WOLFDEN
RESOURCES INC.

John Knapp,
Vice President Northern Operations

December 17, 2004

RE: Update on Wolfden Resources Inc. High Lake Project

Wolfden Resources Inc. (Wolfden) is pleased to provide you with an update on the progress of the High Lake Project during the summer and fall of 2004.

Please find attached an information package, which includes:

- An overall summary of the summer/fall 2004 environmental and engineering programs;
- A summary of engineering-related activities;
- A Nunavut Research Institute report on 2004 Socio-economic Baseline;
- A Nunavut Research Institute report on 2004 Traditional Knowledge Baseline; and
- A Nunavut Research Institute report on 2004 Biophysical Summer Baseline.

Wolfden plans to consult in-person with the communities and regulators in early 2005 to present our initial results and to further understand the issues that are important to the communities and regulators. We look forward to meeting with you at that time to discuss our project and your concerns.

Should you have any questions regarding the information package, please do not hesitate to contact myself (250.769.1425) or Glenda Fratton (403.262.4299, ext.121)

Best regards,

WOLFDEN RESOURCES INC.

John Knapp
Vice President, Northern Operations

Cc: Glenda Fratton, Gartner Lee Limited
Sandra Rickard, Wolfden Resources Inc.

INTERNAL	
PC	dp
MA	
FO	
LA	
BS	
ST	
TA1	
TA2	
RC	
ED	
CH	
BRD	
EXT.	

1593 Klein Rd., Kelowna, B.C., V1Z 3H5 Tel. (250) 769-1425 Fax (250) 769-1062

Overall Summary Update of High Lake Project – 2004 Programs

Wolfden Resources Inc. ("Wolfden") is a Canadian exploration and mining company and has the mineral rights for the High Lake property and the Ulu property in western Nunavut.

What is the proposed High Lake Project?

- Wolfden's plan is to extract mineral rich rock, also called ore, from both the High Lake and Ulu sites, and to build a mill at the High Lake site to process the ore. Ore from Ulu will be transported to High Lake by winter road. Another road, probably an all-season road, will be built between High Lake and a port at Grays Bay. From the port, ships will transport the metal concentrates to markets and bring supplies in.
- The Ulu site has a gold deposit and it will be mined underground. The Ulu site is located on Inuit-owned Land.
- The High Lake site has three areas of mineral rich rock containing copper, gold, silver and zinc. The rock will be mined in open pit (above-ground) and the deeper rocks may be mined underground. The High Lake site is primarily located on Inuit-owned Land.
- Tailings are the rock waste left behind during the process of separating the metal concentrate from the rock. Tailings will be placed in the bottom of High Lake. To date, no fish have been found in this lake, as its natural chemistry is not suitable for fish. Studies are being conducted to confirm this.
- Wolfden would like to start mining in 2008 and is spending the next few years collecting information on the natural and human environments, including traditional knowledge, for the environmental assessment and regulatory approvals. The mine life is expected to be about 15 years. Wolfden expects to employ roughly 200 people during operation of the two mine sites. Efforts will be made to hire locally, whenever practical.

2004 Baseline Data Collection

In 2004, Wolfden collected information on the natural and human environment of the project area. This will allow Wolfden to see what the environment is like now. This helps to understand the possible impacts of mine development and how the impacts can be reduced or compensated. Assistants from Kugluktuk helped with the environmental and engineering studies. These programs will continue in 2005, as required. Several meetings were held with communities and regulators in 2004 on the programs, and consultation on the initial findings will begin in early 2005.

Natural Environment:

- ***Air Quality & Climate:*** Two climate stations were set up at the proposed mine sites to collect information on wind direction and speed, temperature, moisture, pressure, energy from the sun, and rain.
- ***Land:*** Information on the land, including the types of plants and soils was collected and will be used to create maps of vegetation and wildlife habitats.
- ***Wildlife:*** Surveys of Bathurst Caribou Herd, Dolphin-Union Caribou herd, and muskoxen were carried out by plane. Wolverine, arctic fox and grizzly bear tracks were looked at. Information on small mammals (such as voles and squirrels), and birds was also collected.

- ***Water:*** Water and sediment quality was studied in the lakes and streams around the proposed mine sites and in the ocean near the proposed port site. How water moves near the proposed sites was also studied to understand how to manage the water in the future.

- ***Fish and their Habitat***: The types of fish, the amount of fish, their health, and where they live was studied. The fisheries team looked at the ocean near the proposed port sites, and at the lakes and streams near the proposed mine sites.

- ***Whales and Seals***: Whales and seals were studied near the potential shipping routes. These areas include the Dolphin and Union Strait, Coronation Gulf, Dease Strait, Queen Maude Gulf, Victoria Strait, Rasmussen Basin and the straits and passages to the south and east of King William Island, Larsen Sound, Franklin Strait, and Peel Sound.

- ***Archaeology***: Potential archaeological sites were looked at along the coast and at the proposed mine sites.

Human Environment:

- Existing information on the Kitikmeot communities of Kugluktuk, Cambridge Bay, Bathurst Inlet, Umingmaktok, Gjoa Haven, Kugaaruk, and Taloyoak was collected, including: population, employment, income, schooling, community facilities, housing, and culture.

- A summary of the region's economy was written from existing records and reports. It focuses on the future development potential of the Kitikmeot region, and describes all known future development plans and the current setting for these future activities.

Traditional Knowledge:

- Existing information on traditional knowledge was collected on the Coppermine River, the Coronation Gulf, Bathurst Inlet and Contwoyto Lake. This information gave Wolfden a picture of how people use the land in the High Lake Project area. More information will be gathered in 2005.

2004 Engineering

- Air photos of the entire project area were taken by plane.

- Rock, soil and permafrost tests were carried out to help select the best areas for the mine waste rock, ore stockpiles, the processing plant, the airstrip, and the camps.

- The depth of water was measured in Grays Bay and part of the Coronation Gulf to help find a shipping route and port site. Two possible locations for the port site are being considered in Grays Bay.

- The depth of water in High Lake was measured to see if it is able to hold the tailings.

- Several possible road routes (winter and all weather) were studied and further work is ongoing to select the best route.

- A study to understand the amount and quality of ore in the ground and the cost of extracting it is underway.

- Planning for the mine layout has started.

Engineering Summary Update, High Lake Project - Summer & Fall 2004

Mapping

Aerial photography was flown for the entire study area, including potential corridors for road routes between High Lake, Ulu and the coast dock and loading facilities sites. The photography was conducted with ground control at 1:22,000 scale over the entire site and at 1:6,500 scale over selected areas at High Lake, Ulu and the potential dock and loading facilities sites. Topographic mapping is being prepared at 2m and 1m intervals over selected areas at High Lake, potential road corridor routes and the preferred dock and loading facilities site.

Dock and Loading Facilities

A bathymetric survey was conducted in Grays Bay and part of the Coronation Gulf in July and August to determine a feasible shipping route and to identify potential dock and loading facilities sites. This work, nearing completion, has been tied to Canadian Hydrographic Service chart datum and also to survey monuments established for the aerial mapping. Topographic mapping and a site inspection identified four (4) potential dock and loading facilities sites. A preferred dock and loading facilities site has been selected, and further work is being conducted to confirm the selection. Geotechnical drilling was conducted on the shoreline at this site, including thermistor installation in order to characterize the geothermal regime and regional variations at shallow depths.

Technical evaluation of arctic ice conditions and the impact of ice on the type of dry bulk carrier classification required to access the dock and loading facilities site, and the duration of the shipping season for export of mined product and import of project re-supply equipment, materials and fuel was conducted. Inception level engineering of alternative marine structures for the ship berth was also conducted to assess design feasibility, and compare costs.

High Lake Site

Conceptual mine planning work has commenced and ore body modeling is near completion. Geotechnical site inspections were conducted at potential sites for tailings and mine rock containment, plant sites, and airstrips at High Lake. Geotechnical specialists visited the site, inspected and logged selected core, and provided guidance to Wolfden geologists to enhance geotechnical data collection. Thermistors were installed at several of the geotechnical and exploration drill holes. The following provides further information on other activities undertaken for the High Lake site:

- **Mine rock:** A modest geochemical test program was conducted on selected core samples to improve characterization of mine rock, complementing work conducted in 2003.
- **Tailings:** Bathymetric surveys were carried out at High Lake to update previous estimates of its volumetric capacity for storing tailings. Geotechnical inspection, geophysical surveying and

geotechnical drilling was carried out at sites selected for potential impoundment structures on the margins of High Lake.

- **Water:** Overall conceptualization of water management and supply plans has commenced, following site reconnaissance. Focus has been placed on limiting major footprints for open pit mining, mine rock and tailings storage within the catchment of High Lake.
- **Infrastructure:** Development of mining concepts will facilitate the siting of project infrastructure such as process plants or camps. The mining concept will also affect major footprint elements including tailings and waste rock containment and open pits, and it is intended to minimize the footprint of infrastructure. Several potential airstrips have been identified and preliminary field inspections conducted. Options will be refined upon receipt of 2 m contour mapping currently being prepared.

Ulu Site

No significant work has been carried out by Wolfden Resources Inc., pending results of ongoing mine planning. Relatively modest upgrades and expansions of the existing facilities are anticipated but little change is expected in the overall project impact. One borehole was drilled at Ulu for geotechnical purposes in 2004.

Road Access

All-season and winter access routes were identified, based on inspection of the existing 10 m topography mapping and the site reconnaissance visits conducted during 2004. Subsequently, potential routes were identified and a preliminary comparison undertaken, utilizing the recently acquired aerial photography. The route comparison encompasses engineering and operational considerations, and environmental, social and cultural aspects.

2004 Socio-economic Baseline: Nunavut Research Institute Permit Report Research License #0401704N-M

prepared for:
Nunavut Research Institute

prepared by:
Gartner Lee Limited on behalf of Wolfden Resources Inc.

reference:
GLL 41002

date:
December 17, 2004

Gartner Lee

Table of Contents

Executive Summary

Preliminary draft reports were prepared on the socio-economic conditions of the Kitikmeot communities. Community profiles were completed from existing information. A preliminary regional economic profile was also completed. Community consultations were postponed to 2005 due to unavoidable funding constraints that have subsequently been overcome.

Ataniuyunut Nainaqhimayut

Hivuliqmik uuktugutauyuq tuhagakhaliat hannaiyaqhimayut tapkununga inuliginiqmun-maniliugutinut qanugitniinut tahaphuma Kitikmeot nunaligiyainut. Nunaliuyut unipkauhii iniqtiqhimayut tatya atuqtunit tuhaqtakhanit. Hivuliqmik nunaliit aviktuqhimanianut maniliugutinut unipkauhii iniqhimakmiyuttauq. Nunaliuyut uqaqatigiknii kinguvagiaqhimayut 2005-mun piplugit ahiaguqvikhailgui manikhainut amigaqnii tapkuat naamakhihimaliqtuugaluitnguq.

ᐊᖏᓴᖅᖃᓗᓄᑦ ᓯᐱᑭᓇᓕᒫᑦ

ᓯᑐᓪᓗᒍ ᑲᑎᑐᕈᐅᔨᑦ ᕿᖅᓇᖏᐅᓕᒫᑦ ᒡᕐᔨᓄᖏ ᐃᓄᓕᓂᓂᖅᓯᒪᑦ-ᑭᓇᐅᔭᓕᐅᕐᑎᓄᑦ ᖃᓄᓕᓂᓂᖅᓄᓄᑦ ᒡᕐᔨᐊᑦ ᖁᑎᖅᑎᐅᑦ ᓄᓇᕈᓕᐅᔨᖅᑦ. ᓄᓇᕈᓕᐅᔨᓄᑦ ᖃᓄᓕᓂᓂᖅᓄᓄᑦ ᐅᓂᒃᑲᐅᓯᖅᑦ ᐱᐊᓂᓯᒪᔨᑦ ᒡᕐᔨᓇᖏᑦ ᒪᓇ ᐱᑕᖃᖅᓂᖅᓄᑦ ᑐᐱᒃᓴᑦ. ᓄᓇᕈᓕᐅᔨᑦ ᐅᖃᖅᑐᖅᓂᖅᑦ ᑭᖑᓪᓕᐊᖅᓯᒪᔨᑦ ᑕᒡᔨᖏᑦ 2005-ᒧᑦ ᐱᑦᓗᒍ ᐊᓯᐊᔪᖏᓐᓇᖅᓂᓂᖏᓐᖏᑦ ᑭᓇᐅᔭᓄᑦ ᐊᒥᒃᑕᐅᑎᓯᒪᓕᖅᑐᖅᑐᒃᑯᑦ.

1. Introduction

The intent of this document is to provide the Nunavut Research Institute with a summary of the socio-economic activities related to the 2004 baseline programs designed to support the environmental assessment for the High Lake Project. The planned work comprised of:

1) community profiles of the seven Kitikmeot communities;
2) summary of the collective regional profile of economic activity and current land use and occupancy activities; and
3) a summary of the regional aspirations of the residents of the Kitikmeot.

2. Community Profiles

Existing data were collected for the seven communities of the Kitikmeot: Kugluktuk, Cambridge Bay, Bathurst Inlet, Umingmaktok, Gjoa Haven, Kugaaruk, and Taloyoak. The type of information collected to date includes: population, employment, income, schooling, community facilities, housing and culture. Still to be collected in 2005 is land and resource use information, levels of achievement in school, and capacity of health care facilities, among other social indicators. Sources include Statistics Canada, previous reports from other environmental assessments, economic development reports and related documents. Easily confirmed information and gaps in the data were checked with community leaders. Based on this information, draft community profile reports were prepared. These reports will be taken to the communities in 2005 for confirmation of information and response to key questions.

