewshed modelling was not done for the SSA because the area around the Little Chicago site and facilities is forested and visibility of these sites from the ground will be limited. The facility at Norman Wells will be adjacent to the existing Imperial Oil Norman Wells facility, reducing peoples' perceptions of the change to the local landscape.

Summary of Project-Specific Effects

Table 7-18 summarizes the expected project effects on visual and aesthetic resources in the SSA, and the direction, magnitude, geographic extent and expected duration of those effects.

Table 7-18: Visual and Aesthetic Resources – Project Effect Attributes for the Sahtu Settlement Area

Effect	Effect Attributes				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Effect of change in landscape along the pipeline corridor on people travelling in the area or on local land users	Adverse	Low to moderate	Local to regional	Short term to long term	No

7.4.8 Visual and Aesthetic Resources – Deh Cho Region

7.4.8.1 Existing Baseline Conditions

Most of the pipeline corridor is located in the DCR. Upland areas are forested with aspen, spruce, birch and pine. Poorly drained areas are also forested, and there are patterned fens near Fort Simpson. South of Trout River are upland plateau areas. Most of the northern half of the region has been burned in the past 20 years, which has changed the visual and aesthetic qualities of the area. Seismic activity is especially noticeable south of Fort Simpson. The Mackenzie River is a prominent terrain feature in this area.

Most proposed infrastructure sites in the DCR will be located on previously disturbed sites. The Ochre River site will be located on the Mackenzie River, near the mouth of the Ochre River. The area has been previously disturbed, and supports an existing camp within 500 m and an old road to the Mackenzie River. The Smith Creek site will be situated on a site built during Enbridge construction that has an existing barge landing and historical camp. The Camsell Bend Ferry Crossing site will use the old Enbridge site located along the Mackenzie Highway and Mackenzie River, adjacent to an existing barge landing. The Fort Simpson site is located near the town, Mackenzie River and Mackenzie Highway. Similarly, the Liard Ferry Crossing site is along the Mackenzie Highway and Liard River, and is currently used as a ferry and barge landing. The McGill station site is located on the Mackenzie Highway.

7.4.8.2 Assessment and Management of Project-Specific Effects

Viewshed modelling was not done for the DCR because the area around the facilities is forested and visibility of the sites from the ground will be limited.

Summary of Project-Specific Effects

Table 7-19 summarizes the expected project effects on visual and aesthetic resources in the DCR, and the direction, magnitude, geographic extent and expected duration of those effects.

Table 7-19: Visual and Aesthetic Resources – Project Effect Attributes for the Deh Cho Region

Effect	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Effect of change in landscape along pipeline corridor on people travelling in the area or on local land users	Adverse	Low to moderate	Local to regional	Short term to long term	No

7.4.9 Visual and Aesthetic Resources – Northwestern Alberta

7.4.9.1 Existing Baseline Conditions

Forested areas crisscrossed with seismic lines characterize northwestern Alberta. There is a mix of upland and wet lowland areas, and dense forests.

7.4.9.2 Assessment and Management of Project-Specific Effects

General project effects on visual and aesthetic resources are discussed in Section 7.4.3, Assessment and Management of Project-Specific Effects. There are no additional specific effects expected for visual and aesthetic resources in northwestern Alberta.

Summary of Project-Specific Effects

Table 7-20 summarizes the expected project effects on visual and aesthetic resources in northwestern Alberta, and the direction, magnitude, geographic extent and expected duration of those effects.

Table 7-20: Visual and Aesthetic Resources – Project Effect Attributes for Northwestern Alberta

Effect	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Effect of change in landscape along pipeline corridor on people travelling in the area or on local land users	Adverse	No effect to low	Local to regional	Short term to long term	No

There are no significant effects predicted for visual and aesthetic resources. The magnitude of most effects on visual and aesthetic resources ranges from low to moderate within a local to regional geographic extent, with a short- to long-term

duration. Although some of the effects on visual and aesthetic resources could extend into postdecommissioning, it is predicted that these will be low magnitude and therefore will be considered not significant.