3. Regional Profile

A preliminary summary of the regional economic profile was completed. The information in the draft report was developed from existing records and reports. The preliminary regional profile focuses on the future development potential of the Kitikmeot region, and describes all known future development plans, as well as, the current context for these future activities. The draft does not provide baseline information about the economy, land and resource use patterns or the socio-economic conditions of communities in the Kitikmeot. The report was modeled on the structure and contents of the West Kitikmeot Regional Land Use Plan (WKRLUP)[1]. The WKRLUP is a comprehensive land use plan completed in accordance with the Nunavut Land Claim Agreement (NLCA), and we believed it should be used to put the High Lake Project in perspective. The WKRLUP has the following types of development conditions that are relevant to High Lake proposal:

[1] Preliminary draft March 2004

- No Development Zones (NDZ) – a number of land and water areas are excluded from development except for traditional harvesting, community use and scientific research.
- Areas for Special Consideration (ASC) – the land use plan establishes a number of ACS. These areas are to be managed using an ecosystem approach based on watershed boundaries, with the main intent being sustainability of affected species.
- Conformity Requirement – all development proposals must be in conformance with specific elements of the land use plan. These are referred to as conformity requirements[2].
- Actions and Recommendations – the plan defines a number of actions and recommendations for the various federal, territorial, Inuit and stakeholder bodies involved in reviewing, approving and monitoring developments and in implementing the land use plan.

Preliminary information was gathered for the following categories:

- Economic Conditions
- Land and Resource Use
- Socio-economic Conditions
- Current Situation and Future Development Plans
  - Mining
  - Tourism
  - Community Developments
  - Power and Energy
  - Transportation:
    - Air Services
    - Marine
    - Land-Based Transportation
- Wildlife, Habitat, Parks and Conservation Areas
  - Wildlife and Habitat
  - Parks and Conservation
  - Heritage and Cultural Resources
  - Waste Site Clean-up and Management

Preliminary information was also gathered on the following institutions to assess their capacity to respond to development projects:

- Government of Nunavut
  - Department of Health and Social Services

  - Department of Education
- Government of Canada
  - RCMP
  - Human Resources and Skills Development Canada
  - Indian and Northern Affairs Canada
  - Industry Canada
- Institutions of Public Government
  - Nunavut Planning Commission
  - Nunavut Impact Review Board (NIRB)
  - Nunavut Water Board (NWB)
- Inuit Organizations
  - Nunavut Tunngavik Inc.
  - Kitikmeot Inuit Association
  - Kitikmeot Economic Development Commission
  - Kitikmeot Corporation

4. Aspirations

No work was undertaken with respect to documenting the aspirations of the residents of the Kitikmeot due to unanticipated funding restrictions.

5. Community consultation / confirmation

Confirming the community profiles, regional profile and regional aspirations was postponed to 2005 due to unanticipated funding restrictions.

[2] Under the NLCA, the Nunavut Planning Commission (NPC) is required to review all project proposals for conformity with land use plans and cumulative impacts.

2004 Inuit Qaujimajatuqangit (Traditional Knowledge) Baseline: Nunavut Research Institute Permit Report Research License #0401804N-M

prepared for:
Nunavut Research Institute

prepared by:
Gartner Lee Limited on behalf of Wolfden Resources Inc.

reference:
GLL 41002

date:
December 17, 2004

Gartner Lee

Table of Contents

Executive Summary

A program researching existing Inuit Qaujimajatuqangit was undertaken between the months of June and October, 2004. The results revealed that information was available for the coastal area within the study area selected but little information was available for the area between the coast and the Ulu mine site. This will have to be confirmed with elders in 2005 and with a review of the Naonayaotit Traditional Knowledge Project (2004) when it is available.

Ataniuyunut Nainaqhimayut

Tamna havagut naunaiyaqniinik tatya piqaqnii Inuit Qaujimajatuqangit havaktauhimayut akungani tapkuat tatqiqhiutit Juni Aktuupalu, 2004. Tapkuat naunaiqtauyut pihimayut tapkuat tuhaqtakhat piyaulat tapkunangat tagiup hinaani tahamani naunaiyaqtauyumi piyauhimayut kihimik tuhaqtakhaqattiangittuq tapkununga inaitnut akungani tagiup hinaata tamnalu Ulu uyagakhiuqviup havakvianut. Una nauniaqtauqpiagialik inutqutyanit 2005-mi tamnalu naunaiyaqnia taphuma Naonayaotit Inuit Qaujimajatuqangit Havangat (2004) piyaulaliqat.

ᐊᖓᔪᖄᖑᔪᓄᑦ ᓯᕕᑭᓇᖅᓯᒪᔪᑦ

ᑖᒻᓇ ᐱᓕᕆᑦᔪᑦ ᖃᐅᔨᓴᐃᓂᖅᒧᑦ ᒫᓇ ᐱᑕᖃᖅᓂᖏᓄᑦ ᐃᓄᐃᑦ ᖃᐅᔨᒪᓂᑐᖃᖏᑦ ᐱᓕᕆᔭᐅᓯᒪᔪᑦ ᐊᑯᖓᓂ ᑖᑉᑯᐊᑦ ᑕᖅᑭᑦ ᔫᓂ ᐊᒻᒪᓗ ᐊᒃᑑᐱᕆ, 2004-ᒥ. ᑖᑉᑯᐊᑦ ᐱᓕᕆᔭᐅᔪᑦ ᓇᓗᓇᐃᕆᑕᐅᔪᑦ ᑖᑉᑯᐊᑦ ᑐᓴᒐᒃᓴᑦ ᐱᑕᖃᖅᑐᑦ ᑖᑉᑯᓄᖓ ᑕᕆᐅᑉ ᓯᓈᓄᑦ ᑕᒫᓂ ᖃᐅᔨᓴᐃᕕᐅᔪᒥ ᑎᑯᐊᖅᑕᐅᓯᒪᔪᒥ ᑭᓯᐊᓂᒃ ᑐᓴᒐᒃᓴᖃᑦᑎᐊᖏᑦᑐᑦ ᑕᒪᐅᖓ ᐃᓂᖓᓄᑦ ᐊᑯᖓᓂ ᑕᕆᐅᑉ ᓯᓈᓄᑦ ᐊᒻᒪᓗ ᐅᓗ ᐅᔭᕋᒃᓯᐅᖅᕕᒃ ᓴᓐᓇᕕᖓᓄᑦ. ᐅᓇ ᖃᐅᔨᒋᐊᖅᑕᐅᓂᖓᖅ ᐃᓐᓇᑐᖃᓂᑦ ᑕᒻᕙᓂ 2005-ᒥ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖅᑕᐅᓗᓂ ᑖᑉᑯᓄᖓ ᓇᐅᓇᐃᔭᐅᑎᑦ ᐃᓄᐃᑦ ᖃᐅᔨᒪᓂᑐᖃᖏᓄᑦ ᐱᓕᕆᐊᖑᔪᓄᑦ (2004) ᐱᔭᐅᔪᓐᓇᓕᑐᐊᖅᐸᑦ.

1. Introduction

The intent of this document is to provide the Nunavut Research Institute with a summary of the Inuit Qaujimajatuqangit (IQ) activities related to the 2004 baseline data gathering programs designed to support the environmental assessment for the High Lake Project. The planned work comprised of 1) a review of existing IQ for the High Lake area; and 2) elders site visit and follow-up workshop to collect IQ and confirm previously collected information. In the end, due to unanticipated funding constraints, only the collection of existing data was completed except for reviewing the Naonayaotit Traditional Knowledge Project (2004)[1] data, which was not yet available for public consideration.

2. Collection of existing data

An extensive literature search was undertaken which included the listed databases and literature sources below. The region under consideration included the Coppermine River in the west, the Coronation Gulf north to the southern portion of Victoria Island, east to Bathurst Inlet and south to the Contowyto Lakes area. A keyword search list was used to guide this work.

Databases:

- Nunavut Tunngavik Inc. - Environmental Database
- International Institute of Sustainable development (IISD)

Literature Sources:

- Arctic Institute of North America
- National Archives of Canada (National Archives Maps related to the Inuit Land Use and Occupancy project (RG85 (Northern Affairs) Accession C0000367 (G000065))
- Canadian Museum of Nature
- Canadian Museum of Civilization (personal communications with Copper Inuit experts)
- Internet Sites (http://www.civilization.ca/archeo/nadlok/nadloke.html, http://www.arctic.uoguelph.ca/cpe/environments/inland_water/rivers/burnside.htm; http://www.canadianencyclopedia.ca/index.cfm?PgNm=TCE&ArticleId=A0001906)
- Hudson Bay Archives

[1] The Naonayaotit Traditional Knowledge Project (2004) is a seven IQ study undertaken in the Kitikmeot. The information is the property of the KIA. Eventually the information will be accessible by the public for a fee.

- Anglican Church Archives
- Geological Survey of Canada
- Canadian Arctic Expedition reports (Diamond Jenness)
- British Expeditions
- The Arctic Journal of Peter Warren Dease 1836-1839
- Doris North Publications
- Inuit Land Use and Occupancy Study. (1977) DIAND

Key word used for literature search:

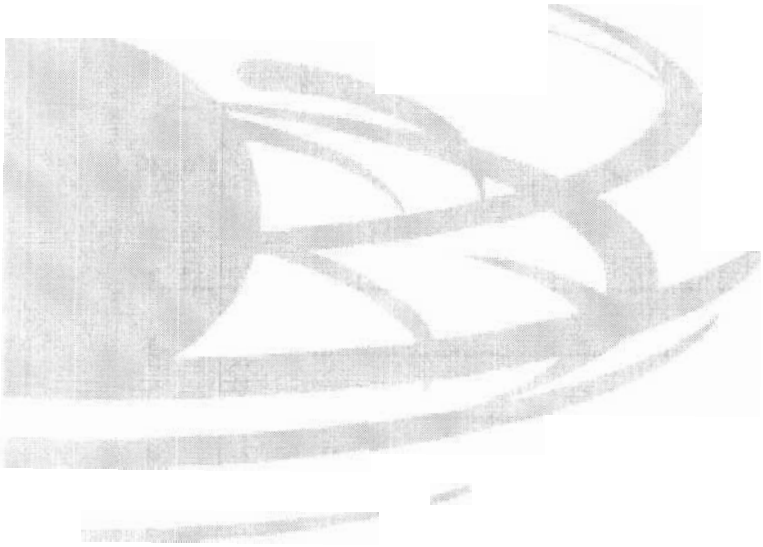
- medicinal plants
- permafrost
- grizzly
- soil instability
- lake level changes - volume / depth
- ice thickness on lakes
- sea ice
- precipitation patterns - snow /rain
- Nunavut
- Inuit qaujimajatuqangit, IQ
- Indigenous ecological knowledge
- climate change, impacts and adaptations
- community relations / external affairs
- general environmental
- archaeology
- fisheries
- water quality
- fishing
- Inuit World (Inuktituk / English)
- iglu / igloo
- sulukpangaq / rock eel
- maqtak / whale or seal meat
- savik / cresent shaped knife
- qilalugaq / white whale (I assume Beluga)
- igimag / harpoon
- natsiq / seal
- nauja / seagull
- carving stone
- flood
- berry harvest
- soil slumping
- stream flow - volume / depth
- snow cover
- freeze up time / break up time
- air temperature
- Kitikmeot
- Traditional knowledge / traditional ecological knowledge, TK, TEK
- Indigenous knowledge
- meetings
- presentations
- wildlife
- limnology
- marine
- hunting
- Inuit culture
- umiaq / large seal skin boat
- qulliq / seal oil lamp
- kanajuq / sea scorpion
- ulu / knife
- tulugaq / raven
- qajait / kayak
- kanguq or nirqlik / geese
- kamiit / seal skin clothing
- ukaliq / rabbit

- pitiksik / bow and arrow
- inukshuk
- iqalukpik / arctic char
- tiriganniaq / white fox (arctic fox)
- anguviagaq / spear
- tuktu / caribou
- nanuq / polar bear
- whales
- mitiq / eider duck
- aiviq / walrus
- ulluriaq / stars
- kakivak / fish spear
- allanguaq / narwhal
- annnumajuq / clams
- qaiggiq / ptarmigan
- clams

Based on the results of this search, a picture of land use and occupancy was established for the High Lake Project area. It was clear that the coastal areas have been used for centuries. It would also appear that the interior regions were used far less. This information will be confirmed in the elder interviews and workshops to be held in 2005.

3. Elders site visit and workshops

The elders site visit and workshops were postponed to 2005 due to unanticipated funding constraints.



Summer 2004 Biophysical Baseline Programs: Nunavut Research Institute Permit Report Research License #0401104N-M

prepared for:

Nunavut Research Institute

prepared by:

Gartner Lee Limited on behalf of Wolfden Resources Inc.

reference:

GLL 41002

date:

December 17, 2004

Gartner Lee

Table of Contents

List of Tables

List of Figures

List of Appendices

Executive Summary

Wolfden Resources Inc. ("Wolfden") is a Canadian exploration and mining company and has the mineral rights for the High Lake property and the Ulu property in western Nunavut.

Wolfden's plan is to extract mineral rich rock, also called ore, from both the High Lake and Ulu sites, and to build a mill at the High Lake site to process the ore. Ore from Ulu will be transported to High Lake by winter road. Another road, probably an all-season road, will be built between High Lake and a dock and loading facility at Grays Bay. From the dock and loading facility, ships will transport the metal concentrates to markets and bring supplies in.

The Ulu site has a gold deposit and it will be mined underground. The Ulu site is located on Inuit-owned Land. The High Lake site has three areas of mineral rich rock containing copper, gold, silver and zinc. The rock will be mined in open pit (above-ground) and the deeper rocks may be mined underground. The High Lake site is primarily located on Inuit-owned Land.

Tailings are the rock waste left behind during the process of separating the metal concentrate from the rock. Tailings will be placed in the bottom of High Lake. To date, no fish have been found in this lake, as its natural chemistry is not suitable for fish. Studies are being conducted to confirm this.
Wolfden would like to start mining in 2008 and is spending the next few years collecting information on the natural and human environments, including traditional knowledge, for the environmental assessment and regulatory approvals. The mine life is expected to be about 15 years. Wolfden expects to employ roughly 200 people during operation of the two mine sites. Efforts will be made to hire locally, whenever practical.

In 2004, Wolfden collected information on the biophysical environment of the High Lake Project area. This will allow Wolfden to see what the environment is like now. This helps to understand the possible impacts of mine development and how the impacts can be reduced or compensated. Assistants from Kugluktuk helped with the environmental and engineering studies. These programs will continue in 2005, as required.

Air Quality & Climate: Two climate stations were set up at the proposed mine sites to collect information on wind direction and speed, temperature, moisture, pressure, energy from the sun, and rain.

Land: Information on the land, including the types of plants and soils was collected and will be used to create maps of vegetation and wildlife habitats.

Wildlife: Surveys of Bathurst Caribou Herd, Dolphin-Union Caribou herd, and muskoxen were carried out by plane. Wolverine, arctic fox and grizzly bear tracks were looked at. Information on small mammals (such as voles and squirrels), and birds was also collected.

Water: Water and sediment quality was studied in the lakes and streams around the proposed mine sites and in the ocean near the proposed dock and loading facilities site. How water moves near the proposed sites was also studied to understand how to manage the water in the future.

***Fish and their Habitat*:** The types of fish, the amount of fish, their health, and where they live was studied. The fisheries team looked at the ocean near the proposed dock and loading facilities sites, and at the lakes and streams near the proposed mine sites.

***Whales and Seals*:** Whales and seals were studied near the potential shipping routes. These areas include the Dolphin and Union Strait, Coronation Gulf, Dease Strait, Queen Maude Gulf, Victoria Strait, Rasmussen Basin and the straits and passages to the south and east of King William Island, Larsen Sound, Franklin Strait, and Peel Sound.

***Archaeology*:** Potential archaeological sites were looked at along the coast and at the proposed mine sites.

Ataniuyunut Nainaqhimayut

Wolfden Risuasis Nanminilgit ("Wolfden-kut") tapkuat Kanatamiutat havikhaqhiuqtit tapkuatlu uyagakhiuqtit nanminilgit pihimaplutiklu havikhanik pilaqniinik tahamani High Tahiqmi havakviani tamnalu Ulu havakviani uataani Nunavut.

Huna tamna uuktuqtauyuq High Tahiq Havakvia?

- Wolfden-kut upalungaiyaqhimayut amuhinahuaqniqmun havikhaqaqpiaqniqnik uyaqanik, taiyauvakmiyut havikhanik, tapkuknangat tamatkiknit High Tahiq tamnalu Ulu havakviinit, tamnalu hanayaunianik havikhaliuqvik talvani High Tahiqmi havakviani hanayaunikhainik tapkuat havikhat. Havikhat talvangat Ulumin agyaqtauniat High Tahiqmun ukiumi apquhiuqhimayukkut. Ahia apqut, ukiuq tamaat atuqtaulagunaqhiyuq apqut, hanayauniaq akungani High Tahiq tamnalu tulaqaqvik Grays Bay-mi. Talvangat tulaktaqvikmin, umiaqpait agyaqpakniat havikhat katiqhuqhimaniinik niuviqtikhainut agyaqlutiklu atuqtakhainik.
- Tamna Ulu havakvia pilik guulinik tamnalu uyagakhiuqtauniaq nunap iluani. Tamna Ulu havakvia inilik Inuinait-nanminiani Nunami.
- Tamna High Tahiq havakvia pilik pingahunik atuniiqtunik havikhaqaqpiaqtunik piliknik kaapa, guulit, silva zinc-miklu. Tapkuat uyaqat uyagakhiuqtauniat algaqhimayumi ilutuniqmi (qangani-nunap) tapkuatlu ilututqiyamiittut uyaqat uyagakhiugaulaqmiyut nunap iluani. Tamna High Tahiq havakvia iniqaqniqhaq Inuinait-nanminiani Nunami.
- Havikhaliat iqakuit tahapkuat uyaqat iqakut kihinguqtut atuqtitlugit tapkuat havaktaunii ahivaqtigititlugit tapkuninga haviknik katiqhuqhimaniinik tapkunangat uyaqanit. Havikhaliat iqakuit iliuqaqtauniat talvunga natqanu taphuma High Tahiq. Uplumimun, iqalungnik nalvaqtuqaqhimaittuq uvani tahiqmi, piplugu ilitquhia akuhimania nakuungitman iqaluknut. Naunaiyaqtauyut naunaiqpiagahuaqhugu tamna.
- Wolfden-kut pigiagumayut uyagakhiuqniqmik 2008-mi tapkuatlu atuqniaqtai tuklikhat ikittut ukiut katitiginiqmik tuhaqtakhanik tapkuat ilitquhiinik tapkuatlu inungnut avatigiyainik, ilautitlugit ilitquhiinik qauyimayatuqaqnik, tapkununga avatiliginiqmun naunaiyainiqmun aulattiyinitlu angiqtauniinut. Tamna uyagakhiuqviup atukhaqnikhaa nigiugiyauyuq mikhani 15 ukiunut. Wolfden-kut nigiuktut havaktitinikhamik mikhani 200 inungnik atuqtitlugu aulataunia tapkuak malguk uyagakhiuqviik havakvii. Piyaunahuaqniat havaktitiniqmik nunaliknit, ayuqnaittagangat.

2004 Auyami Uumayuvaluit Piqaqnii Ilitquhii Huniumaititlugit Tuhaqtakhat Katitiqnii

2004-mi, Wolfden-kut katitiqhimayait tuhaqtakhat tapkununga uumayuvaluknut piqaqniinik avatiliginiq taphumunga High Tahiq Havakviani. Una pipkalaqtai Wolfden-kut takuniinik hunat tapkuat avatiliginiqmun qanugitnii tatya. Una ikayuqhiutiyuq kangiqhimaniinik tapkuat piqalaqniinik aktuqtaunii uyagakhiuqviup pivaliatitauniinik tapkuatlu qanuq aktuqtaunii mikhilagiagiakhaita tapkuatluniit utiqviulagiakhaita. Ikayuqtaunii talvangat Kugluktukmin ikayuqhiutiyut tapkununga avatiliginiqmun tapkualu qauyimayiuyut naunaiyaqniinik. Tahapkuat havagutit huli atuqniat 2005-mi, piyaqaqniitigut.

- ***Aniqhaktugauyup Nakuunia tamnalu Hila:*** Malguk hilaligiviik hannaiyaqtauyuk talvani uuktugutauyumi uyagakhiuqviup inikhani katitigahuaqniinut tuhaqtakhat nakit anuqhigiakhanik kayumikniiniklu, uunaqniinik, kinipaniinik, hakugikniinik, uunaqnianiklu hiqingup, tamnalu nipaliqniq.
- ***Nuna:*** Tuhaqtakhat nunamun, ilautitlugit tapkuat qanugittuunii nauttiat nunalu katitigauhimayut tapkuatlu atuqtauniat hanayauniinik nunauyat nauhimayunut tapkuatlu angutikhat nayuqpaktainut.
- ***Angutikhat:*** Naunaiyaqnii tapkuat Qingauk Tuktut Amihuaqyui, Dolphin-Union Tuktut Amihuaqyui, tapkuatlu umingmait piyauhimayut tingmitikkut. Qalviit, tigiganiat akhaitlu tumai takuyauhimayut. Tuhaqtakhat mikitqiyanut uumayunut (tahapkuavaluit avingait hikhiitlu), tingmityatlu katitiqtauhimakmiyut.
- ***Imaq:*** Imaq halumailgutlu qanugitnii naunaiyaqhimayut tahapkunani tahiqni kuugauyaqnilu avataani taphuma uuktugauyup uyagakhiuqvikhap naunaiyaqtauhimakmiuyuttauq kangiqhinahuaqhugit qanuqtut aulatauniagiakhai immat hivunikhami.
- ***Iqaluit tapkuatlu Nayuqpaktai:*** Tapkuat qanugittuunii iqaluit, qaphiuniilu iqaluit, nakuunii, tapkuatlu naniitpagiakhai naunaiyaqhimayut. Tapkuat iqaluligiyit havaqatigiit takuhimayai tagiut haniani taphuma uuktugauyup tulakvikhat, tapkuatlu tattit kuugauyatlu haniani taphuma uuktugauyup uyagakhiuqvikhat.
- ***Qinalukkat Nattiitlu:*** Qinalukkat nattiitlu naunaiyaqtauhimayut haniani atugahuquqtup umiaqpait apqutikhaini. Thapkuat inigiyai ilalgit taphuminga Dolphin Unionlu Tagiunga, Kugluktup Tagiunga, Dease Tagiunga, Killingup Iluiliup Tagiunga, Killingup Tagiunga, Rasmussen Tagiunga ikigahailu apqutailu tahamani kangivani kivataanilu Uqhuqtuup Qikiqtaata Nunata, Larsen Tagiunga, Franklin Tagiunga, tamnalu Kingailaup Tagiunga.
- ***Inituqlituqat:*** Piqalagahuquqtut inituqlituqat inigiyai takuyauyut tahamuuna tagiup hinaagut tahamanilu uuktugauyup uyagakhiuqvikhat.

ᐊᖓᔪᖄᖑᔪᓄᑦ ᓯᕕᑭᓇᖅᓯᒪᔪᑦ

ᕗᓪᑉᑕᓐ ᕆᓱᐊᓯᔅ ᓇᒥᓂᖃᖅᑐᑦ ("ᕗᓪᑉᑕᓐᑯᑦ") ᑲᓇᑕᒥᐅᓂ ᓴᕕᒃᓴᖅᓯᐅᖅᑎᑦ ᐊᒻᒪ ᐅᔭᖅᓯᐅᖅᑎᑦ ᓇᒥᓂᖃᖅᑐᑦ ᐊᒻᒪ ᓴᕕᒃᓴᓄᑦ ᐱᔪᓐᓇᐅᑎᓖᑦ ᕼᐊᐃ ᑕᓯᖅᒧᑦ ᓴᓇᕕᖓᓄᑦ ᐊᒻᒪ ᐅᓗ ᓴᓇᕕᖓᓄᑦ ᑕᒫᓂ ᐅᐊᓕᖓᖓᓂ ᓄᓇᕗᑦ

ᓱᓇ ᐆᒃᑐᕈᑎᖓ ᕼᐊᐃ ᑕᓯᖅ ᐱᓕᕆᐊᖓ?

- ᕗᓪᑉᑕᓐᑯᑦ ᐸᖅᓇᒃᓯᒪᔪᑦ ᐊᒧᓯᓂᖅᒥᒃ ᓴᕕᒃᓴᖃᒻᒪᓇᒃᑐᓂᒃ ᐅᔭᖃᓂᒃ, ᑕᐃᔭᐅᓲᖑᒃᒥᔪᑦ ᓴᕕᒃᓴᓂᒃ, ᑕᒪᑭᒃᓂᑦ ᑖᑉᓱᒪᓂ ᕼᐊᐃ ᑕᓯᖅ ᐊᒻᒪ ᐅᓗ ᓴᓇᕕᖏᓂ, ᐊᒻᒪ ᓴᓇᓂᖏᓄᑦ ᓴᕕᒃᓴᓕᐅᖅᕕᒃ ᑕᑉᐸᓂ ᕼᐊᐃ ᑕᓯᖅ ᓴᓇᕕᖓᓂ ᐱᓕᕆᔭᐅᓂᖏᓄᑦ ᓴᕕᒃᓴᑦ. ᓴᕕᒃᓴᑦ ᑕᑉᐸᖓᑦ ᐅᓗᒥᑦ ᓄᒃᑎᒐᐅᓂᐊᑦ ᕼᐊᐃ ᑕᓯᖅᒧᑦ ᐅᑭᐅᑯᑦ ᐊᑉᖁᑎᖓᒍᑦ. ᐊᓯᖓᑦᑕᐅᖅ ᐊᑉᖁᑦ, ᐅᑭᐅᓕᒫᖓᓂ ᐊᐅᔭᖓᓂᓗ ᐊᑉᖁᑕᐅᓇᔭᖅᑐᖅ, ᓴᓇᔭᐅᔪᒫᖅ ᐊᑯᖓᓂ ᕼᐊᐃ ᑕᓯᖅ ᐊᒻᒪ ᑐᓚᒃᑕᖅᕕᒃ ᑕᑉᐸᓂ ᒍᕇᔅ ᐲᒥ. ᑕᑉᐸᖓᑦ ᑐᓚᒃᑕᖅᕕᒃᒥᑦ, ᐅᒥᐊᖅᔪᐊᑦ ᓄᒃᑎᖅᓂᐊᖅᑕᖏ ᑕᒪᑯᐊᑦ ᓴᕖᑦ ᑲᑎᖅᓱᖅᓯᒪᓂᖏ ᓂᐅᕕᖅᑎᒃᓴᖏᓄᑦ ᐊᒻᒪ ᑎᑭᓴᐃᓗᑎᒃ ᐊᑐᓕᒃᓴᓂᒃ.
- ᑕᒻᓇ ᐅᓗ ᓴᓐᓇᕕᖓ ᐱᑕᖃᖅᑐᖅ *ᒨᓕᑕᖃᖅᑐᖅ* ᐊᒻᒪ ᐅᔭᖅᓯᐅᖅᕕᐅᓂᐊᖅᓗᓂ ᓄᓇᑉ ᐃᓗᐊᓂ. ᑖᒻᓇ ᐅᓗ ᓴᓐᓇᕕᖓ ᐃᓂᖃᖅᑐᖅ ᐃᓄᒪᓈᑦ ᓄᓇᖓᓂ.
- ᑖᒻᓇ ᕼᐊᐃ ᑕᓯᖅ ᓴᓐᓇᕕᖓ ᐱᑕᖃᖅᑐᖅ ᐱᖓᓱᓂᒃ ᓴᕕᒃᓴᖅᑕᖃᓕᓇᒃᓂᖏᓂᒃ ᐅᔭᖃᓂᒃ ᐱᑕᖃᖅᑐᓂᒃ *ᑰᐳ; ᒨᓕᑦ, ᓯᓪᕗ* ᐊᒻᒪ *ᐳᖅ*. ᑖᒻᓇ ᐅᔭᖅ ᐅᔭᖅᓯᐅᒐᐅᓂᐊᖅ ᐊᖓᒪᐅᒪᔪᒥ ᐃᓗᑦᑐᖅᓯᒪᔪᒥ (ᓄᓇᑉ ᖃᖓᓂ) ᐊᒻᒪ ᑕᒪᑯᐊᑦ ᐃᓗᑐᓂᖅᓴᑦ ᐅᔭᖃᑦ ᐅᔭᖅᓯᐅᒐᐅᓚᑦ ᓄᓇᑉ ᐃᓗᐊᓂ. ᑖᒻᓇ ᕼᐊᐃ ᑕᓯᖅ ᓴᓐᓇᕕᖓ ᐃᓂᖃᖅᓂᖅᓴᖅ ᐃᓄᐃᑦ-ᓇᒥᓂᖓᓂ ᓄᓇᒥ.
- ᓴᕕᒃᓴᓕᐅᖅᓂᑯᑦ ᐊᒃᑕᑯᖏ ᑕᒪᑯᐊᑦ ᐊᒃᑕᑯᑦ ᐅᔭᖃᑦ ᐊᒥᐊᑯᖏ ᐱᓕᕆᔭᐅᓂᖏᓄᑦ ᐲᔭᖅᑕᐅᓂᖏ ᑖᑉᑯᐊᑦ ᓴᕖᑦ ᑲᑎᖅᓱᖅᓯᒪᓂᖏ ᑖᑉᑯᓇᖓᑦ ᐅᔭᖃᓂᑦ. ᓴᕕᒃᓴᓕᐅᖅᓂᑯᑦ ᐊᒃᑕᑯᖏ ᐃᓕᐅᖃᖅᑕᐅᔪᒫᑦ ᓇᑎᖓᓄᑦ ᕼᐊᐃ ᑕᓯᖅᒧᑦ. ᐅᑉᓗᒥᒧᑦ, ᐃᖃᓗᒃᒥᒃ ᓇᓂᓯᕕᐅᓯᒪᖏᑦᑐᖅ ᐅᕙᓂ ᑕᓯᖅᒥ, ᐱᑦᓗᒍ ᐃᓕᖁᓯᖓ ᐊᑯᑦᑕᖅᓂᖓ ᐊᑲᐅᖏᑦᒪᑦ ᐃᖃᓗᒃᓄᑦ. ᖃᐅᔨᓴᖅᓃᑦ ᐱᓕᕆᔭᐅᔪᑦ ᑖᑉᑯᐊᑦ ᓇᓗᓇᐃᑎᐊᓕᕆᓚᒐᓯᒃᓗᒥᑦ ᑕᐃᒪᐃᑲᓗᐊᖅᒪᖓᑦ.
- ᕗᓪᑉᑕᓐᑯᑦ ᐱᒋᐊᕈᒪᔪᑦ ᐅᔭᖅᓯᐅᖅᓂᖅᒧᑦ 2008-ᒥ ᐊᒻᒪ ᐱᓕᕆᔪᑦ ᑖᑉᑯᓇᓂ ᖃᑉᓯᓂ ᐊᕐᒍᒃᓴᓂ ᑲᑎᑎᕆᓂᖅᒧᑦ ᑐᓴᒐᒃᓴᓂᒃ ᑖᑉᑯᐊᑦ ᐃᓕᖁᓯᖏᓄᑦ ᐊᒻᒪ ᐃᓄᖕᓄᑦ ᐊᕙᑎᓕᕆᓂᖅᒧᑦ, ᐃᓚᐅᑎᑦᓗᒋᑦ ᐃᓕᖁᓯᖅᓂᒃ ᖃᐅᔨᒪᓂᖏᓄᑦ, ᑖᑉᑯᓄᖓ ᐊᕙᑎᓕᕆᓂᖅᒧᑦ ᖃᐅᔨᓴᖅᓂᖏᓄᑦ ᐊᒻᒪ ᐊᐅᓚᑦᑎᓂᖅᒧᑦ ᐊᖏᖅᑕᐅᓂᖏᓄᑦ. ᑖᑉᓱᒪ ᐅᔭᖅᓯᐅᖅᕕᐅᑉ ᐊᑐᒃᓴᖅᓂᒃᓴᖓ ᓂᕆᐅᒋᔭᐅᔪᖅ ᒥᒃᓵᓂ 15 ᐊᕐᒍᑦ. ᕗᓪᑉᑕᓐᑯᑦ ᓂᕆᐅᒃᑐᑦ ᓴᓇᑎᑦᑎᓂᖅᒧᑦ ᒥᒃᓵᓂ 200 ᐃᓄᖕᓂᒃ ᐊᑐᖅᑎᑦᓗᒍ ᐊᐅᓚᑦᑎᓂᖅ ᑖᑉᑯᐊᒃ ᒪᕐᕈᒃ ᐅᔭᖅᓯᐅᖅᕖᒃ. ᐱᓇᓱᒃᓂᐊᑦ ᓴᓇᑎᑦᓂᖏ ᓄᓇᓕᐅᔪᓂᑦ, ᐊᔪᖅᓇᖏᑕᖃᐃᒃᒪᑦ.

2004 ᐊᐅᔭᖓᓂ ᐆᒪᔪᕋᓗᐃᑦ ᐱᑕᖃᖅᓂᖏᓄᑦ ᓱᓂᐅᒪᖏᑎᑦᓗᒍ ᐃᓕᖁᓯᖓ ᑐᓴᒐᒃᓴᑦ ᑲᑎᑎᖅᓂᖏ

2004-ᒥ, ᕗᓪᑉᑕᓐᑯᑦ ᑲᑎᑎᕆᓯᒪᔪᑦ ᑐᓴᒐᒃᓴᓂᒃ ᑖᑉᑯᓄᖓ ᐆᒪᔪᕋᓗᒃᓄᑦ ᐱᑕᖃᖅᓂᖏᓄᑦ ᐊᕙᑎᓕᕆᓂᖅᒧᑦ ᑕᒫᓂ ᕼᐊᐃ ᑕᓯᖅ ᐱᓕᕆᕕᖓᓂ. ᐅᓇ ᐱᔪᓐᓇᕈᑕᐅᔪᒫᖅ ᕗᓪᑉᑕᓐᑯᑦ ᑕᑯᓂᖏᓄᑦ ᓱᓇᑦ ᑖᑉᑯᐊᑦ ᐊᕙᑎᓕᕈᑎᖏ ᖃᓄᓇᑦᒪᖓᖏ ᒫᓇᐅᔪᖅ. ᐅᓇ ᐃᑲᔪᕈᑕᐅᔪᖅᑐᑭᓯᒪᓂᖏᓄᑦ ᑖᑉᑯᐊᑦ ᐊᒃᑐᐊᓇᔭᖅᓂᖏ ᐅᔭᖅᓯᐅᖅᕕᐅᑉ ᐱᕙᓕᐊᑎᑕᐅᓂᖏ ᐊᒻᒪ ᖃᓄᖅᑐᖅ ᑖᑉᑯᐊᑦ ᐊᒃᑐᐊᓂᖏ ᒥᒃᓯᒋᐊᕈᓐᓇᖅᒪᖓᖏ ᐅᕙᓗᓃᑦ ᐅᑎᖅᕕᐅᔪᑦᑕᐅᔪᓐᓇᖅᒪᖓᖏ. ᐃᑲᔪᖅᑕᐅᓂᖏ ᖁᖅᓗᖅᑐᒥᑦ ᐃᑲᔪᖅᓯᐅᑎᓯᒪᔪᑦ ᐊᕙᑎᓕᕆᓂᖅᒧᑦ ᐊᒻᒪ ᖃᐅᔨᒪᔨᐅᔪᓄᑦ ᖃᐅᔨᓴᒐᐅᓂᖏᓄᑦ. ᑕᒪᑯᐊᑦ ᐱᓕᕆᑦᔪᑎᑦ ᓱᓕ ᑲᔪᓯᑐᐃᓇᖅᓂᐊᑦ 2005-ᒥ ᐱᔭᕆᐊᖃᓂᖏᑎᒍᑦ.

- *ᐊᓂᖅᓴᖅᑐᒐᒃ ᐊᑲᐅᓂᖓ ᐊᒻᒪ ᓯᓚᓕᕆᓂᖅ:* ᒪᕐᕈᒃ ᓯᓚᓕᕆᕖᒃ ᐋᕿᒃᓯᒪᔫᒃ ᑕᓗᕙᓂ ᐆᒃᑐᖅᕕᐅᔪᒥ ᐅᔭᖅᓯᐅᖅᓂᖅᒧᑦ ᓴᓐᓇᕕᐅᔪᓂ ᑲᑎᑎᕋᓱᒃᓂᖏᓄᑦ ᑐᓴᒐᒃᓴᑦ ᐊᓗᓇᑉ ᓇᒥᖓᖅᓂᖏᓄᑦ ᐊᒻᒪ ᓴᖏᓂᖏᓄᑦ, ᐆᓇᖅᓂᖓ, ᖃᐅᓯᖅᓂᖓ, ᐊᒃᓱᕈᖅᓇᖅᓂᖓ, ᐆᓇᖅᓂᖓᓗ ᓯᕿᓂᖅ, ᐊᒻᒪ ᓯᓚᓗᒃ.
- ᓄᓇ: ᑐᓴᒐᒃᓴᑦ ᓄᓇᒧᑦ, ᐃᓚᐅᑎᑦᓗᒋᑦ ᖃᓄᓇᑦᑑᓂᖅ ᐱᕈᖅᓯᐊᑦ ᐊᒻᒪ ᓄᓇ ᑲᑎᑎᒐᐅᓯᒪᔪᑦ ᐊᒻᒪ ᐊᑐᒐᐅᔪᒫᑦ ᓄᓇᖑᐊᓕᐅᖅᓂᖅᒧᑦ ᐱᕈᖅᓯᒪᔪᒐᓗᒃᓄᑦ ᐊᒻᒪ ᐆᒪᔪᕋᓗᐃᑦ ᓇᔪᖅᐸᒃᑕᖏᓄᑦ.

- *ᐆᒪᔪᑦ:* ᖃᐅᔨᓴᐅᑎᓂᖏ ᕿᖓᐅᑉ ᑐᒃᑐᑦ ᐊᒥᓪᕋᖏ, ᑕᓪᕕᓐ-ᔪᓂᐊᓐ ᑐᒃᑐᑦ ᐊᒥᓪᕋᖏ, ᐊᒻᒪᓗ ᐅᒥᖕᒪᐃᑦ ᐱᓕᕆᔭᐅᓯᒪᔪᑦ ᑎᖕᒥᔪᒃᑯᑦ. ᖃᓪᕖᑦ, ᑎᓇᒐᓂᐊᑦ ᐊᒻᒪᓗ ᐊᒃᓚᐃᑦ ᑐᒥᖏ ᑕᑯᔭᐅᓯᒪᔪᑦ. ᑐᓴᒐᒃᓴᑦ ᑕᒪᑯᓄᖓ ᒥᑭᓂᖅᓴᓄᑦ ᐊᖑᑎᒃᓴᓄᑦ (ᑕᒪᑯᐊᕋᓗᐃᑦ ᐊᕕᖓᐃᑦ ᐊᒻᒪᓗ ᓯᒃᓰᑦ), ᐊᒻᒪᓗ ᑎᖕᒥᕐᔭᑦ ᑲᑎᑎᒐᐅᓯᒪᒋᓗᑎᒃ.

- *ᐃᒪᖅ:* ᐃᒪᖅ ᐊᒻᒪᓗ ᓴᓗᒪᐃᓪᕈᑦ ᖃᓄᓇᑦᓂᖏ ᖃᐅᔨᓴᐅᓯᒪᒋᓗᑎᒃ ᑕᓯᖅᓂ ᐊᒻᒪᓗ ᑰᒐᐅᔭᖅᓂ ᑕᒫᓂ ᐊᕙᑎᖓᓂ ᑖᑉᓱᒪ ᐆᒃᑐᕈᑕᐅᔪᑉ ᐅᔭᕋᒃᓯᐅᖅᕕᒃᓴᑉ ᓴᓇᕕᖓ ᐊᒻᒪᓗ ᑕᓇᐅᒥ ᖃᓂᖓᓂ ᑖᑉᓱᒪ ᐆᒃᑐᖅᕕᐅᔪᑉ ᑐᓚᒃᑕᖅᕕᒃᐅᔪᒥ. ᖃᓄᖅᑐᑦ ᐃᒪᖅ ᐊᐅᓚᓂᖓ ᖃᓂᖓᓂ ᑖᑉᓱᒪ ᐆᒃᑐᕈᑕᐅᔪᑉ ᓴᓐᓇᕕᐅᔪᑦ ᖃᐅᔨᓴᐅᓯᒪᒃᒥᔪᖅ ᑐᑭᓯᓇᓱᒃᓂᖏᓄᑦ ᖃᓄᖅᑐᑦ ᐊᐅᓚᑕᐅᓂᐊᖅᒪᖓᖏ ᑖᑉᑯᐊᑦ ᐃᒪᐃᑦ ᓯᕗᓂᒃᓴᒥ.

- *ᐃᖅᑲᓗᐃᑦ ᐊᒻᒪᓗ ᓇᔪᖅᐸᒃᑕᖏ:* ᑕᒪᑯᐊᑦ ᐊᓪᓚᖅᑭᒃᓂᖏ ᐃᖅᑲᓗᐃᑦ, ᐊᒥᓲᓂᖏ ᐃᖅᑲᓗᐃᑦ, ᐊᖅᑲᐅᓂᖏ, ᐊᒻᒪᓗ ᓇᒦᖃᑦᑕᖅᓂᖏ ᖃᐅᔨᓴᐅᓯᒪᒋᑉᓗᑎᒃ. ᑖᑉᑯᐊᑦ ᐃᖅᑲᓗᓕᕆᓂᕐᒧᑦ ᐱᓕᕆᔨᐅᔪᑦ ᕿᓂᖅᓯᒪᔭᖏ ᑕᓇᐅᒥ ᖃᓂᖓᓂ ᑖᑉᑯᐊᑦ ᐆᒃᑐᕈᑕᐅᔪᑦ ᑐᓚᒃᑕᖅᕕᒃᓴᑦ, ᐊᒻᒪᓗ ᑕᓯᖅᓂ ᐊᒻᒪᓗ ᑰᒐᐅᔭᖅᓂ ᖃᓂᖓᓂ ᑐᑭᓯᓇᓱᒃᓗᒋᑦ ᐊᐅᓚᓂᖏ ᑖᑉᑯᐊᑦ ᐃᒪᐃᑦ ᓯᕗᓂᒃᓴᒥ.

- *ᕿᓇᓗᒐᐃᑦ ᐊᒻᒪᓗ ᓇᑦᑏᑦ:* ᕿᓇᓗᒐᐃᑦ ᐊᒻᒪᓗ ᓇᑦᑏᑦ ᖃᐅᔨᓴᐅᓯᒪᔪᑦ ᖃᓂᖓᓂ ᐊᑐᒐᐅᓇᔭᖅᑐᑦ ᐅᒥᐊᖅᔪᐊᑦ ᐊᑉᑯᑎᖏᓂ. ᑕᒪᑯᐊᑦ ᐃᓂᖏ ᐃᓚᖃᖅᑐᑦ ᑕᓪᕕᓐ ᐊᒻᒪᓗ ᔪᓂᐊᓐ ᑕᓇᐊᖓ, ᖁᓪᓗᖅᑐᑉ ᑕᓯᐅᖓ, ᑏᔅ ᑕᓇᐅᖓ, ᑮᓪᓕᓂᖅ ᐃᓗᐃᓕᐅᑉ ᑕᓇᐅᖓ, ᑮᓪᓕᓂᖅ ᑕᓇᐅᖅ, ᖀᔅᒥᐅᓴᓐ ᑕᓇᐅᖅ ᐊᒻᒪᓗ ᐃᑭᕋᓴᐃᑦ ᐊᒻᒪᓗ ᐊᑉᖁᑕᐅᔪᑦ ᑲᖏᕙᓂ ᐊᒻᒪᓗ ᑭᕙᑎᖓᓂ ᐅᖅᓱᖅᑑᑉ ᕿᑭᖅᑕᖓᓂ, ᓚᕐᓴᓐ ᑕᓇᐅᖅ, ᕗᕋᐃᒃᓕᐊᓐ ᑕᓇᐅᖅ ᐊᒻᒪᓗ ᑭᖓᐃᓚᐅᑉ ᑕᓇᐅᖓ.

- *ᐃᓂᑐᖅᓕᑐᖃᐃᑦ:* ᐱᑕᖃᕋᔭᖅᓂᖏ ᐃᓂᑐᖅᓕᑐᖃᐃᑦ ᐃᓂᖏᓂᒃ ᑕᑯᔭᐅᔪᑦ ᑕᒫᓂ ᑕᓇᐅᑉ ᓯᓈᓂ ᐊᒻᒪᓗ ᑕᓪᕆᓂ ᐆᒃᑐᕈᑕᐅᔪᒥ ᐅᔭᕋᒃᓯᐅᖅᕕᐅᑉ ᐃᓂᖓᓂ.

1. Introduction

The intent of this document is to provide the Nunavut Research Institute with a summary of the field activities related to the 2004 environmental baseline programs designed to support the environmental assessment of the High Lake Project. The Research Licence (number 0401104N-M) related to this work states that a Final Report summarizing activities and major findings must be submitted to the Nunavut Research Institute upon completion of the field work.

Please note that all photographs for this report are presented in Appendix A.

2. Summary of Project Description

Wolfden Resources Inc. has initiated the High Lake Project, aimed at developing an operating gold and base metal mine in the Kitikmeot Region of Nunavut (Figure 1). Current projections for the development predict an approximate mine life of 15 years. The project consists of the following three main components:

1. the High Lake (base metal with gold and silver) and Ulu (gold) mineral properties;
2. transportation corridors:
    - from Ulu to High Lake (to transport ore from Ulu to High Lake for processing); and
    - from High Lake north to Grays Bay (to transport ore concentrate to the coast for shipping to market, and transporting supplies from the dock to High Lake and Ulu);
3. a deepwater dock and loading facility at Grays Bay on the Coronation Gulf.

Potential activities related to the proposed project are outlined in Table 1.

To meet environmental assessment and regulatory requirements for developing the High Lake Project, Wolfden Resources Inc., through its main consultant Gartner Lee Limited, have developed and are conducting environmental, traditional knowledge, and socio-economic baseline information gathering programs. Baseline data collection methods have been designed to provide the information required to make predictions concerning impacts of the activities outlined in Table 1. Information gathered as part of the field programs will also assist with the design and construction planning of the project.

Field programs in 2004 focused on the Ulu, High Lake and potential dock and loading facilities sites. Field work associated with the potential road routes was limited, as only preliminary road routing was known at the time of field data collection. Field programs for 2005 will be designed to collect more specific information along the potential road routes

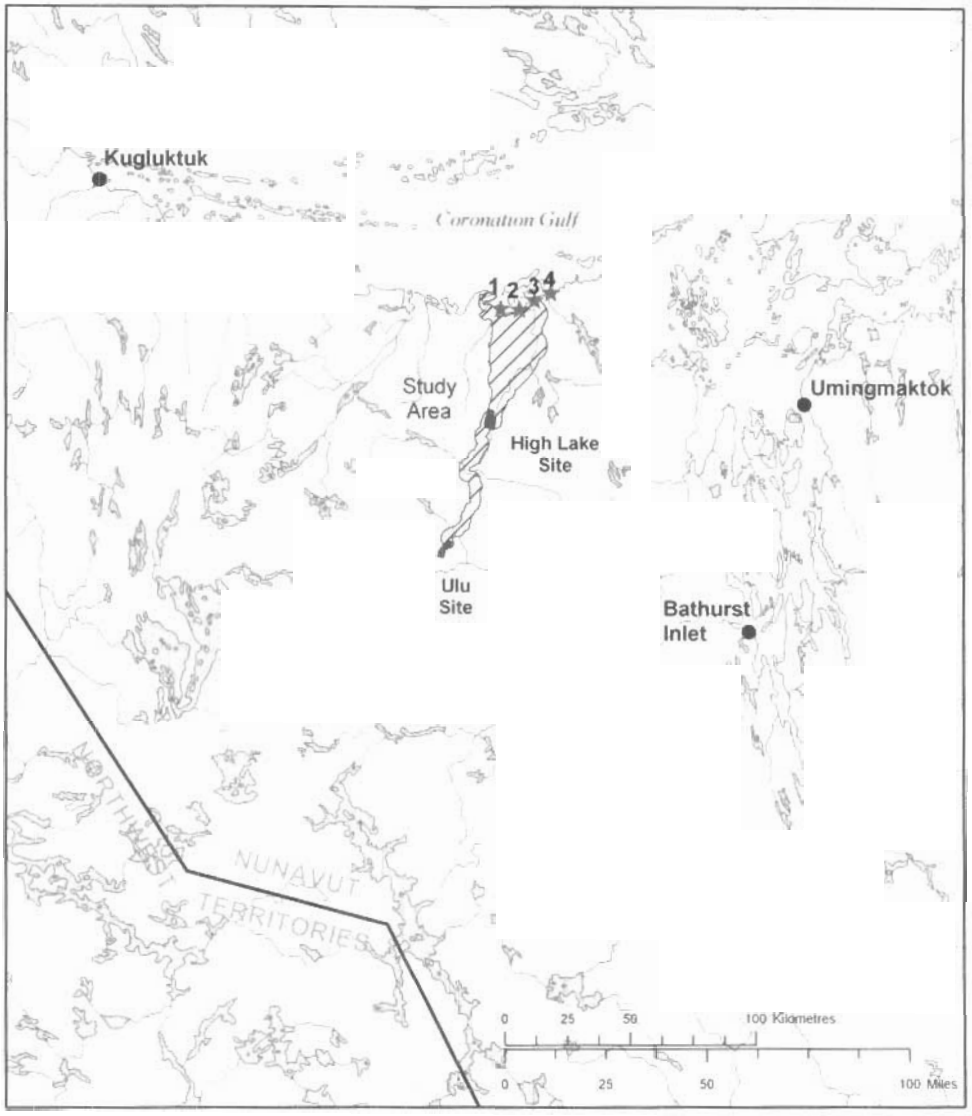


Figure 1. High Lake Project Map

Table 1. Potential activities associated with the proposed High Lake Project.

• barge transportation / tugs; • shipping through Gulf; • general cargo transfer; • fuel transfer; • bulk supply transfer; • concentrate transfer and transport; • marine wildlife management (e.g., polar bears) (indirect); • garbage disposal and recovery; • demolition; • geotechnical drilling; • soil remediation; • construction-related drilling; • blasting; • excavation and fill placement for construction of buildings, airstrip, roads; • building construction; • open pit and underground mining;	• site clearing; • offshore dredging; • offshore construction; • general equipment operation; • power generation; • burning; • landfilling; • snow removal and piling; • recreational activities (indirect); • road traffic; • berming and lining for fuel tank farm; • waste rock removal and storage; • waste rock transportation • terrestrial wildlife management (e.g., bear, wolverine control) (indirect); • ore processing; • air traffic (fly in fly out); • tailings management.

Wolfden's vision is to bring the High Lake property into mining production for the benefit of its shareholders and the residents of Nunavut in a manner that respects the environmental and socio-economic conditions in Nunavut.

3. Summer 2004 Biophysical Baseline Programs

3.1 Pre-field work tasks

The pre-field work tasks included a review and compilation of existing documents related to the Ulu and High Lake areas, regional information available through government agencies, and impact assessment documents related to similar mining projects in the region. A preliminary data gap analysis was performed based on this information, from which the field programs were based.

3.2 Disciplines and Teams

The biophysical programs have been organized into the following disciplines:

- Air Quality, Climate and Noise
- Terrain and Soils
- Vegetation
- Hydrology
- Marine and Freshwater Sediment and Water Quality
- Marine Fish, Fish Habitat and Aquatics
- Freshwater Fish, Fish Habitat and Aquatics
- Marine Mammals
- Wildlife and Terrestrial Wildlife Habitat
- Archaeological Resources

Each discipline has been organized with a lead, a senior technical support person, and junior technical personnel. A biophysical program leader coordinated the teams and programs and liaised with the client, GIS team, public participation, and engineering teams. A health and safety and logistics coordinator was present on-site to coordinate the teams and ensure safe work practices. Programs were integrated early in the process during a reconnaissance trip in June 2004 (Photo 1).

The biophysical teams consisted of Gartner Lee Limited personnel except in the case of the archaeology, marine mammals and marine fish and aquatics teams, where consultants were hired as subcontractors to complete the programs. At least one Inuit local assistant worked with each team on each program, including the engineering programs (not discussed in this report). Local assistants were hired directly by Wolfden for a total of 163 person/days.

3.3 Permits

In early April, the process of obtaining permits and licences for the summer biophysical program was initiated. The following permits and licences were obtained (Table 2).

Table 2. List of Permits and Licenses Obtained for the 2004 Summer Biophysical Field Programs

Issuing Agency	Name of Permit	Date of Issue	Expiry Date
Nunavut Research Institute	Scientific Research Licence 0401104N-M[1]	July 01, 2004	December 31, 2004
Department of Culture, Language, Elders and Youth, Government of Nunavut	Nunavut Territory Archaeologist Permit 04-04A	June 1, 2004	December 31, 2004
Department of Sustainable Development, Government of Nunavut	Wildlife Research Permit WL 00724	July 5, 2004	July 5, 2005
Department of Fisheries and Oceans, Government of Canada	Licences to Collect Aquatic Plants, Animals, and Fish for Scientific Purposes (SLE-04/05-21 and SLE-04/05-11)	June 12, 2004 July 17, 2004	March 31, 2005 March 31, 2005

4. Air Quality, Climate and Noise

The air quality assessment for the Project requires an understanding of transport, dispersion, transformation, and deposition processes and relies on meteorological data for development and application of site-specific dispersion models. Similarly, the assessment of potential noise impacts is also dependent on an understanding of existing noise levels and the noise generated by the various proposed activities. Air quality and noise monitoring instruments will likely be installed in summer 2005.

Installation of two Campbell Scientific Model CR10X meteorological stations (one at High Lake and one at Ulu) was completed in July 2004 and data is being downloaded at regular time intervals (Photo 2). The parameters included in the monitoring program include:

- wind direction and speed;
- air temperature;
- relative humidity and barometric pressure;
- solar radiation; and
- total precipitation.

[1] The Nunavut Impact Review Board completed a Screening Decision Report (04YN0073, June 23, 2004) as part of the NRI licensing process.

The stations are self-contained, battery-powered and include a digital data acquisition module that is capable of storing data for a period of up to two years. These units are commonly used in the Arctic, are specifically designed to withstand extreme temperature fluctuations and are also designed for un-manned operation. Data is stored in a digital format suitable for manual downloading using a portable computer.

5. Terrain and Soils

A solid understanding of the soils, surface and bedrock geology is essential for siting of all facilities and roads. The geological maps will be the interface between engineering, construction and design teams, and the environmental teams. This is particularly important in permafrost-affected areas, where poor handling of the ice-rich sediments or slopes may cause long-term disturbances and thus affect the integrity of the surface. Subsurface data obtained from the 2004 geotechnical drilling programs and geophysical surveys will be incorporated into the geological mapping and map unit description in the fall of 2004.

Surface geology maps at 1:50,000 scale were prepared and ground-truthed this summer. Map unit descriptions include soils associated with landforms, at the soil subgroup level. The surface geology maps will be used as basis for the ecological land classification. In addition, some map units or terrain units are strongly linked to heritage and archaeological sites, and sites with high wildlife habitat value, such as denning sites or wetlands

Fieldwork involved one geologist or soil scientist working for a total of 13 days. The soil and terrain team worked in an integrated fashion with a biologist and a local assistant who collected vegetation and wildlife habitat baseline data. All sites were identified by a site identification number, and location was noted using a hand held GPS unit. In total, 189 terrain and soil sites were documented.

Data were collected pertaining to the following:

- dominant texture;
- genetic agent and modifier;
- soil horizons description;
- soil classification at the subgroup level;
- soil drainage class and type;
- description of the organic material;
- active layer depth;
- depth to bedrock;
- depth to water table;
- slope and aspect;
- active geological processes and modifier;
- field indicators of slope or surface instability;
- notes on potential geological processes;

- general vegetation type;
- wetland classification and water pH: and
- Soil pH.

6. Vegetation

The proponent is expected to provide textual and mapped information on the environment including local vegetation communities, rare or uncommon plants or plant communities in order to analyze potential impacts such as loss or alteration of ecosystem or habitat loss or alteration of rare or highly valued plant or plant communities.

The objectives of the 2004 summer program were to prepare a list of plant associations and their characteristics and to obtain enough ground sites in a wide range of areas and plant communities. The intent is to use this information to develop a preliminary vegetation map of the area using aerial photography flown in late July 2004. The vegetation and terrain mapping will be integrated to form a preliminary ecosystem map.

In August 2004, plant ecologists and a local assistant collected baseline data at approximately 200 sites, including species presence, percent cover of each species, incidental observations on wildlife sign and sightings, habitat information, substrate observations, and preliminary vegetation association identification (Photo 3). All sites were identified by a common site identifying number and the location was defined using a hand held GPS unit.

A preliminary list of vegetation associations is presented in Table 3. Ecological land classification will be used to describe the vegetation, landforms and soils in an integrated manner. This ecosystem-based classification will be used for the impact assessment including impacts related to biodiversity, wildlife habitat and landforms. A preliminary ecological classification system is likely to include: dominant vegetation communities, dominant landform type and soil type and non- vegetated surface descriptors (e.g., bedrock, lake, pond).

Samples of grasses, willows and sedges were collected, pressed and sent to specialists for identification.

Table 3. Preliminary List of Vegetation Associations (UA)

HIGH LAKE (UA)	CODE
MARINE	**M**
Intertidal	MI
Sandy beach	MIsb
Gravel beach	MIgb
Sand or mud flats w/ low veg.	MImf
Marine backshore	MBK
Sandy tidal channels	MEtid
Salt marsh areas	MEsm
Talus/boulder shorelines	MT
Rocky shoreline (bedrock)	MR
PLEISTOCENE MARINE	**P**
Low bench floodplain	Pbf
Alluvial	Pal
Fans	Palfan
Floodplains	Palfp
Domes	Pdome
Frost boils with shells	Pfb
WETLANDS (Sedge)	**S**
Emergent	Se
Non-tussock sedge	Snt
Tussock association	St
RIPARIAN	**R**
Riparian birch	Rb
Riparian willow	Rw
Riparian heath	Rh
Riparian shoreline shrub	Rs
HEATH TUNDRA	**HT**
Lichen-heath	HTlh
Upland heath tundra	HTu
Heath tundra on frost scars	HTfs
Heath tundra on solifluction	HTso
Heath tundra on hummocks	HTh
Lowland coast heath tundra	HTl

HIGH LAKE (UA)	CODES
LICHEN-ROCK	**LR**
Heath/boulders	
Boulder field/felsenmeer	LRhb
Glacial rebound beaches	LRgrb
Bedrock associations	LRr
Cliff ledges	LRcl
Cliff faces	LRcf
ESKER/OUTWASH PLAIN	**EC**
Outwash plain/esker crest	Ecc
Sandy crest assn.	Eccs
Cobble crest assn.	ECcc
Outwash plain slopes	ECs
Outwash plain ponds	ECp
Outwash plain riparian	ECr
MISCELLANEOUS	
Mossy shorelines	MSs
Mossy cliff bases	MSc
Birch seep	Bs
Birch shrub	Bsh
Avens association	A
Snowbank	SB
UNVEGETATED TERRAIN	**U**
Aufeis	Ua
DISTURBED SITES	**DS**
Den sites	DSd
Nesting ledges	DSn
Bird nesting islands	DSbn
Greywater outflow from camp	DSg
Caribou trails	DSt
Roads or airstrips	DSr
Mining/sampling sites	DSm
Camps	DSc
Tailings ponds	DSp

7. Hydrology

A good understanding of the existing aquatic environment is key to demonstrating that the aquatic environment is adequately protected at all stages of mine development, operation and closure. Information on baseline conditions will help develop a mine plan that minimizes environmental impacts, assesses the potential effect of the project and provides the baseline information for monitoring during the operational and closure phases.

The objective of the surface water hydrology program was to collect sufficient additional baseline information to characterize the surface water hydrology in the project area. The fisheries and water quality programs were carefully coordinated with the hydrology program (Photo 4). For example, stream gauging sites were coordinated with water quality sample sites.

The 2004 study area was defined as any sub-watershed that contains a proposed component of mine infrastructure including camps, mills and airstrips. The Kennarctic River located upstream of the inlet of the High Lake outlet creek and downstream for 8 to 10 km to below the inlet of drainage from the potential airstrip location is also part of the local study area. The mouth of the Kennarctic in Grays Bay and the potential dock and loading facilities location are also included.

Field work was conducted between May and September 2004 and included the following field tasks:

- download gauge data and service gauges;
- meter flows at all gauged sites at minimum of three times during the first two weeks of July;
- photograph all primary streams from the air and all gauge sites in July;
- meter flows (when there is flow) twice during August and once in each of September as described above;
- remove gauges near end of October;
- Survey streams; and
- Survey/photograph outlets and connection between High Lake and large lake to the west.

8. Marine and Freshwater Sediment and Water Quality

A detailed study of the water and sediment quality was conducted around the proposed High Lake and Ulu mine sites and dock sites. This study is designed to provide sufficient detail to support the design engineers in planning the layout of the mine and the environmental assessment for the Project. The 2004 study area was the same as the study area defined for the hydrology program, above.

The overall goal of the 2004 baseline data collection program was to collect water and sediment quality data from areas most likely to be affected by the proposed mine development at High Lake keeping in mind that the layout of the mine infrastructure is currently in the early stages of planning.

The objective of the water and sediment quality program is to collect sufficient baseline information to:

- characterize the physical limnology of the lakes within the project area;
- characterize the surface water quality within the project area including lakes, streams and rivers;
- characterize the fresh water sediment quality within the project area including lakes, streams and rivers; and
- characterize the sediment quality in the marine environment including the mouth of the Kennarctic River and the potential dock and loading facilities area.

The general field program included sampling at the following locations:

- Lakes (two times – ice-free conditions in early July and August):
  - limnology – depth profiles of dissolved oxygen, conductivity, temperature and pH;
  - water quality samples at surface (0.5 m depth), mid-depth and 1 m above bottom analyzed for the parameters listed in Table 5 along with total chlorophyll and hydrogen sulphide; and
  - bottom sediment samples analyzed for the parameters listed in Table 4 (only in July).

- Rivers and Streams (two times – during the spring melt in late June and August):
  - visual assessment of channel characteristics;
  - surface measurement of temperature, dissolved oxygen, pH and conductivity; and
  - water quality samples analyzed for the parameters listed in Table 5.

- Marine Sediment (in late August):
  - bottom sediment samples from the mouth of the Kennarctic River (3 samples – composite), general proposed dock and loading facilities areas (3 samples – composite) and two reference sites (composite).

It is important to note that in 2004, the field studies focused on the proposed High Lake and Ulu mine site areas, specifically on those drainages that may be associated with mine infrastructure or receive drainage from areas that may have mine infrastructure.

Table 4. Sediment Quality Analytical Parameters

Conventional Parameters			
pH		Cobalt	T-Co
Moisture (%)		Copper	T-Cu
Organic (%)		Iron	T-Fe
Particulate Size		Lead	T-Pb
Gravel (>2.00 mm)		Lithium	T-Li
Sand (2.00 mm - 0.063 mm)		Magnesium	T-Mg
Silt (0.063 mm – 4 μm)		Manganese	T-Mn
Clay (<4 μm)		Mercury	T-Hg
Total Metals by ICP-MS		Molybdenum	T-Mo
Aluminum	T-Al	Nickel	T-Ni
Antimony	T-Sb	Potassium	T-K
Arsenic	T-As	Selenium	T-Se
Barium	T-Ba	Silver	T-Ag
Beryllium	T-Be	Strontium	T-St
Bismuth	T- Bi	Thallium	T-Tl
Boron	T-Bo	Tin	T-Sn
Cadmium	T-Cd	Titanium	T-Ti
Calcium	T-Ca	Uranium	T-U
Chromium	T-Cr	Vanadium	T-V

Table 5. Water Quality Analytical Parameters

Conventional Parameters		Major Ions	
Water Temperature		Sulphate	
Conductivity		Magnesium	T-Mg
Dissolved Oxygen		Calcium	T-Ca
		Sodium	T-Na
pH		Potassium	T-K
Alkalinity		Nutrients / Organics	
Total Inflection Point (Gran) Alkalinity		Ammonia Nitrogen (low level)	
Total Hardness		Total Kjeldahl Nitrogen	
Total Dissolved Solids		Nitrate + Nitrite	
Total Suspended Solids		Total Phosphate	
Turbidity		Ortho-phosphate	
ORP		Total Organic Carbon	
Cyanides		Dissolved Organic Carbon	
Total Cyanide			
Total Metals by ICP-MS		Dissolved Metals by ICP-MS	
Aluminum	T-Al	Aluminum	D-Al
Antimony	T-Sb	Antimony	D-Sb
Arsenic	T-As	Arsenic	D-As
Barium	T-Ba	Barium	D-Ba
Beryllium	T-Be	Beryllium	D-Be
Bismuth	T- Bi	Bismuth	D-Bi
Boron	T-Bo	Boron	D-Bo
Cadmium	T-Cd	Cadmium	D-Cd
Chromium	T-Cr	Chromium	D-Cr
Cobalt	T-Co	Cobalt	D-Co
Copper	T-Cu	Copper	D-Cu
Iron	T-Fe	Iron	D-Fe
Lead	T-Pb	Lead	D-Pb
Lithium	T-Li	Lithium	D-Li
Manganese	T-Mn	Manganese	D-Mn
Mercury	T-Hg	Mercury	D-Hg
Molybdenum	T-Mo	Molybdenum	D-Mo
Nickel	T-Ni	Nickel	D-Ni
Selenium	T-Se	Selenium	D-Se
Silver	T-Ag	Silver	D-Ag
Strontium	T-St	Strontium	D-St
Thallium	T-Tl	Thallium	D-Tl
Tin	T-Sn	Tin	D-Sn
Titanium	T-Ti	Titanium	D-Ti
Uranium	T-U	Uranium	D-U
Vanadium	T-V	Vanadium	D-V
Zinc	T-Zn	Zinc	D-Zn

With respect to the roads, no baseline water/sediment quality work has been undertaken, as the specific routes have not yet been identified.

Quality assurance/quality control protocols are a necessary component to any environmental sampling program. Three types of quality assurance sampling were collected: trip blanks, field blanks and replicate samples. Trip and field blanks are used to test for possible contamination of water samples, and replicate samples are collected to verify sampling variability and analytical precision. Blanks and duplicate samples were collected at a frequency of 5 to 10% of the total number of water samples. For sediment samples, at each project site (High Lake, Ulu and proposed dock and loading facilities location), a duplicate sediment sample was collected and one composite sample will be split and submitted for analysis as two separate samples.

9. Marine Fish, Fish Habitat and Aquatics

The summer 2004 Marine Fish program focused on documenting species type and presence, abundance and the general overall habitat near the proposed dock and loading facilities site and the alternate dock and loading facilities site. These data will allow for future planning of the dock and loading facilities location and design of the facilities and appropriate mitigation measures. For example, the dock structure (both loader and cargo) may affect the on-shore communities, both during construction and operation phases.

Data were collected in late August 2004. Laboratory analysis will follow within the same year, with some components being sent out to labs. Sediment sampling, water quality and any marine mammal work were coordinated with this program.

The objectives of the 2004 field survey were:

- to gain a better understanding of the intertidal fauna prior to any shoreline disturbance during construction;
- to gain a better understanding of the type and number of primary producers (important part of the food chain) within the Gulf;
- to establish baseline data on the benthic communities present, particularly for sensitive species close to the potential dock and loading facilities site; and
- to determine marine fish species present in the Grays Bay area and to identify those that might be culturally sensitive or part of a food fishery.

Marine field surveys were conducted late August 2004 in the vicinity of proposed dock and loading facilities sites. Efforts were concentrated around the "most preferred" potential dock and loading

facilities site 2, but sampling activities extended from dock and loading facilities site 1 to dock and loading facilities site 4 (Figure 1). Survey activities included zooplankton, benthic, and sediment sampling; intertidal surveys; and fishing.

Vertical zooplankton samples were collected by towing a 5 micron mesh net through the water column. Typically zooplankton was sampled in conjunction with and before benthic and sediment samples were gathered. Table 6 presents a list of depth and locations of samples.

Table 6. Marine Fisheries Sample Depth and Locations

Vicinity	Depth (meters)	# of tows
Potential Dock and Loading Facilities Site 1	8.6	3
Potential Dock and Loading Facilities Site 1	25	5
Potential Dock and Loading Facilities Site 2	30	3
Potential Dock and Loading Facilities Site 2	15	4
Potential Dock and Loading Facilities Site 2	10	3
Potential Dock and Loading Facilities Site 2	24	2
Potential Dock and Loading Facilities Site 3	6	3
Potential Dock and Loading Facilities Site 3	22	2
Potential Dock and Loading Facilities Site 4	20	2
Potential Dock and Loading Facilities Site 4	6.5	4
Kennarctic River	2	7
Kennarctic River	24	2
Between the Kennarctic River and Dock and Loading Facilities Site 2	14	3

Benthic and sediment samples were collected using an Ekman grab sampler. Three replicates were gathered at each sample location.

No minus tides occurred in the study area during the survey. The greatest tidal variance was estimated to be approximately 0.5 meters during the sampling period. A total of twelve intertidal surveys were conducted in the study area. Five intertidal surveys were conducted in the vicinity of potential dock and loading facilities site 2; two were conducted near dock and loading facilities sites 1, 3 and 4; and one was located near the mouth of the Kennarctic River.

A variable mesh gillnet was fished 27 times throughout the sample area for approximately one-hour long sets. A total of 75 fish were caught and released. Fish captured included Arctic cisco, Arctic char, Pacific cod, and lake trout.

10. Freshwater Fish, Fish Habitat and Aquatics

Mine development can affect the aquatic resources of an area in many ways. The most common changes are often related to the direct footprint of the mine and associated infrastructure as well as water usage and wastewater creation and deposition in the environment. Aquatic studies are required to identify the aquatic resources in the project area, the location of particularly critical or sensitive areas and the linkages between water (quality and quantity) and the aquatic resources.

The objective of the fisheries studies is to collect sufficient baseline information to:

- identify species and life history characteristics of fish in the project area;
- identify any threatened, rare or endangered species as required under the federal *Species at Risk Act* and their associated habitat requirements;
- identify sensitive or critical habitats within the project area including the location and quantity of habitat used by each life stage and species (spawning, rearing and over wintering);
- estimate the productivity/biomass of primary and secondary producers and fish in the lakes, streams and rivers in the project area;
- characterize fish health in the area, including the existing contaminant loadings (i.e., metals in fish tissue);
- confirm drainage patterns – i.e., ground truth map information; and
- begin to understand the migratory patterns of fish in the area (this will take more than one year).

In 2004, the detailed field studies focused on the proposed High Lake and Ulu mine sites and associated mine infrastructure and included the collection of general baseline information required to complete the "alternatives assessment" for tailings and waste rock disposal sites. The general field program conducted in 2004 included investigation of 31 lakes, 40 streams and 5 sites on the Kennarctic River within the High Lake area, along with compilation of 17 lake bathymetric maps. In addition, three lakes in the Ulu area were assessed.

For each lake, the following data were obtained:

- fish presence and distribution, including gill netting (12 panel nets ranging from 5-55mm stretch mesh), angling, electrofishing and minnow trapping for fish capture under DFO permit number SLE-04/05-21; and
- fish habitat, including quantifying and qualifying fish habitat, shoal areas, substrate types and depth with an Aquaview underwater camera.

In addition, visual spawning surveys were carried out at dusk on four lakes using both a spotlight and an Atlantis underwater camera. Limnological studies were carried out at 18 sites and included bathymetric surveys completed with a Garmen depth sounder/GPS unit, dissolved oxygen and water temperature profiles, Secchi disk measurement, euphotic zone composite sample for chlorophyll and algal taxonomy,

zooplankton sampling using a Wisconsin net from 1 m off bottom, a vertical profile of water quality using the Hydrolab Datasonde 4a, and a littoral kick and sweep sample for benthic invertebrates.

For each river or stream, the following data were obtained:

- Fish presence and distribution, including gill netting (12 panel nets ranging from 5-55mm stretch mesh), angling, electrofishing and minnow trapping for fish capture under DFO permit number SLE-04/05-21; and
- Fish habitat, including determining flow characteristics, channel type, substrate, quantity and quality of fish habitat using standard techniques for inventory of stream habitat (Department of Fisheries and Oceans. 1989).

In addition, sediment and periphyton samples were collected from four sites on the Kennarctic River. For consistency and efficiency, freshwater fisheries stream and lake benthic sampling sites were coordinated with sediment and water quality sampling sites where feasible.

Arctic char (*Salvelinus alpinus*), lake trout (*Salvelinus namaycush*) and slimy sculpins (*Cottus cognatus*) were the only fish species captured in the study area. All fish were identified and length and weight data was collected. A representative sample of trout and char (less than 200) was sacrificed for stomach contents analysis, otolith and scale collection for age determination, and dorsal muscle and liver collection for metals and isotope analysis. Slimy sculpins were identified and returned to the water alive.

11. Marine Mammals

Wolfden Resources Inc., intends to develop dock and loading facilities in Grays Bay, Coronation Gulf, and to ship ore concentrate from there to Europe, North America, or the Orient. Thus, either eastern or western arctic shipping routes, or both, may be used. Shipping will be carried out only during the ice-free months of the year. Dock and loading facilities construction and stockpiling of ore concentrate at the dock and loading facilities will occur during the winter and spring when the landfast ice occurs in the area.

In summer, a number of marine mammal species may be present in the Coronation Gulf and along shipping routes to the east and the west. Noise from project activities, including the construction and operations phases, may disturb marine mammals.

A considerable amount of information is available on the distribution of marine mammals along parts of the shipping routes, from the Beaufort Sea to the west and Barrow Straight, Lancaster Sound, and Baffin Bay to the east. Much of the information is from studies carried out by LGL Limited in the eastern Arctic in the 1970s and in the Beaufort Sea from the 1980s to the present. Little or no information is available for the parts of the shipping route in between. Surveys in those areas are required as part of the impact assessment process.

Two of the six populations of beluga in the Canadian Arctic summer in the study area; the Beaufort Sea and high arctic stocks (Davis and Finley 1979; Finley *et al.* 1987). During the early open water period, belugas concentrate in large herds of several thousand animals in a few shallow estuaries (Finley 1976; Smith *et al.* 1985). A concentration of about 2,000 narwhal may summer in Peel Sound (Finley and Johnson 1977; Smith *et al.* 1985). A few bowheads from the Davis Strait stock occur in the Peel Sound/Franklin Strait area and in Barrow Strait (Davis and Koski 1980; Davis *et al.* 1980). Bowheads from the Bering Sea stock occupy areas off the Bathurst Peninsula and Amundsen Gulf early in the open-water period, and gradually extend their range westward to include areas off the Tuktoyaktuk Peninsula, usually by late July or early August (Davis *et al.* 1982). Pinnipeds that may be encountered are the ringed seal, bearded seal, walrus, and, in parts of the eastern shipping route, harp seals.

Both shipping routes are being considered and studied, as environmental constraints will be considered for final route decision. In 2004, spring and fall marine mammal surveys were conducted in areas along the shipping routes where there are few or no previous data available. Those areas include the Dolphin and Union Strait, Coronation Gulf, Dease Strait, Queen Maude Gulf, Victoria Strait, Rasmussen Basin and the straits and passages to the south and east of King William Island, Larsen Sound, Franklin Strait, and Peel Sound. August surveys were postponed till 2005.

Noise from project activities, including the construction and operations phases, may disturb marine mammals. The surveys described here were required because of the complete lack of knowledge of the distribution of marine mammals near the mine and in the central part of the shipping routes, i.e., those areas listed above.

Final decisions on the dock and loading facilities location and shipping route may require additional work in summer 2005. Any such studies would be focused on particular areas of interest because of those decisions or concentrations of marine mammals observed in 2004. As noted above, there is considerable information available, including government studies and consultant's reports on marine mammal distribution in the Beaufort Sea and the eastern High Arctic.

Marine mammals surveys were carried out using strip transect methodology. Surveys were flown at an altitude of 91 m (300 ft) above sea level at a ground speed of 220 km/h (~120 knots), either along the coast or in grids offshore. For each marine mammal sighting, the observer dictated onto audiotape the species, number, and behaviour of the marine mammal(s), and noted whether the sighting was on or off transect.

Aerial surveys for marine mammals (primarily whales) were conducted during the period 1-19 September 2004. Survey coverage extended from Amundsen Gulf, east to Peel Sound in the central High Arctic. Areas surveyed included eastern Amundsen Gulf, Dolphin and Union Strait, Coronation Gulf, Grays Bay, Bathurst Inlet, Melville Sound, Dease Strait, Queen Maud Gulf, Albert Edward Bay, Victoria Strait, M'Clintock Channel, Rasmussen Basin, St. Roch Basin, Larsen Sound, Franklin Strait, and Peel Sound.

Belugas (white whales) were the only whales observed. Those were encountered in eastern Amundsen Gulf, Dolphin and Union Strait, and Peel Sound. None were seen between Dolphin and Union Strait and Peel Sound. There were no sightings of bowhead whales, narwhals, or other species of whales. Ringed and bearded seals were seen in small numbers throughout the study area, and there were two sightings of polar bears.

12. Wildlife and Terrestrial Wildlife Habitat

Wildlife resources are important to the communities in the regional vicinity of the proposed High Lake Project, both for subsistence hunting and economic opportunities. Baseline environmental studies and assessment for the Project therefore necessitates a detailed understanding of the species potentially impacted by the Project. The purpose of the 2004 wildlife programs was to ensure sufficient information is available to document the regional setting and the potential impacts of the Project on the following ecological parameters:

- local and regional occurrence of species and populations;
- relative seasonal abundance and distribution of wildlife species/populations;
- seasonal range or habitat use, movements, and population status of wildlife; and
- significant wildlife habitats, such as eskers, denning sites and other valued habitat units.

A considerable amount of useful information is available for wildlife and wildlife habitat within the Kitikmeot region of Nunavut. Information sources include research conducted by government and other agencies (e.g., West Kitikmeot Slave Study, EMAN-North, peer-reviewed scientific literature), and baseline studies and environmental assessments for other projects within the region (e.g., Doris North Mine, proposed Ulu Mine). These information sources have been consulted when preparing the field programs and will be used in conjunction with the results of field investigations. Our field programs in many cases were designed not to replace existing data, but to confirm existing knowledge gained through other sources.

The wildlife biologists leading the research programs worked closely with the ecosystem and vegetation-mapping team to design field sampling protocols that aim to evaluate seasonal habitat value of ecosystem and vegetation units encountered within the local and regional study area. The following programs were completed in summer and fall 2004.

Ungulate Aerial Surveys

A significant amount of research undertaken by the wildlife authorities of the Territorial Governments is available for barren ground caribou (*Rangifer tarandus groenlandicus*) herds in the general area (Photo 5). Previous work indicates that the Bathurst Caribou Herd (BCH; population ~186,000), and Dolphin-Union Herd (DU Herd; population ~28,000) may be seasonally present in the region. Muskoxen (*Ovibos*

moschatus) and moose (*Alces alces*) are also known to occur with the general area throughout the year. While moose are common south of treeline, densities on the tundra are very low. Muskoxen populations in the Arctic are comprised primarily of island populations (especially Banks and Victoria Islands); the total mainland population is estimated at 14,000 animals.

The distribution and migration patterns of the BCH can be summarized as follows: The herd winters outside the region in forested areas of the southern Northwest Territories, and migrates in the early spring to the calving grounds near Bathurst Inlet. Calving takes place in May and early June, and caribou may be found within the region in summer. By September the BCH tends to have begun their migration southwest out of the general area, and the rut takes place in September and October closer to the wintering area. The timing of each season is subject to interpretation of the monitoring data and seasonal variation.

The Dolphin-Union Caribou Herd (DU Herd) was formerly considered part of the Peary caribou herd, and may occur in the general area. The DU Herd is found on Victoria Island during the summer and rutting season, and migrates to the mainland when the channel between Victoria Island and the mainland freezes. The DU Herd winters on the mainland, and at this time some caribou within the herd may occur in the regional study area. The DU Herd returns to Victoria Island in late winter or early spring where calving takes place.

Surveys undertaken by Gartner Lee were designed to confirm the expected distribution and occurrence of the BCH and DU Herds in the general area, and identify occurrence, and relative abundance of muskoxen and moose. Ungulate Aerial Surveys are planned to take place five times during the calendar year. The timing of the surveys considers migratory behaviour and changes in distribution that reflect caribou life history of the BCH and DU herds. To date four surveys have take place. These include:

- Pre Calving (1 May – 31 May) — Survey completed May 22 to 23, 2004
- Calving (1 June – 15 June) — Survey completed June 9 to 18, 2004
- Post Calving and Summer (July – August) — Survey completed August 17 to 21, 2004
- Rutting Season (September 15 – October 31) — Survey completed October 15 to 18, 2004
- Winter Season (1 November – 30 April) — Survey scheduled for 1st Quarter 2005

The ungulate surveys encompassed the project area (Figure 1) within the road corridor from south of Ulu to the Coronation Gulf, and the general area, approximately 120 kilometres east and west of the High Lake site. Systematic transects were flown throughout the project specific and general areas, using a stratified random sampling technique. Surveys were completed using a Cessna 185 aircraft flying at an altitude of 150m and maximum speed of 160 km/hr, with a complete survey totalling over 2,500 kilometres flown along transects. Animals were counted and recorded both on and off transects 500 metre on either side of the aircraft. Caribou observed were classified as antlered cows, calves, antlerless caribou, juveniles, or bulls, based on appearance of antlers (females have light and males have dark coloured antlers in spring) and body size. Muskoxen and moose were classified simply as adults and calves. Other species noted during the surveys included grizzly bears, ptarmigan, red fox, and wolverine.

Several grizzly bear (*Ursus arctos*) dens were also observed (incidentally) and locations marked during the ungulate surveys.

Carnivore and Furbearer Tracking Surveys

Carnivores occurring in the general area include wolverine (*Gulo gulo*), arctic fox (*Alopex lagopus*), red fox (*Vulpes vulpes*), and grizzly bear (Photo 6). In May 2004, tracking surveys took place aimed at documenting the presence of carnivores and other furbearers (primarily mustelids and arctic hare (*Lepus arcticus*)). Snow tracking took place using paired transects, with one starting near the Ulu and High Lake sites, and the second located farther away from the potential mine sites. Sign from carnivores and other furbearers such as tracks, evidence of winter nests, and dens were recorded. To document grizzly bear den locations, a bear denning and emergence survey is planned for spring 2005.

Ground Transect Surveys

Ground transect surveys provide information on habitat characteristics and was integrated with the vegetation and soil surveys. Transect surveys took place in August 2004. Ground transect methods were used to record sign such as tracks, evidence of winter small mammal activity, scat, and dens from all species. Approximately 200 transects were documented at the same sites as vegetation and soil survey sites for an integrated habitat characterization.

Small Mammal Abundance Survey

Producing density estimates for small and medium-sized herbivores will play an important part of an ecosystem-based approach to environmental assessment, as these species are a key influence in the trophic dynamics of the arctic ecosystem. Small mammal live trapping surveys were completed during the summer of 2004 to document occurrence and relative abundance of small mammals, among representative habitat types between the High Lake and Ulu camp locations.

Survey methods consisted of live trapping individual animals through a 3-trap night program. At each of 10 representative habitat types, a 200 metre transect was set, with 20 Longworth live traps set at 10 metre intervals. Traps were deployed August 26, 2004 and retrieved August 29, 2004. Preliminary results confirm the presence of small mammals including redback voles (*Clethrionomys rutilus*) and meadow voles (*Microtus pennsylvanicus*). Use by Arctic ground squirrels (*Spermophilus parryii*) was observed in all habitat types. No lemmings were captured during the 2004 trapping session.

Raptor Nest Surveys

To document distribution and characteristics of active breeding territories of all raptor species, a series of aerial and ground surveys were conducted in July 2004 (Photo 7). Nests surveys were conducted by helicopter at a speed of 05-130 km/h by two observers looking for any signs of active nests: adults flushed from cliff, actual platforms, whitewash, and orange lichen growth on rocks. Nesting raptors were

located in all parts of the study areas and extra effort was expended to get a solid appreciation of their distribution and abundance.

One Peregrine Falcon nest (of ten territories/nests in total) was located near the High Lake site, among 27 occupied territories or confirmed nests for the four key species in the general area.

Waterfowl and Loons Surveys

In July, a lake survey for loons and waterfowl was adapted to a visual survey, primarily during other operations. This was selected as the best approach as a variety of biophysical conditions (i.e., elevation, lack of wetlands, oligotrophic lake conditions and latitude) meant that this area was particularly unproductive for waterbirds (at least away from the coast). At the coast, two surveys were undertaken in the general area of Grays Bay (where concentrations of loons and waterfowl were noted) and one at each proposed dock and loading facilities site.

Shorebird and Songbird Surveys

In July, stratified random breeding bird survey transects were completed in all breeding bird habitat types, at both proposed mine sites, along general road route corridors, and at each potential dock and loading facilities site. In total, over 150 transects (of 400 m by 100 m) were completed by the field crew. Forty-four bird species were recorded in total. These data can be used to help predict typical breeding bird communities in both the local and regional study areas.

13. Archaeological Resources

In Nunavut, the Nunavut Archaeological Sites Regulations governs the conduct of archaeological research and the protection of archaeological sites and artifacts. In 2004, Points West Heritage Consulting Ltd. in association with Gartner Lee Limited conducted archaeological investigations for Wolfden Resources Inc. south of Grays Bay in the Coronation Gulf (Nunavut Archaeologist Permit 04-04A). This work was conducted through Gartner Lee Limited and involved two proposed mine sites, one at Ulu and one at High Lake, as well as possible road routes connecting the two mines and linking the more northerly High Lake with Grays Bay (Figure 1).

The objectives were to determine the archaeological potential of proposed development areas and to locate and record archaeological sites in selected areas. These objectives were achieved through a combination of aerial reconnaissance and ground examination, in conjunction with terrain assessment, background research and previous experience. Emphasis was placed on portions of the study area in which developments were well defined and where moderate to high archaeological potential was suggested. A second field trip was conducted later in the summer to ensure that geotechnical drill sites did not affect archaeological features. No artifacts were collected during the 2004 field investigations, which were conducted under a Class 2 Nunavut Archaeologists permit.

The Ulu mine study area was intensively examined previously and therefore only limited portions were assessed in 2004. No archaeological resources were encountered. The proposed winter road connecting the Ulu and High Lakes study areas was examined primarily from the air because the route is tentative, but ground reconnaissance resulted in the discovery of five new archaeological sites. Four sites contain one or two stone features and one site is a lithic scatter, a location with unworked flakes evident on the surface.

The entire High Lake study area was subjected to relatively intensive helicopter reconnaissance, but ground reconnaissance was limited to the highest potential portion of the primary area of development and two of the three potential airstrip locations. A single archaeological site consisting of a rock cache was discovered and recorded. There are higher potential landforms in the larger study area, but no specific development was identified in such areas prior to the 2004 archaeological field investigations.

Aerial reconnaissance was undertaken of a proposed all-weather road route between High Lake and the most westerly dock and loading facilities option on Grays Bay. Two locations suggestive of high archaeological potential were examined on the ground and one new archaeological site was discovered, a lithic scatter consisting of a few white chert flakes. Archaeological potential along the road route ranges from low to high, but a more defined route that can be identified on the ground is necessary before detailed ground reconnaissance can be conducted. The other two road routes to identified dock and loading facilities options were not examined due to the preliminary stage of planning although the northern portion of one was traversed as part of the geotechnical assessment.

Aerial reconnaissance of four potential dock and loading facilities locations was undertaken, but ground reconnaissance was restricted to the first three since the fourth location was very tentative

Thirteen new archaeological sites, consisting of over 80 archaeological features, were recorded during the July field investigations. The field investigations in 2004 have provided significant information on the archaeological potential of the High Lake regional study area as well as identifying specific archaeological resources within possible development areas. Additional preliminary and ground reconnaissance will be required regardless of the road route(s) and dock and loading facilities selected, but finalized development locations need to be identified prior to further detailed archaeological investigation.

14. Literature Cited

Davis, R.A. and K.J. Finley. 1979. Distributions, migrations, abundance and stock identity of eastern arctic white whales. Rep. Int. Whal. Comm. IWC Doc. SC/31/Sm10.

Davis, R.A. and W.R. Koski. 1980. Recent observations of the bowhead whale in the eastern Canadian High Arctic. Rep. Int. Whal. Comm. 30:439-444.

Davis, R.A., K.J. Finley and W.J. Richardson. 1980. The present status and future management of arctic marine mammals. Science Advisory Board of the Northwest Territories Report No. 3. Department of Information, Government of the Northwest Territories, Yellowknife, N.W.T. 93 p.

Davis, R.A., W.R. Koski, W.J. Richardson, C.R. Evans and W.G. Alliston. 1982. Distribution, numbers and productivity of the western arctic stock of bowhead whales in the eastern Beaufort Sea and Amundsen Gulf, summer 1981. Rep. by LGL Limited, Toronto, ON, for Sohio, Alaska Petroleum Company *et al.*, Anchorage, AK. 134 p.

Department of Fisheries and Oceans. 1989. Stream Survey Field Guide. Fish Habitat Inventory and Information Program. Vancouver, BC.

Finley, K.J. 1976. Studies of the status of marine mammals in the central District of Franklin, N.W.T. June - August, 1975. Rep. by LGL Limited, Toronto, ON, for Polar Gas Project, Toronto, ON. 183 p.

Finley, K.J. and W.G. Johnston. 1977. An investigation of the distribution of marine mammals in the vicinity of Somerset Island with emphasis on Bellot Strait, August -September 1976. Rep. by LGL Limited, Toronto, ON, for Polar Gas Project, Toronto, ON. 91 p.

Finley, K.J., J.P. Hickie and R.A. Davis. 1987. Status of the beluga, *Delphinapterus leucas*, in the Beaufort Sea. Can. Field Nat. 101:271-278.

Smith, T.G., M.O. Hammill, D.J. Burrage and G.A. Sleno. 1985. Distribution and abundance of belugas, *Delphinapterus leucas*, and narwhals, *Monodon monoceros*, in the Canadian high Arctic. Can. J. Fish. Aquat. Sci. 42:676-684.

Appendix A

Baseline Program Field Photographs

Appendix A. Baseline Program Field Photographs

Photo 1. Reconnaissance team site visit; photo taken in June 2004.

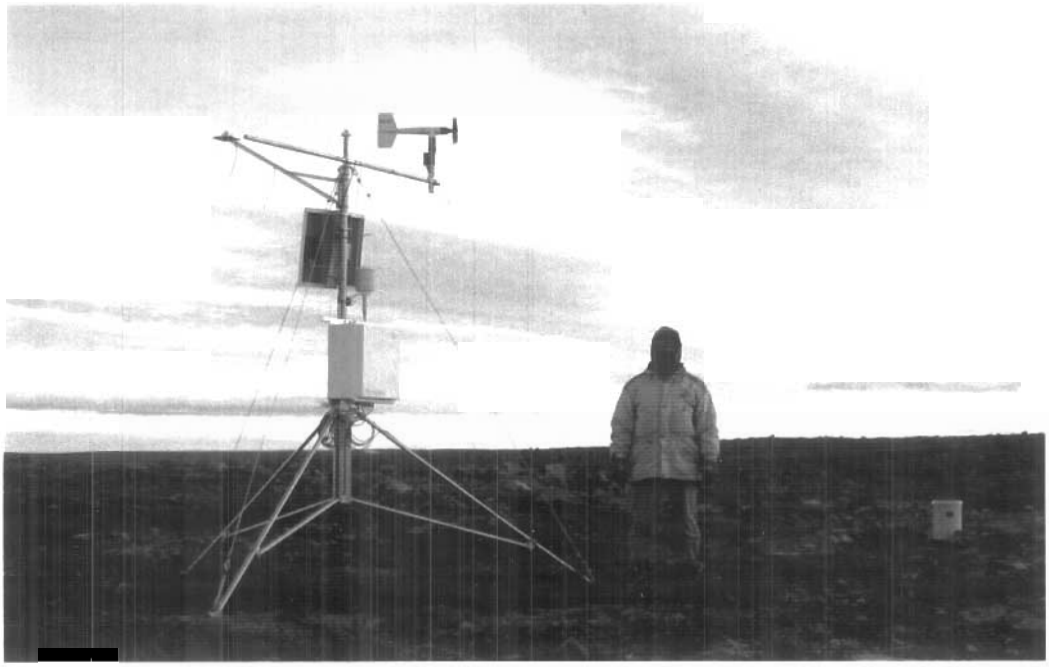


Photo 2. Climate station installed at Ulu Camp.

Photo 3. Vegetation, soil and wildlife team working at the same site selected for terrain and ecosystem classification.

Photo 4. Hydrology and water sediment programs team at work at Ulu in June 2004.

Photo 5. Bull caribou observed during July 2004 vegetation surveys.

Photo 6. Grizzly bear track observed near Grays Bay.

Photo 7. Collection of raptor nest data.